CLUB VITA
Ahead of the *longevity* curve

Thank you for joining us – the webinar will start shortly

Setting mortality improvements with post-pandemic data

Emerging signals, or too early to tell?

Thursday 2nd April 2026

8am PT / 11am ET / 4pm UK

linkedin.com/company/club-vita

www.clubvita.net

Today's panel

Chair

Natalie Gleed FIA FSA

Head of Business Development

Panellist

Erik Pickett PhD FIA FSA

Head of Actuarial Content

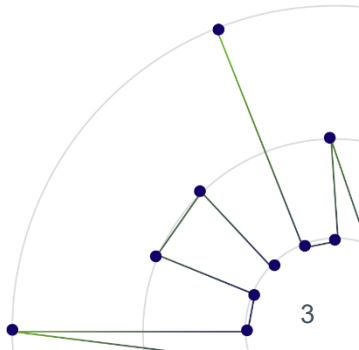
Panellist

Nick Chadwick FIA

Longevity risk specialist

Agenda

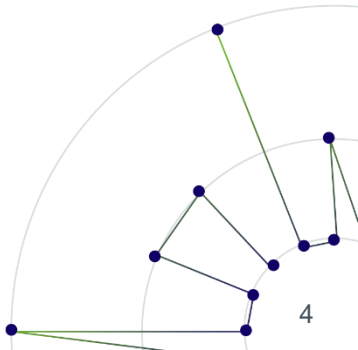
1. How far off the pre-COVID trend is emerging data?
2. Can we use pandemic data to set post-pandemic improvements?
3. What happens if we just ignore the COVID years?



Poll question

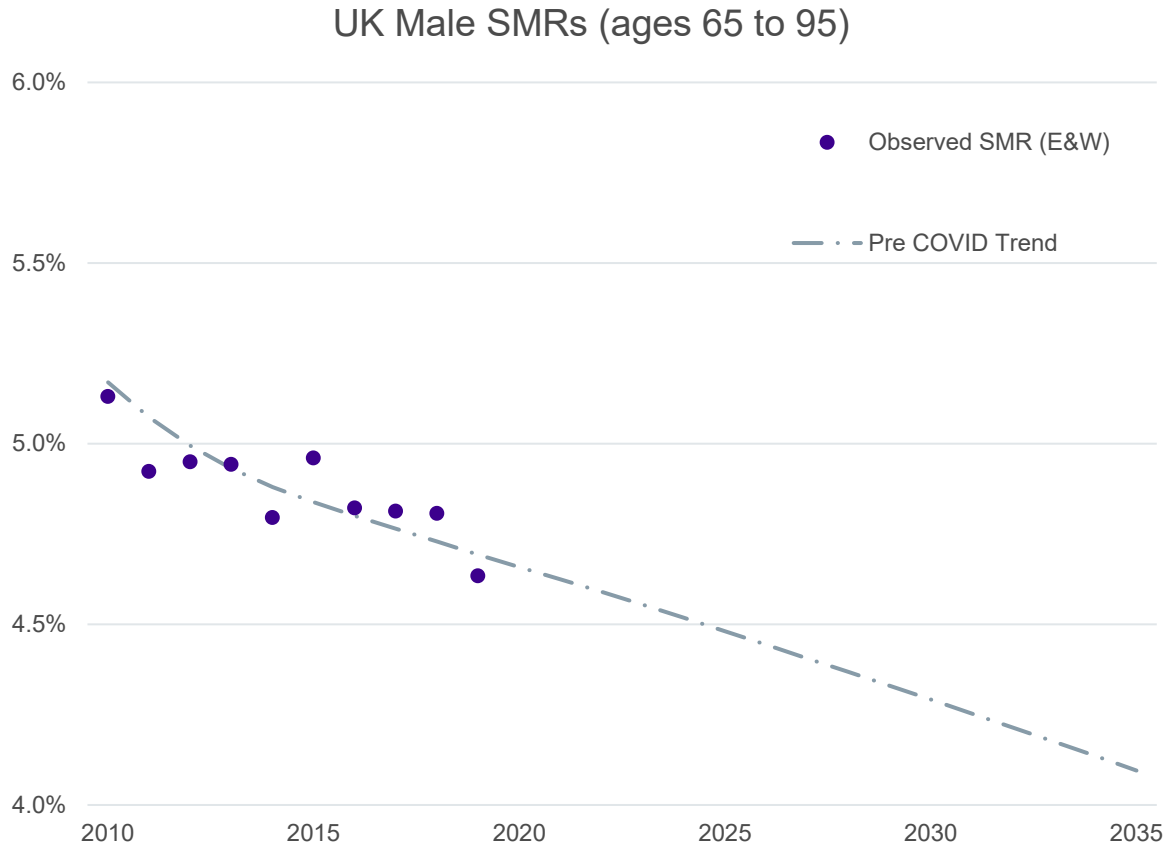
Based on our calculations, US men in 2020 had the highest excess mortality in a single year of the pandemic. Which group do you think had the second highest excess mortality peak?

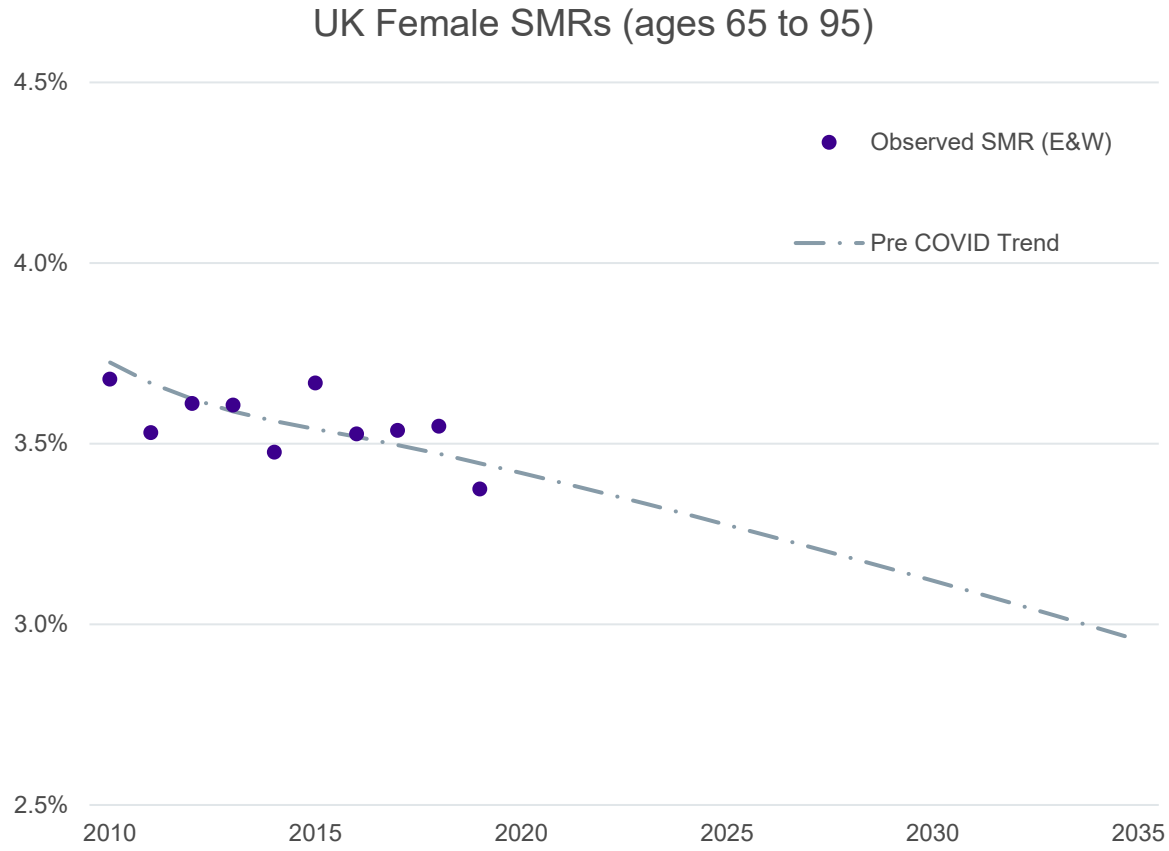
- UK men (in 2020)
- US women (in 2020)
- Dutch men (in 2020)
- US men (in 2021)
- Canadian men (in 2022)



Question 1:
How far off the pre-COVID trend is emerging data?

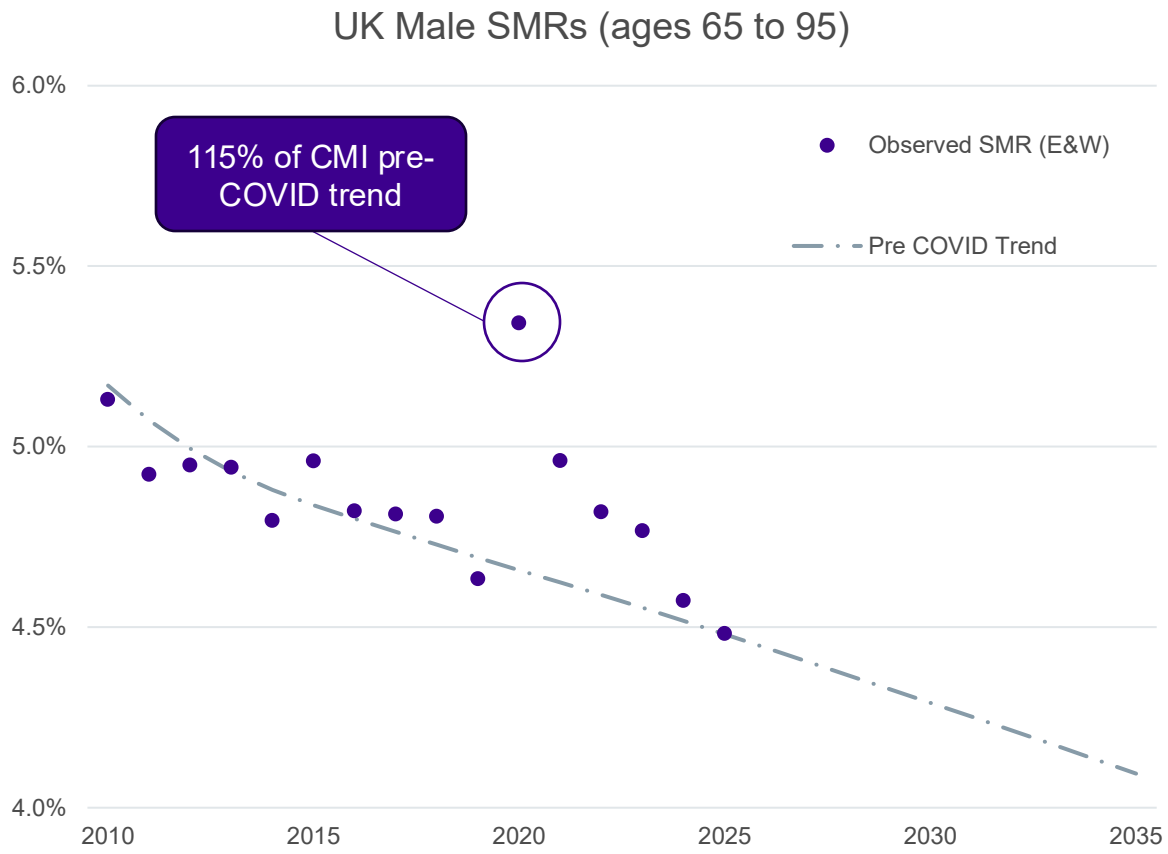
Pre-pandemic trend (UK)

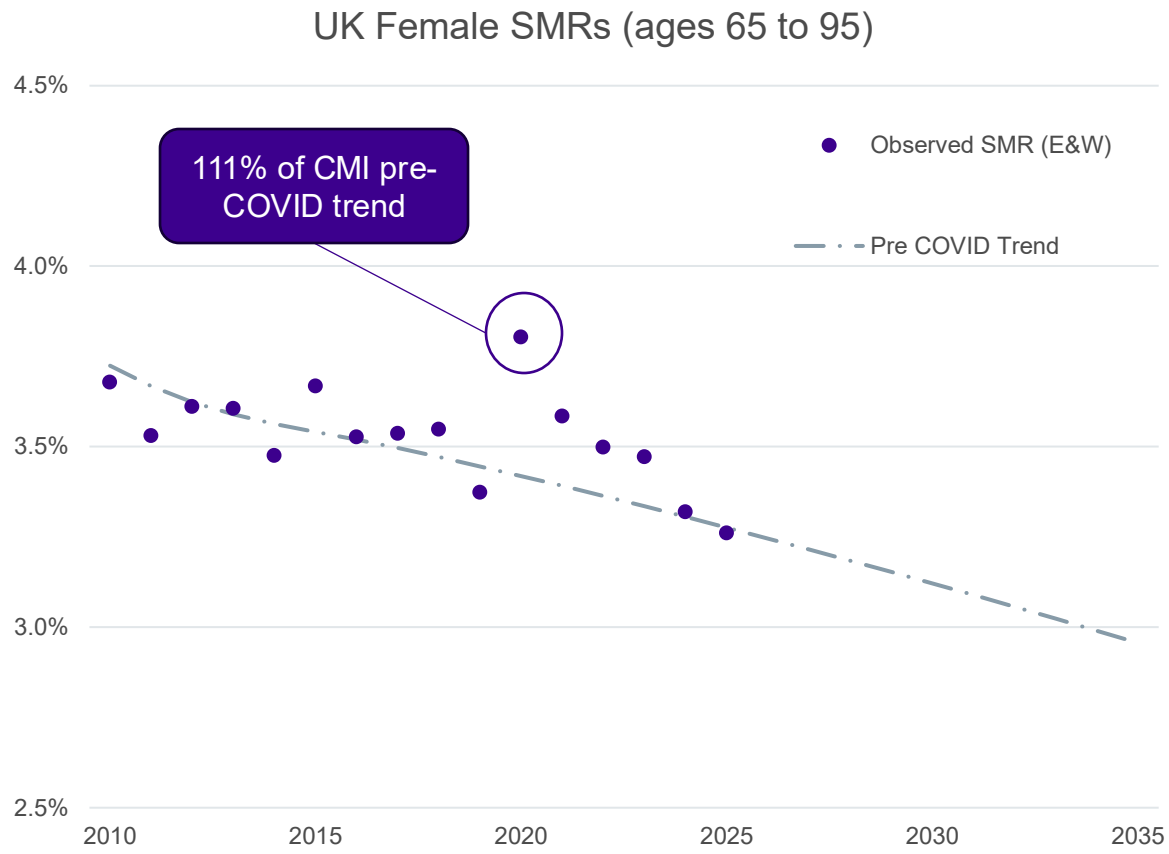




Observed SMR rates extracted from CMI_2025 model. Pre-COVID trend based on advanced calibration of the CMI_2025 model with MinYear set to 1979, MaxYear set to 2019, FittedOverlayApplies set to “No”, otherwise core parameters with a long-term rate of 1.5% pa.

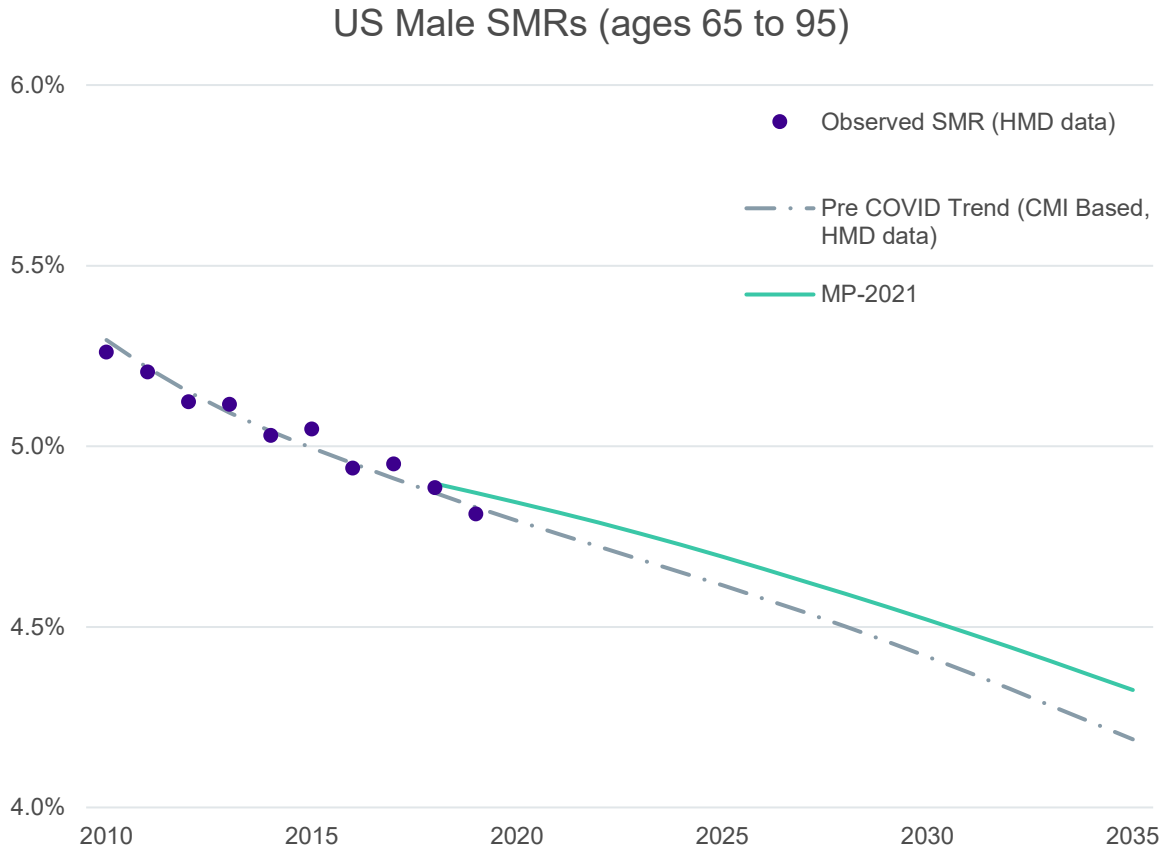
What happened next? (UK)

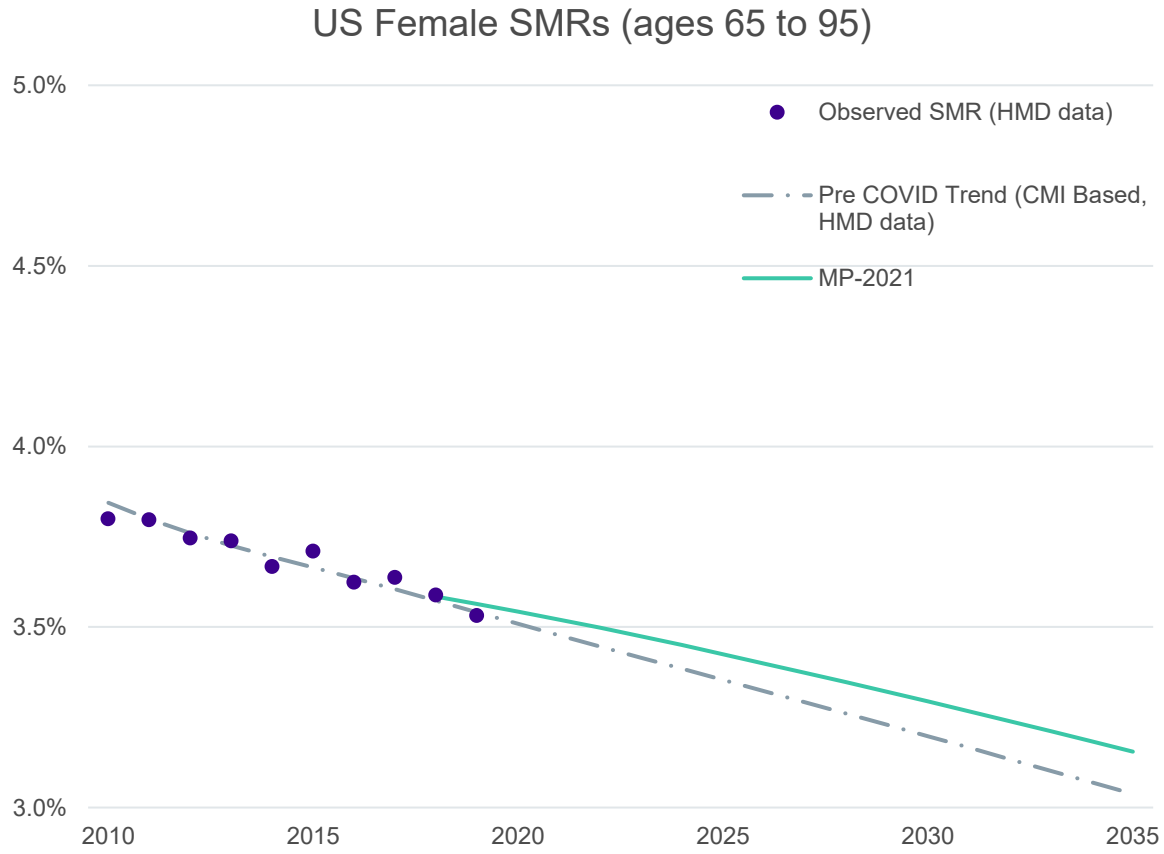




Observed SMR rates extracted from CMI_2025 model. Pre-COVID trend based on advanced calibration of the CMI_2025 model with MinYear set to 1979, MaxYear set to 2019, FittedOverlayApplies set to “No”, otherwise core parameters with a long-term rate of 1.5% pa.

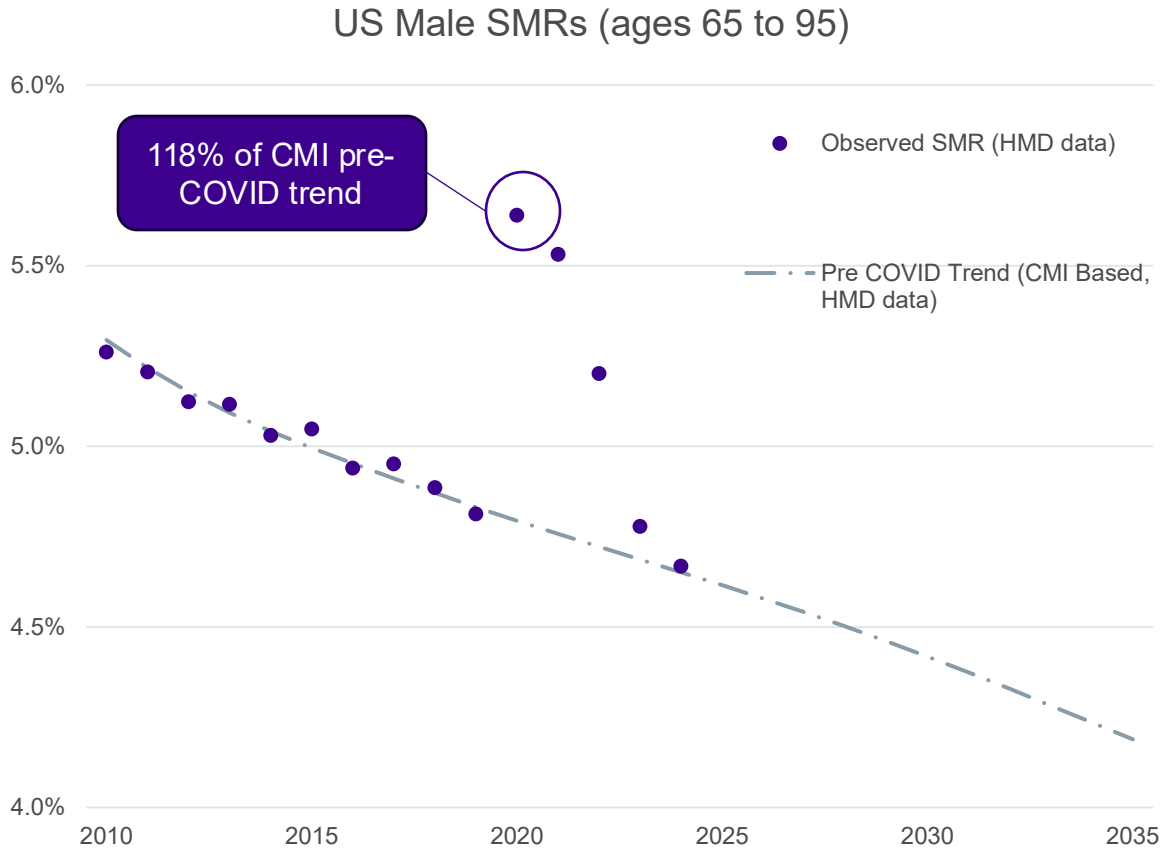
Pre-pandemic trends (US)

