United4Health

Scottish Centre for Telehealth & Telecare

# Deployment of Telehealth at Scale

## Lessons Learned & Guidelines for Implementation

DIABETES

CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD)

CONGESTIVE HEART FAILURE (CHF)

## Documentation

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# Executive Summary

United4Health was a large European project on scalable deployment of telehealth which aimed to support the management of long term conditions. It has been implemented by a consortium of 14 regions in 10 countries, with overall project coordination provided by the Scottish Centre for Telehealth & Telecare (SCTT) within NHS24 in Scotland.

The purpose of this report is to present the lessons learned from the implementation of the United4Health Project in Scotland which consisted of nine telehealth projects operating across three territorial Health Boards. Capturing and sharing the lessons learned from implementations of telehealth is essential to improve our understanding of what works and why. The lessons learned and the guidelines set out in this document are derived directly from the implementation experiences of U4H deploying at scale.

United4Health captured important insights and enablers to overcome the challenges of large scale deployment of telehealth. As such, this report will be used to inform the expansion of telehealth in Scotland within the framework of Technology Enabled Care.

## *Methodology*

External evaluators worked with U4H project staff at both the national and local pilot site level to formally review the experiences in Scotland. This was undertaken through onsite visits by the evaluators, including meetings with the Health and Care Partnerships, relevant Health Boards, and interviews with project staff, clinicians and patients. A thematic review of the project Lessons Learned Log was also undertaken to identify common themes and develop future implementation guidelines.

## *Outcomes*

Telehealth services were successfully implemented in all of the Scottish sites. These provided digitalised telemonitoring services to more than 1000 patients with Congestive Heart Failure (CHF), Chronic Obstructive Pulmonary Disease (COPD) and Diabetes. A further 4800 diabetes patients registered to the MyDiabetesMyway Self Management portal with some degree of integrated telemonitoring.

In the current telehealth deployment landscape, United4Health has been a breakthrough project for Scotland. It has enabled transformational service change and created an appetite for at scale solutions. It has enabled the project areas to develop the capability, skills and expertise to further progress the objectives of Scotland's Technology Enabled Care (TEC) Programme and has

pushed forward the strategic development of an at scale, clinically & cost effective National Model for Home & Mobile Health Monitoring in Scotland. U4H has provided the space and time to learn about the challenges and devise realistic solutions which in turn informs our national approach to Home and Mobile Health Monitoring.

### *Main Challenges*

While many lessons learned were identified and are set out in this report, three major challenges stand out as having had the most profound effects on most of the sites. The lessons learned relative to these challenges reflect the key messages to come out of this project:

- **Stakeholder engagement,** specifically engagement of Health and Care professionals **(**HCP's), is crucial to successful telehealth deployment and presented a significant challenge in almost all of the sites. However, these challenges were successfully addressed in most cases through the implementation of additional approaches to awareness and engagement and benefit realisation.
- **Procurement of technology** and the integration of technology into existing ICT systems and workflows, as well as existing technology infrastructures, was complex, ambitious for a 3 year programme and much more time consuming than anticipated. Engagement with procurement specialists needs to take place as early as possible in the planning stages.
- **Evaluation methodology** required for deployment in real life differs from traditional research methods and needs to complement effective and scalable deployment. The appropriate methodology for deployment is most likely to be iterative, with outcomes at each stage reported to inform further changes in process or workflow. Ultimately, however, the U4H project evaluation has provided valuable evidence on the clinical and economic benefits of telehealth to inform future plans for at-scale deployment in Scotland.

## Key Learning

- Technology in this area is continually being updated. An additional emerging opportunity which accelerated and scaled telemonitoring deployment, was the introduction of simple, low cost mobile and web based technology solutions.
- Telehealth technology must fit the "environment" within which it is being deployed in terms of availability, infrastructure, accessibility and ability to customise.

- Digital technologies that enable telehealth for chronic disease management, supporting prevention and anticipatory care planning need to be firmly rooted in primary care and community healthcare settings to provide the greatest benefit for patients and best value for the healthcare system.

