

# A retrospective study of the impact of a DSN in primary care

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## Article points

1. A DSN was employed for a duration of nearly 4 years at Hall Green Health Surgery, Birmingham.
2. As well as caring for insulin-treated people with diabetes, the DSN initiated insulin therapy, where necessary, and also offered pre-conception advice.
3. A statistically significant decrease in the median HbA<sub>1c</sub> values was observed in all people with diabetes ( $P=0.002$ ) as well as in those who joined after the DSN arrived ( $P=0.034$ ).

## Key words

- Commissioning services
- Glycaemic control
- HbA<sub>1c</sub>
- Primary care

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The authors of this study aimed to determine whether the employment of a DSN by Hall Green Health Surgery to care for insulin-treated people with diabetes in primary care between 9 June 2004 and 22 April 2008 had any discernible effect on mean and median HbA<sub>1c</sub> levels. This retrospective study assessed change in HbA<sub>1c</sub> level for people with diabetes, from the first relevant reading on the computer database to the most recent available. There was a decrease in the mean and a statistically significant reduction in median HbA<sub>1c</sub> values for all data sets.

The document *World Class Commissioning* (Department of Health [DH], 2007) affects both primary care activities and the relationship between healthcare services and local needs (Stanton et al, 2009). The provision of money for commissioning occurs through PCTs, with clinicians adjusting the care provided for local populations using their local knowledge (DH, 2007; 2008; 2009). This provides new opportunities for primary and secondary care to work together, for example by reducing hospital admissions.

## Background

A DSN was employed for nearly 4 years at Hall Green Health Surgery (HGHS) in Birmingham, using funds provided by pharmaceutical companies. When the funding was no longer available, the service was withdrawn, and all the people with insulin-treated diabetes were referred back to secondary care. A number of them have since failed to attend. When the DSN was employed, HGHS clinicians involved in diabetes care included five practice partners and

two nurses, all of whom possessed the Warwick certificate in diabetes care. As well as caring for people with insulin-treated diabetes, the DSN initiated insulin therapy, where necessary, and offered pre-conception advice. She did not care for people using insulin pumps.

Staff training sessions at the practice took place quarterly for all doctors and nurses with an interest in diabetes care. These consisted of roundtable discussions of individual cases. The nursing home received weekly ward rounds, and once or twice a month this was undertaken by a diabetes-trained doctor. Education of the care home staff would be given on the round, and the DSN could be approached as a source of advice.

Within the surgery, as well as face-to-face discussion, the IT system permits messaging for immediate questions, and tasking for delayed questions, but with the advantage of attachment to the patient notes. In this way, all staff had access to the DSN's advice.

The DSN saw each person with diabetes for 30 minutes, and made full use of telephone consultations. When initiating insulin or

changing the dose, the DSN normally reviewed the person 2 days after the appointment, phoned 1–3 days later, then saw them weekly for as long as necessary, then monthly until glycaemia had stabilised, and then every 6 months. She made a management plan for their care and recorded the date of the next expected phone call and appointment.

The DSN gave each person with diabetes individualised education. Structured education was available via the DESMOND (Diabetes Education and Self-Management for Newly Diagnosed) programme held by the PCT at another site, but this programme is designed for people newly diagnosed with diabetes, so the DSN felt it more appropriate to provide education on an individual basis.

### Aims

The aim of this study was to evaluate the impact of a DSN on HbA<sub>1c</sub> levels across the practice, and to establish whether any improvements were maintained after the departure of the DSN.

### Methods

This study retrospectively examined patient-level data from HGHS, and no controls were used. The total practice population at the beginning of the study was 24051 with 944 people with diabetes (939 adults, 240 of which were insulin-treated). At the end of the study, the practice was caring for 1283 people with diabetes, of which 1275 were adults, and 305 were insulin-treated. The percentage of people with diabetes in the practice population was 5.54% (Quality and Outcomes Framework [QOF] Database, 2009).

Data were analysed between 19/02/2002 and 03/09/2009 to see whether there was any change from the first relevant HbA<sub>1c</sub> measurement (either before the arrival of the DSN, or during her time working there) to the last HbA<sub>1c</sub> measurement during her time working there. The changes from the last HbA<sub>1c</sub> during the DSN's time to the most recent one were also analysed. Since the DSN was both initiating and adjusting insulin therapy, HbA<sub>1c</sub> was taken as the surrogate outcome for the measure of achievement.

Data for 354 adults who were prescribed insulin by the DSN were included. Those

excluded from the study were children, women with gestational diabetes only, people present for too short a duration to receive two HbA<sub>1c</sub> readings (due to leaving the area or death), and two people with haemoglobinopathy.

Of these 354 people, 260 had a further HbA<sub>1c</sub> test after the DSN left. The data for all adults prescribed insulin were subdivided into two groups: those who were present before the DSN, and those who arrived or were diagnosed with diabetes during her presence at HGHS.

The means and medians were calculated, and the Wilcoxon sign rank test was then used to show whether the difference between the medians was significantly different.

### Results

QOF data showed that 5.7% of the practice population had diabetes at the end of March 2008 (QOF Database, 2009). Of all of the people with diabetes in the practice, 98% had their HbA<sub>1c</sub> level checked within the past 15 months. Of these, 94.9% had an HbA<sub>1c</sub> level of  $\leq 10\%$  ( $\leq 86$  mmol/mol) and 71.4% had an HbA<sub>1c</sub> level of  $\leq 7\%$  ( $\leq 53$  mmol/mol). The percentage of insulin-treated people with HbA<sub>1c</sub> levels  $>7.5\%$  ( $>58$  mmol/mol) before the DSN worked at HGHS was 70.3%, during her work it was 63.8%, and after she left it was 63.3%. *Table 1* summarises these results.

