Australian responses to the outbreak of bubonic plague at the end of the nineteenth century

By Emily Haynes for HIS225: Life and Death in the City

Australian responses to the outbreak of bubonic plague at the end of the nineteenth century demonstrate significant advancements in public health that occurred in previous decades. For centuries, the cause of bubonic plague remained a mystery among scientists and medical professionals. The belief in the existence of malignant miasmas remained the dominant theory behind disease and epidemics well into the nineteenth century. As a result, Australian public health focused on fixing environmental problems in an attempt to minimise malignant odours. This environmental focus is particularly evident in responses to typhoid fever in Toowoomba in the 1870s. However, in the last two decades of the nineteenth century, the germ theory began to divide opinions on disease among scientists and medical professionals. The science of germs was used to transform the aims and methods of public health from an inclusive concern with the environment to a focus on disease agents, people and their interactions. As the bubonic plague made its way towards Australia in the 1890s, Australian health authorities were aware of building evidence that the epidemics were associated with an epizootic infection in rats and began to incorporate preventative strategies. The implementation of quarantine stations, cleansing programs, the extermination of rat populations and the inoculation of at-risk people were several measures that demonstrate Australia drew on recent advances in science and public health to minimise the effects of the bubonic plague.

Bubonic plague pandemics historically raised many questions on the cause of disease. The plague is now known as an epizootic infection transmitted to humans by fleas infected with the bacterium Yersinia Pestis (Cossart, Mellor and Witton 2009, pp. 2-3). The bacterium spreads from the site of infection to the nearest lymph nodes, causing inflammation and swelling, and the toxins then spread to the internal organs (Cossart, Mellor and Witton 2009, p. 3). Vaccines are effective against the disease, and antibiotics can prevent its spread through the body (Cossart, Mellor and Witton 2009, p. 4). The most devastating epidemic in history, now known as the Black Death, swept through Europe, North Africa and parts of Asia in the fourteenth century (Altman 1998, p. 19). With the germ theory yet to emerge for several centuries, people believed the Black Death was “the wrath of God”, while others blamed the stars and looked to astrology for answers (Altman 1998, p. 22). Many people blamed miasma, which argued air became malignant from emissions of organic decomposition and resulted in gases or foul

smells that produced disease (Altman 1998, pp. 12-25). After wiping out at least a third of Europe's population, the bubonic plague continued to strike half a dozen more times before the end of the fourteenth century (Altman 1998, p. 26). There was little progress in understanding the plague or how it was treated during the Great Plague of London centuries later in 1665. The fumigation of houses and streets and herbs used to purify the air, were implemented in line with the miasma theory (Cossart, Mellor and Witton 2009, pp. 11-12). While infected ports were quarantined and authorities improved administrative measures, the strategies did little to prevent the bubonic plague's spread, with 110,000 people dying within a year (Cossart, Mellor and Witton 2009, pp. 11-12).

The belief in the existence of malignant miasmas was still central to Australian public health for the majority of the nineteenth century. Public health measures focused on fixing environmental problems, as demonstrated in responses to outbreaks of typhoid fever in the 1870s. Typhoid fever is caused by bacterium Salmonella Typhi which, when ingested, spreads to the organs and results in a range of symptoms including fever and diarrhoea (Emmeluth 2009, pp. 18-29). With an incubation period of 10-14 days, the disease is most commonly transferred from the urine and stool of infected people to food or drink they may be serving or preparing (Emmeluth 2009, pp. 18-29). Typhoid fever was particularly prevalent in Australia in the latter half of the nineteenth century as the country experienced marked urban growth without implementing adequate sanitary measures (Lewis 2014). Boards of Health were established from 1875 in response to a series of outbreaks (Curson 1989).

