Type 2 diabetes in the young is more lethal than type 1

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As Constantino et al say in the introduction to their article (summarised alongside), a diagnosis of type 2 diabetes in a young person is often met with relief. As the alternative diagnosis at that stage is likely to be type 1 diabetes, type 2 diabetes may be perceived as a "milder" disease. Certainly, the immediate impact on day-to-day life may be less with a diagnosis of type 2 diabetes. However, published data do not show that the eventual impact of the disease is less with type 2 diabetes than with type 1 diabetes. The striking conclusion of this paper is that young-onset type 2 diabetes is the more lethal form of the disease with more cardiovascular risk factors, more complications and a great mortality.

The impact of this message is perhaps reduced by the study design. Type 2 diabetes has only been recognised as a significant problem in children in the relatively recent past. The authors have, therefore, performed a retrospective study of individuals with type 2 diabetes between the ages of 15 and 30 years. These were matched with a similar number of individuals with type 1 diabetes in the same age range. In clinical practice, it can often be difficult to distinguish between the types of diabetes. Teasing out who has type 1 diabetes, type 2 diabetes or monogenic diabetes can be challenging and may not become clear for some months or years.

In this study, which was carried out in Australia, individuals appear to have been categorised at diagnosis but detail has not been given about how this conclusion was reached. What is very noticeable is the contrast in ethnicity between the groups. A total of 28% of the type 2 diabetes group were Anglo-Celtic versus 78% in the type 1 diabetes group. A high proportion of the type 2 diabetes group were Aborigine or Islanders. Ethnicity and socio-economic factors have previously been shown to significantly contribute to cardiovascular risk, and there is no reason to believe that this would not apply here.

Intuitively, we believe what the authors are saying. Type 2 diabetes is likely to result in more deaths, but, in this paper, they have not made a watertight case.

DIABETOLOGIA

Risk factors for macular oedema

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

1 In this retrospective review with data spanning 20 years, the authors examined the effect of glycaemia and arterial blood pressure (BP) changes on the incidence of photocoagulation.

2 Participants were screened for retinopathy every 2 years, and the study end point was progression to the first photocoagulation therapy for "clinically significant macular oedema" (previous photocoagulation therapy was an exclusion criterion).

3 The study end point occurred in 297 out of 1878 individuals: 15.9% and 15.7% for male and female participants, respectively.

4 The findings are that diabetes duration, high levels of glycaemia and high BP significantly increase the risk of photocoagulation requirement, and, unexpectedly, that large changes in glycaemia and BP were independent risk factors for developing macular oedema in need of photocoagulation.

Sander B, Larsen M, Andersen EW, Lund-Andersen H (2013) Impact of changes in metabolic control on progression to photocoagulation for clinically significant macular oedema: a 20 year study of type 1 diabetes. *Diabetologia* **56**: 2359–66

DIABETES CARE

Mortality in young-onset T2D and T1D

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

1 This article compared the long-term clinical outcomes, including cause of death, of individuals with young-onset T1D and T2D in Australia.

2 The authors cross-referenced data from the Royal Prince Alfred Hospital Diabetes Clinical Database and Australian National Death Index between 1986 and 2011, with a sensitivity and specificity of 94% and 100%, respectively, and they also used 20 years of observational data.

3 The age of diabetes onset in the study groups were 22.0 ± 4.3 years ($T1D_{15–30}$ [n=470]) and 25.6 ± 3.7 years ($T2D_{15–30}$ [n=354]), and both groups were in the overweight to obese range.

4 At the last clinical visit, the $T2D_{15-30}$ cohort had a significant excess of complications, including increased cardiovascular disease risk factors. There was no significant difference in the prevalence of retinopathy or renal function measured by estimated glomerular filtration rate between the cohorts.

5 In regard to mortality, deaths in the $T2D_{15–30}$ cohort occurred at a significantly shorter diabetes duration from onset, and there was a case fatality rate of 11% (n=39) and 6.8% (n=32) for the $T2D_{15–30}$ and $T1D_{15–30}$ cohorts, respectively (P=0.03 for difference). For both cohorts, the primary predominant causes of death were cardiovascular (50.0% versus 30.3%; T2D versus T1D; P<0.05).

