

## DATA INSIGHTS

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# Analysing a season of death and excess mortality in Scotland's past

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## WHAT WE DID

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A national system of compulsory registration of births, deaths and marriages was introduced in Scotland in 1855. The records provide a unique source of information about people and their lives, but their handwritten form, which was in place until 1973, has substantially limited research possibilities. All the certificates have been transcribed recently by the Digitising Scotland project and now they are being enhanced and made research-ready as part of the Scottish Historic Population Platform (SHiPP).

In the face of Covid-19, we can look at the past disease outbreaks to find parallels and learn lessons that can be applied today to better respond to the current crisis. We investigated a 20-year period from 1911 to 1930 which includes the 1918-19 influenza pandemic known as the “Spanish flu”. We followed the daily death tolls and in particular analysed deaths in excess of what we would expect – we used the same manner as is currently done to track the spread of the Covid-19 pandemic.

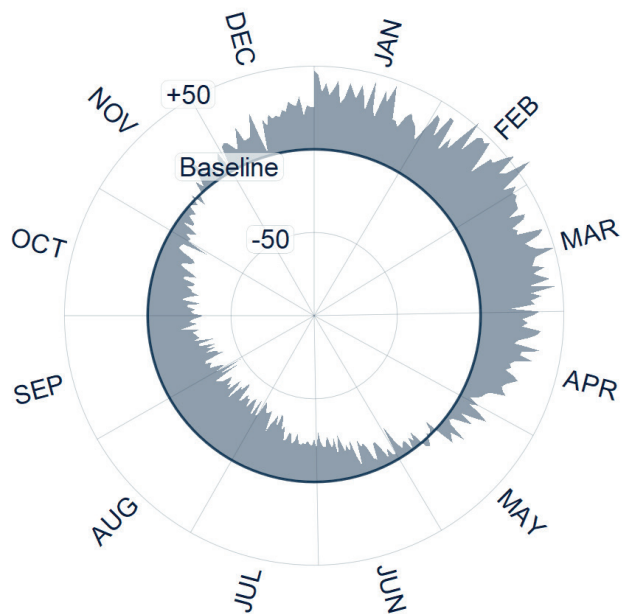
The selected dataset covered the necessary period and provided sufficient granularity to identify typical seasonal variability, unusual influenza outbreaks, and rare lethal events.

## WHAT WE FOUND

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### Excess winter mortality

Every year more people die in the four winter months (December to March) than at other times of the year. This is also the case for the analysed 20-year period (1911 to 1930), although April days are also characterised by increased number of deaths compared with an average number per day.



**Figure 1** Median number of daily deaths above and below annual median of 184 per day derived for 1911-1930.

### Major influenza outbreaks

The current Covid-19 disease is not the first time that we have been faced with a major viral pandemic. As described widely and shown on **Figure 2**, the renowned 1918–1919 H1N1 influenza pandemic led to the death of a large number of people in Scotland. On some days in February 1919 there were almost 300 more deaths than would normally be expected on that day of the year.

Note that those are not the deadliest days during the considered period. More people died in a single day during the influenza outbreak that followed the “Spanish flu”(1918-19), namely in January 1922 (see **Figure 3**). The total death toll of the 1929 epidemic was comparable to the one in 1922

A relatively heavy mortality from influenza that can be considered as an epidemic, also occurred in 1924, as shown in **Figure 3**.

