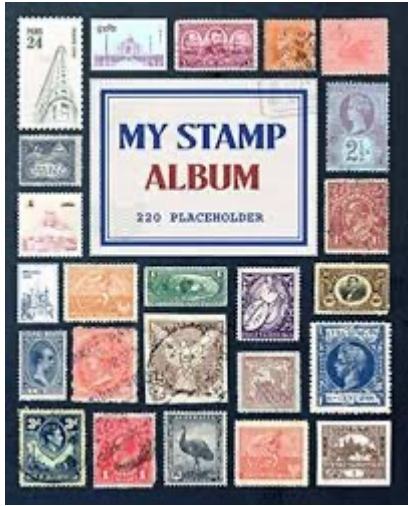




Changing patterns of diabetes: what might the future hold?



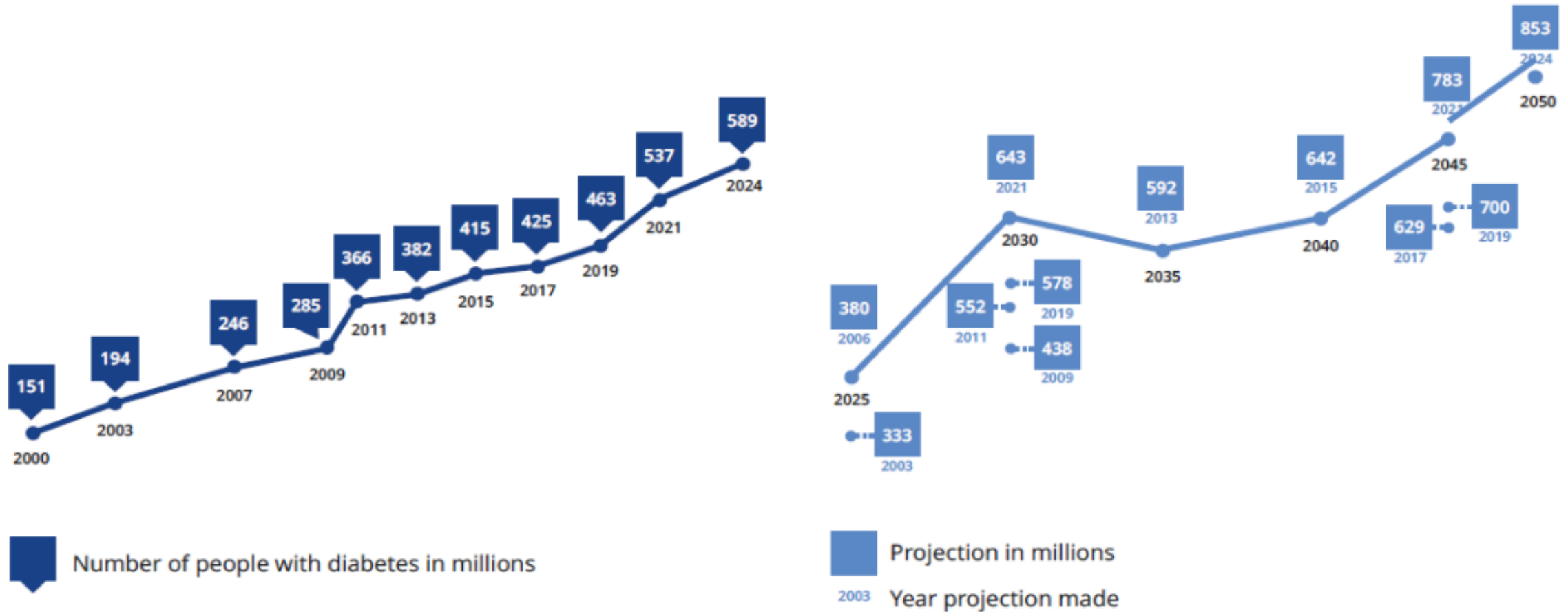
Sarah Wild

Professor of Epidemiology, University of Edinburgh,
ABCD conference, Newcastle, November 2025

Outline

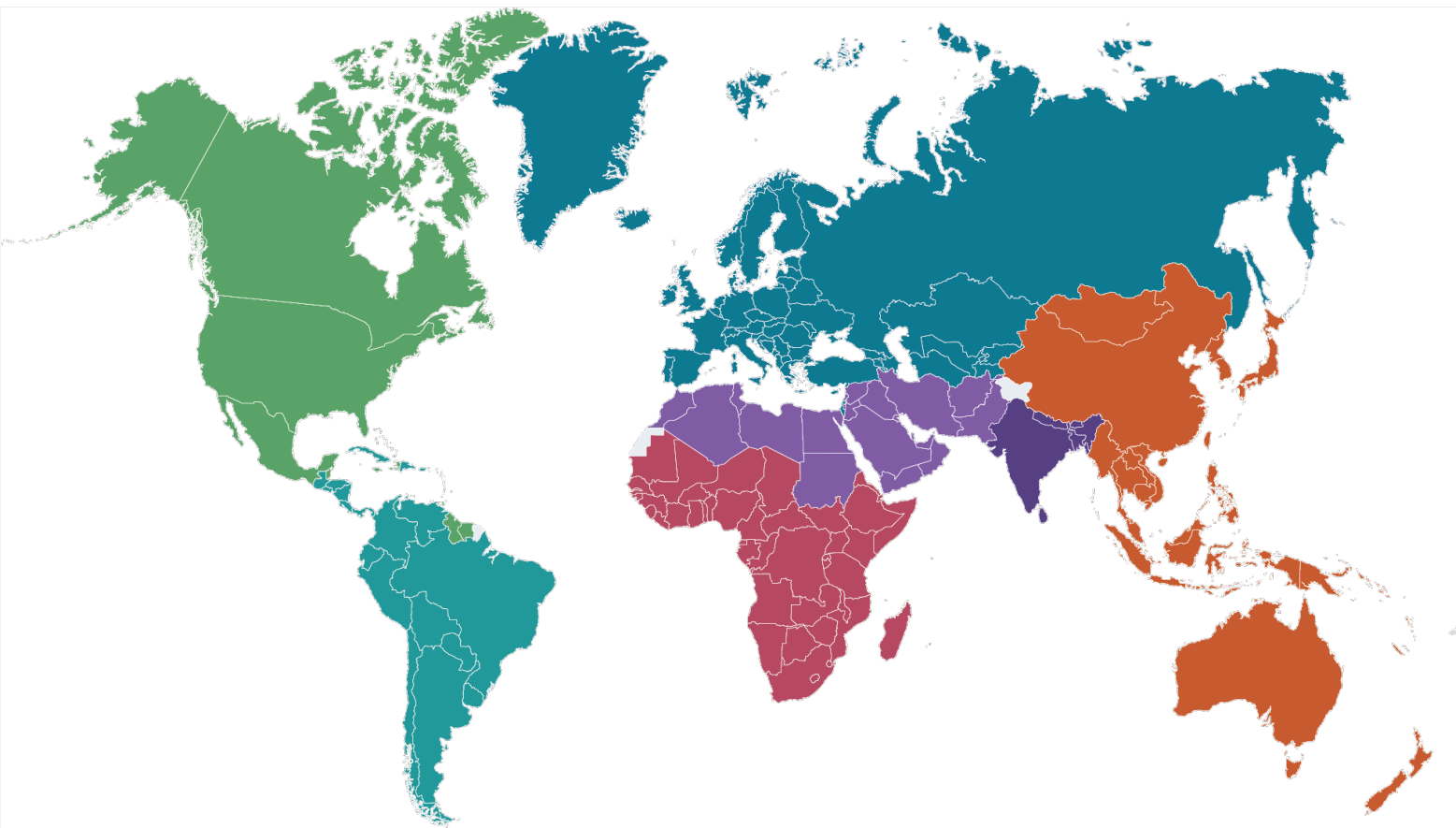
- Estimates of global and UK/Scottish diabetes prevalence
- Changes in key risk factors
- Incidence, mortality and time trends
- Complications of diabetes
- Summary

IDF global estimates/projections of the number of people (20-79 years of age) with **diabetes** (millions) 2000-2050



Estimated numbers of people with diagnosed and undiagnosed **diabetes** and the projected increase between 2024 and 2050

Aged 20–79 years by International Diabetes Federation region



World

2050	852.5 million	45% increase
2024	588.7 million	

Europe (EUR)

2050	72.4 million	10% increase
2024	65.6 million	

North America and Caribbean (NAC)

2050	68.1 million	21% increase
2024	56.2 million	

South-East Asia (SEA)

2050	184.5 million	73% increase
2024	106.9 million	

Africa (AFR)

2050	59.5 million	142% increase
2024	24.6 million	

Middle-East and North Africa (MENA)

2050	162.6 million	92% increase
2024	84.7 million	

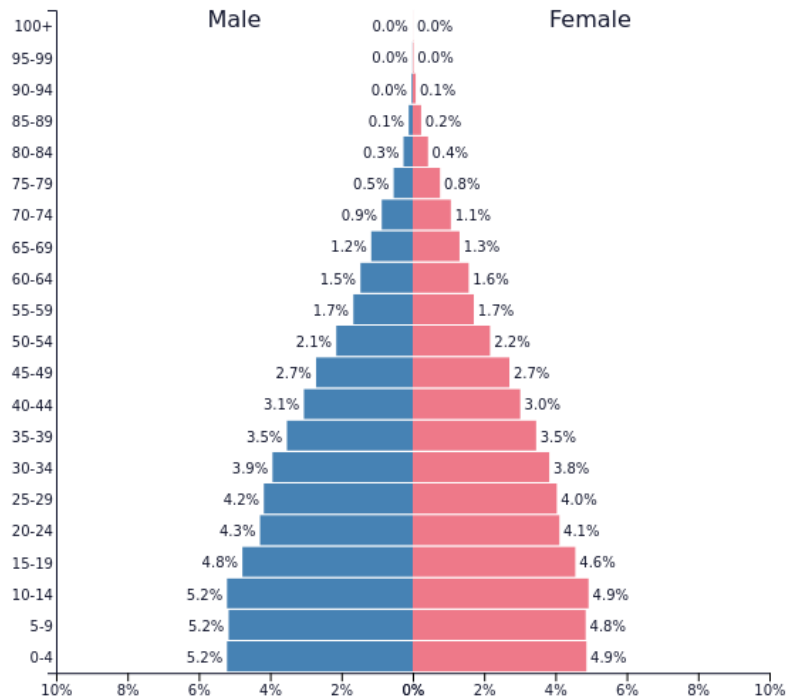
South and Central America (SACA)

2050	51.5 million	45% increase
2024	35.4 million	

Western Pacific (WP)

