

Technology and Innovation in the NHS Diabetes Scotland

Scotland has the fifth highest incidence of Type 1 diabetes in the world and has an increasing prevalence of people with Type 2 diabetes. One in five people are living with, or at risk of, diabetes. There are more people living with diabetes in Scotland than with coronary heart disease, and all cancers combined. At any time between 15 – 20 per cent of patients in Scottish hospitals have diabetes.

Diabetes costs NHS Scotland around £1 billion each year, of which approximately 80 per cent (£800 million) is spent treating potentially avoidable complications. Furthermore, around 12 per cent of the total inpatient budget in Scotland goes on treating diabetes and its complications.

The complications of diabetes mainly arise through poor glycaemic control where blood sugar levels are often too high, causing damage to organs. This damage builds up over time and has a cumulative effect. In the past 3 years there has been a revolution in the development of technologies that help people maintain good glycaemic control, tackle the misery of diabetes complications and bring down the economic cost of diabetes to the NHS in Scotland. The response to this opportunity has been partial and has been slow, and at present it falls far short of seizing the benefits that technology-supported transformation could deliver.

1. What do you consider have been the main successes of the existing Scottish Government's eHealth and telecare/telehealth strategies and why?

Scottish Government has facilitated the increase in the use of Insulin Pump therapy over the past six years that has seen the uptake grow from 2.5 per cent of the Type 1 diabetes population to 9.5 per cent.

Scottish Government announced in December 2016 of £10 million in additional funding for increased provision of technology for people living with Type 1 diabetes. This has been marked to increase the number of adults accessing Insulin Pump therapy and to increase the availability of Continuous Glucose Monitoring devices (CGM). CGM measures blood sugar levels continuously through the day and night, meaning that people do not have to prick their fingers to test sugar levels up to 10 times a day and in many cases, when linked to a pump, that families do not need to wake their children during the night for testing.

My Diabetes My Way (MDMW) is NHS Scotland's information portal for diabetes that gives patients access to their records, test results, clinical letters and treatment plans. It is a valuable resource in helping people self-manage their condition. The site contains educational materials, videos and interactive tools supporting education and self-management.

2. What do you consider have been the main failures of the existing Scottish Government's eHealth and telecare/telehealth strategies and why?

Scottish Government is hoping to raise the number of adults on Insulin Pump therapy to 8 per cent in each Health Board and double the number of people using CGM to 111 by the end of 2018. While this is positive, more effort is required to ensure that everyone can get access to the technology which will support them to manage their diabetes well. In the United States, for example, 40 per cent of people with Type 1 diabetes have insulin pumps.

In respect of MDMW, in 2016 nearly 17,000 people had been signed-up to use this service. However this service is under-utilised. There are nearly 300,000 people in Scotland with diabetes. In addition, while an interface is provided to allow patients to upload test results via MDMW, there is no consistent infrastructure within the NHS in Scotland to facilitate a "virtual ward" where people can avoid having to go to hospital appointments in person and instead receive their help and support through digital means from consultants and nurse specialists.

Additionally, we need to see strategic investment in staff training for emerging technologies to ensure they can support people living with the condition. The 2014 Diabetes Improvement Plan sets out no targets for the development of relevant staffing or skills in Scotland.

One of the issues with the last target of the uptake of Insulin Pump therapy was the lack of capacity to carry out the implementation and the communication to patients of the benefits, there was enough funding for the materials but there was not the staff and knowledge to fulfil the target across all Health Boards. On 21 October 2011, the Cabinet Secretary for Health, Wellbeing & Cities Strategy announcedⁱ the decision to commit NHS to substantially increasing the availability of insulin pump therapy across Scotland to ensure equity of access: "a quarter of young Scots with type 1 diabetes must have access to insulin pumps by March 2013". By this date only two of the fourteen Health Boards had achieved this target, the main reason put forward for this was a combination of a lack of local health board in-house training and a failure to articulate the benefits of the technology to the people with the condition. With any strategy there must be the provision for the technology and also the training and staff to deliver for the patient.

A survey undertaken by Diabetes UK of Diabetes Specialist Nursesⁱⁱ (DSN) found that 45 per cent of respondents said that DSN posts have been regraded at a lower band, despite the specialism of the role intensifying. The down grading of staff posts at a time when specialist skills are required to implement the roll-out of the new technologies, is particularly worrying.

3. How well does the Scottish Government's draft Digital Health and Social Care Vision 2017-2022 address the future requirements of the NHS and social care sector?

4. Do you think there are any significant omissions in the Scottish Government's draft Digital Health and Social Care vision 2017-2022?