### Discussion

A decrease in mean and median HbA<sub>1c</sub> values was shown by the whole cohort between the first and second readings, suggesting that all groups showed some improvement. This decrease was statistically significant when considering all people with diabetes ( $P=0.002$ ) as well as those who joined after the DSN arrived ( $P=0.034$ ).

Data from after the DSN had departed shows more mixed results, with only those who joined after the DSN having a fall in both mean and median HbA<sub>1c</sub> level. This was not statistically significant.

During the time that the DSN was employed, the mean and median HbA<sub>1c</sub> values for all adults with diabetes decreased from 8.6 to 8.2% (70 to 66 mmol/mol), and 8.3 to 8.0% (67 to 64 mmol/mol), respectively ( $P=0.002$ ).

### Page points

1. The aim of this study was to evaluate the impact of a DSN on HbA<sub>1c</sub> levels across the practice, and to establish whether any improvements were maintained after the departure of the DSN.
2. The percentage of insulin-treated people with HbA<sub>1c</sub> levels  $>7.5\%$  ( $>58$  mmol/mol) before the DSN was 70.3%, during her work it was 63.8%, and after she left it was 63.3%.
3. A decrease in mean and median HbA<sub>1c</sub> values was shown by the whole cohort between the first and second readings, suggesting that all groups showed some improvement. This decrease was statistically significant when considering all people with diabetes ( $P=0.002$ ) as well as those who joined after the DSN arrived ( $P=0.034$ ).

Department of Health (2007) *World Class Commissioning: Competencies*. DH, London. Available at: <http://tiny.cc/4TUW> (accessed 20.01.2010)

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QOF Database (2009) *South Birmingham PCT*. Available at: <http://tiny.cc/3hWnU> (accessed 20.01.2010)

Stanton E, Ahmed M, Kennedy I (2009) *Commissioning: commission impossible? BMJ Careers*, 12 August. Available at: <http://tiny.cc/j4FTg> (accessed 20.01.2010)

These improvements were maintained for more than a year after the DSN left. There was a high attendance rate within the DSN clinics. Also, other additional benefits included education of carers at nursing and residential homes, domiciliary visits to housebound people with diabetes treated with insulin, and regular education meetings with the practice team allowing some transfer of knowledge of insulin management.

**Limitations**

This study has a number of limitations. Bias was possibly present for a number of reasons: people registered with the practice for many years may have been better educated about diabetes than those who were registered for insulin treatment at HGHS during the time that the DSN was present.

No distinction was made within the study between people with type 1 and type 2 diabetes. The number of people with type 1 diabetes in the PCT is relatively small.

This study cannot answer comparative questions against a control group. It also did not ask people their opinions of the service. Future

research might involve comparison of results, admission rates and patient opinions between practices or PCTs offering community insulin care and those not doing so.

**Conclusion**

Provision of funds for commissioning occurs through PCTs. Practices plan to offer a service that would reduce hospital referrals and outpatient attendance, in which they feel they have expertise but need funding. HGHS felt that the provision of a DSN met these criteria and that the DSN provided a beneficial service for the local population. It was also anticipated that provision of a DSN would reduce hospital admissions.

A plan and application was submitted to the PCT as a commissioning bid. This was unsuccessful. In this case the PCT stated that they would prefer to provide their own PCT-wide diabetes service. No community service is yet available providing long-term insulin care in the authors' Birmingham locality. However, with the introduction of World Class Commissioning (DH, 2007), PCTs continue to be encouraged to involve clinicians in the commissioning of healthcare services. ■

**Conflict of interest:**

Sheila Pennington has had her DSN paid for by sanofi-aventis and GlaxoSmithKline. Masood Nazir has received funds from sanofi-aventis to pay for attending a diabetes conference. Helen Pennington and Emma Davis have nothing to declare.

**Table 1. HbA<sub>1c</sub> test results and statistical significance.**

<b>HbA<sub>1c</sub> measurements for all adults with diabetes on insulin:</b>				
	HbA <sub>1c</sub> (%; mmol/mol)			
	Mean	Median	Change in median	Significance
Baseline (n=354)	8.6 (70)	8.3 (67)	} -0.3	(P=0.002)
During nurse presence (n=354)	8.2 (66)	8.0 (64)		
After nurse presence (n=264)	8.2 (66)	7.8 (62)		
<b>Change in HbA<sub>1c</sub> level for adults with diabetes present before the arrival of the DSN:</b>				
	HbA <sub>1c</sub> (%; mmol/mol)			
	Mean	Median	Change in median	Significance
Baseline (n=152)	8.3 (67)	8.0 (64)	} -0.1	(P=0.27) NS
During nurse presence (n=152)	8.2 (66)	7.9 (63)		
After nurse presence (n=152)	8.3 (67)	7.9 (63)		
<b>Change in HbA<sub>1c</sub> level for adults with diabetes registered or diagnosed after the arrival of the DSN:</b>				
	HbA <sub>1c</sub> (%; mmol/mol)			
	Mean	Median	Change in median	Significance
Baseline (n=108)	8.7 (72)	8.3 (67)	} -0.3	(P=0.034)
During nurse presence (n=108)	8.3 (67)	8.0 (64)		
After nurse presence (n=108)	8.1 (65)	7.8 (62)		
Baseline: HbA <sub>1c</sub> level before nurse presence or first HbA <sub>1c</sub> level during nurse presence.				