



Digital Health & Care Institute (2014) Innovation in Diabetes - Ideas and Initiatives. [Report] ,

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Innovation in Diabetes - Ideas and initiatives

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Innovation in Diabetes – October 2014

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| 20 | My Diabetes My Way electronic personal health record – uptake at scale | Scott Cunningham |
| 21 | TeleClinics for diabetes | Scott Williamson |
| 22 | Develop a diabetes sim / game in which the main character has diabetes. Young people need to keep the sim / character alive as they face the various challenges of life or the game. | Steve Birnie |
| 23 | Development of meaningful automated glucose data to in-patient clinical areas | Stuart Ritchie |

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| 24 | In-patient Care: Integrated eHealth solutions to improve patient care, safety and outcomes. | Brian Kennon |
| 25 | Innovative model of care to address the 'process of care' in managing people with long term conditions | Brian Kennon |
| 26 | Young Persons Remote Clinic Consultation | Hillary Shand |
| 27 | Maximise use of the data to support self-management of patients with co-morbidities | George Dodds |
| 28 | Virtual practice outreach and education in primary care | Sam Phillip |

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| Innovation | MyDiabetesMyWay Patient Portal Provides online data access (health care records) for all patients in Scotland with Diabetes displayed using patient friendly visualisations. Also offers access to a massive online education resources site (interactive games/ videos/ written info via website), with tailoring of educational links depending on patients clinical characteristics. |
| Problem | Improving self management/ patient empowerment for all patients in NHS Scotland |
| Benefits | Improved diabetes outcomes, and reduced complications. Improving patient knowledge, quality of life and motivation. |
| Costs – Development | Basic Patient Portal already developed- running costs around £150k/ annum, but see planned development below |
| Timescale | Now New development e.g. integration with 3 rd party apps and products (Apple/ uMotif/ wearable tech etc)- over 12 months. |
| Implementation costs | Ongoing running cost for basic MDMW portal around £150k/ yr . Additional cost for future developments. |
| Risks | Risk- poor uptake by patients in Scotland (recruitment has been slower than expected). Ongoing funding risk- currently funded partly by ehealth leads/ Scottish Diabetes Group on an annual basis- no long term guarantee |
| Partners | Opportunities to work with industry partners to allow MDMW to gather additional data from 3 rd party apps and wearable technology and to allow data display back into other apps/ mobile technology e.g. uMotif app and Apple health kit app (ongoing conversations with both). |

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| Innovation | MyDiabetesMyWay e-learning hub (Moodle) |
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| Problem | Jacqui Charlton (DSN Lothian) is working with the MyDiabetesMyWay Team) to develop some structured online education programmes to support self management of diabetes as an adjunct or an alternative to traditional face to face patient education. These will be delivered through an elearning platform called moodle that will be integrated into MDMW, Whilst MDMW already provides some patients resources these are not provided in a structured way. These e-learning resource allow patients to work through a structured series of material on a particular topic and include interactive elements. Health Care Professions could enrol patients onto courses depending on their needs. |
| Benefits | Provision of education that can be completed in patients own time – flexible learning without need for face to face contact. |
| Costs – Development | £10k has been made available for development of the platform and some connect development for type 1 diabetes (young patients) A further £20-40k would be required to develop further modules for both type 1 and type 2 diabetes. |
| Timescale | 6 months- type 1 elearning module will be ready (Further 18 months to fund and develop wider diabetes modules including type 2) |
| Implementation costs | Running costs around £20k/ year (nationally) £5-10k/ yr for patient and HCP engagement |
| Risks | Poor engagement of patients Poor engagement of health care professionals – HCPs need to recommend to patients Loss of technical team from MDMW due to lack of funding. |
| Partners | Current partnership between MDMW team and Jacqui Charlton. No third party provider. A third party provider could be considered to run this, however this is likely to be expensive and the skills are already present in house (MDMW tea,). |

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| Innovation | <p>SCI-diabetes/ MDMW Communication Portal- Tools for Remote Communication/ Consultation</p> <p>To allow the development and use of tools for patient-HCP communication, such as Skype style clinics, email service/ online messaging for non urgent queries, online discussion groups (education), and home upload of blood glucose monitor readings for sharing with health care professionals. Plan to capture communication and data flow through SCI-diabetes/ MDMW platform.</p> <p>We are also working closely with United for Health who are doing some similar work focusing on home blood glucose upload (using Diasend s third party SME).</p> |
| Problem | <p>It is costly and time consuming for patients to attend clinic and face to face education. Some of this care could be delivered more flexibly and remotely using communication tools that are now widely available.</p> |
| Benefits | <p>Improved quality of life, quality of care, flexibility and satisfaction for patients. <u>Reduced costs of care (less face to face consultations)</u></p> |
| Costs – Development | <p>Around £103K given by SDG to support a pilot in 4 health care areas (NHS Tayside, Lothian, Grampian and Lanarkshire)</p> |
| Timescale | <p>We are 12 months into a 24 month pilot which has been funded by the Scottish Diabetes Group. Following this (around Dec 2015- Feb 2016), we hope the tools will be available for national use, but this will require ongoing funding.</p> |
| Implementation costs | <p>Implementation and Running Costs: Home glucose upload (Diasend) accounts- costs nationally (around Scotland)- around £100k/ annum Support and technical management of other remote communication tools - £50k/ annum</p> |
| Risks | <p>Risks- poor uptake by patients, poor engagement with clinical staff, inability to change rigid clinic structures/ credit not given to staff for remote communication work.</p> |
| Partners | <p>We are already partnering with DIASEND (commercial SME) re blood glucose upload and working with the NHS Scotland National Video Conferencing Service re : Skype style clinics.</p> |