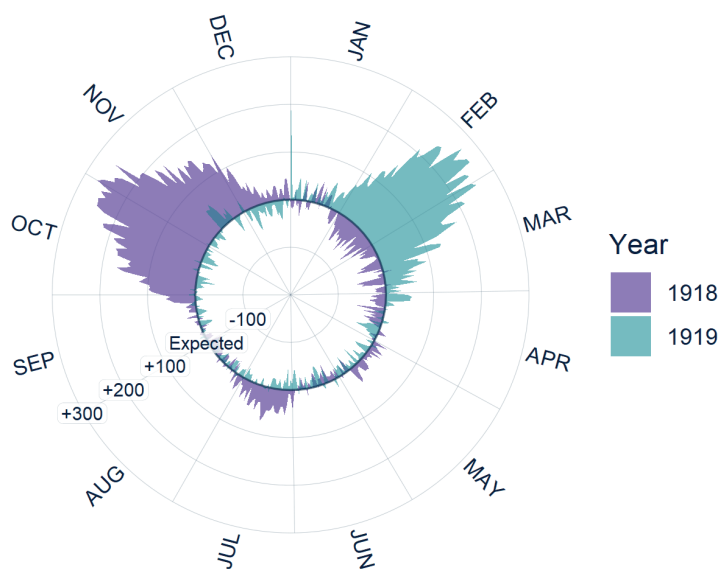
The recurrence of epidemics over an extended period in the 1920’s may suggest that this could happen after the current Covid-19 pandemic.

The large number of deaths on 1st January 1919 is not related to the “Spanish flu”. On that day the “Iolaire” disaster happened, when the naval yacht crashed onto rocks close to Stornoway and more than 200 people died.

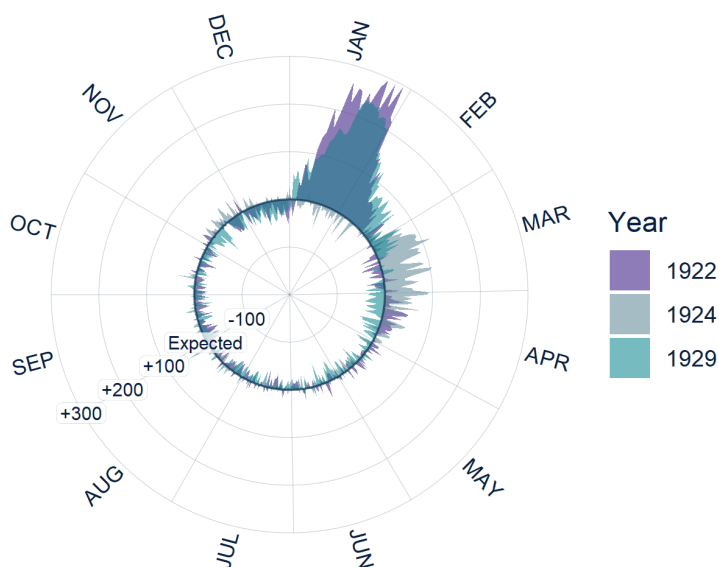
**Figure 1** shows whether the median number of deaths, is above or below the annual median of 184 per day (indicated as a baseline zero circle) derived for 1911-1930.

- There are days in February and March when this value is higher by more than 50 deaths.
- May and November are transitory months with some days above and some days below the baseline.
- The fewest people die between July and September.

Median is used instead of an average as it is not affected by the impact of outliers, i.e. elevated number of deaths during pandemics.



**Figure 2** Daily excess deaths in 1918-1919.



**Figure 3** Daily excess deaths in 1922, 1924 and 1929.

## WHY IT MATTERS

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Access to detailed data on historical populations can advance not only our knowledge about the past and long-term demographic trends, but can also help to address contemporary challenges.

Historical individual-level longitudinal data give an opportunity to analyse complete life histories of individuals from birth to death, which is crucial in understanding the mechanisms linking early and later life that can support development of strategies for improved health and well-being.

## WHAT NEXT?

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One of the aims of the SHiPP enhancements is to code the transcribed text for causes of death, into an international classification scheme (a historical extension of WHO International Classification of Diseases 10th revision). This will allow researchers to analyse seasonality of cause-specific mortality.

After the data linkage, we aim to use the 1918-1919 influenza pandemic to investigate impacts of early life adverse conditions on life expectancy and mortality by cause of death. This is particularly important for Scotland given the nature of health inequalities.

The Scottish Centre for Administrative Data Research (SCADR) analyses public sector data, using new data sources and novel methodologies to deliver cutting-edge applied research with real-world impact. We work with our partners to provide evidence-based insights, which inform policy and practice for public benefit.

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