Institute and Faculty of Actuaries

IFoA Life Conference

Causal mortality data: Getting the most out of the data

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Deputy chair of the Population Mortality Improvements Working Party

Agenda

Causal modelling - Why the need?

Overview of our work to date

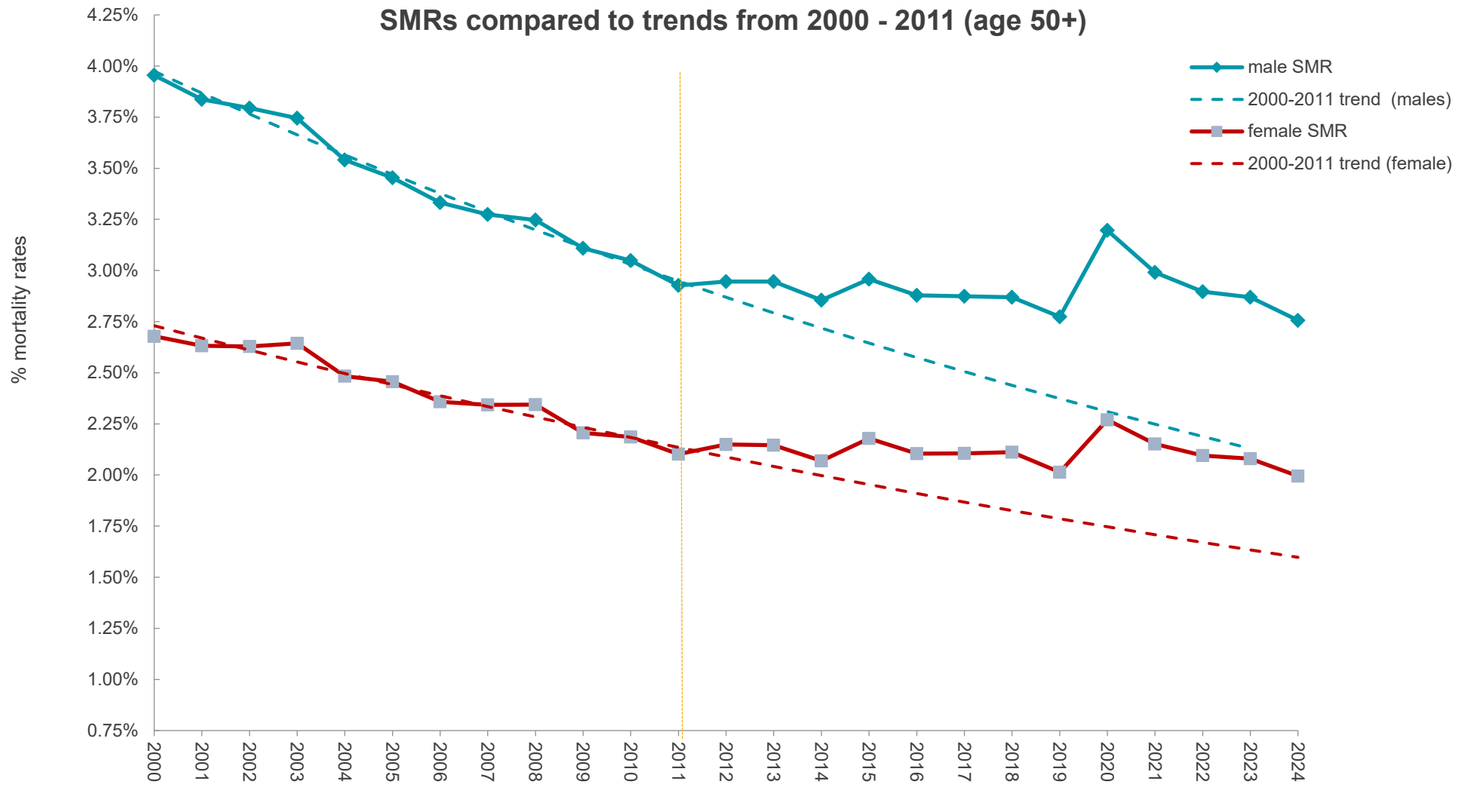
The role of the expert judgement

Plans for the future

The need for Causal Data

Why do we need Causal Data

Understanding the past…



To predict the future

Chart based on CMI data on deaths and exposure

What we built – the dataset

The ONS cause of death dataset

Uses method provided by WHO

Changes in method not applied retrospectively

Underreporting of some leading causes for developed nations?