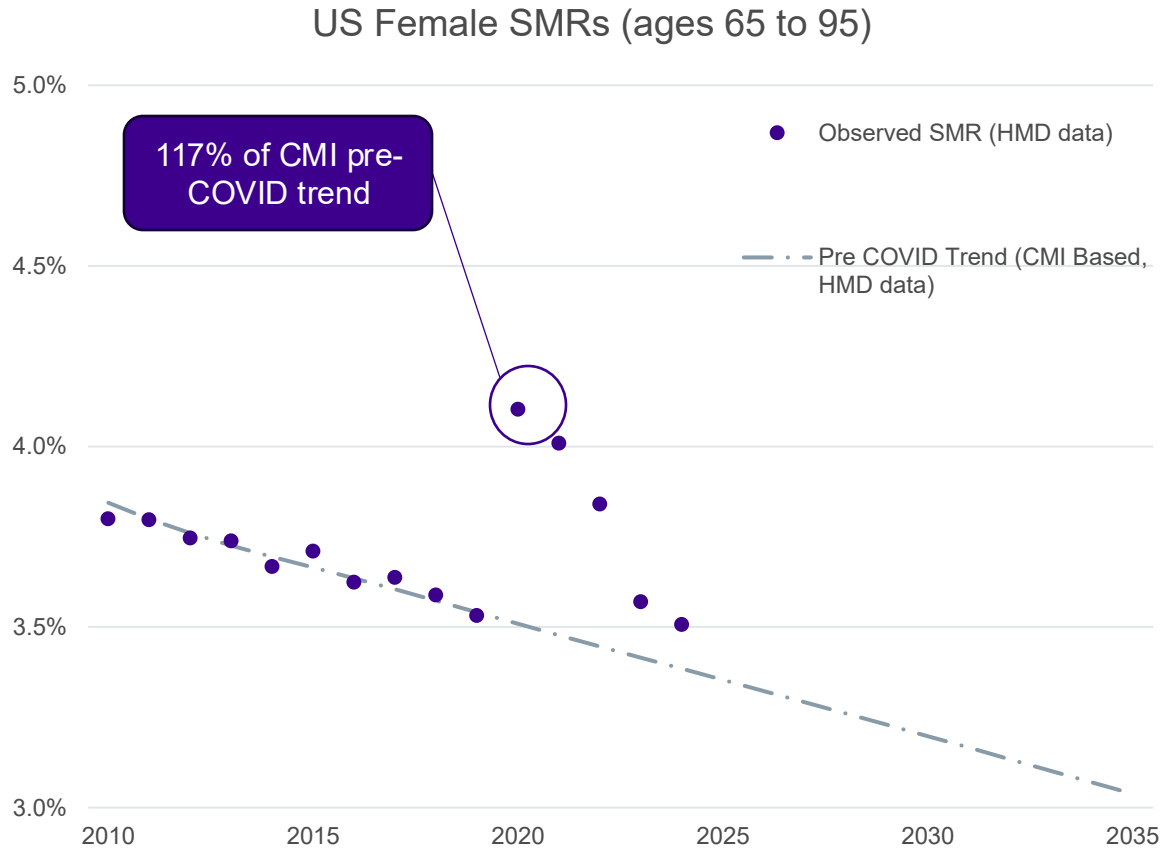




Source: Club Vita calculations using CMI_2024 v05 projections model. US data up to 2024 from the Human Mortality Database (www.mortality.org). MP-2021 accessed through the Society of Actuaries MIM-2021 Note: 1.0% long term rate of improvement is used in the US application of the CMI model throughout

What happened next? (US)

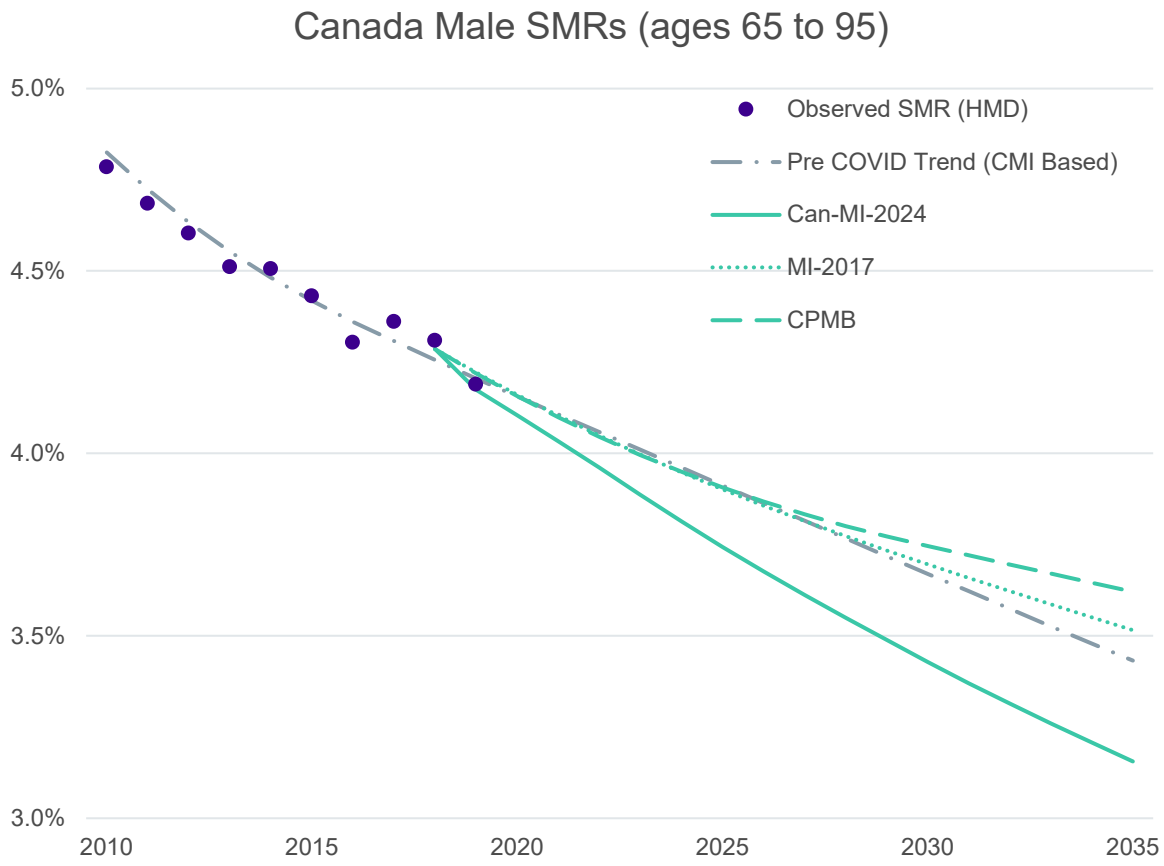


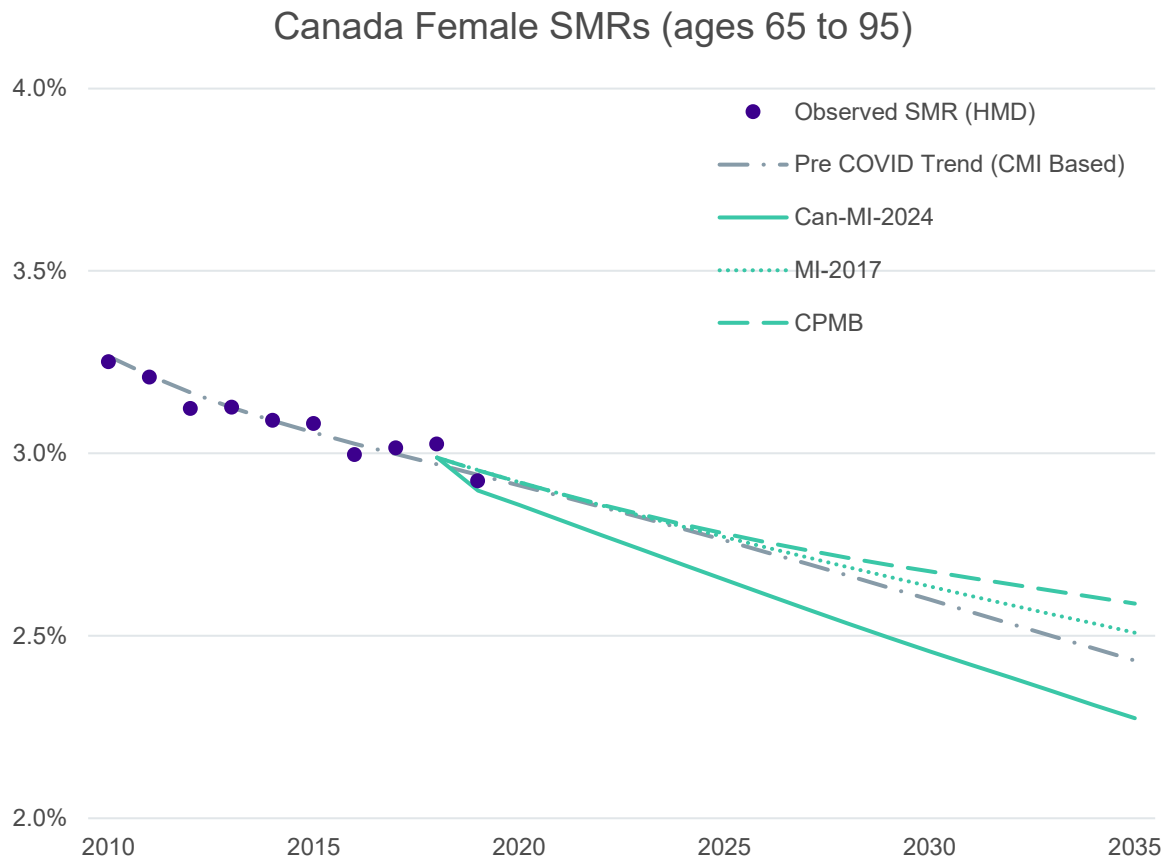


At the population level, COVID hit hardest in 2020, with excess almost as high in 2021, then halving in 2022. 2024 mortality almost back to trend for men, still high for women

Source: Club Vita calculations using CMI_2024 v05 projections model. US data up to 2024 from the Human Mortality Database (www.mortality.org). MP-2021 accessed through the Society of Actuaries MIM-2021 Note: 1.0% long term rate of improvement is used in the US application of the CMI model throughout

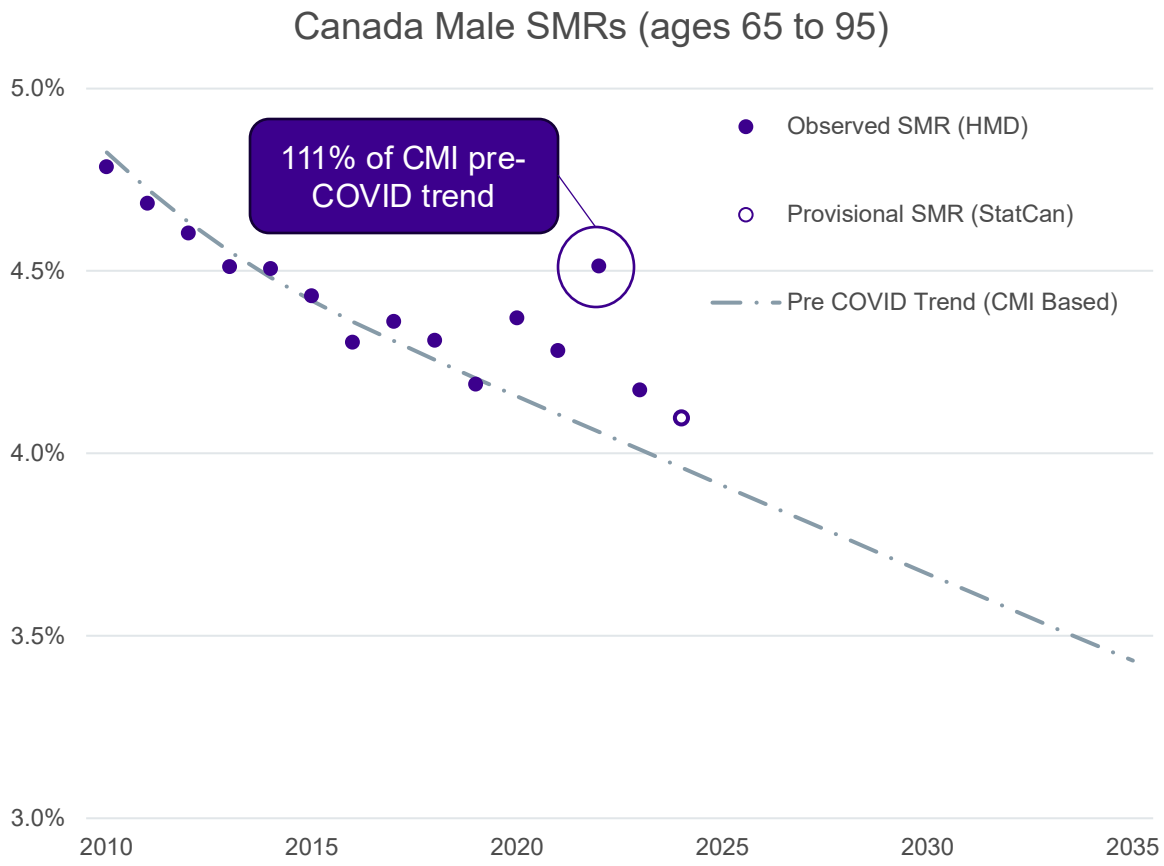
Pre-pandemic trends (Canada)

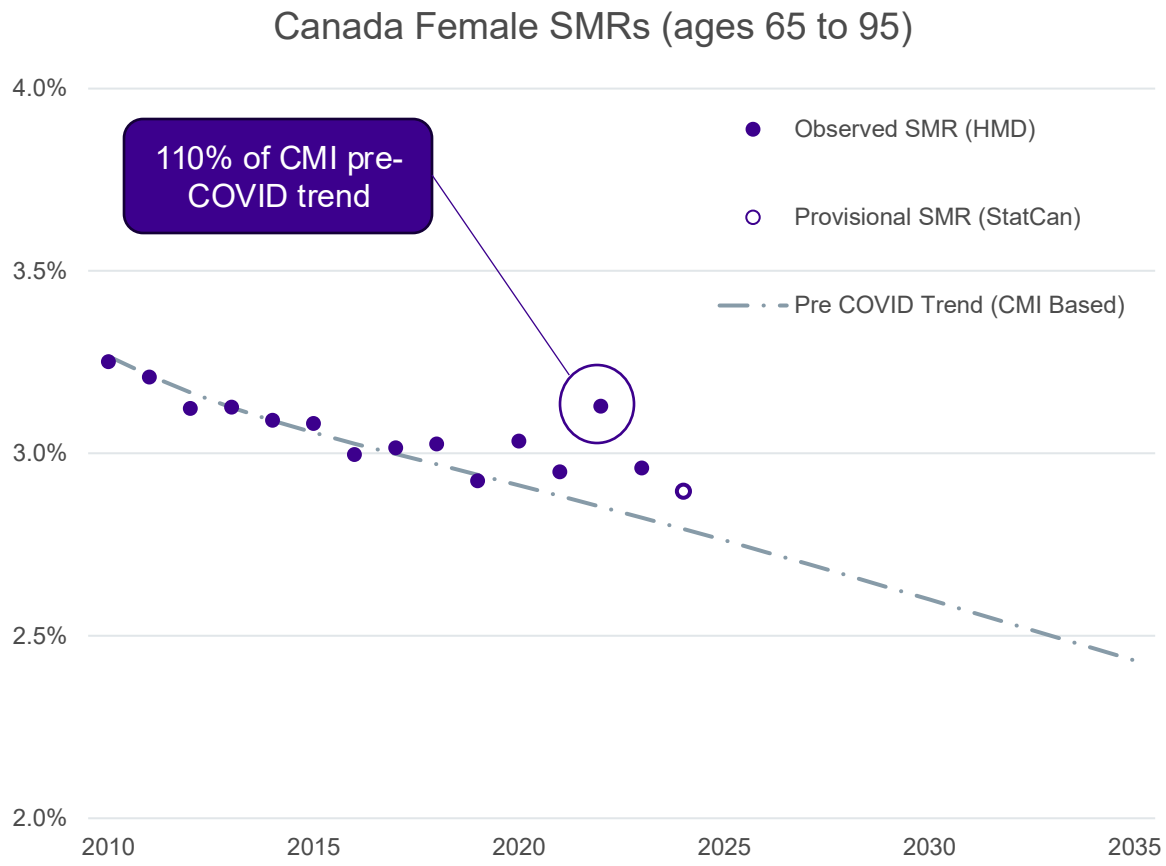




Source: Club Vita calculations using CMI_2024 v05 projections model. Canadian data up to 2023 from the Human Mortality Database (www.mortality.org), 2024 data estimated using StatisticsCanada life table. CanMI-2024, MI-2017 and CPM-B all available from the Canadian Institute of Actuaries (www.cia-ica.ca). Note: 1.3% long term rate of improvement is used throughout

What happened next? (Canada)

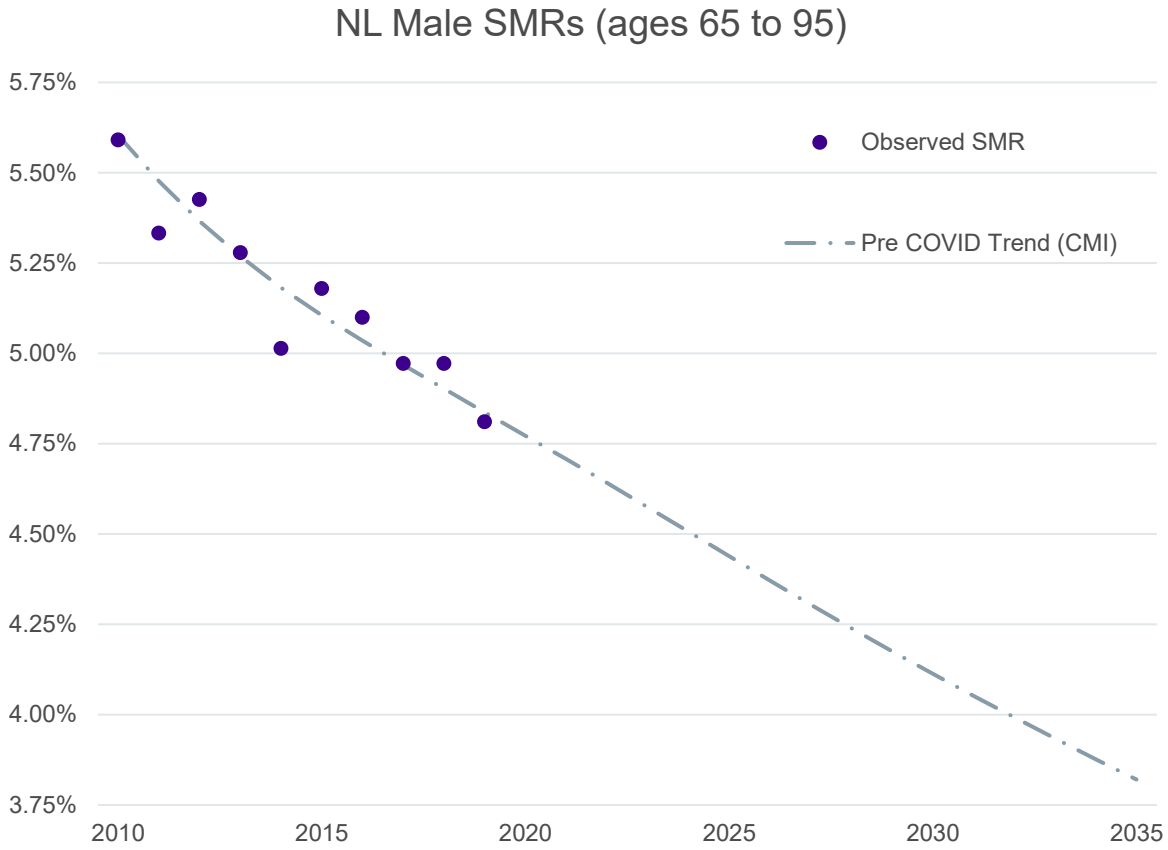


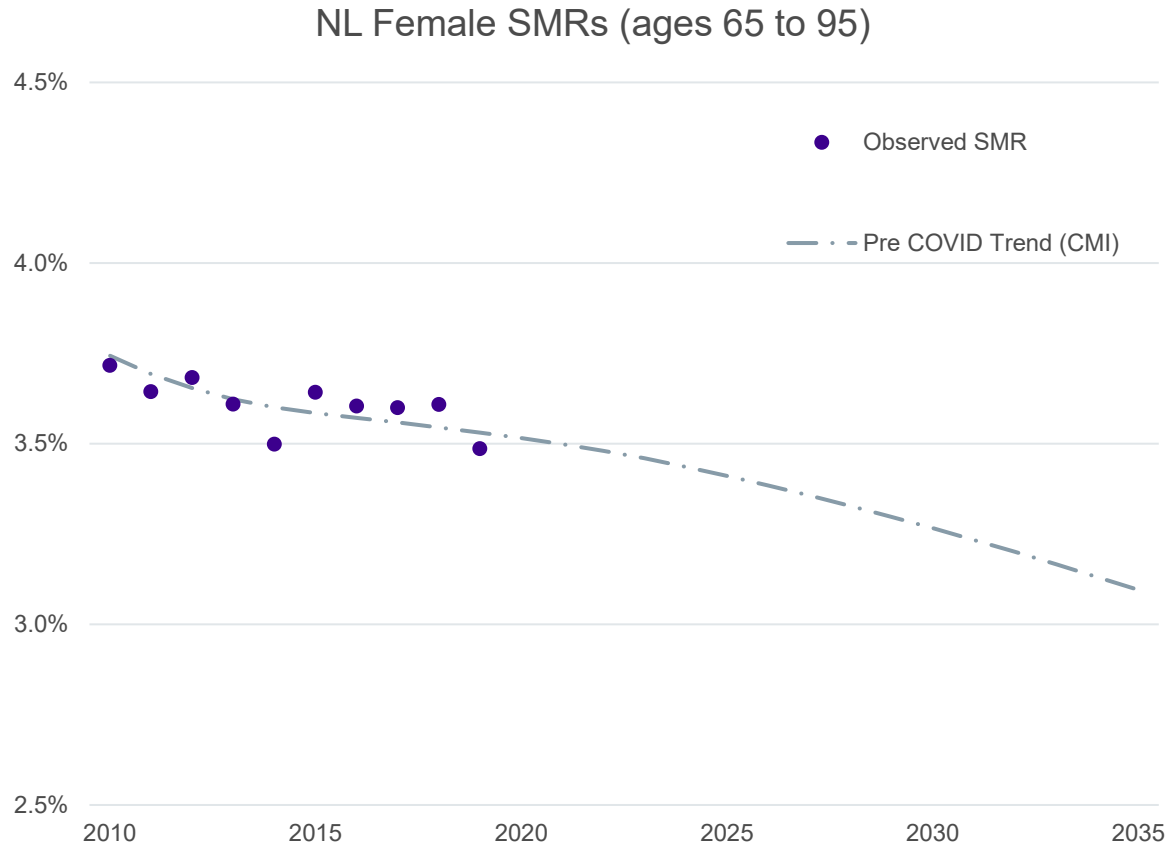


COVID peak delayed until 2022 in Canada and excess (or new normal) is persisting. 2024 mortality still higher than pre-pandemic trends.

Source: Club Vita calculations using CMI_2024 v05 projections model. Canadian data up to 2023 from the Human Mortality Database (www.mortality.org), 2024 data estimated using StatisticsCanada life table. Note: 1.3% long term rate of improvement is used throughout

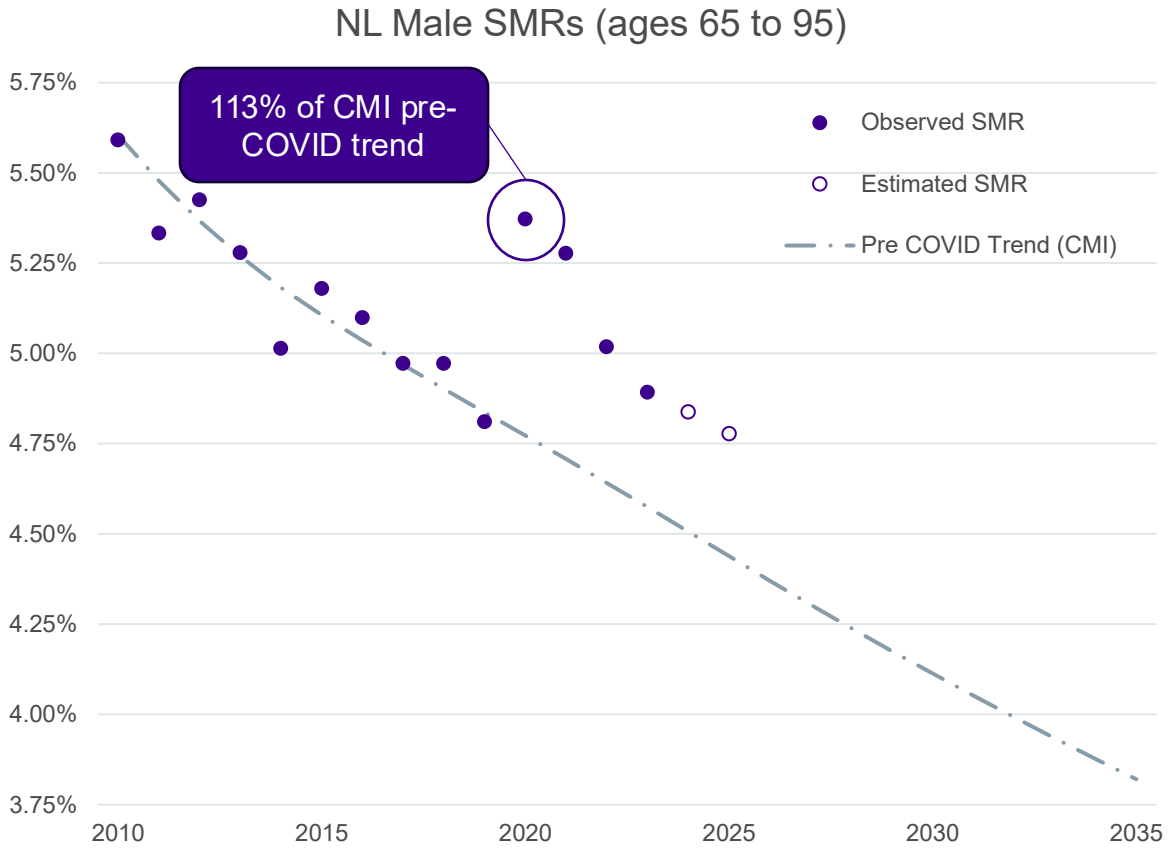
Pre-pandemic trends (Netherlands)

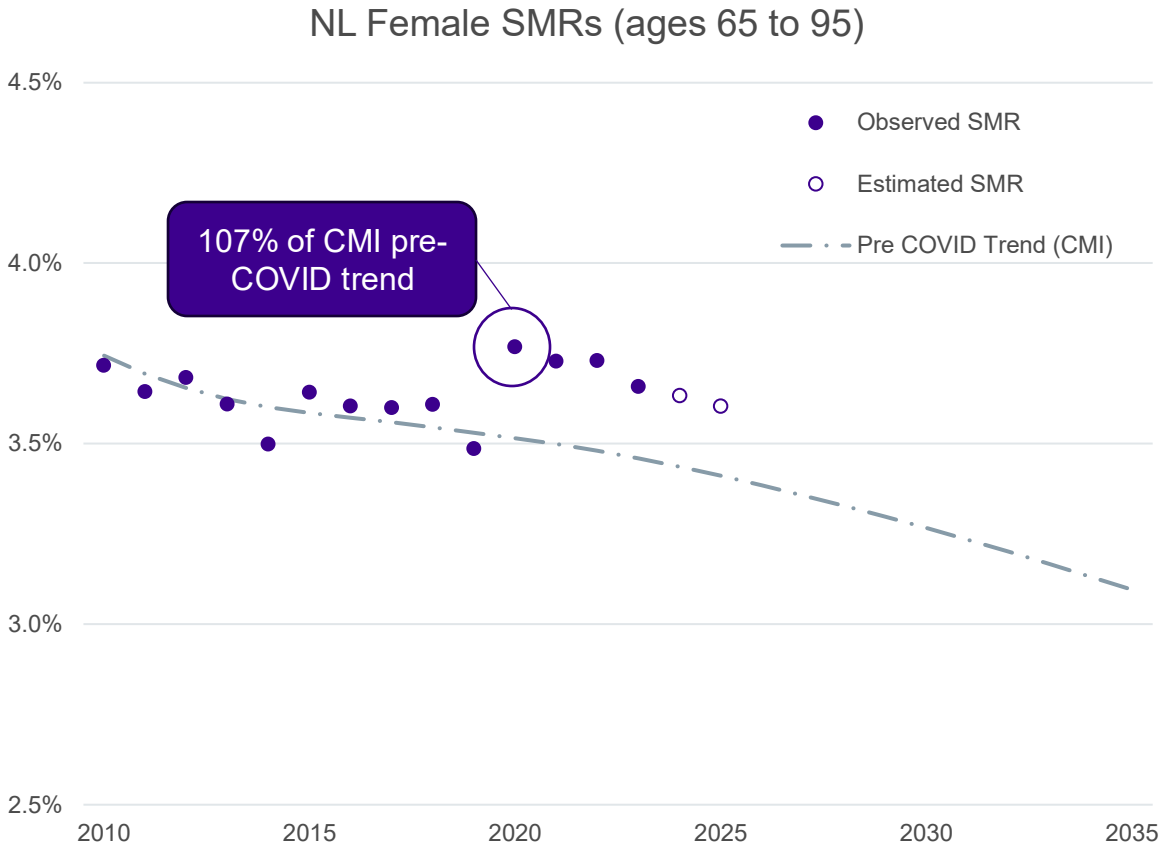




Source: Club Vita calculations using CMI_2024 v5 BETA. NL data up to 2023 from the Human Mortality Database (www.mortality.org). Pre COVID trend based on an advance parameterisation of the model with MinYear = 1979, MaxYear = 2019, AdjustSmoothing = Yes, FittedOverlayApplies = No. Long-term rate = 1.5% pa for men, 1.4% pa for women, set to achieve broad consistency with the AG2024 model.

