Research Development Team, Norfolk and Suffolk Primary and Community Care Research Office

Models of Integrated Diabetes Care in the UK

Evidence briefing

SNCCG.ResearchDevelopment@nhs.net

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Contents

1.0 Integrated models of care and the evidence base

Integrated models of care aim to improve patient care through coordination of services, both within NHS organisations and between the NHS and social care providers. There is particular interest in integrated care for people with long term conditions and/or multi-morbidity. Organisations are aiming to make care more cost-effective, in part by reducing unplanned hospital/emergency admissions. A review of the integrated care model literature by the King's Fund (Purdy, 2010), found little systematic evidence to support the idea that integrated care leads to a reduction in emergency admissions. An evaluation of 16 integrated care pilots (all funded by the Department of Health) also found no effect on emergency admissions over 6 months (Bardsley, 2013). However, there was a net reduction in combined inpatient and outpatient attendances for interventions which piloted the use of case management (Bardsley, 2013) reducing overall hospital costs for commissioners.

Much of the literature surrounding integrated models of diabetes care focusses on the effect of altering single elements within a wider system (e.g. the changing roles of practitioners, introduction of diabetes specialist nurses, educational interventions), rather than evaluating the effects of a new model of integrated care. Further, many articles are authored by those who had the initial idea and were instrumental in the development and implementation of the intervention. In these cases any results/opinions must be interpreted carefully as there may be an element of bias.

A systematic review (SR) is a literature review with pre-defined search criteria and unbiased methods of quality appraisal. SRs can take 6 months or longer to complete by a team of trained researchers and offer readers an unbiased overview of the literature. A Cochrane collaboration SR conducted in 2000 (Renders, 2000) assessed the effect of interventions aimed at healthcare professionals or the structure in which they deliver care, on the management of diabetes. The authors reviewed 41 published studies involving 48,000 patients. They concluded that interventions which included patient education were the most effective at improving patient outcomes, in particular improved glycaemic control as measured by HbA_{1c}levels. A more recent overview of SRs examined 50 high quality reviews which evaluated the effectiveness of any intervention designed to improve the quality of diabetes care (Worswick, 2013). The reviews included studies which involved a variety of strategies as well as those which specifically focused on: patient education and support (n=21); telemedicine (n=10); provider role changes (n=7); and organisational changes (n=9). The authors also concluded that patient education and support were associated with improved

glycaemic control, improved blood pressure and cholesterol levels as well as a reduction in diabetic foot outcomes. Further, telemedicine, in the form of text messages, and changes which integrated the roles of healthcare professionals were also associated with an improvement in glycaemic control. One systematic review concluded that shared decision making between primary care and specialist physicians improved blood glucose levels (Foy, 2010).

Here we present five integrated models of diabetes care which have been implemented in the UK. These have been chosen by Diabetes UK (Diabetes UK, 2014) to illustrate how models can be initiated and implemented within local financial, structural and geographical constraints.
This evidence briefing aims to provide CCGs with the evidence base surrounding integrated diabetes care models to support commissioning decisions.

2.0 Models of Integrated Diabetes Care in the UK

2.1 Portsmouth: the 'Super Six'

In Portsmouth 4.6% of the population were diagnosed with diabetes. A new model of care was required (Kar, 2012) (Kar, 2013) to reduce pressure on the acute trust. The model changed the role of the community diabetes team (CDT), took 2 years to develop and was implemented from November 2011.

2.1.1 Organisations involved:

SE Hampshire CCG; Fareham and Gosport CCG; Portsmouth CCG; Portsmouth Hospital NHS Trust; Southern Health Foundation; Solent NHS Trust; South Central Ambulance Service; all GP practices within the CCGs.

2.1.2 Aims of restructure

- To discharge 90% of patients receiving follow-up secondary care into primary care
- To integrate primary and community care with secondary care, ensuring the correct skill sets were available in the best environment for the patient.

2.1.3 Expected outcomes

Reduction in: inefficiencies; variation in care; diabetic complications; emergency admissions.

2.1.4 Model developed

Secondary care:

Care of the 'Super Six' conditions which required high levels of expertise or a multidisciplinary team: inpatient diabetes; antenatal diabetes; diabetic foot care; diabetic nephropathy; insulin pumps; T1D (poor control or adolescent).

Primary care:

Care of all other patients.

Primary care managed this with the support of a community diabetes team comprising secondary care consultants and diabetes specialist nurses (DSN). The team provided education and specialist support to GP practice staff.