(Question 3&4 have been answered together) The high level vision is positive but it will be the strategy beneath the vision that will need to articulate Scottish Government's blueprint and approach. Enabling self-management is key to mental and physical health of people with diabetes and must be reflected throughout the strategy. Diabetes Scotland hopes that the issues highlighted in this submission will be promoted in the subsequent strategy.

5. What key opportunities exist for the use of technology in health and social care over the next 10 years

[The Modern Outpatient: A Collaborative Approach 2017-2020](#) has the aim of reducing wasted hospital appointments, addressing issues of rurality and bringing about service transformation. People with Type 1 diabetes are managed in secondary care and acute services. Disengagement from services risks some people not receiving the support they need to maintain glycaemic control and avoid complications.

With technology, people can be managed nearer home and still be getting the expertise they need, meaning that they do not have to take days off work or off school, while reducing wasted hospital appointments where people simply don't attend because of other pressures in their lives. This is particularly important in facilitating a reduction in health inequalities. In Diabetes Scotland's consultations with service-users, we are frequently told that there are physical barriers to engaging with Type 1 diabetes services including attendance at benefits meetings, zero-hours contracts, hourly-paid work and self-employment. In other words, it appears that those further down the socio-economic spectrum are most likely to find engagement challenging.

Advances in communication technology has changed how people can access their health services. For example Skype consultations are beginning to be used – especially linked to downloaded information from pumps or monitors – and this is proving effective at better managing time in appointments and reducing do not attend (DNA) rates. This kind of resource is already utilised in the NHS Highlands, NHS Orkney and NHS Shetland. In other areas e-mail and text support is becoming more common. Working round patient's lives, smartphone apps such as [Florence](#) and [Diabetes Nurse](#) can help manage and reduce risk by using technology in an innovative way. Diabetes is self-managed by patients 24 hours a day, 365 days a year. It does not only need support 9-5 Monday to Friday. Technology that provides opportunities for out-of-hours support and potentially avoids costly hospital admissions, needs to be considered as part of the overall mix.

Unlike Type 1 diabetes, which cannot currently be prevented, onset of Type 2 diabetes can be prevented or delayed. Early identification of people at risk is essential. It is estimated that 1.1 million peopleⁱⁱⁱ are at increased risk of developing Type 2 diabetes, that is one in five adults in Scotland. Many factors influence an individual's risk including obesity, age, physical activity and a family history of the condition. People from certain

communities and population groups are at higher risk, including those from lower socio-economic groups, people of South Asian, African Caribbean, Black African and Chinese descent. Interventions targeting at risk groups are considered cost effective based on economic evaluations.

Many people develop diabetes as they get older with prevalence rising fastest in the over 65 age group. This does not mean that such patients should be excluded from e-health opportunities. Diabetes Scotland has been running Diabetes at Your Fingertips (DEFT) in Glasgow over the past three years, using e-learning (specifically modules of Type 2 diabetes and Me) to engage older adults as well as provide them with the necessary skills to access diabetes information online. The programme used tablets with older adults who were not as confident with computers and the internet and showed them how to navigate the internet and find reliable health information and services online. This resulted in increased skills in using the internet to access local resources/activities and national health information. Roughly only 10 per cent of people who started DEFT sessions had used the internet before. The DEFT sessions work towards the Scottish Government's visions for our aging population following the Digital Inclusion Strategy where information technology can impact positively in many ways to the lives of older people.

Diabetes is a very complex condition and undertaking a structured course to better understand the condition, and how to manage, it is recommended in the clinical guidelines for diabetes. The evidence base for group based education is extremely strong, significantly improving long term glycaemic control^{iv} for both Type 1 and Type 2 diabetes, body weight for people with Type 2 diabetes^v and reduced anxiety and depression for people with Type 1 diabetes^{vi}. Diabetes education courses make living with diabetes easier. However, attending a course can be a big time commitment, and will often involve time off work. Helping to fit this around patient's lives, using technology, can be a natural fit and increase the uptake of structured education, giving people the tools and confidence to manage their condition. In America, a randomized controlled trial^{vii} evaluated the effects of web-based diabetes education on HbA1c levels and health check attendance. Participants in both the experimental and control groups had completed basic diabetes education prior to this study. After six months of individualized patient education delivered over the web, the experimental group had significant decreases in HbA1c and significantly higher health check attendance rates compared to the control group who received education from a diabetes nurse in a clinic setting.

All these examples show how investment in technology and e-health fit with current Scottish Government priorities and will deliver economic savings, social savings and tackle health inequalities in the years to come.

