Management of type 1 diabetes

Increase in type 1 diabetes in children might be attributable to environmental influences

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The incidence of type 1 diabetes is continuing to rise; in Finland, the number of new cases of diabetes per year is accelerating and is predicted to double in the next 15 years. These figures are also likely to correspond with the incidence of type 1 diabetes in the rest of the world. Finland has one of the highest rates of type 1 diabetes worldwide; however, the country is also more efficient at collecting vital data on the incidence and treatment of the condition, using a national recording system.

Research by Harjutsalo and colleagues (summarised alongside), supports the opinion that this reported increase in type 1 diabetes might be partly attributed to the rising incidence of type 2 diabetes in childhood; despite the authors' efforts to exclude these individuals, they found that because of the existing mindset that any diabetes occurring during childhood is type 1 diabetes, exclusion errors could have occurred in their study. It is difficult to distinguish between the two types of diabetes, even when it is acknowledged that insulin resistance has an integral part in the disease process. In addition, ketoacidosis is not exclusively attributed to type 1 diabetes, and positive autoantibodies are also observed in patients with type 2 diabetes.

In some ways, this study is hindered by its attempt to make this distinction between the two types of diabetes in childhood. There are differences in the treatments of each type of diabetes, but there are also distinct similarities. Great efforts have been made by the authors to subdivide the population into groups that are becoming increasingly difficult to define. The paper would have perhaps been even more interesting if the total numbers of cases had been quoted, even though the number of excluded patients appears to be relatively low (300 of a total 11 000 participants). The data were generated from national hospital discharge records, but it is not clear if it is possible to be diagnosed with diabetes without being admitted to hospital.

The work presented by Harjutsalo and colleagues does not answer the question of why this increase in cases of type 1 diabetes is occurring, but their findings strongly suggest that the trigger might be attributed to environmental factors. A feature of this article that is noteworthy, is the conclusion drawn from the accompanying commentary in the same issue of the *Lancet* (Myers and Zimmet, 2008) that argues that the environmental factors affecting the increase of type 1 diabetes in children are mouldy vegetables, in particular, the common potato scab. Although certainly a helpful way of making the study memorable, little evidence is provided to support this editorial conclusion.

Myers M, Zimmet P, T (2008) Halting the accelerating epidemc of type 1 diabetes. *Lancet* **371**: 1730–1

LANCET

Incidence of type 1 diabetes in children continuing to rise

Readability	✓✓✓✓
Applicability to practice	✓✓✓✓
WOW! factor	✓✓✓✓

1 In the 1990s, the incidence of type 1 diabetes in Finland was estimated as 40 per 100 000 people per year, the highest figure worldwide.

2 This study aimed to predict the number of new cases of type 1 diabetes likely to arise in children, based on the figures observed in the past.

3 The authors searched the Finnish National Public Health Institute diabetes register, the Central Drug Register and the Hospital Discharge Register; they included data on patients newly diagnosed with type 1 diabetes between 1980 and 2005.

4 A total of 10 737 children (age <15 years) were diagnosed with type 1 diabetes during the study period; data on diabetes occurring in children secondary to other conditions was excluded from the study.

5 Overall, the incidence of disease was on average 42.9 per 100 000 children per year (95% CI 42.6–44.3).

6 Average incidence increased, from 31.4 per 100 000 in 1980, to 64.2 per 100 000 in 2005; this increase was particularly pronounced in children under 4 years of age, with approximately 4.7% more children in this age group diagnosed each year.

7 The number of new type 1 diabetes diagnoses in children is predicted to be 10 800 between the years 2006 and 2020.

8 Incidence of type 1 diabetes is likely to double in the next 15 years, particularly in children under 4 years of age.

Harjutsalo V, Sjoberg L, Tuomilehto J (2008) Time trends in the incidence of type 1 diabetes in Finnish children: a cohort study. *Lancet* **371**: 1777–82

DIABETES

Retinopathy complications attributed to changes in HbA_{1c}

Readability	✓✓✓
Applicability to practice	✓✓
WOW! factor	✓✓

1 Results from the Diabetes Control and Complications Trial indicated that, statistically, patients with similar HbA_{1c} levels were at increased risk of retinopathy if they were receiving conventional treatment, compared with patients receiving intensive treatment.

