

Remembering 1918

WHY DID MĀORI SUFFER MORE THAN SEVEN TIMES THE DEATH RATE OF NON-MĀORI NEW ZEALANDERS IN THE 1918 INFLUENZA PANDEMIC?



THE 1918 INFLUENZA PANDEMIC remains the world's worst disease-disaster of recent history, killing an estimated 60 million people, or four times the estimated total death toll from the First World War.¹ Indigenous populations ('First Nations') were severely affected by the second wave of the pandemic, and suffered some of the highest recorded death rates in the world. Some aboriginal stations in Queensland recorded death rates of 50%.² Island nations were especially at risk. In Western Samoa, then under New Zealand military control, failure to impose a maritime quarantine resulted in the deaths of 8500 people, about a fifth of the whole population.³ Recent research by John Ryan McLane has found that the disruption to agriculture caused by the flu pandemic resulted in a famine in Western Samoa in 1919, and the combined death toll from both disasters may have claimed as much as a quarter or a third of the pre-pandemic population.⁴

New Zealand's indigenous Māori population also suffered severely in the 1918 flu, though not on the same scale as the people of Western Samoa.⁵ The recent compilation of an electronic dataset of registered Māori influenza deaths from 1918 has enabled a reappraisal of Māori mortality patterns and their geographical distribution.⁶ While largely confirming the author's previous analysis, this new work has highlighted the greatest puzzle about the 1918 pandemic in New Zealand: why did it kill Māori at more than seven times the rate of Pākehā New Zealanders?

Official figures for Māori deaths from the 1918 flu are notoriously unreliable. The official figure released in 1919 was 1130. This had been arrived at in a very simple way. Clerks from the Census and Statistics Office had been told to count all registered Māori deaths in November–December 1918 from influenza and/or pneumonia. They counted 1160. Dr Robert Makgill, senior Health Department bacteriologist, compared this with the last quarter of 1917, when there had been just 30 registered Māori deaths from respiratory causes. He deducted that number and concluded that there had been 1130 excess Māori deaths attributable to the flu pandemic.⁷ It does not seem to have occurred to Makgill or the census clerks that the disruption caused by

the pandemic would make the registration of Māori deaths very late in 1918. When I went through the death registers at Lower Hutt in the 1980s I found nearly 500 more Māori deaths that had occurred in November–December 1918 but were not registered until early in 1919. These registrations were mostly made by police, clergy or government interpreters. I also found 59 Māori deaths that had been entered on the Pākehā register by mistake. The final total of registered Māori deaths was therefore 1679.⁸

This was not the full picture, however. There were suspiciously low totals of registered Māori deaths from Waikato, Bay of Plenty, East Cape and Manawatu. Waikato also had very low population figures from the 1916 census. The reason for this was probably the Māori anti-conscription campaign, which had resisted any participation in the white man's war, the 1916 census or vital registration. After all, why would an oppressed ethnic minority want to give their vital statistics to a colonial government that had confiscated their land and reduced them to poverty?

Newspapers provided another source of evidence, from the reports of police and relief parties that had visited Māori settlements during and after the pandemic. In some places they provided totals of deaths, and sometimes (more rarely) lists of names. Comparing the registered totals with these reports enabled an estimate of how many Māori deaths had not been registered, and finally nudged the total of evidence-based Māori mortality to 2160. From a Māori population estimated at 51,000 in 1918, that total yielded a death rate of 42.3 per 1000. The Pākehā death rate was much lower: 6413 registered deaths from a population of 1.09 million gives a rate of 5.8 per 1000. On the evidence of the registered deaths, Māori died at 7.2 times the rate of non-Māori in the 1918 pandemic.⁹

However, there were some places in Waikato and Northland where there may have been dozens of Māori deaths neither registered nor reported. Two memorials in Northland are suggestive. The Motukaraka Point memorial lists eight names of Māori victims; only four were registered. In the old meeting house at Otiria near Kawakawa, which was used as a temporary Māori flu hospital in 1918, there is a framed list of the names of 28 victims: fewer than half of these were registered.¹⁰

Any attempt to estimate Māori death rates is complicated by the imperfections of the 1916 census. The total Māori population of 49,397 was regarded as faulty at the time, and the best estimate for 1918 remains about 51,000. In some places where population was under-reported, and the true denominator population was higher, the registered deaths would produce a lower mortality rate. Conversely, in areas where the census figures are more reliable, under-reporting of flu deaths may conceal a higher mortality rate. At

present there is insufficient available data to resolve these uncertainties, but the defects go both ways and may cancel each other out. We have to make the best we can of the available evidence, and the overall picture is fairly clear.