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| Innovation | <p>Risk Modelling for Care Planning- integration into Informatics Dashboard for Clinical Use.</p> <p>To allow the development of risk models and integration into online dashboards, that allow the prediction of which individuals/ patient groups are likely to be at risk of complications/ admission/ adverse events. Allow care to be tailored to those in need at an early stage. This would also allow development of individual care pathways for screening etc.</p> |
| Problem | <p>Complication rates and admission rates for diabetes are hugely costly. Early intervention could reduce such costly care episodes. Care provision can be individualised.</p> |
| Benefits | <p>Improved quality of care, reduced costs of care (Admissions / complications).</p> |
| Costs – Development | <p>Risk algorithm development- some already developed/ some would need developing- needs close collaboration between academic groups and industry</p> <p>New risk algorithm development _ ??£1-300k (needs further discussion with academic groups)</p> <p>IT dashboard development - £100k</p> <p>Dashboard could be based on existing algorithms initially and adapted as new algorithms become available</p> |
| Timescale | <p>12 months- dashboard development 24-36 months- ongoing algorithm development for more risk prediction tools</p> |
| Implementation costs | <p>Implementation and Running Costs:</p> <p>Dashboard running costs for Scotland (?50k-100k)- depends whether being done in house or by 3rd party.</p> |
| Risks | <p>Risks- Defining IP/ establishing collaboration/ ability to produce good algorithms Uptake and use of product by HCPS/ managers etc eHealth policies re integration of products into existing system</p> |
| Partners | <p>Aridhia Informatics are interested in developing diabetes risk apps both in Scotland and other settings. This was discussed in relation to a TSB bid (between Aridhia and academic partners e.g. University of</p> |

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| | <p>Dundee (Helen Colhouns group) and SCI- diabetes team), but the funding bid wasn't suitable given the weighting of costs towards academia. There remains an opportunity for collaboration in this area, and development of a commercial product to be used in Scotland and wider with a revenue share to all parties.</p> |
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| Name of Innovation |
| Access to Chronic Medication Service (CMS) and Pharmaceutical Care Planning |
| <p>Pharmaceutical Companies may have some IT solutions around how to make the technology that supports CMS a bit “slicker” and more users friendly i.e. could the functionality of the patient access site of My Diabetes My Way include the Pharmaceutical Care Plan.</p> <p>In addition as the Community Pharmacists has a role to play in supporting people with diabetes, could limited access to SCI – Diabetes (e.g. biochemistry results, medication history, cardio/renal and lifestyle) be made available to Pharmacies who provide CMS?</p> |
| Problem |
| <ul style="list-style-type: none"> • Partial completion of the Pharmaceutical Care Plan due to lack of information • Poor Glycaemic Control and quality of life |
| Benefits |
| <ul style="list-style-type: none"> • Pharmacists are more knowledgeable about the person with diabetes and better support them with regards to their medication • Improved Glycaemic Control and quality of life • Person centred |
| Development costs |
| Unknown |
| Timescale |
| Dependent on workload for SCI –Diabetes and other related IT systems (funding resources) |
| Implementation costs |
| Unknown |
| Risks |
| Information Governance with SCI –Diabetes and Community Pharmacists |
| Partners |
| SCI – Diabetes, other related IT providers NHS Boards and Community Pharmacy |

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| Name of Innovation |
| Medication and Lifestyle Coaching |
| To provide some form of medication and lifestyle coaching/review for the individual with diabetes possibly via General Practice, Keep Well, or Weight Management Programmes (Leisure Services) and or Pharmacy which is triggered by changes in the persons medication regimen. Life style coaching should be offered to all those with long term conditions, possibly a prolonged programme of information, access to gym/personal trainer and full lifestyle advice may be an option along with medication review. This programme could also be adapted for those with pre-diabetes or family history of diabetes. |
| Problem |
| <ul style="list-style-type: none"> • Poor life style choices • Poor Glycaemic control • Poorer outcomes |
| Benefits |
| <ul style="list-style-type: none"> • Improved Glycaemic Control • Improved life style choices (behaviour change) • Better self management • Improved outcomes |
| Development costs |
| Keep Well currently provide brief interventions on alcohol, tobacco, weight and mental health. Weight management programme (Weigh to Go Ayrshire) 12 week programme delivered by Leisure Services and other trained professionals. |
| Timescale |
| Unknown |
| Implementation costs |
| Weigh to Go Ayrshire (£5k per year- covers about 80 attendees) Keep Well - Unknown |
| Risks |
| Services continue as they are. Many at breaking point as more and more people are diagnosed with diabetes |
| Partners |
| Boards, MCNs, Pharmacy, Keep Well, Leisure Services and Public Health |

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| Name of Innovation |
| Multi-media Diabetes Resources Utilise the expertise of drug companies to produce videos/ DVDs/ CDs/ You Tube, computer streaming etc., to provide information in various formats around medicines used to treat diabetes; why and how they should be taken, possible side effects, where to go to find more information, e.g. single source i.e. My Diabetes My Way. This could be used by various healthcare professionals as tools to signpost patients. |
| Problem |
| <ul style="list-style-type: none"> • Health literacy • Carers level of understanding of medication |
| Benefits |
| Takes into account where people with diabetes may have literacy problems, e.g. where patients may not be able to read information leaflets. Also very useful for carers, both paid and unpaid, to increase their understanding and knowledge about the medicines their clients/family may be taking |
| Development costs |
| unknown |
| Timescale |
| Company dependent |
| Implementation costs |
| If resources are already available by individual pharmaceutical companies websites is it possible to directly transfer these to My Diabetes My Way to reduce costs |
| Risks |
| Access to hardware. However this potentially could be supported by co-production with local libraries or Third Sector Organisations who have public access IT facilities |
| Partners |
| NHS Boards, Pharmaceutical Companies and My Diabetes My Way (Public Libraries and Third Sector Organisations) |

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| Name of Innovation |
| Promoting Diabetes Education |
| People with diabetes need to be encouraged to attend any educational sessions around managing their medicines and condition. To attract people we need to set out our stall better (it is not just about informing the person with diabetes it is about drawing them in, finding the hook). Linking this with care planning, anticipatory care and the talking points agenda would give us the best returns and hopefully support medicine compliance and better diabetes outcomes. These are skills we recognise as being available within the Pharmaceutical companies and would like to tap into to help improve attendance at education. |
| Problem |
| This is lacking in our own services and think this is reflected in the lack of attendance at educational events. |
| Benefits |
| <ul style="list-style-type: none"> • Knowledgeable person with diabetes who is better able to self-manage • Optimal Staff utilisation for education events |
| Development costs |
| Unknown |
| Timescale |
| Unknown |
| Implementation costs |
| Would Pharmaceutical companies consider providing a 'marketer' for each Board to work with MCN Education Lead and local Communications Department? The cost of the new materials developed would be met by the Boards |
| Risks |
| Continued poor attendance at education events where staff time is not being fully utilised. People with diabetes are not fully educated about their condition and are unable to self-manage successfully |
| Partners |
| Pharmaceutical companies, NHS Boards, MCN's and local Communication Departments |