A Toowoomba Board of Health report developed in response to an outbreak of typhoid fever in 1878 and found the town's inner streets were lined with overflowing cesspits, filthy pigsties, dirty poultry houses, accumulations of fruit and vegetables, ill-kept drains and stagnating slop-water (Beal 1878, pp. 3-15). Three doctors who provided evidence to the board agreed the town was in desperate need of sanitary improvement. Doctor Stephen Flood considered the "town to be in a most deplorable sanitary condition", and that "there will very probably be another epidemic next spring or autumn, unless immediate sanitary improvements are carried out" (Beal 1878, p. 13). The Board blamed the prevalence of typhoid fever on the drought, well-water contamination and neglect for cleanliness and proposed preventative measures such as the abolition of cesspits, the substitution of dry-earth systems and stopping the use of well-water supply in favour of reservoir water (Beal 1878, pp. 3-4). Concerns with filth causing disease were also echoed in the Toowoomba community. The *Darling Downs Gazette*

published a letter from a ratepayer (1878, p. 3) stating, “the whole filth of many drains is being left to poison the atmosphere until such time as the general scavenger, rain, is gratuitously sent to our assistance, then for a time we can breathe freely”.

While we now know the miasma theory has been disproven, the push for sanitary reforms due to the belief of miasma was important in connecting dirt and disease. However, public health was still a low priority for the Queensland Colonial Government at this time, with the belief sanitation standards were up to individuals to take care of (Hampton 2005). As Hampton (2005, p. 66) states, “intransigent colonial government policy condemned both cities [Brisbane and Toowoomba] to inadequate sanitation infrastructure until the twentieth century”.

In the last two decades of the nineteenth century, the germ theory began to divide scientists and medical professionals on what caused disease. The new science of bacteriology that emerged in the 1850s was followed by the identification of pathogens involved in many significant communicable diseases in the late 1870s, including typhoid and cholera (Lewis 2014). While scientific understandings of communicable diseases were improving, a cure for many diseases was yet to be found, therefore much of the emphasis on public health in Australia was still on prevention (Lewis 2014). The shift to the ‘bacteriological era’ can be demonstrated in the transformation of the aims and methods of public health work from an inclusive concern with the environment to a focus on disease agents, people and their interactions (Worboys 2000). In Australia, a Public Health Bill passed in 1885, which included legislation on quarantine, the prevention of epidemic disease and sanitary regulation. A *Sydney Morning Herald* article (1885, p. 7) on the bill said the legislation enabled the Governor to appoint quarantine stations and medical officers for the inspection of ships, with masters of vessels required to report to and answer all questions from a health officer. Part III on the prevention of epidemic diseases enabled a Public Health Board to isolate infected people and remove them to quarantine, as well as clean and disinfect premises. The bill also gave local authorities the power to purchase, maintain and make sewers, as well as provide for the removal of refuse (Sydney Morning Herald 1885, p. 7). This bill was part of a range of comprehensive health acts passed in all Australian colonies in the last two decades of the nineteenth century (Curson 1989, p. 49). Many colonies looked into urban sanitation and public health conditions, and in the late 1890s public health attention turned towards the threat of bubonic plague (Curson 1989, pp. 49-51).

When bubonic plague was confirmed in Asia in 1894, Australian authorities began to tighten public health legislation in an attempt to avoid the disease spreading to the country via shipping routes. A *Newcastle Morning Herald* article (1894, p. 5) reported 447 deaths had occurred within 23 days in Hong Kong. Australian authorities were also responding to reports a Chinese steamer had arrived at Townsville with a man who had died with symptoms of plague. The article states, "owing to the rigorous requirements regarding fumigation, the agents have refused to land anything from the vessel" (Newcastle Morning Herald and Miners' Advocate 1894, p. 5). Meanwhile, scientist Alexandre Yersin was studying the Hong Kong outbreak where he found evidence of the link between rats and the bubonic plague in 1894 (Cossart, Mellor and Witton 2009, p. 2). Later, French bacteriologist Paul Louis-Simond proved fleas were the transmitter of the plague bacillus in 1898 and in 1901 John Ashburton Thompson, the chief medical officer of the New South Wales Board of Health, isolated Yersinia Pestis from fleas captured from dead rats in Sydney (Cossart, Mellor and Witton 2009). Thompson was appointed the head of the Board in 1896 where he selected Sydney Medical School graduates to build a public health department, including bacteriologist Frank Tidswell and medical officers' William Armstrong and Robert Dick (Sydney Medical School 2006). Thompson drafted a Public Health Bill passed in November 1896 (Sydney Morning Herald 1896, p. 5), which enforced the compulsory notification of diseases and gave the board the power to declare insanitary buildings unfit for human habitation, enabling them to close or pull down buildings. When Sydney was declared a plague-infected port in January 1900, health authorities began to implement preventative strategies using recent advancements in public health policies and scientific knowledge (Evening News 1900, p. 4).