6 Young-onset T2D is more high risk than T1D, and trials of statins and other drugs are needed in younger patients.

Constantino ML, Molyneaux L, Limacher-Gisler F et al (2013) Long-term complications and mortality in young-onset diabetes. *Diabetes Care* 11 Jul [Epub ahead of print]

DIABETOLOGIA

Insulin pump versus injection therapy in children

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

1 Using a non-randomised, case–control design, the authors compared insulin pump with insulin injection therapy for controlling glycaemia in children with T1D. Both cohorts were well matched for baseline characteristics (e.g. mean age of 11.5 years old in both groups and a similar HbA_{1c} level).

2 This is the largest and longest study into pump use in children and combines paediatric clinical databases and observational measurements.

3 HbA_{1c} was measured in all children every 3 months in the clinic by agglutination inhibition immunoassay.

4 Over the maximum 7-year follow-up, the pump cohort achieved a significant HbA_{1c} reduction of 6.6 mmol/mol (0.6%) and had significantly improved HbA_{1c} over all time points. Also, the pump cohort's insulin requirement (in units/kg) fell by 9%, compared with an 11% increase in the injection cohort ($P<0.001$).

5 The frequency of hospitalisations for diabetic ketoacidosis increased only in the injection cohort ($P<0.001$), and hypoglycaemic events were 30% lower in the pump cohort over the follow-up period ($P=0.013$). There were no significant BMI changes between the two groups.

6 The pump cohort participants were assessed before the study began for suitability, and the novelty of using the pump and the increased education and contact with the clinic they recieved could account for these results.

Johnson SR, Cooper MN, Jones TW, Davis EA (2013) Long-term outcome of insulin pump therapy in children with type 1 diabetes assessed in a large population-based case-control study. *Diabetologia* 21 Aug [Epub ahead of print]

DIABETES CARE

Exenatide's metabolic effects

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

1 The metabolic effects of exenatide were investigated in this study with 17 participants with T1D (eight with residual insulin secretion and nine without). All had two mixed meal tolerance tests (MMTTs) and two intravenous glucose tolerance tests (IVGTTs) with and without exenatide pretreatment.

2 When data from all subjects were analysed, exenatide pretreatment significantly reduced glucose excursion by 33% after the MMTT, but there was no significant difference after the IVGTT or between those with or without residual insulin production.

3 Exenatide is believed to delay nutrient absorption, supress glucagon secretion and preserve insulin secretion.

Ghazi T, Rink L, Sherr JL et al (2013) Acute metabolic effects of exenatide in patients with T1D with and without residual insulin to oral and IV glucose challenge. *Diabetes Care* 12 Aug [Epub ahead of print]

DIABETES CARE

Closed-loop control via smart phones

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

1 The authors' main aim was to examine the feasibility of controlling a closed-loop insulin pump with a smart phone using the *Diabetes Assistant* (DiA) platform.

2 Twenty experienced pump users with T1D were involved in a 2-day stay over four centres, providing outpatient test conditions; the first 13 hours were open-loop controlled, and the remaining test time used the closed-loop setting.

3 The primary and secondary end points were to achieve 80% system functionality (97.7% was achieved), and to calculate the failure rates of the system components (the sensor, DiA and insulin pump had 0.03, 0.09 and 0.12 malfunction events per 24 hours, respectively).

4 The system was well understood and completely controllable by the subjects, as well as being lighter than current technology.

5 This technology would allow remote monitoring for healthcare practioners and more freedom for people with diabetes.

Kovatchev BP, Renard E, Cobelli C et al (2013) Feasibility of outpatient fully integrated closed-loop control: first studies of wearable artificial pancreas. *Diabetes Care* **36**: 1851–8

DIABETOLOGIA

Danish trends in T1D mortality

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

1 This study compared data from the Danish background population with 4821 individuals with T1D to define the absolute and relative mortality rates for T1D from any cause of death over a 10-year period from 2002 to 2011.

2 Nephropathy was identified as a main complication among the T1D cohort; the mortality rates were 2.2 and 2.4 times higher in men and women, respectively.

3 Mortality rates were significantly higher in individuals with T1D and the main cause of death was cardiovascular disease. Rates were highest in those with young-onset diabetes, highlighting the need for early treatment.

4 Over the 10-year period, the T1D cohort had a significantly faster decrease in mortality rate.

Jørgensen ME, Almdal TP, Carstensen B (2013) Time trends in mortality rates in type 1 diabetes from 2002 to 2011. *Diabetologia* 16 Aug [Epub ahead of print]

"Over the maximum 7-year follow-up, the pump cohort achieved a significant HbA_{1c} reduction of 6.6 mmol/mol (0.6%) and had significantly improved HbA_{1c} over all time points."