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| Name of Innovation |
| Tele-Pharmacy – development of links within patient information leaflets to a service that would trigger text-message reminder alerts to encourage people with diabetes to take their medicine at the appropriate times – patient centred approach |
| Problem |
| <ul style="list-style-type: none"> • Poor Glycaemic control • Medication compliance • Medicine wastage |
| Benefits |
| <ul style="list-style-type: none"> • Improved glycaemic control and quality of life • Compliance • Reduction in medicine waste |
| Development costs |
| Unknown (Florence (FLO) system developed by NHS Stoke on Trent provides 37,500 texts for £10.5k) |
| Timescale |
| Company dependent |
| Implementation costs |
| Limited for NHS however will have an impact on individual companies |
| Risks |
| Potential for inequality due to lack of hardware |
| Partners |
| Pharmaceutical companies and NHS and Community Pharmacy, IT Partners, possibly SCI-Diabetes |

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| Name of Innovation |
| Understanding my diabetes medication What would be useful to People with diabetes is a workshop or a resource which explains in easy to understand language the whole issue of medication, what has been prescribed, how it works and why it is important to take it correctly (compliance, titration etc). Also included would be, what if I miss a dose, does it impact on any other medication I have been prescribed. It would address side effects and questions to ask GP, PN, DSN, Consultant and Community Pharmacy. |
| Problem |
| The issue of understanding and taking prescribed medication effectively is a common theme occurring in our self management programmes. |
| Benefits |
| As a person centred approach, people with diabetes will be empowered and in the driving seat in terms of managing their medication. The interactions between people with diabetes and acute, primary care staff and community pharmacists will be improved and enhanced. This should result in improved compliance and reduction in waste. This resource could be designed as an enhancement of the Diabetes Conversation Maps which are a core part of patient education. |
| Development costs |
| Healthyi ©, Lily Diabetes Care would need to be approached for this development (could the eLearning on Diabetes Medication provided via the Scottish Government and the Virtual College be adapted for use by people with diabetes) |
| Timescale |
| Soon – within two years |
| Implementation costs |
| There will be an investment of NHS staff and volunteer time to roll out the new resource once completed. |
| Risks |
| Investment of time from interested parties and securing additional funds to produce the resource. |
| Partners |
| Diabetes MCN, Community Pharmacists, NHS Boards, Healthyi © and Lily Diabetes Care |

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| <p>Name of Innovation</p> <p>Pharmaceutical Industry and Medical Technology (PIMTs)</p> <p>A joint Pharmaceutical Industry and Medical Technology sector collaboration with the NHS and citizens to enhance the opportunities for people to be more informed about diabetes and take the appropriate and relevant actions for prevention and or better self-management of their condition.</p> |
| <p>Problem</p> <p>There has historically been a "silo" approach taken by the NHS and industry to the support that is provided to citizens in the prevention and subsequent self management of diabetes in both its forms.</p> <p>The involvement of citizens in the design of services to support them in their management of diabetes, has been limited and tends to deliver solutions geared to whole populations rather than tailored to individuals.</p> <p>This approach to service redesign can often also re-enforce the silo approach to service delivery – with individual services only contributing to the redesign of their part of the pathway – rather than being involved in looking at the whole continuum of care.</p> <p>As a consequence, people’s ability to prevent Type 2 diabetes and self manage both Type 1 and 2 can be difficult, if they fall into the gaps between service delivery silos – resulting in potential increased incidence of the disease and a consequent increased demand on health and other statutory services.</p> |
| <p>Benefits</p> <p>By taking a collaborative approach to the future delivery of patient centred services, there will be the opportunity for both the pharmaceutical and medical technology industries to deliver products, whose design has been influenced through the ongoing engagement with:</p> <ul style="list-style-type: none"> • A range of citizens who will identify what their needs are and what the range of “approaches” require to be that will enable them individually to have a sustained approach to adopting preventative life style choices with enhanced self management capability , and • A range of clinicians who can outline what is required to innovate the services that they provide to their patients, whilst at the same time providing clinical expertise in evaluating suggestions being put forward by citizens and industry partners. |
| <p>Development costs</p> <p>The main cost will be that which is required to support the setting up and running of the collaborative design workshops which will seek to capture innovative ideas as a result of multi stakeholder engagement.</p> <p>Funding will be required to prototype new technologies / medications and to pilot new pathways of service delivery, with the evaluation of these then determining their ability to meet the required outcomes determined by service users and clinicians.</p> |

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| Pharmaceutical Industry and Medical Technology (PIMTs) (cont.) |
| <p>Timescale</p> <p>Once started this process will be ongoing, but subject to a requirement to have some early successes around the glucose monitoring and medication management part of the existing pathways.</p> <p>An improved combined model to the delivery of improvements to these parts of the pathway will be looked for within the first six months of this collaborative project – replicating the Digital Health Institute workshop approach to deliver this.</p> <p>After six months and the initial evaluation of the effectiveness of the changes delivered, the collaborative model will then be tasked to identify a range of new potential innovative approaches across the care pathway.</p> |
| <p>Implementation costs</p> <p>The enhancements to existing service delivery and the proposed future innovative developments will all require to be funded through resource release as the consequence of achieving:</p> <ul style="list-style-type: none"> • More effective services in terms of both cost and clinical outcomes, • A reduction in the demand for NHS provided resources. |
| <p>Risks</p> <p>The main risks will be:</p> <ul style="list-style-type: none"> • Ensuring that this model continually has the agility to maintain change at the required pace and with the ability to quickly try out and evaluate new approaches, and take the learning from these to the next stage*, • Ensuring that all stakeholders retain an “open collaborative” approach to their engagement in the process, so that there is always on going transparency and trust <p>* All of this within a Governance Framework that provides for the flexibility to engage with citizens using a range of mediums / approaches and that supports innovative change, rather than stifles it.</p> |
| <p>Partners</p> <p>There will be representation from:</p> <ul style="list-style-type: none"> • Citizens (both those with diabetes and those for whom effective preventative measures will avoid or delay onset), • Third sector representatives. • Pharmaceutical Industry and Medical Technology (including digital communication) companies, • Clinicians and NHS staff involved in managing the processes for service delivery, • Academia, including the College of Art Design Department. • Scottish Government departments and agencies. |