2050	253.8 million	18% increase
2024	215.4 million	

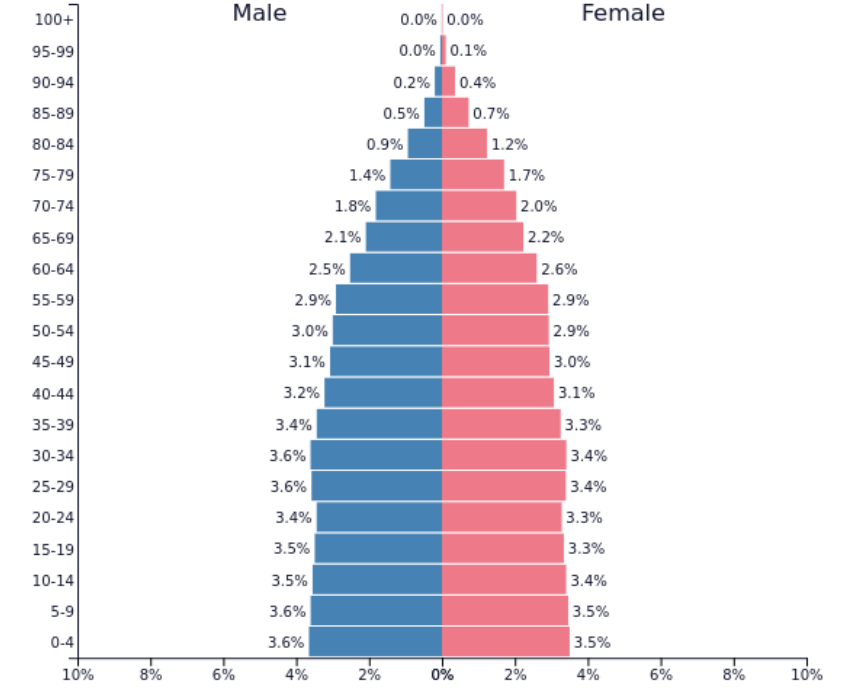
Explanations: changing global age distribution



PopulationPyramid.net
WORLD - 2000
Population: 6,148,898,975

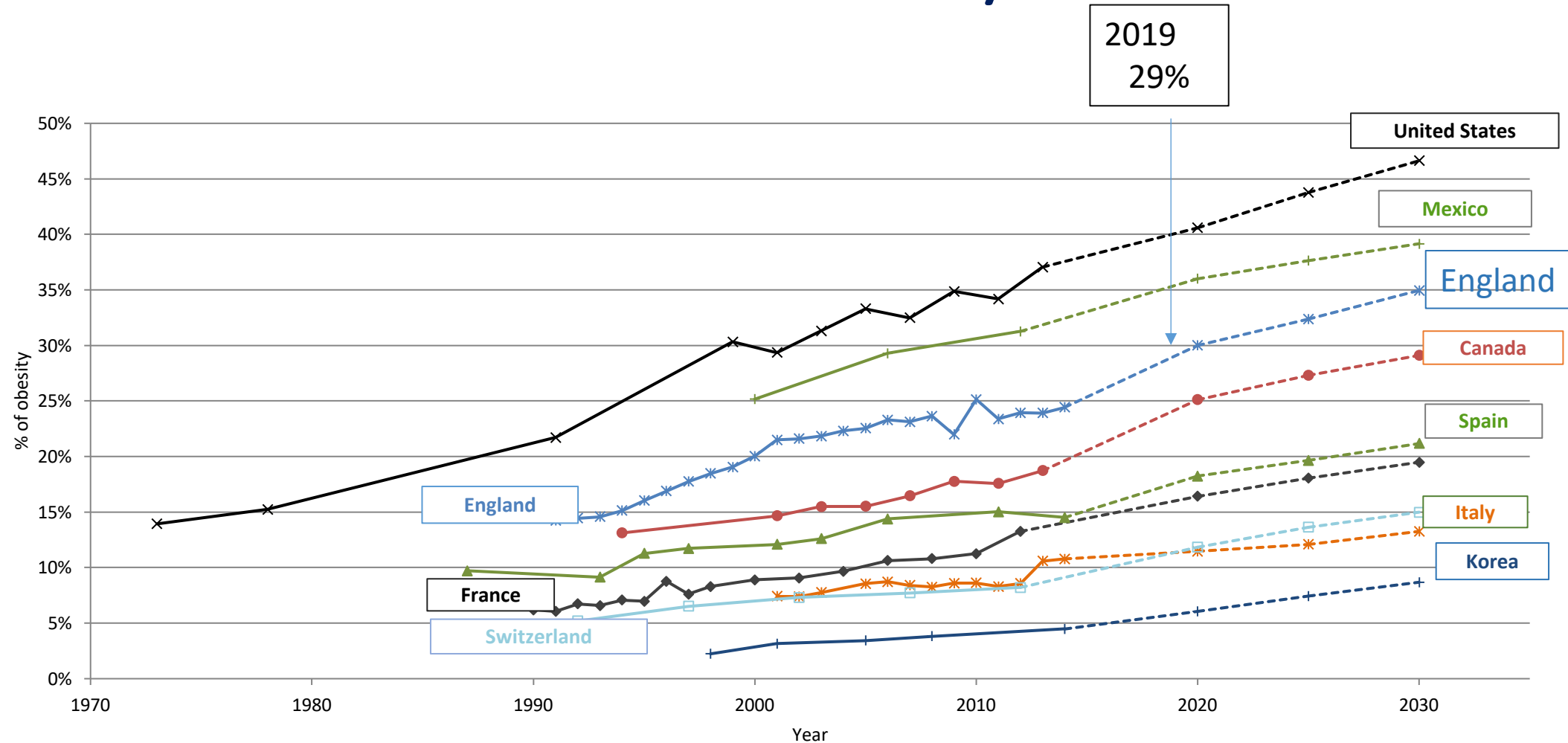


PopulationPyramid.net
WORLD - 2021
Population: 7,909,295,151



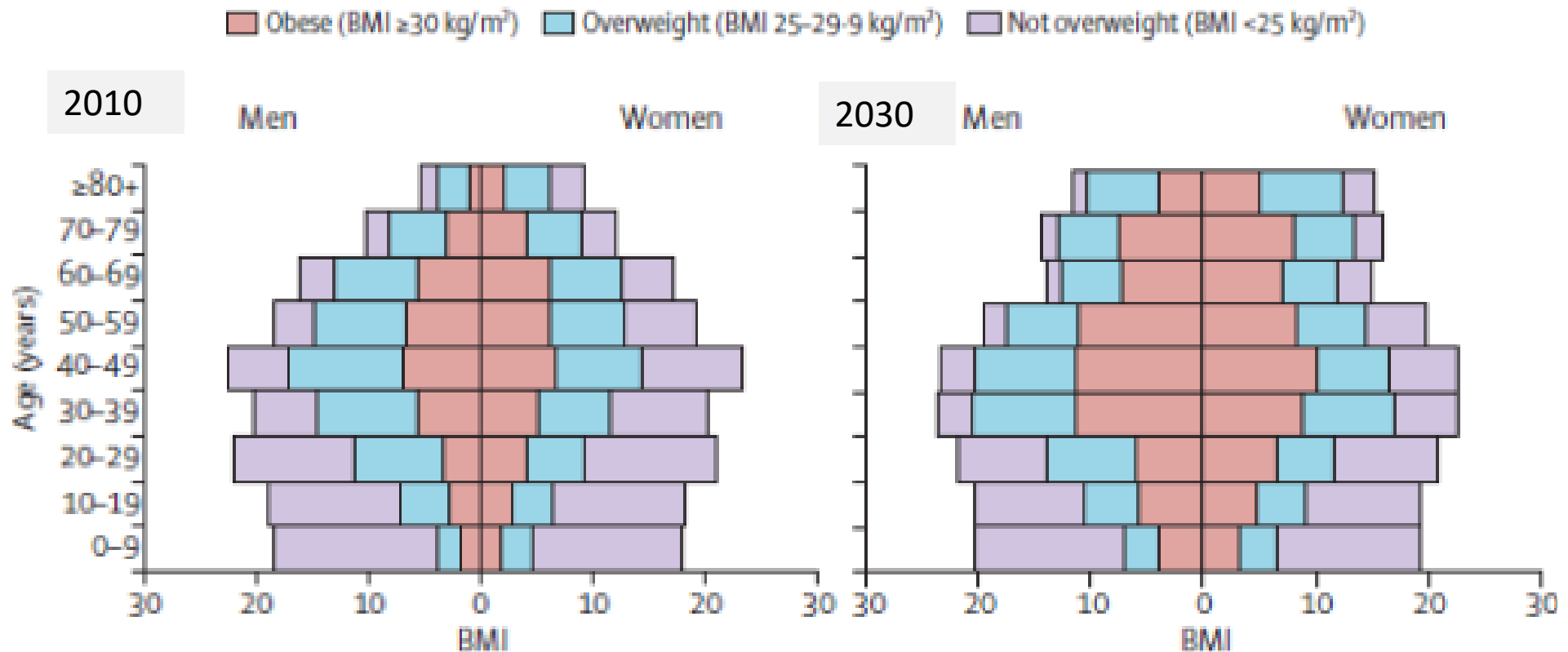
PopulationPyramid.net
WORLD - 2045
Population: 9,467,543,574

