Diabetes Care in Scotland

Progress against National Priorities

2014 - 2020

Scottish Government
Riaghaltas na h-Alba
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Table of Contents

Clinical Foreword

The last year has resulted in unprecedented disruption to healthcare services and life in general. All areas of our society have been affected and yet as individuals, teams and communities we have adapted to meet those challenges. The Scottish diabetes community is no different and although many services underwent significant reconfiguration at the start of the COVID-19 pandemic many are now considering within the recovery phase how to ensure the impact on individuals with diabetes is minimised as best we can. As the evidence base grows, highlighting the increased risk of severe COVID for those with comorbidities such as diabetes and obesity, now more than ever it is vital we consider how best to support individuals to optimise their health and wellbeing.

The refresh of the Diabetes Improvement Plan is therefore timely as it allows us to review the progress we've made since the original plan of 2014 and also consider the opportunities that exist to drive ongoing improvements in diabetes care.
A detailed breakdown of the progress against each priority is outlined in this document. Examples of this progress includes a significant increase in the number of children and adults with type 1 diabetes accessing technologies such as insulin pumps and glucose monitoring devices. Other national initiatives focusing on improving type 1 diabetes care include a DKA prevention campaign, supporting children and young adults at school and early glycaemic intensification at diagnosis.

The significant investment in the *Type 2 Diabetes Prevention Framework* has allowed us to develop an infrastructure across Scotland to help realise its aims of preventing and improving the identification of type 2 diabetes, with the realistic goal of achieving remission with early intervention. The forthcoming national type 2 diabetes structured education package is also a welcome addition to help standardise care across Scotland and wider roll out is imminent.

We have made progress in improving the care of individuals with diabetes admitted to hospital with the roll out of the Diabetes Think, Check, Act programme. This has helped improve the timely management of acute issues such as hypoglycaemia and

also upskilled healthcare professionals to identify and manage diabetes in an in-patient setting.

We've also seen Scotland leading the way internationally, using data from SCI-diabetes, to produce world class epidemiological research that helps inform policy and care models. The development of the diabetes dashboard has also been a significant advance allowing ready access to 'real time' data at national, regional, local and individual level to help drive improvements to care and outcomes. The diabetes community is also actively involved within the innovation landscape and outputs from this will help ensure that ongoing care models evolve to meet the challenges of delivering diabetes care in a rapidly changing environment.

The eight priority areas with the refreshed Diabetes Improvement Plan remain the same with an ongoing focus on optimising glycaemic control, preventing and early detection of type 2 diabetes and minimising the risk of complications. Supporting self-management, optimising mental wellbeing and upskilling healthcare professionals all remain key to optimising outcomes. The ongoing focus on in-patient care is also important given the adverse outcomes seen in those with diabetes admitted to hospital.

Driving improvement is a challenge. Timely access to data is vital and within diabetes and we are fortunate that ongoing development of SCI-diabetes means we remain well placed to capitalise on this to evolve and evaluate care processes and outcomes. Embracing innovation to ensure we maximise the benefits of the rapidly expanding number of interventions that we can offer individuals with diabetes remains a priority area. This is particularly important in relation to technologies such as Artificial Pancreas Systems which have the potential to fundamentally change how we deliver type 1 diabetes care.

The way we develop and evolve care models to address these priorities and meet the challenges faced by individuals, systems and society is key to improving outcomes and mitigating risk. For many years we have looked to implement virtual diabetes care models and improve areas such as connectivity with technologies and yet overnight

these have become the ‘new norm’. We need to ensure that future models of care are fit for purpose not only within the COVID era but also address many of the issues which drive existing health inequalities such as deprivation and ethnicity.

As such, we need to be mindful of the unintended consequences of service redesign and ensure that individuals and groups, who are often the most vulnerable, are not left behind and inequalities widen. Involving people with diabetes, understanding and mitigating against the risk of exclusion and offering services that adapt to individual need is key to improving the care and outcomes for all.

I’d finally like to thank all of you within the Scottish diabetes community and beyond who have been instrumental in implementing the Diabetes Improvement Plan and driving forward improvements in care. We should take time to reflect on the progress we have made and to celebrate our successes. However, there is still much to be done and the refreshed plan allows us to refocus our efforts, consider collaboratively how we progress the priorities and commitments within the plan, aimed at improving the care and outcomes of individuals living with diabetes in Scotland.

Professor Brian Kennon
Chair of the Scottish Diabetes Group

Diabetes Improvement Plan 2014

The Diabetes Improvement Plan 2014 highlighted eight national priority areas, agreed through consultation with the diabetes community, to improve the experience and clinical outcomes for people living with diabetes. These priority areas were identified to be specific challenges for Scotland; areas where examples of good proactive activity already existed and where a focused effort on improvement could have an impact. These priorities were:

Aim: To improve the experience and clinical outcomes for patients living with diabetes across Scotland.

Prevention and Early Detection of Diabetes and its Complications To establish and implement approaches to support the prevention and early detection of type 2 diabetes, the rapid diagnosis of type 1 and the implementation of measures to promptly detect and prevent the complications of diabetes.	**Type 1 Diabetes** To improve the care and outcomes of all people living with type 1 diabetes.
Person-Centred Care To ensure people with diabetes are enabled and empowered to safely and effectively self-manage their condition by accessing consistent, high quality education and by creating mutually agreed individualised care plans.	**Equality of Access** To reduce the impact of deprivation, ethnicity and disadvantage on diabetes care and outcomes.
Supporting & Developing Staff To ensure healthcare professionals caring for people living with diabetes have access to consistent, high quality diabetes education to equip them with the knowledge, skills and confidence to deliver safe and effective diabetes care.	**Inpatient Diabetes** To improve the quality of care for people living with diabetes admitted to hospital by improving glucose management and reducing the risk of complications during admission.
Improving Information To ensure appropriate and accurate information is available in a suitable format and effectively and reliably used by all those involved in diabetes care.	**Innovation** To accelerate the development and diffusion of innovative solutions to improve treatment, care and quality of life of people living with diabetes.

The diabetes landscape has changed radically in recent years with greater emphasis on self-management, use and choice of technology and risk stratification for prevention and remission of type 2 diabetes. In addition to this there is a wide range of government policy which fits with improving the health of people with diabetes. The response to the ongoing COVID-19 pandemic has required everyone supporting diabetes care to work differently and as we continue to respond to this it is vital that we revise care models to ensure they meet the challenges of healthcare delivery with the restrictions that we now live with.

It is timely therefore to take this opportunity to reflect on the priorities agreed previously, outline the breadth of activity that has taken place against the actions agreed to support improvements and consider ongoing and new areas of focus for 2021 – 2026 to support continued improvements in the experiences and outcomes of people living with diabetes. This report covers the progress to date and is published in conjunction with the refreshed Diabetes Improvement Plan 2021 – 2026.

Interaction with other Scottish Government Policies

This report sits alongside a wide range of government policy. In particular, this report should be read alongside our diet and healthy weight policies, our mental health strategy, our Technology Enabled Care programme and the Scottish Access Collaborative and Modernising Patient Pathways Programme. We seek coherence with a range of other policy areas and we will continue to work collaboratively across the Scottish Government to ensure that appropriate links are made and maintained.

Successes in healthcare which have resulted in people living longer have brought about new challenges; such as older people living with multiple conditions and additional complexity, both in their experience of illness and care. People working in health and social care and people who use services are encouraged to consider the values and the behaviours that underpin good experience. The ethos of Realistic Medicine is to support meaningful conversations with people to plan and agree care around what matters most to people with a shared understanding of what healthcare might realistically contribute to this.

Tackling unwarranted variation is essential to improving outcomes derived from healthcare across Scotland. Unwarranted variation is variation in healthcare that cannot be explained by need, or by explicit patient or population preferences. We need to ensure the prevention of harm and waste from overuse and overtreatment, freeing up resources currently used without benefit to clinical outcomes in order to address under-provision of care. The Scottish Atlas of Healthcare Variation, produced by Public Health Scotland, aims to highlight geographical variation in the provision of health services and associated health outcomes.

Sitting above all of these policies is Scotland's National Performance Framework. Two of the aims of the Framework are to increase the wellbeing of people living in Scotland and to reduce inequalities. The new national diabetes priorities will contribute to the National Performance Framework and its outcomes. We will know this by measuring progress against the following performance indicators: Healthy life expectancy, Health risk behaviours, Quality of care experience, Premature Mortality.

The Scottish Government's Programme for Government 2020/21 has been launched and there are many parallels between this programme and the commitments outlined in this refresh of the diabetes improvement plan[i]. This includes the commitment to the Type 2 prevention work stream to increase access to weight management services for all adults living with obesity and commitments to improve the lives of young adults, focus on mental health issues, digital exclusion and health inequalities.