The latest estimate suggests there may have been as many as 2500 Māori deaths from influenza and/or pneumonia in the 1918 pandemic.¹¹ From a Māori population estimated at 51,000, this would give a death rate of 49 per thousand (almost 5%), which is among the higher rates in the world for an indigenous population. (Ethnic Fijians had a 5.5% death rate.) Recent work on New Zealand military personnel overseas has added another 258 mostly Pākehā deaths.¹² With the estimate of 2500 Māori deaths, total New Zealand mortality in the 1918 flu was probably close to 9000. From a total population (Māori and Pākehā combined) of 1.15 million, we get an overall death rate of 7.8 per 1000. This is much the same as France or Germany, but it conceals the striking ethnic differential in mortality rates in New Zealand.

Over 18,000 New Zealand soldiers died in the four years of the First World War, yet about 9000 New Zealanders, mostly civilians, died from the flu in just two months in late 1918. This was New Zealand's worst public health disaster to date, and the death toll massively outstrips those of the Napier earthquake or the Erebus disaster, New Zealand's more familiar 'worst' disasters.

So why did Māori die from the 1918 flu at more than seven times — probably eight times — the rate of the Pākehā population? A major study of differential mortality rates by ethnicity in New Zealand in the influenza pandemics of 1918, 1957 and 2009 suggests a higher prevalence of infection, concurrent medical conditions and lack of access to health services as the three main factors for poorer pandemic influenza outcomes among indigenous populations.¹³ Geographic remoteness may also have contributed to a higher Māori death rate, though another study has found that rurality offered some protection to the non-Māori population.¹⁴ The higher mortality rate among Māori soldiers confirms that the 1918 pandemic adversely affected even relatively fit young men. Another risk factor identified was the high rate of illness and death among young adults, which would have limited their capacity to care for the young and old who also caught the flu. Crowding and poor housing were seen as other contributing factors in 1918.

Epidemiologists recognize three key factors in explaining pandemic mortality: the virulence of the infective organism; host susceptibility; and environmental or social contexts. Epidemic diffusion also depends on the extent of contact between infected and susceptible individuals, usually expressed as R , or the reproduction-rate.¹⁵ Mortality is also influenced by the attack rate of a new infection, which affects the case-fatality rate.

Public health measures to increase social distance, such as school closures and banning gatherings at race meetings, churches and dance-halls, do not appear to have had any significant effect on the Māori population, which was predominantly rural in 1918.

Infective Virulence

The 1918 pandemic was caused by a new avian influenza virus, A/H1N1, which swept around the world in a mild form in the first half of 1918. It showed a preference for young adults (which was unusual, as influenza normally kills only the very young and the very old), but mortality was generally low. Then, after the virus had passed through the millions of men fighting on both sides of the Western Front, the virus seemed to change in character, and became much more aggressive and invasive. Normally healthy and robust adults were hit suddenly, with high fever, headache, dry cough, prostration and delirium. Two unusual symptoms associated with this severe second wave were copious nose-bleeds and cyanosis. The latter is discoloration of the skin, turning it a dusky purple, when the lungs become so congested with blood and fluid that insufficient oxygen is exchanged into the blood stream. Young adults aged between 25 and 45 began to die in large numbers, all around the world, and their bodies often turned black after death.

Experiments a decade ago with a reconstructed A/H1N1 virus injected into macaque monkeys have suggested that this was an unusually invasive virus, by-passing the usual defences of the respiratory tract to lodge deep inside lung tissue, causing inflammation and bleeding, and unleashing various types of pneumonia.¹⁶ Observers noted in 1918 that most victims died from pneumonia, usually after a week or so, but some died very suddenly, only a day or two after first flu symptoms appeared.

