Remembering the 1918 influenza pandemic: national survey of memorials and scope for enhancing educational value around pandemic preparedness

Nick Wilson, Catharine Ferguson, Geoffrey Rice, Michael G Baker, Ben Schrader, Christine Clement, George Thomson

ABSTRACT

AIM: To systematically identify physical memorials to the 1918 influenza pandemic in an entire country.
METHODS: Internet searches, contact with local historians and field expeditions were conducted.
RESULTS: Despite the high impact of the 1918 influenza pandemic in New Zealand (~8,600 deaths), only seven publicly accessible local memorials which referred this pandemic were identified. Another 11 memorials were identified, but these were in private settings or did not refer to the pandemic. There is no national memorial and a marked contrast exists with the number of war memorials (260 times more per 1,000 deaths for one war), and for 20 smaller mass fatality events (one of which has eight memorials alone). The current educational value of these pandemic memorials is likely to be minimal since only three are in cities, there is a lack of supporting signage and there are no links to online resources.
CONCLUSIONS: Despite the major impact of the 1918 influenza pandemic in New Zealand, publicly accessible memorials were found to be rare. This was in marked contrast to other disaster-related memorials and particularly to war memorials. There appears to be major scope for enhancing public education around the persisting threat of future pandemics via improved use of physical memorials and linkages to online resources.

Pandemics of influenza and other infectious diseases remain a serious global threat, requiring ongoing preparations by all countries. Such preparations include wide-ranging core capacities for surveillance and response. There is also increasing emphasis on preventing emergence of new microbial threats with approaches such as the Global Health Security Agenda. However, there might be decades between future pandemics, particularly those of the scale seen in the 1918 influenza pandemic. Consequently, this threat can fade from public and official memories. Without clear reminders of the potentially massive effects of such pandemics, there may be little impetus to ensure preparatory efforts and proportionate resourcing.

Memorials might be one way to ensure that a society’s collective recollection of the threat of influenza and other pandemics remains. Physical memorials can provide a locality for civic rituals (such as gatherings at anniversary events), and for visits by school groups and others. Memorials can also be used to enhance awareness around
social capital and civil responsibility—in this case by potentially providing examples and narratives of health workers and volunteers who worked to reduce the impact of the pandemic. Some memorials (such as the National War Memorial in New Zealand) even offer educational programmes that interpret the function and meanings of the memorial to visitors.

New Zealand provides a good case study for considering the issues around the memorialisation of pandemic influenza, as it is a relatively small country and there is fairly detailed national documentation of memorials on official websites. It is also a country where there might be at least some modest awareness of the impact of the 1918 influenza pandemic, owing to the major scale of the impact, especially for the Māori population as detailed in a book and on an official history website. As with most other countries, New Zealand has experienced three notable influenza pandemics since 1900: in 1918 (8,573 deaths), in 1957–59 (179 deaths in 1957 with even higher excess deaths in 1959) and in 2009 (49 deaths). The 1968 pandemic reached New Zealand but we found no data on excess mortality estimates.

**Methods**

**Searches to identify memorials**

We aimed to identify memorials for multiple pandemic deaths or for individual health workers involved in responding to the pandemic. We conducted internet searches using Google and Google Images with search terms covering all of the following terms: “New Zealand”, “influenza”, “Spanish flu” and “influenza/pandemic/obelisk/statue/plaque/cemetery”. Searches were conducted in December 2015. Also examined were: a New Zealand online encyclopaedia (http://www.teara.govt.nz/en), an online history site (http://www.nzhistory.net.nz/) and an online list of national monuments.  

New Zealand has an online “Historic Heritage” list of historic sites, which includes selected memorials and cemeteries (http://www.heritage.org.nz/the-list). This database was also searched with the terms: “influenza”, “epidemic” and “pandemic”.

To determine if the gravestones of any individuals provided linkages to memorials, we also searched the online Cenotaph database (keyword searches: “influenza”, “epidemic”, “pandemic”). Specific books on memorials in New Zealand were also examined.

**Local networks and memorial site visits**

We utilised informal local history networks to identify potential additional memorials in the Northland Region (which has a relatively high population of Māori who suffered disproportionately in the pandemic). For selected memorials we conducted site visits to document accessibility, to take photographs and ascertain any associated signage in the vicinity. We also determined if publicly accessible memorials were visible on Google Street View.

**Comparisons with other memorials**

For comparisons with other New Zealand-based mass fatality events, we selected events with 20 or more fatalities since 1900 (as per a recent study). To identify any memorials associated with these events, we used the data from an official history website, supplemented with internet searches, to see if memorial data were lacking at the primary data source (using the search terms: “memorial”, “monument” and “plaque”). For comparisons with war memorials we used the following official website: http://www.nzhistory.net.nz/map/memorials-register-map.