Progress against Diabetes Improvement Plan 2014

Significant progress has been made against all of the priority areas in the Diabetes Improvement Plan 2014. The information below outlines the aim of each priority and a brief overview of this topic as highlighted in the 2014 plan. To support the implementation of the 2014 plan, 21 actions were agreed and an update on the activity which has taken place against each action is provided. Progress against each of the priority areas was monitored regularly from 2014 to 2020 and our understanding of this progress helped us to determine which areas required further development in the refreshed Diabetes Improvement Plan 2021.

Priority 1 - Prevention and Early Detection of Diabetes and its Complications
To establish and implement approaches to support the prevention and early detection of type 2 diabetes, rapid diagnosis of type 1 and to implement measures to promptly detect and prevent the complications of diabetes.

The Diabetes Improvement Plan 2014 highlighted the need for the diabetes community to work alongside public health colleagues to support prevention of type 2 diabetes and signpost people at risk of developing diabetes towards relevant information and services. Supporting people to understand the risks and learn what can be done to manage them can delay or prevent the onset of type 2 diabetes.

Type 1 diabetes presents more acutely, but early identification and urgent treatment can prevent the development of life threatening diabetic ketoacidosis (DKA). Understanding the signs and symptoms of type 1 diabetes is critical for early identification and treatment of type 1.

Approximately 80% of diabetes complications are preventable or can be significantly delayed through early detection, good care and access to appropriate self-management tools and support. People living with diabetes are encouraged to engage with health services regularly to enable early detection of complications and treatment to prevent or delay further deterioration.

Action 1.1 Enhance strategies to support people at risk of developing diabetes and early identification of those with diabetes

Prevention, Early Detection and Early Intervention of Type 2 diabetes

The *Framework for the Prevention, Early Detection and Early Intervention of type 2 diabetes* was launched in July 2018[ii]. To support the implementation of this framework the Scottish Government committed significant investment over 5 years. Three early adopter areas were identified (Tayside, East Region (Fife, Lothian and Borders) and Ayrshire and Arran) in September 2018 and all other Boards provided with the opportunity to apply for seed funding to scope how the framework could be implemented in their area. Since then, all 15 NHS Boards have come on stream and continue to receive funding annually to support implementation of their plans.

There are a number of specific work streams within this agenda. National milestones have been agreed with the T2D Framework oversight groups in each health board to ensure progress towards delivery is monitored, supported by the SG Diet and Healthy Weight team. These work streams are summarised below:

- Adoption of the Counterweight Plus Programme as the tool for Type 2 Diabetes remission. Counterweight Plus is a total diet replacement programme delivered in line with the DIRECT study evidence base[iii]. It involves a minimum of 1 year of intensive dietetic intervention and meal replacements, followed by a period of food reintroduction. Clinical measures are taken, monitored and analysed throughout.
- Promotion, implementation and delivery of structured patient education programmes for people diagnosed with pre-diabetes, or at high risk of developing Type 2 Diabetes, that are integrated with subsequent tier 2 and/or 3 weight management pathways if needed to provide a menu of options to suit the health needs of this population.
- Confirmed and operationalised pathways for gestational diabetes (GDM) education to ensure consistent, high quality education for women with GDM, with additional dietary and lifestyle support during pregnancy for those women

who need it most. These pathways should extend to post-partum stage, improving follow up rates for all women with GDM, with timely access to Type 2 diabetes prevention education and appropriate weight management if sought and required by women.

- To support early identification of people with Type 2 diabetes another area of focus is around risk stratification, promotion of self-assessment tool to access risk and targeted screening for those identified as moderate to high risk.
- Operationalised pathways that ensure those newly diagnosed with Type 2 diabetes get access to accredited and validated diet and lifestyle type 2 Diabetes structured education with seamless links to tier 2 and 3 weight management programmes, remission programmes and bariatric surgery where appropriate.

Across all disease areas in response to COVID-19 virtual care models are becoming the norm. Digital solutions, such as Near Me, are now the cornerstone of clinical care. In addition, virtual and digital solution are being developed to replicate many of our face to face interactions. To support the roll out of the Framework, a virtual information sharing event took place in May 2020 to showcase the current solutions being utilised by some boards and discuss various options and levels of input across adult and child healthy weight, GDM, pre-diabetes and type 2 Diabetes. A market review has been undertaken for the Scottish Government's Diet and Health Weight Team by the Digital Health and Care Institute (DHI) improve access to digital programmes.

SIGN Update: Prevention of Type 2 diabetes

The Scottish Intercollegiate Guideline Network (SIGN) are developing an update to their existing guideline Management of Diabetes (SIGN 116) in relation to the Prevention of Type 2 diabetes.

Action 1.2 Earlier identification of the diagnosis of diabetes and its complications

Prevention of DKA at diagnosis of Type 1 diabetes

In Scotland, over 30% of people diagnosed with type 1 diabetes have the life threatening condition diabetic ketoacidosis (DKA) and this rises to nearly 40% in those

under the age of 5. A national education campaign on the early detection and urgent referral for those with new onset type 1 diabetes was launched in 2015 to increase awareness of this condition and provide guidance to support generalist care. The campaign centred on Think, Test, Telephone (3Ts) and encouraged people to question if symptoms looked like diabetes. People were advised to test immediately using a finger prick blood glucose and if identified telephone the diabetes centre so they could be reviewed by diabetes specialists that day.

Revision of the diagnostic information pages on SCI-Diabetes now allows capture of detailed information at diagnosis of type 1 diabetes including DKA status and requirement for admission. This will help assess the impact of the Think, Test, Telephone campaign. Refinements of the diabetes dashboard recently developed within SCI-Diabetes will include a focus on these metrics to further drive improvements.

A recent publication reviewing deaths in Scotland for those with type 1 diabetes highlighted that although absolute mortality has fallen, the relative impact of type 1 diabetes on mortality below 50 years has not improved. Key areas to consider are premature circulatory diseases and excess deaths related to DKA[iv]. Given these findings the DKA prevention campaign will be extended to include those with existing type 1 diabetes as well as potential new presentations.

Nine Processes of Care

Screening for diabetes complications enables care to be optimised when complications are developing. For adults living with diabetes, there are nine processes of care that are currently checked on an annual basis and Managed Clinical Networks are required to report on performance and progress against this.

One of the challenges impacting on performance of screening uptake has been the loss of the Quality Outcome Framework in primary care which linked payment with screening uptake. It is noted however that while this may have contributed to a reduction in the number of people with type 2 diabetes getting all nine processes of care undertaken, there has also been a reduction in performance for people with type

1 diabetes who are primarily looked after within secondary care. The 2019 Scottish Diabetes Survey reports that the number of adults who have foot screening recorded is 57% and 65% for type 1 and type 2 diabetes respectively. It is noted that while individuals with type 1 diabetes are more likely to attend diabetes specialist clinics, they are less likely to get their feet examined despite being twice as likely to develop a foot ulcer compared to people with type 2 diabetes. We are mindful that the ending of the Quality Outcome Framework and new developments in primary care bring new challenges but also opportunities and we need to enhance the interface between generalist and specialist care to improve quality.

The e-learning resource, Foot Risk Awareness and Management Education (FRAME)[v] was commissioned by the Scottish Government to upskill and help standardise diabetes foot screenings performed by health care professionals. Information leaflets for people living with diabetes tailored to the person's individualised foot risk are available for sharing following foot screening in a variety of languages.

In 2017 posters featuring a prominent Scottish comedian focusing on diabetes and the importance of the nine processes of care were issued to every community pharmacy across Scotland. As well as demonstrating the checks that people with diabetes should have to help detect and reduce their chances of complication this poster campaign also directed people to areas of further support eg *My Diabetes, My Way*, Diabetes Scotland and their local pharmacy.

One local example of good practice around this is demonstrated in NHS Fife where they have developed local posters for displaying in clinic areas their performance in the last month for each of the measures of care alongside promotion of why the checks are important. Other health boards share information of the essential health checks with patient appointments to encourage greater uptake of these.

Our response to the ongoing COVID-19 pandemic has required diabetes teams to consider revising care models to ensure they meet the challenges of healthcare delivery with the restrictions that are likely to be in place for some time. There are opportunities to further develop existing care models in line with the 'House of Care'

philosophy and utilise community hubs to develop a robust approach to screening and the surveillance of diabetes, and other long term conditions, to address the decline in monitoring.

Being mindful of the principles of realistic medicine changes to the regularity of some of the processes of care for some people will take place in the near future with retinal screening and foot screening moving to two year intervals for individuals deemed at low risk. There is opportunity to review this further to ensure that where possible we are providing an evidence based personalised approach to care which supports shared decision making.

Alongside any changes that evolve there is a need to continue to promote the value of these processes of care being undertaken to health professionals and people living with diabetes is noted.