Specialists as educators:

Educational support was delivered to primary care via 'virtual' access and direct visits to GP practices (2 per practice, per year). A consultant and DSN delivered education to GPs and PNs. The content of the visits was pre-arranged and flexible allowing each practice to request tailored help. More complex cases were used as a learning opportunity which created a ripple effect within the practice

as learning could be applied to multiple patients. Virtual (phone/email) help had pre-defined response times.

Finances:

Savings to commissioners were realised by discharging patients from the acute trust who did not fit into the Super Six. The number of new referrals was also expected to decline as general referrals were suitable for discussion as part of the community model. Loss of revenue for the acute trust, due to reduced activity, was harder to tackle. It was decided that all four hospital consultants would be part of the CDT and as such would take a drop in salary from the acute trust which was picked up by a sessional contract with the community trust.

2.1.5 Outcomes

After 2 years the following outcomes were reported

- >90% secondary care patients were discharged into primary care (978 individuals) saving ~£90000 per year (saving based on follow up appointment cost of £90)
- Referrals to secondary care reduced from 15 to 1 per month
- 18% reduction in ketoacidosis episodes
- 16% reduction in hypoglycaemic admissions ('hypoglycaemia hotline' with ambulance trust (Buchanan, et al., 2014)
- 22% reduction in hypoglycaemic non-ketotic coma
- Rates of stroke and myocardial infarction were monitored and there was no increase.

2.2 Leicester, Leicestershire and Rutland

Funding was provided in 2012/13 by CCGs. 54,000 patients have been diagnosed with diabetes in the area and this is projected to rise to 100,000 by 2030, with a particularly high prevalence in the black and ethnic minority (BME) population.

2.2.1 Organisations involved

West Leicestershire CCG; East Leicestershire and Rutland CCG; Leicester City CCG; Leicester City and County Council; University Hospitals of Leicester; Leicestershire Partnership Trust.

2.2.2 Aims of restructure

The restructure was based on the Super Six model employed in Portsmouth, with the addition of patient education for type 2 diabetes patients and those at high risk.

The aim of the 3 CCGs, in collaboration with University Hospitals of Leicester was to provide evidence based patient intervention and access to education which encouraged self-management of conditions. Type 2 diabetes patients were offered access to Diabetes Education and Self-Management for Ongoing and Newly Diagnosed (DESMOND). Type 1 patients were offered Dose Adjustment For Normal Eating (DAFNE).

2.2.3 Model development

As the Portsmouth 'Super Six' but with the addition of professional and patient based education.

Secondary care:

Responsible for: inpatient care; insulin pump clinics; renal clinics; foot clinics; pregnancy care; Type 1 and rare diabetes.

Primary and community care:

Responsible for: screening; prevention; regular review; prescribing; insulin initiation; patient education; cardiovascular care; care homes; outcomes and audit.

Primary care also has the support of a local community diabetes specialist team comprising consultants, DSNs and dieticians. The team provided clinics at 8 locations for patients where their GP practice did not offer enhanced services.

2.3.4 Finance

An enhanced payment system was set up to support the delivery of more complex care in primary care.

2.3.5 Outcomes

No outcomes reported

2.3 Derby

6.3% of the population have diabetes. The new model (www.firstdiabetes.co.uk) was implemented in 2009, following 2 years of development.

2.3.1 Organisations involved

Derby Hospitals NHS Foundation Trust; Derby PCT (currently commissioned by Southern Derbyshire CCG); Derby City GP practices.

2.3.2 Aims of restructure

- To reduce the number of patients attending specialist secondary care clinics for routine review
- To free up time and resource for secondary care to tackle complex cases

2.3.3 Expected outcomes

- Improved continuity of care for patients
- Improved patient satisfaction
- Enhanced skills for GPs to enable them to tackle more complex cases in primary care

2.3.4 Model development

Creation of a new NHS organisation:

A not for profit joint venture, 'First Diabetes', was created. 50% of shares are held by the hospital trust and 50% held by a primary care group of GP practices.

The model:

A team of hospital consultants, GPs, specialist nurses, healthcare assistants and dieticians work at one site. GP practices refer patients to the First Diabetes clinic and all care is provided in one place. The team also visit practices to provide training and advice to GP practice staff. Patient education is provided throughout the whole pathway, including for patients with pre-diabetes and newly diagnosed patients.

Finances:

Creation of a single budget held by the joint venture was used to fund diabetes care irrespective of the healthcare professional responsible for delivery. The new organisation does not directly employ anyone; rather GPs are paid an hourly rate and the trust receives an income based on the time specialists spend in the joint clinics.