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| <p>Innovation</p> | <p>An on-line and interactive education system for young people with type 1 diabetes to understand self-management for their lifestyle.</p> <p>Young people are a challenging age group for care delivery. Diabetes education, monitoring and support from Health Care Professionals (HCPs) is essential to achieve acceptable blood glucose control for wellbeing, and prevention of acute and long-term complications. Education is traditionally delivered face-to-face in a hospital setting. Digital-based education is a novel alternative that would allow young people to learn at a pace and time to suit, with guidance and support from a HCP via email/phone. This intervention would be situated within My Diabetes My Way, with access by personal log-in. A home page would provide general Type 1, with separate sections for topics including daily activities (exercise, alcohol, employment, sex and contraception etc.), and acute and long-term complications. Each topic will have a step through interactive module with key questions to instigate thoughts around personal situations, self-management strategies and evaluation of effectiveness. Delivery tools include digital presentations, on-line activities for reinforcement e.g. checking glucose before and after exercise, and written feedback to aid understanding /empowerment. Further information will be given as word documents, patient stories, video clips, links to publications (via MDMW or other websites). Digital communication with healthcare professionals and peers will support learning.</p> |
| <p>Problem</p> | <p>Type 1 patient education is a fundamental part of treatment and care, and is currently provided either face to face by a HCP, or using leaflets, or non-validated websites. However, digital based education that is developed by HCPs and people with Type 1 diabetes, would ensure relevant, accurate, evidence-based information, in a user-friendly format. This information can be accessed by young people whenever, and wherever they wish. On-line education may reduce the need for hospital attendance, thus reducing costs and time off school / work for patients. Patients with social phobias and those living remotely may also prefer this delivery method.</p> |
| <p>Benefits</p> | <p>This is an innovative approach to education and patient support, based on established technology and common modes for people locating general information and social networking. This has potential to improve: the glycaemic control and wellbeing of individual patients, current DNA rates of patients attending diabetes appointments, and also communication between patient and HCP by using internet resources. This would not totally replace face-to-face appointments with HCPs for clinic appointments, but would provide an alternate</p> |

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| | resources/ method of engagement which may particularly appeal to young people and socially isolated patients who have disengaged from traditional care. |
| Costs – Development | |
| Timescale | The system will be written by Spring 2015, and hopefully evaluated by a small number of patients and HCPs regarding the content, structure and appearance. Once “live” the system will need the below evaluation. |
| Implementation costs | Would need evaluation regarding the impact on glycaemic control and quality of life. Evaluate around HCPs regarding the time, and benefits of using the system with a patient compared to only face-to-face education. |
| Risks | HCPs not using it. Lack of advertising. YP not engaging with the system. |
| Partners | |



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| Innovation | <p>Proof of Concept study to deliver personalised use of information to support diabetes management and behaviour change; right information; right time; right way.</p> <p>Remote Diabetes clinic delivering care via digital technology interaction, comprising evaluation of diabetes self-efficacy and self-care and technology acceptability: Home or Office VC consultation (WebEx) Text and Email support Remote sharing of BG data</p> |
| Problem | <p>Remote and rural landscape Long return waiting list appointments Poor glycaemic control especially in type 1 diabetes Significant patient and staff travelling times</p> |
| Benefits | <ul style="list-style-type: none"> ▪ Improved flexibility around appointments & engagement with HCPs (medical, nursing, dietetic staff) ▪ Personal needs driven service ▪ Enhanced self management and behaviour change ▪ Improved glycaemic control ▪ Reduce hospital admission and outpatient attendance ▪ Reduced patient and staff travelling times |
| Costs Development | <p>– Project is currently funded</p> |
| Timescale | <p>Project is currently funded</p> |
| Implementation costs | <p>Integration to current diabetes services is envisaged Licensing costs - difficult to estimate for technologies developed and external to NHS Costs of support for text use will be non discipline specific should be attributed to eHealth budgets across boards</p> |
| Risks | <p>NHS eHealth endorsement and support for all modalities of interaction Local IT issues – broadband access</p> |
| Partners | <p>Telecoms: Need reliable platform for personalised VC Informatics/Tech company: Robust and cost effective system for remote BG transmission from evolving BG monitoring devices</p> |

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| Innovation | Virtual promotion of physical activity for people with type 2 diabetes |
| Problem | Poor adherence to healthy lifestyle behaviours in diabetes, physical activity in particular Difficulties in accessing information about how and where to engage in physical activity, especially in remote and rural localities |
| Benefits | Improved physical activity participation based on behaviour change theory Improved glycaemic control Enhanced self-management Weight loss |
| Costs – Development | Project is currently funded |
| Timescale | - Now (within 6 months). Results suggest positive outcomes for the interactive arm of the study (RCT) |
| Implementation costs | This innovation reflects several research projects that have incorporated co-design with people who have type 2 diabetes. It offers the opportunity to be further developed as a national resource to not only aid management of diabetes through a behaviour change model but also prevention of diabetes and the opportunity for a population-wide approach to improve physical activity levels based on application of local information. |
| Risks | Local IT issues – internet/broadband access Support for web site maintenance Maintaining accurate and up to date information on local physical activity access maps |
| Partners | Informatics/Tech company: Further develop for diabetes prevention, overweight and sedentary population Consider development of mobile phone app version |

