Surviving winter: NZ’s journey through 145 years of seasonal survival – New study

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Lucy Telfar-Barnard, Michael Baker, Philippa Howden-Chapman, Nick Wilson

Summary

Our recently published study examined long-term trends in Excess Winter Mortality (EWM) in Aotearoa New Zealand (NZ) for a 145 year period (from 1876 to 2020). We found that the average age- and sex-standardised EWM Index (EWMI) increased from 1.20 during 1886-1917 to 1.34 in the 1920s, before gradually decreasing to 1.14 in the 2010s. In percentage terms, there was a favourable decline in winter excess deaths from 7.9% of annual deaths in the 1920s, down to 4.5% in the 2010s (1450 excess deaths per year). These and other findings support continuing efforts to investigate the public health benefits of improving housing standards and reducing seasonal respiratory infections. This EWM measure should continue to be monitored to ensure NZ keeps making progress in such domains.

Excess Winter Mortality (EWM) describes the higher mortality rate typically seen during winter compared to other seasons. This difference between winter and the rest of the year is measured as an index (EWMI). It compares mortality in the four coldest months to the mortality rate over the combined previous and subsequent 4-month periods, and after

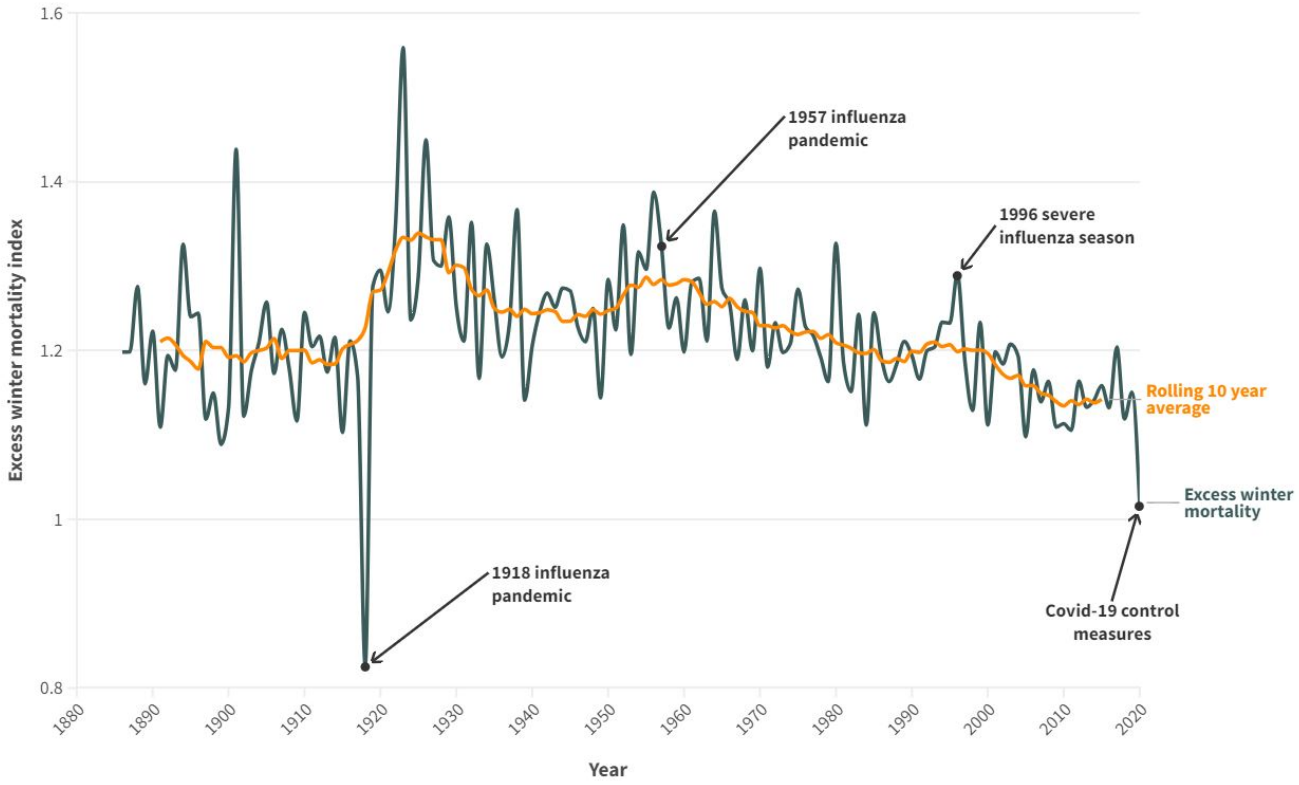
some adjustment, expresses the excess as a ratio. The index is highest in temperate climates such as Aotearoa New Zealand (NZ), and it is sometimes used as an indicator of vulnerability to cold, including how well our housing protects us from the cold. EWM is highest among the very young and elderly, and it usually has a contribution from winter-illnesses such as influenza.