What happened next? (Netherlands)





Mortality rates have been stubbornly high in the Netherlands (versus pre-COVID expectations) since 2020.

Source: Observed SMR and Pre COVID trend as per previous slide. Provisional SMRs are Club Vita estimates based on CBS data on total annual deaths amongst male and female over 65s (https://opendata.cbs.nl/#/CBS/en/dataset/70895ENG/table), data downloaded on 20 March 2026.

Observations

- Most significant excess mortality experienced in the 2020-2022 period
- UK men, UK women, US men

  Mortality rates back down to pre-pandemic expectations by c2024

  Are we now stably back to pre-pandemic trends?
  Or could we be witnessing a survivorship effect?

- US women, Netherlands men, Netherlands women, Canadian men, Canadian women

  Latest mortality data not (yet) back to pre-pandemic expectations

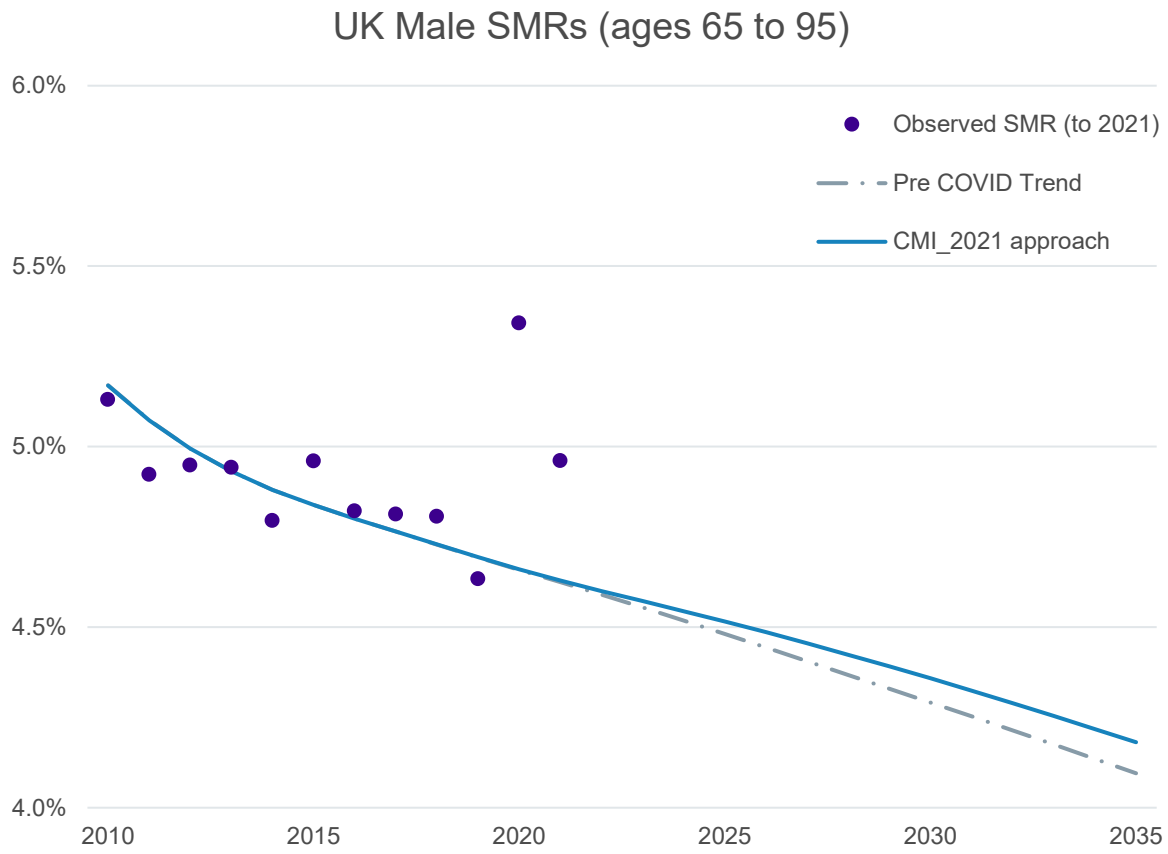
  Is this ‘excess mortality’ that will reduce in time?
  Or is a ‘new normal’ emerging?

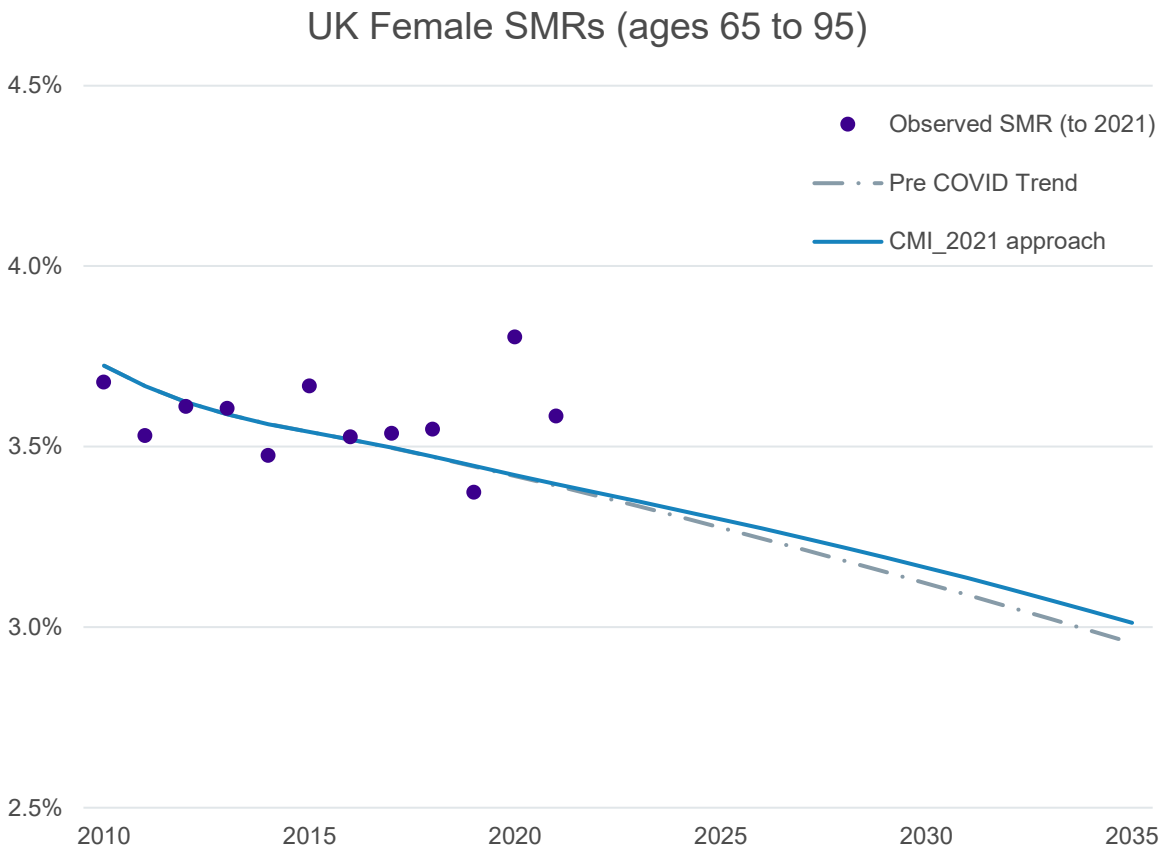
Each new year of data gives vital information

Question 2:
Can we use pandemic data to set post-pandemic improvements?

The development of the CMI's "fitted overlay" methodology

CMI approach to COVID: CMI_2020 / 2021

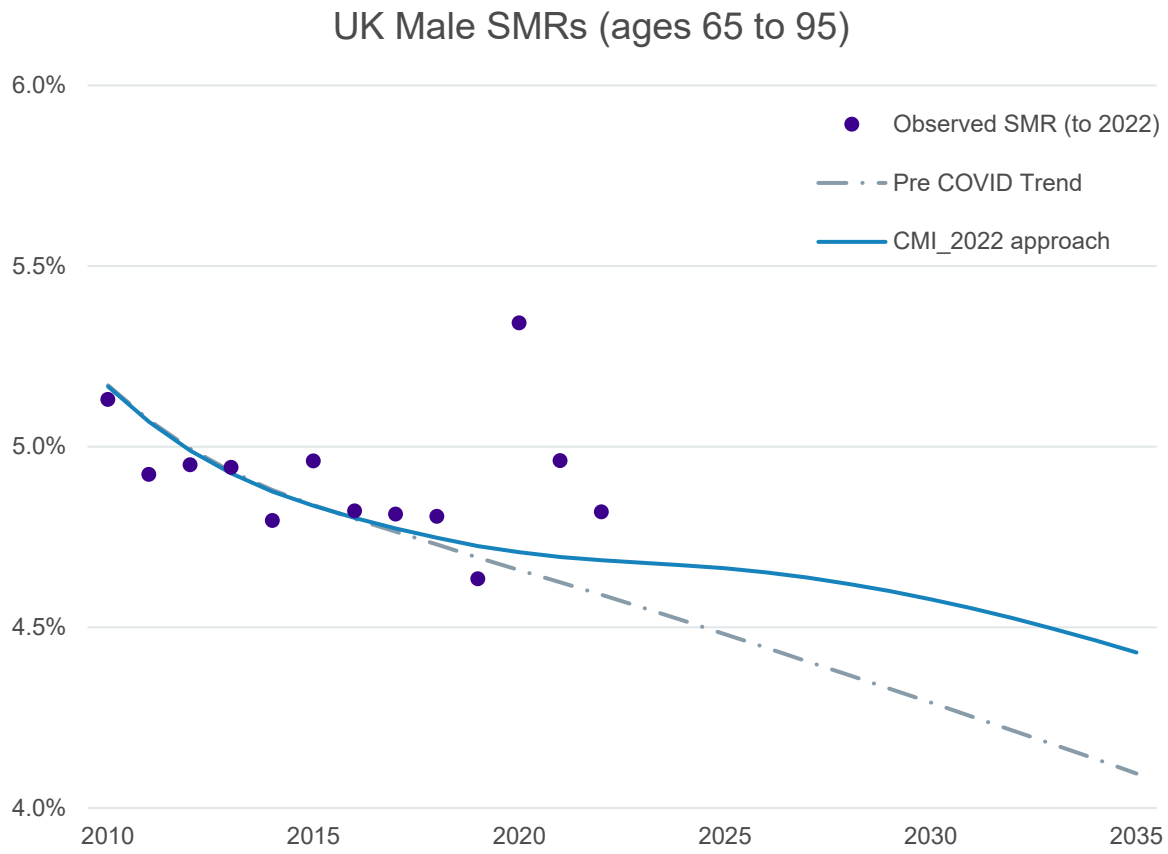


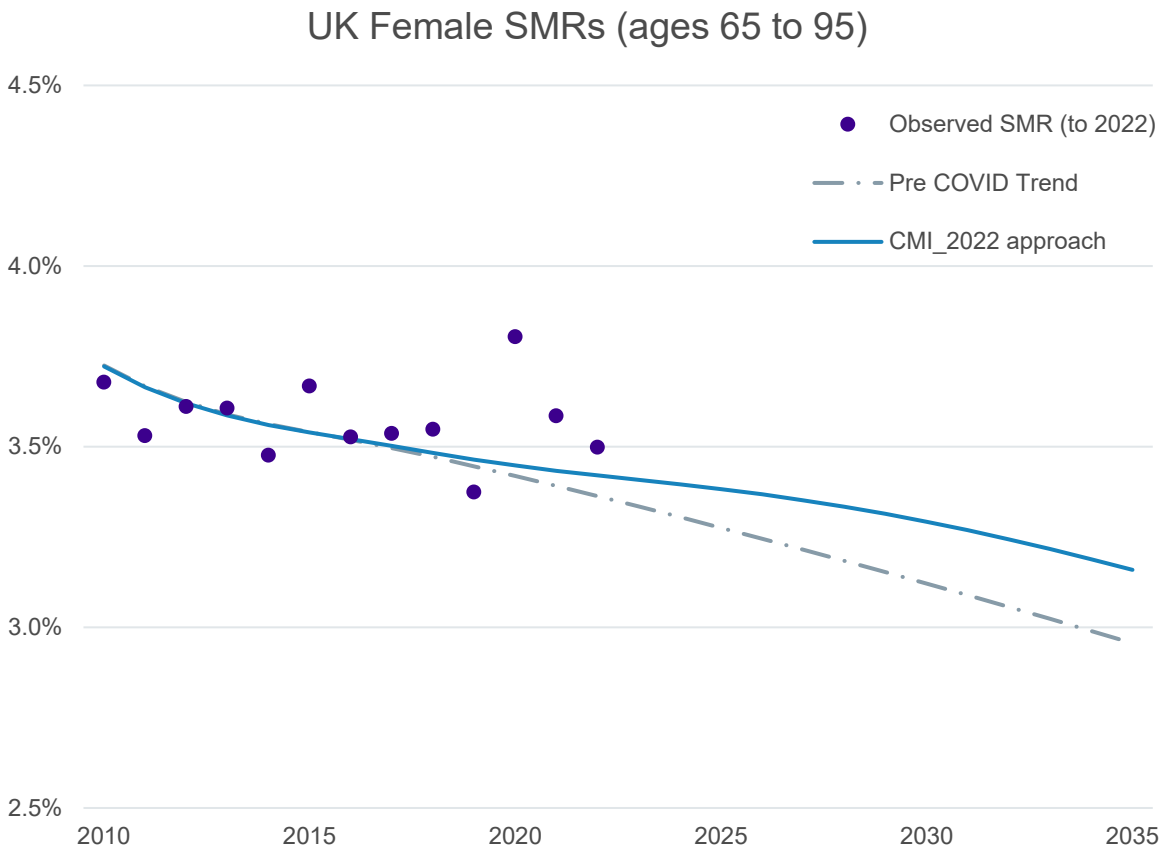


CMI_2020 and CMI_2021 put zero weight on post 2019 data via "W" parameter. Pushing out the long-term rate leads to a slightly weaker projection.

CMI_2021 approach based on advanced calibration of the CMI_2025 model with MinYear set to 1981, MaxYear set to 2021, FittedOverlayApplies set to "No", W_{2020} & W_{2021} set to 0%, otherwise core parameters with a long-term rate of 1.5% pa.

CMI approach to COVID: CMI_2022

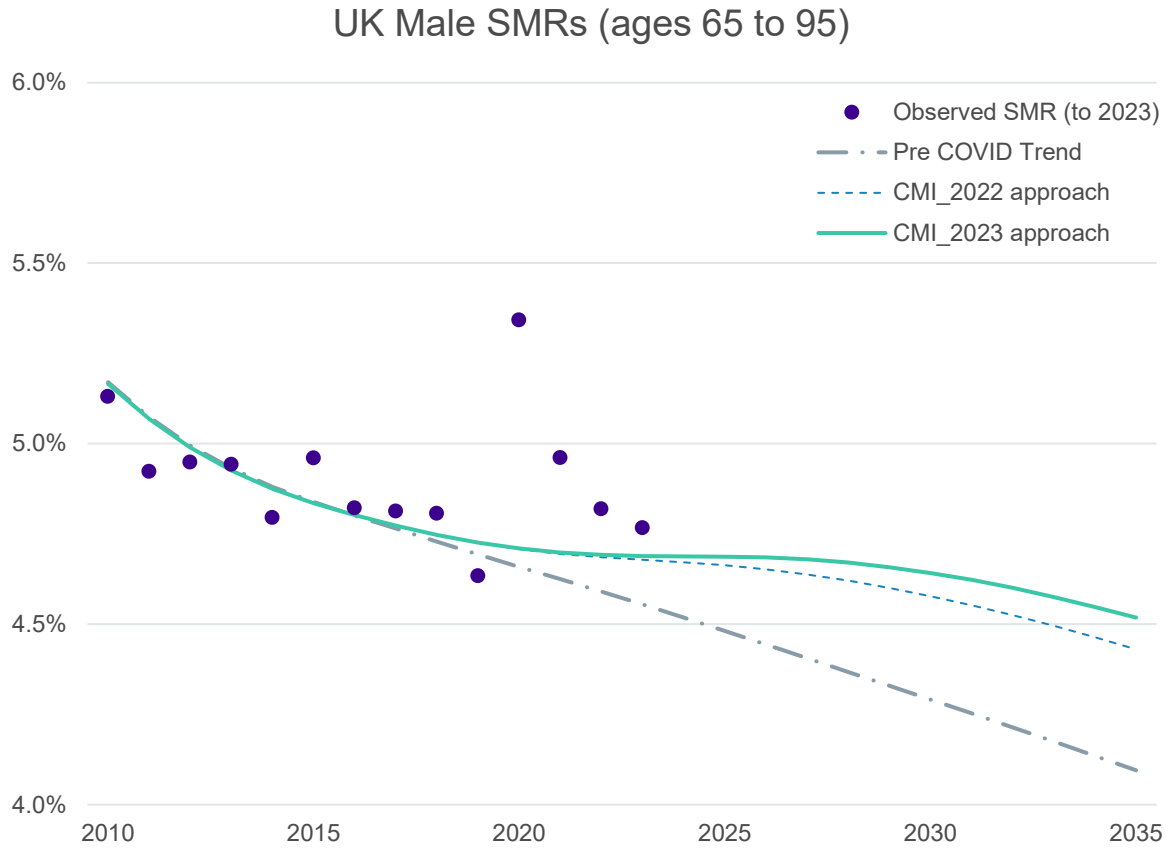


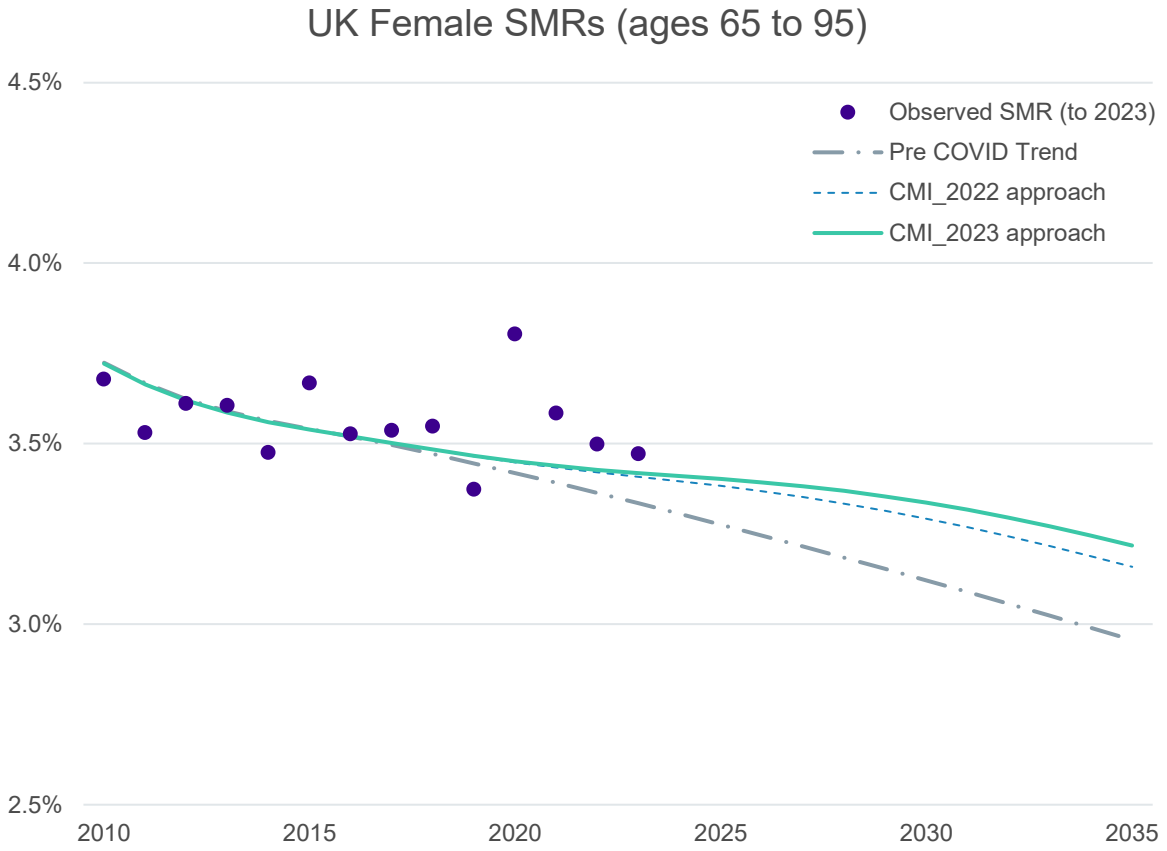


CMI_2022 was first version to allow for post-COVID data in fitted trend.
25% weight placed on 2022 data via "W" parameter.

CMI_2022 approach based on advanced calibration of the CMI_2025 v01 model with MinYear set to 1982, MaxYear set to 2022, FittedOverlayApplies set to "No", W_{2020} & W_{2021} set to 0%, W_{2022} set to 25%, otherwise core parameters with a long-term rate of 1.5% pa.