**The overall conclusion of this report reiterates that successful deployment of telehealth technologies needs to address two critical elements:**

- **Technology** – this includes getting the technology to work properly, integrated with existing infrastructure and ensuring it is compatible with existing technological solutions or systems
- **People** – getting the key users to adopt and use the technology in clinical practice, designing and tailoring it to their needs and training them to use it effectively.

By adopting the lessons learned during the project many of the deployment sites have been able to subsequently move forward with greater speed and insights into their telehealth service development. A notable outcome is that all but one of the U4H sites in Scotland intend to continue and expand the telehealth services developed and deployed within the framework of the U4H project.

Participating in a project like United4Health has many benefits & many challenges. The benefits for Scotland are that it has enabled a significant leap forward in the deployment of telehealth, and Scotland has been enriched by learning from the experience of other EU countries. The main challenges were the extent of programme management requirements associated with such a large and complex undertaking, and the many "research requirements" in the project which blurred the necessary focus on scalable deployment and patient recruitment. This distracted time and energy away from deployment onto activities to serve the demands of the evaluation of project outcomes. Ultimately however, the evaluation has also proved useful in evidencing the clinical and economic benefits.

Final U4H evaluation reports can be downloaded : **https://sctt.org.uk/programmes/home-and-mobile-monitoring/**

United4Health has been a positive and valuable learning experience for Scotland which will serve as a guide for further national scale up of telehealth deployment. It has been a significant programme, supporting and enabling real transformational change within Health and Social Care in Scotland and its contribution is recognised.

# 1.0 Introduction and Background

## 1.1 Aim of United4Health

The aim of the U4H project in Europe was to reach new frontiers in the evaluation and large scale deployment of telehealth services for people living with chronic diseases in home settings. It used, as a starting point, the experience accumulated in the Renewing Health[1] (RH) project, which had similar objectives to U4H. Three health conditions were the focus of U4H including:

- Life–long diabetes management (DM);
- short-term follow-up after hospital discharge for Chronic Obstructive Pulmonary Disease (COPD) patients;
- remote monitoring of patients with Congestive Heart Failure (CHF).

The project has included 25 service models in 10 countries. The sites deployed telemonitoring focused on managing and supporting patients with DM, COPD, CHF and hypertension. The sites have procured the necessary technology, and successfully deployed scalable telehealth solutions. The project coordinator was NHS 24 Scotland through the SCTT, and the participating deployment sites countries were: Czech Republic, Finland, France, Germany, Greece, Italy, Norway, Slovenia, Spain and UK represented by Scotland and Wales.

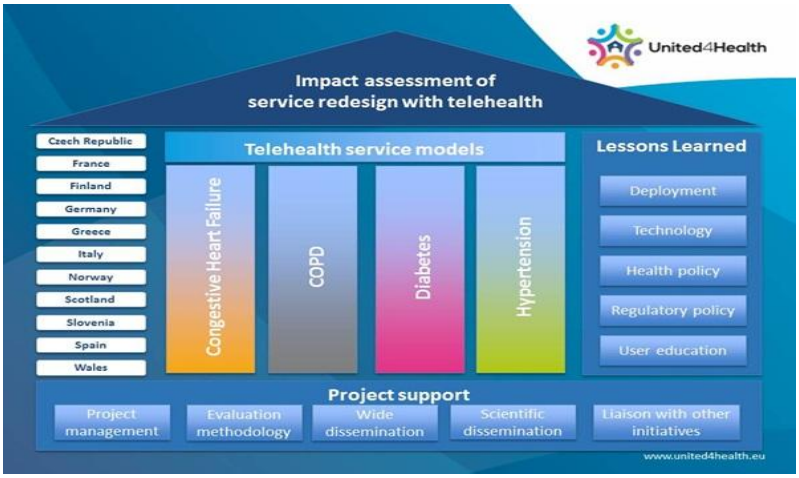



**Figure 1. U4H Project Design**

## 1.2 Scotland

Across Europe, Scotland is considered to be amongst the most progressive of the European Regions in the use of technology in health care, particularly telehealth and telecare. One of NHS Scotland's strategic targets has been the development and large scale deployment of telehealth

and telecare. In 2011, a National Telehealth and Telecare Delivery Plan for Scotland to 2015 was developed by the Scottish Government & partners which continued and expanded earlier strategies in this area.