**Results**

**Memorials related to the pandemic**

A total of seven publicly accessible memorials that referred to multiple pandemic deaths or health worker responder deaths from the pandemic were identified (Table 1). Even so, several of these cannot be considered to be fully pandemic-related in that: (i) they also relate to the life work of the named individual (eg, the two memorials to Dr Cruickshank including Figure 1); and (ii) also relate to other causes of death (ie, for soldiers the Featherston Camp memorial and for the nurses memorialised at the two chapels listed in Table 1).

For none of these seven memorials was there evidence of signage in the vicinity.
Table 1: The seven identified publicly accessible memorials relating to multiple deaths from the 1918 influenza pandemic deaths (or health worker responders) in New Zealand and which specifically mention “influenza” (organised by north to south location within the country).

<table>
<thead>
<tr>
<th>Memorial type</th>
<th>Location</th>
<th>Further details (see the Appendix for additional details and selected photographs)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>North Island</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Granite memorial to the 1,128 citizens of Auckland who died in the pandemic (with many in unmarked graves)</td>
<td>Waikumete Cemetery, Glen Eden, Auckland</td>
<td>The granite memorial erected in 1988 specifically states: “victims of the 1918 influenza epidemic” and “Particular respect is paid to doctors, nurses, citizen volunteers whose selfless efforts to aid the sick resulted in their own untimely deaths.” Of note is that the memorial location is not shown on any signage at the cemetery or in an online map of the cemetery, but it is mentioned on the Waikumete Cemetery’s official website.</td>
</tr>
<tr>
<td>Headstone on grave raised by public subscriptions for the nurse Jessie Linton</td>
<td>Shortland Historic Cemetery, Thames</td>
<td>The inscription on the white marble gravestone states: “…after untiring devotion to duty during the epidemic of 1918 she fell a victim…”. The site visit indicated that the wording is becoming illegible due to corrosion of the lettering (Figure A, Appendix).</td>
</tr>
<tr>
<td>The Featherston Military Camp memorial obelisk and adjacent memorial wall.</td>
<td>Featherston Cemetery, Featherston</td>
<td>The notice beside the memorial wall briefly refers to the “Spanish influenza” epidemic killing soldiers training at the Featherston military camp. The obelisk refers to those who died in the camp—but not to influenza. Both the obelisk and the memorial wall are also for others who died in the camp (eg, from accidents or other diseases or injuries), though pandemic influenza was the major cause as per the November 1918 dates of death on the gravestones and other work.23 (Figure B, Appendix).</td>
</tr>
<tr>
<td><strong>South Island</strong></td>
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</tr>
<tr>
<td>Marble statue of Dr Margaret Cruickshank with information board</td>
<td>Seddon Square, Waimate, South Canterbury (Figure 1)</td>
<td>Dr Cruickshank was New Zealand’s first registered woman doctor, and she died in the 1918 pandemic while caring for her patients. The inscription on the three metre high statue reads: “The Beloved Physician/Faithful unto Death”. The information board beside the statue does refer to the pandemic and her death during it. The creation of this memorial may also reflect her multiple healthcare contributions to the community. Nevertheless, in 2007 the New Zealand Ministry of Health named a pandemic preparedness exercise “Exercise Cruickshank” in recognition of her work during the 1918 influenza pandemic (<a href="http://www.nzhistory.net.nz/people/margaret-cruickshank">http://www.nzhistory.net.nz/people/margaret-cruickshank</a>).</td>
</tr>
<tr>
<td>Grave of Dr Margaret Cruickshank and associated information board</td>
<td>Waimate Old Cemetery, McNamaras Road, Waimate, South Canterbury</td>
<td>The information board with a map is just inside the entrance of the Old Cemetery. It provides information about Dr Cruickshank’s work in the influenza pandemic “providing services well beyond expected of a doctor” and her death from it. The inscription on her prominent gravestone does not refer to influenza. See other details in the row above.</td>
</tr>
<tr>
<td>Christchurch Nurses’ Memorial Chapel</td>
<td>Christchurch Hospital site, Riccarton Avenue, Christchurch</td>
<td>This memorial is multi-purpose in that it is for two of the nurses who died in the pandemic and it is New Zealand’s only dedicated memorial chapel to women who died in any war. It is publicly accessible in principle, but has not been so in recent years due to repairs from earthquake damage sustained in 2011.</td>
</tr>
<tr>
<td>Plaque for nurses who died (in a chapel)</td>
<td>Dunedin Hospital, Dunedin</td>
<td>The plaque is for the “Dunedin Hospital Trained Nurses” who died in the war or from the “influenza epidemic” in the Otago Region, or in a “troopship epidemic” (ie, on the Tahiti troopship). Also listed are the names of four Voluntary Aid Detachment workers who died in the epidemic. See also Figure G in the Appendix.</td>
</tr>
</tbody>
</table>
directing visitors to their location, including the one at Waikumete Cemetery for the 1,128 people who died from the pandemic in Auckland. None of the publicly accessible memorials were specifically for Māori and only three were in cities: at Waikumete in Auckland, the Chapel in Christchurch and the Chapel in Dunedin. There was also fairly limited information on the memorials relating to the pandemic, with only two having information boards (excluding the Chapel in Christchurch which has been closed for some time due to earthquake damage and could not be visited). The role of health workers and/or citizen volunteers during the pandemic was explicit in five of the memorials: at Waikumete, to the nurse Jessie Linton, the two memorials to Dr Cruickshank and to nurses in the Dunedin Chapel. None of the memorial sites had documentation that linked to any related website resources about the pandemic or which linked all the influenza pandemic memorials together in a thematic manner. Six of the seven memorials were identifiable based on internet searches and five had some aspects of the memorial that were visible on Google Street View.

