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Briefing note

Weight loss: CMI_2024 consultation

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The CMI has recently published its proposed changes to the next iteration of the Mortality Projections Model (CMI_2024). The proposed changes represent a major overhaul of the model structure and have significant impacts on projections at certain ages. The proposal is subject to an industry consultation. In this article, we discuss the main changes to the model and how this could impact (re)insurers.

Introducing the overlay

The proposed approach to dealing with post-pandemic data is to build an "overlay" component into the model fit.

Previous iterations of the model, which made use of the "weight" parameters, couldn't cope with the spike (and subsequent run-off) of excess mortality caused by the pandemic. They instead largely ignored and smoothed through this volatile data, resulting in large differences between the actual and expected mortality rates. Many users adjusted the historical rates outside of the CMI model to make sure that experience analyses conducted over that period didn't contain high Actuals / Expected values.

The model structure also required subjective assumptions for the degree of "ignoring the data". The choice of weight parameter values had a material impact on the projection and were challenged for not being intuitive or objective. Inclusion of 2024 data would have resulted in an even less intuitive result, which would be challenging to communicate and explain to stakeholders.

The proposed overlay component of the model allows a spike and run-off to be automatically built into the model fit, which can be done objectively, referencing the historical data. The core parameters values effectively assume the excess mortality observed over the past five years has now largely run-off. Users can also change the overlay shape if they wish (using the "half-life", "permanent" and "run-off type" parameters).

Although the overlay is a neat new feature to the model, which may avoid manual adjustments, it may not be ideal for all users. For example:

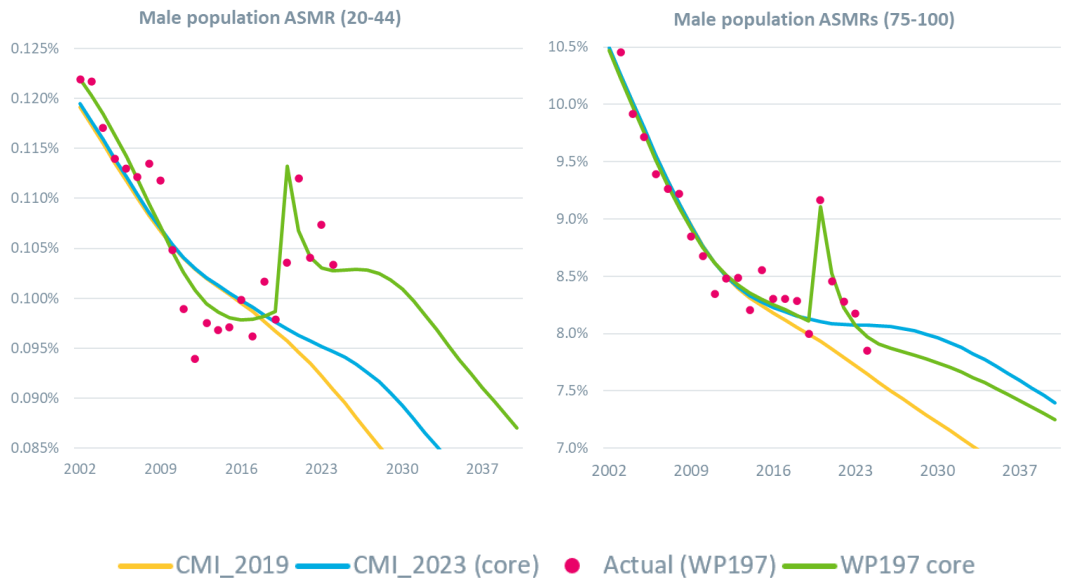
- **The overlay doesn't vary by age**. This results in a particularly poor fit at the younger ages (20-44), as we will discuss further below.