Reducing Microvascular Complications

In 2016, a national campaign to support the prevention of complications by improving glycaemic control *'Know Your Numbers'* was launched and information resources were developed. These included posters, banner stands and leaflets to encourage people with type 1 diabetes to know what their blood glucose levels mean and what they should be aiming for. These were provided to all diabetes centres across Scotland and these continue to be a core component of person centred care and agenda setting. Separate materials were developed specific to adults and children with type 1 diabetes and more recently this format has been used to develop 'Know Your Numbers' materials to support people living with type 2 diabetes.

Heel Ulcer Prevention

The Check, Protect, Refer (CPR) for Feet initiative aims to ensure all individuals with diabetes who are admitted to hospital have their feet checked on admission, if they are at risk of developing a foot ulcer their feet are protected and if they have a current foot ulcer they are referred appropriately[vi].

Developments to SCI-Diabetes has led to the development of the Ulcer Management System where clinicians are asked to record all foot ulcers. This has resulted in over 5,000 ulcers being recorded now with an overall prevalence of around 1.7%. There is however a wide range of results across health boards, ranging from 1.1 to 2.2% for type 2 prevalence and 1.6 to 3.9% for type 1 diabetes. Further promotion of this should see improvements in recording all new episodes of ulceration on SCI- Diabetes and the variation in prevalence decline.

Retinal Screening

In 2016, the National Screening Committee recommended that people with diabetes who have a low risk of sight loss, receive screening every two years instead of every year, as is the case currently. Those people at high risk of sight loss will continue to receive annual screening. It was also proposed that the Optical Coherence Tomography (OCT) Surveillance Cycle be managed and delivered from within the DRS Programme.

Out of Hours Care

To support improvements in care for people living with diabetes out of hours, some partnership working is underway with the Scottish Ambulance Service and NHS24.

The Scottish Ambulance Service and NHS Fife are working together to better manage hypoglycaemia in their patients with diabetes. NHS Fife have developed a triage process to follow-up and manage people with diabetes who have experienced a hypoglycaemic event which results in an ambulance call out. Clinical systems between the Scottish Ambulance Service and NHS Fife have been linked to allow for glucose results to be reported and therefore alert the diabetes team of the people that require follow up. This initiative has led to a significant reduction in the number of call outs due to a hypoglycaemic events and improvements in patient care. There is ongoing work to roll this programme out nationally.

NHS Greater Glasgow and Clyde, with the support of the Scottish Diabetes Group are reviewing the algorithms and triage tools used within NHS 24 to ensure people using this service are directed to the most appropriate service in a timely manner. Self-

directed support is central to this and the Diabetes Education Action Group now has editorial control over the content of the NHS Inform Diabetes web pages with an update having taken place at the end of 2019. A self help guide for diabetes is being developed and will be hosted on NHS Inform similar to public support tools which exist for some other conditions.

SIGN Update: Pharmacological Management of Type 2 Diabetes

The Scottish Intercollegiate Guidelines Network (SIGN) supports improvements in the quality of health care for patients in Scotland by reducing variation in practice and outcome, through the development and dissemination of national clinical guidelines containing recommendations for effective practice based on current evidence.

In November 2017, SIGN published Guideline 154: Pharmacological management of glycaemic control in people with type 2 diabetes[vii]. This guideline provides guidance on optimal targets for glucose control for the prevention of microvascular and macrovascular complications, and outlines the risks and benefits of the principal therapeutic classes of glucose-lowering agents and insulins currently available.

Priority 2 - Type 1 Diabetes

To improve the care and outcomes of all people living with type 1 diabetes

The Diabetes Improvement Plan 2014 set out to improve the care and outcomes for people living with Type 1 diabetes through improving glycaemic control, improving care at the onset of type 1 diabetes, early intensification of therapy and access to high quality patient education. It also highlighted the need to support children and young adults during the education years and during transition from paediatric to adult care settings to minimise disengagement and risk of deteriorating glycaemic control.

Action 2.1 Improve the care for children and young people

Prevention of DKA at diagnosis of Type 1 diabetes

As discussed under Action 1.2 a national campaign was launched to support the early identification and referral of new onset type 1 diabetes.

Using data to support improvements in care

SCI-Diabetes has further enhanced their paediatric pages and these are now being used routinely by all paediatric units in Scotland which gives the ability to harness comparative data. SCI-Diabetes produces quarterly MCN reports which highlights performance against some key measures for people with diabetes and data for under 18s is included within the relevant measures. An adult and paediatric centre level report outlining HbA_{1c} level within each centres respective patient population is now available on a quarterly basis through SCI-Diabetes. The development of the paediatric diabetes dashboard is supporting teams to further review the care they are providing to children and young people through additional metrics related to this age group and provides opportunities for teams to learn from one another.

Improving Care in Schools

In June 2014, the document *Supporting Children and Young People in Education* was launched to help provide clarity and promote a team approach for your people with diabetes in schools[viii]. A review of this document will take place to ensure support is available for children in pre-school services and those attending out of school care services, such as after school clubs.

Supporting Transition to Adult Services

For young people with diabetes the transfer from child to adult services is a critical transition in their lives and like all transitions it offers both a risk and an opportunity for the young person and their diabetes care. The consensus would suggest that this process should be collaborative and that the young person and their family will require active support throughout this period.

In 2015 *the National Standards for Transition*[ix] were published and in 2017, a national *Paediatric and Adolescent Diabetes Transitional Policy*[x] was launched to support teams in achieving these standards. Alongside the policy, which could be adapted for local use, a transition standards self-reflection tool was developed to highlight areas that are working well and any areas that might need to be developed.

The diabetes dashboard within SCI-Diabetes now allows teams to review diabetes related process and outcome measures for the 18 – 25 year old population. This gives the opportunity to identify how well people within this age group are doing following their move to adult services and identify where improvements may be required.

Action 2.2 Improve Glycaemic Control

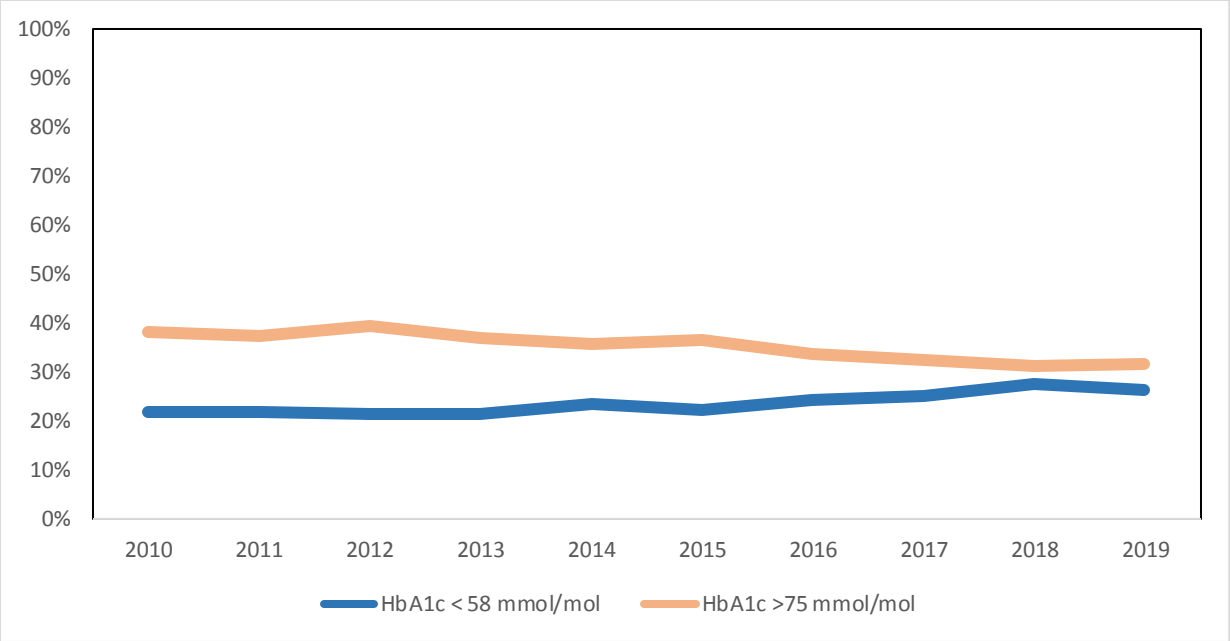
National Standards for Glycaemic Control

Intensive glycaemic control improves short, medium and long term outcomes of type 1 diabetes and is one of the key goals of care. In 2016, the paediatric and adults diabetes teams and the wider diabetes community agreed national guidance for the management of type 1 diabetes in both adults and children. This led to a focus on early intensive glycaemic management for newly diagnosed patients and to support patients with established type 1 diabetes with the aim that every diabetes centre in Scotland gives the same consistent messages about the glycaemic levels to aim for from diagnosis.