International trends in obesity ? Effect of GLP1 RAs

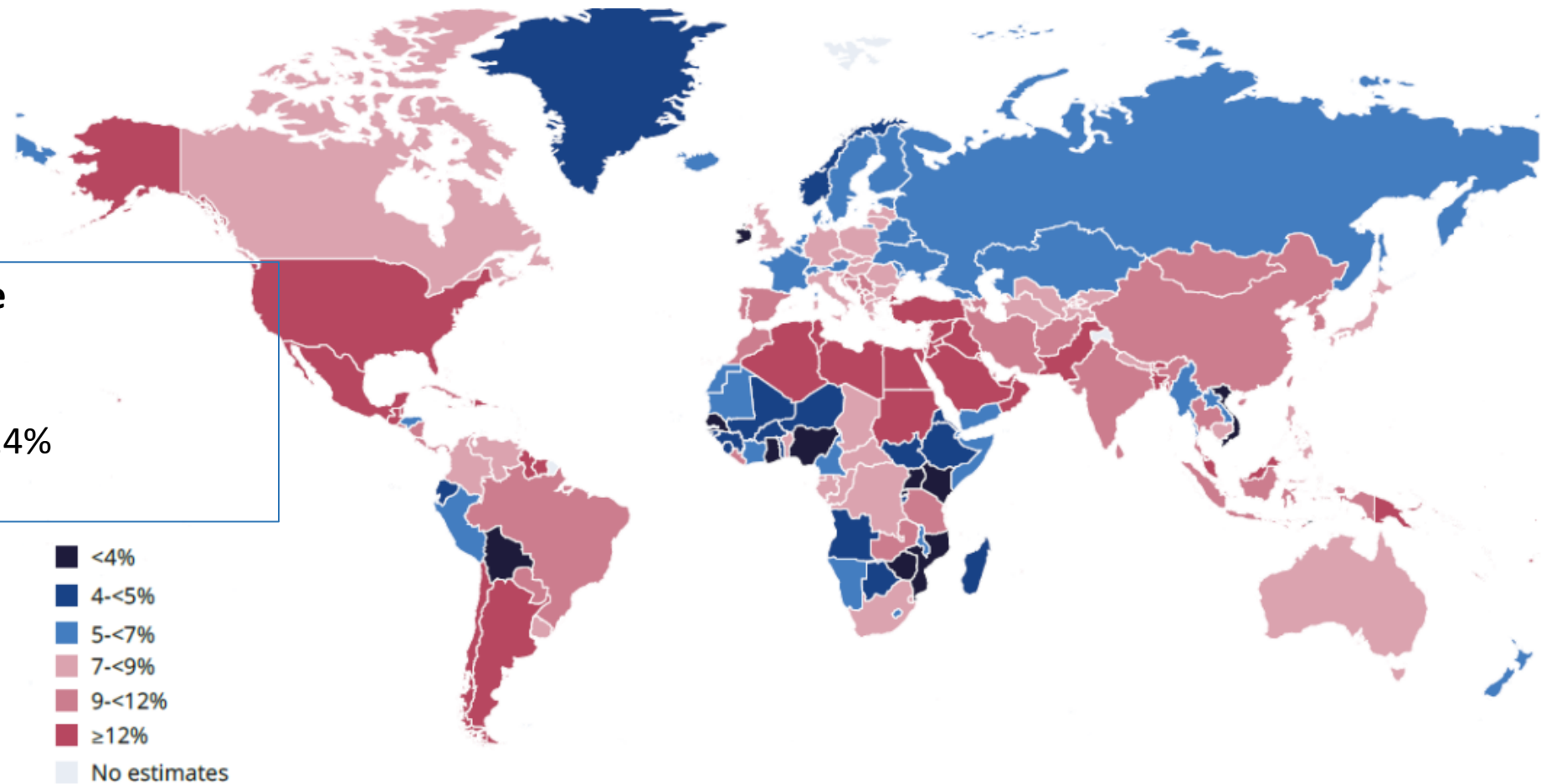


Sources: Figure 5 OECD <https://www.oecd.org/health/obesity-update.htm>
<https://digital.nhs.uk/data-and-information/publications/statistical/statistics-on-obesity-physical-activity-and-diet/statistics-on-obesity-physical-activity-and-diet-england-2019>

The future: UK population pyramids by overweight or obesity status for 2010 and for 2030 assuming BMI trends for 1990-2020 continue



Estimated age-standardised prevalence of **diabetes** (diagnosed and undiagnosed) in adults aged 20–79 years in 2024

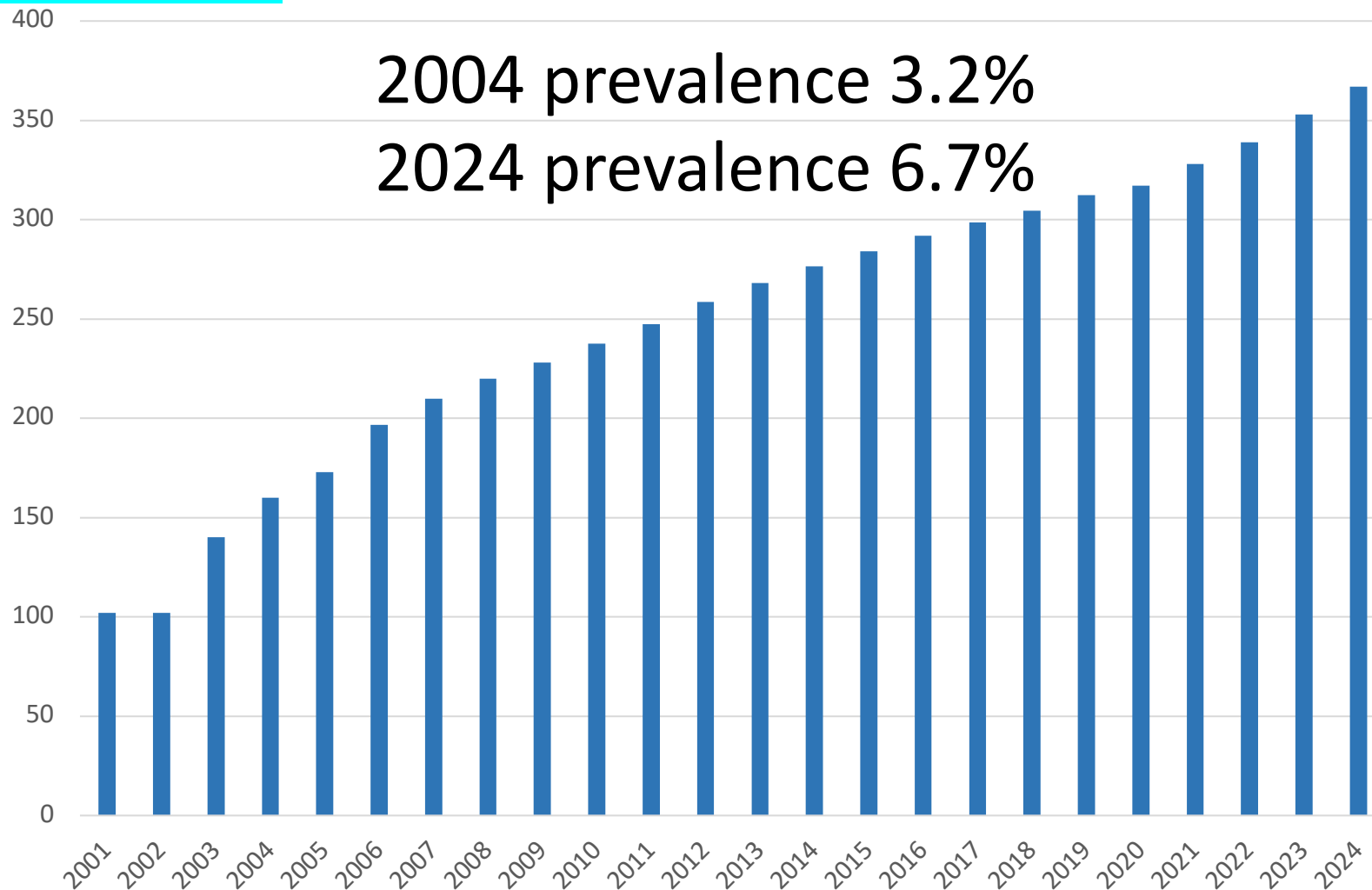


UK adult prevalence

Crude: 9.2%

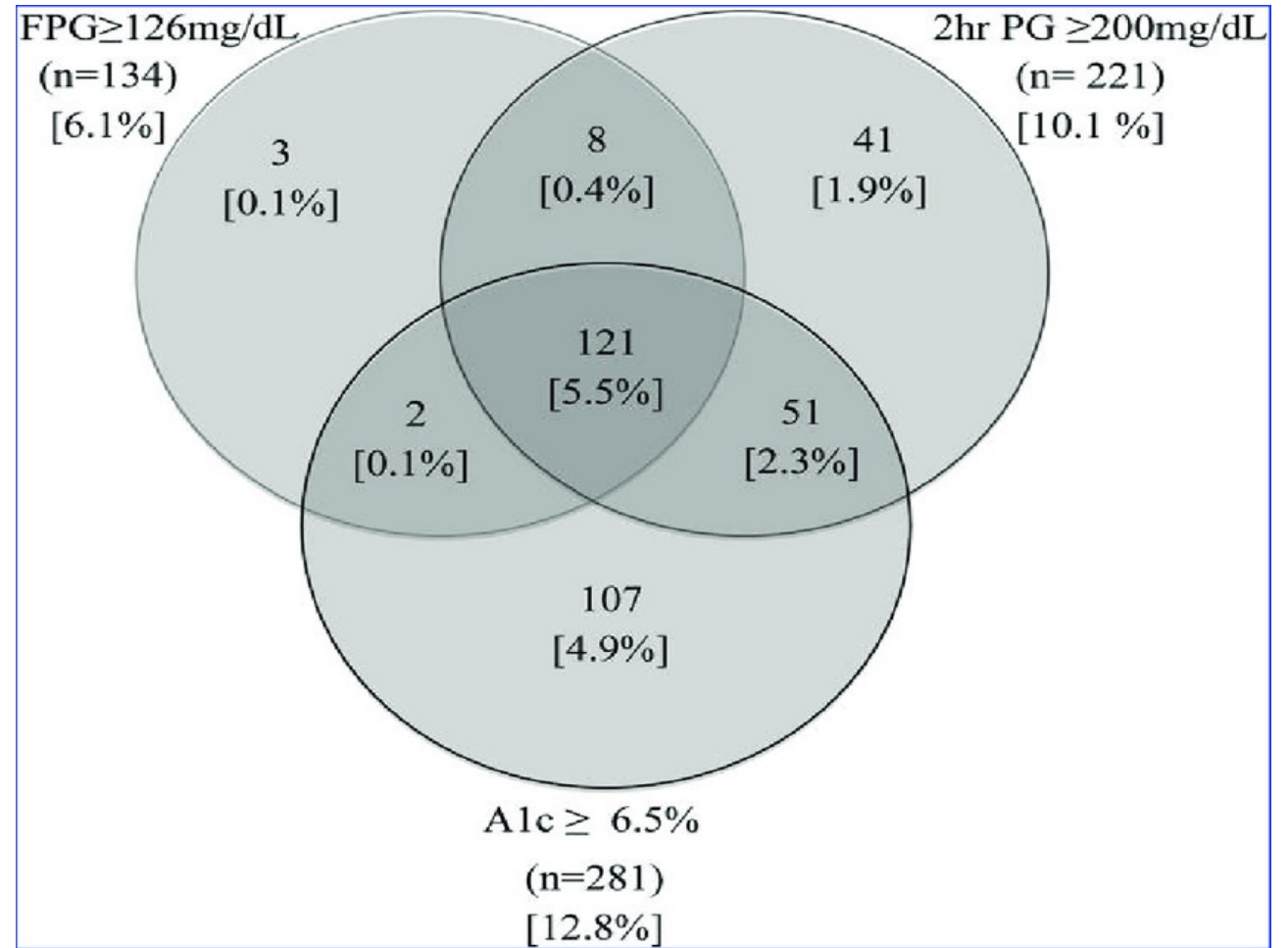
Age standardised: 7.4%

Numbers of people (thousands) with diagnosed diabetes (all ages) in Scotland 2001-2024

