Epidemics and public health policy in New South Wales

John W. Ross

Cover photograph:

Medical staff at the Riley Street Depot, Surry Hills, during the Spanish Influenza epidemic, 1919
(State Archives of New South Wales)

“Smallpox was the most terrible of all the ministers of death”.

British historian Thomas Babington Macaulay.

“Considerable doubt exists whether the disease [smallpox] was brought here by the Chinese…we have far more to fear from our own countrymen than from the Chinese”

Sydney Morning Herald, 10 February 1882.

Health advice during the Asiatic influenza epidemic (*Australian Star*, 14 April 1890)

“The greatest blessing that ever came to Sydney, from the standpoint of the future welfare of the city, was the bubonic plague”.

Sydney Town Clerk Sir Robert Murray, 1901.

“Slumless, laneless and publess”

Marketing slogan for Haberfield model suburb, 1901.

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Foreword

In the early years of the Australian colonies, illnesses were treated privately by doctors or in the few public hospitals. Public health policy in the modern sense did not exist in those days. Medical knowledge was primitive by today's standards and was held back by outdated theories of disease transmission and the lack of effective medicines.

For a long time, Australians assumed that their great distance from the frequent epidemics of infectious diseases in Europe and Asia would be an effective barrier to those diseases. But a serious cholera epidemic in Europe in the 1830s led to the first quarantine policy in New South Wales and the establishment of the Quarantine Station at North Head. This was the first time the Government had involved itself in public health policy. The Station went on to play a major role in managing the spread of the infectious disease epidemics that eventually found their way to Sydney.

The first serious epidemics in Sydney, measles in the 1860s and scarlet fever in the 1870s, generated little public health response. They were fairly well-known, affected mainly young children, and were not feared as much as other more deadly diseases. However, the scarlet fever epidemic did result in the first official effort to explain its cause and transmission, and attention was given for the first time to cleanliness and sanitation in the community. Government involvement in public health was slowly increasing by this time.

The arrival of smallpox in 1881 was the first experience of one of the most feared deadly diseases that had ravaged Europe and Asia for centuries. The government's response to the community alarm was dramatic and resulted in the first concrete public health measures taken in New South Wales: compulsory notification of infectious diseases and the establishment of a Board of Health, an infectious diseases hospital and a dedicated ambulance service.

The last great epidemic of the nineteenth century was Asiatic influenza in 1890-91. This epidemic demonstrated that the measures adopted in 1881 such as isolation, quarantine and formal cleansing were ineffective for such a highly contagious disease. Instead, authorities focused on a public education campaign, encouraging the population to take responsibility for protesting their own health in public.

In 1900, Sydney was visited by bubonic plague, possibly the most feared disease of all, brought by infected fleas on rats leaving ships arriving in Sydney Harbour. While there were only about 300 cases and 100 deaths, the panic in Sydney was massive, as was the official response by municipal and State Government health departments who launched into a furious campaign of cleansing, disinfecting and rat extermination. Significant reforms came out of what was a fairly small outbreak, such as renewal of dilapidated and unsanitary housing, serious planning for a better urban environment, and a Sydney Harbour Trust to administer the badly planned harbourside facilities that allowed the plague to take hold.

The pneumonic influenza pandemic of 1919 is the final infectious disease outbreak examined in this study. It was undoubtedly the worst, with almost 4,000 Sydneysiders dying in a nine-month period following the return of the Anzacs from World War I, in which almost 62,000 Australian soldiers died. The main public health outcome of this catastrophe was to bring quarantine and inoculation services under the control of the Commonwealth Government.

The modern era has benefited greatly from the gradual evolution of public health services in New South Wales since the colonial era. This derives partly from a better understanding of infectious diseases and their transmission, but also from more effective drugs and a wide range of vaccinations. While the Covid-19 pandemic of recent memory took a serious human and economic toll on this country and the wider world, it did not attract the same degree of panic and hysteria that was commonly experienced during earlier pandemics.

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Early epidemics

Acknowledgement of country

The author acknowledges the Gadigal people of the Eora nation upon whose ancestral lands Sydney is now located. He would also like to pay respect to the Elders both past, present and emerging, acknowledging them as the traditional custodians of knowledge for these lands.

Infectious disease outbreaks

The greatest natural disasters of all time have been epidemics of infectious diseases such as bubonic plague, smallpox, cholera, influenza and yellow fever. Periodic outbreaks of these diseases took a fearful toll on human life. The sheer magnitude of casualties from epidemic disease is staggering and makes mortality from all other causes pale into insignificance by comparison. In Europe during the fourteenth century, bubonic plague caused some 25 million deaths out of a total population of about 100 million[1], and in the turbulent period between 1910 and 1921 when war (World War 1), revolution (Russia 1917, Mexico 1910-21) and massacres (Armenia 1915-16) accounted for about 11.4 million deaths, disease epidemics carried off between 23 and 26 million[2].

In the nineteenth century, death and disease were conspicuous and frequent companions of everyday life. Unlike our own society where death and disease have largely become confined to the elderly and infirm, earlier societies had to incorporate death and disease into their everyday frame of living. Throughout most of the century, epidemic diseases were called zymotic diseases. This is from the Greek zymos meaning fermentation, when people believed that such diseases originated from the fermentation of the body's tissues produced by some external stimuli[3].

Bubonic plague

Bubonic plague is a bacterial infection that appears one to seven days after exposure to the bacterium Yersinia pestis when flu-like symptoms develop[4]. There are three types of plague, each one the result of the route of infection: bubonic plague, septicaemic plague and pneumonic plague. The first is mainly spread by infected fleas from small animals. Several antibiotics are effective in treatment.

Figure 1 Venetian plague doctor (World History Encyclopedia)

Without treatment, plague causes death in 30% to 90% of those infected, which typically occurs within ten days[5]. The plague is considered the likely cause of the Black Death that swept through

Asia, Europe and Africa in the fourteenth century and killed an estimated 50 million people[6]. The best-known symptom of bubonic plague is one or more infected, enlarged and painful lymph nodes, known as buboes, commonly found in the armpits, upper femoral area, groin and back region.

The first recorded pandemic of plague was named the Plague of Justinian (541-549 AD) after Emperor Justinian I in the Byzantine Empire. The pandemic killed some 25 million in the sixth century outbreak and up to 50 million in two centuries of recurrence[7]. The plague followed supply lines created by Justinian, who acquired luxurious goods of the time and exported supplies, making the capital Constantinople the leading exporter of the bubonic plague.

The second pandemic in the Late Middle Ages (lasting roughly six years from 1346 to 1352), put a deadly halt to medieval society's increasing population. It was later dubbed the Black Death (the name deriving from the blackening of hands and feet when gangrene sets in). The disease claimed one-third of Europe's human population, with mortality rates as high as 70-80%[8].

Some historians believe that society subsequently became more violent as the mass mortality rate cheapened life and so increased warfare, crime, popular revolt and persecution[9]. The Black Death originated in Central Asia and spread to Italy and then throughout other European countries. Chinese records show a huge outbreak in Mongolia in the early 1330s[10].

The scale of death and social upheaval caused by plague has made the topic prominent in historical accounts since its first recognition. It was described in numerous contemporary sources, including works by Chaucer, Boccaccio and Petrarch. Boccaccio's *Decameron* is based around a story of individuals who flee Florence for a secluded villa to escape the Black Death.

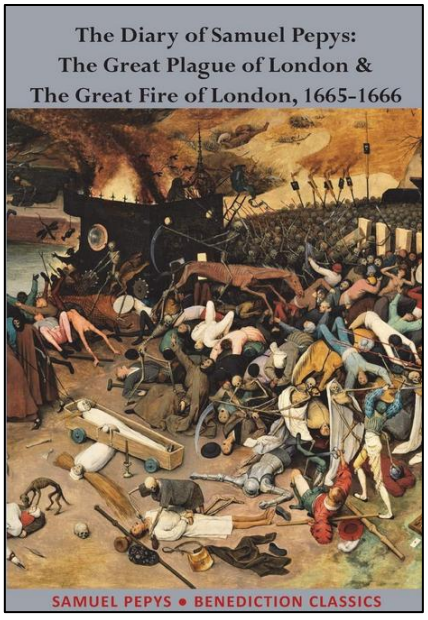


Figure 2 The Great Plague of London (Samuel Pepys diary)

Samuel Pepys's diary makes several references to his first-hand experience of the Great Plague of London in 1665-66[11]. Later works, such as Albert Camus's novel *The Plague* and Ingmar Bergman's film *The Seventh Seal* have used bubonic plague in settings as a backdrop to explore the breakdown of society, institutions and individuals during the times of plague.

Bubonic plague is still with us: globally there were 3,248 documented cases resulting in 584 deaths between 2010 and 2015. The countries with the greatest number of cases were the Democratic Republic of Congo, Madagascar and Peru[12]. Between 1,000 and 2,000 cases are conservatively reported to the World Health Organisation each year[13].

Quarantine

Forty days of isolation

The devastation caused by the bubonic plague that spread from Asia to Europe in the fourteenth century led to measures to detect its presence on ships arriving at European ports, in particular Venice, the gateway to the East. A thirty-day isolation period for ships and people was introduced in the 1370s, and in 1448 the Venetian Senate extended the period to forty days. It was known as quarantena, the Venetian form of Italian meaning "forty days", which in English was called quarantine[14].

Other diseases lent themselves to the practice of quarantine. Those affected by leprosy were traditionally isolated long-term from society[15]. Quarantine systems were implemented to prevent the spread of yellow fever in Spain in the early nineteenth century and the arrival of Asiatic cholera in 1831[16].

The 1826-1836 cholera pandemic in Europe and Asia

This outbreak is called the second cholera pandemic (the first was 1817-1824). It reached from India across Western Asia to Europe, Great Britain and the Americas as well as east to China and Japan.

Cholera caused more deaths than any other epidemic disease in the nineteenth century[17], and because of this, many researchers consider it the defining epidemic disease of the century. The medical community now believes that cholera is exclusively a human disease, spread through the many means of travel at the time, and transmitted through warm faecal-contaminated river waters and contaminated foods.

Historians believe that this pandemic began (like the first) with outbreaks along the Ganges Delta in India and from there the disease spread along trade routes to cover most of India. The epidemic slowly travelled westward, reaching Russia by 1829. From there it spread to the rest of Europe, claiming hundreds of thousands of lives[18].

The epidemic eventually reached Great Britain in October 1831[19]. The disease claimed over 5,000 lives in London and about 100,000 deaths in all of France[20]. In 1832, the epidemic reached Canada and then the Pacific coast of the United States by 1834.

North Head Quarantine Station

In the colony of New South Wales, the *Quarantine Act* of 1832 was passed by Governor Sir Ralph Darling in response to the 1828-1838 second cholera epidemic in Europe. The whole of North Head was set aside for quarantine purposes[21] and the Quarantine Station was established in August 1832.

Initially, sick people were housed on board their ship on arrival. But the long detention of the *Lady Macnaghten* in 1837 and subsequent heavy demurrage (a charge on the ship owner for failure to discharge the cargo within the agreed time) led to a change of policy. After that any sick people were taken ashore to the Quarantine Station, while the ship was fumigated and scoured before being

returned to the owner with a minimum of delay. This decision resulted in the construction of permanent accommodation and stores buildings at the Quarantine Station.

One reason for the 1832 legislation was the increasing number of immigrant vessels entering Sydney. In 1831, 34 immigrant ships arrived, which increased to 63 in 1832. From 1832, all ships were required to be screened for disease and quarantined if necessary. Another consideration was the increasing time constraints placed on captains of commercial vessels, necessitating a rapid turnaround in port. Time in quarantine was income lost. The convict ships could be held in Sydney Harbour for the quarantine period with little added expense, but free commercial carriers sought a demurrage charge from the Government for any delays it imposed.

Figure 3 North Head Quarantine Station wharf c1919 (Q Station website)

The downturn in immigration during the economically stagnant 1860s saw the Quarantine Station become run down and unsuitable for quarantine purposes, particularly for first- and second-class passengers. From 1881 to 1894, the smallpox hospital ship *Faraway* was anchored off the Quarantine Station. Then, largely as a result of poor outcomes during the 1881-82 smallpox epidemic, the *Faraway* was upgraded in 1884, after which it was known as the Floating Quarantine Hospital.

The Commonwealth took over responsibility for the Quarantine Station in 1909. When Australian soldiers returning from World War I were quarantined on the *SS Argyllshire* due to concerns about Spanish flu, some attempted to escape, prompting authorities to offer the Quarantine Station as an onshore quarantine site. However, the Station was not prepared, and the soldiers had to clear the land themselves, reportedly killing sixty snakes the first night. Some 900 soldiers marched off the site in protest and were allowed to quarantine at the Sydney Cricket Ground[22]. A local snake wrangler offered to clear the Station of all snakes[23].

The Quarantine Station closed in 1984. From 1828 until that time, at least 580 vessels had been quarantined at the Station. More than 13,000 people were quarantined, of whom an estimated 572 died and were buried there[24]. The separation of passengers at the Station based on social status was most clearly shown by the barrier fences erected between the various class compounds.

Disease transmission

Miasma theory

The miasma theory of disease transmission was advanced by Hippocrates in the fifth century BC[25] and accepted from ancient times in Europe and China. The term miasma comes from ancient Greek and loosely translates as stain or pollution[26]. Miasma was considered to be a poisonous vapour or mist filled with particles from decomposed matter (called miasmata) that caused illnesses.

The theory was that diseases were caused by environmental factors such as contaminated water, bad-smelling air and poor hygienic conditions. Infection was not passed between individuals, but people were affected in the location that gave rise to such vapours. Miasma was identified by its foul smell[27]. The same idea gave rise to the name malaria (literally "bad air") in Medieval Italy.

The miasmatic theory remained popular in the Middle Ages. In the 1850s, miasma was used to explain the spread of cholera in London and Paris and partly justified George-Eugene Haussmann's major renovation of Paris between 1853 and 1870. It was widely believed that cholera was transmitted by air, in particular from a deadly concentration of miasmata near the banks of the River Thames[28], supported by the generally poor air quality in urbanised areas.

Challenging the miasma theory

The London physician John Snow, who was a sceptic of the dominant miasma theory, traced the source of an 1854 cholera outbreak in Soho to a particular public water pump. By talking to local residents during the outbreak, he found that the pump in Broad Street was the source of the infection. But the germ theory of disease had not yet been developed, so Snow did not understand the transmission mechanism for cholera, although his findings showed that it was water-borne and not air-borne.

Snow's discovery persuaded the local council to remove the handle of the pump and has been commonly credited with ending the outbreak (although Snow observed that it was already in decline). He obtained evidence that homes and public wells supplied by a waterworks company taking water from sewage-polluted sections lower down the Thames had a cholera rate fourteen times that of a water company taking water from the cleaner upriver Seething Wells[29].

But after the cholera epidemic subsided, government officials rejected Snow's theory, as accepting his proposal was to indirectly accept the faecal-oral route of disease transmission, which was thought to be too unpleasant for most people to contemplate[30]. It was not until 1866 that the British epidemiologist William Farr, originally an opponent of Snow's theory, realised that Snow had been right while Farr was investigating another cholera outbreak[31].