Another 11 memorials for mass deaths or deaths of health worker responders were pandemic-associated but were either in private settings or did not specifically mention the pandemic (Table 2). Nine of these had specific relevance to Māori, and all nine of these were located in the North Island. These memorials to Māori do not have routine public accessibility, as they are in urupā (cemeteries) or are on marae, which are private spaces. Marae are areas with buildings and grounds which are the cultural and social focus for an iwi (tribe), hapū (sub-tribe) or whānau (family). Of these 11 additional memorials, seven had some information about them on the internet.

**Figure 1:** Statue of Dr Margaret Cruickshank, a physician who died in the 1918 influenza pandemic, Waimate, South Canterbury (photograph by the lead author, 2016).
Table 2: Additional memorials with a relationship to the 1918 influenza pandemic in New Zealand, but which are either in private settings or do not specifically refer to the pandemic (organised by north to south location within the country).

<table>
<thead>
<tr>
<th>Memorial type</th>
<th>Location</th>
<th>Further details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>North Island</strong></td>
<td></td>
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</tbody>
</table>
| Stone memorial with plaque                 | Te Aute Urupā (cemetery), Te Tii Mangonui, Bay of Islands, Northland, (private setting) | The translation of the korero on the memorial from Te Reo Māori (Māori language) is as follows:

“In memory
Of those of our extended family who died
In the great flu
during the years 1918–1935
Rest peacefully in the Lord”

(translation courtesy of Te Huranga Hohaia of the Te Tii Community).

The time period covers those who died in the pandemic and those who were considered to have died in subsequent years from its effects. Of note is that urupā are private settings with no public access. See Figure C in the Appendix. |
| Stone memorial to local Māori who died in the pandemic | Beside the “Church of Our Lady of the Assumption” at Motukaraka Point, Hokianga Harbour, Northland | The memorial inscription is in Te Reo Māori and has the names of eight individuals who died in the pandemic (ages 31 to 73 years). It specifically includes the word “influenza” in English language. The official heritage listing is Category 1 and the site is now part of the adjacent marae (a private setting). |
| Memorial tablet in a meeting house (Porowini) | Otiria Marae (west of Kawakawa) Northland (private setting) | The meeting house of this marae (Porowini), is reported to have a memorial table on one wall. It has “a list of the names of 28 Ngāti Hine men, women and children who died of influenza between 20 November 1918 and 3 January 1919”. (http://www.nzhistory.net.nz/media/photo/otiria-marae-memorials). |
| Three memorials: common graves with headstones | Tapikitu Urupā, Omanaia Churchyard, Omanaia, Hokianga, Northland, (private setting) | One gravestone lists the names of 22 family members who died in November and December 1918. Another is for six family members with dates in 1919 and 1920 (possibly reflecting the subsequent pandemic waves). The third headstone has part of the inscription that specifically refers to the epidemic (in English language): “In memory of those family members who passed away during the flu epidemic in 1918”.

This latter memorial is associated with a 15-metre-long area with unmarked graves. See Figure D in the Appendix for one of the three memorials. |
| A carved wooden Māori cenotaph | Te Ihingarangi Marae, Waimihia, north of Taumarunui, (private setting) | The cenotaph was designed and carved by Tene Waitere of Ngāti Tarāwhai. A marae is a private setting and so this memorial is not accessible to the public. Four colour photos are in an online image gallery (http://maorimaps.com/te/main-map#url=/te/full_marae/waimihia-te-ihingarangi). |
| A carved wooden Māori cenotaph | Te Kōura Marae, north of Taumarunui, (private setting) | The cenotaph was designed and carved by Tene Waitere of Ngāti Tarāwhai (with similar features to the one at Te Ihingarangi Marae, detailed in the row directly above).