Wartime transport by sea and rail spread the enhanced virus around the world within a few months. Every country with a developed rail network saw very rapid diffusion of the 1918 flu. Australia was the 'lucky country' in 1918: a prompt and effective maritime quarantine from 16 October kept the second wave at bay. American Samoa had no flu deaths, also thanks to a strict maritime quarantine. The third wave of the pandemic in 1919 affected many countries in Europe, as well as Japan and North America. Australian cities now had the flu over a longer period, but the death rate was very low, a mere 2.4 per 1000.¹⁷ New Zealand had no major return of the flu in 1919. The A/H1N1 virus had settled down to a normal pattern of seasonal flu, without the spectacular mortality of late 1918.¹⁸

A communal style of living ensured that pandemic influenza spread rapidly once it entered Māori settlements. A major effort to replace old

thatched whare with European-style wooden houses had started in 1901, but these were expensive for Māori to build, and the bulk of the indigenous population was poverty-stricken from loss of land by the late nineteenth century. Many Māori in 1918 preferred sleeping communally in te noho whare (raupō-thatched sleeping huts) on bare earth floors or mats, huddled together at night for warmth. These conditions enabled droplet infections to spread rapidly. Raeburn Lange remarks that the new wooden houses were often unlined, and therefore cold and draughty.¹⁹

Lack of Immunity

The first wave of the 1918 pandemic undoubtedly conferred some immunity on those who caught it. Observers often reported in New Zealand that people who had caught the flu in September or October were able to nurse others in November and December without any further symptoms. Yet there were also some unlucky individuals who caught it in both waves. Pākehā morbidity in the November pandemic has been estimated at roughly half the population, suggesting that most of the other half had caught the milder first wave or were naturally immune to influenza. However, a few unlucky places such as Inglewood and Nightcaps had up to 90% morbidity, and suffered high death rates.

The pattern of immunity from the first wave in the Māori population appears to have been extremely patchy and limited. Dr C.S. Davis, medical officer to the Māori in Waiapu County near East Cape, reported that mortality from the November wave at Waipiro Bay was much less than expected when compared with other North Island districts. Influenza had been rampant in his district in September, and Māori who had had the flu then seemed immune to the second wave.²⁰ His colleague at Tolaga Bay, Dr Weeks, confirmed this observation. The earlier wave had been more fatal than the second in his area. Newspaper reports suggest similar pockets of immunity elsewhere. In the Bay of Plenty, from Matakana to Te Puna, and in the Waikato around Matamata, several communities seemed to have missed the November flu entirely. When questioned by a reporter, those near Matamata said they had all had severe influenza about six weeks before, in early October.²¹

While it is hazardous to generalize from these few scattered exceptions, it would appear that the majority of the Māori population missed the first wave of the pandemic, and therefore lacked immunity to the more severe second wave. One possible explanation might be that the Māori population was still overwhelmingly rural in 1918. More remote settlements had little contact with the Pākehā population, and few or no European-style medical services. The flu spread rapidly in the Pākehā population, by rail and sea,

and only after it was established in the main centres and towns did it start to extend to Māori settlements. Outside the main centres the ratio of urban to rural deaths was two to one, with 61% of Pākehā deaths occurring in boroughs or town districts. A person was therefore three times more likely to die from the flu if they lived in a city than if they lived in the country, and twice as likely to die if they lived in a town rather than on a farm.²² For the Pākehā population, the 1918 flu was a largely urban phenomenon. The peak of Pākehā flu deaths occurred on 23 November and mortality declined rapidly thereafter. Registered Māori deaths peaked a few days later, on 26 November, but mortality declined more slowly than in the Pākehā population, extending well into December.

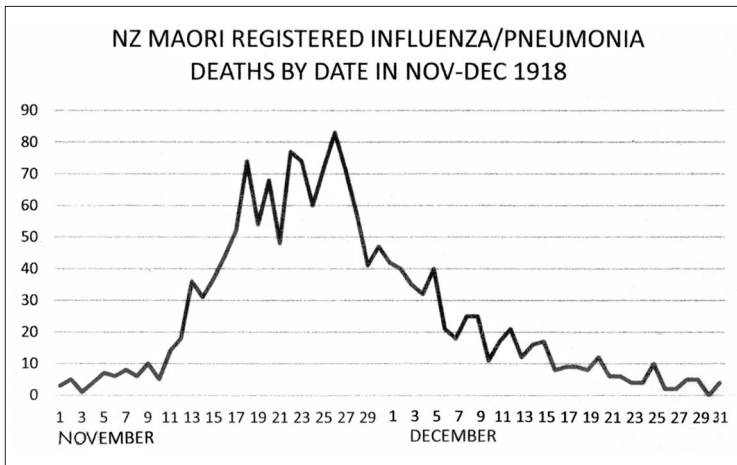


Figure 1: New Zealand Māori Registered Influenza/Pneumonia Deaths by Date in November–December 1918.