In our recently published study,[1] we analysed 145 years of mortality data for NZ, from 1876 to 2020. This was to describe trends and changes in EWM in NZ, and to explore what factors might have contributed to those changes.

Our study used data from Statistics NZ and Internal Affairs, interpolating where necessary, and adjusting for changes in age and sex distribution of the population. We excluded effects of the 1918 influenza pandemic and noted impacts of the Covid-19 pandemic and response, and various poliomyelitis epidemic control measures. We also explored spatial trends by comparing mortality data between the North and South Islands, adjusting for population shifts. We used statistical techniques (eg, “structural breaks”) and considered temporal trends to understand changes in EWM over time.

What our study found

For the whole study period we found that mortality rates were 22% higher in winter than over the rest of the year. Although numbers of deaths rose as the population increased, mortality rates declined across both winter and non-winter periods. Year-on-year variation in mortality rates reduced overall, but reduced less in winter than in the rest of the year. EWM indices were unstable until the 1918 influenza pandemic, which was followed by a sharp increase in EWM, then a gradual decline, albeit with occasional spikes eg, during the 1957 influenza pandemic and a relatively severe influenza season in 1996. Despite the relative decline, excess winter mortality still causes 1450 excess deaths per year (average for the 2010s).



Source: Telfar-Barnard et al., 2023

Structural break testing confirmed there was a change in trend in 1918 for both winter mortality rates and EWMI. There were further potential trend changes in various years for those 65 and older, suggesting nuanced shifts in mortality patterns over time. EWMIs in the North Island increased relative to the South Island, indicating changing regional mortality trends.

What has caused the decline in EWM since the 1920s?

The overall decline in EWM post-1918 in NZ is in keeping with EWM reductions seen in other countries over the 20th century. We could find no clear evidence for any specific driver of this downward trend eg, provision of influenza vaccination or specific housing quality improvements. This is despite strong NZ evidence that improvements such as retrofitting insulation in housing reduce hospitalisations and mortality.[2] [3] Therefore we attribute the decline in EWM since the 1920s to overall advances in NZ's economic, social, and health standards. Warmer winters due to climate change may also be playing a role in the decline in EWM, however increasing temperatures also risk reducing NZ's EWM in an unhelpful way, if new summer diseases or heat wave deaths become established here.

These findings do hint at a pathway that may be one of the main drivers of EWM, which is seasonal respiratory infections. NZ's very successful elimination response to the Covid-19 pandemic not only eliminated that virus in 2020,[4] but also other respiratory pathogens.[5] That year saw EWM drop to 1.02, the lowest level since 1891, showing that EWM is not inevitable in NZ. This pathway deserves further investigation to better understand how we can intervene to reduce this annual excess of deaths.[6]

Conclusions

Our recently published study found favourable long-term declines in Excess Winter

Mortality (EWM) in Aotearoa New Zealand (NZ) since the 1920s. This EWM measure should continue to be monitored to ensure NZ keeps making progress in such domains as improved housing quality and respiratory disease control which protect our population from seasonal health impacts.

What is new in this Briefing?

- Our published study found that the average age- and sex-standardised Excess Winter Mortality Index (EWMI) for NZ increased from 1.20 during 1886-1917 to 1.34 in the 1920s, before gradually decreasing to 1.14 in the 2010s.
- In percentage terms, there was a favourable reduction in excess winter deaths from 7.9% of annual deaths in the 1920s, down to 4.5% in the 2010s, though the health impact remains substantial at 1450 excess deaths per year.

Implications for research and public health

- This EWM measure should continue to be monitored for NZ to ensure that the country keeps making progress in addressing preventable winter deaths.
- Although changes in EWM likely reflects numerous societal and health trends, there is a case for further improving housing quality based on strong scientific evidence linking housing improvements with reduced hospitalisations and mortality. There is also an argument to investigate interventions to reduce seasonal respiratory infections and monitor their impact on EWM.

Authors details

Dr Lucy Telfar-Barnard, University of Otago Wellington | Ōtākou Whakaihu Waka, Pōneke

Professor Michael Baker, University of Otago Wellington | Ōtākou Whakaihu Waka, Pōneke

Professor Philippa Howden-Chapman, University of Otago Wellington | Ōtākou Whakaihu Waka, Pōneke

Professor Nick Wilson, University of Otago Wellington | Ōtākou Whakaihu Waka, Pōneke

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