IT:

All specialists and 85% GP practices use SystmOne allowing access to records for health professionals at all stages of the pathway.

2.3.5 Outcomes

Improvement in QOF targets from Aug 2009-Jan 2011:

- Percentage of patients with HbA_{1c} <7% increased from 40 to 55%
- Percentage of patients with HbA_{1c} <8% increased from 62 to 79%
- Percentage of patients with HbA_{1c} <9% increased from 73 to 87%

Improvements were also seen in blood pressure and cholesterol levels.

Positive feedback from patients and GPs.

Report to have seen a small, but significant, reduction in cardiovascular outcomes, but state that they require evaluation of the service over next 10-15 years to see the full effect of the service on complications related to diabetes.

The First Diabetes service has recently been forced into a full competitive re-tendering process, which is currently in progress, with its CCG.

http://www.bjdvd.co.uk/index.php/bjdvd/article/view/23/60

2.4 North West London

In 2011, NHS London provided £5.7million for the integrated care pilot (ICP) to improve the delivery of diabetes care and general health and social care for >75 year olds in North West London. A robust evaluation of the pilot in Inner North West London has been carried out by the Nuffield Trust in collaboration with Imperial College London (The Nuffield Trust, 2013).

2.4.1 Organisations involved

Two hospitals, two mental health providers, three community health care service providers, five municipal providers of social care, two non-governmental organisations and, by the end of April 2012, 103 GP practices, across 5 London boroughs.

2.4.2 Aims of restructure

The aims of the pilot were to

- Improve outcomes for patients
- Create access to better, more integrated care outside hospital
- Reduce unnecessary hospital admissions
- Enable effective working of professionals across provider boundaries.

2.4.3 Expected outcomes

- Acute savings of £10.9 million in year one, rising to £23.2m by year 5.

2.4.4 Model developed

No new services were introduced during the pilot. Type 1 diabetic patients remained under secondary care.

Core elements of the new model included:

- GPs created care plans for all patients in the pilot
- Shared IT platform allowed information to be accessed across various organisations
- Sharing care plans amongst participating organisations using a bespoke IT tool which also calculated the risk of hospital admission
- Collaborative working between different service providers through monthly Integrated Management Board (IMB)meetings
- Formation of local multidisciplinary groups (MDGs) to improve care planning and co-ordination across different services and discuss complex cases

Finances: The time to produce care plans and to attend MDGs was encouraged by the provision of funds to backfill staff. An Innovation Fund was available to multidisciplinary groups to commission new community services which could support out of hospital care in their respective localities

2.4.5 Outcomes and Evaluation

Four volumes of evaluation of the first year of the pilot have been published by the Nuffield Trust and Imperial College London (The Nuffield Trust, 2013). The four topics are outlined below, along with key points from the evaluations.

Strategic implementation and the policy context:

- Leadership must balance the pressure to make and demonstrate savings with time for the care planning to have an impact. In future the pilot must maintain momentum so that integrated care becomes 'business as usual'
- Too many attendees at IMB meetings results in slow decision making
- Evaluation of MDGs found that although attendees had a range of backgrounds, discussions mainly involved consultants and GPs with little input from nurses or allied health professionals. This brings into question the true multi-disciplinary nature of the groups. Further, discussions were limited to a case being presented with little debate about how to improve local models of care.

Quality of care and health outcomes:

- Apart from the creation of care plans there was little evidence that the ICP had impacted on care processes, intermediate patient outcomes e.g. HbA1c levels, or adverse events.

Understanding patient and provider experience and communication:

- There were enthusiastic organisations with the ability to remove barriers and organisational issues across a large number of organisations within the context of a turbulent political and policy environment.
- IT tool not successful and clinicians reported duplication of data entry; however they did comment that it made sharing information much easier.
- Patients were unaware of ICP and their part in it.
- Variation in care plans across the pilot area including who delivers the care and what the plans comprise; only 1 in 10 patients were aware they had a care plan but they were positive about it.

Impact on service use and cost:

- No significant reduction in emergency admissions, A&E attendances, costs of emergency admission or total inpatient costs in the first 1236 cases compared to a matched cohort
- International evidence suggests improvements in these areas can take 3-5 years to manifest.

2.5 Wolverhampton

16,043 patients with diabetes (7.7% of the population).

2.5.1 Organisations involved

The Royal Wolverhampton NHS trust (hospital and community services); Wolverhampton CCG; GP practices within the CCG area.

2.5.2 Model

The Wolverhampton model is based on self-care through education and an agreement between service providers to shift care away from the hospital setting.