A photograph from 1920 is online (http://www.nzhistory.net.nz/media/photo/maori-memorial-influenza-pandemic) and a more recent colour photo also (the first image at: http://www.maorimaps.com/main-map#url=/full_marae/te-k%C5%8Drura). |
| A granite obelisk | Te Reinga Marae, Wairoa, northern Hawkes' Bay (private setting) | The obelisk has text in Te Reo Māori that can be paraphrased in English language as:

“These are the people of the tribe who died in the epidemic that they called the flu in the year of our Lord 1918.”

A photograph and additional details are at: http://www.nzhistory.net.nz/media/photo/te-reinga-marae-influenza-memorial |
| **South Island**                           |                                                                          |                                                                                                                                                                                                 |
| Marble statue of Dr Charles Little | Waikari Hospital grounds, Waikari, North Canterbury | The inscription says “to commemorate a life of devotion and self-sacrifice” but does not mention the pandemic. This monument may reflect Dr Little’s role in providing care during the pandemic (from which he died) but also his prior healthcare work to the community “for close on forty years”. See also Figure E in the Appendix. |
| Obelisk to Dr Little (the same doctor as per the above row) | Rutherford Reserve, Mountainview Rd, Culverden, North Canterbury | The inscription says “he gave his life for others” but does not mention the pandemic. See also Figure F in the Appendix. |
Table 3: New Zealand war memorials, sourced from New Zealand History Online with a comparison to the 1918 influenza pandemic (data from this study).

<table>
<thead>
<tr>
<th>War/s, pandemic</th>
<th>Memorials throughout NZ* (N)</th>
<th>Deaths in this war/pandemic</th>
<th>Calculated memorials per 1,000 deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>NZ Wars (1845–1872)</td>
<td>68</td>
<td>Approximately 3,000</td>
<td>22.7</td>
</tr>
<tr>
<td>South African War</td>
<td>49</td>
<td>230</td>
<td>213.0</td>
</tr>
<tr>
<td>Both World Wars**</td>
<td>941</td>
<td>First World War=18,058 (including war-related deaths up to 31 August 1921); Second World War=11,928; Total=29,986</td>
<td>31.4</td>
</tr>
<tr>
<td>1918 influenza pandemic</td>
<td>7 (see Table 1)</td>
<td>Using 8,573 (but possibly higher given new estimates of deaths in the military, albeit with some of these outside of New Zealand at the time)**</td>
<td>0.8</td>
</tr>
</tbody>
</table>

*In addition, there are multiple museum displays related to all these and other wars involving the New Zealand population, eg, in Auckland’s War Memorial Museum, and the “National Army Museum” in Waiouru.

**Combined for both wars since the same memorial is often used for both wars in the New Zealand context.

Comparison with memorials to other mass fatality events

The physical memorial status was ascertained for non-epidemic/non-pandemic mass fatality events for the period 1900 to 2015 in New Zealand where there were 20+ fatalities (n=20 events with 1,414 deaths, Table A3). It was found that there are memorials in existence or currently being constructed for 80% (16/20) of these events. Indeed, for one of these events there are at least eight memorials associated with it: the Mt Erebus aircraft crash. Several other such events had multiple memorials to them and in two cases they have dedicated sections in New Zealand museums (an earthquake and a shipwreck—see Appendix).

It was also apparent that the list of “disasters” at an official New Zealand history website includes no epidemics or pandemics at all. That is, it ignores the influenza pandemics of: 1918, 1957–1959, 1968 and of 2009. It also makes no mention of other post-1900 epidemics such as the 53 deaths in a 1913 smallpox epidemic, up to 173 deaths per year in various poliomyelitis epidemics and up to 375 deaths per year in various measles epidemics. This research also failed to identify any physical memorials to any of these other pandemics or epidemics.

Comparison with war memorials

The ratio of the number of publicly accessible memorials to deaths in various wars is shown in Table 3. This ratio was 261 times higher for the South African War than the pandemic (213 vs 0.8 memorials per 1,000 deaths). For the two World Wars together (since memorials to these are often combined), the respective value was 38 times higher.

Discussion

Main findings and interpretation

This study found only seven publicly accessible memorials that referred to the 1918 influenza pandemic in New Zealand. The comparison with the much greater number of war memorials and memorials other disaster events (with the latter comprising a much lower total mortality burden) was particularly stark. Such a difference is further compounded when considering the estimated NZD 122 million (around USD 79 million) spent on Second World War memorials by the New Zealand Government (in 2011 dollars), and the NZD 120 million spent on a national war memorial park that was completed in 2015. Many reasons might explain these differences, but possibilities include: (i) the
timing of the 1918 pandemic at the end of the First World War (when New Zealand society was still highly disrupted from the impact of this war); (ii) the perception of these pandemic deaths being less “heroic” than military deaths; and (iii) the limited understanding around this time of potential lessons for the future arising from the pandemic experience. For example, some citizens who promoted the construction of various memorials to preventable causes (eg, to train crash disasters and also war memorials) might have believed that memorialising the dead and the disaster event might provide lessons for prevention. But in the early part of the 20th century the epidemiology of pandemic influenza and the potential for preventing and controlling it was still poorly understood scientifically and in popular culture. Other reasons may also apply given the complex psychological and sociological processes involved in memorialisation processes, particularly as detailed for war memorials.13,21,22