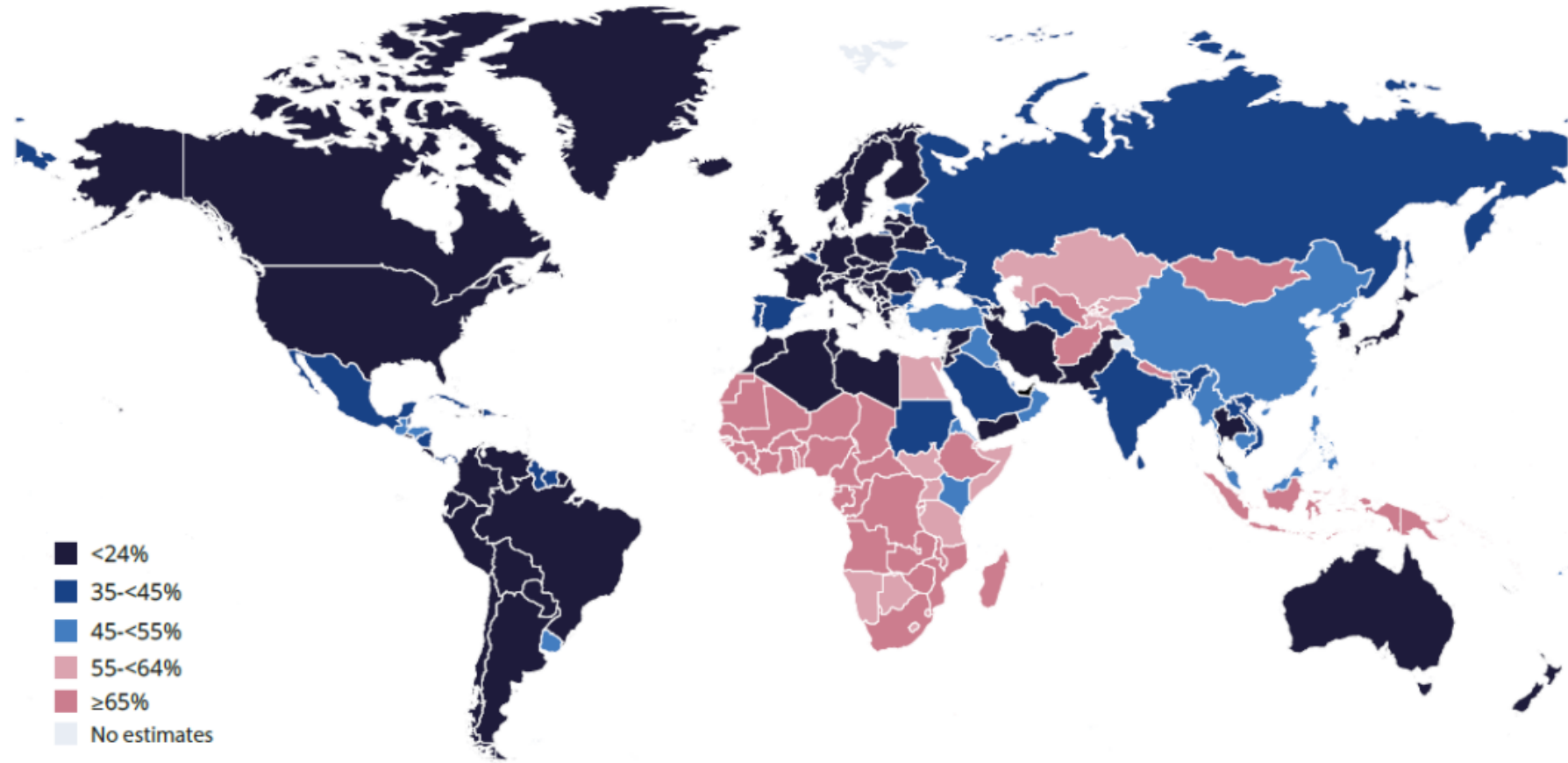


Changing diagnostic criteria for diabetes

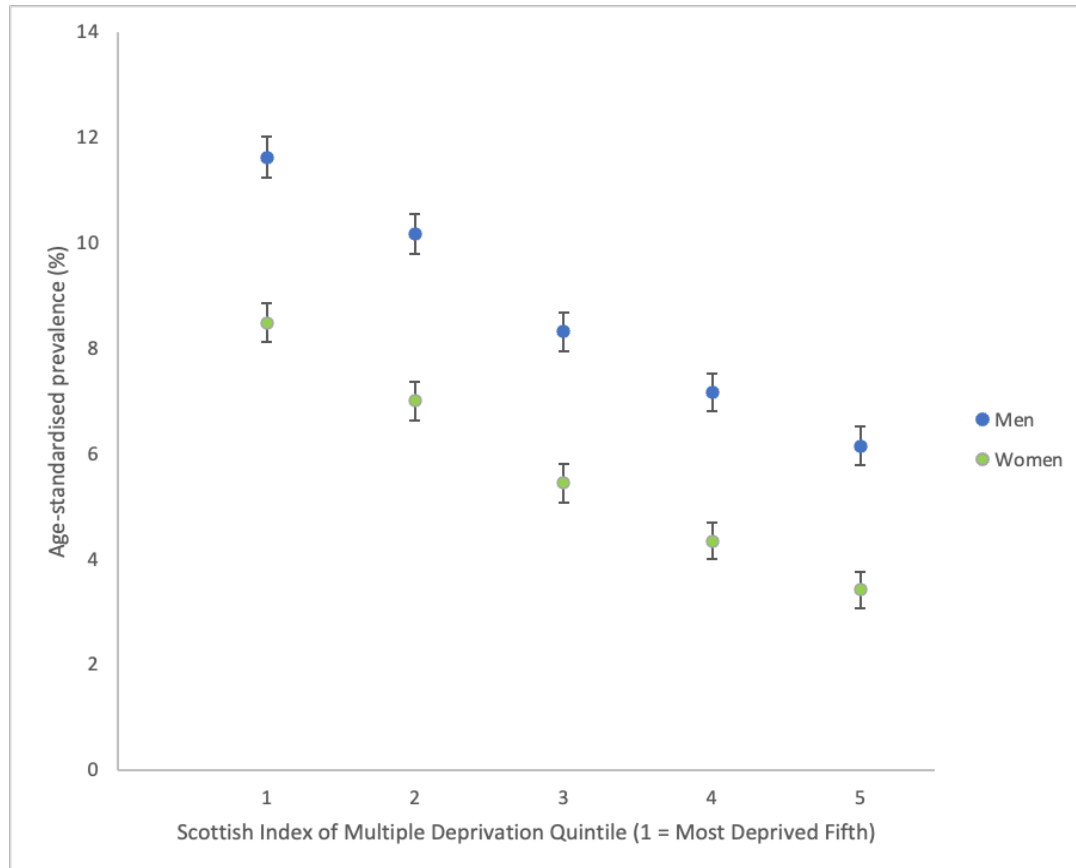
- Clinical records or self-reported diagnosis
- **Fasting plasma glucose** $>7\text{mmol/l}$ ($>7.8\text{mmol/l}$ before 1998)
- **Two hour glucose** $\geq 11.1\text{mmol/l}$ after a 75g oral glucose load
- Since 2011 **HbA1c** $\geq 6.5\%$ (48mmol/mol) – performance against glucose measures varies



? Increasing ascertainment from screening:
Estimated proportion of adults with undiagnosed diabetes
aged 20–79 years by country in 2024



Age-standardised* prevalence of T2DM among 35-84 year olds in Scotland by area based socio-economic status in 2021



RR (95% CI) for most vs least deprived fifth:

1.89 (1.73-2.08) for men

1.58 (1.20 to 2.07) in 2007

2.48 (2.15-2.89) for women

2.00 (1.52 to 2.62) in 2007

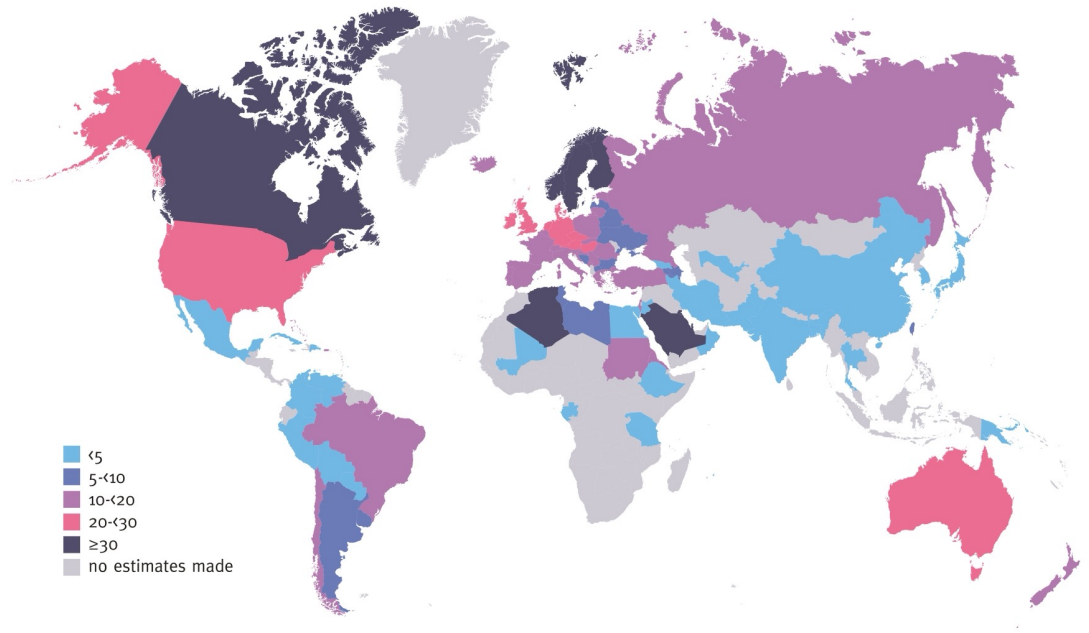
* Using European standard population

Age-sex standardised incidence rates of type 1 diabetes 2021

Per 100,000 population per annum in children and adolescents aged 0–14 years and incidence of adult-onset type 1 diabetes in adults aged 20–40 years

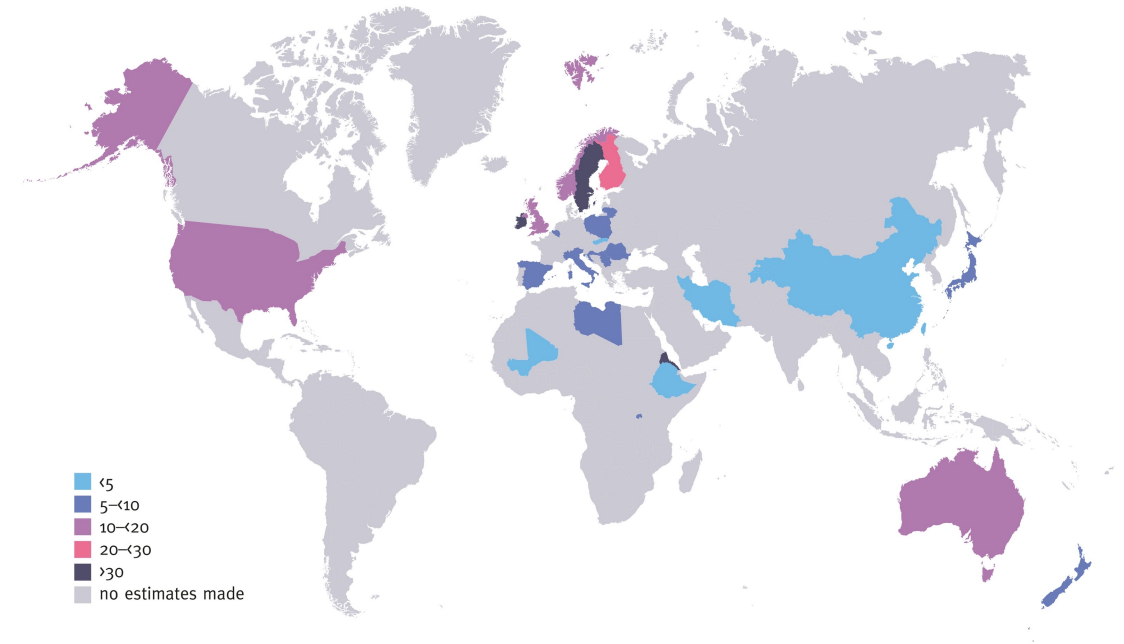
0-14 year olds

Map 3.4 Age-sex standardised incidence rates (per 100,000 population per annum) of type 1 diabetes in children and adolescents aged 0–14 years