6. What actions are needed to improve the accessibility and sharing of the electronic patient record?

The eHealth Strategy 2014 – 2017 says patients will be able to use a patient portal to access their own Personal Health Record and make their own contributions to the record by 2020. Recent analyses have shown that results such as HbA1c, weight, and blood

pressure improve following use of MDMW. Patients also report improved knowledge of diabetes and motivation to manage it effectively. However, integration of MDMW with primary, community and acute hospital records is key.

7. What are the barriers to innovation in health and social care?

The first barrier to innovation in relation to diabetes, is lack of forward planning at both national and Health Board Levels. Technology to manage Type 1 diabetes is developing rapidly, with further advances such as closed loop systems and artificial pancreas due in the next few years. Scotland needs to have a plan to:

- Create the infrastructure for e-health for diabetes
- Support early adoption as products become available
- Plan and develop a workforce fit for the digital age
- Assist Health Boards to feel confident making investments in diabetes technology by providing an evidence base of the way in which technology assists people to maintain good glycaemic control and avoids unnecessary A&E attendances, and unnecessary hospital admissions and hospital stays
- Assist Integration Joint Board's (IJB) to make investment decisions in digital primary prevention in relation to Type 2 diabetes, in secondary prevention, and especially in relation to diabetes education.

The Scottish Diabetes Improvement plan 2014 does not comprehensively cover these areas and work needs to accelerate significantly if Scotland is to achieve World class diabetes care.

Health Boards and IJB's need to include in their plans the need for technology-enabled diabetes care – in their e-health plans, their workforce plans, their plans for the implementation of the Modern Outpatient agenda and in longer-term financial plans.

The need to self-fund is currently a barrier to uptake of innovative technologies for people living with diabetes. A current example of this is flash monitoring, a way of recording blood sugar levels continuously that can be accessed by scanning a sensor attached to the skin. The only current monitor available in the market is the FreeStyle Libre. However this is not available through the NHS.

A recent study^{viii} by Prof JA McKnight and Dr FW Gibb in Edinburgh, describes the experiences of 130 people with Type 1 diabetes, all of whom had self-funded the use of flash glucose monitors. Those using the monitors had greater reductions in HbA1c than non-users and a higher proportion reached their glycaemic targets. Assessing this according to the Scottish Index of Multiple Deprivation (SIMD), 60% belonged to the least deprived quintile with only 4% in the most deprived quintile. This means that those able to fund the £110 a month cost benefited most.

Technological advances have the potential to improve people's lives with this condition, however if the people from the most deprived backgrounds do not have equal access to these innovations it will widen the health inequalities gap for people living with diabetes. Investing in technology now will bring economic and social benefits for the future.

Any Scottish Government strategy must ensure that technology helps tackle this issue and bridges the gap in health inequalities.

About Diabetes Scotland

Our vision is of a world where diabetes can do no harm. As the Scotland's leading diabetes charity, our mission is that by bringing people together to work in partnership, we will support those living with diabetes, prevent Type 2 diabetes, make research breakthroughs, and ultimately find a cure.

ⁱ [CEL 4 2012](#), Scottish Government

ⁱⁱ An online survey was carried out by Diabetes UK between March and June 2016. There were 59 respondents in Scotland, around half of the country's DSN workforce.

ⁱⁱⁱ [State of the Nation 2015](#) Diabetes Scotland p.6

^{iv} DAFNE Study Group (2002). Training in flexible, intensive insulin management to enable dietary freedom in people with Type 1 diabetes: dose adjustment for normal eating (DAFNE) randomised controlled trial. *British Medical Journal* 325; 746

^v Steinsbekk A, Rygg LO, Lisulo M et al (2012). Group based diabetes self-management education compared to routine treatment for people with Type 2 diabetes mellitus. A systematic review with meta-analysis. *BMC Health Services Research* 12; 213

^{vi} Hopkins D, Lawrence I, Mansell P et al (2012). Improved biomedical and psychological outcomes

1 year after structured education in flexible insulin therapy for people with Type 1 diabetes.

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^{vii} The effects of web-based diabetes education on diabetes care results: a randomized control study. Avdal EU, Kizilci S, Demirel N *Comput Inform Nurs.* 2011 Feb; 29(2 Suppl):TC29-34.

^{viii} Flash glucose monitoring is associated with improved glycaemic control but use is largely limited to more affluent people in a UK diabetes centre, J. A. McKnight, F.W. Gibb, *Diabetes Medicine* Vol. 34, No. 5, May 2017 p. 732