Concomitantly, the Scottish Government set forth an eHealth Strategy for 2011–2017 which includes telehealth. Telehealth, Telecare and Home and Mobile Health Monitoring (HMHM) are viewed as a part of the overall eHealth Strategy with a major objective to support the integration of health and social care. Expansion of HMHM is a key priority within the Technology Enabled Care Action Plan, 2016.

## 1.3 United4Health and European Projects in Scotland

United4Health was viewed by Scotland as an excellent opportunity to implement the Scottish Telehealth & Telecare Delivery Plan through projects that are jointly funded by the Scottish Government and the European Commission. Thus, the deployment of United4Health must be viewed within the larger context of the transformational redesign of health and care that is taking place in Scotland.

A significant component of this redesign is what is being called “Technology-Enabled Care” (TEC). TEC is defined as: “where the quality of cost-effective care and support to improve outcomes for individuals in home or community settings is enhanced through the application of technology as an integral part of the care and support process” (Scottish Government, 2015) – including, but not limited to, the use of telecare, telehealth, video conferencing and mobile health & wellbeing”.

United4Health provided an essential catalyst for Scotland to progress our national approach in TEC, by successfully implementing nine telehealth scalable start up services across three geographical Health Boards at the same time. This is a very significant achievement. The lessons learned from implementing a deployment project like United4Health have provided some very important insights into the challenges and barriers underpinning large scale deployment of clinically and cost-effective and sustainable telehealth both in Scotland and Europe.

## 1.4 Methodology

The evaluators visited all three sites and met with stakeholders, spending a full day in each area. These visits took place during year 3 of the project. They met with project management staff, health & care professionals and citizens. In two of the sites, they also met with the leadership of

the new Joint Health and Care Integrated Partnerships that have been delegated the responsibility for planning and resourcing service provision for adult health and social care services by their respective Health Boards and Local Authorities**.**

The evaluation methodology sought to address the following questions:

- What were the key factors for success as well as the challenges and barriers for optimal implementation?
- Why the processes worked as they did?
- How can things work better in the next stages of deployment?

Scotland implemented all three United4health telehealth services in each of the following Health Board Areas – nine (9) projects in all:

- NHS Greater Glasgow and Clyde(GGC)
- NHS Ayrshire and Arran (A&A)
- NHS Lanarkshire (NHSL)

# 2.0 Detailed Analysis of Lessons Learned in Scotland

## 2.1 Strategic Lessons Learned

### 2.1.1 Cultural Readiness

In all three sites, there was a level of "cultural readiness" to deploy telehealth. This was evident in the manner which all of the sites recognised the potential contribution of telehealth to meet the needs of an increasing older population with chronic illness and limited resources – both human and financial. There was a strong commitment to large scale implementation of "technology enabled care" (TEC), and all of the stakeholders interviewed (project managers, HCP's, Health Board and Health and Social Partnership members) stated that this is strategically "the way to go" and were committed to finding the best way to operationalise and deploy telehealth successfully to move to scale.

However, as section 2.2.1 outlines, there is a difference between a generally positive view about the use of technology in the delivery of services and the real world deployment. The deployment sites in U4H experienced a number of barriers and challenges which were identified and resolved; these are detailed below together with the learning.

### 2.1.2 Better Alignment with National and Local Strategy

In Scotland, a major strategic objective is to care for people living with long term chronic conditions at home wherever possible. Telehealth is regarded as key enabler towards achieving this objective. This involves identifying or "case managing" patients in the community at risk of hospitalisation and strengthening the care in order to prevent hospitalisation. However, the U4H eligibility criteria for two out of the three of the clinical subgroups required that the patients be enrolled while hospitalised, at the point of discharge or within 6 months of a hospital stay or an accident & emergency visit. This in turn influenced the type of clinical staff designated to provide the telehealth services requiring either to be hospital-based or be part of an integrated pathway with hospital services. This caused two major challenges:

- It created a barrier in finding and enrolling patients suitable for telehealth services and did not fully exploit the contribution telehealth can make to early intervention[1]
- U4H was not perceived to be a care option which directly supported the shift in the balance of care from the hospital to the community which is a key policy driver in Scotland.