Germ theory

The germ theory of disease is the currently accepted scientific theory for many diseases. It states that microorganisms, or pathogens, are responsible for diseases rather than airborne vapours. The growth and reproduction of these small organisms within their host can cause disease. The term "germ" refers to many things: bacteria, fungi, parasites and viruses. Diseases caused by pathogens are called infectious diseases. These pathogens are agents that can pass from one individual to another and across multiple forms of life.

The first vaccine, for smallpox, was commonplace in Europe by the early nineteenth century, although doctors did not know how it worked or how to extend the principle to other diseases. The work of Louis Pasteur in the 1850s showed that heating beverages killed the microorganisms that caused spoilage[32]. This was extended by Robert Koch in the 1880s, who discovered the specific causative agents of deadly infectious diseases such as tuberculosis, cholera and anthrax[33].

By the end of that decade, the miasma theory of disease was struggling to compete with the germ theory. Viruses were first discovered in the 1890s, and eventually the era of bacteriology ensued, in which germ theory quickly led to the identification of the actual organisms causing many diseases[34].

Yet by 1900, opinion in Sydney was still divided, and many medical practitioners had not accepted the germ theory of infectious diseases[35].

Smallpox, 1789

A major epidemic raged in Sydney during 1789. Historians suggest it was either smallpox or chicken pox, but there are no clear signs which it was. It was almost entirely confined to the Aboriginal community and drew only confused and sluggish responses from the colonial medical officers. The outbreak was short-lived but exhibited many features that were repeated in later epidemics. Both its nature and origin were unknown, and authorities were unsure how to respond. Its appearance in a group outside the mainstream of society meant that there was little urgent pressure to react immediately.

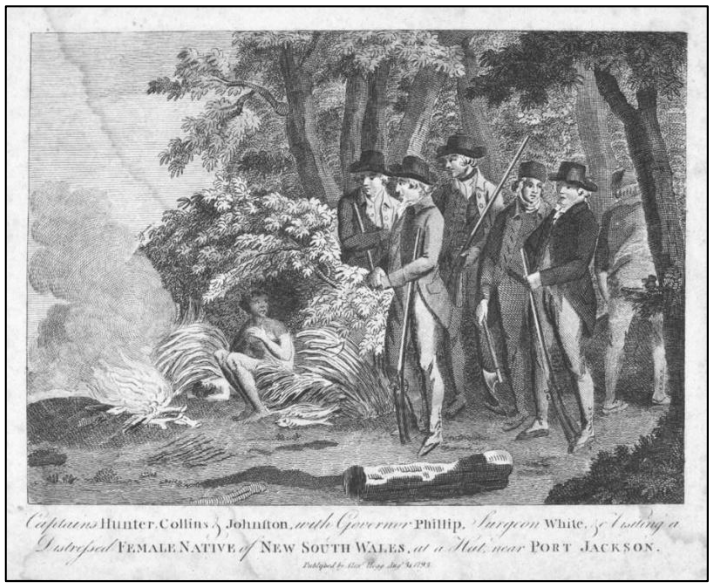


Figure 4 Smallpox in Sydney, 1789 (National Library of Australia)

Because its cause was unknown, the search for its origin soon extended to a search for a scapegoat. For some years afterwards, a theory persisted that French sailors introduced the disease, but they were only in Sydney for a few weeks from January 1788 and were long gone when smallpox appeared in 1789. Even the principal medical officer Thomas Jamison perpetuated this unlikely theory in a newspaper article in 1804[36]. At the time, Britain and France were at war, so there may have been little incentive to be scrupulous about the facts, and this interpretation passed into Australian history.

There is still debate over how smallpox broke out in the Sydney area in 1789, and about whether it was even smallpox or the more common chicken pox. Later news reports of the 1880s smallpox epidemic show that the two diseases were notoriously hard to tell apart in the early stages. The colonists would have sufficient immunity to chicken pox that an outbreak would not have received any real attention.

Modern evidence suggests that the epidemic, if it was smallpox, was caused by the misuse of a bottle or bottles of smallpox variolus matter which had been brought out by surgeon John White on the First fleet for vaccination purposes. This material, accidentally or deliberately, seems to have infected Aboriginal people and unleashed the epidemic[37].

Measles, 1867

A highly contagious virus

The name measles is probably from Middle Dutch or Middle High German meaning “blemish, blood blister”[38]. It is a highly contagious viral disease whose symptoms usually develop ten to twelve days after exposure to an infected person and last seven to ten days[39]. Initial symptoms include fever, cough, runny nose and inflamed eyes[40]. A red, flat rash typically begins three to five days after the start of symptoms, usually starting on the face and spreading to the rest of the body[41].

Measles is an airborne disease which spreads easily from one person to the next through the coughing and sneezing of an infected person[42]. Being extremely contagious, some 90% of those who are not immune and share a living space with an infected person will be infected. People are infectious from four days before symptoms to four days after the start of the rash. It can affect people of any age, although it is often regarded as a childhood disease. Most people do not get measles more than once, and it does not occur in other animals.

Once infected, no specific treatment is available, although supportive care may improve outcomes, such as oral rehydration solution, healthy food and medications to control the fever[43]. The measles vaccine is safe and very effective at preventing the disease. More than 95% of a community must be vaccinated to achieve her immunity. It is one of the leading vaccine-preventable diseases causing death[44].

A common part of childhood

The effect of measles, compared with other more feared diseases, was much more subtle. During the nineteenth and early twentieth century, people tended to be more afraid of scarlet fever and diphtheria, and the merest hint of plague or smallpox was enough to cause considerable panic. But measles was generally accepted as much more commonplace. It was regarded then, as it is today, as a mild disease of infancy, just a short-term nuisance.

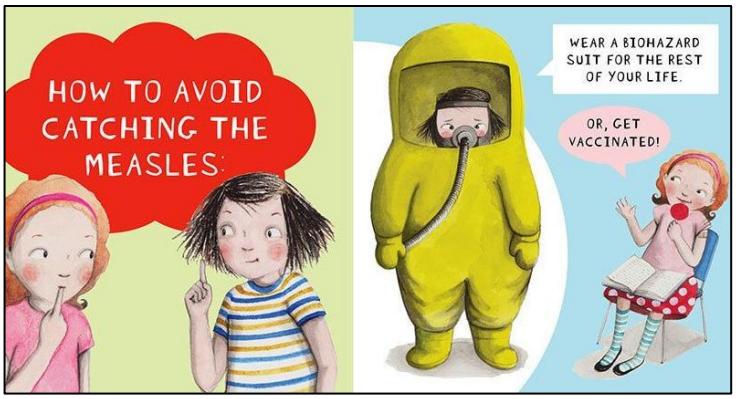


Figure 5 Measles vaccine (North Country Public Radio)

However, to Sydney’s poor who lived in depressed conditions with malnourishment, measles was often much more prolonged and severe, leading to a higher rate of fatality. This also applied when the disease had been unknown for a generation or more, often producing catastrophic results. Among Sydney’s poor children the emaciation associated with an attack of measles had a great

effect on infant mortality, and many deaths occurred from diarrhoea, dysentery and broncho-pneumonia that were triggered by an attack of measles.

The interaction between measles, malnutrition and other infections remained close throughout this period. Unlike in Australia today, when measles tends to peak in children after they start to socialise in pre-school and primary school (ages 3 to 5), in the nineteenth century the infection occurred mainly at home and at ages 1 to 3. While the infection rate was probably high among all social classes in Sydney, it was the families living in marginalised conditions with some degree of protein deficiency and malnutrition that suffered the most severe mortality[45].

The 1867 epidemic

The first death from measles in Sydney was a three-year-old girl in February 1867[46]. In March, a Dr Bell, writing in the *Empire* newspaper, said that "measles presently prevails in the city and suburbs. There have been four or five visitations of measles in the colony in his 26 or 27 years here"[47].

The Sydney Municipal Council Health Officer was then reported in the *Sydney Morning Herald* saying that measles had commenced mildly in Sydney in February, but by March it appeared in a more aggressive form, especially in the more crowded and unhealthy parts of town. He concluded that it was epidemic in the city and had carried off many children[48]. By April, the epidemic was at a severe level as far away as Albury, where almost every family had been visited by the virus. The only public response was to close some schools temporarily[49].

Figure 6 Measles protection (sciencemuseum.org.uk)

By the end of April, *Freeman's Journal* reported that the streets of Sydney "have been crowded with the funerals of young people. It has been several years since measles visited Sydney, and it is more fatal this time". The paper pointed out that measles is generally not fatal, but if in a more virulent form it will bring in its wake other more deadly diseases[50].

By this time, the family notices in Sydney newspapers were recording most deaths from measles sufferers to be from other diseases such as bronchitis, congestion of the lungs, and dysentery. The disease peaked in April, when the *New South Wales Government Gazette* recorded 266 deaths (234 of these being children under the age of five)[51]. 149 deaths were recorded in May, overwhelmingly from the Sydney City Council area[52].

The epidemic was rapidly subsiding in June with 56 deaths[53] followed by 12 deaths in July[54]. Monthly deaths after this were in single figures, and the epidemic was effectively over by August. The total number of deaths reported by the Government from March to July 1867 was 645[55].

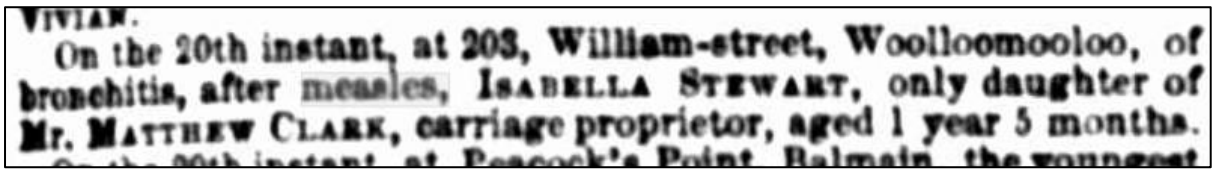

VIVIAN.
On the 20th instant, at 203, William-street, Woolloomooloo, of bronchitis, after measles, ISABELLA STEWART, only daughter of Mr. MATTHEW CLARK, carriage proprietor, aged 1 year 5 months.

Figure 7 Measles death notice (*Sydney Morning Herald*, 22 April 1867)

The unusually virulent measles epidemic of 1867 was probably the greatest childhood disaster of the nineteenth century in Sydney. Figures for the total number of infections are not known, but some 8,600 cases were reported to authorities in New South Wales[56]. Possibly as many as 13,000 young children caught the disease, which is about 70% of the city's population under five years of age. The poor suffered the highest mortality, indicating the high level of malnutrition among disadvantaged families in Sydney.

Surprisingly, despite its severity, it evoked little or no public reaction and was largely accepted as a normal part of childhood[57]. Sydney experienced recurring epidemics of measles, and serious outbreaks occurred subsequently in 1875, 1893, 1898 and 1920[58].

Scarlet fever, 1875-76

The deadly rash of fire

Scarlet fever, also known as scarlatina, is a bacterial disease that was once enormously prevalent among the global population and associated with high mortality rates. The first notable description of what was possibly scarlet fever was in 1553 when the Sicilian physician Giovanni Ingrassia, well known for his contributions to public health, called the disease “rossalia” and described the patient has having “numerous spots, large and small, fiery and red, of universal distribution so that the whole body appeared to be on fire”.

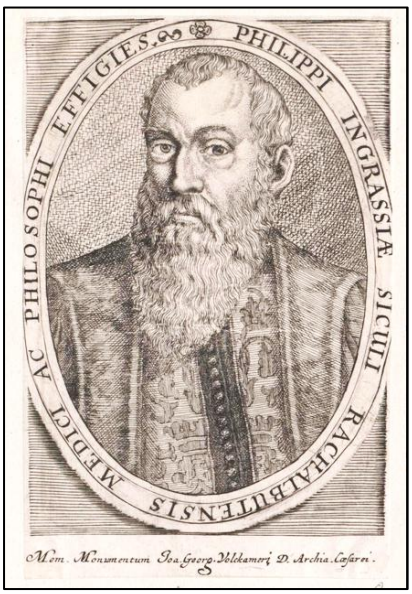


Figure 8 Giovanni Ingrassia (Australian National Library)

Over the following century, various scientists and physicians added elements to the definition, further distinguishing it from other rash-causing illnesses such as measles. It was noted that it was particularly fatal to infants and patients presenting with a sore throat or fever in addition to a rash. Scarlet fever can occur in people of all ages but occurs most often in school-age or adolescent children, due to the ease of transmissibility in classrooms and their lack of immunity to protective antigens[59].

Scarlet fever usually follows from a streptococcal bacterial infection in a small number of people[60]. The symptoms include a sore throat, fever, headache, swollen lymph nodes, a flushed face and a characteristic red rash. The face typically feels like sandpaper and the tongue may be red and bumpy[61].

The bacteria are usually spread by infected people coughing or sneezing and can also be spread when a person touches an object that has the bacteria on it and then touches their nose or mouth. There is no vaccine for scarlet fever, and prevention is by frequent hand washing, not sharing personal items and staying away from other people when sick. In time, the disease was managed effectively and in the twentieth century good outcomes are produced by treatment with antibiotics.

The 1875-76 epidemic

The next major epidemic in Sydney was scarlet fever in 1875-76. The disease had been reported in Sydney a few years earlier in 1871, when the *Empire* newspaper urged the "cessation of animal slaughter in butchers' shops or within the city as a cause of scarlatina"[62]. By March 1876, the Sydney City Council was concerned enough begin an investigation into the "special case of a malignant outbreak of scarlet fever in the city and suburbs"[63].

As with measles, its victims were mainly children. The estimate is that the death rate in Sydney was 32 per 1000, while in Alexandria and Waterloo the figure was made worse by an infant mortality rate reported as 46% of all births[64].

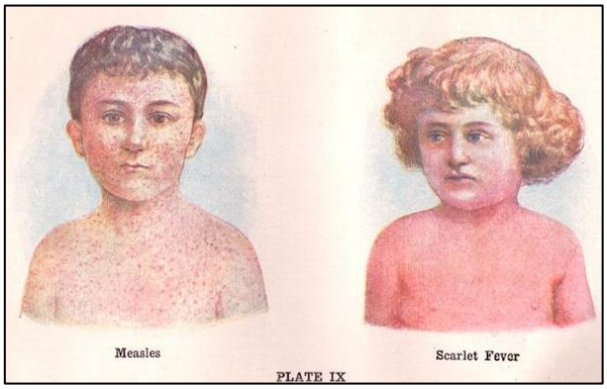


Figure 9 Scarlet fever identification, 1908 (Wikicommons)

The *New South Wales Government Gazette* reported 246 deaths in Sydney from scarlet fever during 1876[65], but the Dictionary of Sydney reported 1,500 deaths in New South Wales including 600 in Sydney[66] and Peter Curson from the University of Sydney reported more than 2,000 in New South Wales[67].

However, the monthly figures in the *Gazette* from 1863 to 1875 reported a total of around 400 deaths[68], which are separate from the peak of the outbreak in 1876. So, the much greater figures quoted in the Dictionary of Sydney and by Peter Curson correspond to the period 1863 to 1876 and not just the 1875-76 epidemic.