In the recent years there has sustained efforts to increase the number of people with HbA_{1c} < 58mmol/mol (optimal glycaemic control) and reduce the number of people with HbA_{1c} >75mmol/mol. In the last 6 years the number of people with optimal control has increased with 26.5% of adults having HbA_{1c} < 58mmol/mol compared to 21.5% as reported in 2013. The gap between those with optimal glycaemic control and poor glycaemic control has also narrowed with the number of adults having HbA_{1c} >75 has reduced to 31.6% from 37.1% in 2013. Improvements in glycaemic control are down to a number of factors, most notably increasing access to high quality education and access to technology to support self-management.

The graph below demonstrates the improvements that have taken place between 2010 and 2019. It is noted that performance on glycaemic control in 2019 has decreased marginally from the figures reported in 2018. HbA_{1c} is strongly influenced by age and socioeconomic deprivation and therefore we will explore barriers to meeting HbA_{1c} targets to help inform targeted intervention in groups not currently benefiting from current care models.

Figure 1: Percentage of people with Type 1 Diabetes with a record of HbA_{1c} in each HbA_{1c} category, Scotland 2010-2019.



Early Intensification: STEP programme

Funding was provided by the Scottish Diabetes Group to support NHS Forth Valley to develop and pilot patient education tailored to adults newly diagnosed with type 1 diabetes. The aim of the Scottish Type 1 Education Programme (STEP) is to provide people newly diagnosed with type 1 diabetes with the understanding and confidence to carbohydrate count and independently adjust their insulin dose. This education programme has demonstrated significant improvements with 62% of participants achieving an HbA_{1c} level on <58mmol/ml after 6 months.

Following the pilot in NHS Forth Valley, this programme has been rolled out with NHS Highland, NHS Boards, NHS Lothian, NHS Shetland and NHS Grampian offering this programme while some other boards have expressed an interest in providing this.

The diabetes dashboard in SCI-Diabetes provides detailed information on glycaemic control at national, regional, local and individual level. One key measure is the % of individuals achieving optimal control (HbA_{1c} <58mmol/mol) at 1 year post diagnosis. The clinical community have set an initial target of 58% of people achieving this. At the end of 2019, 51.6% of people were achieving this.

Access to Technology

In December 2016, the Scottish Government gave a commitment to build on the progress made following the Ministerial commitment in February 2012; which lead to an increase in insulin pump provision for people with type 1 diabetes, particularly in young people. The additional funding commitment was announced to support increased levels of provision of insulin pumps within the adult type 1 population and to support NHS Boards in developing services for Continuous Glucose Monitoring (CGM) provision, embedding this technology into clinical practice in both adults and children.

The number of people with type 1 diabetes using insulin pump therapy in Scotland at the end of 2019 was 4,614, representing 13.8% of the type 1 diabetes population. Within the under 18 type 1 diabetes population, 38.9% are using pump therapy while 11.3% of people with type 1 diabetes over the age of 18 are using insulin pump therapy. This is a significant increase on the number of people using insulin pump therapy as reported in the Diabetes Improvement Plan 2014 where 22.6% of people under the age of 18 and 4.5% of people over the age of 18 had access to this technology (this equates to an additional 2,767 pump users in Scotland). It is noted that the substantial increase in insulin pump therapy use in those under the age of 18 is likely to be a key factor in the substantial improvements in HbA_{1c} observed in Scottish children over the past decade.

Technology is supporting people to self-manage their diabetes and is now part of standard practice. The advent of flash glucose monitoring (FGM) has transformed how

individuals can monitor their glucose levels on a day to day basis. In 2018, the Type 1 subgroup of the SDG produced eligibility criteria for the use of FGM. This was followed by a formal assessment of FGM by the Scottish Health Technology Group[xi]. This combined approach has ensured wide spread adoption of this technology and FGM is available across all health boards in Scotland dependent on local eligibility criteria. At the end of 2019, 42% of people of people with type 1 diabetes under the age of 18 and 31.4% of people with type 1 diabetes over the age of 18 had access to this technology.

The funding provided by Scottish Government has also supported an increase in both children and adults having access to Continuous Glucose Monitoring (CGM) systems. These can now be linked to insulin pumps to create sensor augmented pumps and hybrid closed loop systems. These systems significantly reduce the risk of severe hypoglycaemia and improve glucose control.

Diabetes technologies have had a transformative effect for many individuals living with type 1 diabetes but the diabetes community across Scotland must strive to ensure that access is equitable and does not result in greater widening of inequalities in diabetes outcomes.

SIGN Update: Glycaemic Control in Type 1 diabetes

The Scottish Intercollegiate Guidelines Network (SIGN) have committed to producing a new guideline in relation to optimising glycaemic control for people living with type 1 diabetes. This process started in March 2020 but is currently on hold during the COVID-19 pandemic.

Priority 3 - Person-Centred Care
People with diabetes enabled and empowered to safely and effectively self-manage their condition by accessing consistent, high quality education and by creating mutually agreed individualised care plans

The Diabetes Improvement Plan highlighted that person-centred care and well supported self-management were critical to ensuring good health outcomes and improved quality of life. Central to this was provision of quality and accessible patient education, supporting individualised care planning and recognising what is important to the person living with diabetes. A key area within this priority area was to improve outcomes for women with diabetes during pregnancy. There is a need to improve uptake of pre-pregnancy and pregnancy care for those with established diabetes and the screening for and management of those with gestational diabetes.

Action 3.1 Timely and appropriate access to high quality patient education and self-management support

Patient Education

For people living with diabetes, patient education can promote self-management, improves well-being and aid optimisation of glycaemic control. We need to reduce barriers to education and support by providing these opportunities at the right time, in the right place and with the most appropriate peer group or health care professional support.

To provide person centred care we continue to work across all aspects of the health and social care communities, including our partners in the third sector, to promote accessibility to educational and support opportunities. We continue to review how we open up education to everyone living with diabetes, their carers and families who may also need support.

We continue to develop and share resources across Scotland to optimise the educational message, information and support for all. The rate of change regarding new technologies to support team working during the COVID-19 pandemic could be used to evolve how patient group education is delivered. This removes previous

barriers such as travel, numbers attending in a community setting and accessibility however we need to be mindful that new ways of delivering education does not exclude people from participating. It is noted that information governance issues within NHS Boards can limit progress with virtual patient education and so we strive to offer national resolution where possible.

STEP for people Newly Diagnosed with Type 1 Diabetes

As discussed under Action 2.2, STEP is a programme to support adults newly diagnosed with type 1 diabetes is in use or being rolled out across a number of health boards.

Development of National Education Pathway for Type 2 Diabetes

Work is underway to develop a national pathway for people newly diagnosed with type 2 diabetes to optimise their health and well-being. Uptake levels of type 2 diabetes education varies across Scotland and currently a range of packages/formats are offered depending on where the person with diabetes lives. In recognition of the importance of information on diagnosis a national stakeholder group is developing a toolkit of resources and options for learning (including online education) to ensure consistency of message which can be accessed in a format that is suitable to the person living with diabetes. Anything developed will include measurable outcomes to assess impact where possible while being mindful that requirements will vary based on an individual's needs. This work is being taken forward in collaboration with the DHI marketplace work with the SG Diet and Healthy Weight Team.

Action 3.2 Improvements in Care Planning

Care and Support Planning

There continues to be a move towards ensuring that people with diabetes are at the centre of the goal setting process and are able to develop mutually agreed care plans that meet the individuals care needs. The House of Care framework which has been implemented in many board areas across Scotland works to make Care and Support

Planning conversations routine for people with long term conditions and supports self-management.

SCI-Diabetes has been progressively developed to ensure it has the functionality to generate person centred care planning booklets which include individualised goal setting. HCPs are encouraged to use these to inform consultations and actively promote self-management. The development of the diabetes dashboard shows the level of care planning that is taking place and we continue to strive to demonstrate improvements in this.

Action 3.3 Empowering and Engaging People living with Diabetes

Resources to support self-management

Websites, Social Media platforms and on-line learning (individual or group) have developed significantly in recent years but we need to ensure we are inclusive in promoting their use, ensure they support our person centred care models within communities while being mindful that digital solutions do not suit everyone. Education can open up opportunities to change behaviour and we need to be ambitious with our new developments and ideas to support self-management.

My Diabetes, My Way is an interactive diabetes website (and app) to help people who have diabetes through providing information on diabetes (leaflets, videos, educational tools and games) and giving access to diabetes clinic results to support them to manage their condition more effectively. Clinical teams have been proactively promoting this website and encouraging people to register to *My Diabetes, My Way* leading to an increase uptake in registrants and people actively using this website. By the end of 2019, the number of people living with diabetes who are registered to *My Diabetes, My Way* was 15.2% (47,343 people).

NHS Inform is Scotland's national health information service helping the people in Scotland to make informed decisions about their own health and the health of the people they care for. In addition to providing information on managing different types

and complications of diabetes this website gives information on local services and healthy lifestyle advice. As noted earlier, the Scottish Diabetes Education Subgroup has recently taken over the editing rights on this website to ensure that the information and services are relevant to support people living with diabetes.