Quarantining infected patients, as well as ships coming into Australian ports, played a significant role in preventing the spread of bubonic plague. In January 1900, Australia's first infected patient Arthur Payne, a delivery driver in Sydney, was immediately moved to a quarantine station along with those he had been in contact with (Evening News 1900, p. 4). The Board of Health traced where Payne had contracted the disease back to Sydney's wharf, and requested wharf labourers and shipping employees to assist by reporting "any unusual mortality among rats" or "any migrations of numbers of rats" they may observe (Evening News 1900, p. 4). Just three months later, a *Sydney News* article reported that the Premier had authorised expenditure of 3,000 pounds on permanent hospital buildings in the quarantine area at Stockton, Newcastle, and 300 men were commencing work on buildings at the North Head Quarantine Station in Sydney to supply extra accommodation for people who had been in

contact with plague sufferers (Evening News 1900, p. 6). As Cossart, Mellor and Witton (2009, p. 15) state, "if plague was diagnosed, arrangements were made to transport the person and their immediate contacts to the Quarantine Station. They were first taken to the Woolloomooloo depot, before travelling to North Head by steamboat". In March 1900, the government had closed a number of wharves in the plague-affected area in Sydney and all vessels were to be strictly fumigated (The Wingham Chronicle and Manning River Observer 1900, p. 7). An article in *The Wingham Chronicle* (1900, p. 7) stated drastic steps were to be taken to isolate Darling Harbour wharves, with no other vessels allowed to berth there until the area was considered "free of plague". The article also stated that goods—particularly produce and grains—from ships were to be removed and destroyed on the wharves. As Cossart, Mellor and Witton (2009, p. 16) state, "inbound ships were not permitted to communicate with the shore until they had been issued with a certificate stating they had been fumigated in line with Department of Health regulations".

Another significant response to the outbreak of plague in Australia was the cleansing of streets to improve hygiene. Gangs from a Plague Department in Sydney were employed to inspect houses and businesses, flush out and disinfect drains and toilets and catch and destroy rats (Cossart, Mellor and Witton 2009). A *Sydney Morning Herald* article (1900, p. 4) published in March 1900 demonstrates the emphasis put on private and public efforts to minimise the disease. The article reported the North Sydney Council was to issue letters to ratepayers directing that their premises be "thoroughly overhauled and cleansed" and that council undertake the removal of surplus debris. In the same month, the government reportedly employed "thousands of men" to clean the Darling Harbour district and a dozen wharves, with the area to be "entirely cut off from the rest of the city" if necessary. The Government was to also provide temporary shelter for the poorer classes during the works of disinfection (The Wingham Chronicle and Manning River Observer 1900, p. 7).