[1] Some sites in order to resolve this conflict, created broader criteria for patient inclusion for their COPD and CHF telehealth programme and were recruiting more patients but only reporting to U4H on the patients that met the strict U4H criteria

## Learning

Project staff felt strongly that at scale telehealth projects need to originate in the community, not the hospital, although fully integrated effective pathways should also enable staff in hospital to access the service. This is a key lesson learned and is already being applied post U4H through the local plans for service reconfiguration across Scotland.

For example,

- In NHS A&A, the GP's initially felt that the U4H project disenfranchised them. Prior to U4H, they were involved in GP led telehealth services. The U4H inclusion criteria focused the project away from the GPs and toward the hospital staff. This approach challenged the telehealth models that had already started to develop.

### 2.1.3 Better Alignment with Clinical Guidelines & Process of Care

When deployment started, some incompatibility between the project requirements and the local guidelines and processes of care were noted, resulting in implementation delays.

An example of this was the U4H inclusion criteria for diabetes which was limited to Diabetes Type 2 patients. The Scottish U4H Diabetes Network did not see U4H as merely a “project” but as an opportunity to advance the use of digital healthcare in Scotland in an embedded way. There was recognition that it would contribute to a step change in the uptake in the use of the online tool *My Diabetes My Way* and would further existing plans within Scotland to introduce a digitalised form of blood glucose testing.

Digitalised Blood Glucose Monitoring (BGM) was considered to be valuable in the secondary care of Type 1 and complex Type 2 Diabetes, and there was uncertainty about the value of telehealth for Type 2 Diabetes alone. BGM for all Type 2 patients also contradicted Scotland SIGN Clinical guidelines, which advocated blood glucose monitoring for Type 2 patients on insulin but not for the general Type 2 diabetes population. A change was negotiated in the EU U4H inclusion study criteria in order to make the deployment consistent with Scottish Clinical Guidelines.

## Learning

Strict Inclusion criteria was a major issue for all of the sites for all conditions. U4H is not alone in facing this challenge. It is familiar to many technology enabled health and care projects. The inclusion/exclusion criteria developed pan U4H was not sufficiently aligned with the local guidelines and/or were not considered feasible for recruiting patients at scale.

In addition, the criteria did not reflect the contribution that telehealth can make to preventive and anticipatory care planning and early supported discharge.

For example, teams quickly learned that approaching patients whilst still in hospital with COPD/ CHF was not effective. As a consequence, the criteria was changed to “within 7 days after discharge” thus enabling the HCP to approach the patient once settled at home and more able to engage in the process.

### 2.1.4 Adapting to real life change in the NHS and political environment

Legislative changes mandating the integration of health and care services across Scotland commenced in 2014. This resulted in changes in senior personnel in the U4H Health Boards as a result of the formation of new Health and Care Partnerships. As U4H was conducted under the auspices of the original Health Board configurations, responsibility for its implementation and recruitment was retained. Budget alignment and senior management reorganisation impacted on the project in at least two sites:

- In NHS GGC, some of the delays in implementation were caused by people being replaced (including some of the champions) leaving a temporary vacuum.
- In NHS A&A, there were changes in some senior leadership positions that caused delays and at one point resulted in a de-prioritisation of telehealth and a temporary halt in implementation and patient recruitment. This led to significant delays in meeting U4H deployment deadlines.
- On the other hand, in NHSL these changes seemed to have less of an effect as NHSL had not yet completed the process of integration under the new legislation. In addition, there was already cooperation in place, prior to the enactment of the legislation, between health and social care that supported telehealth implementation.