'What matters to you?' is a Scotland-wide campaign to encourage and support meaningful conversations between people who provide health and social care and the people, families and carers who receive such care. It is recognised that if personalised care that takes account of the things that *matter* most to people it will improves patients' outcomes and experiences.

Psychological Needs for People Living with Diabetes

The *Psychology Provision to Support delivery of 'A Healthier Future: Type 2 Diabetes Prevention, Early Detection and Intervention Framework'* was published in June 2020 to complement the Framework by outlining the need for and summarising the role of psychology in its delivery.

This document reports that psychological expertise can contribute to each of the four levels of the Framework and that best outcomes will be obtained by ensuring a suitable skill mix of staff providing psychological support. It highlights that provision of psychological support for those diagnosed with Type 2 diabetes is currently low throughout Scotland and that services for women with gestational diabetes (GDM) are variable. This document reports that early and appropriate support is crucial to improving service provision, physical health, mental health and well-being, and quality of life for people with a diagnosis of, or at risk of Type 2 diabetes. It also highlights how a psychologically informed and skilled healthcare team can support diabetes prevention.

In 2016, NHS Education for Scotland was asked by the Scottish Government to develop a set of resources to promote and implement trauma informed practice within Scotland. This was due to the growing recognition of the impact of traumatic experiences on people. These resources are being rolled out across the NHS

workforce, including those who support people with diabetes to upskill and improve psychologically informed practice.

Action 3.4 Improve the outcomes in pregnancy

A pregnancy work stream was established to support NHS Boards to improve pregnancy related data collection and support improvements in care. This work is co-ordinated and driven by the Pregnancy Subgroup of SDG. There has been a particular focus on the identification and management of gestational diabetes, importance of pre-pregnancy guidance and assessment of the outcomes of diabetes related pregnancy.

Core data sets of information to collect in relation to diabetes related pregnancies have been developed but there have been barriers in terms of the various clinical systems linking with each other. There is the ongoing development of a link between SCI-Diabetes and the obstetric systems used in NHS Scotland. This will allow the introduction of pregnancy related measures within the diabetes dashboard.

Information relating to national trends in diabetes and pregnancy between 1998 and 2013 was published in 2018[xii] and a further paper on factors associated with still birth in women with diabetes was published in 2019[xiii].

As noted earlier, people who develop gestational diabetes during pregnancy are at an increased risk of developing type 2 diabetes. This population is a key area of focus for the ongoing activity to support the Type 2 Diabetes Prevention, Early Detection and Intervention Framework and a core dataset for process and outcomes of gestational diabetes has also been developed.

SIGN Update: Diabetes in Pregnancy

The Scottish Intercollegiate Guidelines Network (SIGN) are producing a new guideline assessing Diabetes in relation to the management of diabetes in pregnancy including GDM.

SHTG Adaptation: CGM in Pregnancy and Type 1 Diabetes

In November 2020 the Scottish Health Technology Group (SHTG) recommended that CGM should be offered to all pregnant women with type 1 diabetes in Scotland from the first trimester[xiv]. This advice reports that the use of CGM during pregnancy may improve maternal glycaemic control compared with self-monitoring of blood glucose (SMBG). It also reduces neonatal hypoglycaemia and the need for and duration of neonatal intensive care. Cost modelling estimates that the use of CGM in mothers with T1DM is cost saving compared with SMBG, with cost savings largely driven by a reduction in neonatal intensive care requirements.

Priority 4 - Equality of Access
To reduce the impact of deprivation, ethnicity and disadvantage on diabetes care and outcomes

Despite improvements in life expectancy and health outcomes significant differences still exist for people living with diabetes depending on deprivation, where they live, ethnic group and their life circumstances. The Diabetes Improvement Plan highlighted that equality of access to health services for everyone living with diabetes should be a theme that runs through all efforts to improve quality of services. To help assess and address inequity, the Diet and Healthy Weight Team as part of the Type 2 Diabetes Prevention, Early Detection and Intervention Framework are undertaking an Equality Impact Assessment (EQIA) and Fairer Scotland Duty Assessment. They have also asked Boards to undertake EQIA to ensure equality. We will also undertake additional impact assessments as part of the publication of the Refresh Plan.

Action 4.1 Minimise the impact of deprivation, ethnicity and geography

Deprivation and Glycaemic Control

'Glycaemic control trends in people with type 1 diabetes in Scotland 2004–2016[xv] report that deprivation continues to have an impact on glycaemic control of people living with diabetes. It reports that the 20% of people living in the most-deprived areas had HbA_{1c} levels on average 8.0mmol/mol higher than those of the 20% of people living in the least-deprived areas. While glycaemic control is improving overall the

difference between HbA_{1c} levels for people living in the most-deprived areas and those living in the least-deprived areas has not changed significantly over time and therefore concerted effort is required to make improvements.

Deprivation and Mortality in type 1 diabetes

A recent retrospective cohort study assessing 'Socio-economic status and mortality in people with type 1 diabetes in Scotland from 2006–2015'[xvi] demonstrated that deprivation was associated with a steeper mortality gradient in people with type 1 diabetes than in the population without type 1 diabetes in Scotland. Age-standardized mortality has decreased over time but socio-economic inequalities may be increasing.

Information on deprivation is available within the diabetes dashboard and there is ongoing work to look at outcomes with individuals from different areas of deprivation.

Tackling Disengagement

One of the quality improvement and outcome measures that health boards report on is the level of disengagement within their population as disengagement from diabetes services is associated with poorer health outcomes. Data available on disengagement (defined as no record of HbA_{1c} and no retinal screening in the preceding 15 months) highlights that people with both type 1 and type 2 diabetes living within the most-deprived areas are more likely to be disengaged from services than those living in the least-deprived areas.

This data also highlights that people within the 18 – 25 age range across all deprivation levels are most likely to disengage from diabetes services. The annual national diabetes sharing best practice meeting for Managed Clinical Networks is used to highlight areas of activity trying to tackle this issue and support wider roll out where applicable.

Geographical Issues

With one fifth of the Scottish population living in rural areas and a significant number living in remote areas, geographical location can present a significant issue for diabetes services. This includes accessing health services, maximising specialist resources locally and retention or skilled health care staff. New technology solutions such as NHS Near Me to access health care professionals remotely and the use of online areas of support is providing ways for people to engagement with services where they may find it difficult to attend in person.

Evolving Models of Care

In response to the COVID-19 pandemic and given the current restrictions in place, the move towards remote support will be fundamental to the evolving models of care to support the wider diabetes population. Ensuring that people have the education and the tools to self-manage their diabetes as much as possible will is key to developing pathways. At the same time, we must approach redesign while being mindful that technology will not be suitable for all.

The National Clinical Strategy outlines the vision of care delivery in a community setting. This is particularly relevant for long term conditions such as diabetes. Diabetes MCNs have been working with health boards, within their transformational change agenda, to redefine care models for type 2 diabetes. This includes speciality input to support generalist care services which is offered in a community setting rather than in hospitals. In addition, diabetes is data rich and this information can be used to offer virtual review with specialist input where required.

Diabetes technologies increasingly allow the ability for people to share their health data with their healthcare team reducing the need for face to face review and offering a more person centred care approach. COVID-19 has resulted in a rapid adoption of many digital and virtual solutions and all diabetes services have this as a core activity within their existing care models. There are challenges, particularly around IT governance and the provision of suitable equipment, but on the whole a robust

infrastructure is now evolving in many diabetes services to embed virtual care and digital solutions within everyday clinical practice.

Key to this area of work is ensuring the principles of person centred care and realistic medicine are considered. The needs of someone living with diabetes will vary from person to person and will be influenced by where they are on their patient journey. There is a need to understand the issues around disengagement and develop our services to meet the needs of the populations we serve to reduce the gap in health inequalities. There is also the need to be mindful that the increasing move toward digital solutions for care will not be suitable for everyone and we cannot disadvantage people as care models develop.

Action 4.2 Improve outcomes for individuals requiring additional support

Access to Psychological Support

People with diabetes experience disproportionately high rates of mental health problems such as depression, anxiety and eating disorders. People with poor mental health are less likely to engage with their diabetes care team and therefore this is linked with poorer health outcomes.

As highlighted earlier the *Psychology Provision to Support delivery of 'A Healthier Future: Type 2 Diabetes Prevention, Early Detection and Intervention Framework'* highlights that early and appropriate support is crucial to improving service provision, physical health, mental health and well-being, and quality of life for people with a diagnosis of, or at risk of Type 2 diabetes.

As reported in the Diabetes Improvement Plan 2014, the Scottish Government previously supported a study to support Psychology in Diabetes, Psychology and Diabetes (PiD-PaD) to improve self-management of diabetes through upskilling staff. There has been no continuation of the PiD-PaD project in any of the pilot boards and it is recognised that access to psychological support is still inconsistent. In some areas local programmes have been developed, for example ACT now (NHS Grampian)

promotes self-management and behaviour change for people with type 2 diabetes and has had positive outcomes. There are also a range of online CBT programmes available for use and while most are not diabetes specific they can be helpful for people who have a long term condition. Diabetes Scotland are currently campaigning for wider psychology to support the general diabetes population with diabetes distress.