Scarlet fever was probably introduced to Sydney via immigrant ships in the late 1830s. Both the *John Barry* and the *Maitland*, arriving in 1837 and 1838 respectively, were quarantined on arrival after outbreaks of the disease on the voyage. Like measles, outbreaks of scarlet fever followed outbreaks in Britain. After 1876, as in Britain, the disease entered a milder form with fewer deaths than previously. The scarlet fever epidemic that broke out in Sydney in September 1875 and extended into the first half of 1876 was part of a much wider epidemic that affected New South Wales, Victoria, South Australia and Tasmania. The epidemic differed from the measles outbreak in 1867 in that it extended over a much longer time period, its effects spread over a wider geographical area, and it produced a wave of public reaction and widespread concern for public health and sanitation.

Compared to the earlier measles epidemic, which mainly affected the children of Sydney's working-class population in the central city, scarlet fever in 1876 tended to affect a greater proportion of the city's middle- and upper-class families in the inner suburbs[69].

The stirrings of public health policy

The epidemic raised considerable public concern and led to a series of official reports investigating the origin and means of transmission of the disease. But at the time the cause and means of transmission of scarlet fever were unknown.

In many ways, the scarlet fever outbreak was crucial in the development of public attitudes towards infectious disease in New South Wales. It was the first infectious disease outbreak to create official concern and generate public unrest. It coincided with a period of increased middle-class concern for sanitation reform and helped focus public attention on disease and the living conditions of the urban poor.

The epidemic resulted in a series of preliminary reports on the causes and prevalence of scarlet fever which produced a series of suggestions for the management of infectious disease cases. In this, the epidemic represents an important precursor in the development of public health policy in New South Wales.

Some of the suggestions that were put forward in 1876 concerning segregation and quarantining of scarlet fever cases and the fumigation and cleansing of infected houses were put to the test five years later during the smallpox epidemic of 1881-2. But in 1875-76 they were only cautious suggestions and were not put into operation.

The scarlet fever epidemic also saw the first attempt at searching for the causes and medium of transmission of the disease, although the conclusions put forward very much reflected the concern at the time with clean water, decent toilets and drains and pure air. Nevertheless, they represent the first official efforts to try and explain causes and transmission of disease.

Early in the epidemic, a committee of the Sydney City and Suburban Sewage and Health Board switched from Sydney's general sanitary condition to inquire broadly into the prevalence of scarlet fever. At the same time, the independent Health Society of New South Wales published a small four-page pamphlet entitled *Hints for the Prevention of Scarlet Fever*[70]. This and the later official Government memorandum *Prevention of Scarlet Fever* provided the framework for future official policy in the management of cases of infectious disease in New South Wales.

The Health Society argued primarily for a policy of segregation, quarantine and public cleanliness. Sick people should be segregated for a month, and children prevented from attending school. The Society also suggested neutralising the "poisons" of the disease by careful attention to cleanliness in the home and exposure to fresh air. All rooms in an infected home should be cleansed with Condy's Crystals (potassium permanganate), carbolic acid and chloride of lime.

Public reaction to the epidemic of scarlet fever was not well reported, and apart from reprinting the government's memorandum and a series of public health measures adopted by the Board of Health in Melbourne[71], the Sydney newspapers hardly mentioned the outbreak. They showed more interest in the disease's progress in Melbourne rather than the one raging in their own backyard.

In addition, newspapers carried no advertisements specifically mentioning scarlet fever, so the makers of popular medicines failed to grasp the financial possibilities in infectious disease epidemics (unlike later and much better-publicised epidemics that spawned numerous "treatments" and cures" among the purveyors of soaps, patent medicines and other vaguely health-related products).

The scarlet fever outbreak produced the first official investigation into the origins and transmission of infectious diseases, it helped focus public attention on the disease and the living conditions of the city's poor, and resulted in the first tentative steps towards an official policy regarding the control and management of infectious disease epidemics[72]. In this, the outbreak was a crucial stage in the development of public health in New South Wales[73].

Scarlet fever in Sydney in 1876 did not lead to a major panic because it was a reasonably well-known disease. Restrictions on children attending school were introduced, policies of isolation and quarantine were put in place and doctors visited the ill in their homes[74]. As a result, the crisis passed without a great deal of public hysteria. However, the Sydney City and Suburban Sewage and Health Board eventually collected a monumental amount of evidence on the various health matters it investigated, and this provided a valuable database for dealing with future outbreaks of infectious diseases[75].

Smallpox, 1881-82

An ancient scourge

Smallpox was a terrible disease that dates back at least 3,000 years. On average three out of every ten sufferers died, and the survivors were usually left with scars, often severe. Before its eradication in 1977, smallpox was a serious infectious viral disease that was spread by direct and fairly prolonged face-to-face contact between people. Symptoms were a fever and a distinctive progressive skin rash[76].

By the eighteenth century, smallpox was a leading cause of death. It killed an estimated 400,000 Europeans each year, including Queen Mary II of England and five reigning European monarchs (Joseph I of Germany, Peter II of Russia, Louis XV of France, William II of Orange and Maximilian III Joseph, the last Elector of Bavaria)[77]. Most people became infected during their lives, and about 30% of these died[78].

Figure 10 Edward Jenner (National Library of Medicine)

One of the first methods for controlling smallpox was variolation, a process named after the variola virus that causes smallpox. People who had never had smallpox were exposed to material from smallpox sores by scratching the material into their arm or inhaling it. After variolation, people usually developed smallpox symptoms, such as a fever or rash, but fewer people died from variolation than from acquiring smallpox naturally.

Modern vaccination began in 1796 when the English doctor Edward Jenner noticed that milkmaids who contracted cowpox were protected from smallpox. He guessed that a version of variolation using cowpox could be used to protect against smallpox with milder side effects. He experimented by vaccinating a small boy with cowpox and then months later he exposed the boy to the variola virus, and the boy did not contract smallpox.

Vaccination (the term is derived from “vacca”, the Latin word for cow) became widely accepted and gradually replaced the practice of variolation[79]. It has been estimated that Jenner’s discovery has saved more lives than the work of any other human[80].

The disease continued to be a great scourge among Europeans even decades after the introduction of Jenner's vaccination. The Franco-Prussian War of 1870-71 triggered a smallpox pandemic in 1870-75 that claimed 500,000 lives. While vaccination was mandatory in the Prussian army, many French soldiers were not vaccinated. Smallpox among French prisoners of war spread to the German civilian population and elsewhere in Europe[81].

This great scourge of mankind was described by the British historian Thomas Babington Macaulay (1800-79) as "the most terrible of all the ministers of death"[82]. No disease of the past or present has come close to smallpox in wreaking such havoc on the world's population over such a long period[83]. The name smallpox is a reference to syphilis, which was historically called the Great Pox[84].

Smallpox erupts in Sydney

The first case in The Rocks

The steamship *Brisbane* arrived in Sydney at 2:50am on 29 April 1881 from Hong Kong flying the yellow flag, indicating infectious disease on board. The journey had taken just over three weeks. On board were 106 Chinese men in steerage, plus cargo. The *Brisbane* proceeded to the quarantine station at North Head with a case of smallpox among its passengers[85]. The victim and several other men were transferred to the hospital ship *Faraway*, while the remainder stayed on board the *Brisbane* until the captain was granted pratique (health clearance) by the quarantine health officer some weeks later[86].

On 25 May, three weeks after the *Brisbane*'s arrival, Dr Haynes Gibbes Alleyne, chief health officer and head of Sydney's quarantine service, was notified of a possible case of smallpox. The infant child of the Chinese merchant On Chong of Lower George Street, had come down with a fever and a rash, prompting a call to a local doctor. Dr Alleyne sent a government medical officer to examine the child, but there was no clear diagnosis, so it was decided the medical officer would monitor the child on a daily basis[87].

Sydney newspapers soon heard of the case and asked why the medical officer was allowed to move freely about the city while making daily visits to On Chong's place[88]. If the child had smallpox, the doctor could well have been spreading it. Another week passed before it was decided to put a barricade around On Chong's store and the adjacent buildings. The doctor, Dr Foucart, was also ordered to stay with the child and a police guard made sure nobody came or went.

There was growing community unease over the following week as fear and suspicion began to take hold. But Dr Alleyne was unwilling to declare that the On Chong case was smallpox or not. Local doctors were told to be on the lookout for signs of a disease that few had dealt with, which in its mildest form could be mistaken for chicken pox or some other infection.

Australia's distance from Europe and Asia kept the colonies relatively free from smallpox for several decades, and an effective quarantine policy kept ships with disease on board in isolation at North Head. But as ships transitioned from sail to steam, travel times were reduced by as much as half. So, diseases such as smallpox, with a two- to three-week incubation period, began to slip through the quarantine net[89].

The Surry Hills outbreak

Three weeks after the On Chong case was notified for investigation, Dr Michael Clune was asked to visit Edward Rout in Surry Hills, and from the description he suspected smallpox. Next morning he went to the terrace house in Bellevue Street where Rout and his wife ran a boarding house. When Clune went upstairs to Rout's bedroom, he was almost overcome by a fetid smell which he recognised from his training in Dublin. From outside the room, he could see Edward Rout's body covered with pustules. He was clearly dying from smallpox in its most virulent form and Clune could not help him.

Clune learned that Rout was a carpenter who had been working on the roof of the premises across the road from On Chong's place for several weeks before falling ill. A total of fourteen people were in the house, including half a dozen children who attended three different schools. The Surry Hills house was placed under quarantine[90]. There was reportedly a stampede of residents from the locality of the new smallpox case. A number of vans were seen in Bellevue Street shifting furniture, the occupants making their departure with all possible haste[91].

Each occupant of the infected house, except Mr. Rout and his wife, was required to be vaccinated by putting his or her arm out through a hole in the fence, while the medical men remained outside and performed the procedure. Mrs. Rout was vaccinated by one of the other inhabitants, under instructions from Dr. Caffyn. Fumigation was carried out profusely, so that the neighbourhood smelled strongly of carbolic acid[92].

But those sent to the quarantine station were treated very badly by Superintendent John Carroll of the station, including the doctors sent to attend them. Dozens of patients were denied basics like clean towels, linen and medical supplies by a man totally unprepared to manage such a situation. Eventually a Royal Commission was set up to inquire into the management of the quarantine station. Carroll was suspended and never reinstated, but the real fault lay with Dr Alleyne who left Carroll in charge knowing he was ill-equipped for the task[93].

Quarantine

Early in the epidemic there was a policy to quarantine and isolate smallpox sufferers and their immediate contacts. The policy was apparently to place a suspect and their house in quarantine until the diagnosis was confirmed or not. If confirmed, then all those in the house who were willing were vaccinated, mosquito netting was fixed to all windows, barriers were erected, a police guard was posted front and back, a yellow flag was hoisted, and neighbours were notified by circular.

If the medical officer thought the patient was able to be moved and they were willing to go, they were taken to the Quarantine Station at North Head (and later to the Coast Hospital). The health officer also tried to persuade the inhabitants to accompany the patient into quarantine, and many seemed to accept voluntary exile. Until almost the end of the epidemic, it seemed that formal quarantine at one of the two locations was not compulsory, expect for a few cases. On the other hand, it seemed the Chinese were rarely given a choice.

Those who refused to leave were quarantined in their homes. In theory, adequate provision was to be made for their upkeep and nursing, including daily medical visits and provision of food, medical supplies, bedding and clothes. In practice, many of those barricaded at home were virtually ignored

and left without adequate care and supplies. The authorities belatedly recognised such problems by early December 1881.

Those who elected to go into quarantine were sent to the Quarantine Station until early December 1881. Later, contacts were sent to the sanitary camp at Little Bay, which eventually became the sanitorium attached to the Coast Hospital. By early December, all cases of smallpox were pressured to go to the Coast Hospital and their contacts to adjacent sanitorium.

Overall, almost 900 people were quarantined during the epidemic, 163 as cases and the rest as contacts. An additional 700 were detained on board ships off North Head after arriving in Sydney. Most people elected to quarantine in their own homes. The latter may have been influenced by the many horror stories circulating about conditions and treatment of inmates at North Head[94].

The Coast Hospital

As the epidemic progressed, it became clear that the Quarantine Station could not cope with the volume of people involved or provide an adequate level of nursing and care. As early as July 1881 the government realised that Sydney needed a fully self-contained isolation hospital located a safe distance from the city. The Board of Health eventually selected a site at Little Bay, 15 kilometres from the city centre, and made plans to build a hospital in a few weeks[95].

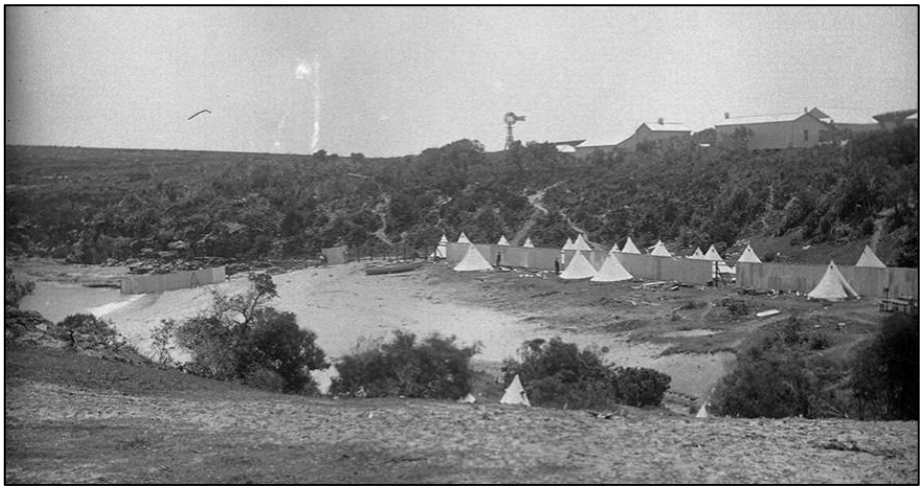


Figure 11 Little Bay tents, 1882 (Prince Henry Hospital Museum)

The plan was to erect eight separate buildings, each to accommodate six patients. The buildings would be constructed of and partly lined with galvanised iron because this material is non-absorbent and was not likely to retain the germs of infectious diseases. The buildings would be surrounded by wide verandahs and would be built ninety feet apart. Quarters would be erected for a matron, five nurses and five other attendants, while the doctor would have a cottage in another part of the grounds, furnished with a consulting room and dispensary.

A telegraph operator and six policemen would also be accommodated with residences. A separate building would be erected for Chinese patients. In all 200 acres of land would be reserved for the station[96]. A golf course was also constructed to provide recreation for the staff, who were essentially prisoners in their own workplace.

However, the hospital did not open its doors to smallpox sufferers until early December. In the meantime, the government was forced to erect a temporary sanitary camp of tents with flooring on the Little Bay site and offer this to contacts of smallpox sufferers as a quarantine choice. The Coast Hospital was formally proclaimed on 7 December as a smallpox hospital[97]. Its accommodation consisted of a series of detached pavilions catering for 106 patients, staff residences, a dispensary, store, kitchen, bathroom, laundry and telegraph office. It was staffed by a full complement of medical and nursing staff.

The sanitorium, separated from the hospital by a galvanised iron fence, consisted of five pavilions and associated facilities to accommodate 42 contacts. But the epidemic had almost run its full course by the time the Coast Hospital began to admit patients. Only 39 cases of smallpox were treated there, although almost 150 contacts were accommodated at the nearby sanitary camp. Conditions at Little Bay were undoubtedly an improvement on those at North Head.