Source: Māori Death Register, Registrar-General's Office, Wellington.

Though a predominantly rural population in 1918, many Māori lived in close proximity to small towns and Pākehā settler farmers. Why did they not therefore share in the immunity conferred by the mild first wave? Much would depend on the frequency of contact between the Māori and Pākehā populations. Where Māori were employed on farms or in shearing gangs, or working in sawmills and meat works, there would have been ample opportunity to become infected by the flu virus. Smaller settlements that were not self-sufficient and relied on purchasing provisions from Pākehā storekeepers would also risk infection. But for more remote rural Māori, their contacts

with the Pākehā population may have been infrequent and intermittent. Even so, it needed only one infected individual, such as a returning soldier, to bring the second wave of the flu into a remote area.

Most Māori districts suffered heavy mortality in the severe second wave. This plain fact logically suggests an absence of immunity acquired from the first wave of the pandemic. Northland was hit hard, with death rates from registered Māori deaths exceeding 50 per 1000 in the Bay of Islands, Hobson County, Dargaville and Otamatea. South-east of Auckland, Thames, Ohinemuri, Whakatane and Opotiki counties also recorded very high death rates. These areas appear to have largely missed the first wave. However, their registered death rates were easily surpassed by the King Country and South Taranaki, which were both on main railway lines. Kaitieke County had 54 registered Māori deaths from a population of only 237, a staggering death rate of 227 per 1000 (similar to that of Western Samoa). However, this exceptional figure may also reflect the incompleteness of the 1916 census. Hawera County recorded 67 Māori deaths from a population of 369, a rate of 181 per 1000. By contrast, Waikato, East Cape, Hawke's Bay and Manawatu had much lower death rates, despite their large Maori populations. It seems highly likely that Māori death registrations in 1918 were seriously incomplete in these regions.²³ Resistance to wartime conscription by the Kīngitanga movement in Waikato had included a boycott of the 1916 census and a refusal to register births and deaths. Even without this special circumstance, Derek Dow has remarked that Māori death registration before 1930 was never much better than half the total of actual deaths.²⁴

Host Susceptibility

Host susceptibility among indigenous peoples is a complex and controversial issue. While there is abundant evidence to show that Māori and other Polynesian peoples have a greater susceptibility to respiratory diseases than Pākehā New Zealanders, epidemiologists see this as a very minor factor in explaining excess influenza mortality.²⁵ Much more important was the burden of concurrent medical conditions.

Reports of teachers in native schools and native medical officers in the two decades before the 1918 flu pandemic frequently refer to the prevalence of 'low fever' or just 'fever' which often affected school attendance. Typhoid was the main cause of such fevers, and was difficult to eradicate, due to poor sanitation and polluted water sources. The 'typhoid year' of 1910–1911 saw major outbreaks in several Māori districts. Almost all observers of Māori health in this period comment on the prevalence of respiratory diseases. Chronic bronchitis and deaths from pneumonia were 'very common'. Such

infections were easily spread by a communal lifestyle, and when Māori gathered in large numbers for tangi and hui. Inadequate or absent sanitation at such times would have added to the risk of typhoid outbreaks.²⁶

In 1918 the so-called 'Spanish' influenza struck a Māori population that was already suffering from a high incidence of pulmonary tuberculosis. Reliable statistics are not available before the 1920s, but Dr Maui Pomare and Dr Peter Buck (Te Rangihiroa) during their work for the new Department of Public Health between 1902 and 1909 had found that TB was rife in all the Māori communities they visited. Dr Pomare thought it the next major cause of death after typhoid and infant mortality. (More than half of Māori infants died before the age of four in those days.) Tuberculosis had spread unchecked in the nineteenth century, mainly due to traditional Māori hospitality and large crowds at hui or tangi.²⁷