There is ongoing work looking to link SCI-Diabetes to data on vulnerable cohorts such as individuals experiencing homelessness, housebound and other disadvantaged groups. This information will be key to considering how care models should be developed to meet the needs of such cohorts.

Priority 5 - Supporting and Developing Staff
To ensure healthcare professionals caring for people living with diabetes have access to consistent, high quality diabetes education to equip them with the knowledge, skills and confidence to deliver safe and effective diabetes care.

Many different health care professionals interact with people living with diabetes and each interaction is an opportunity for the health care professionals to work with the individual to enhance their motivation and optimise their self-management. There is a need therefore to ensure staff have awareness and access to diabetes education to allow them to deliver safe, effective and person-centred care to people living with diabetes.

Action 5.1 Increase the level of consultation and patient engagement skills

Supporting behaviour change

The increasing demand being placed on the whole of the NHS means there has been a change in focus from the more traditional medical model, where healthcare was 'done to' people, to a more collaborative model, where healthcare practitioners work with individuals to prevent illness and to self-manage existing conditions. More than ever, healthcare professionals from across the NHS and social care, are being asked to support people to change and maintain their behaviour to improve their health and

wellbeing. The MAP Health Behaviour Change training programme, developed by NHS Education Scotland, has been promoted and rolled out to staff who care for people with diabetes. The training programme brings together the specific skills that professionals can use to support behaviour change, as well as a system for deciding which skills to use and when.

Action 5.2 Increase the level of educator skills and confidence in delivering diabetes education

Scottish Diabetes Education Action Group

The Scottish Diabetes Education Action Group continue to develop and promote education opportunities to staff involved in providing diabetes care. Delivering high quality patient care requires high quality professional education for our health care professionals involved with diabetes care. There is a wide range of knowledge and skills required throughout healthcare in Scotland and we need to be cognisant that different professional training needs can vary depending on location and population need. A national training course for newly appointed Diabetes Specialist Nurses (RD Lawrence Course) has been developed and this methodology could be considered for the multi-disciplinary team in locality or nationally. A clinical hub has been established via the Knowledge Network to collate and share resources for health care professionals.

Online Learning

To support the Think, Check, Act and CPR for Feet Campaigns online education modules were developed and promoted to staff working within the hospital setting to increase their knowledge in these areas within NHS Healthcare Improvement Scotland[xvii] and NHS Education for Scotland[xviii].

Local Staff Education

Managed Clinical Networks continue to play an important role in supporting and upskilling both specialist and generalist staff in diabetes care.

National CGM Support and Training Lead

To support staff to embed Continuous Glucose Monitoring (CGM) into clinical practice a dedicated post, the National CGM Support and Training Lead was established. This post has helped staff in NHS Boards through a number of initiatives including the development of the CGM Patient Pathway and Education Resource, establish networking groups for the DSNs and provided training in local areas on the new technologies as they develop.

Competency Frameworks

Following on from the *Podiatry Competency Framework for Integrated Diabetic Lower Limb Care* (Scottish Diabetes Foot Action Group and Skills for Health, 2010), a new Capability Framework for Integrated Diabetic Lower Limb Care was published in 2019 to be relevant for the other clinicians in the multidisciplinary foot team. The purpose of this framework is to ensure that all people with diabetes in the UK have their feet cared for by healthcare professionals with appropriate skill sets to improve patient outcomes, such as ulcer-free and amputation-free survival. The Scottish Diabetes Foot Action Group are currently working with the College of Podiatry to ensure that the Capability Framework is available in an interactive on line format to allow clinicians across the country to self-assess themselves in all areas of Diabetes Lower Limb care and identify training needs.

Staff competency frameworks are available for a range of health professionals supporting diabetes care and staff are encouraged to develop their skills in line with relevant specialty competency framework.

Action 5.3 Increase the level of psychological assessment skills

Psychological Support

SIGN Guideline 116 on the management of diabetes, highlights that psychological interventions can improve HbA_{1c} for people living with diabetes. Action 4.2 provided detail on the PiD-PaD project which aimed to help diabetes staff develop their expertise in understanding and changing health-related behaviour.

The Scottish Government's Mental Health Strategy: 2017- 2027[xix] guiding ambition for mental health is to prevent and treat mental health problems with the same commitment, passion and drive as physical health problems. It is hoped that through the actions linked to the strategy everyone living in Scotland, including those living with diabetes, can get the right help at the right time.

The ongoing SIGN guidelines which are being developed on assessing optimisation of glycaemic control in type 1 diabetes and the early detection and prevention of type 2 diabetes will incorporate a review of the existing evidence base for psychology in improving care and health outcomes.

Diabetes UK have launched some resources for supporting staff to have quality conversations about emotional health and diabetes. They have also developed a practical guide for healthcare professionals supporting people with diabetes who are experiencing emotional difficulties. These resources offer strategies and tools for how to recognise and have conversations about emotional problems, as well as for providing appropriate support. These resources have been widely promoted as an area of support for staff providing diabetes care[xx].

MAP Health Behaviour Change

The Scottish Diabetes Education Action Group promoted and supported the roll out of MAP Health Behaviour Change training programme[xxi]developed by NHS Education Scotland amongst staff who care for people with diabetes. The training programme provides staff with a 'route map' to support people to make behaviour changes to improve their outcomes. Based on the Health Behaviour Change Competence Framework[xxii] it brings together the specific skills that professionals can use to support behaviour change, as well as a system for deciding which skills to use and when.

Priority 6 - Inpatient Diabetes
To improve the quality of care for people living with diabetes admitted to hospital by improving their glucose management and reducing the risk of complications during admission

The Diabetes Improvement Plan 2014 reported that at any one time 15-20% of inpatients will have diabetes and that there is clear evidence that inpatient care is suboptimal. Issues highlighted included prescribing and medication errors, diabetic ketoacidosis, hypoglycaemia and hyperglycaemia. Hyperglycaemia is associated with increased infection rates and hypoglycaemia with an increased length of stay and subsequent mortality. Feedback from patient surveys undertaken by Diabetes Scotland highlighted areas where people living with diabetes would like to see improvement such as general understanding of diabetes, suitability and timing of food and insulin administration.

Action 6.1 Improve glycaemic control of people admitted to hospital

Diabetes, Think, Check, Act

In 2014, Healthcare Improvement Scotland supported inpatient diabetes improvement through the initiative 'Diabetes Think Check Act'. This involved development of a package of measures, interventions and education, using improvement methodology, for roll out across Scotland. The Diabetes Think, Check, Act tool[xxiii] provides a range of resources and online learning for in-patient improvement projects and the rational for improving in patient care. However the roll out of this initiative to all hospital wards in Scotland has been challenging.

The Scottish Health and Social Care Delivery Plan (2016) included a commitment to reduce unscheduled bed-days by up to 400,000 by 2018. In March 2017, Dr Jason Leitch, National Clinical Director Healthcare Quality & Improvement Directorate sent a letter to each NHS board on 'Reducing Unscheduled Bed Days through Improving Inpatient Care for Patients with Diabetes'. This summarised the opportunity to reduce

unscheduled bed days across NHS boards through improving inpatient care of people with diabetes who are being cared for in non-diabetes settings. Each health board was asked to nominate a non-diabetes specialist lead to be responsible for the further roll out of Diabetes, Think, Check, Act within their board area including increasing the use of hypo-boxes.

Introduction of 'Hypo boxes'

Approximately 15 - 20% of patients in a hospital at any time have diabetes and have potential to experience problems with hypoglycaemia. Hypo-boxes are now available in hospital wards to promote access to prompt and effective treatment for all patients in the event of hypoglycaemia. In 2018, additional funding was provided to Boards to ensure that hypo-boxes were available in every ward in every hospital in Scotland. Use of hypo-boxes is being expanded to include other areas where people with diabetes may be for example care homes, health centres etc.

Inpatient Data Linkage in NHS Tayside

There is currently no national approach to recording inpatient diabetes outcomes despite ongoing discussions regarding secure data capture in each health board in collaboration with IT departments and the pharmaceutical providers of blood glucose systems. This is something we continue to work towards in all health boards with some board areas being closer to this than others. Ongoing developments within SCI-Diabetes to develop an in-patent diabetes dashboard will support this.

In NHS Tayside, IT linkage of admission, discharge and transfer (ADT) messages from the hospital Patient Administration System (PAS), and SCI-Diabetes and blood glucose monitoring systems has been established since December 2016. This linkage captures blood glucose tests undertaken in each ward and department in people with diabetes, the incidence of hypoglycaemia and resolution of hypoglycaemia within one hour. These data are utilised in NHS Tayside by the specialist team to assess clinical activity and inform quality improvement. The data from Ninewells Hospital demonstrates that between December 2016 and May 2020 the incidence of hypoglycaemia has reduced and the proportion of hypoglycemia resolved within one hour has improved.