Causal, rather than driver, focus

ONS approach: Example death certificate

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1
Report disease or condition directly leading to death on line a

Report chain of events in due to order (if applicable)

State the underlying cause on the lowest used line

	Cause of death*	Time interval between onset and death
a	Direct cause of death **Cerebral haemorrhage**	**4 hours**
b	Due to **Metastasis of the brain**	**4 months**
c	Due to **Breast cancer**	**5 years**
d	Due to	

2
Other significant conditions contributing to death (time intervals can be included in brackets after the condition)

Arterial hypertension (3 years); Diabetes mellitus (10 years)

**This does not mean the mode of dying, e.g. heart failure, respiratory failure. It means the disease, injury, or complication that caused death.*

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Identified cause of death

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Purpose of the Development

Medical interpretation: “Cause” or “Event”

Consistent mapping over time

Mention level data

Grouped by driver

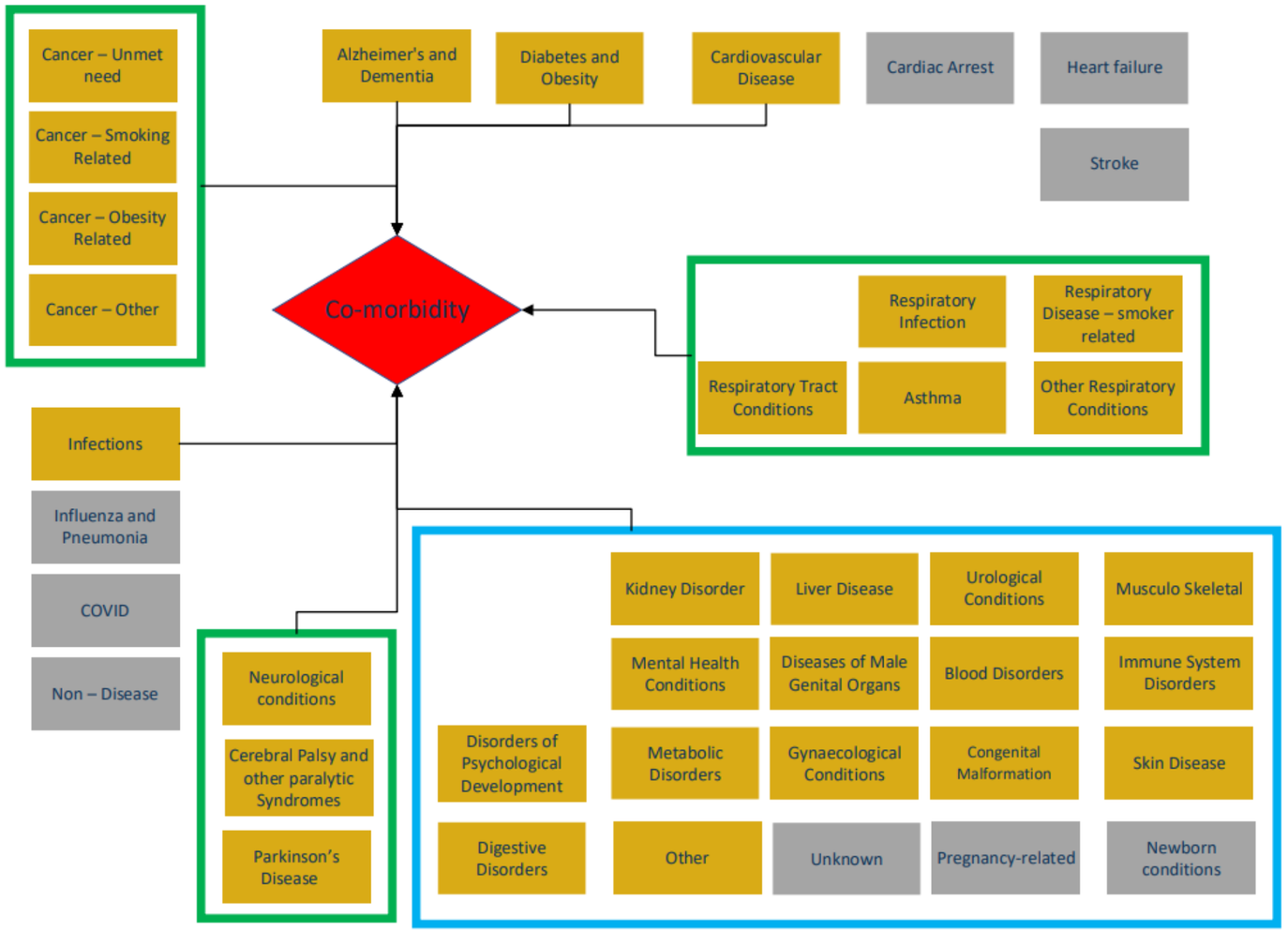
Coverage of the dataset

Coverage	England and Wales
Start	1 January 2001
End	31 December 2021
Extracted	Late 2023
Published	August 2024

2022 data was available at point of extraction but was removed such that occurrence data could be produced