Pomare's worries about TB were confirmed in the 1920s when it became clear even from incomplete death records that Māori death rates for TB were about ten times those for the non-Māori population. Dr Turbott's work in Waiapu County on the East Cape in 1933 provided the first reliable case study, examining over 2000 Māori. He established a death rate of 4 per 1000 from TB, which turned out to be very close to the official TB death rate for the whole Māori population in the 1930s. By 1945 it was down to 3.7 per 1000, and declined rapidly thereafter, with improvements in housing and the use of antibiotics, immunization and X-ray examination.²⁸

We may safely assume, then, that in 1918 a large proportion of the Māori population was infected with pulmonary tuberculosis, and that this made them especially susceptible to a virulent respiratory infection like pandemic influenza. Individuals infected with the flu were likely to develop pneumonia, and in that pre-antibiotic era pneumonia cases usually had only a 50-50 chance of survival. It may also be assumed that the presence of rheumatic fever and meningococcal disease also increased the vulnerability of the Māori population.

Another possible contributing factor to a heavy burden of Māori mortality from the 1918 flu was the prevalence of tobacco smoking. After some initial reluctance, Māori had taken up tobacco smoking in large numbers in the late nineteenth century. Missionaries had protested at the way European merchants tried to get Māori addicted to tobacco. William Colenso thought that 'the unlimited use of tobacco, and its many substitutes, and its many attendant evils', was one of the main causes of the decline of the Māori population. A visitor to the King Country in 1884 commented on the 'immoderate use of tobacco among both old and young'.²⁹

Yet Māori regarded chewing or smoking tobacco as one of their greatest luxuries, as it enabled them to emulate the dominant settler society. Unlike the non-Māori population, where women smokers were rare before 1900, Māori women had taken to tobacco with as much enthusiasm as their menfolk. Those Goldie and Lindauer portraits of old Māori women smoking pipes could be more typical of their day than has been realized hitherto. It is safe to assume that nicotine addiction, and possibly lung cancer, was as widespread as TB in the Māori population by 1918. Heavy smoking of home-grown tobacco would have damaged smokers' lungs from the deposit of tar and nicotine and made them less able to cope with influenza, let alone any secondary pneumonic infections. Indiscriminate expectoration, often observed by visitors to Māori settlements, would have contributed to the spread of TB and other respiratory infections.³⁰

Alistair Woodward and Tony Blakely have concluded that 'the damage to Māori caused by tobacco must have been substantial from the late nineteenth century, but is difficult to quantify'.³¹ Reid and Pouwhare, reflecting on the role of introduced diseases and changes in lifestyle in the decline of the Māori population up to 1900, note that the role tobacco played is not clear, 'although it must have aggravated the devastation of chest infections such as tuberculosis, influenza and pneumonia'.³²

During the 1918 influenza pandemic New Zealand doctors, unaware of the dangers, sent out mixed messages about smoking. Many doctors at the time smoked, and some positively encouraged tobacco smoking among their patients, as a simple personal fumigation system, which might hopefully kill off a few 'flu germs'. The newspapers noticed that many women took up smoking during the 1918 flu, and kept on smoking afterwards.³³

Many doctors also recommended alcoholic stimulants for patients convalescing from the flu, and during the pandemic official supplies of whisky and brandy were made available to flu sufferers who could show a written note or order from their doctor. We just don't know enough about Māori and alcohol in 1918 to make any comment about its role in worsening Māori mortality from the flu, but any alcohol addiction would have added to the vulnerability of a population already afflicted with TB and typhoid.³⁴

Poor nutrition was another possible contributing factor to Māori susceptibility to the 1918 flu. After the end of the musket wars, most Māori had left their healthy hilltop pā sites and settled in the valleys to be close to the fields where they grew new European foods such as maize and potatoes. At certain times of the year, food was not plentiful. It was easier to buy flour and sugar from the nearest European store than to gather and process

traditional foods from the environment. Pork remained a major meat source, while coastal settlements had access to fish or shellfish. Woodward and Blakely suggest that 'Pork and puha' was a standard Māori diet in the late nineteenth century. Dietary changes had resulted in a diet high in protein and carbohydrates, but lacking in many essential vitamins and minerals.³⁵

