BY ANDREW HUNT

The challenge of forecasting post-pandemic mortality in the Netherlands and UK

The COVID-19 pandemic caused over 7 million deaths globally, and whilst its ongoing impact is still uncertain, the potential for continued higher mortality will persist for years into the future. This poses a significant challenge to the way we model mortality trends, since the statistical models used to forecast a post-pandemic world rely predominantly on pre-pandemic data. What impact does this have on our projections and how can we best mitigate the consequences? Comparing the Netherlands with the UK highlights the issues and allows us to consider potential solutions.

A. Hunt is Research Director at Pacific Life Re.

In the Netherlands, according to the Centraal Bureau voor de Statistiek (CBS), there have been c. 52,000 COVID-19 deaths up to March 2024, mostly occurring during 2020 and 2021. However, this estimate may understate the ongoing impact of the pandemic. Extrapolating pre-pandemic trends suggests a slightly higher figure of c. 58,000 excess deaths in the Netherlands over the same period, with this continuing to the present, even as reported COVID deaths have dropped away. Clearly this suggests that the causes of higher mortality are more complicated than just COVID-19.

WHAT DOES THIS MEAN FOR PROJECTIONS?

Age-Standardised Mortality Rates in the Netherlands
Age Profile: European Standard Population 2013
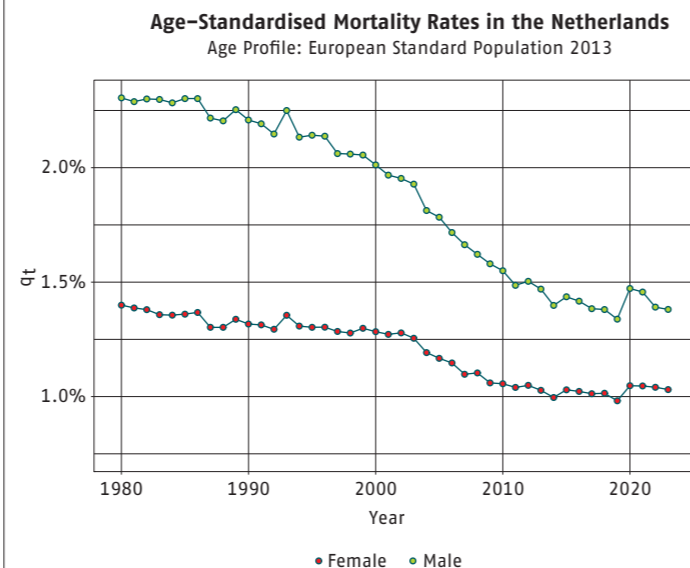
For years, age-standardised mortality rates in the Netherlands have shown steady improvements. However, the excess deaths since 2020 mean that there is now a break in the pattern of these improvements. The question we're therefore faced with is how to manage this when considering future mortality forecasts.

One option is to treat 2020 and 2021 as exceptional, remove these years from the data, but incorporate the data for 2022 onwards without making significant adjustments to our model. However, this approach often means that the current excess mortality is 'locked in' and would be projected to persist indefinitely.

We believe that much of the extra mortality we're seeing is temporary, and therefore is unlikely to persist decades into the future. We therefore require an approach to incorporate these views into our modelling and make more accurate projections.

UNDERSTANDING THE DRIVERS OF EXCESS MORTALITY
At a high-level, our approach is to:

1. Analyse the emerging data on the drivers of excess mortality in 2022 and 2023;
2. Make judgements around the deeper causes of these drivers and consequently how long they may persist into the future; and
3. Quantify these judgements and build them into our modelling.

This requires detailed analysis of the data but also input from other perspectives, including those with a medical or public health background whose insights can help us go beyond what the data is telling us at present.

MORTALITY BY CAUSE OF DEATH
Everyone who dies has their causes of death listed on their death certificate. These are compiled into standardised 'underlying cause of death' statistics which are invaluable for investigating the periods before, during and after the pandemic, and ultimately assisting with understanding the drivers of emerging mortality rates.