## Learning Points

- The necessity to cope with a changing political and social environment is one of the major features that distinguish deployment of a service in real life as part of routine care from a research/pilot project and is important to acknowledge.“Real-life deployment” - as opposed to short-term “proof of concept” deployment – is disruptive and “messy”.

- Organising real-life deployment within a “project” framework serves a positive purpose. This created an opportunity for systematic learning about the pitfalls and the obstacles, as well as the solutions and critical success factors for effective and successful deployment.

- Restrictive telehealth inclusion criteria at odds with local guidelines and care pathways can represent a major barrier for at scale deployment.

- Growing recognition that significant benefits can be realised by adopting a national & consistent " once for Scotland " approach to large scale deployment of telehealth and coproducing an environment for at scale adoption and implementation through development of operational standards , best practice guides, a national service model for HMHM and structure change management and improvement support.

- Better alignment of the eHealth (ICT) strategy and the telehealth strategy is required to support at scale adoption. Two separate strategies can lead to conflicting internal priorities.

## 2.2 Organisational and Change Management

### 2.2.1 Readiness for Deployment & Start up

Programme governance was established early in the project, however there were some delays in launching U4H in Scotland due to a delay with external & subsequently internal grant arrangements from the EU. These delays meant that recruitment of programme & project staff was later than anticipated, with appointments being made at the end of year 1 of the project. Delays in the recruitment of core programme staff also affected engagement at a number of levels in Scotland.

In addition, common barriers particularly in the start up phase of the project were identified across all sites including low levels of readiness for operational deployment, mixed clinical engagement, mixed experiences of telehealth deployment, limited experience managing EU funded projects across U4H sites. Overall, the start up phase of U4H extended well into year 2 of the Year 3 programme and this had an impact on overall scale up targets.

### 2.2.2 Leadership

Effective strategic leadership, both clinical and operational is fundamental to at scale change and this was challenging amidst the flux of organisational change in Scotland. Strategic leaders across the sites, at times, had conflicting priorities and varying levels of commitment to U4H. While a good

model of clinical leadership was evolved during the course of the project, it would have been more effective if it had been in place earlier. However, participation in U4H has enabled the HCP's to realise that TEC can transform care but is most successful when viewed as an inherent part of the service.

### 2.2.3 Deployment Process

While implementation plans were developed in all sites, there were some elements that proved to be problematic as the deployment process progressed. For example, the goals for the numbers of patients to be recruited, and the time allotted to the various stages of the project. This 3 year time-frame was determined based on the assumption by the EU that the "development" part had already been done (Renewing Health). In reality there was a need for development time for key elements such as guidelines development and assessing technology options, and technology procurement processes. The time required for these essential steps impacted on time to recruit patients and, equally importantly, to have a year for follow-up.

### 2.2.4 Workforce Roles, Capacity & Skills

The sustainable roll out of telehealth requires staff who have the capacity to take on this way of working. Staff capacity was a challenge in some of the sites. This issue was most acute with clinical staff. As a rule, HCP staff were asked to “take on” U4H activities in addition to their regular jobs. This was part of the implementation philosophy adopted by the sites as a key requirement for adopting a sustainable service. Capacity requirements were explored but in some cases these were underestimated particularly in the start up phase and recruitment phases of the project.

Workforce and digital skills development are critical for building capacity for at scale delivery. Across all three sites, project areas reported an underestimation of the amount of training and support required for staff not only in the use of the specific technology but also in general IT literacy. Staff must be competent and have the skills and confidence to use the technology appropriately and support patients. Implementation of telemonitoring in the U4H project has also highlighted the potentially growing change in workforce roles

### 2.2.5 The Budget for deployment

The budget for deployment needs to take into account not only the cost of the direct deployment process, but also the costs of integrating a disruptive technology such as telehealth into current systems and work processes. Identifying this resource would also help to move telehealth into the routine, to be viewed as having scope beyond the duration of the project. The sites did not have assurance, at the beginning of the process, that there would be funding beyond the project period.