As noted earlier, the most striking feature of the 1918 influenza pandemic that sets it apart from all other recorded outbreaks is the high mortality among young adults in age groups between 25 and 45. Among those unlucky enough to catch the flu, pregnant women and young adults were at greatest risk of dying. The most plausible recent explanation of young adult mortality in 1918 relates this pandemic to the previous 'Russian' influenza of 1889–1891. It entered Europe from Russia, but its origins were thought to be in Asia, so it was also called the Asiatic flu. This infection spread world-wide, but was not as fatal as the previous major flu pandemic of the 1840s. About a million people are thought to have died. A study of 11 cities in North America found that the peak age of 1918 victims was 28 years, and argued that the cohort born in or around 1890 had unusual susceptibility to the new pandemic virus.³⁶ Independent work by John Brundage and Dennis Shanks supports this hypothesis, suggesting that exposure early in life to the A/H3N8 virus of 1889–1891 damaged T-cells in the immune system which then overreacted when exposed to the A/H1N1 virus of 1918.³⁷ This would help to explain why the 1918 flu killed big strong men in the prime of life: the strength of their immune reactions ('cytokine storm') unleashed secondary pneumonias which killed them within a few days.³⁸

Māori mortality in the 1918 pandemic as shown in the accompanying graph of age-specific deaths (from registered deaths only) clearly demonstrates the preponderance of young adult mortality. There are two striking differences between this graph and age-specific deaths for the Pākehā population. Male and female deaths were almost in tandem among Māori, whereas in the Pākehā population deaths for males in the age-groups 25 to 45 were almost double those for females. Unlike the Pākehā population, many more Māori children and old people died, as well as those in their fifties.

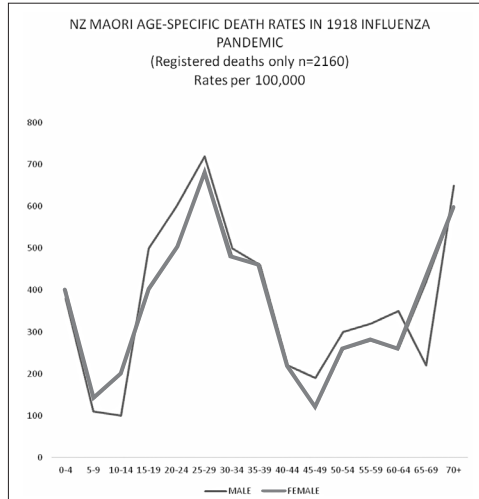


Figure 2: New Zealand Māori Age-specific Deaths in the 1918 Influenza Pandemic (registered deaths only).

Source: Māori Death Register, Registrar-General’s Office, Wellington.

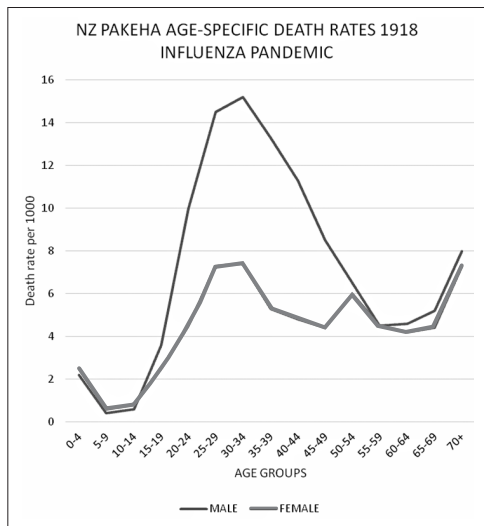


Figure 3: New Zealand Pakeha Age-specific Death Rates in the 1918 Influenza Pandemic.

Source: Registrar-General’s Office, Wellington.

Environmental and Social Factors

The first official history of public health in New Zealand gave the old official figures for Māori mortality in the 1918 pandemic, then remarked: ‘Bad housing conditions combined with overcrowding must have contributed to this heavy mortality’. This was a simple statement of the obvious.³⁹

Dr Maui Pomare in his first tours of Māori districts in 1902–1904 had reported on the dismal state of Māori housing. As previously noted, though some settlements had European-style wooden houses, most Māori in 1918 still slept communally in traditional sleeping huts, on damp dirt floors, packed together at night to keep warm, and without much ventilation. This created ideal conditions for the spread of a droplet infection like influenza, but even more seriously it meant that when the worst cases developed secondary pneumonia, staphylococcal and streptococcal infections could be spread equally easily.

