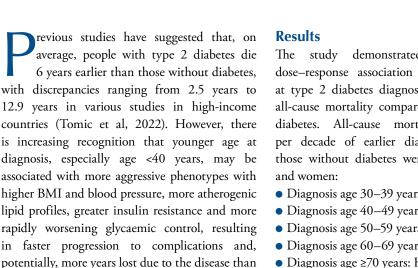# Earlier diabetes, earlier death

A steep linear relationship between age at diagnosis of type 2 diabetes and higher risk of mortality compared to those without diabetes was identified in this observational study using individual patient data from more than 1.5 million participants, across 23.1 million person-years of follow-up. Compared to those without diabetes, the hazard ratio of mortality was 2.69 for people diagnosed with type 2 diabetes at age 30–39 years, 2.26 with diagnosis at 40–49 years and 1.84 at age 50–59 years, reducing to only 1.39 at 70 years and older. Similar hazard ratios were observed for men and women. Using EU death rates, compared to people without diabetes, this translates to 13, 9 and 5 years of life lost with a type 2 diabetes diagnosis at ages 30, 40 and 50 years, respectively, and with slightly more years lost in women than men. For every decade of earlier diagnosis below the age of 50 years, there was an average additional 3–4 life-years lost compared to those without a diabetes diagnosis. As well as the expected increase in cardiovascular causes of death, there was an unexpected, significant increase in non-vascular, non-cancer deaths.

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Previous studies have suggested that, on average, people with type 2 diabetes die 6 years earlier than those without diabetes, with discrepancies ranging from 2.5 years to 12.9 years in various studies in high-income countries (Tomic et al, 2022). However, there is increasing recognition that younger age at diagnosis, especially age <40 years, may be associated with more aggressive phenotypes with higher BMI and blood pressure, more atherogenic lipid profiles, greater insulin resistance and more rapidly worsening glycaemic control, resulting in faster progression to complications and, potentially, more years lost due to the disease than in those with later-onset type 2 diabetes (Misra et al, 2023).

This observational study, published in *Lancet Diabetes & Endocrinology*, used individual patient data from more than 1.5 million people from the Emerging Risk Factors Collaboration (96 cohorts) and from the UK Biobank, with over 23.1 million years of follow-up. The authors calculated age- and sex-adjusted hazard ratios for all-cause mortality according to age at type 2 diabetes diagnosis. Excess years of life lost compared to diagnosis at age 50 years were calculated for those aged 30–39 and 40–49 years at diagnosis.

Results

The study demonstrated a steep, linear dose–response association between earlier age at type 2 diabetes diagnosis and higher risk of all-cause mortality compared to people without diabetes. All-cause mortality hazard ratios per decade of earlier diagnosis compared to those without diabetes were the same for men and women:

- Diagnosis age 30–39 years: HR 2.69.
- Diagnosis age 40–49 years: HR 2.26.
- Diagnosis age 50–59 years: HR 1.84.
- Diagnosis age 60–69 years: HR 1.57.
- Diagnosis age ≥70 years: HR 1.39.

Older adults have higher mortality rates; therefore, the impact of type 2 diabetes is less. The number of years lost was slightly higher in women than in men. Using US death rates, compared with a person of the same age without diabetes, on average, a 50-year-old diagnosed with type 2 diabetes at age 30 died 14 years earlier, one diagnosed at age 40 died 10 years earlier and one diagnosed at age 50 died 6 years earlier. Using EU mortality data, deaths were on average 13, 9 and 5 years earlier with a type 2 diabetes diagnosis at age 30, 40 and 50 years, respectively. In this study, every decade of earlier diagnosis

below 50 years was associated with roughly 3–4 years' lower life expectancy.

Surprisingly, the commonest causes of excess deaths were not only vascular (myocardial infarction and stroke) but also other non-cancer conditions which we would not usually associate with diabetes (including respiratory, neurological conditions and infections).

Discussion

Strengths of this study were the use of more than 23 million person-years of follow-up from population cohorts in 19 different high-income countries, the use of individual patient data and the clarity around age at diagnosis.

In another review, Misra et al (2023) suggest that tight glycaemic control and broader focus on prompt management of comorbid conditions in people with type 2 diabetes, alongside our current focus on preventing and managing cardiorenal conditions, may help reduce these years lost. In an associated commentary, Duncan and Schmidt (2023) highlight three important questions in relation to young-onset type 2 diabetes: what is the role of the intergenerational impact of gestational and other forms of diabetes in pregnancy; what is the role of ultra-processed food; and will these findings translate to those living in low- and middle-income countries? It is estimated that more than 90% of the increase in new cases of type 2 diabetes globally will come from low- and middle-income countries by 2045 (International Diabetes Federation, 2021).

The *T2Day: Type 2 Diabetes in the Young* programme was launched in England in August 2023 and will offer tailored, one-to-one health checks and extra support with optimising management and accessing the eight care processes for the estimated 140 000 people aged 18–39 years who have type 2 diabetes. The programme will include dedicated support for women to reduce the risks of type 2 diabetes during pregnancy.

Practice points

- Prevention of type 2 diabetes remains a priority to reduce excess mortality.
- Consider age at diagnosis when reviewing people with type 2 diabetes.
- Diagnosis at age <40 years is associated with increased cardiovascular mortality, so optimise risk factor control.
- Increased mortality can stem from causes other than conventional diabetes complications – maintain tight glycaemic control and manage comorbid conditions promptly. ■

Duncan BB, Schmidt MI (2023) Many years of life lost to young-onset type 2 diabetes. *Lancet Diabetes Endocrinol* 11 Sep [Epub ahead of print]. https://doi.org/10.1016/S2213-8587(23)00255-3

International Diabetes Federation (2021) *IDF Diabetes Atlas* (10th edition). https://diabetesatlas.org/atlas/tenth-edition/

Misra S, Ke C, Srinivasan S et al (2023) Current insights and emerging trends in early-onset type 2 diabetes. *Lancet Diabetes Endocrinol* 11 Sep [Epub ahead of print]. https://doi.org/10.1016/S2213-8587(23)00225-5

Tomic D, Morton JI, Chen L et al (2022) Lifetime risk, life expectancy, and years of life lost to type 2 diabetes in 23 high-income jurisdictions: A multinational, population-based study. *Lancet Diabetes Endocrinol* **10**: 795–803

Life expectancy associated with different ages at diagnosis of type 2 diabetes in high-income countries: 23 million person-years of observation

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Further reading
Current insights and emerging trends in early-onset type 2 diabetes

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