The findings of this study also suggest that the current educational value of these publicly accessible pandemic memorials is likely to be constrained by: (i) only being in three cities; (ii) the limited signage and information on the memorials relating to the influenza pandemic; and (iii) the complete lack of any website resources that link these memorials together and to additional website-based information about pandemics. This situation suggests major scope for enhancing the presence and use of such memorials if a society wishes to better remember the large impacts of the 1918 pandemic and consider the implications for future pandemic preparedness. These impacts include the large numbers dying within months, the social and economic impacts of these sudden deaths, and the disproportionate effects on particular populations—in this case on Māori. While future influenza pandemics might only be preventable to some extent, it is very likely the appropriate preparedness could reduce the scale of the impact of a pandemic (hence the support for such preparations by the World Health Organization).23

No published studies on 1918 pandemic influenza memorials in other countries were identified, and our internet searches for New Zealand memorials only rarely incidentally identified such memorials in other countries (eg, the Lueg Monument in Switzerland to 54 Bern cavalrmen who died in the pandemic). Further research could more systematically determine the presence of such memorials in both combatant and non-combatant nations at this time.

Strengths and limitations of this study

This study benefited from New Zealand being a relatively small country in which the 1918 influenza pandemic has at least some level of local documentation in a popular book4 and on a popular New Zealand history website.5 Furthermore, it is a country for which national collections of memorial data have been assembled online. But there are limitations in that some additional memorials may not have been identified, especially if these are in private places such as marae, urupā or consist only of a plaque inside a building that is not documented in any book or website. For example, we are recipients of oral history reports concerning three other possible pandemic-associated sites, but for which no written documentation has yet been identified (Table A2). More detailed involvement of local historians throughout the country may be required to capture data on all such pandemic-associated sites.

Options for enhancing the educational utility of pandemic-related memorials

If a society wished to enhance the long-term educational value of memorials concerning pandemic influenza and its future threat, a range of options exist, as suggested by the New Zealand situation:

• Upgrading existing publicly accessible physical memorials to include more information about the 1918 pandemic. Also, symbols (eg, quick response codes) on each memorial or on related signage could allow users with smartphones to gain additional information immediately. Signage around the locality could also make the memorials easier to find. In some cases, existing memorials could benefit from restoration work (Figure A).
• Increasing the number of memorials is an option, especially in cemeteries where there are unmarked graves of those who died in the pandemic. An example of such unmarked graves
is at Andersons Bay Cemetery in the City of Dunedin. Funds could be made available to relevant local authorities that wished to identify sites not yet covered by any memorial. For example, this could include Māori tribal (iwi) authorities who might wish to memorialise additional sites where the pandemic had a notable impact.

- Producing a national memorial (physical or online) that listed all the doctors, nurses and other health workers who died in the pandemic. This could even be done for all the victims, since a comprehensive online memorial exists for all those dying in the wars New Zealand has been involved in (the Cenotaph[11]).

- Integrating links to all the memorials into one official website that has a detailed set of information about the pandemic, its local impacts and a discussion of future pandemic threats. An integrated memorial could also contribute materials to a “traveling museum exhibition” that could tour the country.

A deadline for working on these options could be the 100th anniversary of the 1918 pandemic, with the key organising agencies being the government ones concerned about heritage and health. Ideally however, a range of other parties might be involved in such planning including local government, local heritage and health groups, and representatives of indigenous populations who have suffered disproportionately in past pandemics.

Conclusions

Despite the major impact of the 1918 influenza pandemic in New Zealand (~8,600 deaths), only seven publicly accessible memorials that refer to it were identified in this study. This was in marked contrast to other disaster-related memorials and particularly to war memorials. Furthermore, the current educational value of these pandemic memorials is likely to be very limited for a range of reasons such as remote location and limited signage. There appears to be major scope for enhancing public education around the persisting threat of future pandemics via improved use of physical memorials and linkages to online resources.
Appendix: Additional detail on the identified memorials and selected photographs

Table A1: Additional details on the identified publicly accessible memorials relating to the 1918 influenza pandemic in New Zealand which specifically mention “influenza” (organised by north to south location within the country).