For the Netherlands, while excess mortality has dropped slightly since 2021, there has not been a rapid return to the levels seen before the pandemic. When split by cause of death, we find that the composition of the causes contributing to higher mortality during and after the pandemic has changed significantly.

KEY FINDINGS
- COVID-19 dominated excess mortality during 2020 and 2021 and continues to be a significant cause of death in 2022 and 2023.

- The lack of 'flu outbreaks during 2020 and 2021 resulted in lower mortality from respiratory diseases which, in addition to lower dementia mortality, helped offset COVID-19 deaths. However, these offsets have diminished or disappeared in recent years.

- Higher than expected deaths from heart diseases in 2022 and 2023, while deaths from cancers during and after the pandemic were surprisingly in line with expectations.

- One of the largest contributors to excess mortality is 'ill-defined and unknown causes of death' which is a significant challenge as it's unclear what is driving this and what causes these deaths should be attributed to. One potential explanation could be greater difficulty and delays in attributing a specific cause of death in complex cases. If so, future revisions to the data may help understand the situation better.

COMPARING THE NETHERLANDS AND ENGLAND & WALES
One way to better understand the drivers of excess mortality is to compare the experience of different countries. The Netherlands and England & Wales might be expected to have similar drivers of mortality, and while this is true in aggregate (shown as crosses in the graph right), the drivers by cause look to be very different.

Looking at the differences between countries allows us to explore potential explanations for these different drivers. For example:

- In the Netherlands, lower immunity in the population arising from lower exposure to COVID-19 during 2020 and 2021, may be causing higher COVID-19 mortality in 2022, together with a corresponding higher offset from lower dementia mortality.

- Conversely, in England & Wales, a larger number of severe COVID infections may have caused more lasting frailty due to respiratory, circulatory and other organ damage.

- Differing healthcare systems may also be affecting the excess mortality from causes such as heart diseases and cancers.

- In contrast, both countries experienced significant excess mortality from circulatory conditions which may suggest a common underlying driver, rather than specific issues with how healthcare is provided in either country.

- Interestingly, there is not the same increase in 'ill-defined causes' mortality in England & Wales. However, we do observe a significant increase in alcohol-related liver disease mortality, which may be explained by behavioural changes during the pandemic.

WHAT IMPACT DOES THIS HAVE ON OUR FUTURE PROJECTIONS?
Once we're able to understand what is driving the excess mortality, we can factor this into our projections of the future. Discussions with experts in other fields, such as medicine, epidemiology and public health professionals, will be critical in forming a view on how long these drivers will apply. This narrative can then be turned into assumptions that can be modelled and which build directly on top of the quantification of the current excess mortality.

For example, we expect that monthly deaths due to COVID-19 will continue to fall as the virus approaches its long-term endemic state. To factor this into projections, we need to develop our views on how long it will take for this endemic state to be reached. However, COVID-19 is just one of many causes of death currently contributing to excess mortality and therefore we will need to look at multiple causes and make separate judgements around their drivers and run off periods.

The recently released AG2024 mortality projections go a long way towards doing this by quantifying excess mortality and allowing it to run off in the medium term. However, the lack of a decomposition of excess mortality by cause is a limitation of the modelling. As we have explored, the drivers of excess mortality are far more complex than just COVID-19 and ideally our modelling, and the run-off of excess mortality, should reflect this.

The COVID-19 pandemic represents a step change in mortality rates which cannot be ignored and developments in our modelling will be needed to incorporate the latest data into our projections. Only when we combine detailed analysis of the data with expert judgement will we have an assumption that we can have confidence in. ∎

Age Standardised Excess Mortality in 2022 in the Netherlands and England & Wales
Age Profile: European Standard Population 2013

Cause	
■ COVID-19	■ Heart diseases
■ Respiratory diseases	■ Other circulatory diseases
■ Cancers	■ Ill-defined causes
■ Dementia and Alzheimer's	■ Other causes