CMI approach to COVID: CMI_2023

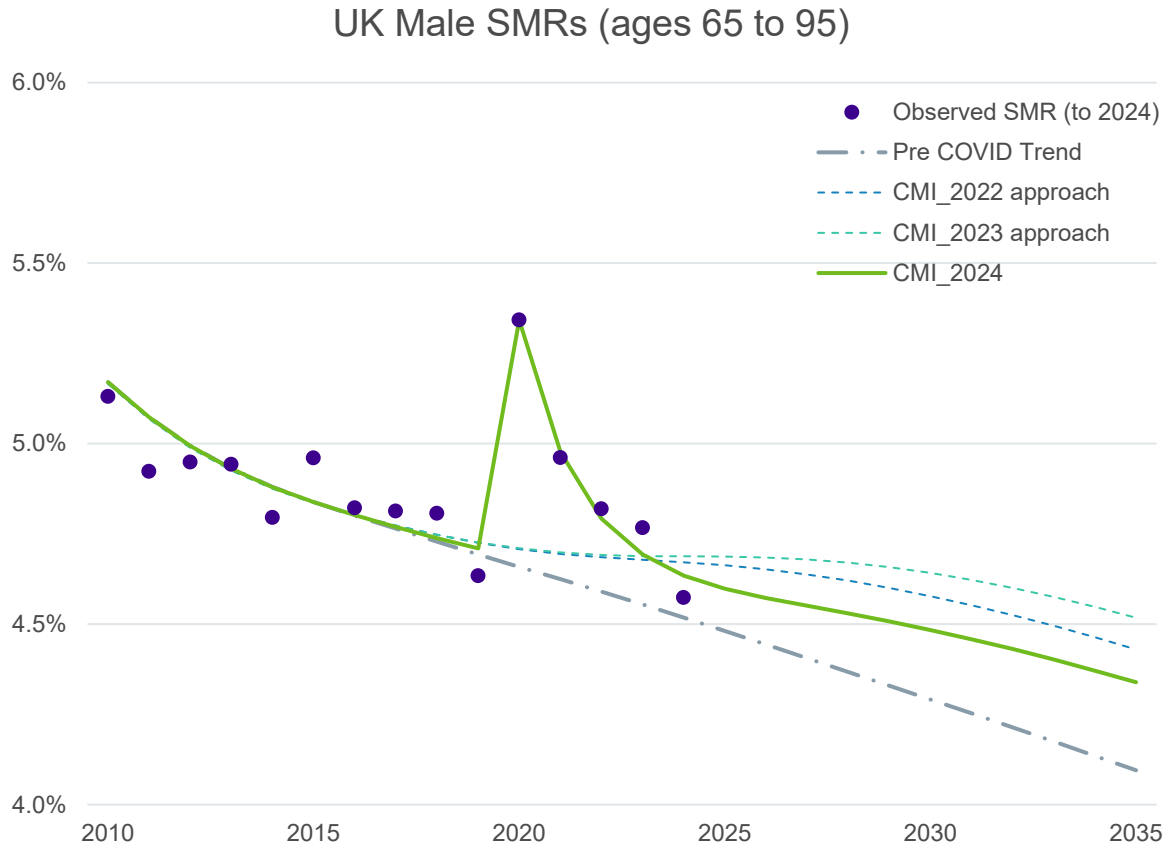


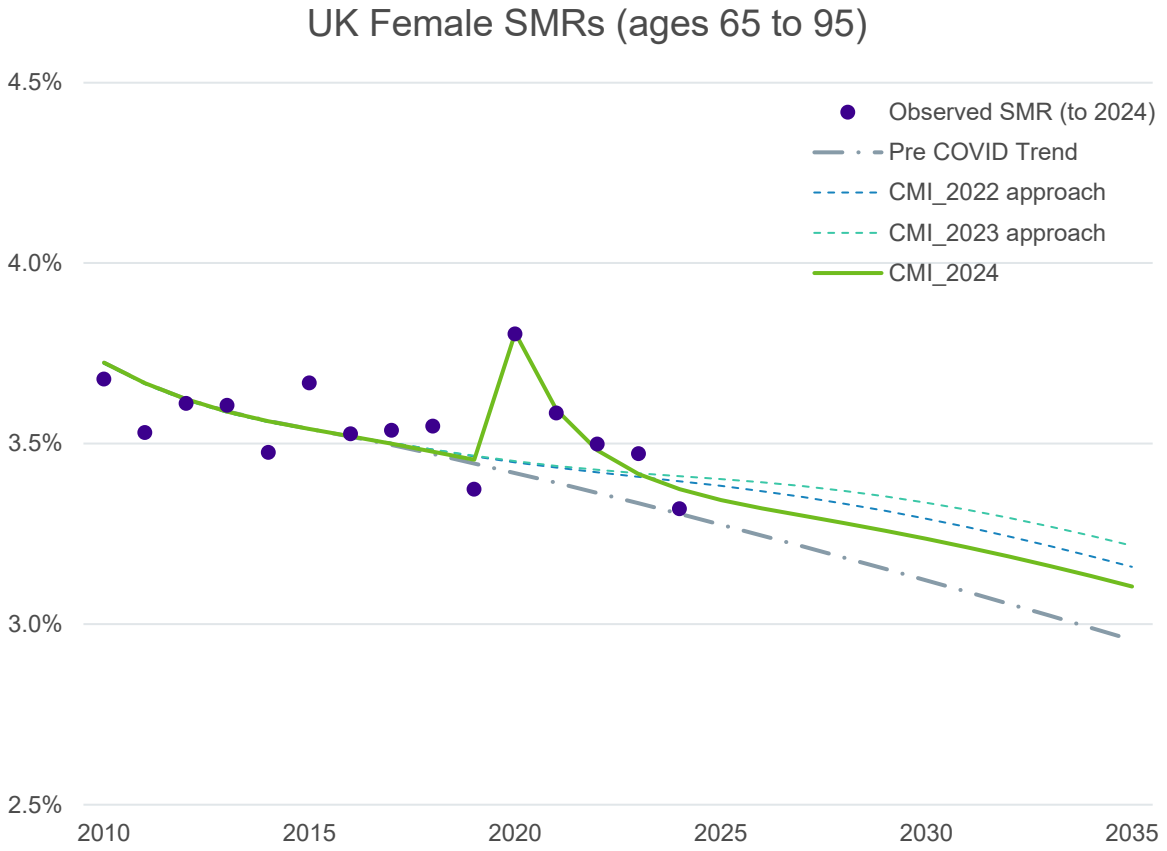


Approach modified for CMI_2023.
15% weight placed on 2022 and 2023 data via "W" parameter.

CMI_2023 approach based on advanced calibration of the CMI_2025 v01 model with MinYear set to 1983, MaxYear set to 2023, FittedOverlayApplies set to "No", W_{2020} & W_{2021} set to 0%, W_{2022} and W_{2023} set to 15%, otherwise core parameters with a long-term rate of 1.5% pa.

CMI approach to COVID: CMI_2024

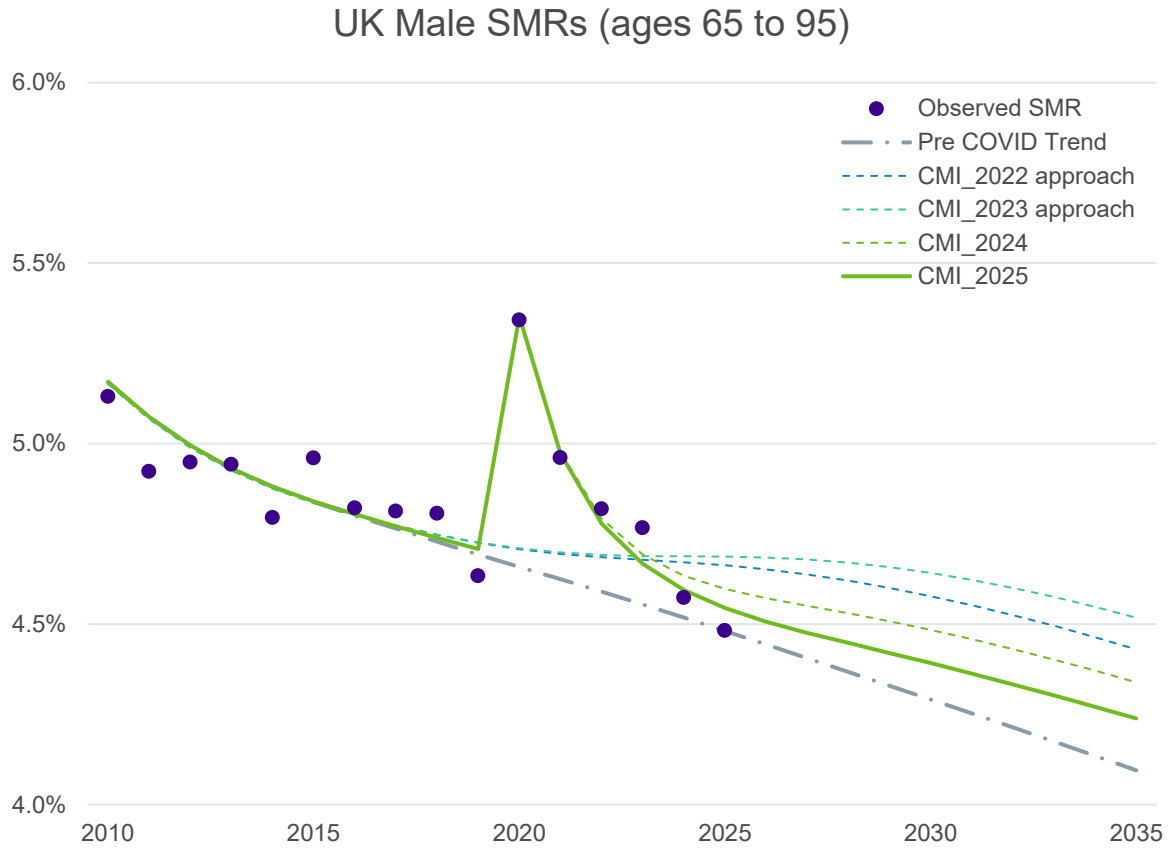


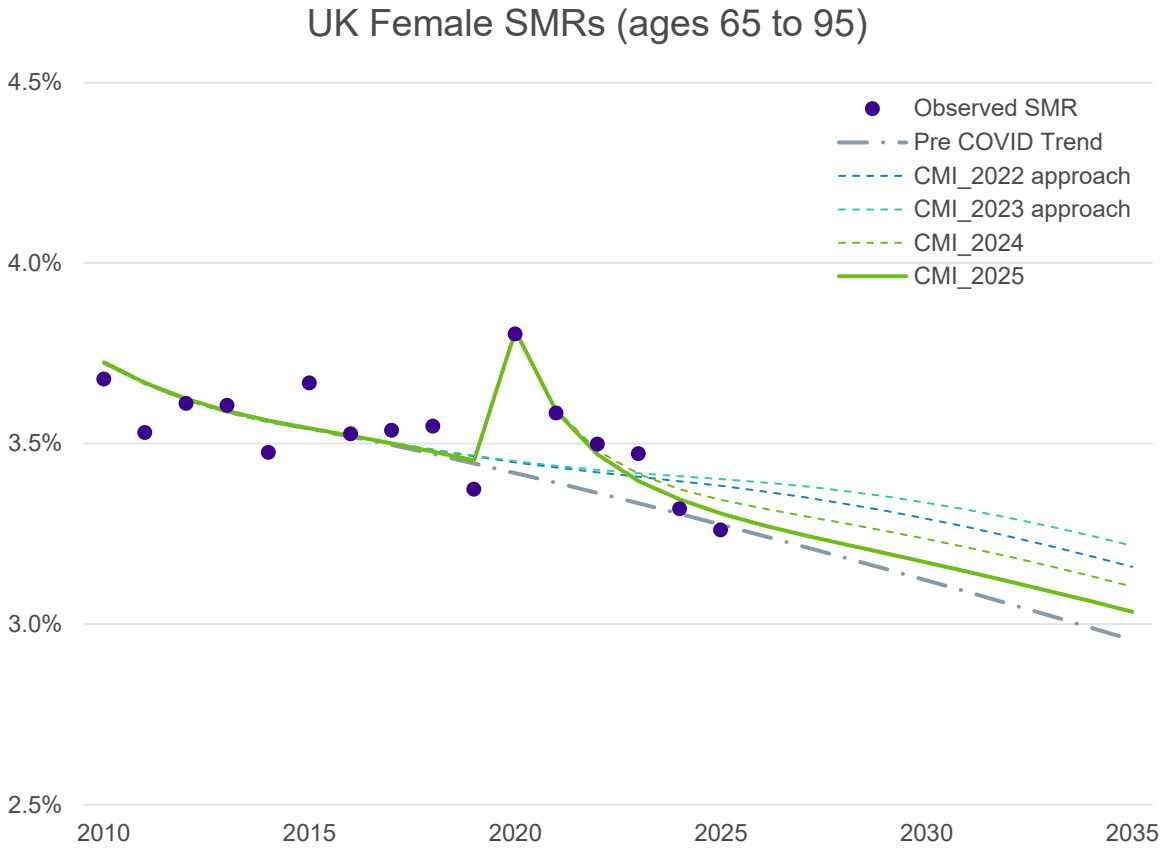


CMI_2024 introduced a "Fitted Overlay" to directly model COVID excess mortality.
Core calibration assumes excess mortality to half each year after a peak in 2020.

CMI_2025 shows output from the core CMI_2024 v05 BETA model with a long-term rate of 1.5% pa.

CMI approach to COVID: CMI_2025



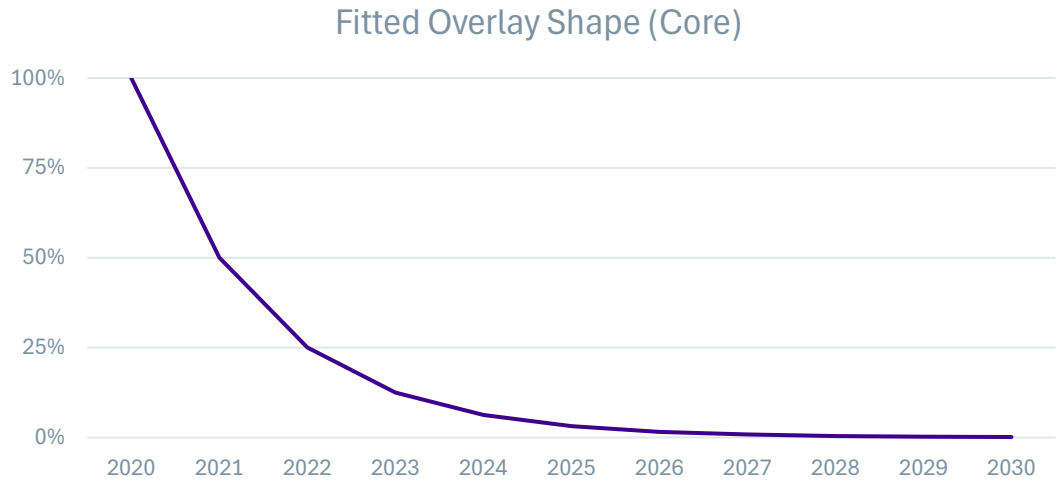


CMI_2025 was the first "business as usual" year under new approach.
Further strengthening of projection due to light mortality in 2025.

CMI_2025 shows output from the core CMI_2025 v01 model with a long-term rate of 1.5% pa.

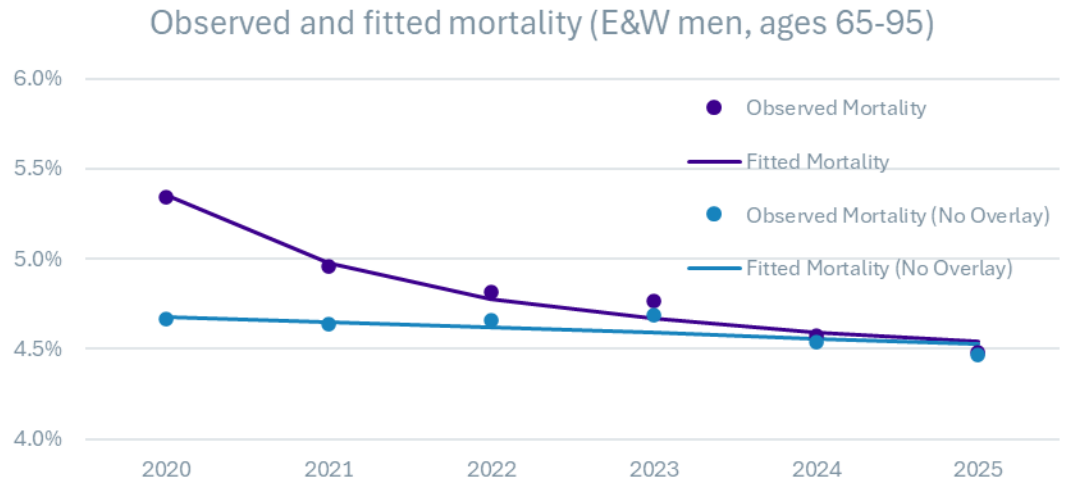
How does the Fitted Overlay work?

Step 1: Define the Shape



- In the UK, the core model assumes the Fitted Overlay halves each year from 2020.
- However, users can also define their own shape by year and by age.

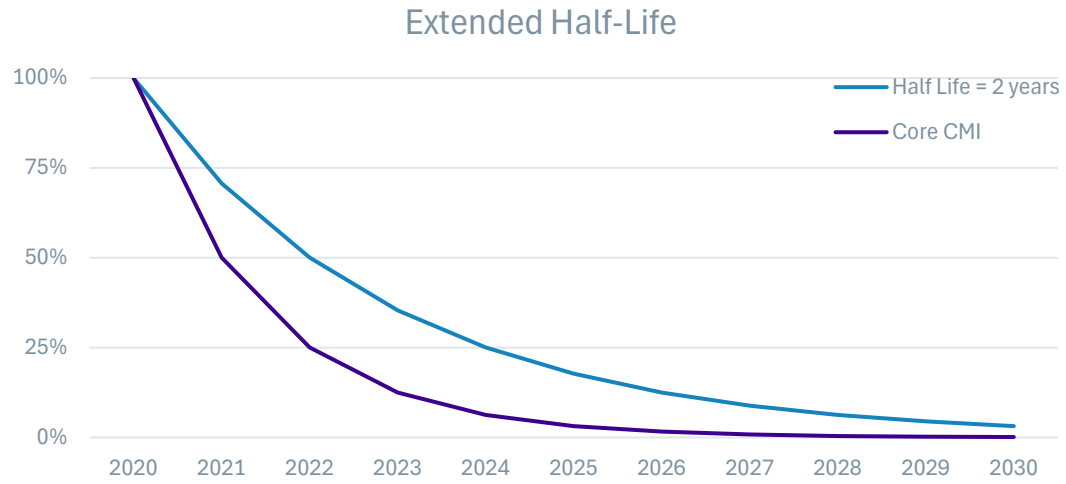
Step 2: Fit the Magnitude



- The magnitude of the fitted overlay is fitted simultaneously alongside age, period and cohort effects within the model.

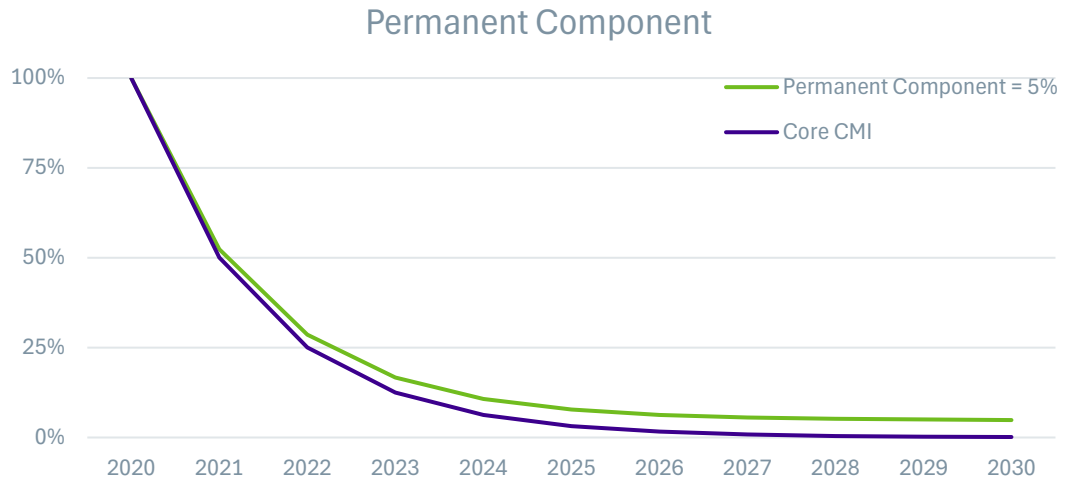
What levers can we pull?

Lever 1: Pace of run off



- We can do this using the extended Half Life parameter, or by using the user-defined option in the CMI model.

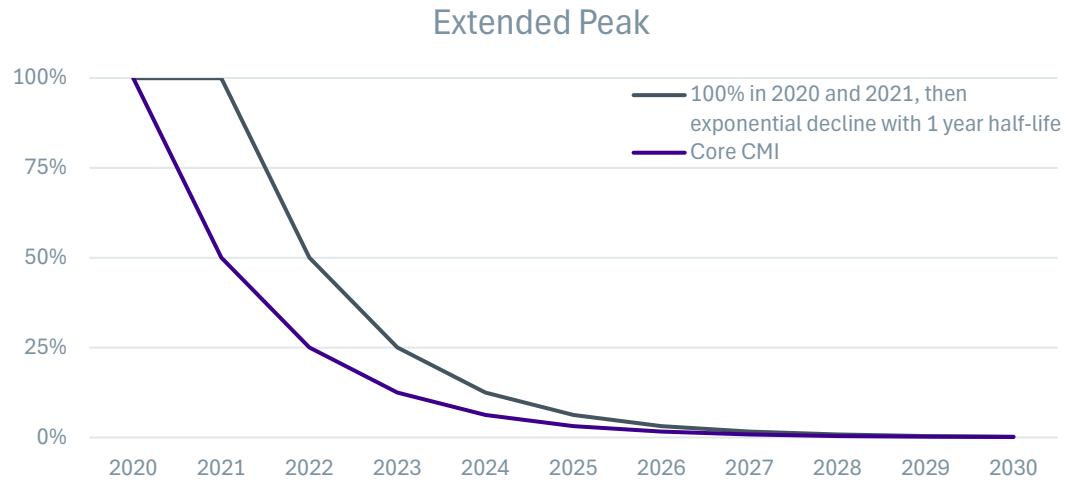
Lever 2: Permanent Component



- We can define a value as an advanced parameter or by using the user-defined option.

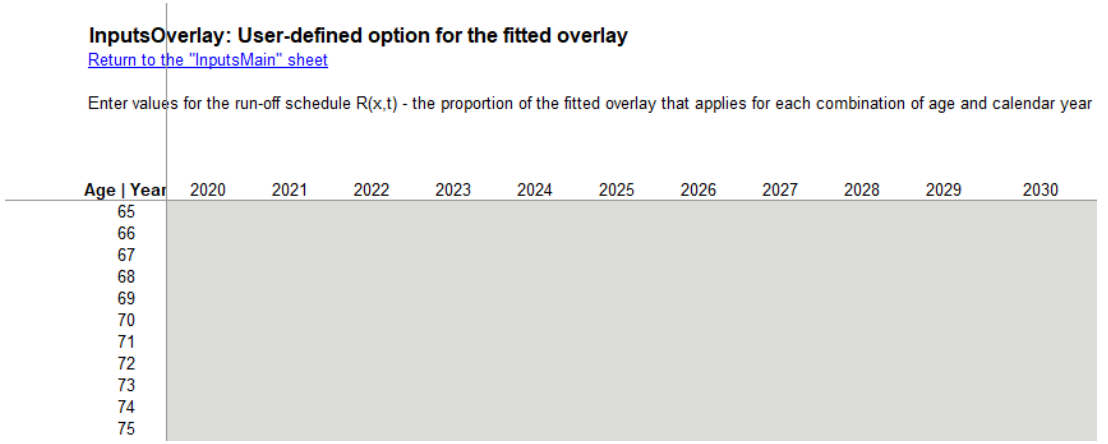
What levers can we pull?

Lever 3: Extended peak



- By using the user-defined option, we can extend the peak or apply the peak in a later year than 2020.

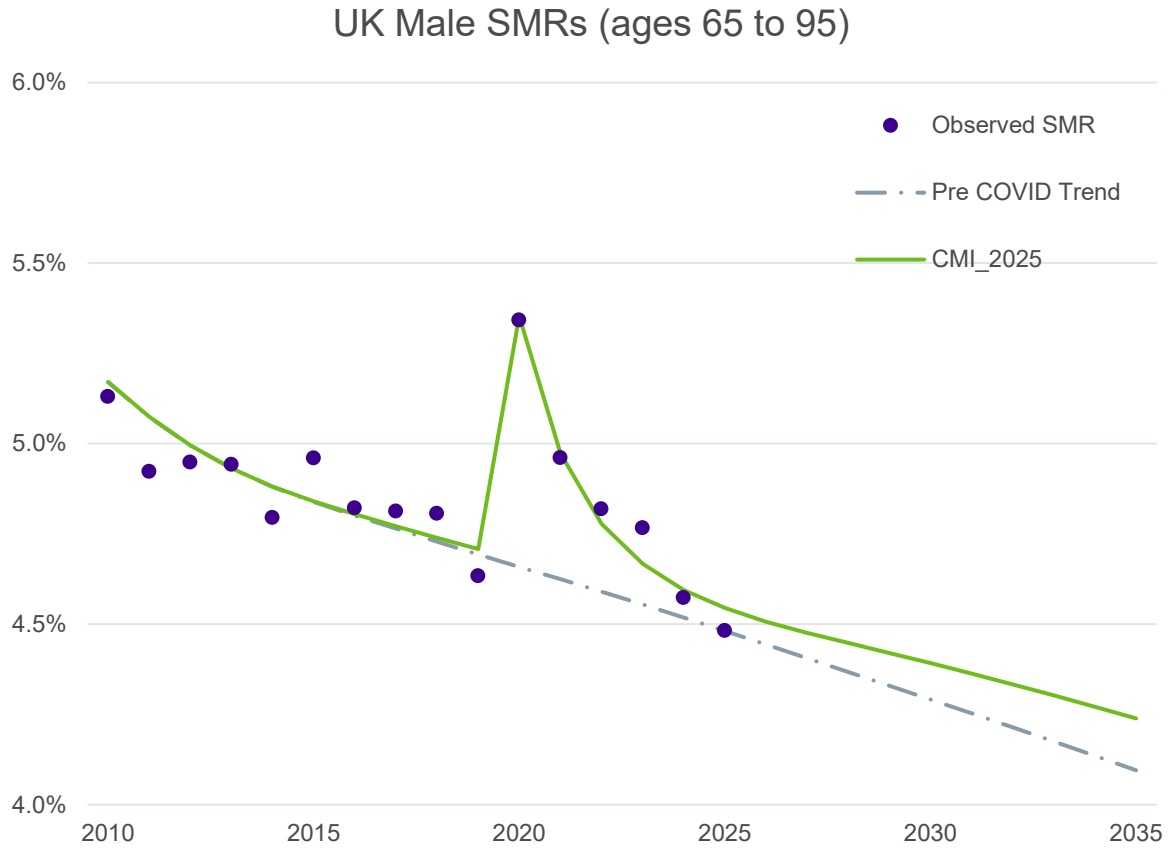
Lever 4: Variation by Age

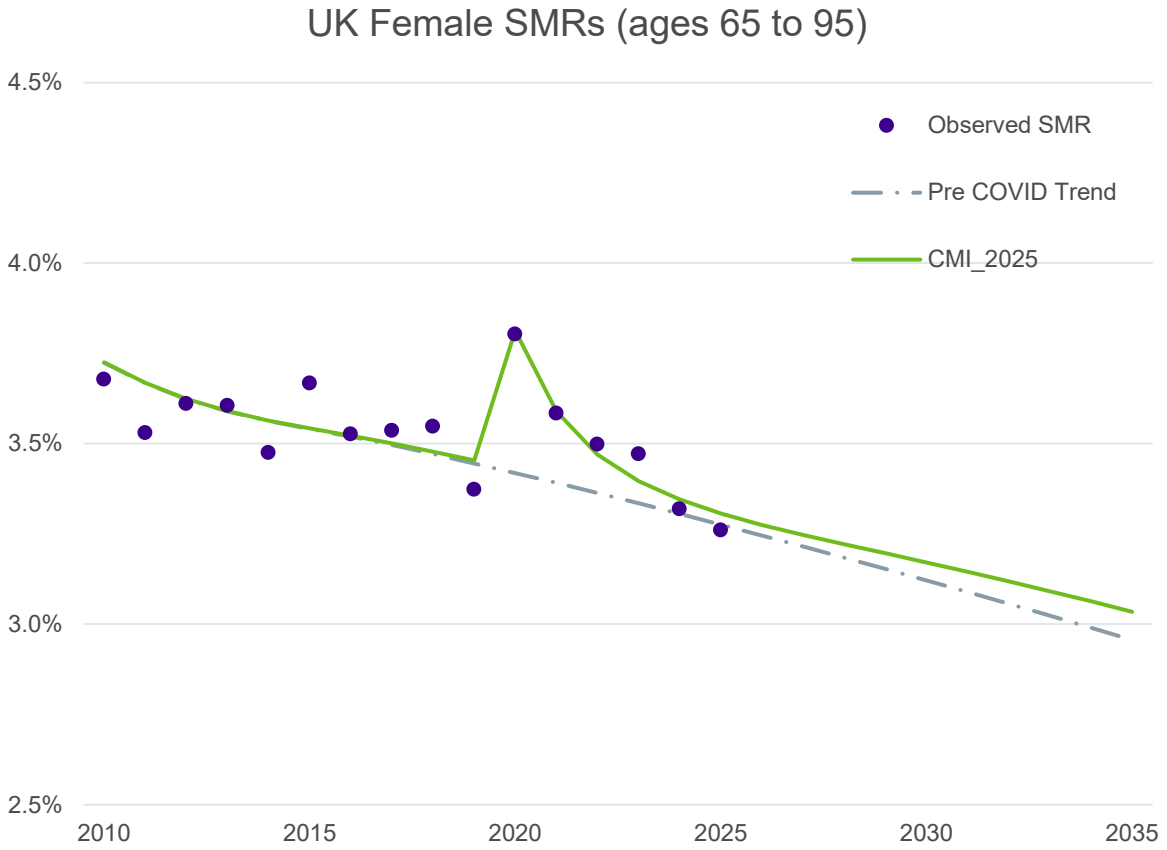


- Finally, we have the option to vary the fitted overlay by age as well as by year.
- We have not explored this option in the analysis presented today.