<table>
<thead>
<tr>
<th>Memorial type</th>
<th>Location</th>
<th>Links to image/s of the memorial</th>
<th>Further details</th>
</tr>
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<tr>
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<td>Granite memorial to the 1,128 citizens of Auckland who died in the pandemic (with many in unmarked graves).</td>
<td>Waikumete Cemetery, Glen Eden, Auckland</td>
<td>For a photograph and details of the inscription see: <a href="https://ohoinfluenza.files.wordpress.com/2013/06/6504329169_8c877c59f4_z.jpg">https://ohoinfluenza.files.wordpress.com/2013/06/6504329169_8c877c59f4_z.jpg</a></td>
<td>The granite memorial erected in 1988 specifically states: “victims of the 1918 influenza epidemic” and “Particular respect is paid to doctors, nurses, citizen volunteers whose selfless efforts to aid the sick resulted in their own untimely deaths.” The memorial is situated at one end of a mowed lawn above unmarked graves (section E on “Eucalyptus Avenue”, with the entrance on Waikumete Road being the nearest). Of note is that the memorial location is not shown on any signage at the cemetery or in an online map of the cemetery, but it is mentioned on the Waikumete Cemetery’s official website. From the satellite “Earth” view on Google Street View, it is possible to see the impressions of the separate unmarked graves (eg, <a href="https://www.google.co.nz/maps/place/Eucalyptus+Ave,+Glen+Eden,+Auckland/@602/@-36.9079602,174.6486759,153m/data=!3m1!1e3!4m2!3m1!1s0x6d0d4177ed5c9c43:0xfe8f9fc261323bac">https://www.google.co.nz/maps/place/Eucalyptus+Ave,+Glen+Eden,+Auckland/@602/@-36.9079602,174.6486759,153m/data=!3m1!1e3!4m2!3m1!1s0x6d0d4177ed5c9c43:0xfe8f9fc261323bac</a>)</td>
</tr>
<tr>
<td>Headstone on grave raised by public subscriptions for the nurse Jessie Linton.</td>
<td>Shortland Historic Cemetery, Thames</td>
<td>The third image at this website shows the gravestone: <a href="http://www.thetreasury.org.nz/Flu.htm">http://www.thetreasury.org.nz/Flu.htm</a>. See also Figure A in this Appendix.</td>
<td>The inscription on the white marble gravestone states: “...after untried devotion to duty during the epidemic of 1918 she fell a victim...”. The site visit indicated that the wording is becoming illegible due to corrosion of the lettering (Figure A). The site is plot 3465, approximately 30 meters behind and to the right of the main cemetery sign (and a few meters in front of a grave with a cross on the top of it). This site is approximately opposite from 103B Danby Street, Thames, and is the most predominantly white headstone in the centre of this map of the cemetery, but it is mentioned on the Waikumete Cemetery’s official website. From the satellite “Earth” view on Google Street View, it is possible to see the impressions of the separate unmarked graves (eg, <a href="https://www.google.co.nz/maps/place/Eucalyptus+Ave,+Glen+Eden,+Auckland/@602/@-36.9079602,174.6486759,153m/data=!3m1!1e3!4m2!3m1!1s0x6d0d4177ed5c9c43:0xfe8f9fc261323bac">https://www.google.co.nz/maps/place/Eucalyptus+Ave,+Glen+Eden,+Auckland/@602/@-36.9079602,174.6486759,153m/data=!3m1!1e3!4m2!3m1!1s0x6d0d4177ed5c9c43:0xfe8f9fc261323bac</a>)</td>
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<td>The Featherston Military Camp memorial obelisk and adjacent memorial wall.</td>
<td>Featherston Cemetery, Featherston</td>
<td>Obelisk and wall: <a href="http://www.nzhistory.net.nz/media/photo/featherston-cemetery-war-memorial">http://www.nzhistory.net.nz/media/photo/featherston-cemetery-war-memorial</a> See also Figure B in this Appendix.</td>
<td>The notice beside the memorial wall briefly refers to the “Spanish influenza” epidemic killing soldiers training at the Featherston Military Camp. The obelisk refers to those who died in the camp but does not use the word “influenza”. Both the obelisk and the memorial wall are also for others who died in the camp (eg, from other diseases and injuries), though pandemic influenza was the major cause as per the November 1918 dates of death on the grave headstones and as detailed in other work (see Sertsou et al, Theor Biol Med Model 2006; 3:38). The wall was also constructed “to celebrate the 30th anniversary of the twinning of Featherston with Messines, Belgium”. Although not visible on Google Street View, the memorial site is visible on “Earth” view on the western corner of the cemetery: <a href="https://www.google.co.nz/maps/search/featherston+memorial/@-41.1220637,175.3142862,306m/data=!3m1!1e3">https://www.google.co.nz/maps/search/featherston+memorial/@-41.1220637,175.3142862,306m/data=!3m1!1e3</a></td>
</tr>
<tr>
<td>South Island</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marble statue of Dr Margaret Cruickshank with information board.</td>
<td>Seddon Square, Wainate, South Canterbury</td>
<td>Contemporary colour photograph: <a href="http://www.teara.govt.nz/en/photograph/32564/statue-of-margaret-cruickshank-wainate">http://www.teara.govt.nz/en/photograph/32564/statue-of-margaret-cruickshank-wainate</a> See also Figure C in this Appendix.</td>
<td>Dr Cruickshank was New Zealand’s first registered woman doctor, and she died in the 1918 influenza epidemic while caring for her patients. The inscription on the three-metre high statue reads: “The Beloved Physician/Faithful unto Death” but does not mention influenza or the pandemic. However, the information board beside the statue does refer to the pandemic and her death during it. The creation of this memorial may also reflect her multiple healthcare contributions to the community. Nevertheless, in 2007 the New Zealand Ministry of Health named a pandemic preparedness exercise “Exercise Cruickshank” in recognition of her work during the 1918 influenza pandemic [<a href="http://www.nzhistory.net.nz/people/margaret-cruickshank">http://www.nzhistory.net.nz/people/margaret-cruickshank</a>]. The statue is visible on Google Street View (at 125 Queen St, Wainate): <a href="https://www.google.co.nz/maps/@-44.7352367,171.0449472,3a,21.3y,119.91h,90.48t/data=!3m6!1e1!3m4!1sEvoC0cP3Z83bcl79BAeKdA!2e0!7i13312!8i6656">https://www.google.co.nz/maps/@-44.7352367,171.0449472,3a,21.3y,119.91h,90.48t/data=!3m6!1e1!3m4!1sEvoC0cP3Z83bcl79BAeKdA!2e0!7i13312!8i6656</a> Other information about Dr Cruickshank (including her role in the pandemic) is in the Waimate Museum. Also in this museum is a brass plaque from the maternity ward at the former Waimate Hospital (this ward was named in her honour in 1948).</td>
</tr>
</tbody>
</table>
Our searches included the following possible memorials (Table A2), but we lack sufficient information to be sure about any link with the 1918 pandemic. Further historical research may be required to clarify any such associations.

