Management of type 1 diabetes

It's good to talk: Is there a place for mobile phones in diabetes care?

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The fabulous thing about writing commentaries for *Diabetes Digest* is that I get to read articles I would otherwise never have come across in my frenetic (and increasingly unsuccessful) attempts to keep up-to-date with the literature. Now, I have to admit that the *Journal of Medical Internet Research* is not one of my usual reads, but I would urge readers to take a look at this paper by Alexander Kollmann and colleagues about the use of mobile phone technology to assist patients with type 1 diabetes (summarised alongside).

Frustrated by the poor results of insulin treatment in people with type 2 diabetes at our diabetes centre, I was nearly 'strung up' by the nurse specialist team when I suggested asking the receptionist to telephone patients and ask them for their blood glucose results so that the diabetes nurse specialist could advise them on insulin titration if necessary. Some people may need daily guidance, particularly those with type 2 diabetes starting insulin therapy who feel anxious about titrating the dose, even if given a treatment algorithm.

Wireless technology has been used to transmit biomedical data in various specialties (examples include oxygen saturation in people with chronic lung disease, and heart rate monitoring for the detection of arrythmias). While Kollmann et al found that its use resulted in unremarkable differences in the glycaemic control of people with type 1 diabetes, it does offer another vehicle for patients and clinicians to communicate with each other. For those who would embrace this technology it is a fairly unobtrusive way for people with diabetes to inform the specialist of their blood glucose test results, while for healthcare professionals it may be an efficient way of overseeing a number of individuals at once, but only contacting those that require advice.

The Dundee group used similar technology to keep in touch with adolescents with diabetes, and sent them text messages with advice about their condition (Franklin et al, 2003). None of these methods supplant a face-to-face consultation, but for people with busy lives they may allow more frequent, focused contacts than are currently possible. While not suitable for everyone, the value of these interventions needs further assessment in additional randomised studies.

Franklin V, Waller A, Pagliari C, Greene S (2003) "Sweet Talk": text messaging support for intensive insulin therapy for young people with diabetes. *Diabetes Technology & Therapeutics* **5**:991–6

DIABETOLOGIA

Excess mortality due to type 1 diabetes

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

1 The authors of this study examined whether early mortality in EURODIAB (Europe and Diabetes study) population cohorts under 15 years of age was linked to incidence of type 1 diabetes or national prosperity.

2 Children diagnosed with type 1 diabetes since 1989 (n=28 887) from 13 population-based EURODIAB cohorts in 12 countries were followed up.

3 The results indicate that there were 141 deaths from 219 061 person years; from national mortality rates it was expected that there would be 69.1 expected deaths.

4 Standardised mortality ratios (of observed versus expected deaths) varied between countries, but there was little relationship with gross domestic product or with the incidence of the condition.

5 There was also no significant relationship with age or time since diagnosis. One-third of deaths in the cohort were directly attributed to diabetes.

6 Significant excess mortality exists in populations under 15 years of age with type 1 diabetes, with an unexplained variation in magnitude between countries.

Patterson CC, Dahlquist G, Harjutsalo V et al (2007) Early mortality in EURODIAB population-based cohorts of type 1 diabetes diagnosed in childhood since 1989. *Diabetologia* **50**: 2439–42

JOURNAL OF MEDICAL INTERNET RESEARCH

Mobile phone data service improves glycaemic control

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

1 The study objective was to assess the practicality of using a mobile phone-based data service to support people with type 1 diabetes in managing their insulin therapy.

2 Four women and six men with type 1 diabetes (mean age 36.6 years) were registered to the service with a secure username and password enabling access via a mobile phone or Web portal.

3 'Diab-Memory' software was installed on the mobile phones to enable manual entry of data on people's blood glucose levels, injected insulin doses, food carbohydrate content, general well being and physical activity participation; an automated text message reminded users to input this information.

4 Data were then transmitted to a central monitoring centre for analysis, and statistics, trends and graphs were generated for access via the Web by participants and healthcare professionals.

5 In total, 3850 log-ins transmitted 13003 datasets (averaging 14 parameters per person per day) over 3 months.

6 After 3 months, all participants had their HbA_{1c} level checked, and filled in a questionnaire to determine their overall satisfaction with the service.

7 The mobile phone-based service was accepted as being practical for daily use and resulted in a significant improvement in glycaemic control (pre-study HbA_{1c} level of 7.9% versus post-study HbA_{1c} level of 7.5%, P=0.02).