Applying the fitted overlay in different countries

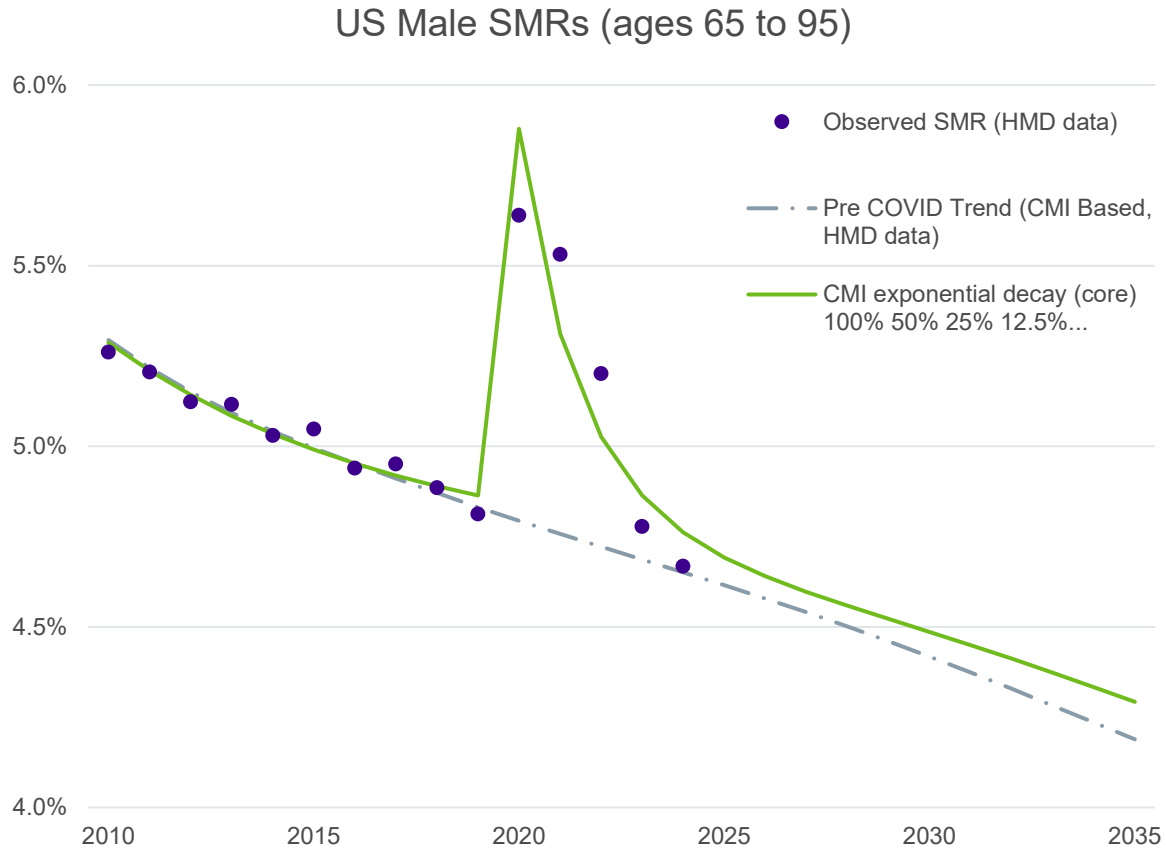
Using pandemic data - exponential decay (UK)

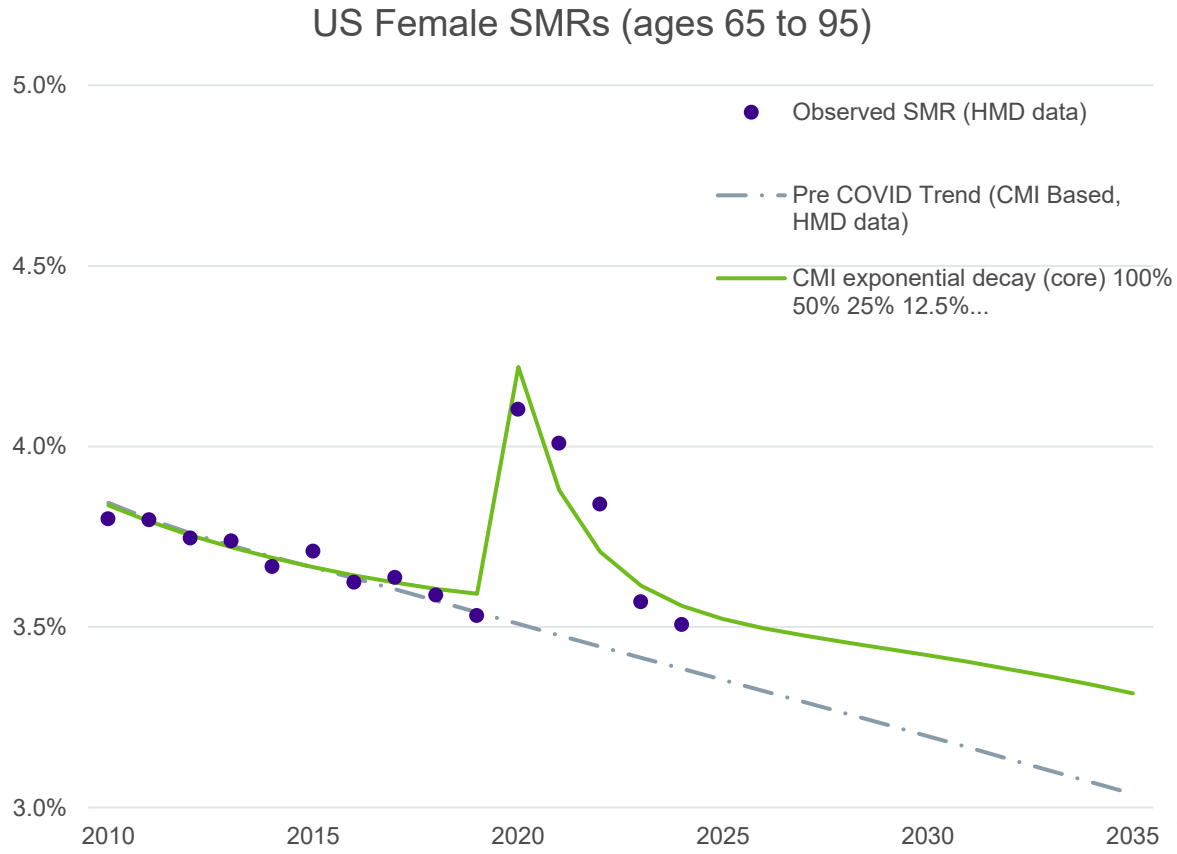




In UK, core calibration of the fitted overlay assumes **exponential decay** following **a peak in 2020** with half life of **one year**.

Using pandemic data - exponential decay (US)

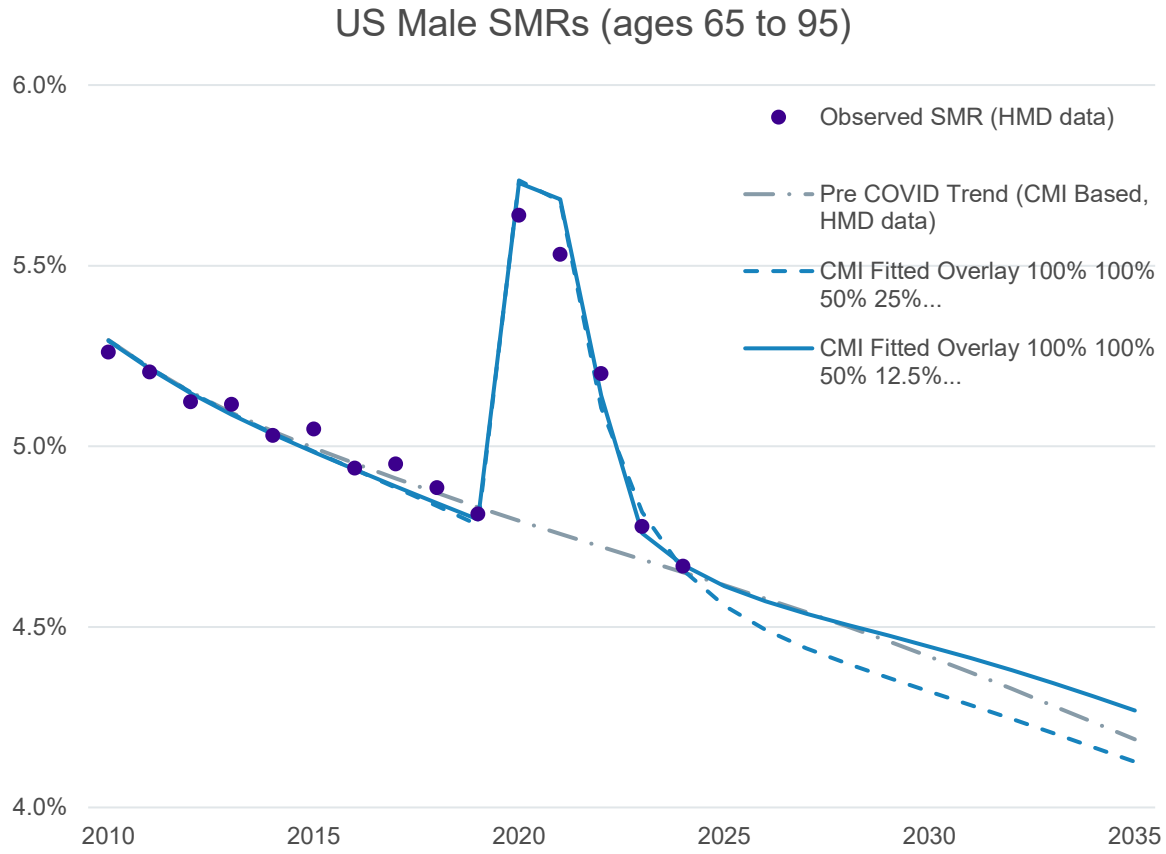


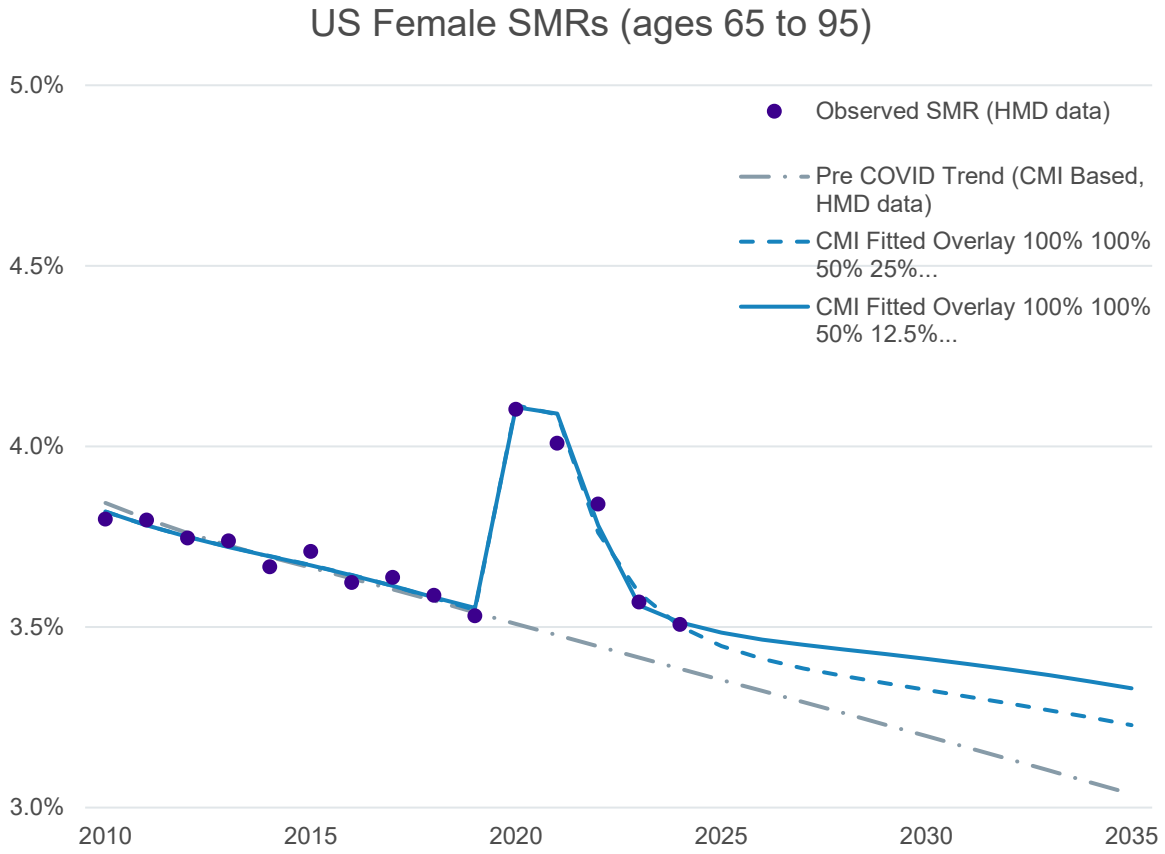


US prolonged peak not captured by exponential decay starting in 2020 – should we try to capture pandemic shape better?

Source: Club Vita calculations using CMI_2024 v05 projections model. US data up to 2024 from the Human Mortality Database (www.mortality.org). Note: 1.0% long term rate of improvement is used in the US application of the CMI model throughout. Fitted overlay excess weightings half in each subsequent from last weighting disclosed.

Using pandemic data - fitted overlay (US)

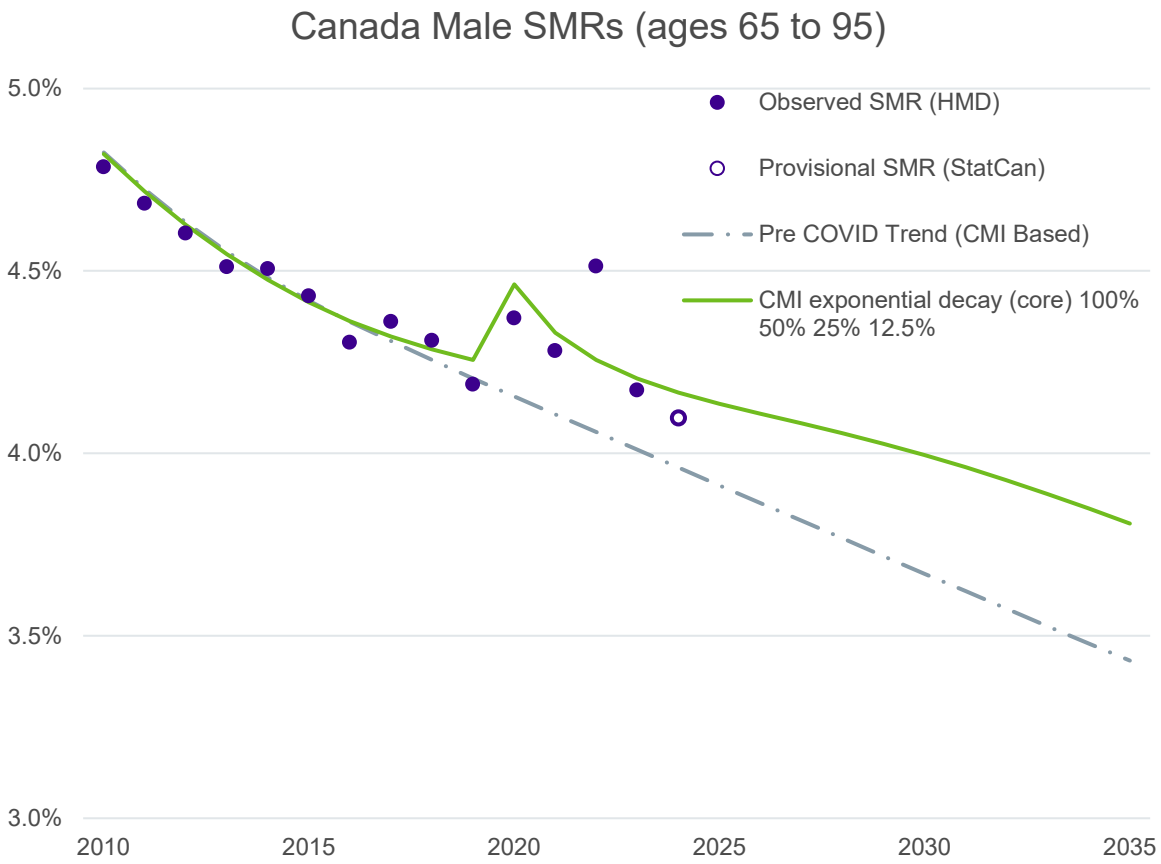


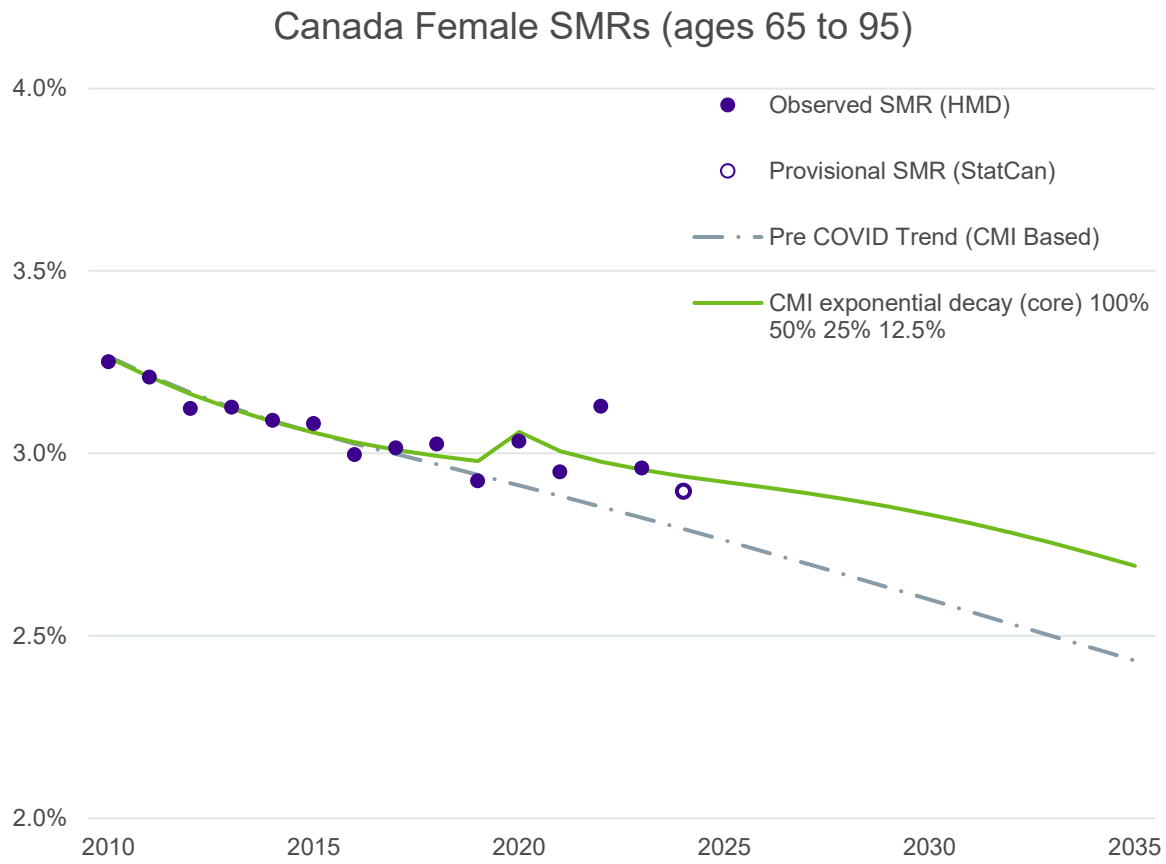


How should exponential decay begin from a prolonged peak?
Does a higher/longer peak justify assuming pandemic excess to be over sooner?

Source: Club Vita calculations using CMI_2024 v05 projections model. US data up to 2024 from the Human Mortality Database (www.mortality.org). Note: 1.0% long term rate of improvement is used in the US application of the CMI model throughout. Fitted overlay excess weightings half in each subsequent from last weighting disclosed.

Using pandemic data - exponential decay (Canada)

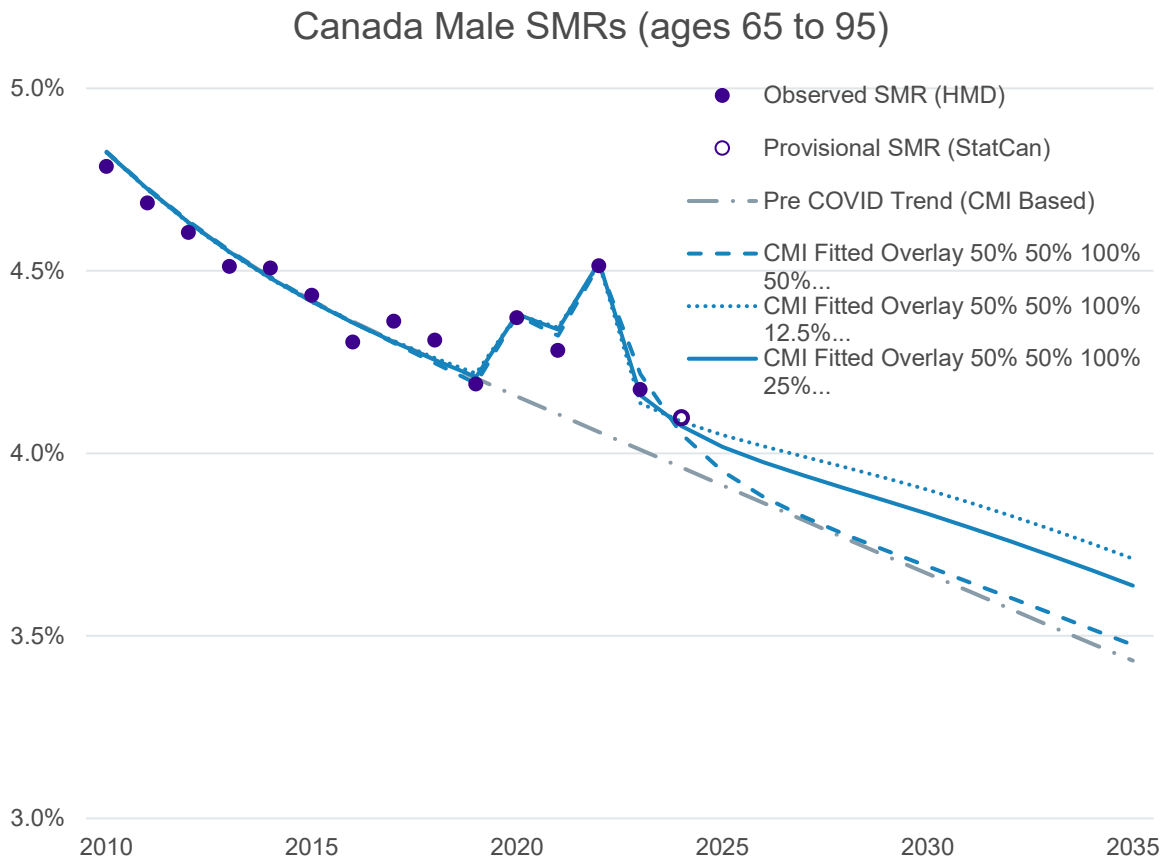


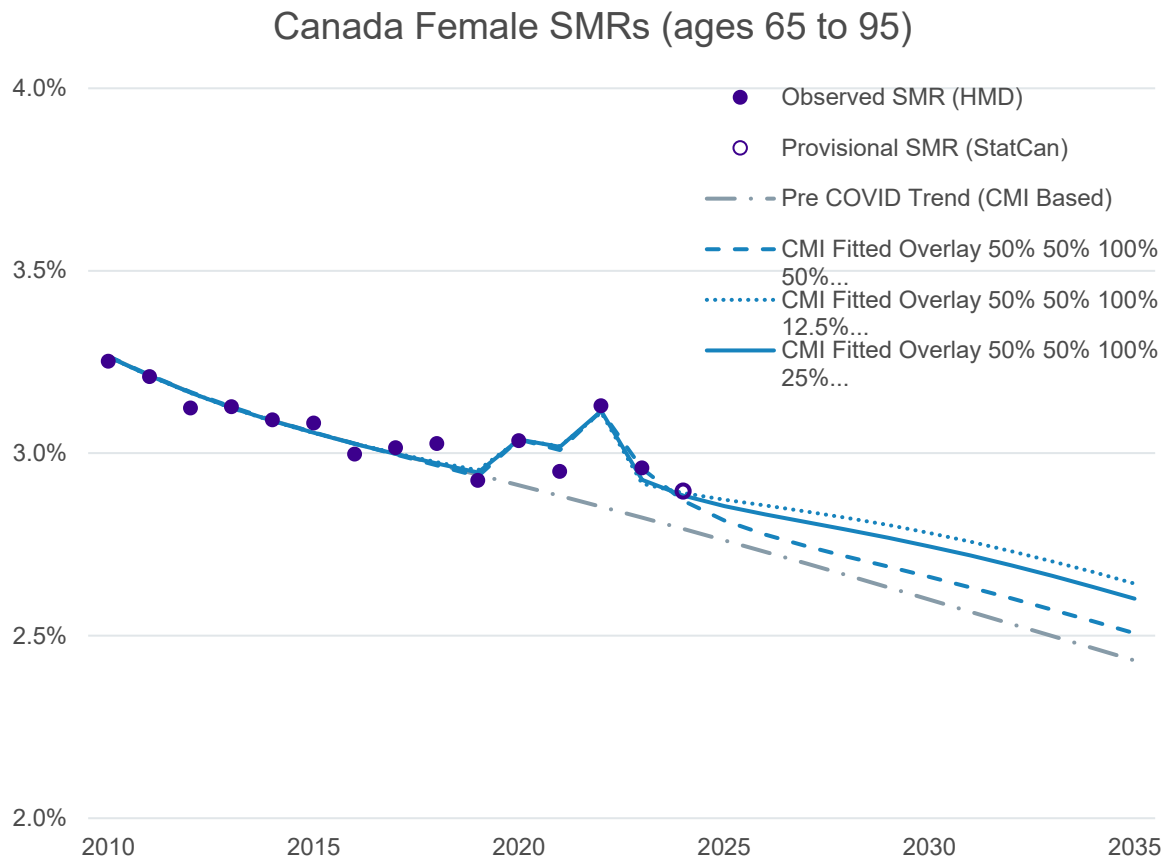


Later peak not captured by exponential decay starting in 2020

Source: Club Vita calculations using CMI_2024 v05 projections model. Canadian data up to 2023 from the Human Mortality Database (www.mortality.org), 2024 data estimated using StatisticsCanada life table. Note: 1.3% long term rate of improvement is used throughout. Fitted overlay excess weightings half in each subsequent from last weighting disclosed.