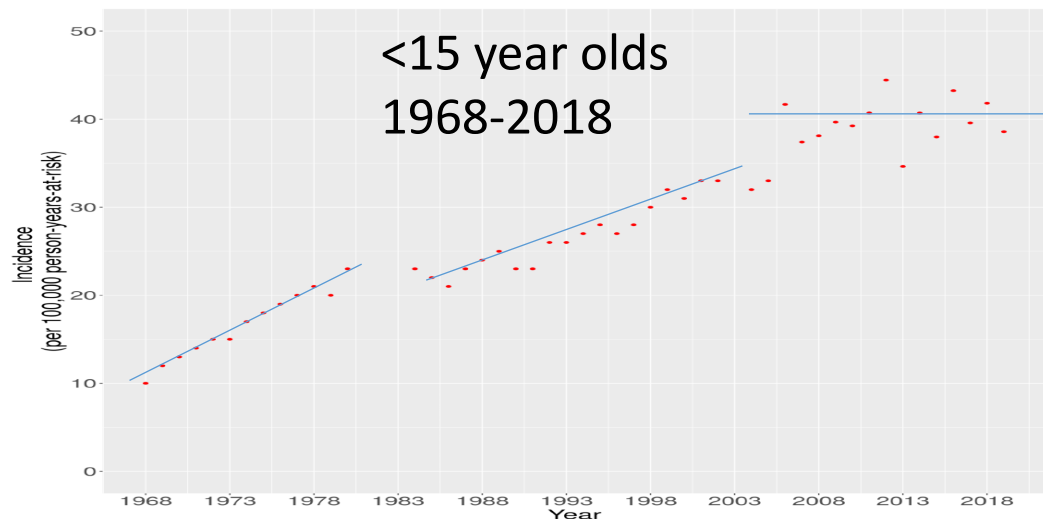
20-40 year olds

Map 3.5 Incidence of adult-onset type 1 diabetes in adults 20–40 years



Annual incidence of type 1 diabetes (per 100,000 per year) among adults aged 20–40 years (men and women) per country/region (estimated from studies between 1973 and 2020)

Scottish trends in type 1 diabetes incidence



Malta: mean annual incidence, 1980-1987,
in 0-19 year olds was 13.3 per 100,000

Sources:

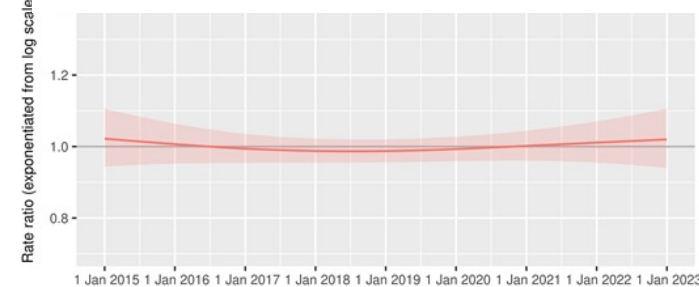
Schranz AG, Prikatsky V. Diabet Med. 1989 Apr;6(3):228-3

Patterson et al doi: 10.1007/BF00282706; Rangasami et al doi: [10.1136/adc.77.3.210](https://doi.org/10.1136/adc.77.3.210)

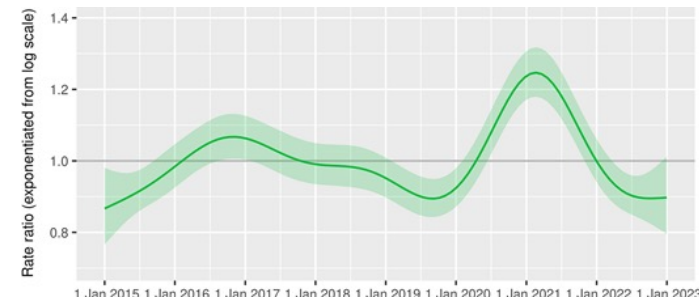
Waugh (personal communication); Thomson et al <http://doi.org/10.1111/dme.15069>

<https://www.gov.scot/publications/best-start-review-caesarean-section-rates-scotland/pages/3/>

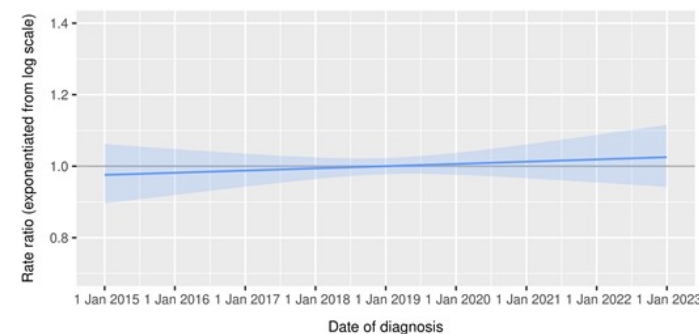
<0-5 year olds 2015-2023



6-9 year olds 2015-2023



15-34 year olds 2015-2023



Source:

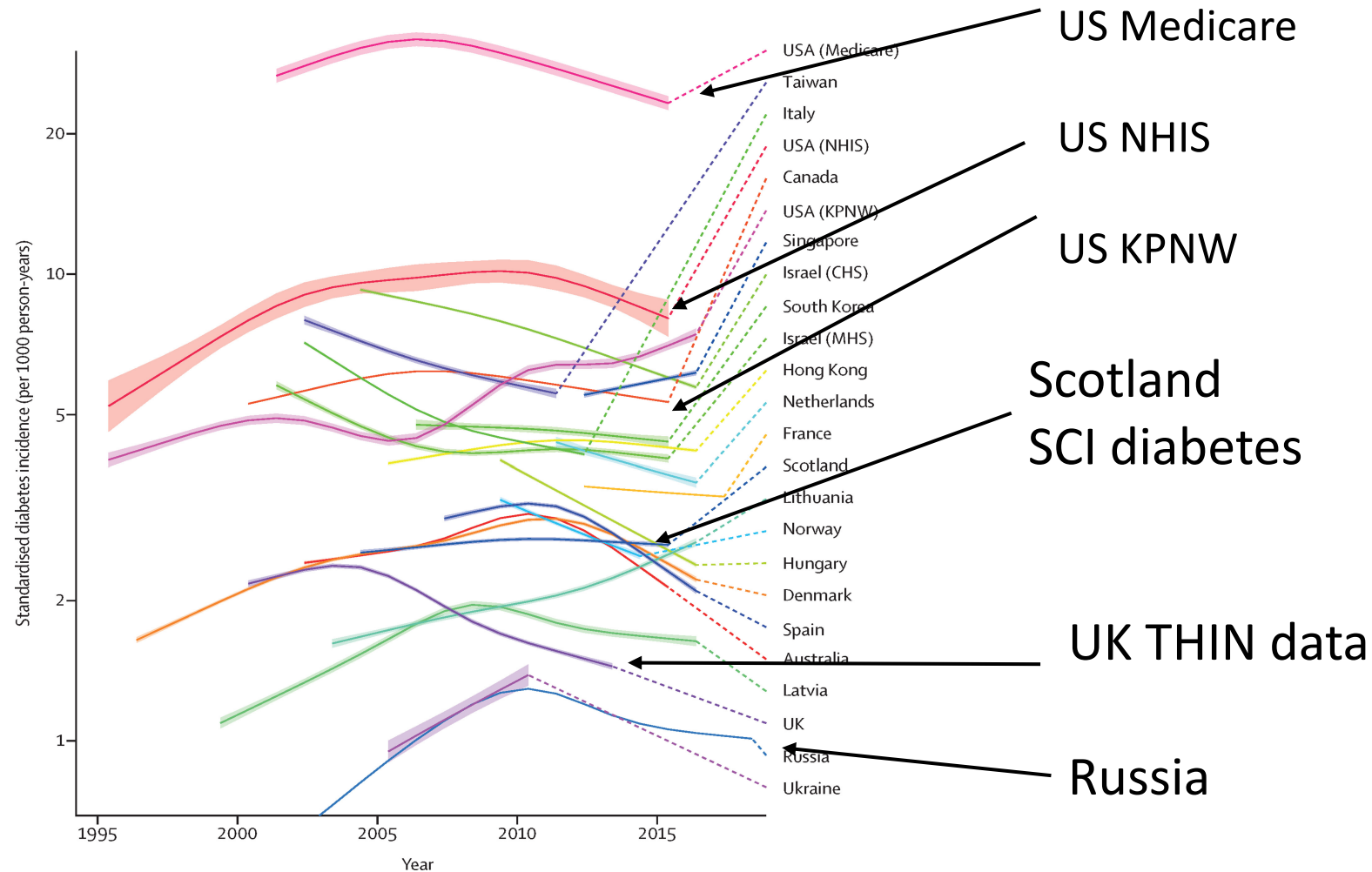
Berthon et al doi: 10.2337/dc23-2068.

Estimates of numbers of people with prevalent **type 1** diabetes (and UK validation)

	Green et al 2017	T1 diabetes index 2022	GBD 2018	NDA for England & Wales 2021	Scottish Diabetes Survey 2021
All ages UK/England/Scotland	376,360 (UK)	403,608 (UK)		227,435	34,928
65+ years of age World	1.4 million	1 million	3.7 million (1094/100,000 for UK)		490/100,000