The data covers a period entirely mapped to ICD-10

Co-Morbidity



Available datasets

Primary mapping

ONS Primary ICD code

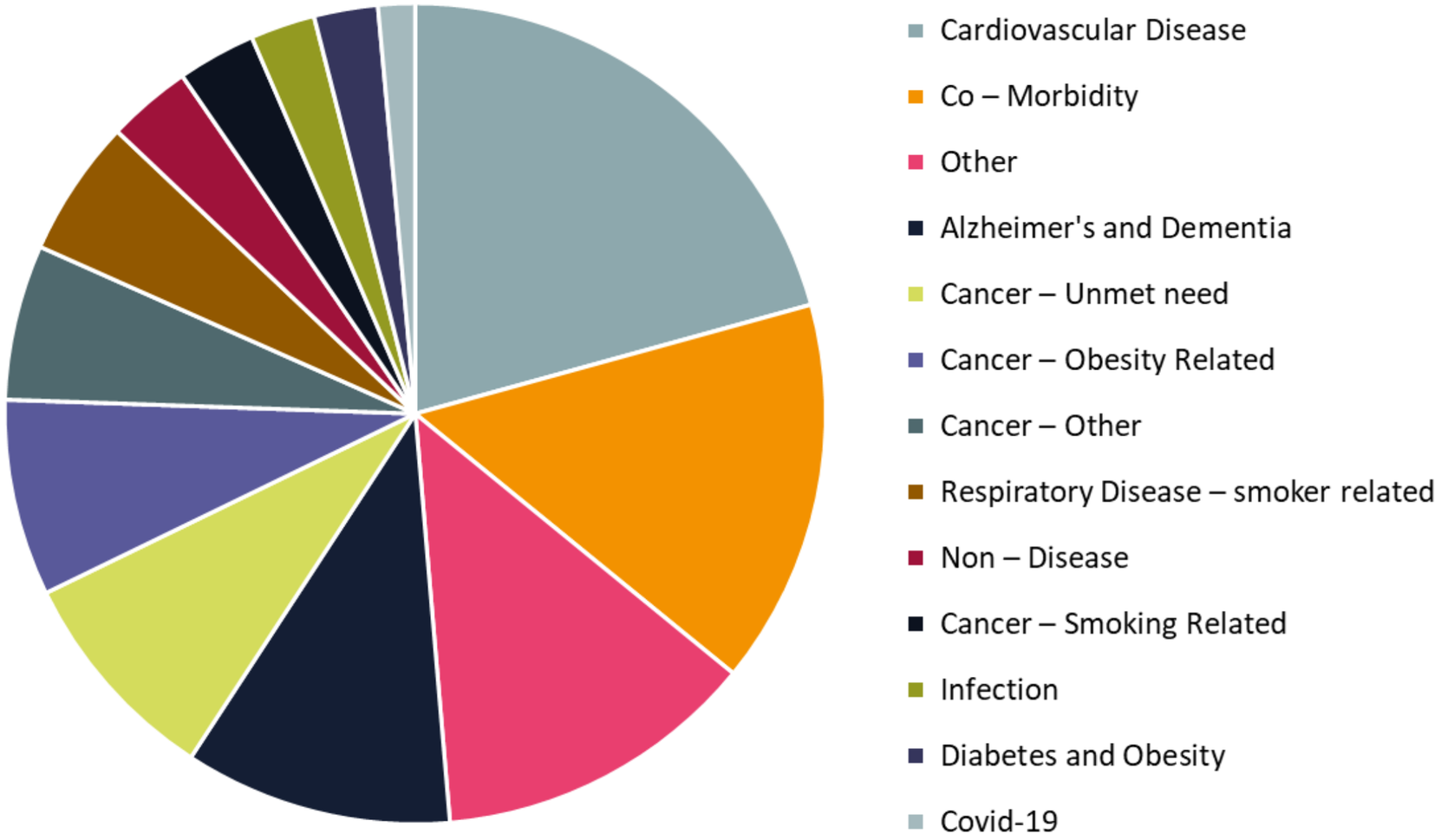
Alternate mapping:

- Without Covid-19
- Without Co-morbidities
- Without Covid-19 and Co-morbidities

