

Growing global temperatures could be contributing to rising diabetic numbers

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Rising temperatures across the world may be playing a part in the growing numbers of people developing diabetes, suggests research published online in the journal *BMJ Open Diabetes Research & Care*.

Worldwide, the prevalence of type 2 [diabetes](#) is increasing rapidly. In 2015, 415 million adults globally had the condition and it is expected that prevalence will rise by almost 55% - up to 642 million cases by 2040.

In the human body, the function of brown adipose tissue (BAT) is to transfer energy from food into heat and previous studies have shown that exposure to cold stimulates BAT, thus leading to modest weight loss and improved insulin action and sensitivity - making a person less likely to develop diabetes.

A team of Dutch researchers from the Leiden University Medical Center led by Professor Patrick Rensen, set out to investigate if global increases in [temperature](#) were contributing to the current type 2 diabetes growth by negatively impacting on glucose metabolism via a reduction in BAT activity.

The intention was to assess the association of outdoor temperature with diabetes incidence and prevalence of [glucose intolerance](#), on a countrywide and global scale.

The researchers used data on diabetes incidence amongst adults in 50

states of the USA and three territories (Guam, Puerto Rico and Virgin Islands) for the years 1996 to 2009 from the National Diabetes Surveillance System of the Centers for Disease Control and Prevention (CDC).

Data was also analysed from the World Health Organization's Global Health Observatory online data repository system on country-wise prevalence rates of raised fasting blood glucose and obesity in 190 countries.

In addition, country-wise average annual temperature data was obtained via the Climatic Research Unit at the University of East Anglia in the UK.

The researchers found that on average, per 1°C increase in temperature, age-adjusted diabetes incidence increased by 0.314 per 1,000.

Similarly, the worldwide prevalence of glucose intolerance increased by 0.17% per 1°C rise in temperature. These associations were the same after obesity was taken into account.

Such findings indicated that the diabetes incidence rate in the USA and prevalence of glucose intolerance worldwide did increase with higher outdoor temperature.

Using their findings, the authors calculated that a 1°C rise in environmental temperature could account for more than 100,000 new diabetes cases per year in the USA alone, given a population of nearly 322 million people in 2015.

This was an observational study, so no firm conclusions can be drawn about cause and effect, but the authors analysed longitudinal state-level data for each state separately before pooling the results.

They also found that once they had taken into account important intercountry differences, such as age, sex, income and obesity, this did not materially change the results on the global level.

The study was unable to evaluate the directness of an association between body mass index (BMI) and diabetes incidence or prevalence in its models because continuous data on BMI were not available.

The authors acknowledged that once they adjusted the results to take into account obesity prevalence - which only slightly reduced the association between [outdoor temperature](#) and diabetes - other studies could evaluate further any impact that BMI might have on their findings.

The authors conclude: "These findings emphasise the importance of future research into the effects of environmental temperature on [glucose metabolism](#) and the onset of diabetes, especially in view of the global rise in temperatures with a new record set for the warmest winter in the USA last year."

More information: Diabetes incidence and glucose intolerance prevalence increase with higher outdoor temperature, *BMJ Open Diabetes Research & Care*, drc.bmj.com/lookup/doi/10.1136/bmjdr-2016-000317

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