Education:

Specialists provide support and education/training for primary care staff, DSN provide training for care home staff and GPs are incentivised to deliver care plans. Patients are sent a questionnaire prior to their annual review which asks them to consider and identify priorities to discuss with their GP.

Integrated IT:

The CCGs introduced an additional IT system, the CareCentric Patient Portal (Graphnethealth), which takes information from existing systems, brings it together and feeds it into the hospital trust's Diabeta3 system. An algorithm stratifies patients according to risk and they are flagged as red, amber or green. This informs where care should be provided and enabled specialist care to commence without referral from primary care.

Finances:

There are no financial barriers as a single trust provides acute and community services. A block contract pays for the delivery of specialist care.

Clinical engagement and leadership:

The Wolverhampton Diabetes Network holds twice yearly meetings and comprises subgroups designed to consider local issues and develop strategy according to local needs. The network is overseen by 'The Diabetes Programme Board' which drives improvement, maintains quality and reports commissioning priorities to the CCG.

2.5.3 Outcomes and evaluation

There is no published evaluation of the model; however the introduction of care planning at specialist diabetes clinics at New Cross Hospital, Wolverhampton, has been piloted. 80% of patients rated the process as good or very good (Gillani & Singh, 2014). In addition 10 of 12 doctors reported increased patient engagement and shared decision making.

3.0 Patient Education to Support Self-management

NICE guidelines (2003/2008) (NICE, 2003) recommend that all diabetes patients should have access to structured education and, along with the Department of Health and Diabetes UK, state that interventions should:

- Be evidence based;
- Have specific aims and objectives;
- Have a theory driven curriculum with effective supporting materials;
- Be delivered by educators trained in education theory;
- Be quality assured and reviewed by independent assessors;
- Be regularly audited to determine outcomes.

Currently no single education programme fulfils all the criteria, but progress is being made. A recent systematic review and meta-analysis of self-management interventions for type 2 diabetes (Bolen, et al., 2014) concluded that education interventions can improve HbA_{1c} in adults with type 2 diabetes and recommended that they are delivered within primary care for those with uncontrolled glycaemia.

3.1 Type 1 diabetes

3.1.1 Dose Adjustment For Normal Eating (DAFNE)

DAFNE (http://www.dafne.uk.com/) is a structured education course delivered as a 5 day intensive programme for patients with type 1 diabetes. The course teaches patients how to adjust their insulin dose in line with the food they wish to eat, rather than working their diet and life around the doses. DAFNE encourages and enables people to self-manage their insulin regimes.

There is a solid evidence base surrounding DAFNE from the past 25 years including randomised controlled trials (RCTs) in Northern Europe and economic analysis in the UK. DAFNE results in clinically and statistically significant improvements in glycaemic control and quality of life (DAFNE Study Group, 2002) and is cost effective, paying for itself within 4-5 years due to the reduction in the rate of complications (Shearer, 2004).

DAFNE is delivered Monday-Friday 9.00am-4.30pm by a trained DSN and/or a dietician. Full costs associated with the programme are available online at: http://www.dafne.uk.com/Cost_of_delivering_DAFNE-I368.html.

3.2 Type 2 diabetes

3.2.1 Diabetes Education and Self-Management for Ongoing and Newly Diagnosed (DESMOND)

DESMOND is the name given to a family of structured self-management education modules, toolkits and care pathways for people diagnosed with, or at risk of, type 2 diabetes (Table 1).

The programme has been the subject of a large well conducted randomised controlled trial (RCT), (Davies, et al., 2008), a 3 year follow up study (Khunti, et al., 2013) and cost effectiveness evaluation (Gillett, et al., 2010). The RCT and 3 year follow up reported a reduction in HbA_{1c} in both the intervention and control groups, although there was no significant difference in the reduction between the two groups (1.49% vs. 1.21% for the RCT). However, the intervention group had a greater understanding of the disease which was maintained at the 3 year follow up.

Programme	Target population	Delivery method	Content
Walking away	At risk	3hrs, 2 educators, ≤ 10 participants, Community setting	Type 2 diabetes and blood glucose, risk to long term health, risk factors, reducing risk, planning for the future
Newly diagnosed	Within 12 months of diagnosis	6hrs (1 day or 2 half-days), 2 healthcare professionals, ≤10 participants, Partner/friend attend, Community or healthcare setting	Understanding diabetes and glucose, Risk factors, Monitoring and medication, Taking control with food and Physical activity, Planning for the future
Foundation	Established diabetes		

Table 1: Current programmes offered by DESMOND

The results from the initial RCT and follow up suggest that ongoing education may be more effective at reducing HbA_{1c} levels than one off interventions. Trials are in progress to assess the effect of offering ongoing, rolling education sessions, delivered over 2 years on maintaining clinical outcomes.