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| Innovation | <p>Remote foot ulcer management: RAPID (Reducing Amputation in People with Diabetes)</p> <p>Access to generic foot email with image review for advice from specialist services to facilitate triage of cases Real time, two way tele-consultation clinic with MDT based on innovative hard & software for remote home consultation</p> |
| Problem | <p>High lower limb amputation rates for people with diabetes Need for timely referral to multidisciplinary foot team Difficulties in accessing appropriate services, especially in remote and rural localities Travel times for patients and staff</p> |
| Benefits | <ul style="list-style-type: none"> ▪ Reduce local amputation rates for diabetes patients ▪ Reduce ineffective or inappropriate travel time for people with diabetic foot ulceration ▪ Promote collaborative working between community and specialist teams ▪ Potential for extrapolation to other acute or chronic conditions for community-based monitoring and linkage to specialist services |
| Costs Development | <p>– Costs for proof of concept need to be more fully estimated, about £15-20,000 assuming NHS in kind costs</p> |
| Timescale | <p>– Soon (within 1 year). Proof of Concept study required, thereafter implemented at larger scale with further evaluation of technology use along with ROI assessment</p> |
| Implementation costs | <p>Costs would reflect number of hardware units Scotland-wide (no cost available at present), plus licensing costs for software.</p> |
| Risks | <p>Engagement of local community services, podiatry, nursing Costs and maintenance of hardware devices Licensing costs for software support</p> |
| Partners | <p>Currently in discussion with IT company who have necessary hard and software to deliver this project</p> |

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| Innovation | Diabetic foot screening – development of technology for HCP or self-recording to facilitate accurate sensory and pressure measurement at annual screening in order to detect early warning signs, improve risk assessment estimation and prevent diabetic foot problems. Devices would link to patient records to upload results. |
| Problem | Routine annual foot screening for people with diabetes utilises crude testing mechanisms with inconsistent application Foot risk status is poorly recorded by non specialists with potential for consequences including increased diabetic foot ulceration and ultimately amputations. |
| Benefits | <ul style="list-style-type: none"> ▪ Increase diabetic foot screening rates ▪ Increase accuracy of foot risk status recording ▪ Improve patient self-awareness of foot risk status ▪ Improve referral to orthotic services for pressure offloading devices and footwear ▪ Reduce diabetic foot ulceration ▪ Reduce amputation rates for diabetes patients |
| Costs Development | NHS in kind costs for initial exploration of concept; currently in early stages with NHS Highland |
| Timescale | Longer (within 2-3 years). Requires development, testing and validation of prototype |
| Implementation costs | Costs would reflect number of devices Scotland-wide. |
| Risks | Development of a sufficiently accurate, portable device to be universally accepted |
| Partners | Bioengineering/IT company |



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| Innovation | Portable capillary HbA1c testing for diagnosis and self-monitoring of diabetes. Possibility of mobile phone adaption for testing |
| Problem | HbA1c monitoring entails costs related to travel and number of visits for patients in primary care. Real time measurement with capillary samples in secondary care is expensive. |
| Benefits | Reduce unnecessary travel and associated visits to primary or secondary care sites Potential to reduce primary care costs and/or allow diversion of resource to other priorities Potential to reduce secondary care costs HbA1c is a more convenient test for diagnosis of type 2 diabetes or at risk individuals |
| Costs – Development | Preliminary testing of capillary testing using filter paper successfully undertaken. Feasibility required for community study. Funding required for analytical chemistry exploration of Hb fragment extraction and glycated component estimate compared with HPLC methodology. Need to explore potential for mobile phone adaption. Health economic analysis |
| Timescale | Longer (within 2-3 years). Requires development, testing and validation of prototype |
| Implementation costs | Costs would reflect development of 'kits' for distribution across site and /or adapted phone technology. |
| Risks | Development of a sufficiently accurate, portable device to be universally accepted Costs at scale |
| Partners | Analytical chemists; bioengineering; cellular phone company |

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| Innovation | Web app for decision support for patients with type 1 diabetes undertaking sport or exercise |
| Problem | People with type 1 diabetes are dissuaded from undertaking increased physical activity due to problems in managing insulin and food intake. |
| Benefits | <ul style="list-style-type: none"> ▪ Reduce sedentary time and increase benefits of physical activity ▪ Reduce errors in insulin or carbohydrate adjustment for sport or exercise ▪ Improve well being ▪ Reduce episodes of hypoglycaemia ▪ Decision support for self-management |
| Costs – Development | Software platform development and feasibility testing with use of CGMS (Libre) and Actigraph monitoring about £10,000 |
| Timescale | Soon (within 1 year). |

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| Implementation costs | Cost to maintain software Evaluation of innovation at scale costs |
| Risks | Product developed not useful leading to high attrition rate Competition from other products Identifying support for maintenance costs |
| Partners | In discussion with software development company |

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| Innovation | Online level 3 structured education for type 1 diabetes |
| Problem | Difficulties in accessing education for people with type 1 diabetes with work commitments that preclude regular attendance and rural communities where face to face group sessions are less viable |
| Benefits | Ensure opportunities for access to structured education are equitable Improve self management and self reliance |
| Costs – Development | Modular adaption of current structured education by HEI about £10,000 Feasibility/evaluation testing NHS in kind |
| Timescale | Soon (within 1 year). |
| Implementation costs | Low as complimentary to existing group sessions delivered by NHS |
| Risks | Maintenance and update of course content online Poor uptake by type 1 diabetes community |
| Partners | In discussion with HEI |