Poor sanitation and contamination of water supplies had caused frequent outbreaks of typhoid fever and other diarrhoeal infections in Māori settlements during the nineteenth century. These were major contributors to the high infant mortality rate that had accompanied the steady decline of the Māori population until the mid-1890s. The 1918 flu did not attack a healthy population. On the contrary, it struck a Māori population that was already often sick and impoverished.⁴⁰

In addition to these environmental and social factors, some weight should also be given to Māori beliefs about sickness. Christian missionaries had seriously undermined the traditional Māori world-view, in which illness with no obvious cause (*mate atua*) was caused by malign spirits, unwitting breaches of *tapu*, or *makutu* (‘black magic’) aimed at or by an enemy. Despite widespread Māori conversion to Christianity, such beliefs had persisted well into the twentieth century. They may help to explain the fatalism often observed by Pākehā relief workers and nurses in Māori districts: the commonest response to the flu was for a Māori sufferer to ‘turn his face to the wall and wait to die’. There was often an absence of any will to live, or treat the illness or help others afflicted by the flu.⁴¹

While most Māori had taken up European medicines with enthusiasm, cost and lack of access to hospitals and pharmacies would have severely limited the resources available in Māori settlements to deal with a medical emergency such as the flu pandemic. There are some isolated examples of the use of aspirin by visiting relief workers and nurses, but most medicines available in 1918 were ineffectual against the influenza virus and its pneumonic complications. Māori reluctance to enter hospital was often reported by relief parties, but access to hospital facilities was no guarantee of survival. Some towns such as Taumarunui admitted Māori and Pākehā alike to the temporary

flu hospital, while others such as Temuka set up separate wards in different church halls. The Health Department's official influenza remedy was a strong expectorant cough mixture, but by the time relief workers reached Māori settlements with such medicines usually the worst was over and fresh graves told their own story. The best chance of survival for flu sufferers in 1918 was expert nursing, with replacement of fluids and control of the fever. But where most of the adults were stricken, few of the children would know what to do, or be able to control violent delirious cases.

Hospital-trained medical personnel were very thinly spread in the Māori population of 1918. Subsidized native medical officers, mostly Pākehā general practitioners, had numbered 46 in 1909, but their ranks had been depleted by government budget cuts and the needs of the First World War. Māori councils often took the view that Māori health nurses were more effective in remote areas in improving sanitation and prevention of disease than the occasional visit by a Pākehā GP, but financial constraints had reduced their numbers too. By 1918, compared with some 250 native school teachers, there were only 18 native health nurses left.⁴²

Rongoā Māori or traditional Māori medicine had only a few herbal remedies for asthma or bronchitis. One was kumarahou, whose leaves were boiled. The liquid was thought to relieve asthma and bronchitis symptoms.⁴³ However, herbal remedies would have been of little help against such a virulent infection as the 1918 flu. It struck too suddenly for slow herbal treatments to have much effect. Worse than that, the favoured tohunga treatment for fever was to sit the patient for half an hour or so in a wai tapu or sacred healing stream or pool. This chilling effect on a feverish body was about the worst possible treatment for someone suffering from pneumonia, and would have finished off most such cases.

Not all Māori were victims of fatalism, however. Some Māori settlements were saved from heavy flu mortality by the actions of a few active leaders who understood what needed to be done to nurse patients through pneumonia. Te Puea in the Waikato is a well-known example, thanks to Michael King's biography.⁴⁴ Whina Cooper in Hokianga is another. Her father, the Te Rarawa leader Heremia Te Wake, was a notable victim of the 1918 flu in Northland. Emma Tainui, from the Arahura pā near Hokitika on the West Coast, is another example. She was the only adult to escape the flu in her settlement of about 120, and she organized the older children to help her sponge patients with high fevers and give them cooled boiled water. As they recovered she fed them with milk puddings, custards and beef tea. From the 30 or so houses in the pā, there was not a single death from influenza, even though adult morbidity must have been about 90%.⁴⁵

Things were much worse in most Māori settlements, especially in the more remote parts of Northland, Bay of Plenty, East Cape and the King Country. Dick Scott in *Ask that Mountain* cites an example of a remote settlement in inland Taranaki, where a visitor counted 140 Māori living in desperate poverty just before the First World War. On a return visit after the war, he found fewer than 50 remaining. The rest had either died from the flu or migrated elsewhere. Neither the newspapers nor the death registers show any trace of Māori flu victims from this remote spot.⁴⁶