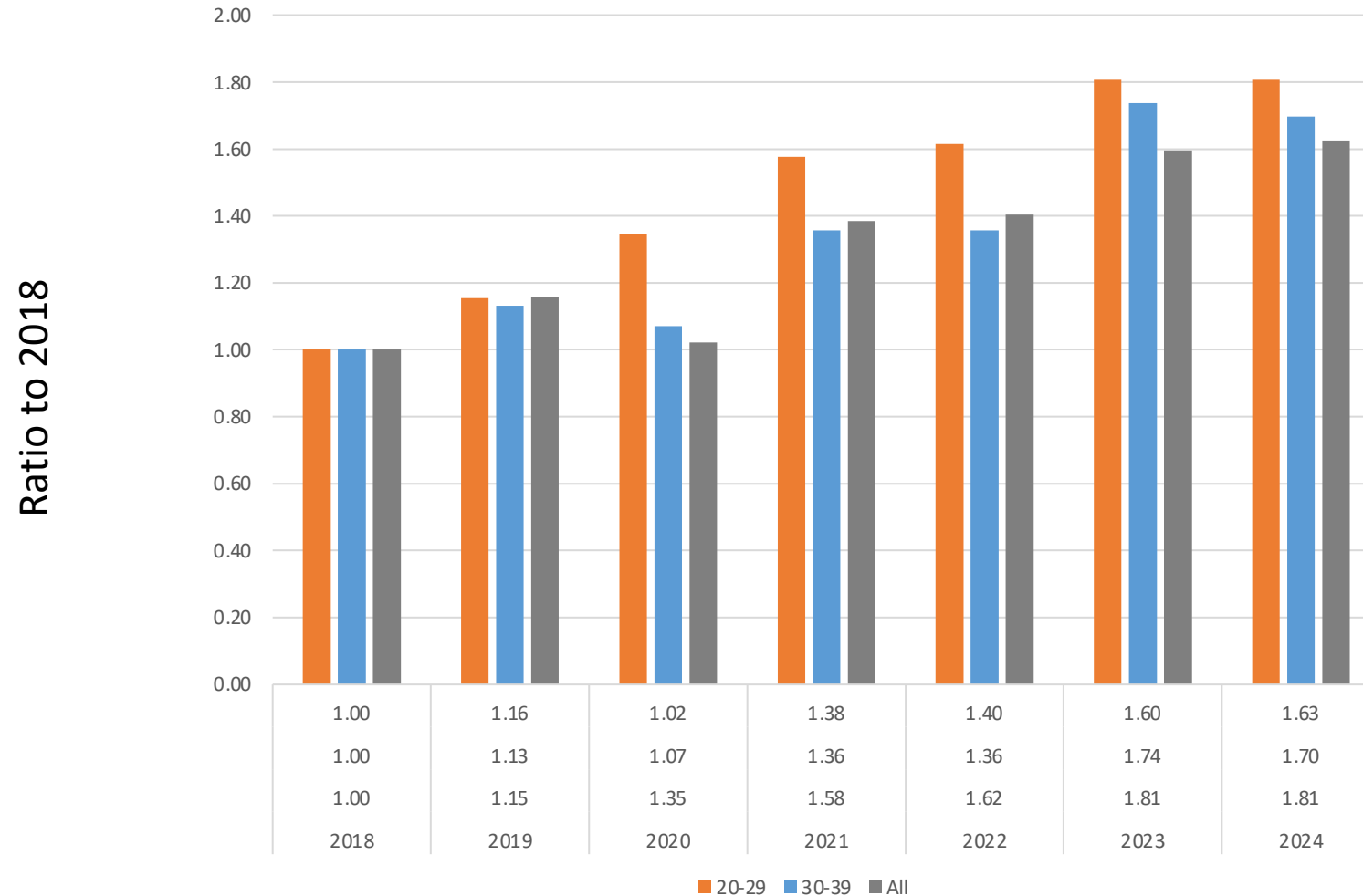
Sources: <https://doi.org/10.1007/s00125-021-05571-8>
<https://www.t1dindex.org/countries/the-united-kingdom/> & <https://www.t1dindex.org/countries/germany/>
<https://digital.nhs.uk/data-and-information/publications/statistical/national-diabetes-audit-type-1-diabetes/nda-type-1-2021-22-detailed-analysis>
<https://www.diabetesinscotland.org.uk/publications/>
<https://www.bmj.com/content/385/bmj-2023-078432>
<https://www.bmj.com/content/385/bmj-2023-078432/rr-1>

Age- and sex-standardised incidence of diabetes for selected countries 1995-2018

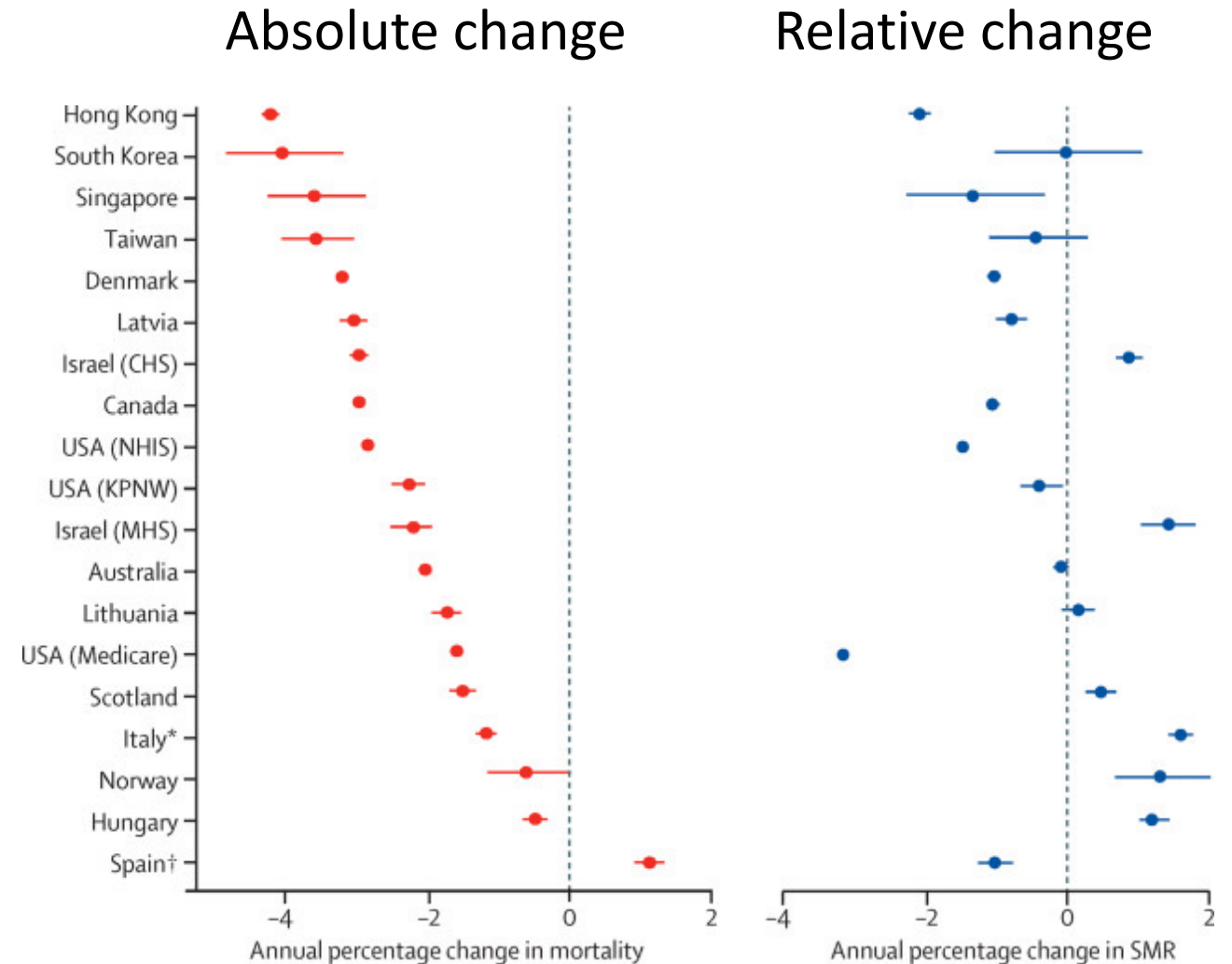
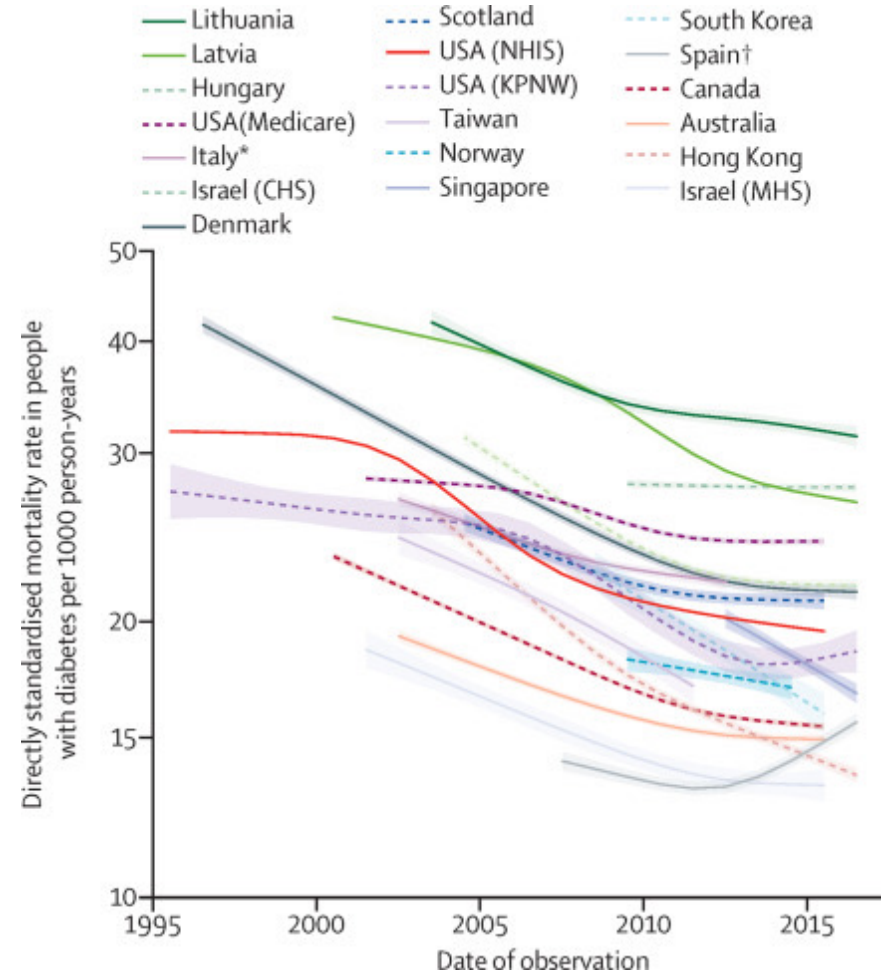


Source: Magliano et al Lancet Diabetes Endocrinol 2021;9(4):203-211

Type 2 diabetes incidence for selected age groups (years) for Scotland 2018-2024: ratio to 2018



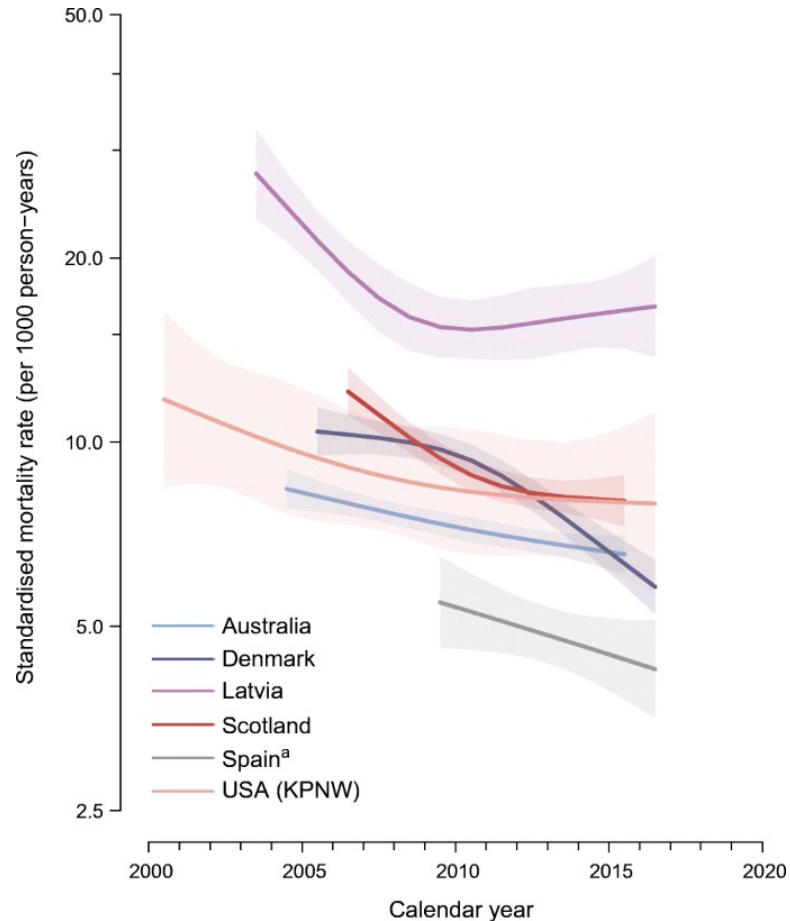
All-cause mortality trends in people with diabetes



