THE NEW ZEALAND MEDICAL JOURNAL
Vol 118 No 1224 ISSN 1175 8716

Re-evaluating a local public health control measure used in New Zealand for the pandemic influenza of 1918

Aim—Given the heightened global concern around pandemic influenza, we re-examined a particular area control intervention used in one New Zealand county during the 1918 influenza pandemic.

Methods—The data analysis used previously tabulated mortality and 1916 census data1 and the software EpiInfo 2000. Literature searches using Medline and Google Scholar identified other relevant literature on similar local interventions during this pandemic.

Results—The pattern of rapid spread of pandemic influenza in New Zealand during 1918 along coastal shipping and the national rail network routes[1] is strongly suggestive of a general failure of pandemic control measures within New Zealand. Nevertheless, one isolated town (Coromandel) instituted the quarantining of passengers on a visiting ferry steamer from Auckland.[1] These passengers were routinely held for 24 hours on an island and were subjected to a medical examination prior to being allowed into the town. All roads leading to the town were also barricaded and travellers were required to have medical certificates. The medical officer involved reported no cases in the town of 1000 people and also claimed to have controlled an outbreak in a nearby Maori community by recommending strict isolation of "eight affected houses".

Our re-analysis of the mortality and 1916 census data suggests that the mortality rate in Coromandel County for Europeans was statistically significantly lower than in the rest of the peninsula (rate ratio [RR] = 0.28, 95% confidence interval (CI) = 0.10–0.77) and when compared with the rest of the District (RR = 0.35, 95% CI = 0.13–0.93; see Table 1). However, the reduction in the Maori mortality rate in the Coromandel County was not at a statistically significant level (Table 1).

Discussion—The apparent success of the public health intervention in Coromandel County in preventing mortality is plausible given the other successful isolation measures within countries during the 1918 influenza pandemic. These included those in some remote Canadian towns[2] as well as in the continental United States in some towns, military installations (on islands), and various institutions (e.g. a training school and sanatorium in New York state).[3] Isolation completely protected some towns in Alaska and even prevented disease spread between an upper and lower part of the same village.[4] The quarantine efforts that delayed disease spread to Fairbanks, Alaska until 1919 may have also provided some public health benefit (since the disease was then less virulent).[3]

Table 1. Pandemic influenza mortality rates for Coromandel County (site of a public health intervention) relative to surrounding areas (based on published tabulated data and using 1916 census data[1])

Locality	Maori			European		
	Deaths (N)	Mortality rate per 1000	Rate ratio (95% CI)	Deaths (N)	Mortality rate per 1000	Rate ratio (95% CI)
Coromandel County	12	40.3	0.92 (0.52–1.61)	4	1.8	0.35 (0.13–0.93)
Rest of the Coromandel Peninsula*	43	64.7	1.47 (1.09–2.00)	51	6.4	1.25 (0.92–1.71)
Rest of the Thames-Bay of Plenty District†	377	43.9	1.00 (Reference)	177	5.1	1.00 (Reference)

*"Thames" township and "Thames County"; †That is the whole District of 15 towns and counties but excluding Coromandel County.

We acknowledge that there are possible limitations with the quality of these mortality data and for the 1916 census data that has been used in the analyses (i.e. the census was taken during a World War). Limitations are particularly plausible due to the under-reporting of Maori deaths and limitations with the census data for Maori.[5,6] Nevertheless, we consider that this type of re-analysis may provide some (albeit weak) level of reassurance that public health interventions at a local level can potentially be successful.

Recent modelling work from Canada also suggests that travel restrictions within a country may play some role in controlling pandemic influenza.[2] Others have also reported on the value of a historical perspective (including the experience from the 1918 pandemic) in informing the contemporary advancement of public health.[7] Even so, a future influenza pandemic virus strain may be far more virulent and infectious than those of the past, and it would arrive into a society with much higher levels and speeds of intra-country transport.

Summary—This re-analysis of mortality data for a particular county exposed to a local public health intervention from the 1918 influenza pandemic is suggestive of a beneficial impact. This association is plausible in the context of similar examples of towns in other countries that successfully isolated themselves during this pandemic.

NZMJ Note: Also see NZMJ editorials by Dr Lance Jennings:

- Avian influenza: a public health risk for New Zealand (23 April 2004 issue).
- New Zealand's preparedness for the next influenza pandemic (11 March 2005 issue).

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