Kollmann A, Riedl M, Kastner P et al (2007) Feasibility of a mobile phone-based data service for functional insulin treatment of type 1 diabetes mellitus patients. *Journal of Medical Internet Research* **9**: e36

'A significant proportion of people with type 1 diabetes may have a persistent, intestinal enterovirus infection.'

DIABETES CARE

Time to insulin treatment cannot define LADA

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

1 These authors examined whether using time to insulin treatment is a valid defining criterion of latent autoimmune diabetes in adults (LADA), where type 1 diabetes presents as apparent type 2 diabetes.

2 People with diabetes were tested for glutamic acid decarboxylase antibodies (GADA); 522 GADA+ people were followed to establish time to insulin treatment.

3 The median time to insulin treatment was 16.2 months in centres with GADA testing, and 45.6 months in centres without routine GADA testing.

4 Thus, time to insulin treatment is not a valid criterion of LADA as it is dependent on clinical judgement and the availability of GADA testing.

Brophy S, Yderstræde K, Mauricio D et al (2008) Time to insulin initiation cannot be used in defining latent autoimmune diabetes in adults. *Diabetes Care* **31**: 439–41

CLINICAL AND EXPERIMENTAL IMMUNOLOGY

Enteroviruses found in gut of people with type 1 diabetes

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

1 As enterovirus infections are more prevalent in people with type 1 diabetes, the authors investigated whether enteroviruses are present in the small intestinal mucosa of this susceptible population.

2 Small-bowel mucosal biopsies were taken from 12 people with type 1 diabetes and 10 controls without diabetes.

3 Enteroviruses were detected using an enterovirus-specific oligonucleotide probe and immunohistochemical staining.

4 Analyses showed that all study participants had normal intestinal morphology.

5 In situ hybridisation detected enteroviruses in six people with diabetes, but in none of the controls; immunohistochemistry data revealed enteroviruses in nine people with diabetes and in one control person.

6 The results indicate that a significant proportion of people with type 1 diabetes may have a persistent, intestinal enterovirus infection.

Oikarinen M, Tauriainen S, Honkanen T et al (2007) Detection of enteroviruses in the intestine of type 1 diabetic patients. *Clinical and Experimental Immunology* **151**: 71–5

ACTA PAEDIATRICA

Gender and age at onset affects hospitalisation rate

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

1 The Swedish Childhood Diabetes Register was used to study the effects of age at diagnosis of childhood-onset type 1 diabetes and gender on the incidence of hospitalisations for severe vascular complications.

2 In total, 9974 children with type 1 diabetes had been followed for at least 10 years (26 years maximum follow up period; 141 839 person-years); 103 had been hospitalised at least once.

3 Diabetic nephropathy was the most common cause of hospital admission.

4 Female gender and age at onset of diabetes were significant risk factors for severe complications resulting in hospitalisation.

Dahlquist G, Möllsten A, Källén B, Swedish Childhood Study Group (2008) Hospitalisation for vascular complications in childhood-onset type 1 diabetes: effects of gender and age at onset. *Acta Pædiatrica* **97**: 483–8

DIABETIC MEDICINE

Bacteriuria prevalence not affected by diabetes

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

1 The aim of this study was to determine the prevalence of significant bacteriuria (SB; the presence of ≥100 000 colony-forming units/ml) in people with and without diabetes attending outpatient clinics.

2 Sixty-four people with type 1 diabetes (37 women) and 441 people with type 2 diabetes (212 women) attending a diabetes outpatient clinic were enrolled in the study; 97 people without diabetes (39 women) were recruited from other outpatient clinics as controls.

3 Parameters measured included blood cell count, fasting plasma glucose (FPG) concentration, HbA_{1c} level, creatinine clearance and urinary albumin excretion (UAE).

4 SB was detected in nine people with type 1 diabetes (14.1%), in 41 people with type 2 diabetes (9.3%) and in six control participants (6.2%); 11 (22%) people with diabetes and two (33%) in the control group showed symptoms.

5 People in the control group who had SB were more likely to be female and older. People with diabetes who had SB were more likely to be female, older and to have retinopathy; they also had increased levels of FPG, HbA_{1c} and UAE.

6 In conclusion, there was no difference in the prevalence of SB in people with and without diabetes.

7 Risk factors for SB in people with diabetes were being female and having increased levels of UAE. Additionally, people with diabetes and SB were more likely to have poor glycaemic control than their counterparts without SB.

Matteucci E, Troilo A, Leonetti P, Giampietro O (2007) Significant bacteriuria in outpatient diabetic and non-diabetic persons. *Diabetic Medicine* **24**: 1455–9