Figure 2: Incidence of hypoglycaemia (Dec 2016 – May 2020) in Ninewells Hospital

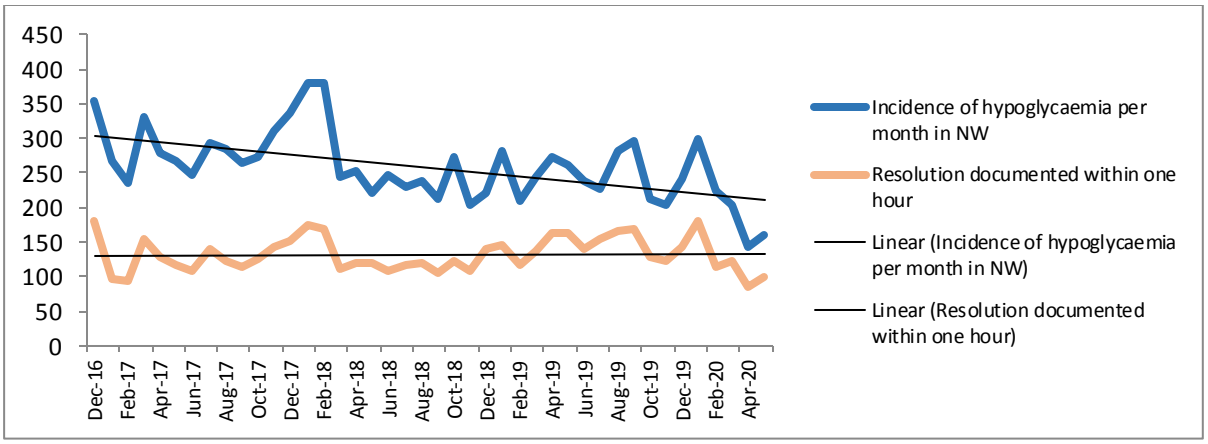
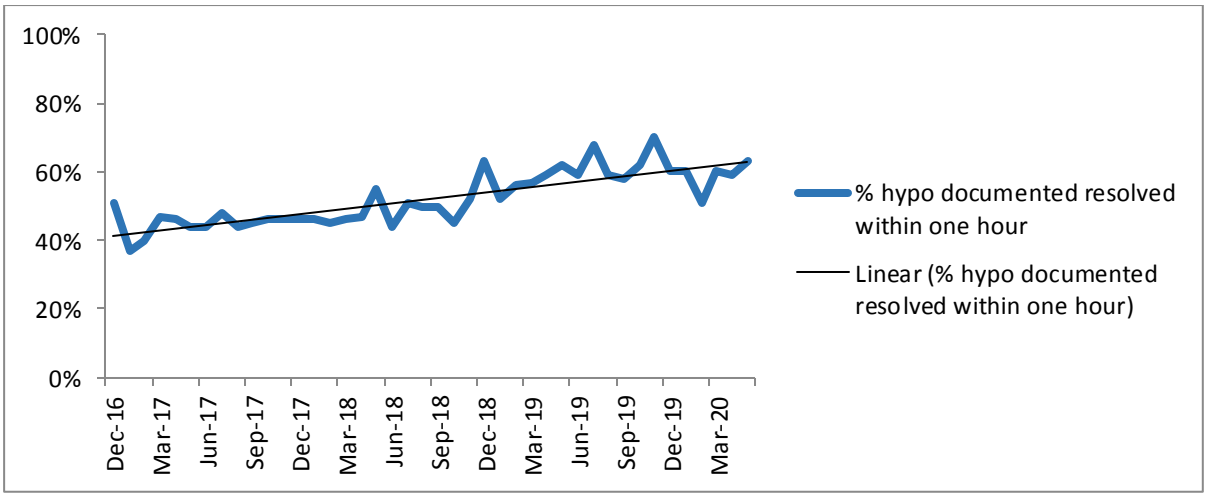


Figure 3: Hypoglycaemia resolved within one hour (Dec 2016 – May 2020) in Ninewells Hospital



Scottish Patient Safety Programme

Scottish Patient Safety Programme is a national initiative that aims to improve the safety and reliability of health and social care and reduce harm, whenever care is delivered. With approximately 15 - 20% of patients in our hospitals having diabetes at any one time it is crucial to consider how best to meet the needs of this population. There is a requirement to audit what care is currently being provided to people with diabetes to support initiatives to make improvements and to develop greater links with the Scottish Patient Safety Programme.

Action 6.2 Improve foot care outcomes

Check, Protect, Refer for Feet (CPR)

As discussed in Action 2.1 the Check, Protect, Refer for Feet (CPR) initiative aims to make sure all patients with diabetes who are admitted to hospital have their feet checked on admission, if they are at risk of developing a foot ulcer their feet are protected and if they have a current foot ulcer they are referred appropriately. To support improvements in care a range of information materials and training tools have been developed to support the uptake of this initiative across Scotland[xxiv].

The recent national inpatient diabetes foot audit demonstrated that more patients were getting their feet checked when in hospital and there was an increase in use of foot protection. However the number of ulcers as consequence of being an in-patient did not decrease, but this may reflect greater awareness and detection of the problem. A local audit identified that more than half of all inpatient DKA episodes were precipitated by unrecognised foot infections.

Work continues to actively encourage the implementation of the CPR for Feet campaign across all care settings and encourage the use of the quality, fit for purpose and cost effective pressure redistribution devices.

Action 6.3 Improve the experience of people with diabetes admitted to hospital

Identifying people with diabetes in hospital

An inpatient domain is now available within SCI-Diabetes, the shared electronic record for the care of people with diabetes in NHS Scotland. In some health boards SCI-Diabetes receives admission, discharge and transfer messages from the hospital Patient Administration Systems and from connected blood glucose meters. This can be used to highlight individuals with diabetes in hospital, support risk stratification and lead to an early assessment of their needs. This data can also be utilised by the

specialist diabetes team to target activity to improve patient outcomes and identify areas within the hospital who could benefit from additional training on caring for people with diabetes.

Only a small number of boards are using this functionality to its full potential but all are encouraged to work towards this as this is an opportunity to reduce the length of inpatient stays through proactive rather than reactive reviews.

Reducing Insulin Errors

While it has not been possible to introduce standardised insulin prescription and monitoring charts due to local governance and existing improvement work, the Scottish Diabetes In-Patient subgroup shares examples of best practice around this. It is recognised that achieving a standardised prescription and monitoring chart at board level remains an aspiration of many boards to standardise practice and reduce the number of insulin errors. It is anticipated that the roll out of electronic prescribing across health boards will support a reduction in insulin errors.

Priority 7 - Improving Information
To ensure appropriate and accurate information is available in a suitable format and effectively and reliably used by all those involved in diabetes care.
in diabetes care.

The aspiration within the Diabetes Improvement Plan 2014 was to ensure that improvements in diabetes care are data driven. This required data and information of diabetes to be comprehensive and accurate and for the systems that manage the data to be effective, reliable and responsive.

Action 7.1 Improve access to appropriate and accurate information

Developments to SCI-Diabetes

SCI-Diabetes remains one of the key cornerstones of diabetes care within Scotland. SCI-Diabetes continues to develop and evolve to meet the needs of the multidisciplinary team supporting diabetes care. There is regular dialogue with clinical

teams and SCI-Diabetes has been developed in an iterative and dynamic manner to meet the needs of this user. This has included specific type 1 diabetes screens, decision support tools, foot screening tool, foot ulcer monitoring system, prescribing timeline, dedicated pregnancy pages, in-patient domain, improved diagnostic information and links to the Scottish Ambulance service. Central to making the most of this SCI-Diabetes is embedding the need for recording information on the system across all teams. As noted above one area where this is limited data collection is around care taking place whilst in the inpatient setting.

Improving communication across the diabetes community

Communication mechanisms have been strengthened between the Scottish Diabetes Group and the teams supporting diabetes care in Scotland.

The Managed Clinical Networks (MCN) across Scotland are central for communicating information on national initiatives to staff working at a local level and support sharing of best practice in diabetes care. Clinical and Management leads from the Diabetes MCNs come together several times a year to provide an update on what is taking place at a national level and share what is happening within their local areas to inform improvements in other areas. Recommendations and lessons learned from Ombudsman Reports which highlight cases where diabetes care has been compromised are shared to support learning across Scotland.

A Type 1 Leads Network has also been developed to share information relating to type 1 diabetes with a nominated lead from each diabetes centre in Scotland for further dissemination around staff involved in providing care for children and adults with type 1 diabetes.

Action 7.2 Better reporting and use of data at both national and local levels

Scottish Diabetes Survey

The Scottish Diabetes Survey is produced on an annual basis to give a comprehensive view on diabetes care across the whole population of Scotland. Information used to populate the survey comes from SCI-Diabetes and as such the information presented covers over 99% of the population diagnosed with diabetes in Scotland.