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| Innovation | <p>My Diabetes My Way electronic personal health record – uptake at scale</p> <p>Provides online data access (health care records) for all patients in Scotland with Diabetes displayed using patient friendly visualisations. Also offers access to a massive online education resources site (interactive games/ videos/ written info via website), with tailoring of educational links depending on patients clinical characteristics.</p> |
| Problem | Improving self management/ patient empowerment for all patients in NHS Scotland |
| Benefits | Improved diabetes outcomes, and reduced complications. Improving patient knowledge, quality of life and motivation. |
| Costs – Development | Basic Patient Portal already developed- running costs around £100k/ annum, including planned development below |
| Timescale | 12 months |
| Implementation costs | Ongoing running cost for basic MDMW portal around £100k/ yr. Additional cost for future developments. |
| Risks | Risk- poor uptake by patients in Scotland (recruitment has been slower than expected). Ongoing funding risk- currently funded partly by eHealth leads/ Scottish Diabetes Group on an annual basic- no long term guarantee |
| Partners | Engagement with GP's: A GP in Highland wrote to her patient caseload and within 2 weeks, uptake of MDMW records access increased from 1% to 23%. Replicating this intervention across Scotland would lead to recruitment of around 70,000, making significant inroads into the wider population. 3 pilots repeating this approach are planned for 2014. Partnership working would allow us to proceed more rapidly across all ~1000 GP sites in Scotland. |

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| Name of Innovation |
| TeleClinics for diabetes |
| Problem |
| High non-attendance rate at young adult diabetes clinics – 25%-40% DNA rate |
| Benefits |
| Improved contact with patients, likelihood of improved diabetes control as a result |
| Development costs |
| IT costs. Establish the use of teleconf software via patients mobile phone/ tablet or computer. Software cost for setting up secure link (e.g. Skype, doctor on demand) |
| Timescale |
| Now |
| Implementation costs |
| Nurse running “clinic” – cost of 0.2 WTE band 6 diabetes nurse. |
| Risks |
| Patient confidentiality / data management issues would need addressed |
| Partners |
| Local IT dept, software company, Diabetes clinic staff |

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| Innovation | Develop a diabetes sim / game in which the main character has diabetes. Young people need to keep the sim / character alive as they face the various challenges of life or the game. |
| Problem | Engagement of young people with diabetes in their own self-management, learning about their diabetes through game play. Minimising risk taking behaviours by allowing them to try it out in a virtual environment. |
| Benefits | By helping young people to understand what the relationship is between insulin, food and exercise. Help them plan for real life scenarios by challenging them in the game. Speed up the effects of not looking after their diabetes so complications that may take years in the real world could start within hours in the game. Young people would be involved in developing the game and this would also help build their personal engagement with their own condition. |
| Costs – Development | This would depend on the complexity of the game, and to what extent this could be supported by an established gaming company. £50,000 Potentially this could be income generating if sold for a minimal cost. |
| Timescale | Once the process of developing the game got started it would probably take 6 – 12 months. The challenge would be creating the algorithms to mimic the effects of insulin, food, exercise and the other parameters that would impact on the characters diabetes control. |
| Implementation costs | Once developed the resources required to launch and maintain the resource would again depend on the type of game produced. In its simplest form it would be available as a simple download from the apple store (IOS) or play store (Android). If more complicated there might be ongoing developer input to update the game with new challenges or to fix bugs in the software. |
| Risks | The possible complexity of the simulation, although this could be made very simple and range from the very early Tamagochi idea to the modern HD game for smart phones. Young people don't like the game and don't engage with it. The development costs are too high |
| Partners | Young people with diabetes Young people without diabetes / test game play Game developers Large established companies looking for good corporate social project EA Games, Rockstar etc Healthcare professionals Writers / animators / higher education establishments |

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| Innovation | Development of meaningful automated glucose data to in-patient clinical areas |
| Problem | In-patient diabetes management – both recurrent and inadequately managed hypo and hyperglycaemia |
| Benefits | <p>1)Improvement in patient experience and safety. 2)Improved quality and efficiency through more effective care.</p> <p>The Diabetes Think, Check, Act programme (formally DiSH) has demonstrated the effects of rapid feedback of glucometer data to wards and the benefits to inpatient care, particularly around hypoglycaemia. Potential economic savings through improved hypoglycaemia and reduced length of stay have been explored.</p> |
| Costs Development | – |
| Timescale | <p>How long until the innovation is ‘box ready’?</p> <ul style="list-style-type: none"> - Now (i.e. within 6 months) – for existing boards with downloadable glucometers - Soon (within 2 years) – for those without |
| Implementation costs | |
| Risks | Boards having the appropriate IT infrastructure including automated glucometers (only 6 out of 14 currently have this) for widespread dissemination in NHS Scotland |
| Partners | Diabetes: Think, Check, Act project, possibly glucometer providers to NHS Scotland, alongside potential other interested parties |



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| Innovation | In-patient Care: Integrated eHealth solutions to improve patient care, safety and outcomes. Some of the following initiatives already exist in some health board areas but standardised care is not available. |
| Problem | In-patient diabetes management – there are ongoing issues with regards the early recognition of diabetes, appropriate timely referral, unsafe use of insulin and incorrect identification and management of glycaemic extremes. |
| Benefits | <p>Potential innovations:</p> <ol style="list-style-type: none"> 1. Timely identification of diabetes: <ol style="list-style-type: none"> a. Remote access for diabetes teams: Utilise existing electronic systems to identify patients with diabetes. Developing a real time link between SCI-diabetes and in patient systems such as trackcare. This could also be linked to existing glucometer data to identify those individuals at highest risk with repeated extremes of glycemia. b. Point of care: ensure the development of electronic admission documents for all disciplines includes assessment of diabetes status. Once a patient is identified as having diabetes there is a direct link to guidance on which individuals require referral to specialist diabetes services. This could also include push support to remind healthcare professional to review the risk of foot problems in line with the CPR for feet campaign. 2. Support prompt assessment/treatment of glycaemic extremes <ol style="list-style-type: none"> a. All point of care blood glucose testing that demonstrates hypoglycaemia results in a prompt to treat according to national standardised hypoglycaemia algorithms. There would also be a prompt to repeat blood glucose testing to ensure hypoglycaemia has resolved. If a recurring problem this could generate an automated e mail to specialist diabetes teams to ensure complete capture of all individuals with recurrent hypos. This could ensure the correct management plan of Treat-Repeat-(Refer). b. All point of care blood glucose testing that demonstrates hyperglycaemia results in a prompt to test for ketones and assess possible causes for a high blood sugar, If a recurring problem this could again generate an automated e mail to specialist diabetes teams. 3. Development of a diabetes dashboard: this would provide real time information at potentially ward level for specialist and non-specialist HCPs to help drive quality improvement. This could include information on in-patients with diabetes, frequency and appropriate treatments of hypos, iatrogenic harm related to insulin/OHA use and new onset foot lesions etc. |
| Costs – Development | Utilise existing systems therefore most costs would be to develop IT links and modify glucometer systems. Uncertain at this stage the potential costs. |