Released by registration and occurrence

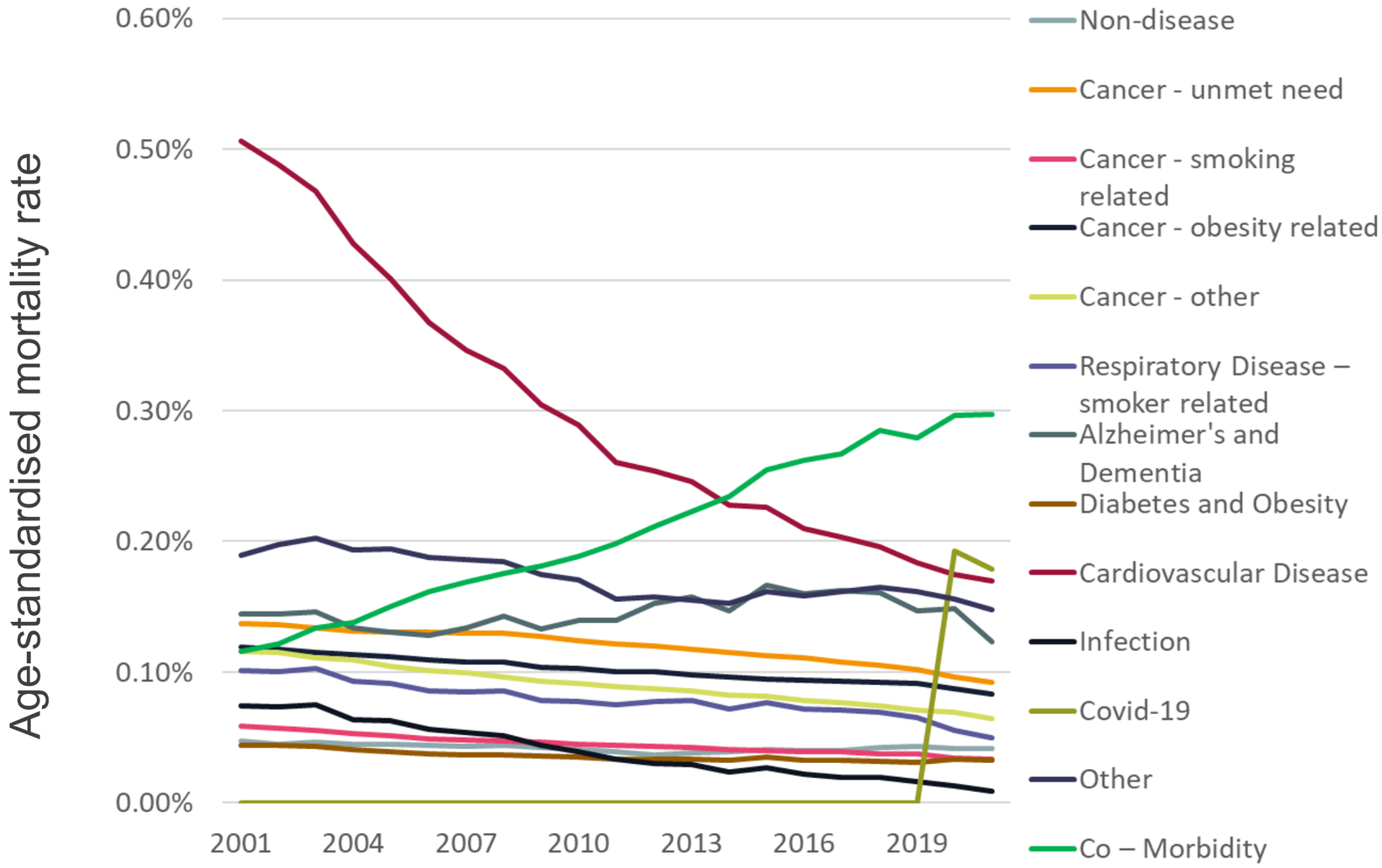
Single age-year approximation for ease of use

