Comparative Study of the Influenza Pandemic of 1918-19 in two island nations: Iceland and New Zealand

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Background

Nations varied in their response to the 1918-19 influenza pandemic; however, certain epidemiological characteristics of this pandemic were repeated in many locations. We aimed to compare the epidemiology and public health response to this pandemic in two island nations, on opposite sides of the globe: Iceland and New Zealand (NZ).

Methods

Historical accounts and records in both nations were reviewed along with more recent analysis of the pandemic's impact and course [1-8].

Results

Iceland, the smaller of the two nations (in terms of population and land mass) is estimated to have lost 480+ people during the 1918-19 influenza pandemic, whilst NZ, an estimated 8500+ people.

Virtually all of NZ was affected by the pandemic, but with lower rates in rural areas [9]. The north and eastern parts of Iceland (representing 36% of the population) were all but spared from influenza mortality in 1918.

Iceland (pop 91,600+) and NZ (pop 1,099,400+) had similar overall national pandemic mortality rates (5.4 vs 5.5 per 1000) amongst people of European ethnicity. However, after adjusting for only the exposed population in Iceland, the mortality rate in 1918 increases to 8.3 per 1000.

Both nations experienced a mild first wave between July and October 1918. The second wave exacted the largest mortality burden and peaked in three weeks at roughly the same time in both countries in mid-November 1918 (figure 1).

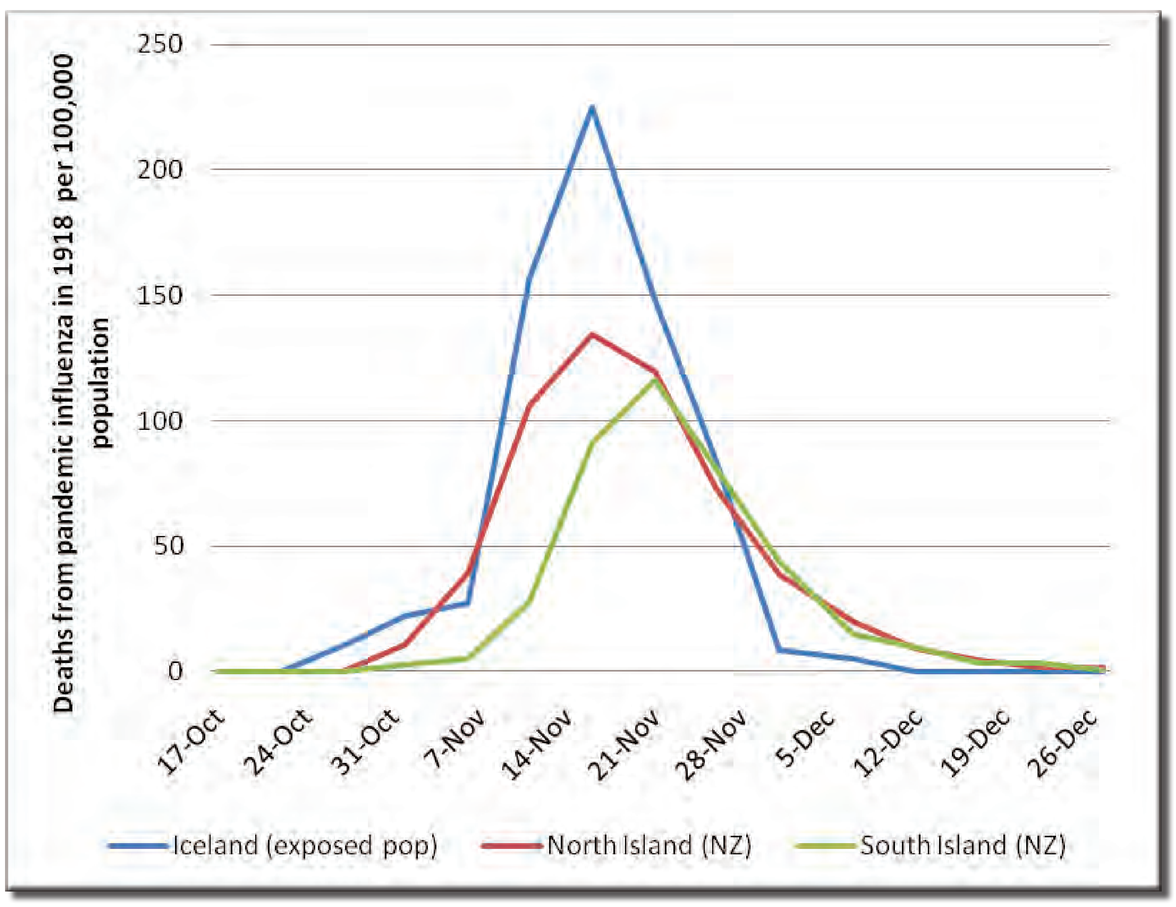

Figure 1: Pandemic influenza mortality in two island nations in 1918 (European population)

The Icelandic capital city, Reykjavik, experienced a noticeably higher overall mortality rate (17.1 per 1000) compared to the NZ cities of Auckland, Wellington, Christchurch, and Dunedin (7.6, 7.9, 4.9 and 3.9 per 1000 respectively).

The estimated reproduction number (R) for Iceland (at 2.2) was higher than both the North and South Islands of NZ (1.6 and 1.5 respectively). However, the incubation period was the same (2 days in both nations).

Both Iceland and NZ reported relatively high pandemic mortality rates amongst young adults compared with the pattern of influenza mortality in pre and post-pandemic years.

Discussion

Influenza was a notifiable disease in Iceland before the pandemic, unlike NZ, which delayed requiring notification until mid-pandemic. Yet officials in both countries delayed in enacting a nationwide response and quarantine measures.However, the eventual public health response in both nations was similar: the creation of temporary/auxiliary hospitals, school and public facility closures, and in post-pandemic years, changes to strengthen public health legislation.

There is evidence that early public health control measures in specific areas of both nations resulted in lower mortality rates. In Iceland, locally-initiated road blocks and ship quarantining (along with a natural barrier of an unbridged glacial river) helped to stop the spread of the pandemic to eastern and northern sides of the island. Similarly, isolation measures (quarantining and travel restrictions) in one county in NZ resulted in significantly lower mortality compared to surrounding areas.

Both NZ and Iceland were relatively isolated islands requiring sea voyages of days to weeks to reach them. This isolation did not protect them from pandemic influenza. A few geographically isolated countries and areas did manage to exclude pandemic influenza in 1918-19 but only by very active policies of 'protective sequestration' [10].

In late 1918, Iceland was entering its winter season, whilst NZ was just entering its warmer summer months, having just past through the usual seasonal influenza period, with potentially higher levels of generalised influenza immunity amongst its population at this time. This may partially explain the difference in the adjusted national and city mortality rates between the two countries.

During 1918, Iceland had more doctors per head of population compared to NZ (0.8 vs 0.6 per 1000), mainly due to one third of NZ doctors serving overseas as part of World War One. However, NZ did have an established nursing workforce (n=1675), unlike Iceland with no nursing profession.

Conclusions

Our study demonstrates some of the consistent epidemiological characteristics of the 1918-19 influenza pandemic; the similar patterns of pandemic waves and mortality (in particular the age pattern), by comparing two geographically diverse island nations. The findings also highlight the importance of an early public health response and the impact it can have on the outcome of a pandemic, regardless of its virulence.

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