By April 1882, there were no remaining smallpox patients at the Coast Hospital, and the last remaining family at the Sanitorium, at their own request, was to be released after Easter. The staff then thoroughly disinfected the buildings, and the windows were removed to allow the wind to blow through them, after which the place was declared free from the taint of infection[98].

Problems of diagnosis and the general panic plagued the epidemic through its course and led to a policy of indiscriminate quarantine. Many suspected cases were sent to quarantine or shut in their houses on the flimsiest evidence. There is evidence of twenty such cases[99].

Vaccination

The people of Sydney were basically apathetic towards vaccination, except during the times of epidemic. There was a suspicion that vaccination carried with it a variety of other diseases, it was widely thought to be unnecessary, and finally there was the misguided belief that Australia's isolation and policy of maritime quarantine offered a certain barrier to diseases like smallpox.

Figure 12 Smallpox vaccination, 1881 (National Library of Australia)

Following the second case of smallpox in June 1881, the Government issued instructions for the vaccination of all police, government boatmen, health workers, ambulance men and cleansers, as

well as all inmates of public institutions. In addition, the public was encouraged to get vaccinated at the Town Hall. Throughout July and August, the Sydney newspapers were full of letters arguing for and against compulsory vaccination. Meetings of both sides were held, at which feeling ran high. Many claimed to have been vaccinated and still caught smallpox.

Both pro- and anti-vaccination groups were agreed on one thing, that all Chinese should be compulsorily vaccinated. The government apparently agreed, and the Chinese community seemed to be subject to forced vaccination. Ultimately an official inquiry was held into compulsory vaccination, at which most of the colony's leading medical men appeared. The inquiry (consisting of the State Government cabinet) sat for almost a week in mid-September and released a report in late October. But no definitive statement or conclusions were ever published by the cabinet, and no act of Parliament was ever passed.

All but one of the fifteen of Sydney's leading doctors who appeared strongly supported compulsory vaccination, so it is surprising that no positive conclusions were reached. By November, public pressure for compulsory vaccination seems to have faded away and was replaced by letters and articles calling for compulsory registration of all cases of infectious disease[100].

Looking for a scapegoat

The most tragic public reaction was the scapegoating of the city's Chinese community. The origins of anti-Chinese feeling lie much deeper than the smallpox epidemic, but it brought long-standing tensions to the surface in a prolonged outburst of prejudice and violence. Most Chinese people in Australia owe their presence to the period immediately following the end of convict transportation when most colonies suffered a severe shortage of labour.

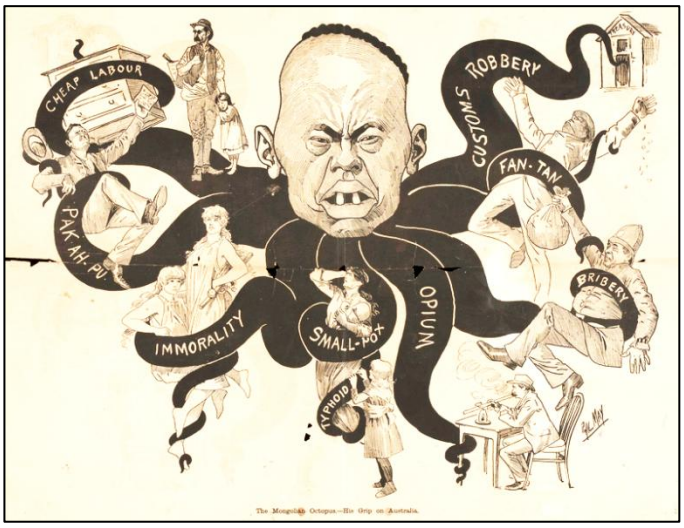


Figure 13 Anti-Chinese propaganda, 1886 (*The Bulletin*, 21 August 1886)

In the 1840s and 1850s, squatters saw the Chinese as a ready source of cheap and reliable labour. An indenture system was introduced and by 1850 thousands of Chinese were making the trip to Australia. The discovery of gold in New South Wales and Victoria brought even more Chinese to Australia, and by the end of the 1850s there were probably 80,000 Chinese in New South Wales and Victoria alone. Resentment was not long in coming. Violence and open riots flared between European and Chinese gold miners during the early 1860s.

The smallpox epidemic seemed to provide authorities and number of politicians with a handy stick to beat the Chinese community. It certainly provided a sure way to mobilise public opinion into accepting an end to Chinese immigration. Considerable publicity was given to the first reported case being a Chinese child, the implication being that the disease must have arrived aboard a ship carrying Chinese immigrants.

Months later, it was revealed that On Chong's child may not have been the first case, but this disclosure received very little publicity. An editorial in the *Sydney Morning Herald* in mid-June argued that the disease could just as easily have been brought to Sydney from London as from Canton[101]. But such comments fell on deaf ears, and the papers were deluged with letters calling for an end to Chinese immigration, their compulsory vaccination and a compulsory 21 days' quarantine for all arriving Asian immigrants.

People began to boycott Chinese goods and services, and the Chinese people were often refused entry to trams, ejected from shops and spat on in the streets. A new *Influx of Chinese Restriction Act* was read in Parliament in July 1881. By the beginning of August, anti-Chinese feeling in Sydney was at fever pitch[102].

The fact that the first case was Chinese gave the anti-immigration lobby the fuel they needed to push through legislation to restrict Chinese immigration. Local Chinese were vilified from the first day of the epidemic. Their homes were inspected regularly and they underwent enforced vaccination. This was even though smallpox was also rife in England and Europe at the time and could just as easily be brought in by someone from there. In the end there were only three Chinese victims, the On Chong child and two men[103].

The Chinese, never well treated at the best of times, suffered the worst of the Sydney Council's cleansing activities. Their houses and shops were subject to more drastic measures than the general population. One house and outbuildings in Botany Road were burned down after the Chinese occupants were forcibly removed. By the end of June, the Sydney Council staff were notifying residents of depots where they could purchase disinfectants and fumigants[104].

At the outbreak, one of the Government's first measures was to declare China and all its ports to be infected places, apparently because Chinese people had been among the earliest reported cases. This allowed the Government to quarantine all ships arriving from China so that it looked like it was doing something[105]. But towards the end of the epidemic the *Sydney Morning Heald* noted: "considerable doubt exists whether the disease was brought here by the Chinese…we have far more to fear from our own countrymen than from the Chinese"[106].

The impact on the public

The 1881 smallpox outbreak of 1881 was not a major epidemic in statistical terms. In the nine months to February 1882, 154 cases were notified to authorities and of these there were 40 deaths. Yet the way the epidemic unfolded and the impact it had on the lives of those caught up in the early days of the outbreak gave it greater significance than the numbers suggest[107]. Such was the public's great fear of smallpox that the outbreak caused a wave of hysteria and panic across Sydney that had never been seen before in the city.

The lack of preparedness combined with horror stories circulating about the disease, the dangers of vaccination, poor conditions at the Quarantine Station, the authorities' neglect of people quarantined in their homes and the inability to accurately diagnose and treat the disease, all contributed greatly to the general feeling of panic. It seems to have produced a situation in which many people avoided reporting cases for fear of public contempt and possible incarceration in quarantine.

Figure 14 Coast Hospital ambulances (Prince Henry Hospital Museum)

In this sense, the epidemic was the first one that inflamed popular opinion, and while the mortality was small, the social impact was tremendous. The newspapers were full of stories and advertisements designed to fan the growing alarm. The outbreak drew attention to the overcrowded and unsanitary living conditions of the city's poor and produced a feverish campaign of cleaning, scavenging, disinfecting and fumigating of infected premises and their surroundings[108].

The case which sparked the epidemic in the first place was never found, but the strongest theory is that the young nursemaid who was employed to care for the On Chong child had acquired a mild case of smallpox which she passed on. But how the nursemaid was infected is not known[109].

There was a lack of coordination between the Government departments dealing with the epidemic, and a perception that popular prejudices and misinformation were being allowed to determine how people were dealt with. Hundreds of people were forcibly quarantined, and families quarantined inside their houses were frequently left to fend for themselves and the various authorities failed to coordinate who was to bring them fuel and food. Tragically, many uninfected people caught smallpox after being quarantined[110].

Public health benefits of the epidemic

A number of positive benefits emerged from the 1881-82 smallpox epidemic. It led to the first tentative steps towards establishing public policy in New South Wales on the control and management of epidemics, which helped lay the foundations of public health administration in the State[111].

The first Board of Health with representatives from local government, health, police and Treasury was set up in response to the epidemic. The board had powers to handle wide-ranging public health matters such as sanitation and living conditions. Its mandate was to administer the newly enacted *Infectious Diseases Supervision Act* of 1881, which introduced compulsory notification of smallpox and other infectious diseases.

Another much-needed development was the establishment of a dedicated ambulance service with personnel trained in infection control. A hospital for infectious diseases was set up at Little Bay, even as the epidemic progressed. It was eventually known as the Coast Hospital and then as Prince Henry Hospital and was finally closed in 1988[112].

In addition to the above innovations, the aftermath of the epidemic saw the commencement of classes at the Medical School of Sydney University in 1883[113] at a time when most English medical practitioners were the product of hospital-based medical schools. The final outcome of the epidemic was a set of practical regulations and guidelines covering quarantine, isolation and the general management of epidemics[114]. In the end, the smallpox epidemic provided an insight into how people react when confronted by the challenge of life and death[115].

Asiatic influenza, 1890-91

The century's final pandemic

The 1889-1890 Asiatic influenza pandemic was a worldwide outbreak of a respiratory virus. It was the last great pandemic of the nineteenth century and one of the deadliest in history. The pandemic killed about one million people out of a world population of about 1.5 billion[116].

Moden transport infrastructure assisted the spread of the 1889 pandemic. The nineteen largest European countries, including the Russian Empire, had about 200,000 km of railroads, and transatlantic travel took less than six days[117]. It was the first pandemic to spread, not just through a region such as Eurasia, but worldwide.

The first outbreak of Asiatic influenza was most likely in western Siberia. By November the virus had reached St Petersburg and Moscow and by December it had reached Great Britain. The disease then spread through Asia and by April 1890 had reached Australia and New Zealand[118].

A children's song was composed during the epidemic and displayed in schools as a safety tip:

> There was a little girl, and she had a little bird,
> And she called it by the pretty name of Enza,
> One day it flew away but didn't go to stay,
> For when she raised the window, in-flew-Enza[119].

Sydney catches the flu

As the nineteenth century progressed, faster shipping ensured that Australia was no longer safe from the influenza epidemics in Europe. By the close of the century, global transport ensured that the Australian colonies were to share in the world's grief of the nineteenth century's largest pandemic, the Asiatic influenza of 1889-91.

The autumn of 1890 saw the return after an interval of thirty years of the historic disease known as influenza in epidemic form. It was not normally thought of as being very fatal but was known to cause considerable discomfort and disablement to a large percentage of the population. As the influenza epidemic was the first since the establishment of the New South Wales Board of Health in 1881, its recurrence was deemed important enough to call for an official inquiry and a series of detailed reports into the behaviour and causes of the disease.

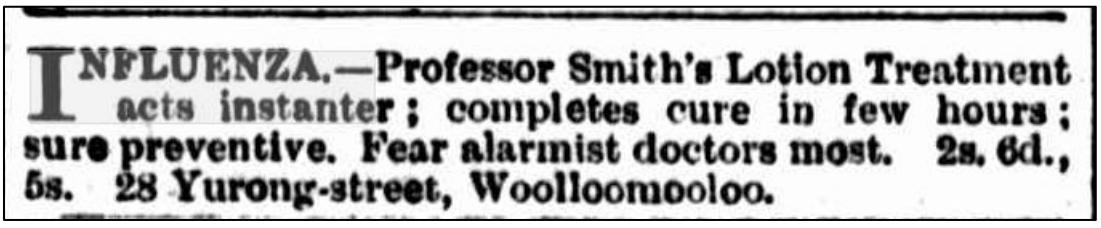

INFLUENZA.—Professor Smith's Lotion Treatment acts instanter; completes cure in few hours; sure preventive. Fear alarmist doctors most. 2s. 6d., 5s. 28 Yurong-street, Woolloomooloo.

Figure 15 Influenza cure ad 1, 1890 (Australian Star, 5 April 1890)

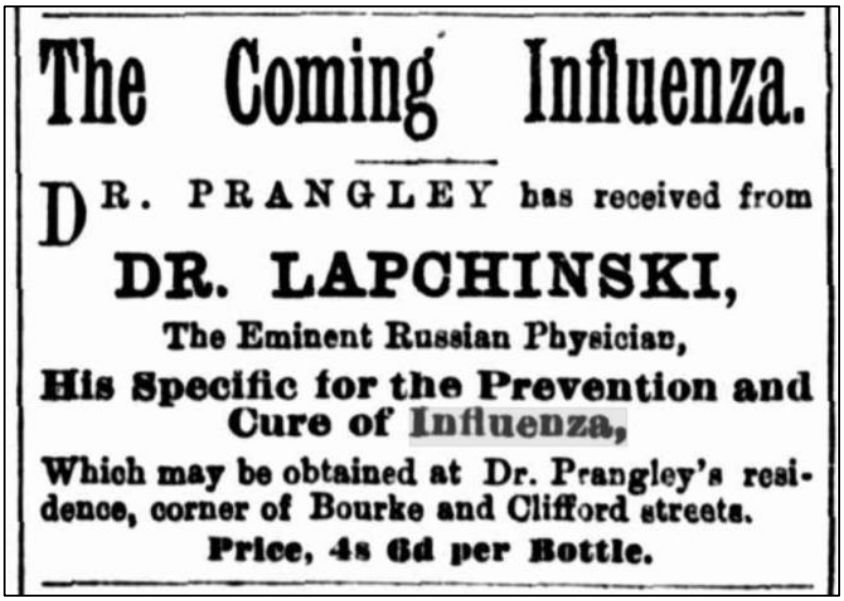
The pandemic affected Sydney in two waves, in 1890 and 1891. It was the first time Sydney had been caught up in a major pandemic of a highly infectious disease such as influenza, the earlier outbreaks in 1836-8, 1847 and 1850 being reasonably minor events[120].

The first wave

The first Australian cases were reported in a mild form in Melbourne during March 1890[121], with the outbreak reaching epidemic proportions in Victoria for three or four months, claiming 164 lives[122]. As in Europe, the disease reappeared the following year in a far more virulent form, and according to the 1892 *Victorian Yearbook*, 1035 people died from influenza in 1891.

The epidemic had considerable impact in Victoria, where doctors reported widespread "dispiritedness" in Melbourne suburbs. The *1892 Victorian Yearbook* reported that the disease was most serious in the old and very young. Many more deaths were registered from bronchitis, pneumonia and other diseases of the respiratory system that originated in attacks of influenza and were complications of that illness[123].

In April 1890, the steamship *HMS Rapid* entered Sydney Harbour from Hobart with 32 cases of influenza on board. Most patients were largely convalescent, and the Board of Health decided not to quarantine the vessel on the condition that those aboard were not allowed ashore for some days after recovery, and no strangers were allowed on board while the attack continued. Several cases were known to exist in Sydney by then[124].



The Coming Influenza.

DR. PRANGLEY has received from

DR. LAPCHINSKI,

The Eminent Russian Physician,

His Specific for the Prevention and Cure of Influenza,

Which may be obtained at Dr. Prangley's residence, corner of Bourke and Clifford streets.

Price, 4s 6d per Bottle.