Driver Mix



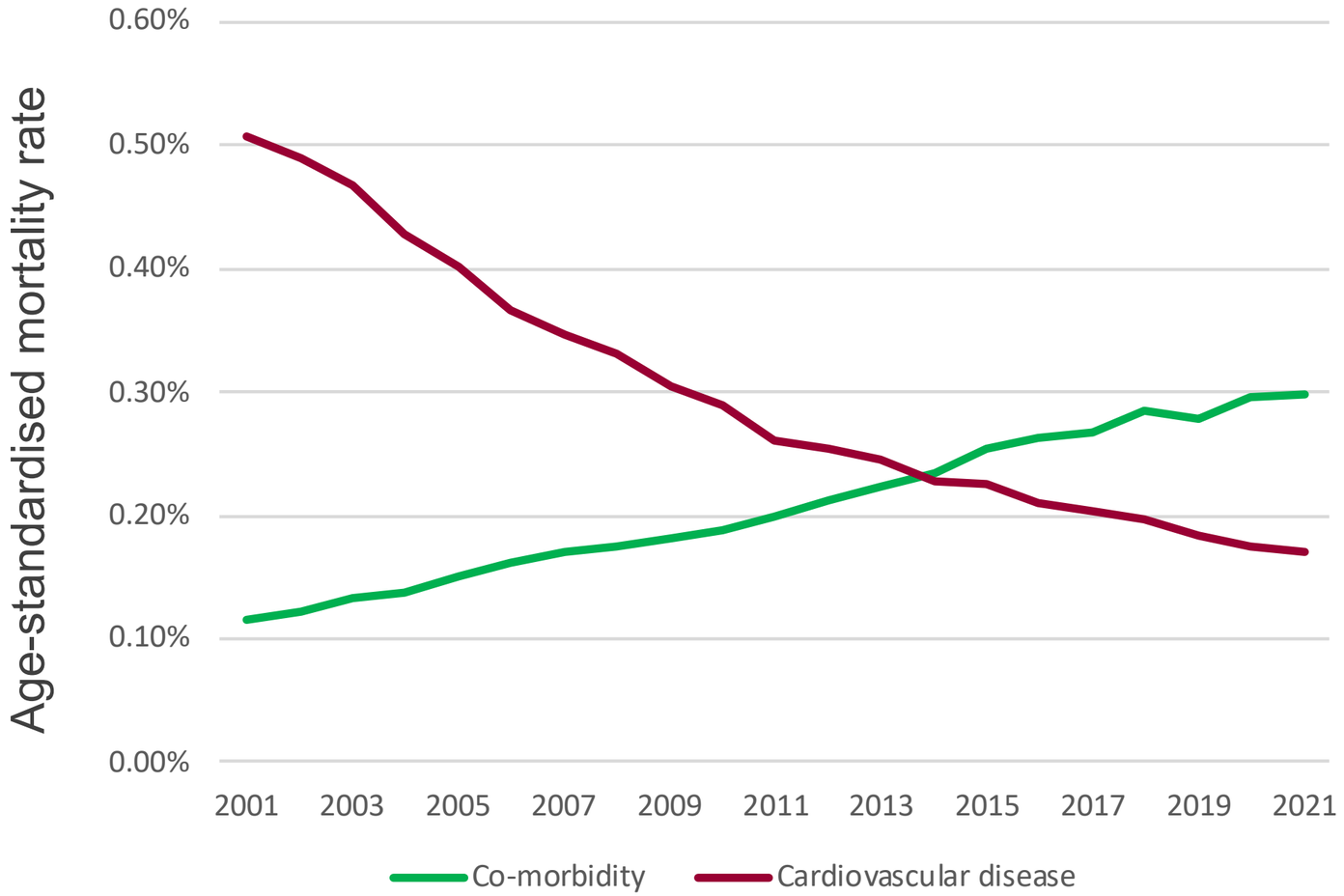
What we learned – Key Findings

Driver Mix over Time



Unisex, age-standardised over ages 20-100

Leading driver of death



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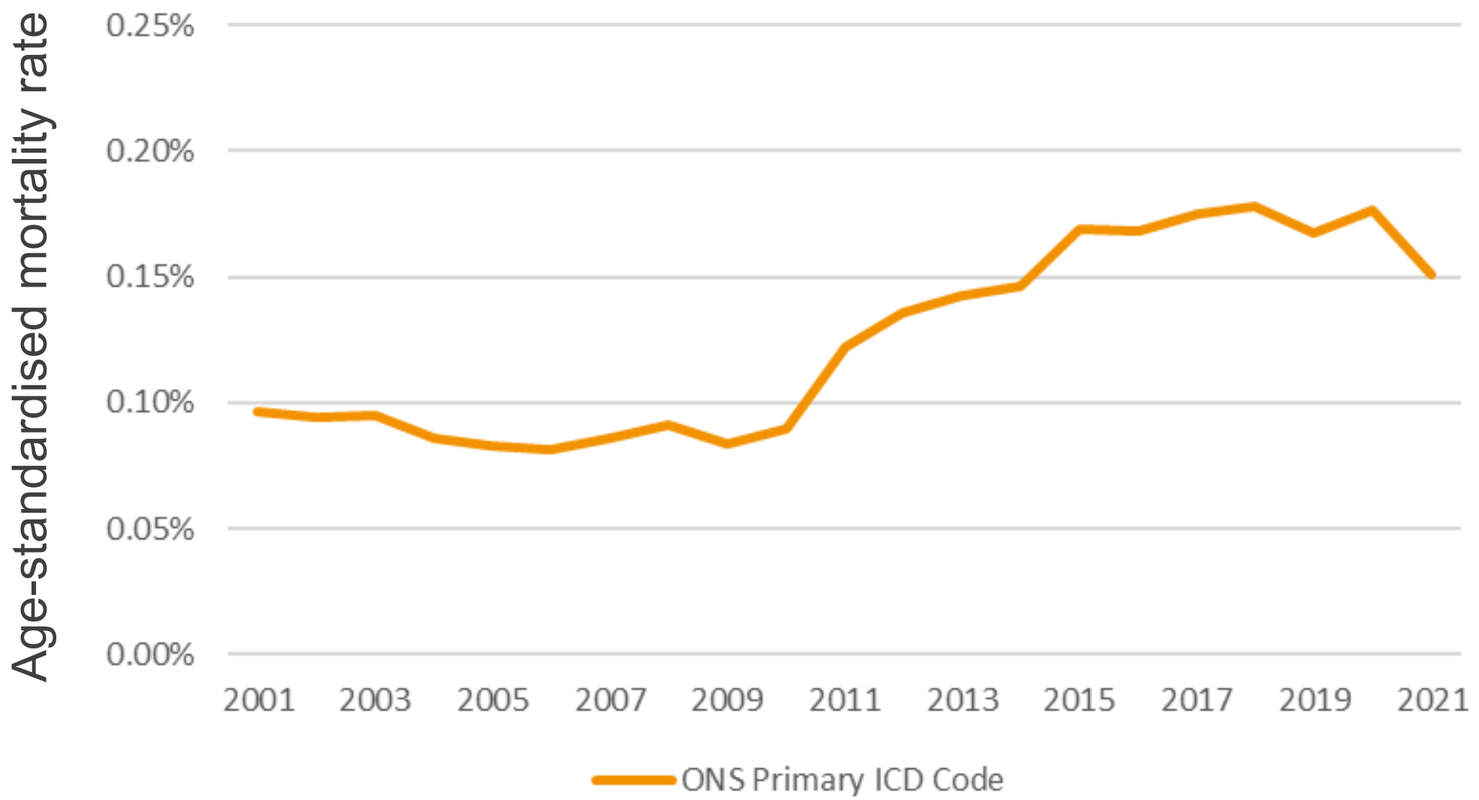
Looking at specific drivers