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| Timescale | Some of the above innovations are already in place and therefore there could be an evolutionary roll out of these initiatives over a phased two year period. The timescale is partly dependent on the ease and development of some of the eHealth solutions. |
| Implementation costs | Unknown |
| Risks | All health boards are developing electronic admissions documents and solutions have already been identified within the Think-Check-Act Diabetes resource. Failure to ensure these are integrated as part of routine clinical care will result in iatrogenic harm from failure to identify patients, lack of appropriate referrals, inappropriate management of in-patient diabetes. |
| Partners | Health Boards, SDG, In-patient sub-group of SDG which has lead on the development of Diabetes: Think, Check, Act. Glucometer companies, eHealth leads nationally and within health boards, informatics companies. |



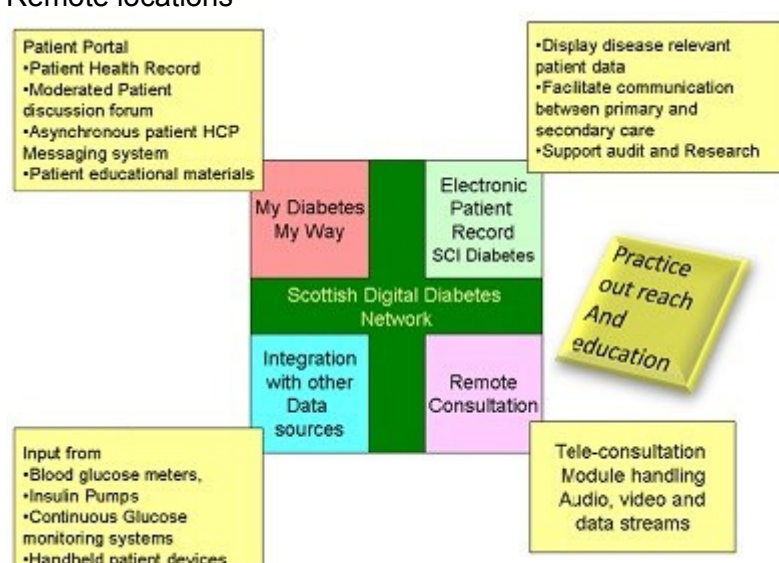
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| <p>Innovation</p> | <p>Innovative model of care to address the ‘process of care’ in managing people with long term conditions. This would focus on microvascular and microvascular screening and could also be combined to address co-morbidities in a person centred manner.</p> |
| <p>Problem</p> | <p>People living with their long term conditions self manage, for better or worse, all the time. Supporting their self-management is a key responsibility of everyone involved in health and social care¹ and up to 80 per cent of consultations in primary care involve people living with one or more long term health problem. Supporting self-management is a key priority in achieving Scotland's 2020 vision for a safe, effective and person centred healthcare system where everyone is able to live longer healthier lives at home, or in a homely setting. However supporting self-management represents a fundamental shift in the relationship between person and healthcare professionals. This can be a challenge for both parties as requires them to assume roles that they may be unfamiliar and uncomfortable with. Supporting self management for people with long term conditions requires a wider, holistic, asset based model that supports side by side, relational interactions that centre on the personal goals of the individual.</p> <p>One of the main barriers to effective consultations and indeed self-management is the inability within existing health services to deal with multimorbidity and also separate the ‘process of care’ from meaningful partnership consultations which focus on agenda and goal setting, the driver for improving health.</p> |
| <p>Benefits</p> | <p>A. Lifestyle and condition management The ability to address all aspects relating to the ‘process of care’ will improve the person centred approach to existing services. It will limit the number of appointments that are required which may in turn improve the level of engagement. The information from the screening visit can be used to generate individualised reports (via SCI-diabetes) that can then be the focus of follow up appointments focusing on person specific targets and goal setting. Pre-consultation reports and combined agenda setting between HCPs and individuals are the cornerstones of partnership healthcare and crucial developments for improving the management of long term conditions and dealing with multiple morbidities. Pilot projects assessing combined microvascular screening have shown them to have high satisfaction for persons with diabetes.</p> <p>B. Reducing routine HCP contact Addressing all aspects relating to the ‘process of care’ will limit the number of HCP contacts required for each individual. This is not only person centred but would also benefit other services such as the Scottish Ambulance Service. In addition this would improve the efficiency and effectiveness of care as this service can be delivered by suitably trained band 3 health care professionals</p> |



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| | <p>ensuring that acute and community based diabetes trained HCPs can focus on management and outcomes rather than processes of care.</p> <p>C. Information transfer Utilising the existing SCI-diabetes IT system will ensure timely and appropriate transfer of information to all healthcare professionals. In addition this information can all be accessed by the person with diabetes via the My Diabetes My Way application. This would address the ability to provide pre-consultation results and greater engagement with health.</p> |
| Benefits (cont.) | <p>D. Early detection Screening rates for retinopathy are higher than any other potential microvascular complication. The lowest rate of screening is for microalbuminuria at just over 50% (SDS 2012). Combining screening of all microvascular conditions and indeed macrovascular risk factors will allow early detection, referral and intervention to limit disease progression and ultimately reduce the socioeconomic costs of the long term complications of diabetes.</p> <p>E. Reduce disengagement There is an opportunity to utilise non-NHS space to deliver this care. Utilising existing commercial space which offers care outwith traditional hours may improve engagement with services and adopting a whole system approach may allow partnership working with current providers of healthcare (opticians, pharmacy) as well as non-health care providers (supermarkets, retail outlets).</p> <p>F. Multi-morbidity There is no reason which such an initiative should be limited to those individuals with diabetes. Modification of the service could allow a similar approach to other long terms conditions such as CHD etc.</p> |
| Costs Development | – Dependent on the scale of the initiative. Most resources already exist albeit some development would be required to allow a fully functional system. |
| Timescale | This could be adapted and piloted within 6 months or so. |
| Implementation costs | Unknown |
| Risks | Services continue unchanged and outcomes remain sub-optimal. Ongoing failure to address problems with disengagement and multi-morbidity. |
| Partners | Health Boards, SDG, House of Care Project SG, Commercial partners, MDMW and SCI-Diabetes, Third sector Diabetes UK Scotland. |