Figure 16 Influenza cure ad 2, 1890 (Goulburn Penny Post, 5 April 1890)

The following month, a newspaper article titled "Under the Influenza" reported that French doctors had advised "warm alcohol" drinks as a precaution against the influenza epidemic. 1,500 people who took this precaution over the next three days were subsequently arrested for being drunk in the streets of Paris. Some 1,200 of the pickled Parisians claimed to the arresting gendarmes that they were simply following their doctors' orders for the treatment of influenza[125].

By this time, several rural New South Wales newspapers were reporting that the influenza epidemic was prevalent in a mild form in their districts, in Newcastle, Bathurst, Glen Innes, Crookwell, Bowral, Tumut, and elsewhere. But there were very few reports of its progress in Sydney, and the initial wave seemed to have subsided by then.

The second wave

By October 1891, influenza was again being reported in several country towns in New South Wales[126]. The Victorian Board of Public Health announced that influenza has reappeared in Europe and America in a very severe and fatal form. Although most cases in Australia were comparatively mild, there were concerns that it might assume a malignant character, as in Europe and America[127]. By early November, influenza was widely reported in Sydney and Parramatta[128].

The influenza outbreak was becoming so serious that the Bishop of Sydney was moved to whip up a special prayer for the clergy of the diocese of Sydney to use at Sunday services. This prayer beseeched the Almighty to "behold the distress in which we are now placed by the prevalence of widespread and serious illness among us, and to give us speedily relief as may be good in Thy sight"[129].

The second wave of the epidemic in 1891 was far more serious than the first and caused many more deaths. 234 deaths were recorded in Sydney, and possibly 100,000 or more people caught the disease. In this regard, it had more in common with twentieth than nineteenth century epidemics in that it had an extremely high number of cases but a relatively low mortality.

The aftermath

The *Victorian Yearbook* of 1892 recorded that many more deaths were registered from bronchitis, pneumonia and other bacterial diseases of the respiratory system that originated in attacks of influenza and were complications of that illness[130].

The germ theory was by no means fully accepted by the colony's doctors when influenza arrived in Sydney in 1890, and many still held firmly to the miasma theory. It had been thirty years since the last outbreak of influenza, and many were not very familiar with the symptoms. In fact, some doctors had never seen a case of influenza.

The New South Wales Board of Health issued a questionnaire to doctors, which produced contradictory and muddled results. However, one thing that was clear was that the disease was spread by person-to-person transmission. Formulating a policy to respond to the epidemic left the authorities in a quandary, as the disease was often mild enough to avoid detection, but which affected a very large proportion of the total population.

The methods adopted for the smallpox epidemic of notification, isolation, quarantine and formal cleansing were impossible to put into effect this time. Consequently, authorities focused on a public education campaign and distributed pamphlets and posters to many householders. Because the disease was spread primarily by airborne droplets from the sick to the healthy, the Board decided the best defence was to encourage people to avoid large crowds and places such as meetings and public transport, to avoid visitors when sick and to keep infected children away from school.

It was the extreme morbidity of the disease, rather than its low mortality, which caused the greatest disruption to Sydney's normal services and activities. Many public services were hard-pressed to maintain normal activities. For example, at the end of October, the tramways department had 32 motormen off sick with influenza.

No aspect of Sydney life escaped the epidemic's effect: people shied away from public gatherings, so attendances were greatly reduced at church services, theatres and sporting events. Influenza took a

heavy toll on Sydney's institutions. Most public institutions, such as gaols and mental hospitals, already plagued by overcrowding, poor ventilation and inadequate sanitary conditions, provided a fertile environment for a highly infectious disease such as influenza. Gladesville Hospital for the Insane was badly hit, with about a quarter of the patients and half the staff infected[131].

The 1890-91 flu was the first global pandemic to receive worldwide media coverage. The same technologies that had carried the disease so quickly around the world were also responsible for helping build hype and anxiety about the disease. This gave the pandemic a double face: the physical reality of the infection and its media reality, which in Australia preceded its arrival and shaped expectations, responses and prejudices for several months.

By the time of Asiatic flu in 1890, ideas of infectious disease, quarantine and foreigners were becoming central to thinking about nationhood in the Australian colonies. During the intercolonial debates that preceded federation, quarantine was constantly debated as the task of a new federal government[132].

New lessons were learnt during this epidemic. The existing isolation and quarantine procedures were found to be inappropriate for such a contagious disease, so new policies were implemented. A major public education campaign was undertaken, using cartoons in the main city newspapers and magazines. Sydneysiders were urged to avoid crowds and home quarantine was introduced. Sales of cough, cold and flu remedies boomed, and the epidemic eventually petered out. One long-term effect may have been to encourage Sydneysiders to think more carefully about protecting their health[133].

Bubonic plague, 1900

Bubonic plague comes to Sydney

The plague's progress

The colonial government had been wary of plague arriving in Sydney via the shipping trade routes since the outbreak in Hong Kong in 1894[134]. Then in December 1899, the Sydney newspapers reported a plague outbreak in Noumea. There was concern in Sydney because it was rumoured that the disease was carried to Noumea in jute bags that came from Calcutta via Sydney[135].

Then, in what the *Sydney Morning Herald* called "Sensational developments", two cases of bubonic plague were reported in Adelaide in mid-January 1900, one having already died in hospital. Before his death, the victim stated that he had deserted from the crew of the ship *Formosa*, which arrived in Adelaide from New York in November 1899. When the ship arrived, it was granted pratique by the assistant health officer, contrary to the instructions of the *Quarantine Act*. Some days later, some sailors deserted and disappeared inland. Then on 1 January, one of the deserters, a German national, travelled from Gawler in a semi-delirious condition and was admitted to Adelaide Hospital where he died. He was not diagnosed with plague until a postmortem following his death on 12 January[136].

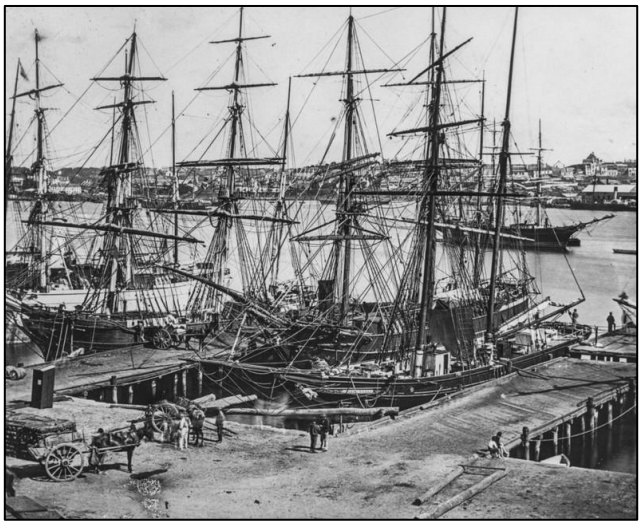


Figure 17 Darling Harbour, c1870 (City of Sydney Archives)

Plague finally arrived in Sydney on 19 January when Arthur Payne, a 33-year-old van driver from Dawes Point, took ill with a suspected case of bubonic plague. He and his family were quickly moved to the Quarantine Station. Payne's work brought him into daily contact with Central Wharf at Circular Quay. Dr. Ashburton Thompson of the Board of Health told the press that plague was spread by fleas and similar pests from infected rats. He said there was no need for panic or alarm[137].

In fact, the response was exactly that, fuelled by knowledge of the ravenous potential of the disease. Many doctors still believed plague was an infection spread by human contact with the infected. However, the health authorities were aware of the growing evidence that plague epidemics were associated with an infection in rats and they began to instigate preventative measures to prevent its entry via the Australian ports[138].

Arthur Payne recovered from his illness, was released from the Quarantine Station in mid-February and returned to his family[139]. The first death from the plague in Sydney was Captain Thomas Riley Dudley on 22 February. He was a sail and tarpaulin maker who worked at a wharf in Drummoyne and was well known in yachting circles. An investigation by Dr Thompson found that Captain Dudley one day removed five dead rats from his Drummoyne premises, the rats having entered the building through defective sewer pipes after leaving one of the boats brought to the victim's wharf.

While it was becoming known that infected rats carried plague with them, it was not understood at the time that when a rat died the infected fleas would look for another host, including a human one. The health authorities urged an active campaign to destroy as many rats as possible, to prevent the spread of the disease[140].

In March, the Board of Health requested the use of the Coast Hospital at Little Bay for the quarantining of plague sufferers and their contacts, but the Government's Ministers were not keen on the idea of having to remove the existing patients from the hospital if it could be avoided[141]. The City Council established a special plague department to cleanse the part of the city abutting Darling Harbour[142].

A number of Citizens' Vigilance Committees sprang up around Sydney in April to assist the local councils in cleansing the municipality. One was established at a meeting of 200 residents of Paddington[143] and another at the Sydney Town Hall. The committees would act as communicative bodies between the public and the governing bodies and point out such matters that required improvement. The thinking was that it would be useful to give the people the opportunity to suggest remedial steps, and to assist in preventing the spread of the disease. Previously, no emergency had arisen in Sydney to cause the thorough investigation and cleansing that had been found necessary this time. There was now an urgent need for the whole city to be made clean and every effort to achieve that objective was justified[144].

The first meeting of the Citizens' Vigilance Committee reported receiving several letters from residents complaining about unsanitary conditions in various places of the city. It was arranged that these would be investigated[145]. The Government, the Board of Health and the Sydney City Council all agreed to cooperate with the committee. The central committee decided to divide the city area into eleven divisions, to be constituted by the present Parliamentary electorates and appoint a local vigilance committee in each one.

Each local committee would take note and report to the central committee on the sanitary condition of the area under their supervision, including whether any dwelling house was in a state so dangerous to health it was unfit for human habitation, or whether the condition of land was such that it would be prejudicial to health to build upon it. They would report on the condition of drains, water closets, water supply, the existence of any rubbish and the state of rubbish bins. They would also report on the condition of surface gutters, pools, ditches, cisterns, urinals, cesspools, cesspits, drains, and stables[146].

By mid-April, new cases and deaths were steadily being reported in Sydney, and by then there were 104 cases with 36 deaths[147]. At the end of April, the bonus paid for rats captured and delivered to the council incinerator was raised from 2d per head to 6d per head. Depots for receiving dead rats would be established soon[148]. By the first week of May, 193 cases and 63 deaths had been reported,

and 4,391 rats were incinerated in the past week[149]. During the epidemic, the death rate was consistently reported to be 33-34% of the cases of infection.

Dr Thompson issued a statement in mid-May in which he wrote that after three months of very hard work, things were then in order when dealing with the plague. An entirely new hospital had been created with almost 100 beds (at the Quarantine Station) and an entirely new procedure had been implemented for transporting patients to quarantine by water. He contrasted the current epidemic with previous smallpox outbreaks, where they never had to deal with more than twenty or thirty cases at a time, which were spread over several weeks (for example, the most serious outbreak in 1881-82 consisted of 154 cases over nine months)[150].

By the end of May, The Citizens' Vigilance Committee reported that it had received a total of 368 complaints since its formation. The committee received letters from the Department of Public Instruction (notifying that schools which were not connected to sewers had been connected at once) and from the Water and Sewerage Board (notifying that premises not connected to sewers would be placed on the compulsory list to be connected by contractors at the proprietors' expense)[151].

By the middle of May 1900, the outbreak was almost over, with no new cases reported for a week[152]. By the first week of August, 71,000 rats had reportedly been incinerated at the Darling Island depot since quarantining began. The grant of 6d per dead rat was still being paid[153]. On 20 August, the final count of 303 cases with 103 deaths was announced[154] .

In mid-September, the *Sydney Morning Herald* reported that the outbreak of plague in Sydney required large numbers of workers for the cleansing operations that were carried out. The liberal wages offered attracted many men from all parts of the country, including other colonies. In addition, those living within quarantined areas obtained employment in these activities. The work thus available enabled hundreds of deserving men to be tided over during the winter months to provide for their families at a time when work was difficult to obtain (which was towards the end of the severe economic depression of the 1890s).

On the other hand, men in the shipping trade were thrown out of work, and the news of the plague scare rapidly dislocated trade and commerce. Traffic from the interior and other colonies was greatly disrupted, and considerable loss was caused to businesses and the Railway Commissioners (due to reduced numbers of people travelling). However, the *Herald* thought that the improving economic conditions were much more hopeful for increased employment in the future, and that achieving Federation would do much in this direction[155].

The end of September saw the last visible sign of the plague outbreak when the final three patients were released from the Quarantine Hospital. It was then more than seven weeks since the last new case. The hospital was thoroughly cleansed and disinfected. The yellow flag which had been flying since January was hauled down, and Sydney was once more a clean port[156].

The *Sydney Morning Herald* thought that the only good thing coming out of the recent plague was to awaken the authorities to the necessity for cleanliness. The Citizens' Vigilance Committee, which did much good work during the outbreak, did not intend to abandon its work now that Sydney was again free of plague. Complaints about unsanitary conditions were still regularly sent to it[157].

The bubonic plague did not entirely leave Sydney but reappeared occasionally over the next few years. For example, in April 1902 the Moore Park Zoo had to be closed when plague broke out among the staff and animals. Investigation of the illness proved that it was bubonic plague. The zoo intended to remain closed until it was subject to thorough cleansing and disinfection. An unusually high mortality had recently been reported among the animals at the zoo, which was said to include six or seven wallabies, a fallow deer, a monkey or two and several smaller animals. The zoo eventually reopened four months later[158].

Extermination of rats

One of the most important measures taken during the epidemic was a campaign to exterminate Sydney's rat population. A permanent gang of rat catchers was employed by the State Government in laying baits, trapping, digging out burrows and destroying the habitual haunts of rats. The Council also employed a special rat-catching squad who destroyed 38,600 rats before handing over their job to the official Government team.

Figure 18 Professional rat catchers, 1900 (NSW State Archives)

From mid-April 1900 to the end of October, the official ratcatchers destroyed almost 70,000 rats. Adding this total to the city and suburban councils' efforts resulted in a grand total of more than 108,000. Early in April, the Water Board began fumigating and disinfecting the city's sewage system, but these efforts killed many of the fish in Darling Harbour and simply drove many rats away from their usual haunts in Darling Harbour to other parts of the city.

There were complaints about people carrying bags of dead rats on public transport to the incinerator. It is easy to imagine that nothing empties a tram or bus of passengers faster than a large fetid bag of plague-infested rats being plonked down in the luggage rack. To avoid this, arrangements were made for receiving depots to be opened at Leichhardt, Annandale, Paddington, Waverley and Woollahra[159].

The rat extermination campaign provided some of the more humorous moments during the epidemic. There were many exotic suggestions for ridding the city of its rats, ranging from digging huge trenches filled with sugar to the Balmain Council's idea of the introduction of ferrets[160] to control the rats[161].

The sugary rat trap idea was proposed by a correspondent to the *Sydney Morning Herald* in May 1900, who was reminded of a method adopted by the authorities during the Siege of Paris (1870-1871). Workmen dug large and deep pits near the sewers, partly filled them with glucose, waited for the rats to jump into the pits, then plucked them out and sold them as food to the starving Parisians. Mentioning that the rats were euphemistically called "house rabbits", the writer borrowed from Shakespeare by suggesting that a rat by any other name would taste as sweet[162].