Using pandemic data - fitted overlay (Canada)

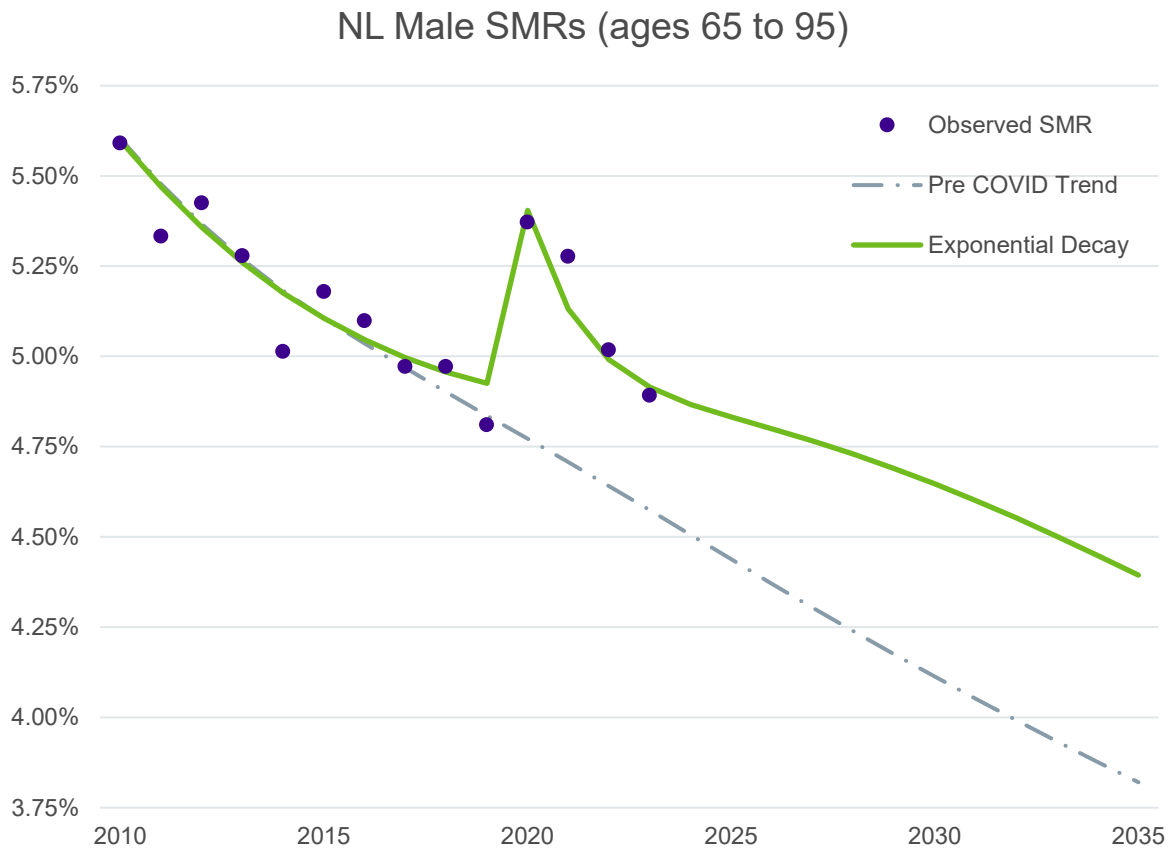


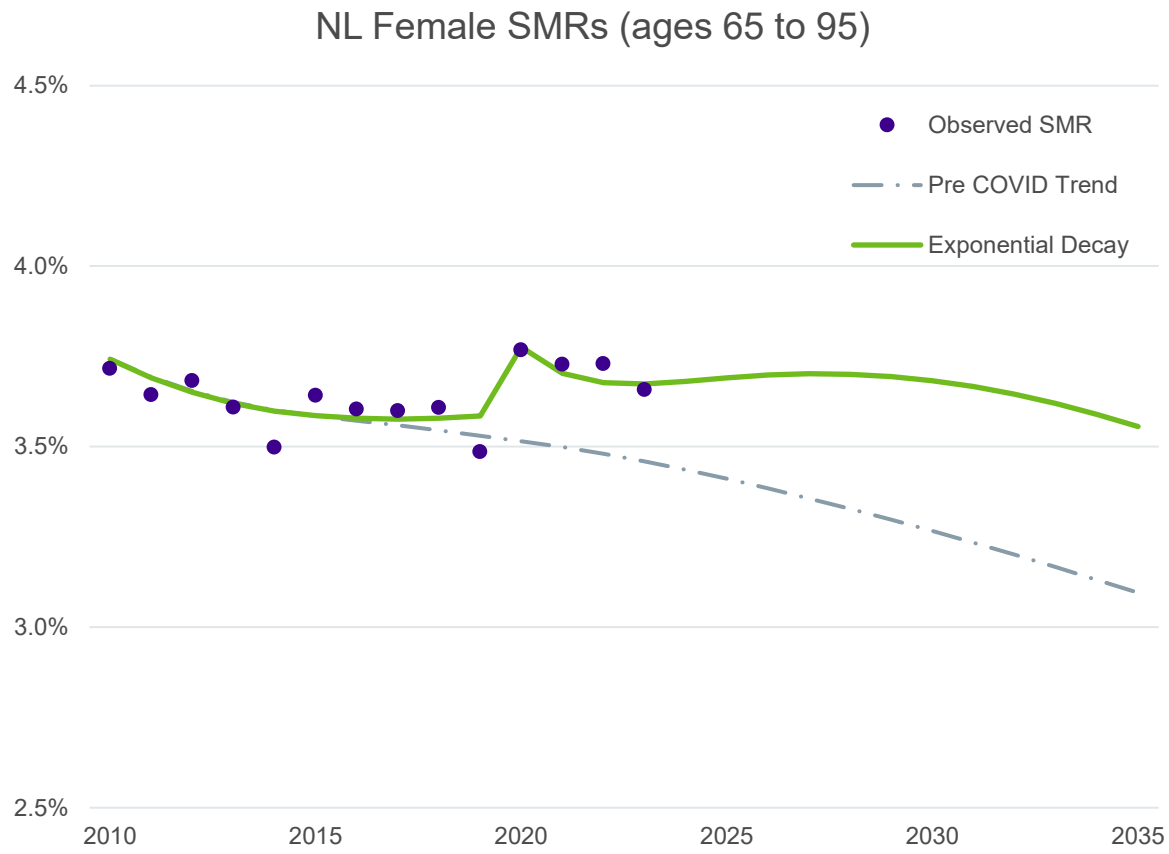


Best approach will depend on view of recent data –
Is the transitory experience from the pandemic over?

Source: Club Vita calculations using CMI_2024 v05 projections model. Canadian data up to 2023 from the Human Mortality Database (www.mortality.org), 2024 data estimated using StatisticsCanada life table. Note: 1.3% long term rate of improvement is used throughout. Fitted overlay excess weightings half in each subsequent from last weighting disclosed.

Using pandemic data - exponential decay (NL)

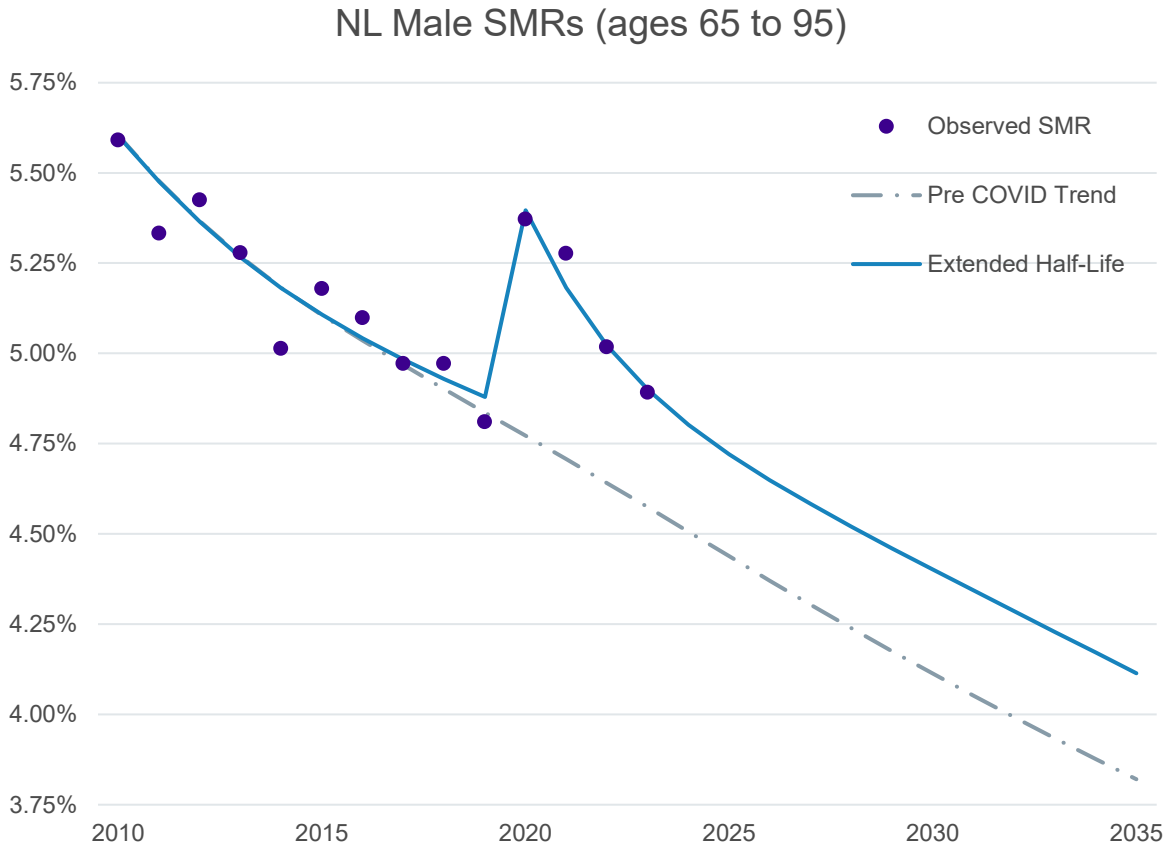


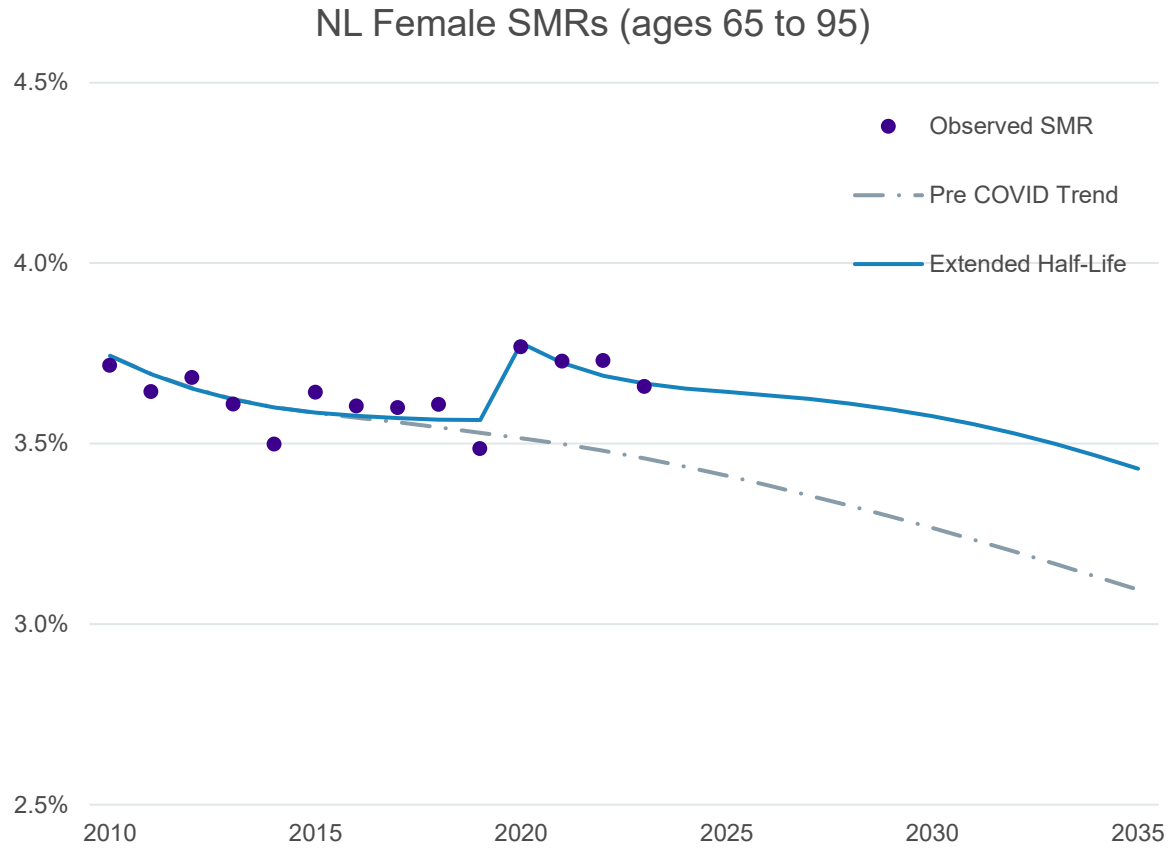


Exponential decay (with one year half life) provides for a poor fit to the underlying data, particularly for women.

Source: Pre COVID trend and calibration dataset as per previous slides. Exponential Decay based on an advanced parameterisation of the CMI_2024 v05 BETA model with MinYear = 1983, MaxYear = 2023, AdjustSmoothing = Yes, otherwise core parameters. Long-term rate = 1.5% pa for men, 1.4% pa for women.

Using pandemic data - with extended half-life (NL)

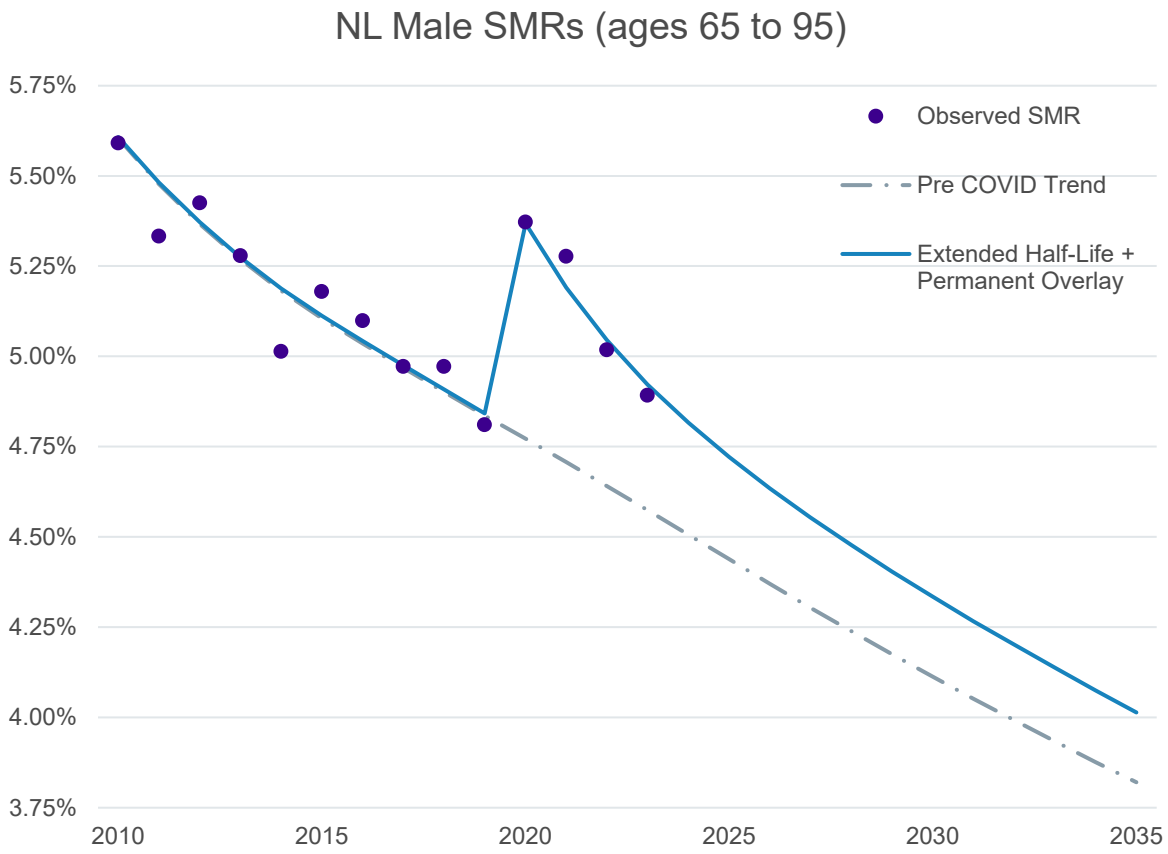


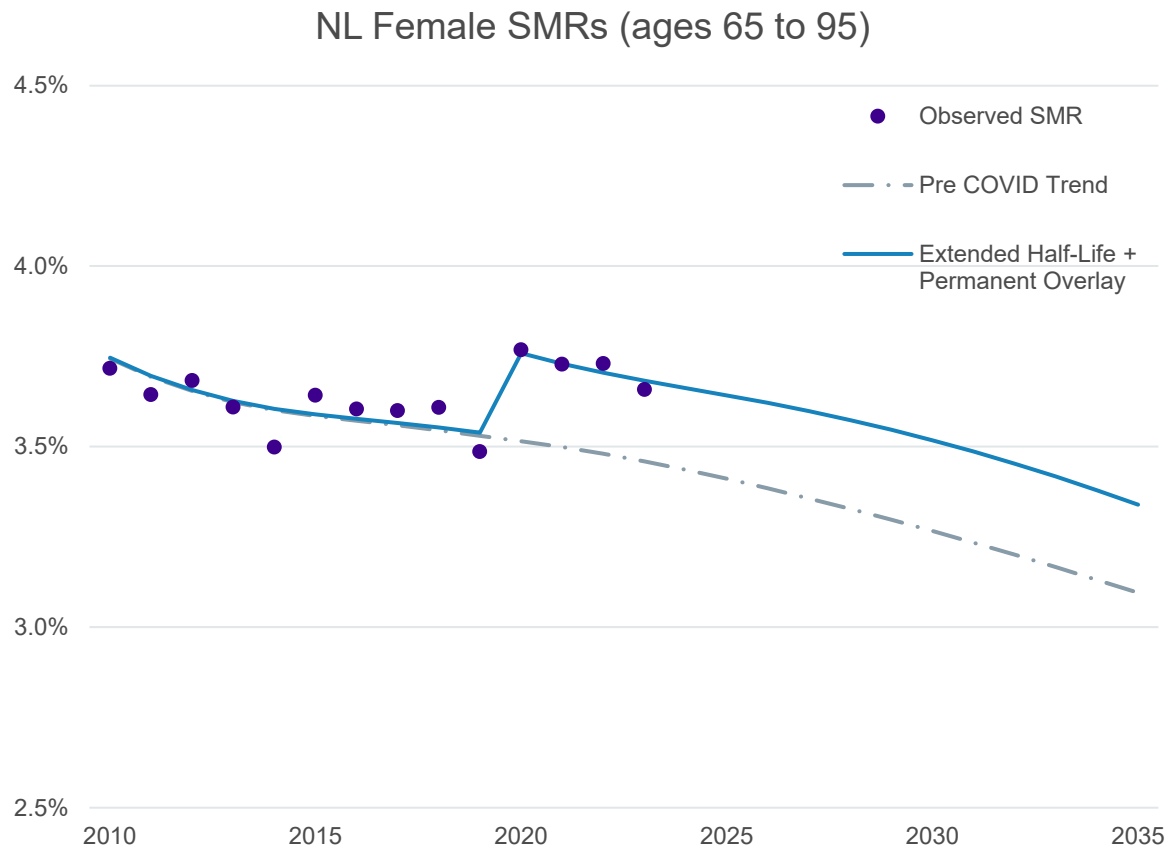


Here we reflect the slow emergence from the pandemic by doubling the half-life.
The fit remains poor – how else can we adjust the Fitted Overlay shape?

Source: Pre COVID trend and calibration dataset as per previous slides. Exponential Decay based on an advanced parameterisation of the CMI_2024 v05 BETA model with MinYear = 1983, MaxYear = 2023, AdjustSmoothing = Yes, FittedOverlayHalfLife = 2, otherwise core parameters. Long-term rate = 1.5% pa for men, 1.4% pa for women.

Using pandemic data - with permanent overlay (NL)





By adding a 5% permanent overlay, we can better capture year-on-year excess rates. However, this still allows for limited "bounce back" for men and none for women.

Source: Pre COVID trend and calibration dataset as per previous slides. Exponential Decay based on an advanced parameterisation of the CMI_2024 v05 BETA model with MinYear = 1983, MaxYear = 2023, AdjustSmoothing = Yes, FittedOverlayHalfLife = 2, FittedOverlayPerm = 5% otherwise core parameters. Long-term rate = 1.5% pa for men, 1.4% pa for women.