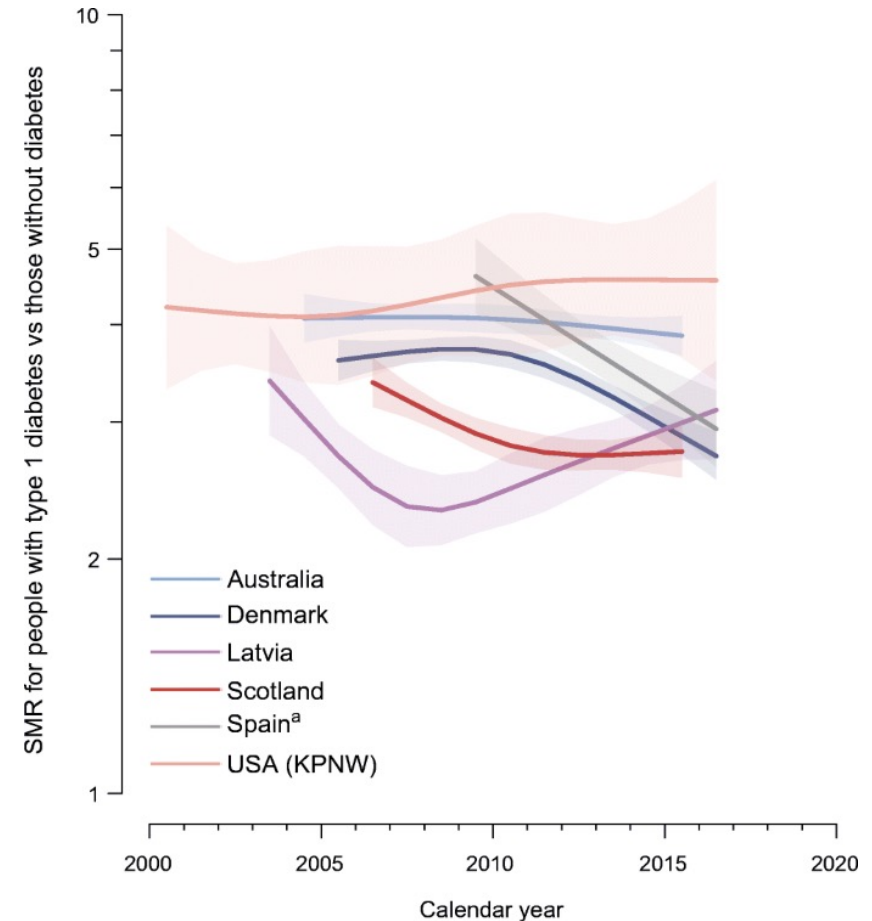
Source: Magliano et al The Lancet Diabetes & Endocrinology, 2022; 10(2): 112-119,

Mortality trends in type 1 diabetes in six countries

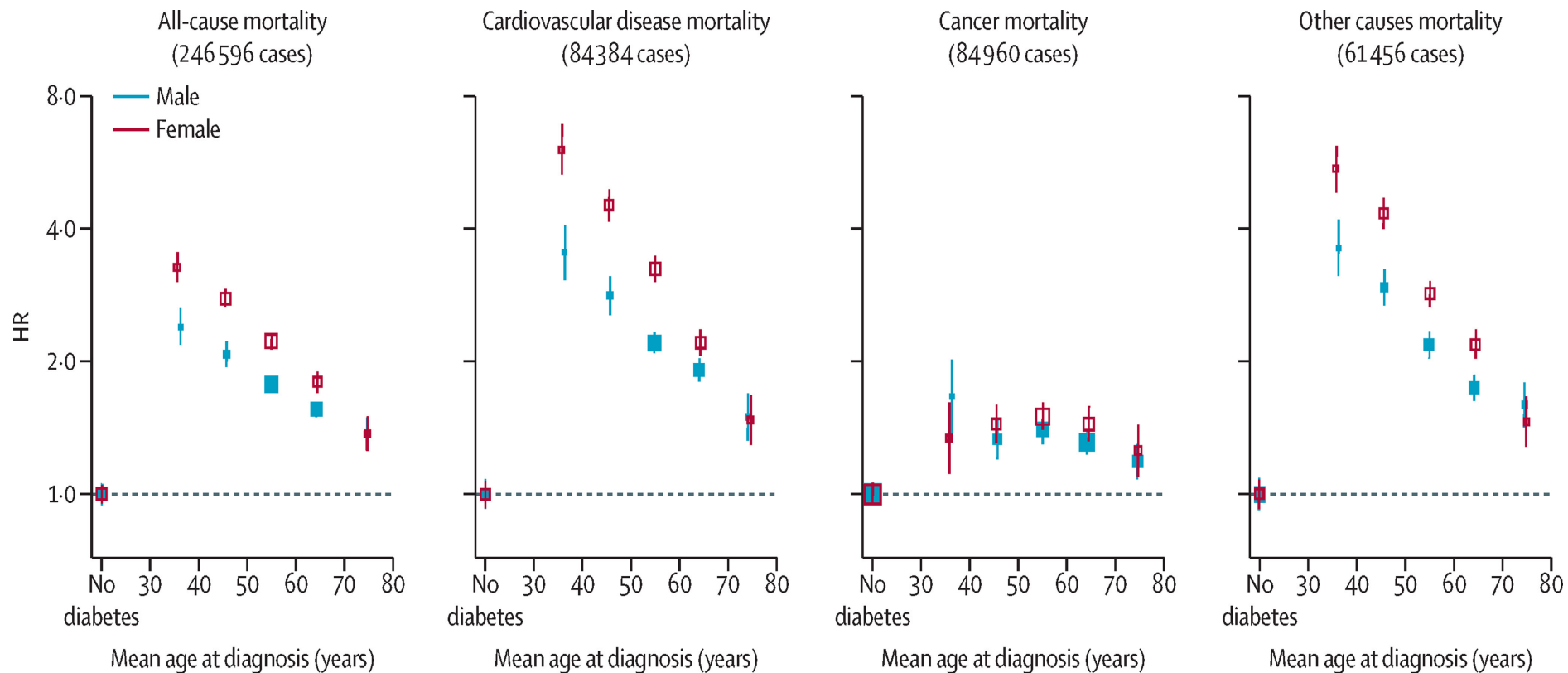
Absolute mortality rates



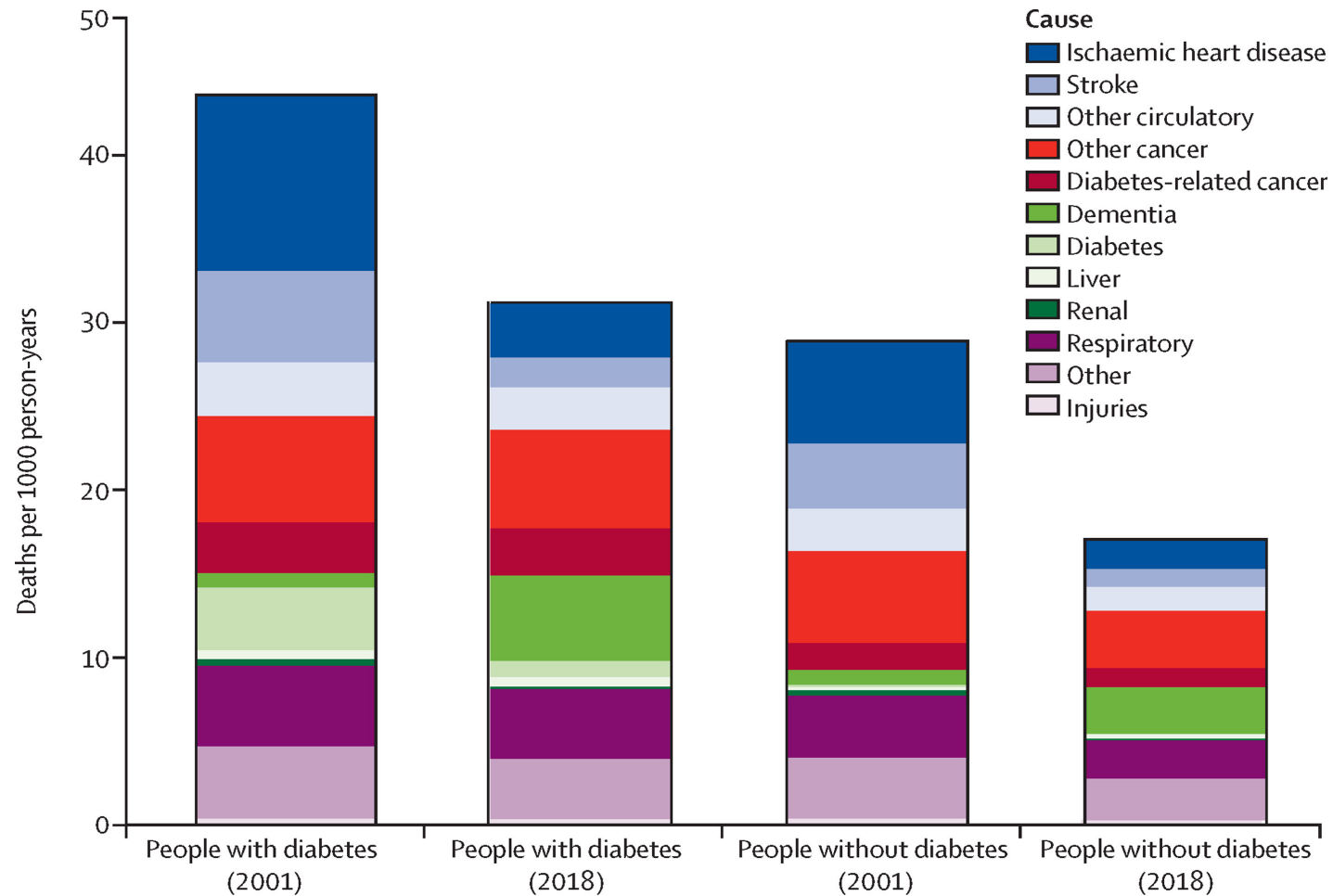
Relative mortality to non-diabetic population



Sex-specific hazard ratios for all-cause and cause-specific mortality by age at diagnosis of type 2 diabetes from cohorts in high-income countries



