Is diabetes prevalence increasing?

In this section, a panel of multidisciplinary team members give their opinions on a recently published diabetes paper. In this issue, the focus is on a Canadian study, in which the authors assess the prevalence of diabetes in Canada.

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Beware of observational data and remember the old adage 'observation is not causation'. What might be the confounding factors that challenge the assumption that diabetes is increasing?

The answer is, firstly, increased testing – simply detecting undiagnosed cases in the community – and, secondly, a shift in the boundary point that defines diabetes. In 1998 diabetes was reclassified (Wareham and O'Rahilly, 1998). This saw the introduction of a lower fasting blood glucose level for diagnosis of diabetes from 7.8 mmol/l to 7.0 mmol/l. They also recommended that testing for diabetes should be extended for everyone aged 45 years or older – this in particular may well account for the especially large increase seen in the younger age group in this study. Another issue to consider is whether or not the healthcare system in Canada had financial incentives in detecting cases of diabetes – I suspect they did. None of this was adequately explored in the discussion section.

This all said, the paper states the obvious – as we become more obese we will see more type 2 diabetes. Obesity is the single greatest public health threat of our generation, but is the solution in the gift of doctors? I strongly suspect not.

Wareham NJ, O'Rahilly S (1998) The changing classification and diagnosis of diabetes. *BMJ* **317**: 359–60

'Obesity is the single greatest public health threat of our generation but is the solution in the gift of doctors?'

Christopher Byrne, Professor, Endocrinology & Metabolism, Southampton General Hospital

Over a 6-year period, the investigators have described a year-on-year increase in diabetes incidence of 31%. Interestingly, despite an age-adjusted and sex-increase in prevalence of 69% over 10 years, there was a decrease in the adjusted mortality rate for people with diabetes over the same period. Should we believe the astonishing results of this study? If not, what could have accounted for this result?

The increase was most marked in the younger age group and it is acknowledged that the ethnic mix in Ontario has changed over the 10-year period. If there was an influx of people from Southeast Asia, this could have accounted for an increase in diabetes but admittedly not such a marked increase. Alternatively, had there been a change in levels of deprivation in this region and how much of the phenomenon could be explained by ascertainment bias, screening and changes in diagnostic criteria? Despite all of these caveats, the findings are striking and are likely to be due in part to the obesity epidemic. The only reassuring finding is that there was a 25% decrease in the standardised mortality ratio for diabetes and this finding raises even more questions. Did this occur because of better treatment for diabetes, or has there been a secular trend toward improvements in other cardiovascular risk factors?

Clearly, this paper has raised more questions and has highlighted the seriousness of this global public health problem.

Trends in diabetes prevalence, incidence, and mortality in Ontario, Canada 1995–2005: a population based study

Lipscombe LL, Hux JE (2007) *Lancet* **369**: 750–6

Diabetes prevalence is increasing ahead of WHO predictions

1 The WHO predicted a 39% rise in global diabetes prevalence between 2000 and 2030, described by some as an underestimate.

2 This study of diabetes trends in Ontario, Canada, was carried out in order to assess whether or not prevalence was increasing ahead of these predictions and to examine the contribution of incidence and mortality rates to this.

3 The authors used population-based data to look at trends in diabetes prevalence and mortality from 1995 to 2005 and incidence from 1997 to 2003 in adults aged 20 years or older.

4 Data for the study were obtained from administrative healthcare databases, which include records for all those eligible for the Ontario health plan that is available for all residents of Ontario; hence, these datasets represent almost the entire population of the province.

5 To examine diabetes prevalence, the authors calculated the number

of people recorded on the Ontario Diabetes Database on a yearly basis from fiscal years (1 April, 1994–31 March, 2005).

6 Incidence was identified by a new record of diabetes with no record of diabetes in the previous 5 years; hence, incidence pre-1997 could not be calculated owing to incomplete data.

7 The results of the study indicate a significant 81.6% increase (from 4.9%–8.9%; $P<0.0001$) in the crude prevalence of diabetes during the study period.

8 The authors found that the number of people with diabetes increased by 113% from 388 433 to 827 419, despite the population only growing by 17%.

9 The greatest rise in diabetes was seen in young women, who showed a 108.2% increase. This was significantly higher than the increase observed in young men: 81.4% ($P<0.0001$).

10 The increase in diabetes prevalence was similar in both men and women over 50 years old (62% and 63%, respectively).

11 There was approximately a 25% reduction in age- and sex-related mortality during the study period ($P<0.0001$).

12 The results show that there was a steady increase in prevalence of diabetes from 1995 to 2005 that gave an average of a 6.2% increase per year. There had been an 8.8% increase in diabetes prevalence in Ontario over the time period, which represents a 69% increase since 1995.

13 This rise has exceeded both the predicted 60% global increase and the 65% Canadian increase expected to occur by 2030. If current trends continue in this linear fashion then over 10% of the adult population of Ontario will have diabetes by 2010.

Simon Griffin
Programme Leader, Medical Research Council, Cambridge

The Ontario health plan is available to all 12 million residents of the province. Consequently the administrative databases, based on hospital discharge summaries and physicians' service claims, reflect the number of people being treated for diabetes reasonably well. This source was used to report the changes in diabetes prevalence, incidence and mortality from 1995 to 2005. Prevalence of known diabetes increased by 69% (after adjusting for age and gender), which was higher than the previous WHO projections, the rise being particularly marked among young and middle-aged women (108%). Incidence rose by 31% from 1997 to 2003, but the more positive news was the 25% reduction in mortality, which may be partly attributable to improvements in care.

Reliance on routine datasets does have limitations. Types 1 and 2 diabetes were not distinguished and only diagnosed diabetes was considered. While it is likely that the rising prevalence of obesity is associated with an increase in diabetes incidence, there are very few true population-based incidence studies that include repeated measures of glucose tolerance. The observed rising prevalence may be explained, at least in part, by the reduction in the diagnostic threshold in 1998, better recording, earlier diagnosis and hence an increase in the ratio of diagnosed to undiagnosed cases (which will also contribute to the apparent reduction in mortality). Immigration of susceptible individuals from Southeast Asia may also contribute. Nevertheless, the authors' sobering conclusion that 10% of adults in Ontario will be diagnosed with diabetes by 2010 is likely to be correct, or perhaps overly conservative.

'... it is likely that the rising prevalence of obesity is associated with an increase in diabetes incidence...'

'The only reassuring finding is that there was a 25% decrease in the standardised mortality ratio for diabetes'

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