Rubbish disposal

In colonial Sydney in the eighteenth and early nineteenth century, residents had to dispose of their own rubbish. The population was small and waste was mostly organic, and for many the solution was to dig a pit in the back yard. Lime or carbolic acid was used to break down the material and reduce the smell. In those days there was extensive recycling due to the short supply of many materials – for example, bottles were refilled and newspapers were reused as packaging.

Then as the cities and towns grew, waste disposal was taken over by the municipal authorities, but it became a major problem due to heath concerns when open tips were established on unused ground. The bubonic plague outbreak in 1900 alerted the City Council to the health hazards of accumulating rubbish throughout the city[163]. Incineration of rubbish had been used in England since 1847, and this was seen as the most effective solution for Sydney[164].

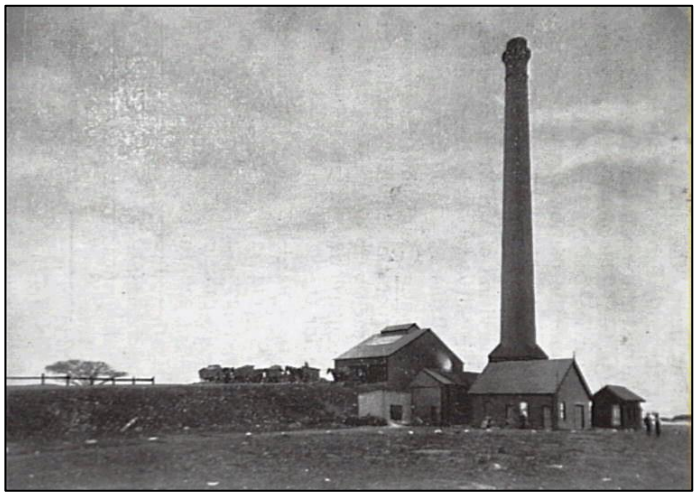


Figure 19 Garbage Destructor, 1906 (City of Sydney Archives)

In April 1901, the Sydney City Council accepted a tender to construct an incinerator with the impressive name of the Perfectus Garbage Destructor and Disinfector, at a cost of £12,000. It consisted of six cells and an imposing 50-metre chimney which could process up to 60 tons of destructible garbage per day, about a quarter of the total amount in the Council's area[165].

Cleansing and disinfecting

The problem of urban poverty in Sydney was suddenly given headline status by the outbreak of bubonic plague. By the end of the outbreak, the cause was known to be the migration of fleas from infected rats to humans, and the Department of Public Health's chief health officer Dr Ashburton Thompson made a significant contribution to the literature on the subject.

But at the beginning of the outbreak, the method of transmission was not widely understood by most people, including the Council's Health Officer, Dr Devereux Gwynne-Hughes. When plague

arrived in the port of Adelaide on 15 January and its imminent arrival in Sydney was expected, Dr Gwynne-Hughes wrote a memo to the Town Clerk claiming that overcrowding, lack of ventilation and accumulation of filth were important to the transmission of the disease.

His remedies did not mention eradicating rats, although he did think they helped spread plague. He stressed quarantine and disinfection, speedy removal of accumulated garbage, and plenty of chloride of lime or carbolic acid down all drains and sinks. This was what most people expected, and when the first case was reported on 25 January, the State Government took over city cleansing, and the quarantining of areas around Darling Harbour where it was first located[166].

The housing of Sydney's poor was dilapidated and crowded together, their homes harboured more rats, and their clothes and personal effects harboured more fleas. In many cases, their housing was located close to central wharves and warehouses, the major focus of the epidemic. Many houses in the residential streets bordering Darling Harbour needed repair and suffered from a lack of ventilation, perpetual dampness and an accumulation of filth and rubbish. Most lacked even the most basic sanitary and washing facilities. Communal facilities were common, and waste products ended up in the harbour via the street or open drains.

Figure 20 Cleansing Sussex Street, 1900 (National Museum of Australia)

In 1900, there were no uniform building regulations applying to the whole of Sydney, which meant that it was possible to erect a building without normal sanitation or water. Also, most houses in the City of Sydney remained unsewered and dependent on a system of cesspits around the city. Many people were infected by virtue of their place of work, others from an incidental encounter in the course of their daily activities. Plague progressed erratically through the city, and for many, infection depended on a chance encounter with an infected flea[167].

The areas cleansed generally coincided more with well-known city slums than areas with outbreaks. Garbage was removed, thousands of gallons of disinfectants and whitewash were applied, and some houses were demolished. The residents were denounced in the press and in Parliament for allegedly spreading the plague. Quarantining caused more hardship, as many people could not go out to work.

None of this was doing anything to curb plague, as it was the least likely of recent deadly diseases to response to cleaning, although it may have reduced infections of typhoid, a more serious killer.

Occupants could cleanse and fumigate their own houses, but usually an official gang of cleansers, scavengers, sanitary inspectors and common labourers descended upon each quarantined area and moved from house to house sweeping, disinfecting, limewashing, demolishing and removing large amounts of household and business rubbish.

The official instructions to these teams show the intensive nature of the exercise: all ceilings and walls had to be limewashed including cellars and basements, all exposed woodwork was to be washed with carbolic acid, all floor coverings were to be removed and the floors scrubbed with carbolic solution, stone and brick floors inside and out were to be thoroughly saturated, all waste material, ashes and dung were to be removed, all drains, sinks and water-closets were to be flushed with hot water followed by carbolic acid and chloride of lime.

In the case of infected warehouses and businesses, all merchandise had to be moved to give access to walls and floors so they could be cleansed, as above. All buildings in bad repair were to be demolished. At the end of these operations, occupants of cleansed premises were issued with a small placard to be fixed to the outside of the house, stating that the premises had been officially cleansed of plague infection. Such notices were for many a badge of shame and for others a sign of somewhere to be avoided.

At any one time, there were around 3,000 men involved in cleansing operations in central Sydney. Their activities usually attracted a large crowd, and watching their progress became a major recreational activity for a while. In a little over two months, almost 4,000 premises were formally inspected and cleansed and many thousands of tons of rubbish and filth removed[168].

After several months of draconian cleaning procedures by authorities, the Public Health Officer was finally heard, and a bounty was offered to volunteer rat catchers and rat poison distributed to councils. By the middle of 1900, the number of new cases of plague was in decline. While steps were being taken to eradicate the plague, a war of words was going on to find the culprit who allowed such a disastrous visitation to Sydney. The press whipped up a feeling of moral outrage against the filth of the inner city and the neglect of sanitation, all of which was largely blamed on the City Council.

There were minor plague outbreaks in later years, each one causing another war of words between the City Council and the Department of Public Health. The most important outcome of the plague was in major reforms at both Council and State government levels. The plague allowed the voices of town planners and improvers to be heard more clearly than before. It became fashionable to discuss the need for direct intervention, in the light of the clear failure of unregulated development, to create a city worth living in[169].

Isolation and quarantine

Cases and contacts were removed to the Quarantine Station at North Head, and during the epidemic more than 1,800 people were quarantined. Both plague victims and their contacts were transported by wagonette to the Woolloomooloo quarantine depot, and from there they were taken to North

Head in small steam launches. Frequently there was no attempt to segregate cases from contacts, and many contacts must have felt terrified during the journey.

People who were reluctant to leave their homes had to be forcibly ejected by the police and health authorities. For city boarding houses and hotels, a case or suspected case of plague meant the mass evacuation of dozens of people at a moment's notice. Fortunately, the Quarantine Station offered vastly improved conditions compared to the 1881 smallpox outbreak. Food was wholesome and plentiful, living quarters were generally comfortable and clean and medical care and nursing staff were readily available. Also, each inmate was allowed to send one free telegram to Sydney each day.

Figure 21 Quarantine Station Hospital (*Manly Observer*, 6 May 2024)

Cases of plague were strictly segregated from contacts. Those infected were housed in hospital buildings isolated on the promontory, while contacts were accommodated in detached pavilion-style cottages. The Chinese, always viewed with suspicion and never treated well, were forced to occupy tents near the beach. Initially, quarantine was meant to be short, but in practice many people were detained for long periods. The average time in quarantine for infected cases was seven weeks, or longer for some people[170].

Vaccination

In August 1899, the New South Wales Government cabled Professor Haffkine in Bombay requesting a litre and a half of a prophylactic preventative of the plague, but this had not arrived by the end of the year[171]. Waldemar Haffkine (1860-1930) was a Ukrainian bacteriologist who had worked in Bombay during the local plague epidemic from 1896 and developed vaccines against cholera and bubonic plague[172]. Until the middle of 1899, about 300,000 deaths from bubonic plague had occurred in India, and the disease had spread into other countries in Asia and the Pacific[173].

Sydney was thought to be at the mercy of the spread of plague and was dependent on effective precautions such as quarantine and the prompt arrival of inoculation material[174]. At the beginning of January 1900, the Victorian Board of Health declared the whole of Polynesia, Madagascar, the Seychelles and Reunion to be infected with the plague. A supply of plague vaccine had been received by the New South Wales Government by then[175].

Throughout the epidemic, no real effort was made to vaccinate Sydney people other than those most at risk from the disease, including those infected, their contacts and all medical staff. After May 1900, all public servants were also vaccinated[176].

In March 1900, the Government decided to conduct plague inoculation in the large Exhibition Building in Prince Alfred Park, due to the great number of people to be inoculated from the recently-infected Sussex Street area[177]. 1,200 people were inoculated in one day[178], and the following day 1,000 men lined up for their jabs before going back to work the following day to continue cleaning out the quarantined area[179].

But the doses soon ran out, and the 10,000 extra doses ordered by cable from India did not arrive for some weeks[180]. This was the only public offer of vaccination made by the Government during the epidemic. Note that the number of doses far outnumbered the actual number of cases, which is indicative of the panicked reaction by the Government when confronted by one of history's most feared diseases.

The aftermath of the plague

Urban renewal

The shock of an outbreak of bubonic plague in 1900 gave the government a timely excuse to clean up and modernise the city's wharves at Miller's Point. Large tracts of privately-owned waterfront land that included houses and stores were resumed (that is, compulsorily acquired) and knocked down. Model housing was erected, new roads were cut through the rocky shoreline and new wharves and shipping facilities were constructed[181].

The resumptions of 1901-1902 that followed the bubonic plague scare at Millers Point, The Rocks and harbour foreshores from Circular Quay to Darling Harbour were carried out by the State Government and not the City Council due to the Council's lack of power to resume properties at the time[182]. The *Sydney Corporation Amendment Act 1900* merely gave the Sydney Council the power to resume land for road alignments, which previously it could only do by purchasing on the open market, and had done so only infrequently.

But a few years later the *Sydney Corporation Amendment Act 1905* gave the Council the power to resume property in general. The Council launched into this with gusto, exercising powers that might astonish modern planners. Little attempt was made to define a slum area or listen to objections from affected parties. In addition, there was almost no recognition that renters had any rights at all.

The first area resumed was Athlone Place in Ultimo, where flooding was endemic. The Council removed a number of narrow streets, 435 houses and 1,779 people, where according to the City Health Officer an "undesirable class of tenants" lived in what everyone agreed was a deplorable slum. Next marked to go were the narrow streets and congested housing around Wexford Street near the Belmore Markets, in order to construct Wentworth Avenue. This resumption removed 178 houses and 724 residents, of which half were Chinese in origin.

There followed many others, including about 60 more houses in the Wexford Street resumption. Some resumptions were small, taking a street here, a house or two there, and some were grand, like the widening of major business thoroughfares such as William Street, Oxford Street and Flinders Street. New streets were opened and narrow lanes disappeared[183].

The genesis of urban planning

The bubonic plague outbreak starkly exposed gross inadequacies in the management of the city's development so far. "Improvement" and "beautification" became buzzwords in civic and professional circles as schemes were hatched for boulevards, public squares and civic centres. Underlying these improvements was the aim of efficiency to stimulate social and material progress. The architect John Sulman had foreshadowed these concerns in his 1890 book *The Laying-out of Towns* to cure the ills of urban disease with convenient, healthy and beautiful living environments[184].

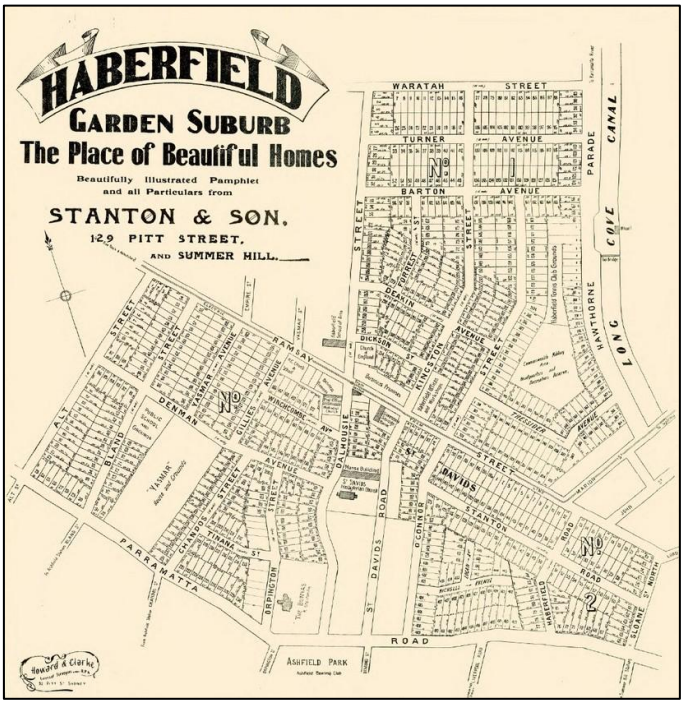


Figure 22 Haberfield Garden Suburb (Haberfield Association)

The practical realisation of urban improvements in Sydney emerged in three model suburbs in the early years of the twentieth century. Two men were instrumental in bringing this about: the auctioneer and estate agent Richard Stanton and John Sulman. In 1901, Stanton purchased fifty acres of land in Ashfield, 10 kilometres west of the CBD, and in a single development he combined subdivision, controls, house construction and tree-planting that was marketed as a Garden Suburb that he named Haberfield (the other two model suburbs were Rosebery and Daceyville).

The Haberfield Garden Suburb was Australia's first successful planned model suburb. It was designed as a direct antithesis of the unplanned densely populated inner-city suburbs that were associated with the recent bubonic plague outbreak (the now heavily gentrified Surry Hills was held up as an example of what to avoid). This visionary social experiment was so successful that it helped lock in the great Australian dream of the quarter-acre block with a house on it, which came to dominate how Australians sought to house themselves.

Haberfield was provided with innovative infrastructure such as sandstone kerbs and gutters, street trees, grass nature strips, sewage, gas and electricity. Stanton also included controls that pioneered local government regulations governing subdivisions: minimum distances from fences, minimum lot sizes, separation of land uses and the specification of materials. If all of this sounds like normal practice now, in 1900 it was not.

Stanton marketed the new suburb as “slumless, laneless and publess”[185]. “Slumless” is self-evident, “laneless” referred to the rear lanes that were common in congested inner-city suburbs, but which were seen as breeding grounds for the rats that spread the bubonic plague. “Publess” because the influential temperance movement was convinced that there were far too many pubs already (see reference to Surry Hills above)[186].