### Table A2: Possible sites with a relationship to the 1918 influenza pandemic but for which further research is needed to clarify.

<table>
<thead>
<tr>
<th>Site</th>
<th>Location</th>
<th>Further details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large, possibly common, grave with a metal fence surrounding it.</td>
<td>St James Church, Kerikeri, Northland</td>
<td>A single oral history report provided to one of us by a former worker at the churchyard (Mr Derek Moon) was that a large grave was a common grave for 1918 influenza pandemic victims. The location of the grave and its level of weathering is compatible with an age of around 1918 but no other documentation has been identified to date (eg, in the Anglican Archives).</td>
</tr>
<tr>
<td>Common grave.</td>
<td>Maketu Cemetery, Bay of Plenty</td>
<td>Oral history reports provided to one of us are that an unmarked concrete tomb is a common grave for 1918 influenza pandemic victims, but no specific documentation could be identified.</td>
</tr>
<tr>
<td>Memorial row of trees.</td>
<td>Rissington Cemetery, Rissington, Hawkes Bay</td>
<td>A single oral history report provided to two of us from a former resident of the area (Mrs Joan Hamlin) was that the row of oak trees beside the Rissington cemetery were planted as a memorial to 1918 pandemic victims and to the hard work of the wife of a local station owner in caring for the sick. However, the site visited indicated no relevant plaque or signage at the cemetery and no online information could be identified.</td>
</tr>
</tbody>
</table>
Table A3: Presence of physical memorials for all the sudden mass fatality events occurring from 1900 to 2015 with 20 or more fatalities (Wilson et al, Aust NZ J Public Health, e-publication 28 February 2017) (for events occurring within current New Zealand territory, including the Exclusive Economic Zone, and ordered by descending number of deaths).