- **The overlay is calibrated to population data.** The population mortality improvements observed over recent years may be materially different to what was observed in insured portfolios / pension schemes. Replacing manual adjustments with a set of improvements from CMI_2024 could be considered a simplification.
- **The overlay doesn't work with pre-pandemic base tables with recent effective dates** (for example, Club Vita's VitaCurves). Combining these together blindly will produce inconsistent projections. Users will need to switch off the overlay (which is an option in the model) or make an adjustment to their base table to ensure they are compatible. This is all doable, but care is needed!

It will be interesting to understand the adoption of this new structure within the insurance industry given many insurers will have already developed their own solutions to dealing with the volatile data.

Kappa, Kappa, Kappa

Although post-pandemic experience has returned to pre-pandemic levels at the older ages, this is not the case for the younger ages. To more readily capture the different emerging trends across age groups, the CMI are proposing introducing more "kappa" parameters. Increasing the number of kappas from one to three is a change to the underlying model structure. The kappa values are automatically calibrated to the population data, rather than being set by the user. The change in structure (illustrated via "WP197 (core)" in graph below[1]) has improved the model fit for ages 20-44 vs. the fit from CMI_2023 and increased the corresponding projected mortality rates for this age group quite materially. This has a limited impact on cohort life expectancy, given the overall size of the mortality rates at this age but would have a material impact for shorter term metrics which are more relevant for protection policies.



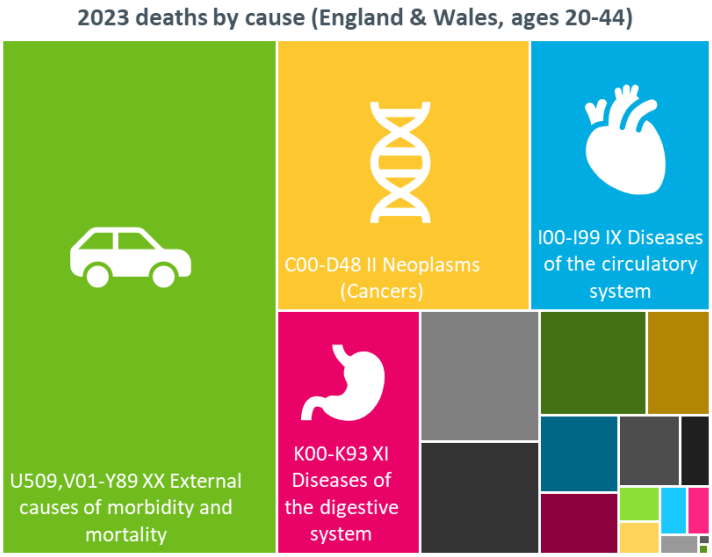
[1] Note a LTR of 1.5% has been assumed for illustration purposes across all projections.

The opposite effect is true for the older ages, where 2024 mortality was the lightest year on record. The new proposed model results in lower mortality rates vs. core CMI_2023. This results in fairly material increases in life expectancy.

The additional complexity of three kappa terms in combination with the fitted overlay term has resulted in other technical changes to the model fitting process, including the fitting algorithm used to calibrate the model and the approach to constraining the cohort components at high / low ages. These changes were considered necessary by the CMI to limit further divergence from CMI_2023.

What is going on at younger ages?

Given the model has been changed so significantly in response to experience at the younger ages, we've done some digging into the data to try to understand what could be driving this emerging trend. The main causes of death for ages 20-44 are shown in the below graphic, with the largest being "External causes". This includes reasons such as road traffic accidents, acts of self-harm and suicide.



Deaths in this group have been increasing before the pandemic, primarily driven by a 60% increase in deaths since 2013 within the subgroup "Accidental poisoning by and exposure to noxious substances" category (eg death by accidental drug overdose) which in 2023 represented 15% of all deaths in England and Wales for those aged 20-44. This may in part explain the emerging picture at younger ages when looking at the all-cause data.

We should also be aware that the population exposure values at these ages are much more uncertain than at the older ages. This is not only since there are fewer deaths at these ages, but also because the exposure numbers are more affected by net-migration. An allowance for this is estimated by the ONS and used directly by the CMI, although the CMI make an estimate for the final year of data.