Other impacts of the plague

When bubonic plague struck Sydney in 1900, the Royal Agricultural Society hesitated but decided to continue with the Royal Easter Show that year. Vendors of patent medicines and disinfectants made the most of the opportunity, selling gallons of infusions and thousands of pills. While the Show went on in 1900, the Government cancelled it in 1919 due to a combination of the pneumonic influenza pandemic and another outbreak of bubonic plague[187].

Throughout the 1800s, Sydney’s wharves were privately owned, and their haphazard development was deemed to have contributed to the spread of bubonic plague in 1900. As a result, the Sydney Harbour Trust was formed in 1901 to take over the management of the harbour and the development of its facilities[188]. The *Sydney Harbour Act* was introduced by Parliament in July 1900[189] to establish the Trust. This arrangement continued until 1936 when the Maritime Services Board was established to unify all port and navigation services across New South Wales[190].

In January 1901, after the plague outbreak had subsided, Sydney Town Clerk Sir Robert Murray Anderson was moved to claim in his annual report that “the greatest blessing that ever came to Sydney, from the standpoint of the future welfare of the city, was the bubonic plague”. For the first time in the history of the State, the plague scare created a general interest in municipal affairs, and this newly awakened interest revolutionised municipal life and brought about reform in every direction[191].

In the end, the outbreak bubonic plague in Sydney, despite the small number of cases compared to other epidemics, proved to be a marvellous reformer[192].

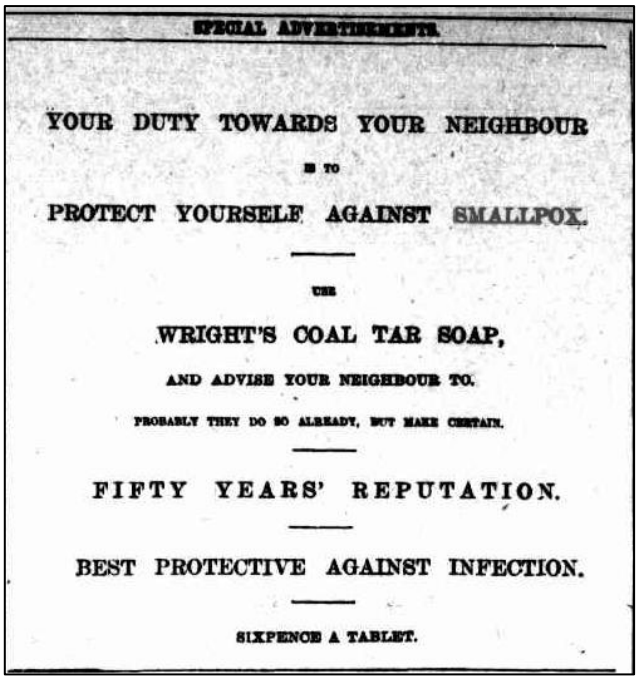
Smallpox, 1913-17

Smallpox in wartime

A mild but contagious outbreak

A smallpox epidemic in 1913, combined with the local impact of World War I, brought new chaos to Sydney. The strain was a mild one, although it was very contagious. There were 2,019 cases in Sydney but only 4 deaths in New South Wales[193].

The first case of a mild outbreak of smallpox in Sydney appeared in April 1913, after initially being suspected of being chickenpox. A crew member of a steamship brought it to Sydney from Vancouver, where a mild outbreak was occurring. By July, sixty cases were traced in Sydney, most of them so mild that medical aid was not called for. By that time, very few Sydneysiders were vaccinated against smallpox.


SPECIAL ADVERTISEMENTS.

YOUR DUTY TOWARDS YOUR NEIGHBOUR

IS TO

PROTECT YOURSELF AGAINST SMALLPOX.

USE

WRIGHT'S COAL TAR SOAP,

AND ADVISE YOUR NEIGHBOUR TO.

PROBABLY THEY DO SO ALREADY, BUT MAKE CERTAIN.

FIFTY YEARS' REPUTATION.

BEST PROTECTIVE AGAINST INFECTION.

SIXPENCE A TABLET.

Figure 23 Smallpox soap advert, 1913 (*Sydney Morning Herald*, 7 July 1913)

In early July, Premier William Holman said there was no need to be alarmed, and that the Board of Health was monitoring the outbreak[194]. However, the health authorities in both New South Wales and Queensland expressed concern that residents of both States had neglected smallpox vaccinations for some time, and that vaccine supplies were being ordered[195].

In the first week of July, 54 smallpox sufferers and their contacts were sent to the Quarantine Station[196], 33 to the Coast Hospital, and 9,500 people were vaccinated. The outbreak continued to be mild[197]. The publicity prompted manufacturers of soaps and sprays to start advertising their products in the newspapers[198].

Things suddenly got serious when an article headed “startling development, city and suburbs quarantined” in the *Sydney Morning Herald* reported that the Governor-General, Lord Denman on the advice of the Government issued a proclamation declaring Sydney and its environments to be a

quarantined area. People could enter Sydney but could not leave until they could prove they had been vaccinated[199].

This was the first time the *Quarantine Act 1908* had been exercised, and the Governor's proclamation was made under Section 12 of the Act. The proclamation was to remain in force for 145 days[200]. An area within a 15-mile radius from the General Post Office was declared a quarantine area, with a heavy £50 fine for non-observance. This amount was about five months wages for the average male worker at the time[201].

The *Herald* mentioned that calf lymph was the basis for smallpox vaccination at that time[202]. After calves were inoculated with smallpox, the lymph containing white blood cells which fight against disease was extracted and preserved in capillary tubes. This was then used to vaccinate people against smallpox[203].

The quarantining of Sydney had a drastic effect on the local economy: both interstate cargo and passenger business suffered a large falling off[204], and the restaurant trade had suffered badly as people were staying out of Sydney[205]. By the middle of July, a woman suffering from smallpox caused the steamship she was travelling in to be quarantined at Melbourne, resulting in a great rush for vaccines in that city[206]. Articles appeared in the press saying that the present outbreak drew attention to the local unpreparedness to cope with an epidemic such as this due to the low vaccination rate[207].

Figure 24 Vaccinated schoolgirls, 1913 (National Museum of Australia)

By the third week of July 1913, Dr Paton, the Director of Public Health, reported that about 150,000 persons had been vaccinated since the start of the outbreak. Sydney's population was about 700,000 at the time[208]. A debate was soon raging on the pros and cons of compulsory vaccination[209]. By mid-August, about 30,000 people had been vaccinated, and new cases of smallpox are either in unvaccinated people or those whose vaccination did not take properly[210]. The New South Wales health authorities expressed frustration that not enough people were being vaccinated against

smallpox, despite its guarantee of preventing the disease. By then, 513 cases had been reported to the North Head Quarantine Station[211].

By the third week of August 1913, public interest in vaccination waned along with the rate of infection. The public were ignoring the warnings from the medical profession of the importance of being vaccinated. There had been no fatalities so far, nor any great suffering. The main effect of the smallpox outbreak had been that Sydney was being shunned by travellers who were loath to go to an infected area[212].

Mandatory reporting of smallpox cases was in force by this epidemic, and the *Sydney Morning Herald* reported that a father in Pearl Street Surry Hills was fined £30 for failing to report to police or health authorities a case of smallpox in his house after his son fell ill with the disease. He had previously had two sons sent to the Quarantine Station with smallpox[213].

By mid-September, the Government was preparing a *Vaccination Act*. The Bill was drafted along the French lines with compulsory vaccinations in infancy, revaccination ten years later and again at age 21. This would only apply to children born after 1913. Moreover, there is a "conscientious objection" clause, so that a parent who conscientiously believes the vaccination is harmful to the health of their child can avoid a fine for non-compliance.

The *Sydney Morning Herald*, while reporting on this Bill, claimed that the power of vaccination had been demonstrated in Sydney where some 700 cases had occurred, and in only two exceptional cases, all were unvaccinated. In the two cases, vaccination was 12 days previously and there was some doubt as to whether the vaccinations were successful[214].

The quarantining of Sydney was controversial both in Sydney and in the country generally. On 18 September 1913, the New South Wales Board of Health resolved that the disease then in Sydney was an exceedingly modified form of smallpox, mild in nature, and with no tendency to change its nature and become more virulent. The Board thought that the quarantine proclamation should be withdrawn as it was unnecessary, and while in existence was injurious in many respects to the State of New South Wales.

On 10 November 1913, the presidents of the State Health Departments and the Commonwealth Director of Quarantine met in Melbourne to discuss the best way of dealing with the outbreak. By 19 November, the conference of medical officers had identified a series of conditions for the safe repeal of the proclamation. They involved the quarantine of all ships leaving Sydney at ports in Tasmania and Western Australia. Also, patients must be isolated, susceptible contacts must be dealt with, and there should be disinfection and required notifications under the *Public Health Act*.

The Federal Government agreed to lift to quarantine under these conditions, and on 26 November 1913, the Commonwealth repealed the proclamation, ending the quarantine of Sydney after 145 days[215]. By July 1914, three deaths from smallpox had been reported[216]. In January 1917, the *Northern Star* newspaper reported the number of cases annually since the start of the outbreak in 1913: 1073 in 1913, 628 in 1914, 471 in 1915, 106 in 1917. This is a total of 2278 to the beginning of 1917, and the epidemic had declined by then[217].

Aftermath of the smallpox epidemic

While the November 1913 conference developed detailed conditions for the repeal of quarantine, it did not create a lasting set of arrangements between State and Federal Governments for managing pandemics and epidemics[218]. The epidemic and the government response had one beneficial effect: it introduced a debate on the virtues and advantages of vaccination, and whether it should be voluntary or compulsory. This led to a rush of people being vaccinated. Sydneysiders were forced to take personal responsibility for safeguarding their own health, and smallpox has not been a problem in Sydney since[219].

Spanish influenza, 1919

The deadliest pandemic

The so-called Spanish flu epidemic was an exceptionally deadly global influenza pandemic caused by the H1N1 subtype of the influenza A virus. The earliest documented case in March 1918 was in Kansas, United States, with later cases reported in France, Germany and the United States in April. By 1920, nearly a third of the world's population, or roughly 500 million people, had been infected. Estimates of deaths range from 17 million to 50 million[220], making it the deadliest single event in recorded history.

The pandemic broke out near the end of World War I, when censors in the warring nations prevented bad news to maintain morale, but neutral Spain freely reported the outbreak. This gave the false impression that Spain was the epicentre and led to its common name of Spanish Flu[221]. Most influenza outbreaks predominantly kill the young and old, but this pandemic had unusually high mortality in young adults[222]. Medical researchers have not managed to explain this, but it is assumed to be related to the virus sending the immune system of young healthy people into overdrive, causing a severe inflammatory response.

The pandemic became a global example of countries scapegoating each other:

- The French press initially called it the "American flu", but then adopted "Spanish Flu" in order to avoid antagonising an ally[223],
- German soldiers called it "Flemish fever"[224],
- The Senegalese called it "Brazilian flu",
- Brazilians called it "German flu"[225],
- Spaniards called it "French flu"[226],
- Russians called it "Chinese flu"[227],
- Poles called it the "Bolshevik disease"[228], and
- The Japanese blamed sumo wrestlers for bringing it home from Taiwan and called it "sumo flu"[229].

The World Health Organisation's response to this tendency to blame others was to minimise social stigma by not associating culturally significant names with new diseases, listing "Spanish flu" as an example of what to avoid[230].

The children's song written during the 1889-90 flu pandemic and quoted earlier was shortened and adapted into a popular skipping-rope rhyme in 1918. It is a metaphor for the transmissibility of influenza:

> I had a little bird,
> Its name was Enza,
> I opened the window,
> and in-flu-enza[231].

Progress of the pandemic

In September 1918, a newspaper report on the Spanish influenza stated wrote that there were already 10,000 cases among the natives in the Rand mines in South Africa as well as Durban and other towns, although it appears to be mild[232]. At the same time, 20,000 cases were reported in military camps in the United States[233]. In December, an influenza vaccine was released in Melbourne. It was to be given in two doses, the weaker dose first and the stronger dose second[234].

Alarming news of what lay in store for Australians in December 1918 was a reported estimate that the pneumonic influenza epidemic had caused six million deaths worldwide in three months. One thousand deaths had occurred in London and no less than three million in India. It was considered the worst worldwide epidemic since the Black Death[235].

Figure 25 Surry Hills influenza depot, 1919 (NSW State Archives)

The Spanish flu finally arrived in Sydney at the end of January 1919, when four cases of the disease were identified in the Randwick Military Hospital in Sydney, the first a returning soldier who had travelled from Melbourne by train. Federal authorities declared New South Wales an infected area, and drastic restrictions were imposed: All theatres and other public places of entertainment were closed immediately as were all schools. Several inoculation depots were opened in the city and nearby suburbs. Inoculation and the wearing of masks were recommended immediately as measures of defence[236].

In the first week of February, the Government suddenly decided to close all bars, catching the alcohol industry by surprise. A meeting called by officers of the United Licensed Victuallers Association with the Government agreed that alcohol deliveries to homes would still be permitted, to fulfil orders received by mail, telephone, or left with hotel keepers personally. It was noted that the alcohol restriction was met with widely differing reactions by drinkers (who were dead against it) and temperate advocates (who were all for it)[237].

The first wave of influenza abated by the first week in March and the restrictions were lifted by the Government[238]. However, but the end of March, a second wave of the epidemic persuaded the New South Wales Government to postpone the Royal Easter Show in Moore Park and to convert the Hall

of Industries into a temporary influenza hospital. The wearing of masks was mandated in trains, trams, licensed vehicles, in the cabins of ferries and lifts[239].

The Hall of Industries was functioning as an Emergency Hospital by the end of March, although the Coast Hospital at Little Bay was taking the greatest number of patients[240]. In the third week of April the *Daily Telegraph* published a detailed report on the operation of the Emergency Hospital. A comparison was made between Easter Saturday in 1918 when 70,000 people happily attended the Royal Easter Show, and 1919 when 350 reluctantly attended, 200 of them patients of the temporary influenza hospital (the remainder being staff).

Figure 26 Influenza relief depot, 1919 (Footscray Historical Society)

A large staff of doctors, nurses and orderlies worked day and night fighting the dreaded epidemic. The row of convalescents in deck chairs indicated where the fight was being won, while swathed in white in the temporary morgue was where all the efforts of modern medical science were in vain and the fight was lost. Because proximity to other sufferers was the principal means of spreading influenza, as much space as possible was given to the living quarters of the staff, and every building in the Showgrounds was converted to accommodation so that each staff member had their own building or cubicle where possible[241].

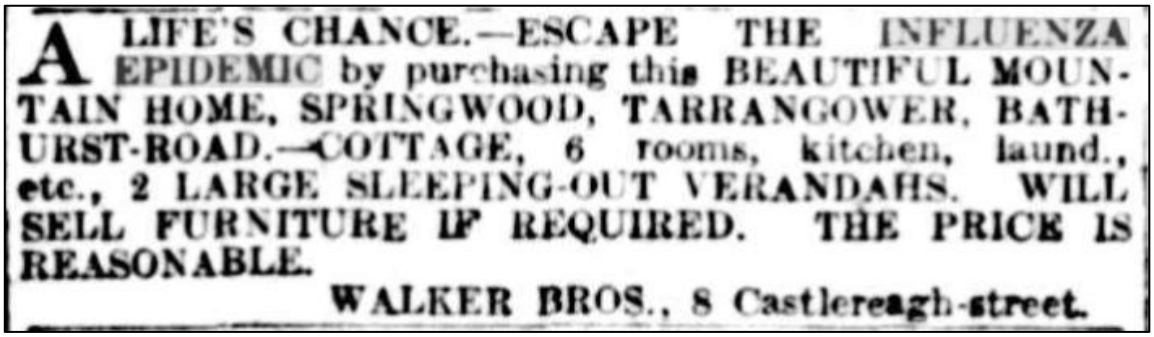
The nurses at the 25 metropolitan hospitals suffered an infection rate of 55%. During 1919, there were 2,966 admissions at the Coast Hospital at Little Bay, resulting in 313 deaths. Additional accommodation was established at the former cable station, Yarra Bay House at Yarra Bay in La Perouse. This was staffed and equipped with 31 beds, and between March and August 1919, 822 convalescent flu patients were treated there[242].