Alzheimer's and Dementia



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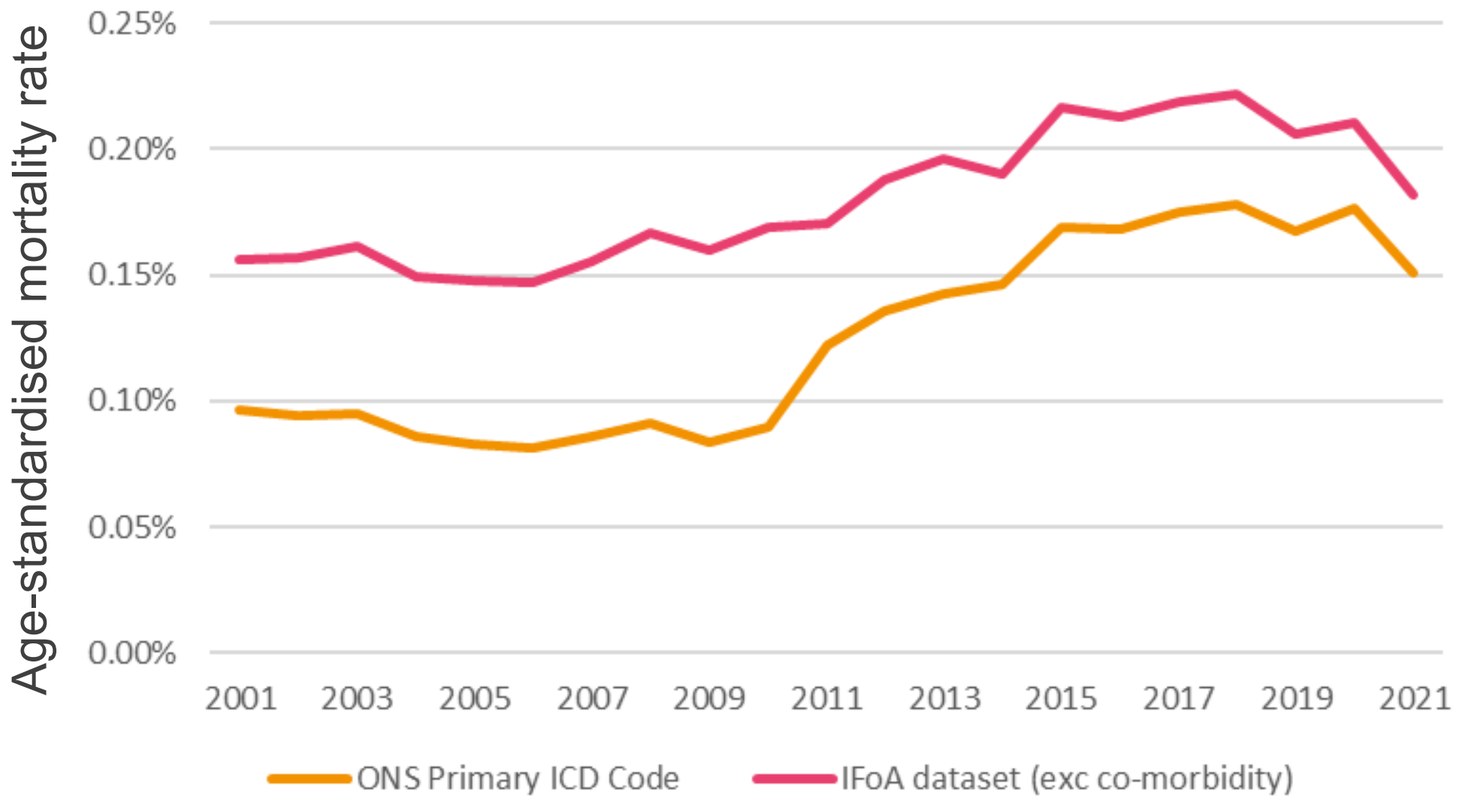