2 Further statistical analyses of these results, indicates that this is not the case; the original conclusion was based on the statistical model used at the time.

3 The authors of this study found that risk of retinopathy progresssion is the same in patients with similar HbA_{1c} levels, regardless of intensity of treatment.

Lachin JM, Genuth S, Nathan DM et al (2008) Effect of glycemic exposure on the risk of microvascular complications in the diabetes control and complications trial—revisited. *Diabetes* **57**: 995–1001

DIABETIC MEDICINE

Prevalence of impaired awareness of hypoglycaemia

Readability	✓✓✓✓
Applicability to practice	✓✓✓✓
WOW! factor	✓✓✓

1 Impaired awareness of hypoglycaemia (IAH) affects a substantial number of people with type 1 diabetes; however, present day figures have not been estimated.

2 The authors of this study conducted a large, hospital-based, population survey, including 518 adults with type 1 diabetes.

3 Overall, 19.5% participants had IAH; patients with IAH were significantly older, had longer duration of disease, and reported increased frequency of hypoglycaemia ($P<0.001$ in all cases).

4 These figures highlight the prevalence of IAH in adults with type 1 diabetes and the importance of addressing this issue.

Geddes J, Schopman JE, Zammitt NN et al (2008) Prevalence of impaired awareness of hypoglycaemia in adults with type 1 diabetes. *Diabetic Medicine* **25**: 501–4

DIABETES CARE

Risk of death increases with age

Readability	✓✓✓
Applicability to practice	✓✓✓✓
WOW! factor	✓✓✓✓

1 This population-based study investigated the rate and cause of death in patients with type 1 diabetes.

2 The authors included data from a UK register of patients diagnosed with type 1 diabetes between 1978 and 2004; data collected included age at diagnosis, occurrence of death and cause of death.

3 A total of 50 471 person-years of follow-up from 4246 patients were included.

4 A total of 108 deaths occurred; of these, 74 were in patients aged 0–14 years and 34 in patients aged 15–29 years.

5 Standardized mortality ratios (SMRs) were higher in patients aged 15–29 years (SMR=6.2), compared with that of patients aged 0–14 years (SMR=4.2); SMRs were found to increase with disease duration.

6 The majority of deaths in the study population were attributed to diabetes complications (44%); the risk of death was found to be increased by 4.7-fold in patients under 30 years of age.

Feltbower RH, Bodansky HJ, Patterson CC et al (2008) Acute complications and drug misuse are important causes of death for children and young adults with type 1 diabetes: results from the Yorkshire Register of diabetes in children and young adults. *Diabetes Care* **31**: 922–6

DIABETES CARE

Premeal priming boluses of insulin improve glucose control

Readability	✓✓✓✓
Applicability to practice	✓✓
WOW! factor	✓✓✓✓✓

1 A system emulating an artificial pancreas that incorporates continuous glucose sensors and insulin pumps, known as full closed-loop control (FCL), is used to control glucose levels in children with type 1 diabetes.

2 Because of the subcutaneous nature of insulin administration, delays in absorption result in frequent postprandial hyperglycaemic excursions.

3 This study compared the efficacy of a hybrid closed-loop control (HCL) system, which combines the FCL with manual priming boluses of insulin, administered 15 minutes before meals, in order to improve glucose control.

4 A total of 17 adolescents were included in this study; 8 participants received FCL treatment, and 9 received HCL, all for 34 hours.

5 Mean glucose levels were improved in the HCL treatment group (135±45 mg/dl, versus 141±55 mg/dl in the FCL group, $P=0.09$); average daytime glucose levels showed similar improvements, with 149±47 mg/dl versus 159±59 mg/dl in the HCL and FCL group, respectively ($P=0.03$).

6 Average peak postprandial glucose levels were also improved in the HCL group (194±47mg/dl), compared with the GCL group (226±51 mg/dl, $P=0.04$); however, night-time control was similar in all patients.

7 Small manual priming bolus doses of insulin can improve postprandial glycaemic excursions.

Weinzimer SA, Steil GM, Swan KL et al (2008) Fully automated closed-loop insulin delivery versus semiautomated hybrid control in pediatric patients with type 1 diabetes using an artificial pancreas. *Diabetes Care* **31**: 934–39