Immigration (and therefore net migration) has increased to unprecedented levels since 2021. This is due to several factors including the war in Ukraine, the post-Brexit immigration system and pent-up demand following the pandemic. The estimate of net migration for the year ending June 2024 was c800,000, which compares to c200,000 prior to the pandemic[2]. This underlying shift is the reason why the exposure values for this age range for the final year in the model has been underestimated in CMI_23 and CMI_22. We expect this may also be the case for CMI_24, which will dampen the emerging trend by a small amount.

Our view

A lot of hard work and time has gone into the most recent model and there's clearly quite a lot to unpack. We consider the proposals to be an improvement on the partial weight parameters approach from previous iterations which were becoming increasingly unfit for purpose. Whilst it has limitations, the fitted overlay

[2] Long-term international migration, provisional - Office for National Statistics

component enables the recent volatility to be captured neatly and will make experience studies over this period more straightforward. In future years, once the "post-pandemic rate of improvement" becomes clearer, there won't be too much ambiguity amongst users about how to parameterise this element of the model.

However, the overlay doesn't really work at the younger ages, making the underlying trend difficult to decipher. This might result in the implied underlying trend being quite volatile over the next few years for these ages. A simpler approach to setting trend for these lives might be better, depending on the time horizon that the rates need to be considered over and by looking at portfolio experience.

Given the sensitivity of the model to introducing the three period terms, the proposal has raised the question of whether pension schemes / annuity writers should be making using of the data at younger ages at all to set their trend assumptions. The data volumes are low, more uncertain and potentially include spurious cohort terms. The current direction of travel is also unclear. The move to the three period terms tries to limit this link, but a simpler solution, such as changing the calibration age range, might be more desirable.

The changes do increase the complexity of the core model fit to recent data. Having a highly detailed model does risk us losing sight of the bigger picture; that mortality improvement projections are highly uncertain and unpredictable and no matter how sophisticated the model, they include a lot of risk. These changes may result in more unintended consequences in the future and produce more volatile results than desirable. Firms will also need to reflect any change in approach within their internal model calibration process (see our recent article discussing this here).

The great thing about the model is that users can flexibly use it how they desire, so that it meets their needs. However, with the ever-increasing parameters and options, the model is becoming more challenging to navigate.

What does this mean for (re)insurers?

The change to the core model results in material changes to life expectancy vs. CMI_2023, particularly at male pensioner ages. This is shown in the table below calculated as of 1 Jan 2025 using S3PxA mortality tables.

Change in life expectancy vs. CMI_2023 core model (1.5% long-term rate)

	25	45	65	75	85
Males	-0.5%	-0.7%	+0.5%	+1.4%	+2.3%
Females	-0.3%	-0.5%	-0.1%	+0.6%	+1.3%

For annuity writers / pension schemes who follow the "core" model closely, this will result in a material increase in liabilities. There may therefore be caution of adopting the model without understanding the details.

Protection writers / reinsurers are likely the group most interested in the trends emerging at the youngers ages. They will likely be analysing their portfolio experience to assess the relevance of the picture within population data. If this emerging trend includes a significant component relating to drug overdoses, they may wish to consider firstly whether those impacted by this cause are likely to have a protection policy, and secondly, if they did, whether such deaths would result in a claim.

Given the timing of the model release, many might wait and see how the model performs over the next year, rather than committing to a major change for this coming year-end. Those who have developed alternative approaches to dealing with post-pandemic data will need to decide if they want to maintain those methods or adopt the simpler CMI_2024 overlay and return to a trend assumption which can be set entirely within the CMI model.

Get in touch

The latest CMI model iteration represents a significant evolution of the model. The model is incredibly flexible, which provides users with plenty of choice when deciding what trend assumption is best for them. Our team has extensive experience in setting trend assumptions and would be delighted to support as you review, refine and validate your assumptions. Please get in touch if you would like to discuss more.

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