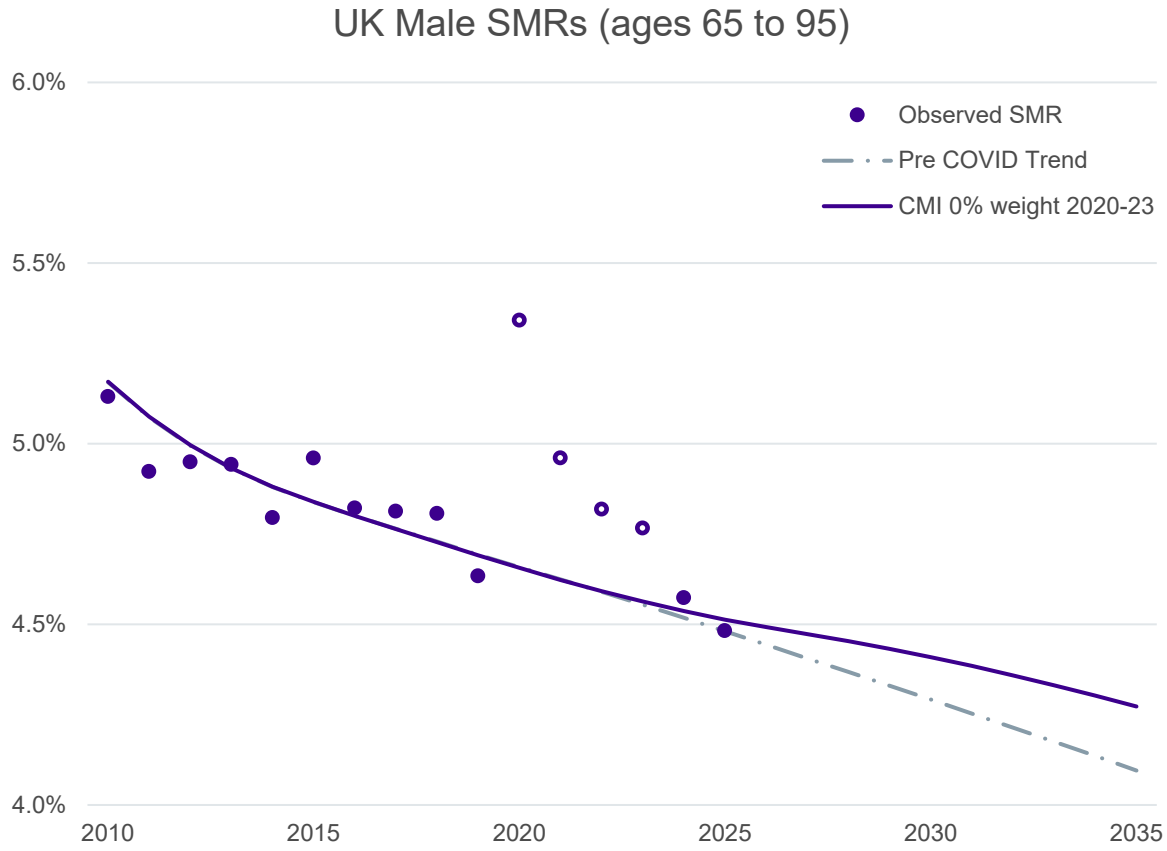
Observations

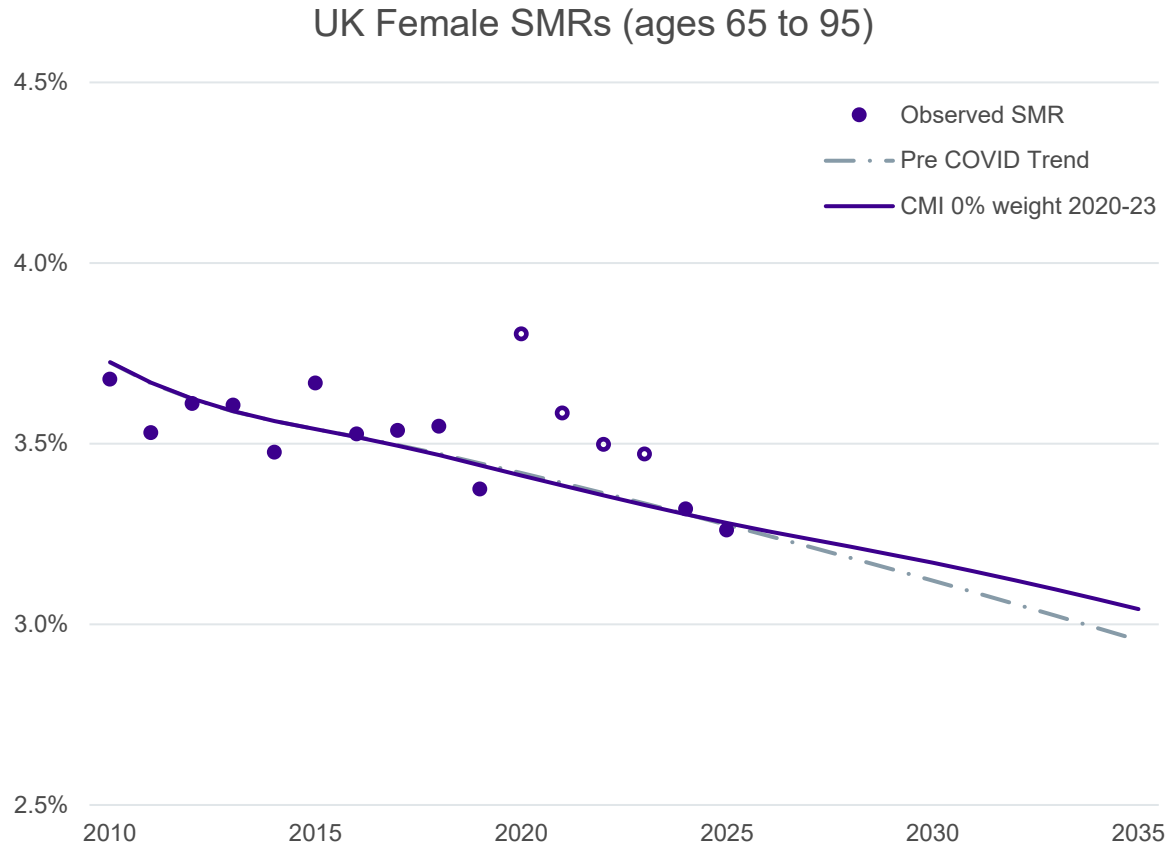
- Different options to use fitted overlay outside the UK:
  - Adjust peak
    - Model will estimate total excess better if you can capture increased mortality more accurately across the key 2020-2022 years
  - Adjust when you start running off
    - Longer period of excess from later or prolonged peak may result in jumping to a later point of run-off
  - Adjust half life
    - Lower peak may result in a slower run-off of excess
  - Add permanent overlay
    - Pandemic may have contributed to a step change in mortality

Each new year of data gives vital information

Question 3:
What happens if we just ignore the COVID years?

Skipping the pandemic years of data (UK)

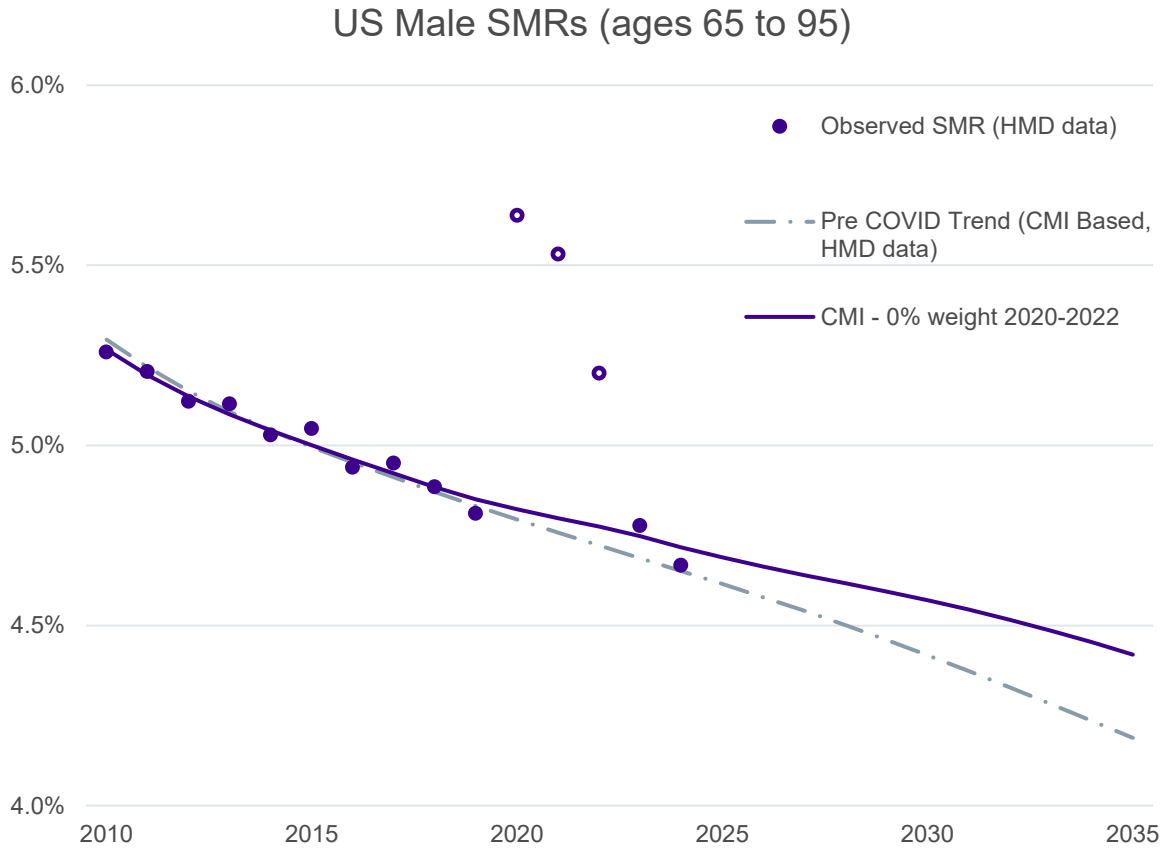


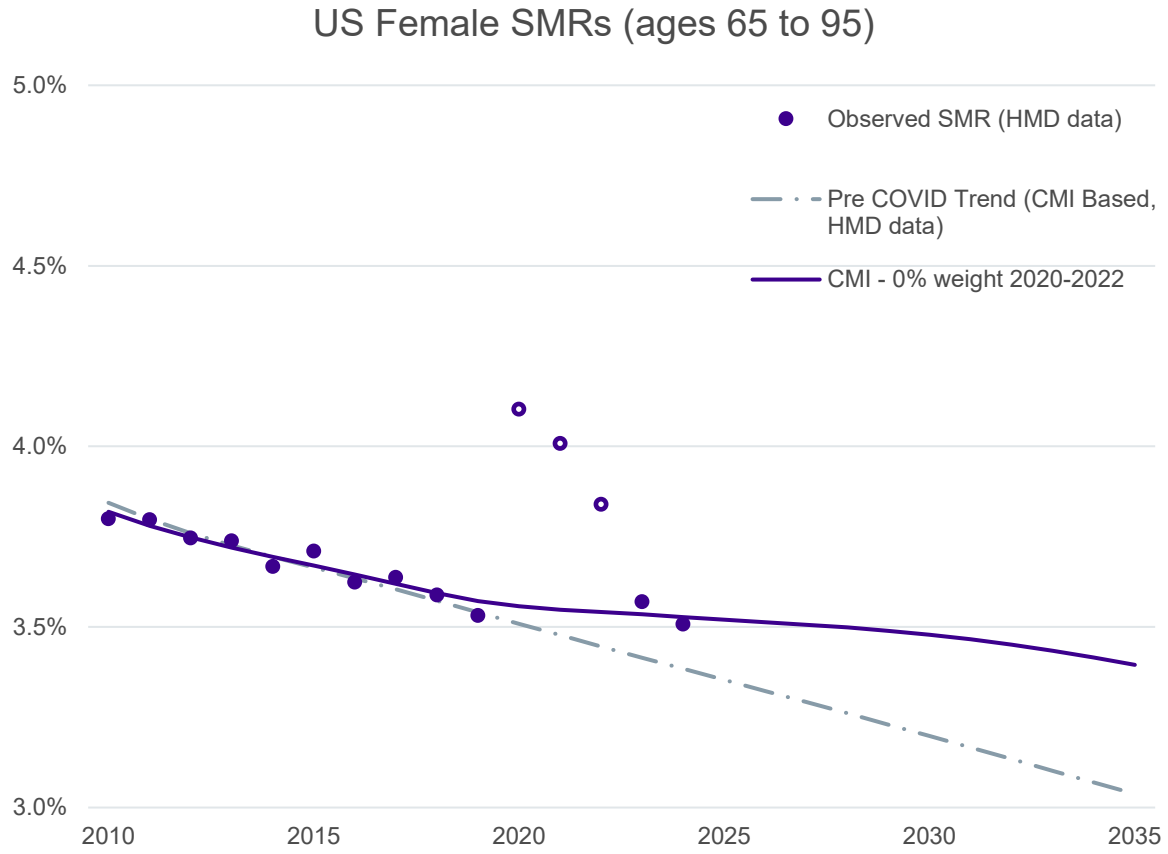


A plausible alternative approach?

CMI 0% weight 2020-23 approach based on advanced calibration of the CMI_2025 v01 model with W_{2020}, W_{2021}, W_{2022}, W_{2023} all set to 0%, otherwise core parameters with a long-term rate of 1.5% pa.

“Skipping” the pandemic years of data (US)

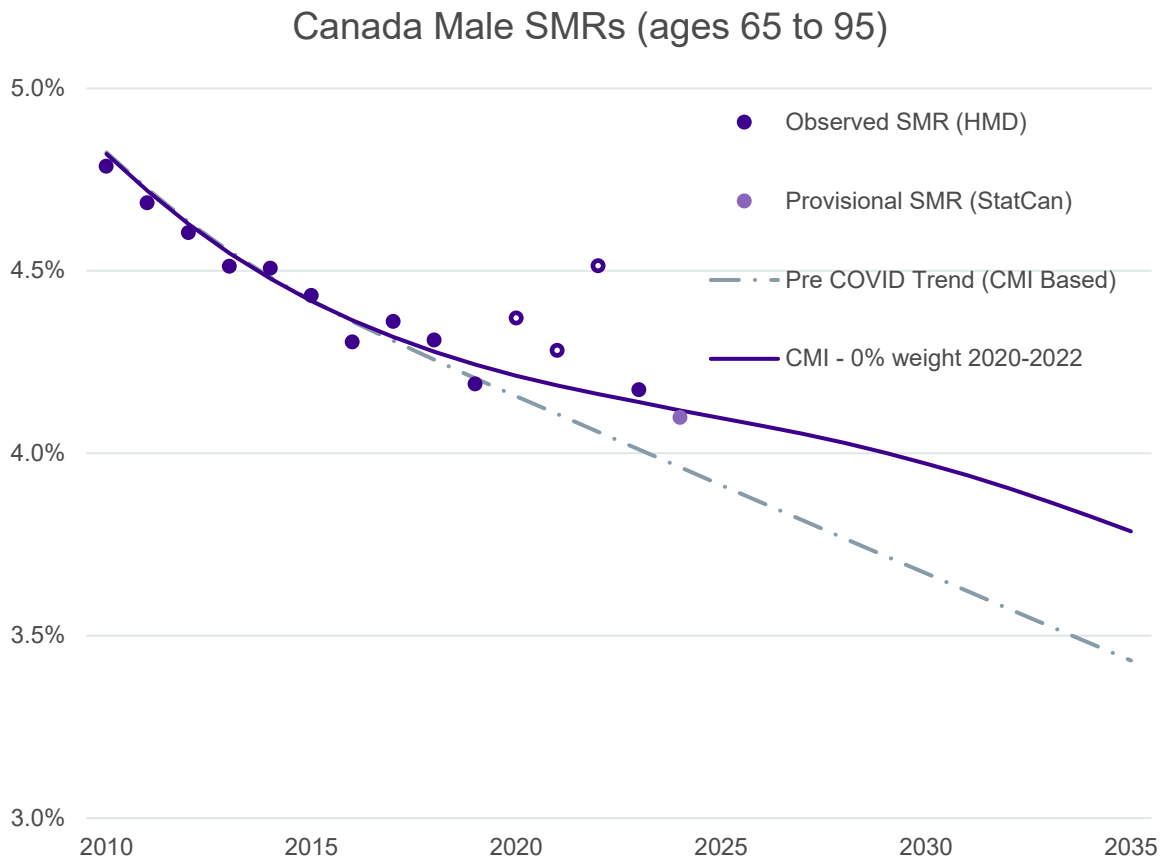


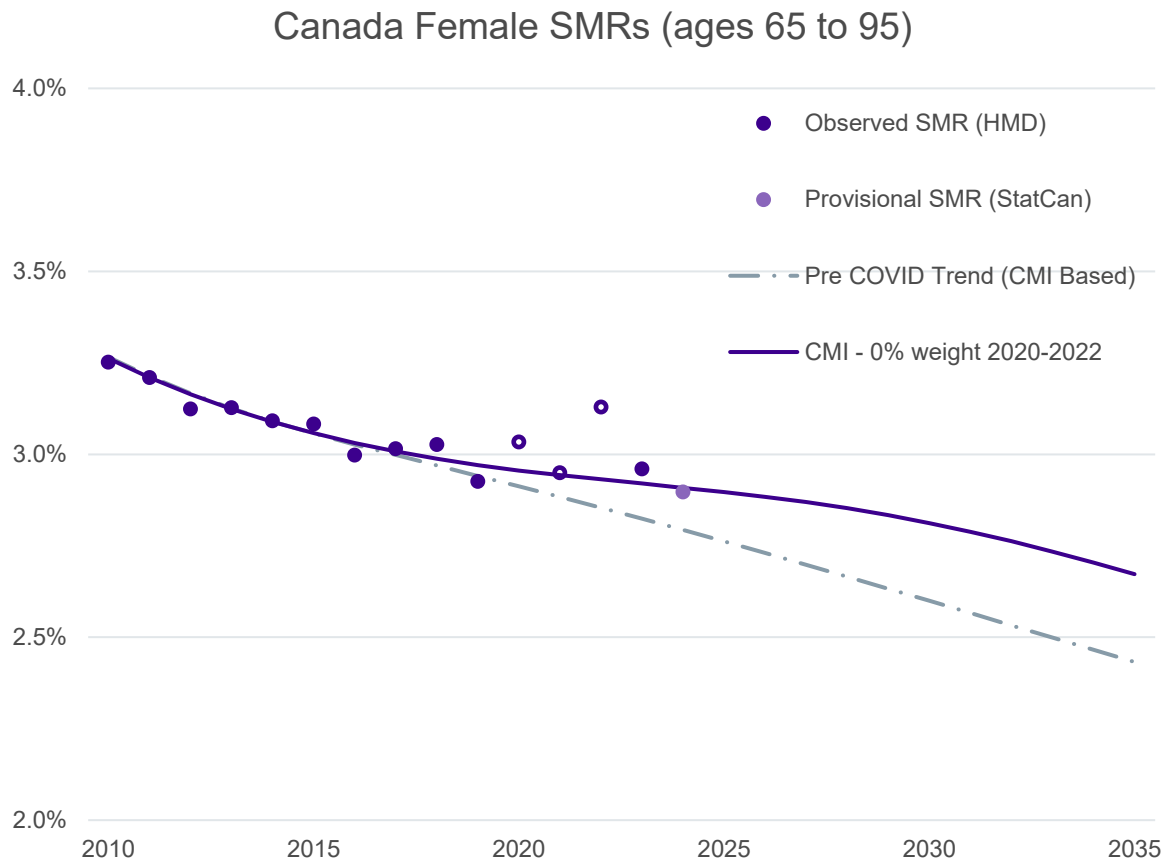


A plausible alternative approach?
Will depend on your view of 2023-2024 data.

Source: Club Vita calculations using CMI_2024 v05 projections model. US data up to 2024 from the Human Mortality Database (www.mortality.org). Note: 1.0% long term rate of improvement is used in the US application of the CMI model throughout

“Skipping” the pandemic years of data (Canada)

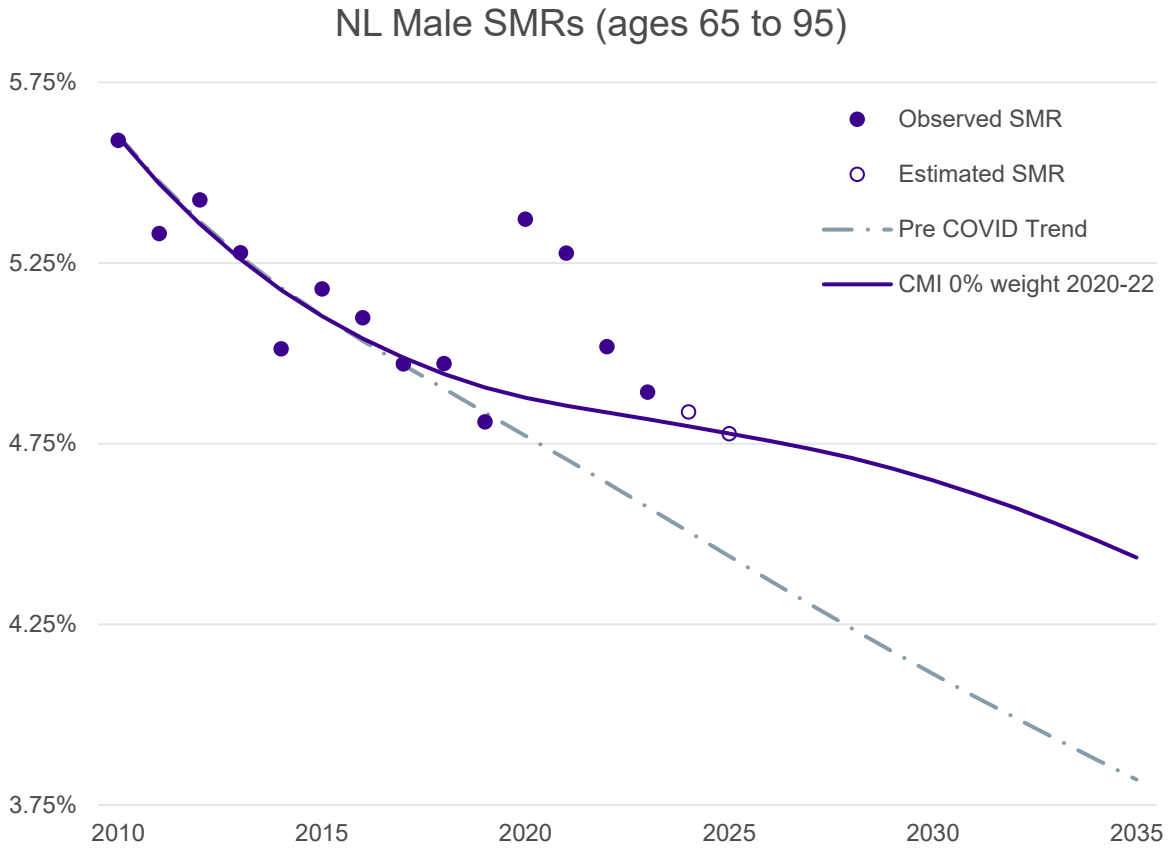


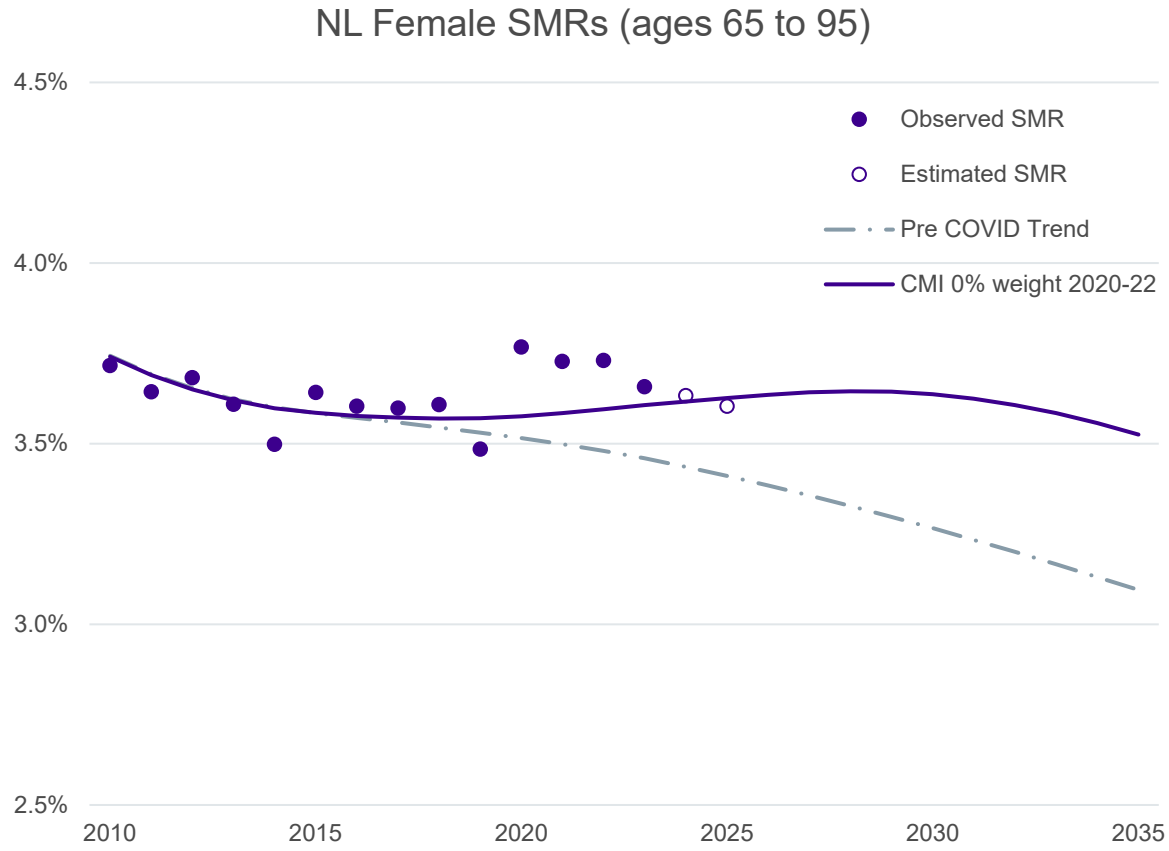


A plausible alternative approach?
Will depend on your view of 2023-2024 data.

Source: Club Vita calculations using CMI_2024 v05 projections model. Canadian data up to 2023 from the Human Mortality Database (www.mortality.org), 2024 data estimated using StatisticsCanada life table. Note: 1.3% long term rate of improvement is used throughout

“Skipping” the pandemic years of data (NL)





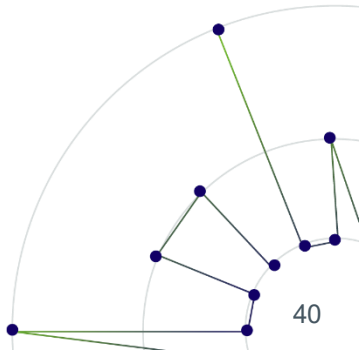
This approach will lead to negative short-term improvements for women.

2024 and 2025 exposures equal to 2023 exposures, 2024 deaths based on a 1.1% improvement for men, 0.5% for women. 2025 deaths based on a further 1.3% improvement for men, 0.8% for women. Projection uses CMI_2025 v01 model with MinYear = 1985, MaxYear = 2025, AdjustSmoothing = Yes, FittedOverlayApplies = No, W_{2020}, W_{2021}, W_{2022} set to 0%, long-term rate = 1.5% pa for men, 1.4% pa for women.