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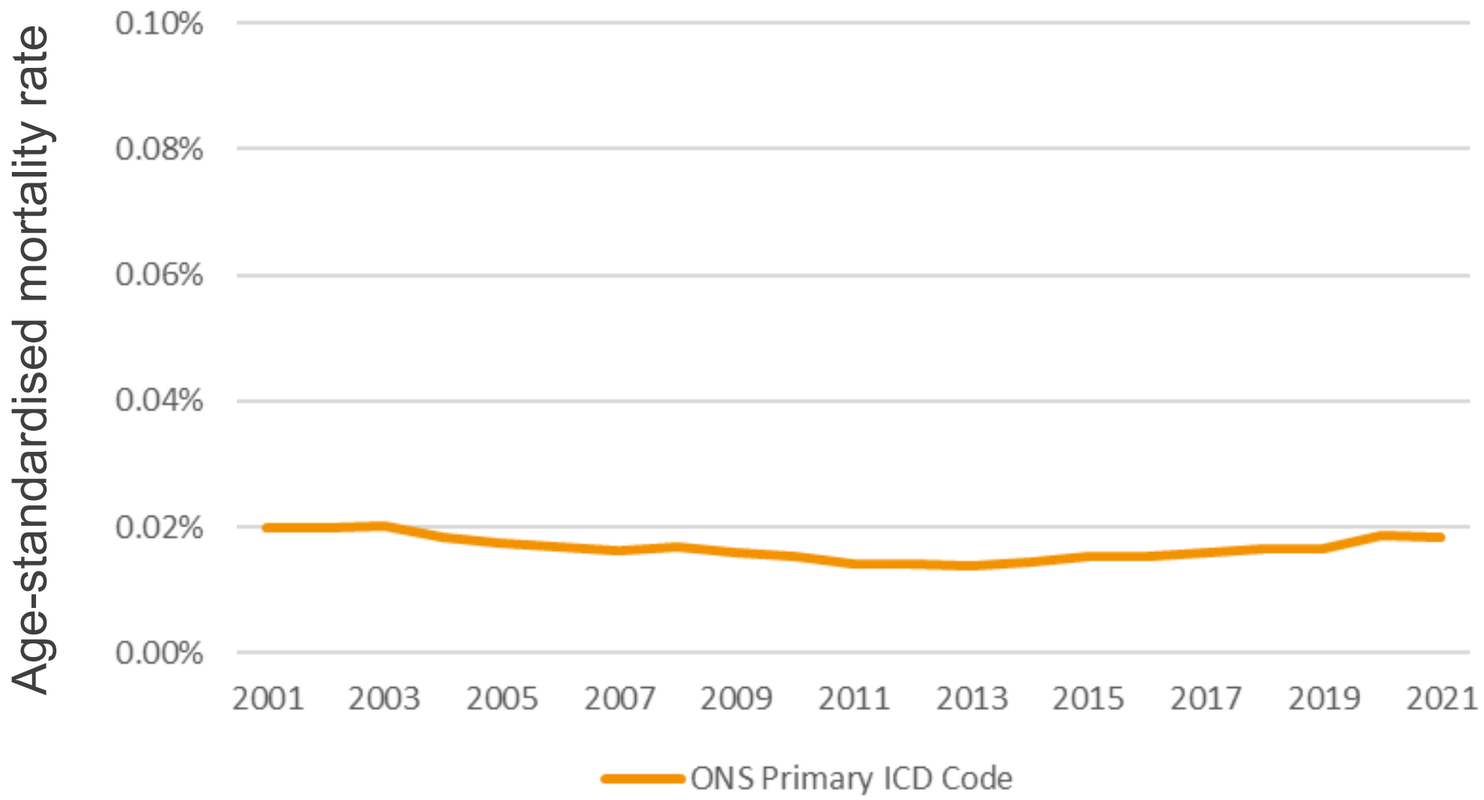
Diabetes & Obesity