This impacted upon, for example, negotiation with suppliers as they could not negotiate a contract beyond the time frame of the project which made the procurement of the technology more expensive. However, feeding back this impact meant that there was a change by the end of the project. Health Boards/Health and Social Partnerships expressed strong commitment to continuing the service after the end of the project.

### 2.2.6 Knowledge Transfer

Learning, knowledge creation and sharing was not generally considered to be part of the ongoing management of the projects. In each site, due to time constraints, those who were involved in the same condition particularly for COPD/CHF met occasionally but rarely across conditions or across geographical area. There was very little knowledge sharing between sites in the early stages of the project. The exception to this was the Scottish U4H Diabetes Network, which was established early in the project and was an important tool for collaboration and implementation support.

## Learning Points

- The Health Board, “project” management, clinicians and staff members need to have a common vision and clearly defined objectives from the outset
- It is vital key project staff are recruited as early as possible and that adequate resources are available to support necessary preparations for deployment
- Operational Leadership is important, Strategic Leadership is crucial and strong project management is required .
- Consideration needs to be given as to how best to engage the strategic leaders with conflicting priorities and how to lever support to unblock local change management issues.
- Clinical Leadership and representation needs to be addressed at the start and sufficient time allocated to complete the breadth of work required to support the change and enable engagement if required with professional organisations.
- Project initiation phase takes far longer than anticipated and three years is not long enough for a programme of this complexity and ambition. Five years is the suggested minimum period for greatest benefit realisation.
- Preliminary ground work such as guidelines development, assessing technology options, and technology procurement processes can take longer than anticipated.
- Commitment to deployment must be long term and seen as part of an accelerator towards at scale delivery.

- Defining and supporting workforce changes in terms of roles & competencies and ensuring staff have the space and support to learn the skills necessary to work with new technologies will be key to implementing telehealth nationwide.

## 2.3 Evaluation Approaches for Large Scale Deployment

The evaluation of the project was based on the established MAST methodology that was also used to evaluate the Renewing Health project (2012). There were two main aspects to the evaluation:

- The evaluation of clinical and economic impact of telemonitoring for the three diseases
- The evaluation of organisational domains including the deployment process

The lack of an appropriate balance between these two aspects gave rise to a number of issues;

- The methodology for the evaluation of clinical and economic outcomes was given priority by the project evaluation team and was the major focus during the first two years of the project. The methodology used was a summative evaluation methodology that focuses on objective, quantitative methods. Thus, the evaluation team focused predominantly on the collection of quantitative data in an attempt to generate “hard” evidence on quality of care and costs.
- There was a tremendous amount of pressure on the Scottish sites to produce numbers and data due to the high recruitment numbers. This diverted time, energy and resources away from action learning. Complexity of data submission for large patient cohorts was a challenge and there were particular concerns from pilot sites regarding coding and timing delays affecting data submissions and access to primary care data.
- Data collection required: pulling information from multiple data systems across a number of different settings, some which were not easily accessible, changes in the criteria, entry duplication, and the definition of data was a significant resource impact effort.
- The drive for comparable data on cost and quality outcomes impeded the deployment process. The recruitment targets set at the outset for Scotland were considered ambitious by the partners and once project commenced it was not possible to change or influence these .
- Due to the focus on the quantitative evaluation, the final version of the requirements for the qualitative organisational domain was made available to pilot sites close to the end of the project. This provided limited opportunity to influence the question structure and ensure compatibility with the telehealth service model and demographics of the patient cohort. For

example, for diabetes, the EU questionnaire was discontinued as it did not fit with the nature of the service being introduced. Rather than lose an opportunity to collect valuable insights Scotland developed their own questionnaires for the purpose of their own learning and to inform future decisions.

The EU project evaluation team did not use a formative evaluation process (in part because of pressure from European Commission project reviewers who wanted quantitative results) which may have provided greater scope to meet their unique challenges of implementation.