Observations

- “Skipping” pandemic years of data could be an alternative approach
- Need to have a few years of post-pandemic data with some continuity from 2019 mortality
- Appropriateness will depend on judgement of signal in emerging years’ data

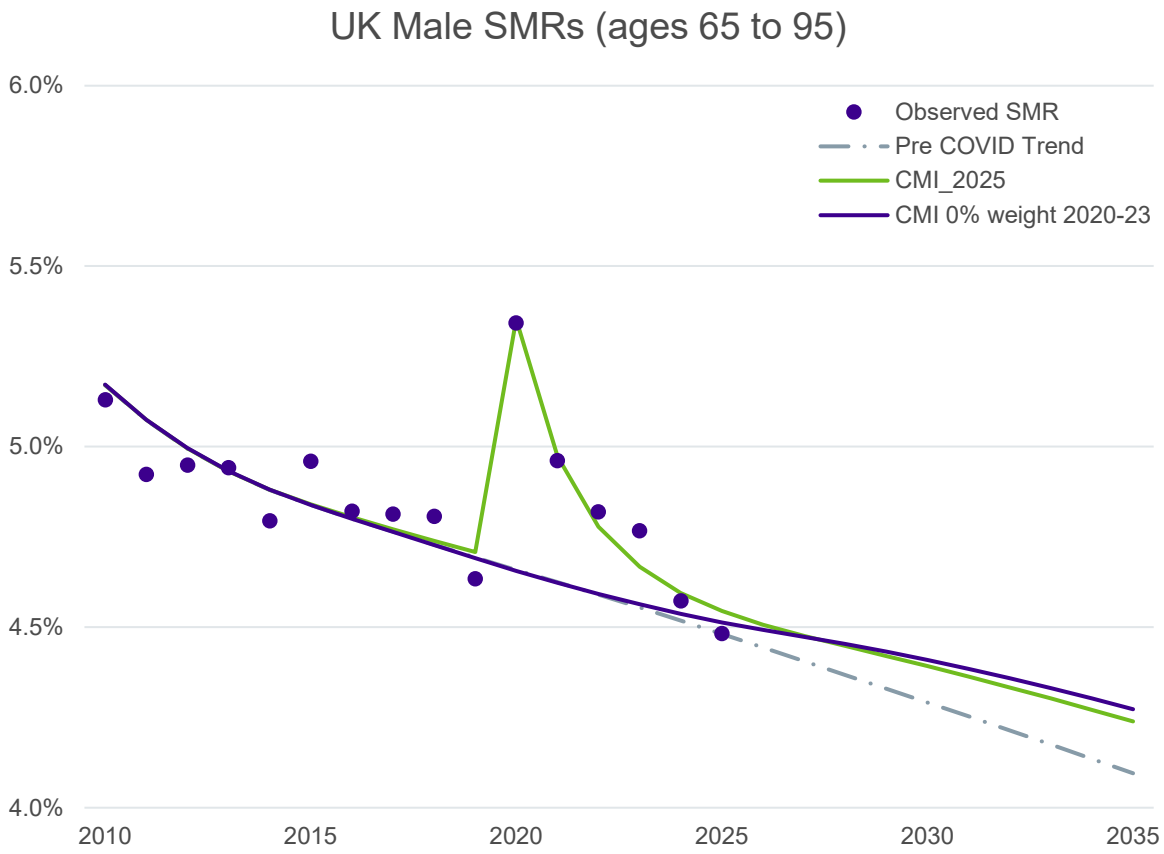
Each new year of data gives vital information

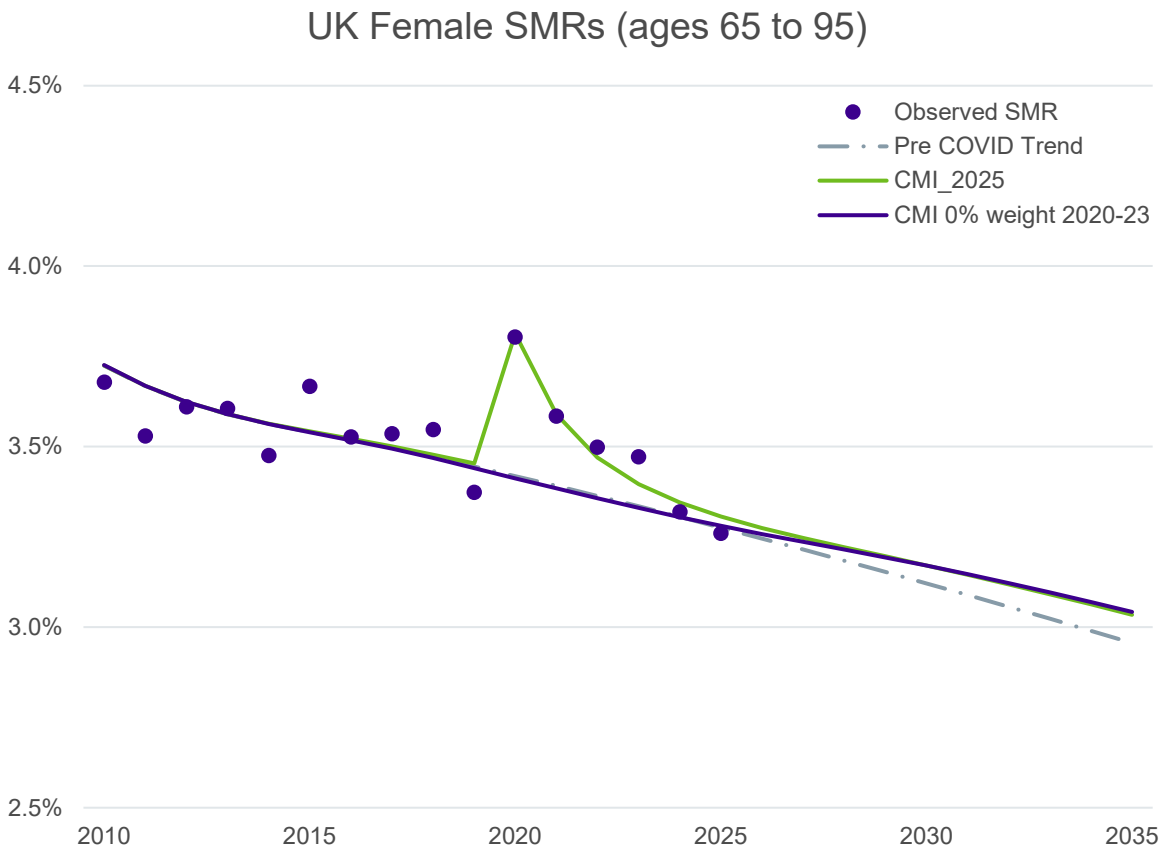


CLUB VITA

What are the most plausible approaches?

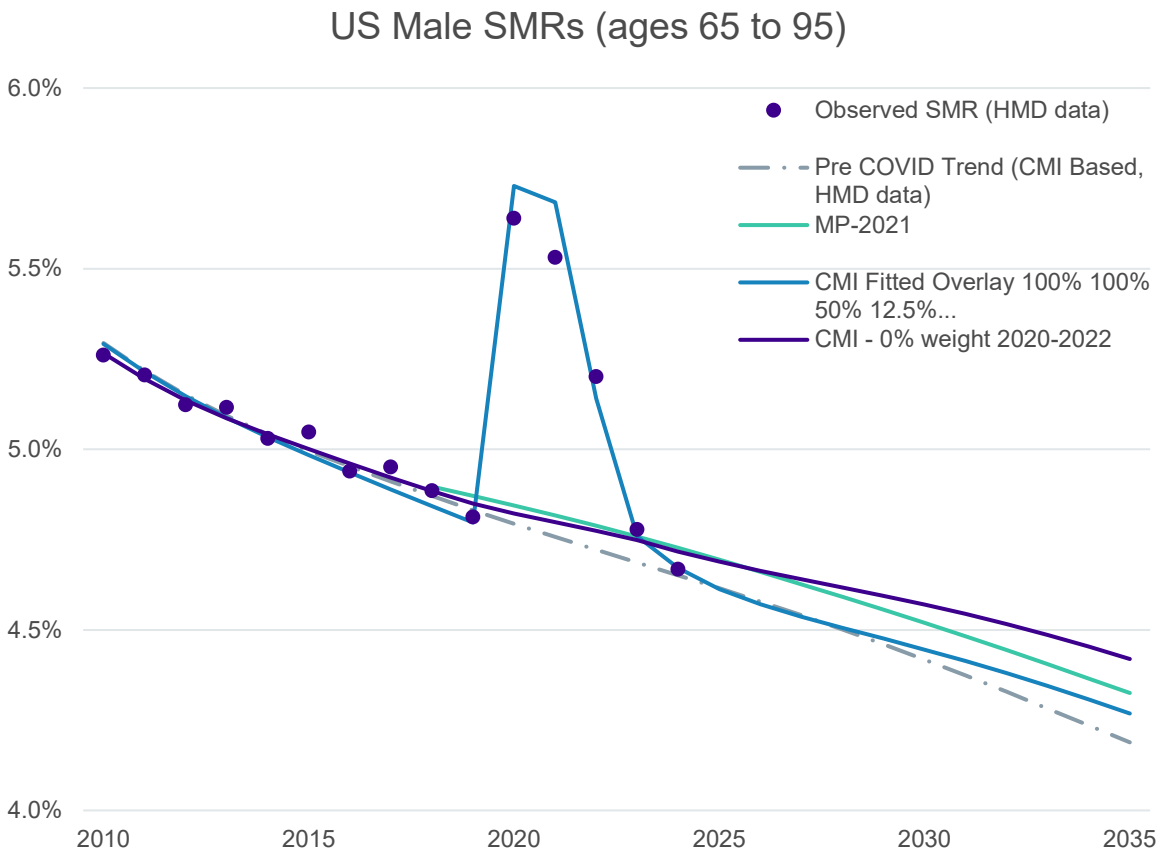
Summary (UK)

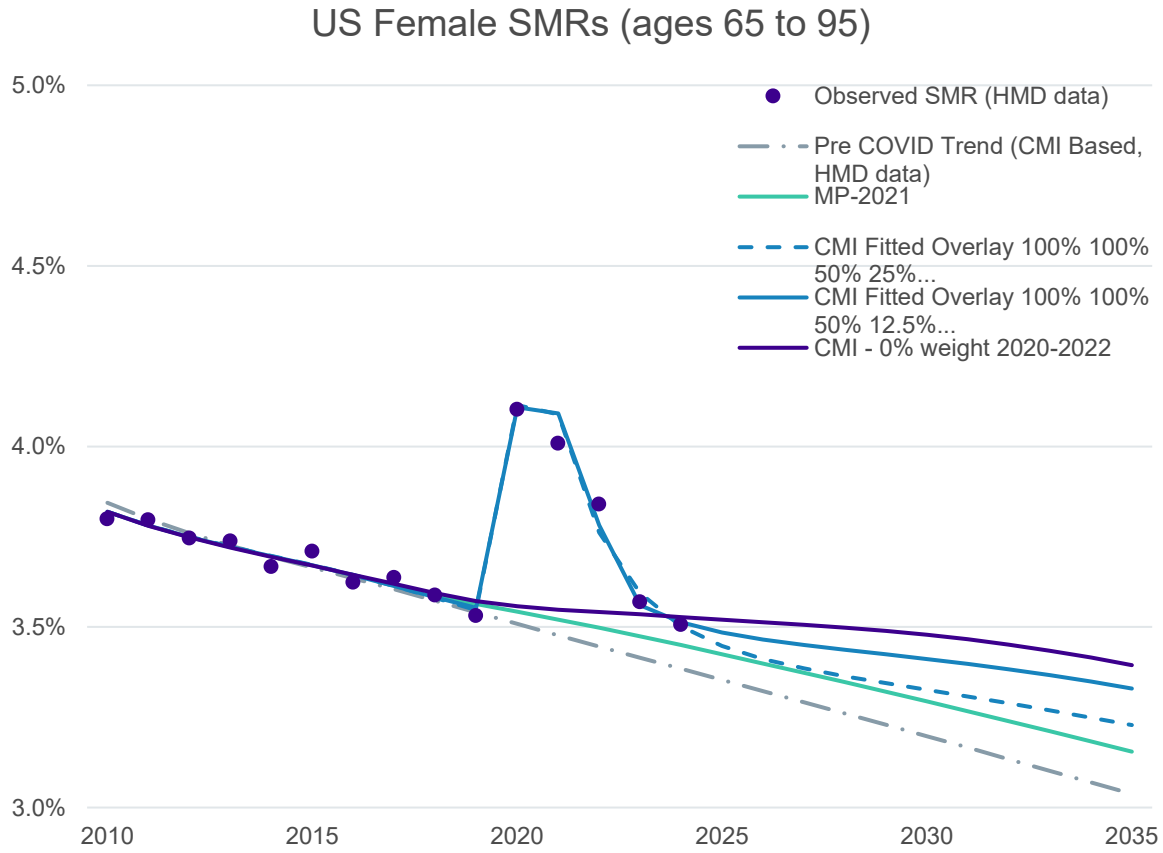




Could a light 2026 lead to a full reversion to the pre-COVID trend?
The CMI_2024+ model is well placed to adapt to the emerging signal.

Summary (US)

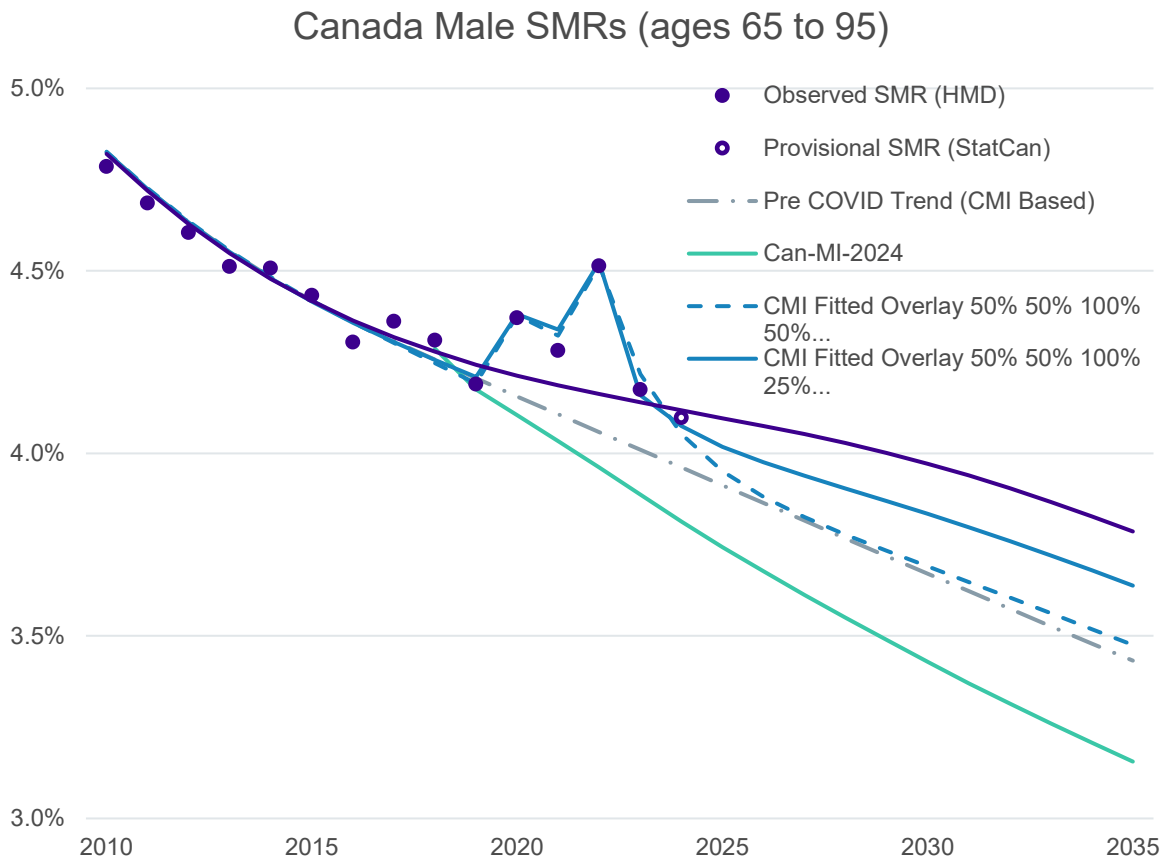


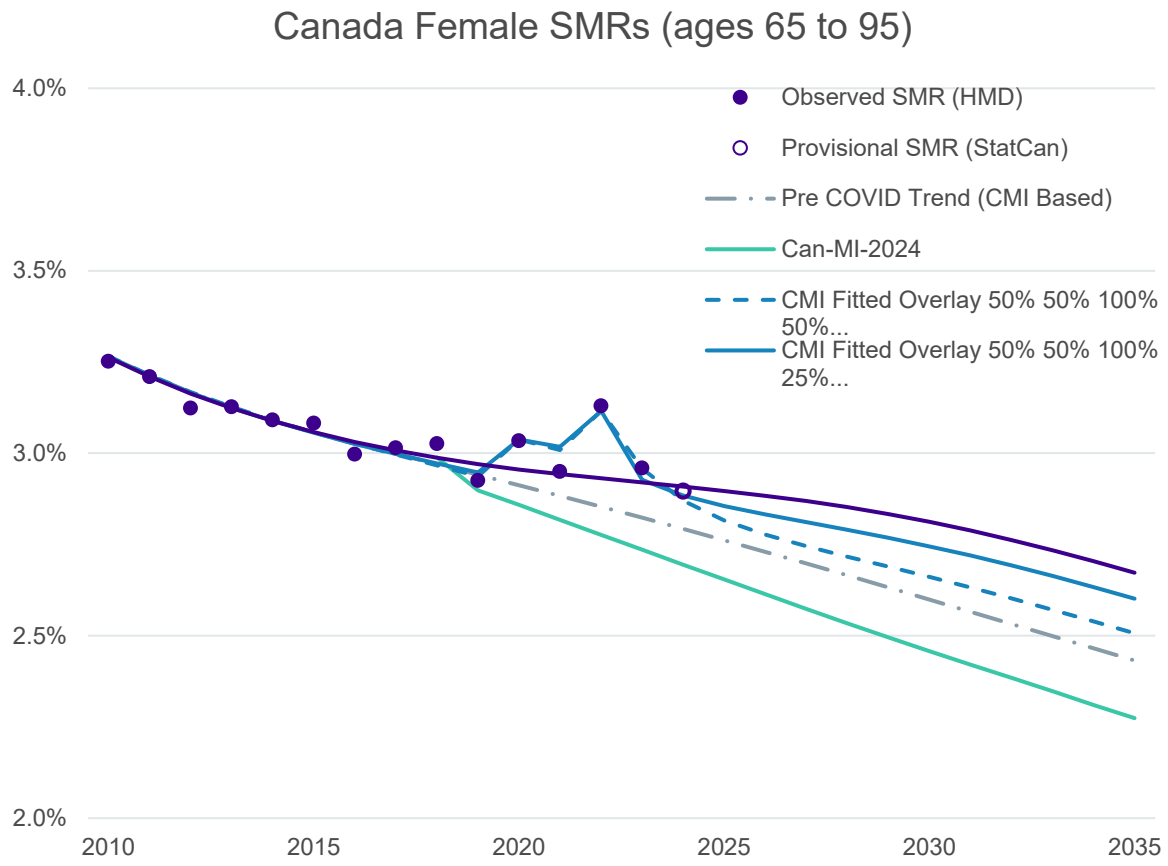


Judgement required on outlook for excess – new years of data very important.

Source: Club Vita calculations using CMI_2024 v05 projections model. Canadian data up to 2023 from the Human Mortality Database (www.mortality.org), 2024 data estimated using StatisticsCanada life table. Note: 1.3% long term rate of improvement is used throughout. Fitted overlay excess weightings half in each subsequent from last weighting disclosed.

Summary (Canada)

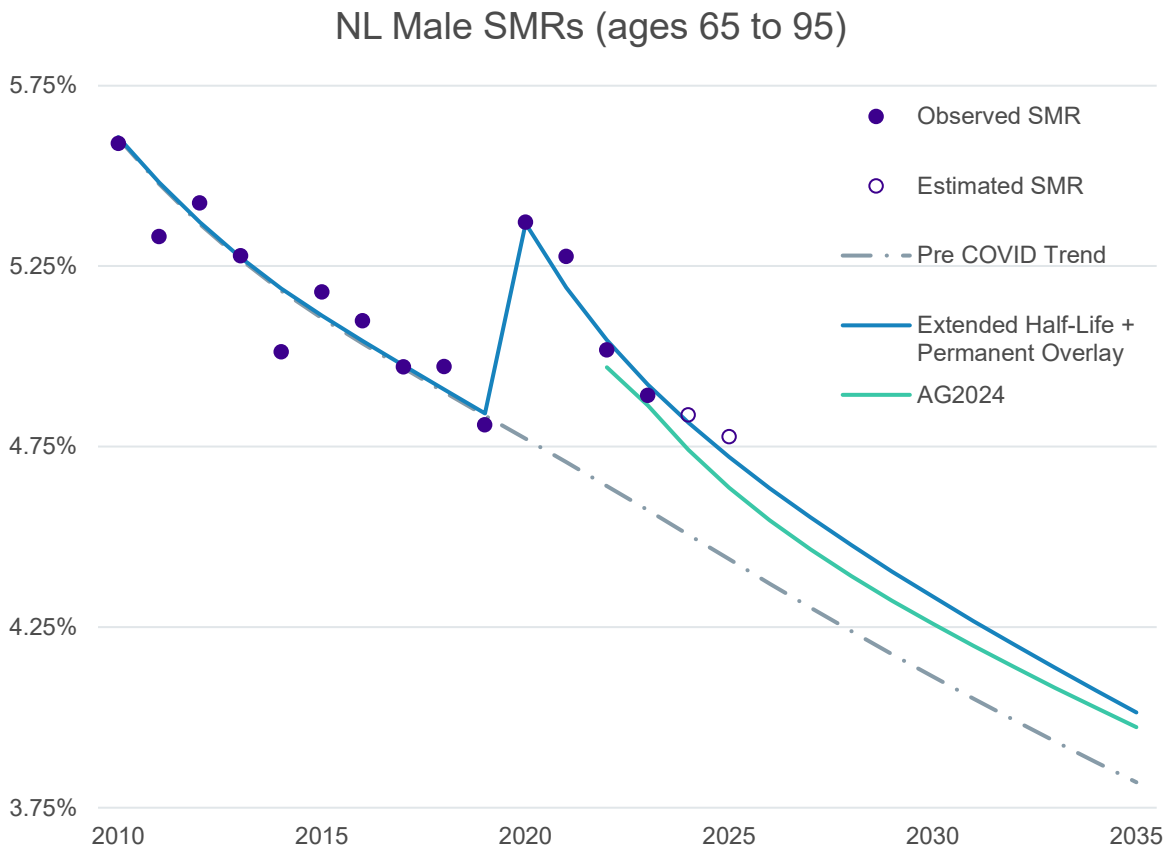


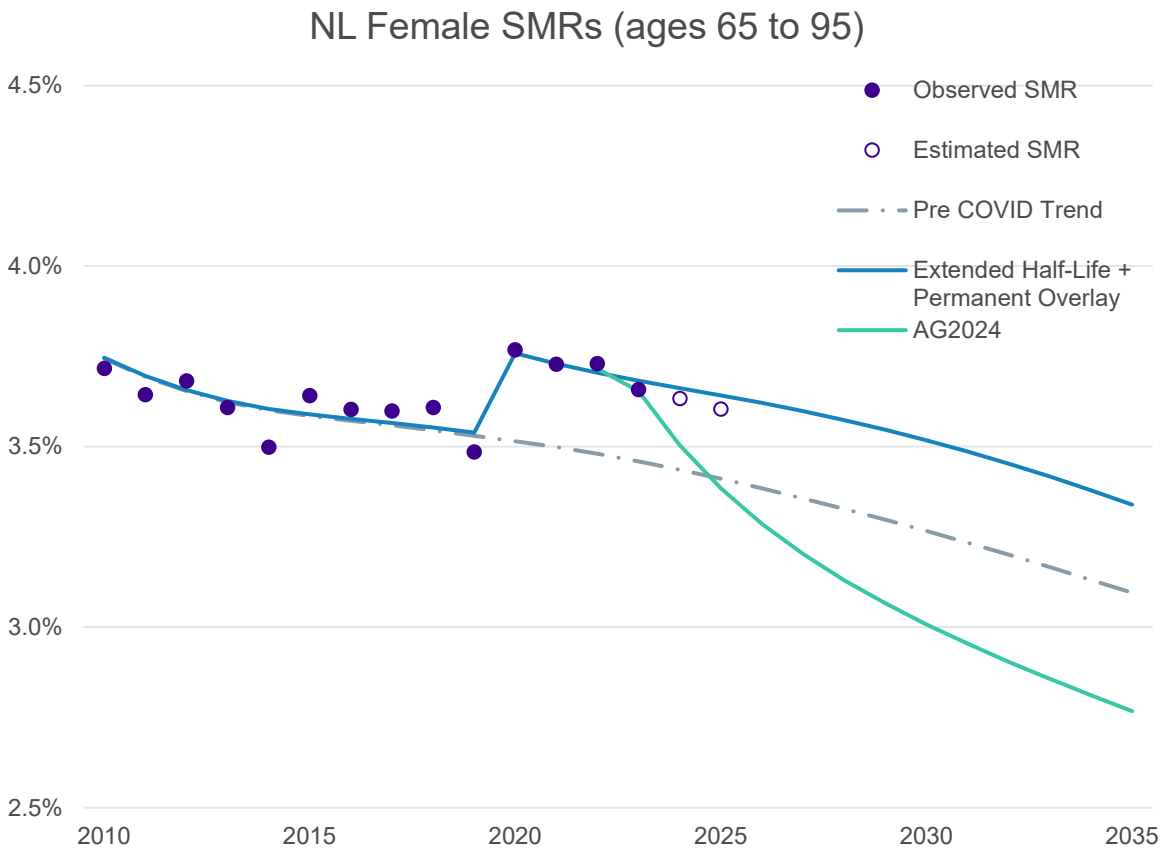


Judgement required on outlook for excess – new years of data very important.

Source: Club Vita calculations using CMI_2024 v05 projections model. Canadian data up to 2023 from the Human Mortality Database (www.mortality.org), 2024 data estimated using StatisticsCanada life table. Note: 1.3% long term rate of improvement is used throughout. Fitted overlay excess weightings half in each subsequent from last weighting disclosed.

Summary (Netherlands)





Should we interpret the post COVID data as a step change, or should we expect some reversion to the grey line in 2026+?

Source: AG24 projection based on published qx rates, converted to mx terms and then age standardised using European Standard population (as used throughout this presentation.)

Further considerations

Variations in emerging trends by age.

Subpopulation considerations:

- Geographical variations in excess rates.
- Insured vs general population.

How to combine preferred projection mechanism with base tables.

Questions?

Chair

Natalie Gleed FIA FSA

Head of Business Development

Panellist

Erik Pickett PhD FIA FSA

Head of Actuarial Content

Panellist

Nick Chadwick FIA

Longevity risk specialist

Thank you