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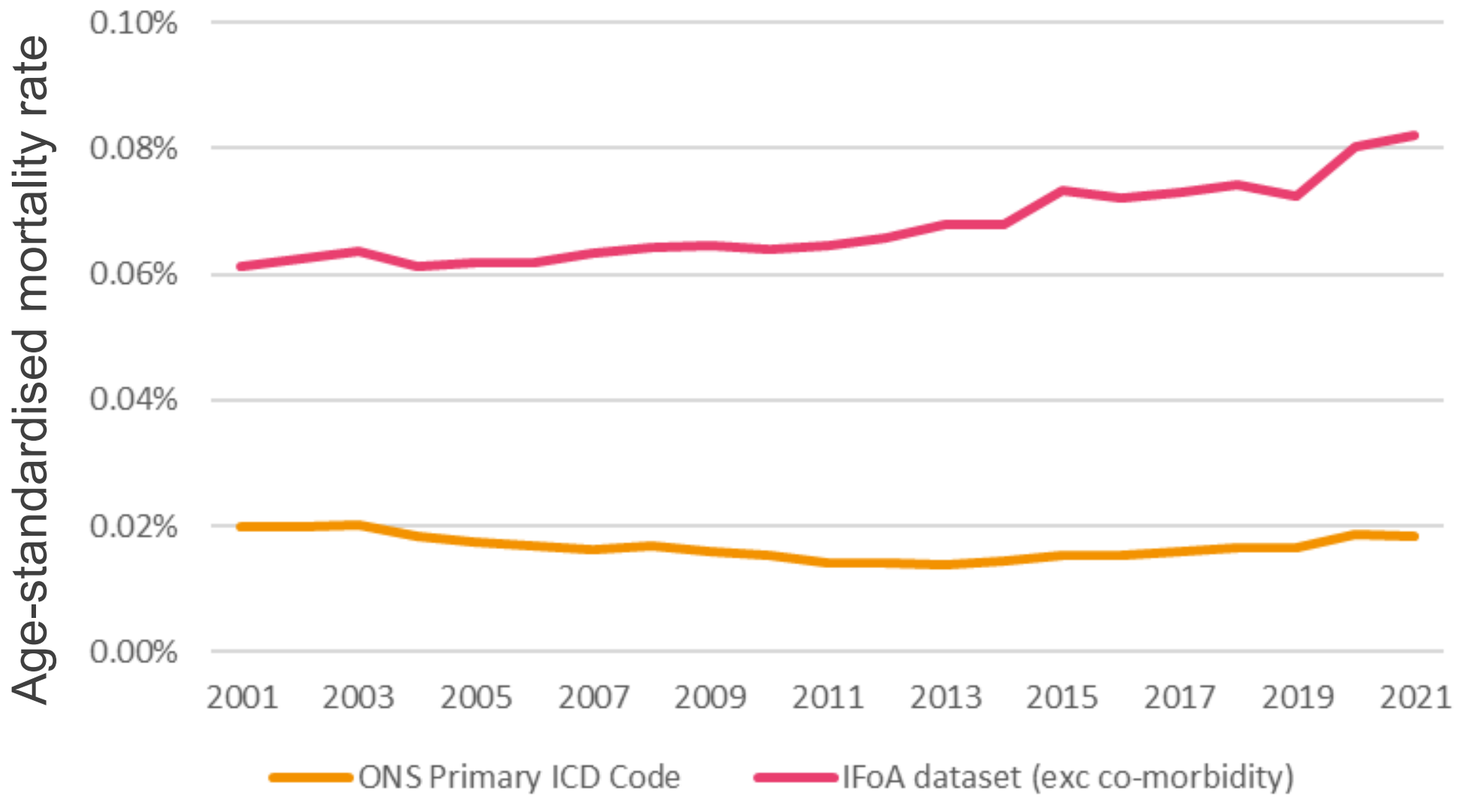

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The Role of the Expert Judgement

Expert Judgements: We Actuarially Know Better!

However…

We probably didn’t get it right first time. What seemed like a good idea 5 years ago may need revisiting.

10 actuaries – 10 different views…..

We aren’t taking it personally when a new idea is suggested!

What Next for the Working Party

Plans for the future

Ambition of regular releases

Re-consideration of drivers (e.g. lung cancer)

Re-consideration of co-morbidities

Other possible refinements (e.g. more granular, IMD etc)

Fundamentally, we want to meet the aims of its users.
Let us know what you think!

Shout out

Working parties like ours rely on the hard work of our volunteers and we are presenting the work on behalf of all the current and previous working party members

Current Members

- Caroline Roberts
- Ben Rees
- Nana Asiamah
- Ashley Campbell
- Jack Carmichael
- Cobus Daneel
- Anil Gandhi
- Rob Mellows
- Martyn McGuigan
- Jon Palin

Previous Members

- Steve Bale
- Chris Ballard
- Steven Baxter
- Brian Cronin
- Sacha Dhamani
- Matthew Edwards
- Guy Naylor
- Dan Ryan
- Han Yan

Q&A

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