The extermination of rats was a significant part of the response in cities affected by plague around Australia. In Sydney and Brisbane, depots were established for receiving rats, with the Crookwell Gazette (1900, p. 2) reporting 731 rats handed in for destruction in one day at Sydney's city depot. Thousands of packets of poison were also distributed to people to kill rats privately (Sydney Mail 1902, p. 621). In Brisbane, the Metropolitan Joint Board for the Prevention of Epidemic Disease placed an advertisement in the Brisbane Courier (1900, p. 8) entitled 'Rewards for Rats', stating:

> A capitation fee of two shillings per dozen will be paid for all rats delivered to the Corporation Yard, Ann Street, City, South Brisbane, Booroodabin, and Toowoong. Precautions issued by this Board for Householders, in regard to the handling of rats, should be strictly observed.

By October 1900, professional ratcatchers and individuals had killed more than 108,000 rats (Cossart, Mellor and Witton 2009, p. 16), while authorities had dredged more than 52,000 tonnes of sewage from wharves, inspected and cleansed 3,800 premises, and destroyed more than 43,000 tonnes of rubbish (Kelly 1991).

The use of preventive vaccines in response to bubonic plague in Australia further demonstrates the advancements in public health that occurred in previous decades. In 1899, before the plague had arrived in Australia, Thompson had taken the precaution of ordering a supply of Haffkine's preventive vaccine (Echenberg 2007, p. 256). Waldemar Haffkine, who was heavily involved in earlier cholera vaccine studies, was called upon by the Indian Government to find a vaccine after the plague had reached Bombay in 1896 (Artenstein 2010, p. 100). He created a vaccine that prevented infection and reduced the mortality rate in plague-affected communities by 50 per cent (Artenstein 2010, p. 100). Thompson administered around 300 vaccines to medical workers and contacts associated with the first cases in Sydney in January 1900, and a further supply arrived two months later enabling another 8,000 people to be injected (Echenberg 2007, p. 256). While immunisation was not widely offered initially, discord broke out in Sydney when inadequate supplies of vaccine could not meet public demand. As Goldsmid (1988, p. 60) states, "with this epidemic there was much horror and panic, and in all 11,000 people were immunized, mostly residents employed in the infected area of Sydney". Even in Melbourne where plague did not break out until later, the Department of Health on Spencer Street had to abolish the practice of "promiscuous inoculation" due to large crowds waiting outside (Melbourne Punch 1900, p. 3). Those who wished "to become immune" had to write in with their name, address, occupation and age to be scheduled an appointment (Melbourne Punch 1900, p. 3).

Altogether, there were 12 major plague outbreaks in Australia from 1900 to 1925 as ships imported wave after wave of infection (Sydney Medical School 2006). Government health archives record 1,371 cases and 535 deaths, with Sydney hit hardest and the disease recorded

sporadically in other areas, including north Queensland, Melbourne, Adelaide and Fremantle (Sydney Medical School 2006). Considering more than 60,000 people died in the summer of 1894 in Canton, China, and 100,0000 people were hit with the disease in Hong Kong in just two months (Cossart, Mellor and Witton 2009, p. 13), Australia's response to the bubonic plague demonstrates significant public health advancements when analysing the comparatively lower rates of mortality.

Australian responses to the outbreak of bubonic plague significantly minimised the impact of the epidemic on the population. The implementation of public health policies such as quarantining infected patients and contacts, as well as vessels coming into ports, the cleansing of insanitary areas, exterminating rats and inoculation of infected patients and at-risk people, all played a significant role in preventing an epidemic of major proportions. These public health measures were a vast contrast to the way previous epidemics in Australia were handled, as demonstrated in the 1878 outbreak of typhoid fever in Toowoomba, which showed a lack of public health policy and empathy from the government for those living in poor sanitary conditions. The widespread belief in the miasma theory limited the government's vision for longer-term solutions. While the miasma theory eventually led to the implementation of important drainage and sewerage infrastructure, it was the emergence of the germ theory in the late nineteenth century that transformed the aims and methods of public health. Governments began to focus not only on the environment, but also on disease agents, people and their interactions, with the introduction of quarantine policies, the compulsory notification of diseases and preventive measures that included private and public intervention. The responses ultimately improved the living conditions of people in cities, with more humane and rational public health policies.

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