In 1954, *The Sun* newspaper published a review of past epidemics in Sydney. Writing about Spanish influenza, the paper noted that when the troops marched home from the Great War, an invader marched with them, silent and as deadly as any man-made missile. This was the pneumonic influenza pandemic, larger, wider and deeper than any of the preceding epidemics. Australia was the last of the continents to be attacked by this world-wide disaster, no doubt introduced by her returning soldiers. Treatments were weak and ineffective – old-fashioned poulticing and medicines

little above the standard of home remedies. Age was no bar and the robust seemed to fare worse than the weak. People stopped socialising, encouraged by the official disapproval of public gatherings at churches, racecourses, hotel bars[243].

The impact of pneumonic influenza

Because the pneumonic influenza targeted adults in the prime of life, it cut across the workforce and a generation of parents. Its impact was therefore felt in almost every community and family around the world. As a result, it is likely to be a part of everybody's family history. A signal moment was Mask Day, 3 February 1919, when a swathe of proclamations around that time led to the closure of public, private and denominational schools, as well as churches, libraries, theatres, music halls, pubs and racecourses. This affected communities, congregations and local economies.



A LIFE'S CHANCE.—ESCAPE THE INFLUENZA EPIDEMIC by purchasing this BEAUTIFUL MOUNTAIN HOME, SPRINGWOOD, TARRANGOWER, BATHURST-ROAD.—COTTAGE, 6 rooms, kitchen, laund., etc., 2 LARGE SLEEPING-OUT VERANDAHS. WILL SELL FURNITURE IF REQUIRED. THE PRICE IS REASONABLE.

WALKER BROS., 8 Castlereagh-street.

Figure 27 Real estate advert, 1919 (*Sydney Morning Herald*, 31 January 1919)

The requirement to wear gauze or muslin face masks on public transport or in enclosed spaces further contributed to the climate of fear. Other preventative measures were also established, such as public inhalation chambers to cleanse the airways[244]. In many areas, the disease steamrolled over the best-laid plans. Because the pneumonic influenza infected up to a third of residents, it often overwhelmed local services and emergency preparations. Falling sick or having to nurse infected family members further limited the number of people able to assist.

With schools serving as emergency hospitals and council buildings used as relief depots, thousands of ordinary residents volunteered to help face the emergency. Their services were often simple, such as providing food and clothing, nursing and childcare, but they helped many thousands through the crises. This was reminiscent of the voluntary spirit of the war years. Volunteers often stepped into the front line, exposing themselves to the deadly infection, and sadly many succumbed[245].

At the beginning of the pandemic, New South Wales had about 2,000 hospital beds, but between January and September 1919 more than 21,000 people were hospitalised. Randwick Racecourse became a 430-bed hospital and some of the closed schools were also used as emergency hospitals with wards set up in classrooms.

The mortality rate among indigenous people was as high as 50% in some areas. About 30-40% of Australia's population of about five million was infected. By contrast, during the 2018 flu season in Australia, the worst in a decade, about 1% of the population was infected and an estimated 1,127 people died.

If you lived in Sydney or in one of the towns on a train line radiating from the city, you were affected by the pandemic. You had to wear a mask and may have been caring for a sufferer. You were

advised to be inoculated and inhale zinc sulphate gases. You may have volunteered with the Red Cross or one of the relief depots. Normal life ceased for six months in the first half of 1919 as everyone from the Prime Minister to schoolchildren tried to manage the outbreak[246].

Figure 28 Melbourne Inhalatorium, 1919 (Museums Victoria)

In the end, the impact of the pandemic was massive: there were 3,902 deaths in metropolitan Sydney and around 15,000 deaths Australia-wide, all in one year. It is very hard to imagine what it must have felt like in Sydney in those days, war weary with so many families mourning loved ones lost at war and then lost at home from the pandemic. Sydney City Historian Lisa Murray wrote that the pneumonic influenza pandemic was a largely forgotten episode in the city's history, but the centenary of the pandemic in 2019 prompted an awakening of historical interest in the subject[247].

Rebuilding a postwar world

After the emergency was declared over in September 1919, individuals, families and communities recovered and focused on building a postwar world. Unlike the many memorials to the Anzacs who served and died in 1914-18, there are relatively few monuments to the victims and volunteers of 1919[248].

Quarantine was one of the first powers handed over by the States to the Commonwealth after Federation in 1901. An *Act Relating to Quarantine, 1908* gave the new federal government responsibility for deciding which infectious diseases should be quarantined and where quarantine areas should be established. The process of taking over the former State facilities was begun in 1910 by the Federal Quarantine Service (later the Commonwealth Quarantine Service). However, both before World War I and during the pneumonic influenza pandemic, Commonwealth and State Governments frequently clashed over quarantine policy.

Nevertheless, the effectiveness of the Commonwealth Quarantine Service in managing the 1918-19 pandemic was a major driver for the formation of the Commonwealth Department of Health in 1921. The Commonwealth Serum Laboratory (CSL), established in 1916, also produced and distributed large quantities of inoculation serum to combat the epidemic of 1918-19[249].

In April 1919, the New South Wales Government appointed a Committee of Claims to deal with the many and varied claims for compensation resulting from the restrictions imposed by the

Government during the pandemic. The *Influenza Epidemic Relief Act*, assented to in December 1919, allowed claims for business-related losses during the year. The claimants were primarily private schools, wine and billiard saloons, hotels, picture theatres and playhouses[250].

Figure 29 CSL staff packing vaccinations, 1919 (CSL website)

The pandemic revealed the poor living conditions that were experienced every day by many people in Sydney. The impact of the proclamations was seen by some as excessive, and the measures were largely ineffective in reducing the spread of the pandemic. Only those who were inoculated suffered a less serious attack of the disease and a lower death rate but were still just as likely to contract the disease[251].

The medical profession as a whole learned much about the importance of public health, in particular the gaps in public health services that had to be covered to deal with the crisis of 1919, and which contributed to reform in coming decades[252]. From the middle of the twentieth century, the combination of annual vaccines against major influenza strains and effective antibiotic drugs has greatly reduced the risk of a similar pandemic happening again[253].

Development of public health policy

Times of crisis such as infectious disease epidemics tend to focus the minds of health authorities on how best to handle the current emergency, and how to learn some public health lessons for dealing with future epidemics. The major outbreaks that affected New South Wales in the nineteenth and early twentieth century provided the impetus for the gradual development of public health policy in the State.

The following summary of the developing public health initiatives is an extract derived from the more detailed descriptions of each epidemic in the preceding sections.

Measles, 1867

The first major epidemic to afflict the colonists of New South Wales, a severe outbreak of measles among young children in 1867, was accepted as a normal part of childhood, to be treated with home care. It did not stir the authorities to implement any public health measures, apart from closing a few schools at the height of the epidemic. This was despite over 600 deaths in New South Wales, mostly children under five, making it probably the greatest childhood disaster of the nineteenth century in the Australian colonies.

Scarlet fever, 1875-76

Scarlet fever in 1875-76 was the first infectious disease outbreak to create official concern and generate public unrest. A series of official preliminary reports investigating the origin and means of transmission of scarlet fever were collected by the Sydney City and Suburban Sewage and Health Board. Suggestions that were put forward concerned segregation and quarantining of scarlet fever cases and the fumigation and cleansing of infected houses.

These were the first official efforts in New South Wales to endeavour to explain causes and transmission of disease, although the conclusions were based on the concern at the time with clean water, decent toilets and drains and pure air. But they were only cautious suggestions and were not put into practice at the time.

The Health Society of New South Wales contributed to the documentation effort by publishing a small four-page pamphlet entitled *Hints for the Prevention of Scarlet Fever*. The Government later circulated a memorandum titled *Prevention of Scarlet Fever*. Victoria was ahead of New South Wales in public health administration at the time, as the southern colony already had a Board of Health. This body published a series of public health measures for Victoria during the epidemic, which were published in Sydney newspapers.

Because scarlet fever was a reasonably well-known disease, the 1875-76 epidemic passed without leading to a major panic.

Smallpox, 1881-82

1881 saw the arrival of one of the most feared infectious diseases of the time when smallpox was detected in Sydney. In the nine months to February 1882, 154 cases were notified and there were 40 deaths. But these modest numbers give no clue as to the great wave of hysteria, panic and Chinese scapegoating that swept over Sydney during this epidemic.

Lack of preparedness by the authorities, very low rates of vaccination among the population, and poor coordination between government departments (including between Sydney Council and the State Government) proved to be a great impetus for reform. As a result, several concrete public health initiatives were implemented both during after the epidemic.

The first Board of Health in New South Wales with representatives from local government, health, police and Treasury was set up in response to the epidemic, with powers to handle wide-ranging public health matters such as sanitation and living conditions. In addition, the *Infectious Diseases Supervision Act* of 1881 introduced compulsory notification of smallpox and other infectious diseases, and the newly constituted Board was mandated to administer this Act.

The Coast Hospital for the treatment of infectious diseases was established in the remote suburb of Little Bay, even as the epidemic progressed. The facility accommodated both infected people and their uninfected contacts. A dedicated ambulance service with personnel trained in infection control was also established.

The Faculty of Medicine had been established at Sydney University in 1856, and the smallpox epidemic prompted the commencement of classes in 1883. This was at a time when most English medical practitioners were the product of hospital-based medical schools. The final public health outcome of the epidemic was a set of practical regulations and guidelines covering quarantine, isolation and the general management of epidemics.

Asiatic influenza, 1890-91

The last great epidemic of the nineteenth century was a worldwide influenza outbreak, whose rapid transmission around the globe was assisted by modern railway and shipping routes. It was the first infectious disease epidemic to hit New South Wales since the establishment of the Board of Health in 1881.

The methods adopted for the smallpox epidemic in 1881-82 of notification, isolation, quarantine and formal cleansing were impossible to put into effect this time because influenza was easily spread by person-to-person transmission, often in a mild form that avoided detection. The authorities could not quarantine the entire population, so they focused on a public education campaign of pamphlets and posters, encouraging people to avoid large crowds and places such as meetings and public transport, avoiding visitors when sick and keeping infected children away from school.

The Asiatic influenza epidemic had a high morbidity rate of some 100,000 infections in Sydney, but a very low mortality rate of 234 deaths. In this it had more in common with twentieth century epidemics than with the much higher mortality rates of nineteenth century epidemics of smallpox and bubonic plague. Because the public health response to this epidemic was to place responsibility in the hands of the population, a long-term effect may have been to encourage Sydneysiders to think more carefully about protecting their own health when in the public domain.

Bubonic plague, 1900

The anticipated arrival of bubonic plague at Sydney wharves in 1900 produced a panicked and confused response by different authorities who were either influenced by the old miasma theory (by disinfecting and limewashing everything in sight in the infected areas) or the newer germ theory (by exterminating the rats who carried fleas infected with plague).

However, both the disinfection camp and the rat removal camp were agreed on one thing, which was that much of the inner city was overcrowded, unhealthy, unsanitary and in dire need of renewal and modernisation. The harbour foreshore was an early target for a facelift, and the Sydney Harbour Trust was established in 1901 to take over the development and management of unregulated private properties in the wharves and warehouses around the harbour.

Sydney City Council was largely blamed for the run-down and rat-infested housing that contributed to the spread of plague in 1900, but its powers of urban renewal were severely limited until 1905, when the *Sydney Corporation Amendment Act 1905* gave it the power to resume property in general, and not just for road alignments as before. The Council went into slum clearance with great enthusiasm for several years, pulling down hundreds of slum dwellings, with little regard for the rights of the thousands of renters who were thus displaced.

A significant public health outcome of the plague outbreak was a new-found focus on urban planning. Model suburbs were designed with an eye to avoiding the problems of the past by providing urban infrastructure that we take for granted today, such as sewers, kerbing and guttering, street trees, gas and electricity, and controls to prevent the overcrowding of the past. From the point of view of urban renewal and the future welfare of the city, the plague outbreak of 1900 proved to be a marvellous catalyst for reform.

Smallpox, 1913-17

A mild but very contagious stain of smallpox erupted in Sydney in 1913 caused more than 2,000 infections but only four deaths. Despite its mild nature, smallpox was still a greatly feared disease, and the Government's draconian response was to quarantine much of Sydney for several months, causing considerable disruption and economic distress.

A major problem was that by then very few Sydneysiders had been vaccinated against smallpox (or survived a mild case in the past), leading to a vigorous campaign of public vaccination, accompanied by an equally vigorous public debate on the pros and cons of compulsory vaccination. By 1913, smallpox vaccination was well established (and manufactured from calf lymph) and provided an almost-guaranteed safeguard against this deadly disease.

Near the end of the quarantine period, two conferences of medical people were held in Melbourne which recommended the repeal of quarantine in Sydney but did not create a lasting set of arrangements between State and Federal Governments for managing pandemics and epidemics.

However, the epidemic and the government response did produce one lasting public health benefit, which was that it stimulated debate on the virtues and advantages of vaccination, and whether it should be voluntary or compulsory. This led to a rush of people being vaccinated. Sydneysiders were forced to take personal responsibility to safeguard their own health, and smallpox has not been a problem in Sydney since.

Pneumonic influenza, 1919

A global pandemic of a deadly strain of influenza swept the world in 1918, carried by troops from the United States to Europe during World War I, then brought to Australia in early 1919 by returning Anzacs. In nine months, it infected at least a quarter of Australia's population and caused up to 15,000 deaths. Health authorities in Sydney were overwhelmed by the size and speed of the disaster, and many volunteers stepped up to the front line to supplement nursing and other roles in a continuation of the recent wartime community spirit.

After the pandemic was declared over in September 1919, communities and Governments focused on rebuilding a postwar and post-pandemic world. In 1910, the Commonwealth took over the State-based quarantine facilities to establish the Commonwealth Quarantine Service, whose effectiveness in managing the influenza pandemic helped to drive the formation of the Commonwealth Department of Health in 1921.

The Commonwealth Serum Laboratory, established in 1916, demonstrated its great value to public health by producing and distributing large quantities of inoculation serum to combat the pandemic. Those who were inoculated suffered a less serious attack of pneumonic influenza and a lower death rate, although were still just as likely to contract the disease.

The medical profession as a whole learned much about the importance of public health during the pneumonic influenza pandemic. In particular, it learned about the gaps in public health services that had to be covered to deal with the crisis of 1919, and which contributed to reform in later decades. In the post-World War II era, annual vaccines against major influenza strains and effective antibiotic drugs have dramatically reduced the risk of a disastrous pandemic like the 1919 pandemic taking such a heavy human toll again.

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