Changing death rates by cause in people with and without diabetes in 2001 and 2018 in the UK



Source: The Lancet Diabetes & Endocrinology 2021 9165-173 DOI: (10.1016/S2213-8587(20)30431-9)

Balance of new cases of diabetes and deaths Scotland 2014-2024

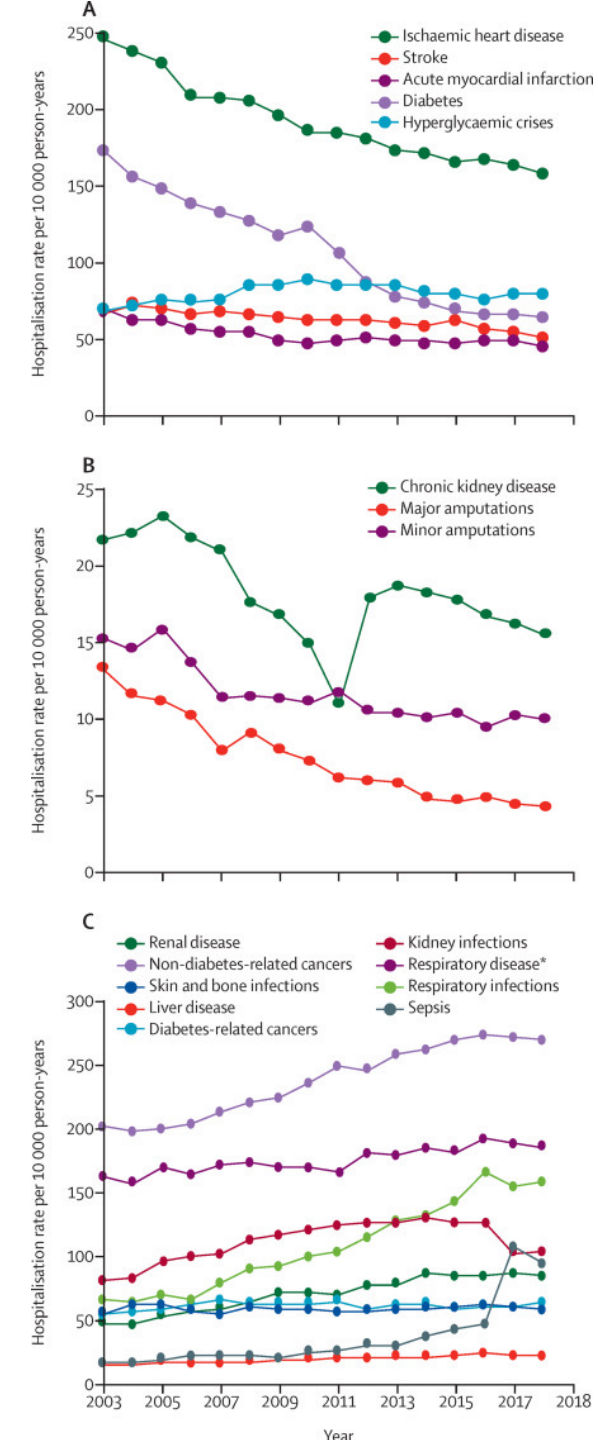
	New type 1	New type 2	Deaths	Surplus
2014	883	16,379	9,925	6,454
2015	898	17,051	10,937	6,114
2016	943	16,973	11,049	5,924
2017	978	16,216	11,823	4,393
2018	993	15,980	11,531	2,339
2019	1024	18,530	11,946	4,746
2020	1068	16,430	13,437	2,993
2021	1213	22,221	13,784	8,437
2022	1082	22,545	13,641	9,986
2023	1034	25,606	13,651	12,989
2024	1030	26,057	14,452	11,605
Total	11,146	188,382	136,176	61,909

Source: Scottish Diabetes Surveys <https://www.diabetesinscotland.org.uk/document-category/survey/>

Complications: trends in leading causes of hospitalisation of adults with **diabetes** in England from 2003 to 2018

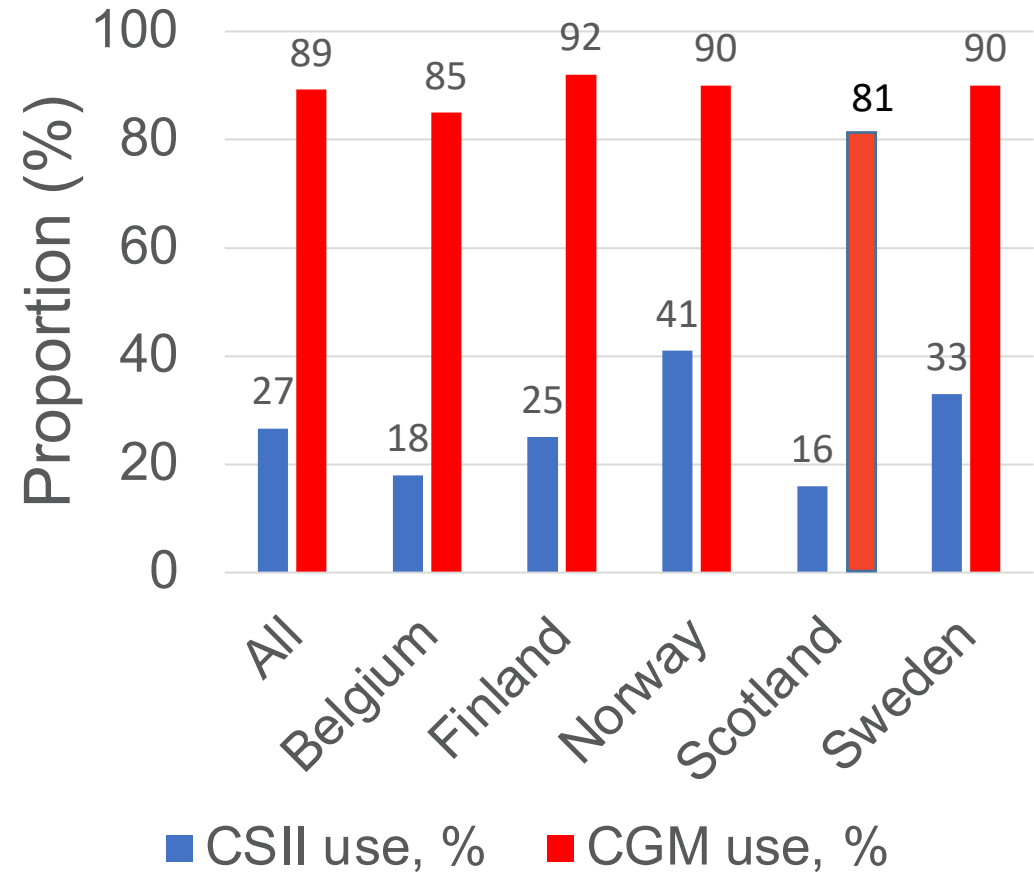
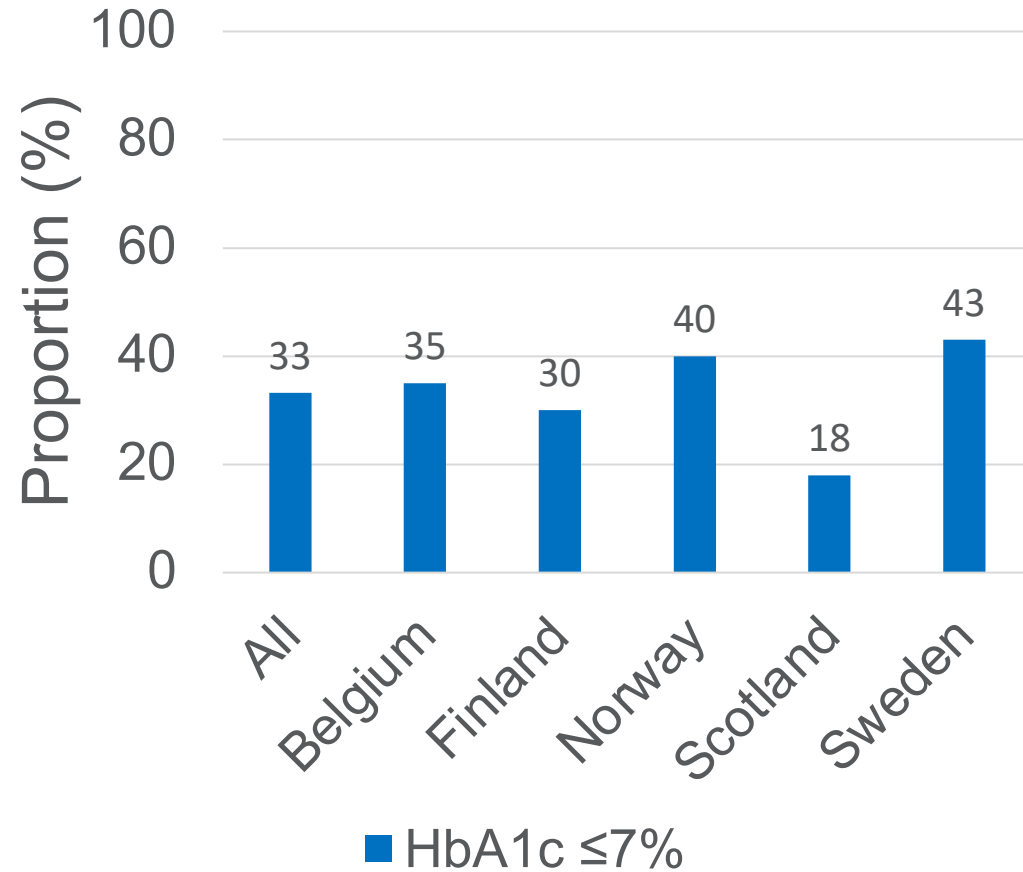
Decreases in:
vascular diseases, amputations, and diabetes

Increases in:
renal and liver disease, cancers, infections,
other respiratory conditions



Scope for improvement?

International comparisons –adults with T1 (2023)



Summary

- Diabetes prevalence continues to increase as a consequence of multiple factors including changes in both incidence and mortality with variation between types of diabetes, population sub-groups and countries
- Increasing incidence of type 2 diabetes in people under 40 years of age is a particular concern, alongside increasing incidence of and mortality from complications such as kidney and liver disease and from cancer following declines in cardiovascular disease mortality
- Wider availability of support for lifestyle change, new technology and drugs is likely to be beneficial in terms of primary and secondary prevention of diabetes, at least in high income countries – more research needed (and review of definition of remission/well-controlled diabetes)

Acknowledgements

- SCI-DC data are available for analysis by members of the Scottish Diabetes Research Network epidemiology group thanks to the hard work of numerous NHS staff who enter the data and people and organisations (the Scottish Care Information – Diabetes Collaboration [SCI-DC] Steering Group, the Scottish Diabetes Group, the Scottish Diabetes Survey Group, the managed clinical network managers and staff in each Health Board) involved in setting up, maintaining and overseeing the SCI-DC system.
- Data linkage work is performed by the Information Services Division of NHS National Services Scotland and was supported by the Scottish Government through the Scottish Diabetes Group.
- The Scottish Diabetes Research Network receives financial support from NHS Research Scotland (NRS).