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| Name of Innovation |
| Young Persons Remote Clinic Consultation |
| <p>The vision is to bring clinics to patients in their home or school, via remote face to face consultation. This idea is not meant to substitute clinics but to supplement existing clinic schedules.</p> <p>The solution would need to consider a 'bring your own device' approach or a patient application which could be accessed from their device via the web.</p> |
| Problem |
| <p>The current DNA rate of 10-20% in adolescent and young persons clinics, for NHS Borders is an issue. Causes for this include lack of engagement in self-management of condition; also travel difficulties given rural location and reluctance to prioritise clinic appointments over personal commitments.</p> |
| Benefits |
| <p>Improved contact with patient therefore improved management of condition, empower patients in self-management by contacting them using technology that we know is largely embraced by this age group.</p> <p>Reduce DNA rate and costs associated, improve control of long term condition and reduce chronic complications associated with the condition and reduce acute hospital admissions with acute complications</p> <p>It generates new business opportunities for companies in an area of technological development that is in line with NHS Scotland 20:20 Vision for delivery of care.</p> |
| Development costs |
| To be determined |
| Timescale |
| 12-18 months |
| Implementation costs |
| To be determined |
| Risks |
| There may significant Information Governance and Information Technology restrictions that need to be considered. |
| Partners |
| Patients, Diabetes Team, NHS Borders and solution provider. |

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| Innovation | <p>Maximise use of the data to support self-management of patients with co-morbidities</p> <p>Through collaborative working with a number of organisations determine how we can maximise use of the data we all have access to support self-management of patients with co-morbidities including obesity, diabetes, Chronic Respiratory problems, Angina</p> |
| Problem | <p>Scotland has lots of different data sets covering different aspects of patient care that is not looked at holistically or used to support the patient self manage.</p> <p>Data sets include national data sets held by ISD (e.g. hospital admissions, prescribing data, cost data)</p> <p>Personal data gathered as part of other pilot projects (Stormhealth have 200 patients with co-morbidities who have provided personal data, who are collecting data over a period of time on their exercise/diets and who are happy for their data to be used to support their longer term health care needs)</p> |
| Benefits | <p>Identify and resolve issues that may prevent data sharing/linkage to establish prototype for collaborative working across health, public sector, academia and SMEs</p> <p>Develop prototype “app” based on patient identified needs (human centred design approach) for this cohort of patients that could be used by patients, health care workers etc.</p> |
| Costs – Development | <p><i>What is the estimated cost of making the innovation ‘box ready’?</i></p> <p>Prototype costs are staff time only</p> |
| Timescale | <p><i>How long until the innovation is ‘box ready’?</i></p> <p>Estimated 6 months to develop prototype</p> |
| Implementation costs | <p><i>Once developed, what is the scale of resource (money/ time/ revenue costs) which might be involved in implementing and running the innovation on a ‘greenfield site’?</i></p> <p>TBC</p> |
| Risks | <p><i>What are the risks and barriers to success?</i></p> <p>Key barriers will be around information governance, data protection etc.</p> |
| Partners | <p><i>Who is or might be interested/involved in developing the innovation?</i></p> <p>NSS (ISD/PHI, PCF), Lothian Health Board, StormHealth/StormID, Health Scotland</p> |

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| <p>Innovation</p> | <p>Virtual practice outreach and education in primary care</p> <ol style="list-style-type: none"> 1. Develop a module within SCI-diabetes to enhance communication between primary care providers and their linked contacts in secondary care. 2. Develop health care provider based case management modules. 3. Develop better links with existing GP software systems to ensure single point of data entry 4. Develop a shared case management strategy for complex patients |
| <p>Problem</p> | <p>Most of the people with diabetes are looked after by Primary care. Increasingly this care is delivered by practice nurses. There is poor uptake of SCI-Diabetes in primary care.</p> <p>We have been developing a practice outreach programme in Grampian and Orkney islands. Have better Case management tools.</p> |
| <p>Benefits</p> | <p>As part of the Scottish Diabetes Group funded project we are developing modules within SCI-Diabetes to enhance telemedicine and telesupport. We will build caseload management , better data visualisation, personalised recommendations.</p> <ol style="list-style-type: none"> 1. Ongoing support to SCI-Diabetes development team 2. better links with primary care including: <ul style="list-style-type: none"> • Nursing homes • Prisons • Remote locations  <p>The diagram illustrates the architecture of the Scottish Digital Diabetes Network. At the center is a green box labeled 'Scottish Digital Diabetes Network'. To its left is a red box 'My Diabetes My Way', and to its right is a light green box 'Electronic Patient Record SCI Diabetes'. Below the central network are two boxes: 'Integration with other Data sources' (light blue) and 'Remote Consultation' (pink). To the left of the network is a yellow box 'Patient Portal' containing: Patient Health Record, Moderated Patient discussion forum, Asynchronous patient HCP Messaging system, and Patient educational materials. To the right is another yellow box containing: Display disease relevant patient data, Facilitate communication between primary and secondary care, and Support audit and Research. Below the network is a yellow box 'Input from' containing: Blood glucose meters, Insulin Pumps, Continuous Glucose monitoring systems, and Handheld patient devices. To the right is a yellow box 'Tele-consultation Module handling Audio, video and data streams'. A yellow box labeled 'Practice outreach And education' is tilted and positioned to the right of the central network.</p> |
| <p>Costs – Development</p> | <p>SCI-Diabetes programmer cost</p> |

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| Timescale | 8 Months development 8 Months Pilot |
| Implementation costs | Practice nurse Diabetes specialist nurse |
| Risks | Resistance from GP software systems to develop links |
| Partners | |