<table>
<thead>
<tr>
<th>Sudden mass fatality event (excluding more drawn out epidemics and pandemics)</th>
<th>Year</th>
<th>Deaths</th>
<th>Any plaque or monument*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hawke's Bay earthquake (using the total from the memorial, though further research is underway to better clarify this).</td>
<td>1931</td>
<td>258</td>
<td>Yes—multiple***</td>
</tr>
<tr>
<td>Crash of Air New Zealand Flight TE901 into Mt Erebus, Ross Dependency, Antarctica. (Within study scope since NZ has a territorial claim on this part of Antarctica).</td>
<td>1979</td>
<td>257</td>
<td>Yes—eight**</td>
</tr>
<tr>
<td>Canterbury earthquake (February 2011).</td>
<td>2011</td>
<td>185</td>
<td>Yes—multiple</td>
</tr>
<tr>
<td>Tangiwai rail crash related to a lahar from volcanic activity which destroyed a railway bridge.</td>
<td>1953</td>
<td>151</td>
<td>Yes—multiple</td>
</tr>
<tr>
<td>Sinking of the SS Penguin near Wellington in “heavy seas” (noting that some online information uses an incorrect “75” deaths).</td>
<td>1909</td>
<td>72</td>
<td>Yes—multiple</td>
</tr>
<tr>
<td>Cyclone Giselle and sinking of the TEV Wahine near Wellington (51 immediate deaths from the sinking, two delayed deaths from injuries, and three killed in the storm on the mainland).</td>
<td>1968</td>
<td>56</td>
<td>Yes—multiple#</td>
</tr>
<tr>
<td>Featherston Prisoner-of-War Camp riot (deaths in Japanese prisoners-of-war and one guard).</td>
<td>1943</td>
<td>49</td>
<td>Yes</td>
</tr>
<tr>
<td>Sinking of the SS Elingamite off the Three Kings Islands.</td>
<td>1902</td>
<td>45</td>
<td>No</td>
</tr>
<tr>
<td>Ralph’s Mine explosion in Huntly.</td>
<td>1914</td>
<td>43</td>
<td>Yes</td>
</tr>
<tr>
<td>Ballantyne’s store fire in Christchurch.</td>
<td>1947</td>
<td>41</td>
<td>Yes</td>
</tr>
<tr>
<td>Seaciff Mental Hospital fire (north of Dunedin).</td>
<td>1942</td>
<td>37</td>
<td>No</td>
</tr>
<tr>
<td>Sinking of the MV Kaitawa near Cape Reinga in “heavy seas”.</td>
<td>1966</td>
<td>29</td>
<td>Yes</td>
</tr>
<tr>
<td>Pike River Mine explosions (northwest of Greymouth).</td>
<td>2010</td>
<td>29</td>
<td>Yes</td>
</tr>
<tr>
<td>Sinking of the Wimmera after striking German mines during the First World War (north of Cape Maria van Diemen, Northland).</td>
<td>1918</td>
<td>26</td>
<td>No</td>
</tr>
<tr>
<td>Sinking of the Manchester (Tasman Sea, near Cape Farewell).</td>
<td>1912</td>
<td>25</td>
<td>No</td>
</tr>
<tr>
<td>Sinking of the Loch Long off the Chatham Islands.</td>
<td>1902</td>
<td>24</td>
<td>Yes</td>
</tr>
<tr>
<td>Crash of NZ National Airways Corp. Flight 441 (Kaimai Ranges).</td>
<td>1963</td>
<td>23</td>
<td>Yes—multiple</td>
</tr>
<tr>
<td>Sinking of the Ranui off Mount Maunganui in a “violent sea”.</td>
<td>1950</td>
<td>22</td>
<td>Yes</td>
</tr>
<tr>
<td>Kopuawhara flash flood destroying a railway work camp (during construction of the Napier-Gisborne Railway line).</td>
<td>1938</td>
<td>21</td>
<td>Yes</td>
</tr>
<tr>
<td>Railway crash at Hyde (Otago).</td>
<td>1943</td>
<td>21</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Total</strong>= 1,414</td>
<td>80% have memorials (16/20)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* If the presence of a memorial was not apparent in the documentation of the primary data sources (http://www.nzhistory.net.nz/map/memorials-register-map), then internet searches were conducted using the search terms: “memorial”, “monument” and “plaque”.
** There are eight memorials listed at: http://www.nzhistory.net.nz/media/photo/memorial-cross-mount-erebus but not all may have a plaque or monument.
*** The MTG Hawke’s Bay Museum Tai Ahuriri in Napier has dedicated a gallery to this earthquake.
# The “Museum of Wellington City and Sea” has a permanent commemorative exhibition to the Wahine sinking.
Figure A: Gravestone of the nurse Jessie Linton erected by the people of Thames after her death in the 1918 influenza pandemic, but now showing scope for renovation work (photograph by Nick Wilson, 2015).

Figure B: Obelisk style memorial to military personnel who died in the Featherston Camp, mainly from pandemic influenza in 1918 (photograph by Nick Wilson, 2015).
**Figure C:** Memorial to Māori victims of the 1918 pandemic at the Te Aute Urupā (cemetery), Te Tii Mangonui, Bay of Islands, Northland (photograph by Catharine Ferguson, 2016; with permission from the kaumātua at Te Tii).

![Figure C](image1.jpg)

**Figure D:** One of three common grave headstones to Māori victims of the 1918 influenza pandemic at Tapikitu Urupā, Omana Churchyard, Omanaia, Northland (photograph by Catharine Ferguson, 2016; with permission from the local kaumātua).

![Figure D](image2.jpg)
Figure E: Statue to Dr Charles Little, a physician who died in the pandemic, outside Waikari Hospital, North Canterbury (photograph by Geoffrey Rice, 2016).
Figure F: Memorial to Dr Charles Little, a physician who died in the pandemic, at Culverden, North Canterbury (photograph by Geoffrey Rice, 2016).
Figure G: Memorial plaque to nurses who died in the pandemic (and the First World War) at the Chapel in Dunedin Hospital (photograph by Nick Wilson, 2016).
Competing interests:  
Nil.

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