To sum up, New Zealand Māori in late November 1918 faced a ‘perfect storm’ of adverse circumstances. They were an overwhelmingly rural and dispersed population. They were probably more susceptible to respiratory disease than their Pākehā neighbours, their living conditions were often crowded and insanitary, and their general health and nutrition were poor. Tuberculosis was rife, and many adults had lungs damaged by heavy smoking. They were isolated from the first wave of flu which may have conferred some immunity and then were attacked by an exceptionally virulent strain of influenza, which triggered pneumonic complications. Traditional whare facilitated the rapid spread of influenza and pneumonia, for which Māori had no effective traditional remedies. Remoteness often cut off communities from prompt assistance, so that the more severe cases were likely to die before any Pākehā relief parties arrived from the towns or cities.

The impact of the 1918 flu on Māori society was severe, but not quite as disastrous as the musket wars and epidemics of the early nineteenth century, in which as many as 40,000 Māori may have died. Recent work by Simon Chapple has identified a major outbreak of rewharewha (influenza) about 1808, which may have killed 100,000 Māori at death rates of 50% or more.⁴⁷ The 1918 flu seems to have wiped out the equivalent of natural inter-census increase, and depressed fertility in the female 20–29 years cohort.⁴⁸ But the long-term effects were slight, and the Māori population bounced back from the 1918 flu with remarkable vigour.

The new dataset has enabled more accurate counting of orphans. Registered Māori victims of the 1918 flu left 1083 male orphans and 1008 females, a total of 2091. Not all of these would have been children, especially the issue of elderly parents, but the great majority were under the age of 20. Pākehā victims of the 1918 flu left a total of 6550 orphans, but only 135 had lost both parents. Similarly, only a handful of Māori children lost both parents, contradicting one of the commonest myths about the 1918 flu in New Zealand, which claimed that ‘whole families’ had been wiped out. Only six deceased couples with deceased issue can be identified from the registered Māori deaths, but we have no way of knowing if any of their issue

survived. Even so, the death registers reveal some sad family tragedies. One gum-digger in the far north, near Te Hapua, lost his wife, his two brothers, his son and two daughters. Newspapers readily repeated ‘horror’ stories of ‘whole families’ wiped out, but these were in fact extremely rare. In one case at Patea an elderly Māori woman was taken to hospital but refused to stay there and walked home. She was taken back to the hospital, and again walked home, where she died. Her husband then died from the flu. Their son and his wife had already died, along with three other family members on the same day.⁴⁹ Only the last three deaths were registered.

The new dataset reveals family connections between pandemic victims. For example, at Matata, north of Whakatane, a mother and her infant son died on the same day, but the father had died three days earlier at Maketu, and had a different surname. At Maungatapu near Morrinsville three siblings and their father died within a week of each other, but the children had different surnames. At Orauta near Kawakawa half of the 14 registered deaths came from just three families. While such relationships may be of negligible epidemiological interest, merely confirming the prevalence of infection within households, the names may prove useful to family historians and compilers of whakapapa.

A myriad of factors contributed to the high Māori death rate in 1918. New data assists in refining our understanding of what happened in 1918. Knowledge of past pandemics and their impact should help to shape planning for future pandemics. The striking difference between Māori and Pākehā death rates in the 1918 flu stands as a reminder that governments and health planners need to be aware of vulnerable groups in society and make appropriate provision for their care.⁵⁰

The exact circumstances of 1918 are unlikely to be repeated, unless we have another world war coinciding with a new flu pandemic.⁵¹ Mass air travel has made the world a viral village, and while this enhances the possible spread of a new pandemic influenza virus it also means that the adult population has been exposed to a greater variety of influenza and pneumonia infections, giving them a more diversified immune repertoire. More attention, however, needs to be given to the possible plight of minority groups and recent migrants in a future public health emergency, especially those isolated by language, race or religion from mainstream society. One sobering lesson from the 1918 influenza pandemic is that it revealed some of the racism lurking just below the surface in New Zealand society at the time, with discrimination seen in separate temporary hospitals for Māori and Pākehā in some towns. In Whangarei there was even a ban on Māori entering the town during the emergency, though this was probably because memories were still

fresh from the 1913 smallpox outbreak in Northland. Like any sudden crisis or disaster, a pandemic is likely to reveal aspects of society that are normally hidden from view, which explains part of their fascination for historians.

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