3.2.2 X-PERT

X-PERT is a patient centred, group-based self-management programme (http://www.xperthealth.org.uk/, 2014). It aims to develop the skills, knowledge and confidence of participants so they can make informed decisions about their lifestyle and management of type 2 diabetes. It is open to both newly diagnosed patients and those with established diabetes. One RCT

carried out in the UK reported a significant reduction in HbA_{1c} levels for the intervention group compared to the control group (-0.6% vs. +0.1%) as well as positive improvements in waist circumference and BMI (Deakin, 2006). A review of the cost-effectiveness of 7 trials studying lifestyle modification for type 2 diabetes concluded that X-PERT was the most cost effective with ≥0.10 QALYs gained and a 99% probability of being very cost-effective (≤€20,000/QALY) (Jacobs-van der Bruggen MA, 2009). The programmes comprises weekly 2 hour group sessions delivered over 6 weeks.

4.0 Conclusions

Joined up, integrated care for diabetes patients should ensure that care is delivered in the most appropriate place for the patient. This co-ordination could result in better patient outcomes in the short- to long-term and a possible reduction in unplanned hospital admissions in the longer term.

Diabetes UK has defined key enablers of integration (Diabetes UK, 2013), many of which are apparent in the models presented in the previous sections.

These enablers are:

- **Integrated IT**:

  All providers in a pathway use the same IT system. In Derby all GP practices and hospitals use SystmOne, making the referral process more efficient. In Wolverhampton patient data are uploaded to a central portal which stratifies patients according to risk. The results are used to decide where care is best delivered to the patient, again enabling earlier treatment and with the intention to reduce emergency admissions.

- **Aligned finances and responsibility**:

  Payment systems and funding should be altered to support the delivery of care according to the new service model.

  It should be clear who does what in practice. In Portsmouth and Leicester, consultant diabetologists focused on the Super Six specialist areas of care in the hospital, with all other care referred to the community. In Portsmouth, diabetologists had two roles: to provide specialist hospital care and to act as specialist educators to ensure the requisite skills were available in primary and community care.

- **Care planning**:

  Ensuring patients have active involvement in their care, working with clinicians to identify needs, develop and implement action plans and monitor progress. In Wolverhampton, patients are sent a questionnaire before their annual review, giving them time to think about their priorities before discussion with their clinician.

- **Clinical engagement and leadership**:

  To maximise the chances of success all relevant healthcare professionals and stakeholders should be involved in collaborative discussions at an early stage. In NW London discussions involved chief executives, commissioners, GPs and diabetologists as well as Diabetes ULK and Age UK.

Clinicians must be engaged and involved. In NW London, clinicians had concerns about the effect of the pilot to their position and current way of working whilst in Portsmouth there were concerns about a lack of expertise in primary care.

- **Clinical governance**:

  A clear and effective clinical governance structure helps to align the ambitions of clinicians with those of commissioners and people with diabetes. In Derby there was a single clinical governance structure as the service is jointly led by a GP and consultant.

5.0 Recommendations

Based on the evidence we recommend collaborative working across primary and secondary care boundaries and with relevant local CCGs. We recommend that any new model of diabetes care should:

- Follow the principles of the Portsmouth 'Super Six' model;
- Feature patient education to support successful self-management;
- Feature professional education.

The 'Super-Six' conditions (section 2.1.4) should remain under secondary care. All other aspects should move to primary care. Portsmouth and Derby have adopted this principle in two different ways. In Portsmouth a community consultant diabetes team was established comprising secondary care consultants. They retained their hospital specialist role and took on an educator role to support primary care. In Derby a new not- for-profit joint venture was formed and a team of hospital consultants, nurses, healthcare assistants and dieticians work on one site. They also provide training and advice to GPs and practice staff. Primary care staff should be educated by secondary care staff to enable care for more complex patients within primary care. All diabetes patients should receive education to support self-management, including those at risk of developing type 2 diabetes.
An ongoing programme of education for those with established disease is recommended.

Any model should have realistic short and long term goals. Outcome measures for any evaluation should be set prior to implementation and monitored quarterly. The acute setting is a costly and often inappropriate place to care for long-term condition such as diabetes. The model proposed here would shift the majority of diabetes care to the primary care setting which could improve outcomes for patients and have the potential for cost savings in the longer term.

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