To accompany the 2019 Scottish Diabetes Survey a narrative was published to contextualise the key data from the survey against the national priorities set out within the Diabetes Improvement Plan. The annual Scottish Diabetes Survey in tandem with the diabetes dashboard provides information on key diabetes related measures and outcomes and be used to inform progress within the Diabetes Improvement Plan 2014 and drive health improvement initiatives.

The Scottish Diabetes Survey provides a one page health board specific summary outlining individual performance against the national average for some of the key measures within the survey. Health Boards through their Managed Clinic Networks are asked to review the information and use this to inform how best to deliver ongoing improvements in diabetes care.

Audit Reports via SCI-Diabetes

Following the publication of the Diabetes Improvement Pan, SCI-Diabetes provided health boards with quarterly reports on 12 nationally agreed quality improvement and outcome measures to access local performance, target improvement initiative and form the basis of reports health boards to the Scottish Government.

Additional reports have subsequently been added to SCI-Diabetes which provide information and comparative data on glycaemic control (HbA_{1c} levels) within the local adult and paediatric diabetes centres (type 1 diabetes) and within GP clusters (type 2 diabetes).

Diabetes Dashboard

The diabetes dashboard, launched in June 2019, has been developed within SCI-Diabetes through consultation with the Scottish Diabetes Group, its subgroups and the Managed Clinical Networks. This provides professionals looking after people with diabetes timely access to 'live' data on a continual basis at national, regional, local and individual level.

The dashboard has several diabetes related process and outcome measures specific to the population being reviewed. This allows teams to identify their current performance and supports improvements in real time by providing easy to interpret information with drill down ability to support individual care at practice/centre level. Data available within the dashboard is discussed at SDG and Diabetes MCN meetings to prioritise areas where targeted improvement is required and to support sharing of best practice and learning from others.

Using data to drive innovation and patient care

Scotland has excellent routine data available on people with diabetes and their care. A central aim is to improve use of this data to inform and improve care. We have already noted how routine data has been used to measure improvement in HbA1c in people with type 1 diabetes. At a broader level ongoing work in type 2 diabetes is being undertaken to develop cardiovascular risk engines and to explore how real world data can be presented to policy makers to support assessment of interventions[xxv].

Action 7.3	Improve patient access to their data to support self-management

My Diabetes, My Way

My Diabetes, My Way continues to develop its support to patients and now includes a range of patient support information (available in a variety of languages) and e-learning modules to support patients to self-manage their diabetes. In addition to the website, a *My Diabetes, My Way* app is available and the system can collect information in lifestyle interventions such as fitness trackers.

My Diabetes, My Way now supports standardised diabetes foot screening for private podiatrists in Scotland. At present, as many as 20% of people with diabetes attend private podiatry for their diabetes foot care, and the information recorded is not available to NHS healthcare teams. A new service allows this information to be collected via *My Diabetes, My Way* and shared with SCI-Diabetes.

My Diabetes, My Way continue to promote their service to patients via providing supplies of patient information practices/clinics, demonstrating system functionality at local patient and professional events, contacting unregistered patients (from SCI-Diabetes) in conjunction with interested GP Practice. All health care professionals are encouraged to ensure that enrolling people with diabetes in *My Diabetes, My Way* as a key step in their care.

With the increasing use of technologies, people living with diabetes are encouraged to view their available healthcare information to support their self-management e.g. flash glucose monitoring run charts. With evolving care models moving towards a more virtual basis, there will be continued focus of promoting the use of such programmes.

Priority 8 – Innovation
To accelerate the development the development and diffusion of innovative solutions to improve treatment, care and quality of life of people living with diabetes.

The Diabetes Improvement Plan 2014 highlighted the increasing pressures being placed on diabetes services due to the increasing prevalence and the resultant need to ensure it strengthens capacity through innovation. This includes innovation through medicines management, emerging technologies, and collaborations.

Action 8.1 Promote networking and mechanisms to support innovation

Scottish Diabetes Technologies & Innovations Group

To progress this priority the Scottish Diabetes Group in conjunction with the Chief Scientist Office have established a Scottish Diabetes Technologies & Innovations

Group (SDTIG). The aim of the group is to establish an infrastructure to ensure Scotland can maximise the opportunities around data, technologies and innovation to improve diabetes care and outcomes in Scotland.

The group are also keen to support Scotland becoming an internationally renowned 'test bed/research' arena for the development and assessment of technologies and innovations used in diabetes care. The SDTIG is a facilitative /advisory group and its functions include sharing information to facilitate collaboration and act as a source of expertise and signposting. The group shares information about innovation projects and funding opportunities and encourage registration of initiatives[xxvi]. Its role also includes proactively communicating with wider audiences in order to promote and protect diabetes interests. The SDTIG is currently running an open innovation SBRI competition (Small Business Research Initiative) in diabetes, funded by Innovate UK and NHS Scotland. There are 3 separate challenges, being run from NHS Highland, NHS Lothian and NHS Greater Glasgow and Clyde. The challenges are as follows:

- Using artificial intelligence and machine learning to help develop prediction algorithms and risk stratification for diabetes foot ulceration, amputations and mortality.
- Improving the clinical care of patients with a pre-existing diagnosis of diabetes when admitted to hospital by developing a real-time decision support tool and alert mechanism. The tool must improve triage, prevent medication errors, identify emergencies and streamline the diabetes care pathway.
- Improving the identification (case-finding) of people at risk of osteoporosis and fracture, including those with diabetes.

Another key function of the group also includes helping initiatives to navigate a health technology assessment (HTA) and acts as a contact point for Scottish Government, health boards (E-health) and procurement for providing strategic advice on the purchase and implementation of diabetes technologies.

The SDTIG aims to add value by working with others to iteratively consider how the priorities within the Diabetes Improvement Plan might be solved/supported by

technology and innovation. The SDTIG links into existing groups and offers a supportive infrastructure to make it faster and easier to bring together those with needs and challenges in diabetes, with the people, organisations and businesses capable of developing a solution.

Action 8.2 Increase the pace of adoption of proven innovations

Innovative Technology

The SDG and wider diabetes community have worked in conjunction with NHS Scotland procurement to revise the framework for technologies involved in diabetes care. This collaborative approach has helped ensure wide stakeholder engagement in this process and improved communication across all areas of NHS Scotland involved in this process.

The Type 1 subgroup of the SDG have also worked closely with the Scottish Health Technologies Group to assess the clinical and cost effectiveness of Flash Glucose monitoring (Freestyle Libre). Scotland was one of the first countries in the world to provide a HTA of the device. This helped support a standardised approach to access to this innovative product and this ongoing collaboration will help assess the effectiveness of this device in a 'real world' setting and help inform ongoing roll out across Scotland.

These types of collaboration and 'whole system' working help increase the pace of adoption and also help assess devices within NHS Scotland to ensure ongoing clinical and cost effectiveness. They also help develop an infrastructure for the ongoing assessments of new technologies that are likely to come in the near future.

The SDTIG also links into NHS Scotland wider innovation work streams and is leading on several diabetes specific initiatives. These include evaluation and potential adoption of technologies such as the bionic pancreas as well as projects aimed at improving in-patient diabetes care and foot ulcer prevention. In addition several Scottish based groups are looking to develop health informatics and artificial

intelligence solutions to improve risk stratification, communication and improve person centred care models.

The SDTIG is currently developing a framework to support horizon scanning for forthcoming innovations. This will consider how to support innovation from concept, to development, through regulation, assessment, procurement and ultimately adoption. Supporting the entire innovation pathway will help improve timely adoption of innovative solutions to improve the care and outcomes for those with diabetes.

Diabetes Improvement – Moving Forward

This report highlights the progress that has been made to diabetes care, treatment and support over the last five years. Under every priority, we have seen significant development, improvement and growth. The Scottish Diabetes Group (SDG) provides oversight of these initiatives and its subgroups have been instrumental in driving many of the developments. Upon reflection of these improvements in diabetes care, we have come to understand the crucial role of the SCI-Diabetes data. Access to real time data at a local, regional and national level has allowed us to track progress and identify areas of opportunity. We also have a well-established Managed Clinical Network which has allowed regular, collaborative planning for all of the improvement projects. It is thanks to these various group and our wider stakeholders, including Diabetes Scotland and the Type-1 charity, JDRF, that we have been able to see the results outlined in this paper.

The COVID-19 pandemic has caused unprecedented impact on diabetes care and services. Although we have made significant progress to date, we are aware that many challenges remain. Our Diabetes Improvement Plan 2021 – 2026 outlines the actions we will take in order to tackle these challenges. Although the pandemic has added additional strain to services, it has also provided substantial opportunity to renew, reshape and restructure. We will learn from the projects we delivered from 2014 to 2020 and move into a new era of diabetes improvement with experience and ambition.

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