## Learning Points

- The approach to evaluation of a multi-site, real–life, large scale deployment project is very different from a randomised controlled clinical trial (RCT).
- Evaluation needs to be more balanced and qualitative and focus on assessing performance on an iterative basis. It should evaluate what has worked and what has not, identifying unanticipated obstacles, and then enable changes to improve the process. Quantitative measures can be assessed alongside this to support and inform the deployment process.
- If the evaluation objective is real-life scalable deployment, deployment considerations must be more effectively aligned with “scientific” interests. The deployment must dictate the evaluation and not the other way around.
- Seek out and use validated approaches and tools in evaluation. Ensure that these a compatible with the telehealth service model and consider integrating evaluation feedback into the telehealth devices for easier collation.

### 2.4 Stakeholder Engagement

While there are a number of critical success factors for the successful deployment of new services and processes, the most important are all related to people – identifying the people that must be involved and managing the process of their on-going involvement. Deployment of new services and new technologies requires change and many people tend to resist change. Best practice recommends involvement of the critical stakeholders as early as possible.

Engaging clinicians in U4H was more resource intensive than initially anticipated. There were a number of reasons for this:

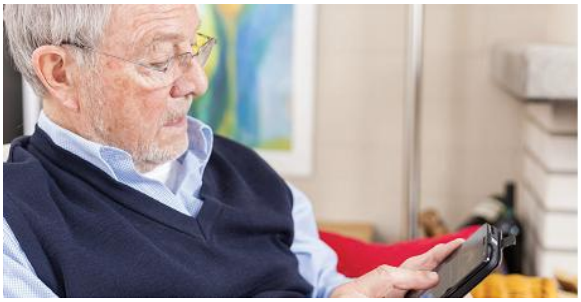
- Some HCP's clearly had negative previous experience of telehealth projects, for example, in terms of cost or sustainability. This resulted in both cynicism and skepticism on the part of participating HCP's.
- Some GP's raised the issue of incentives. As independent practitioners, they noted that they had to assess workload as well as important economic implications and not only what would benefit their patients.
- Initially HCP's felt telehealth might result in a change in their current role. There were a number of misconceptions expressed by staff about the project and role of telehealth, cost effectiveness and lack of long term investment by Health Boards and Ehealth.

A number of positive engagement strategies and methods were adopted to provide support for HCP's involved in the project. The most successful are outlined below:-

| Engagement Strategies & Support Methods |
|---|
| ○ Involve staff directly in planning the clinical care pathways at the outset of the project. |
| ○ Establish appropriate networks and forums for clinicians to agree and seek peer consensus. |
| ○ Provide additional short term staffing in order to avoid clinician overload. |
| ○ Provide additional compensation (backfill) for time dedicated to the project. |
| ○ Provide a range of mobile technology to support remote working. |
| ○ Ensure adequate provision is available to provide staff with training and education to meet the requirements of the service and individual teams. |
| ○ Make sure that there is an agreed and clear process for their on-going input into the project. |

**Figure 1 U4H Engagement Support Strategies**

In all sites, telehealth champions were identified and were increasing recognised as key to supporting adoption. As the deployment moved forward, and as HCP's began to perceive benefits, such as improved care for their patients as well as greater efficiencies in their own work flows, there was a ripple effect that began to influence the "cultural climate" among other clinicians. This resulted in a more positive attitude to telehealth and its contribution to service delivery.



### 2.4.2 Patient engagement and coproduction

## Learning

Recruiting patients while in hospital or at point of discharge can be challenging as this is a high stress time for patients and their career.

Carers are a very important element of the service-providing support for patients and in some cases handling the technology.

Initially patients feared that telehealth would interfere with their relationship with their GP but this did not transpire.

Patients using telehealth clearly viewed this as a part of their routine care but as a supplement to rather than a substitute for the clinician patients relationship.

Some patients were not motivated to use technology, even though a great deal of thought was given to providing technology that was easy to use.

Technology needs to "fit into " the patients lifestyle and technology preferences.

Digital participation challenges were very evident. Patients had no access to Wi-Fi, but they did have mobiles with 4G/3G access.

Patients using telehealth can become real champions for the services proving valuable feedback and improvement suggestions to local teams.

Once patients agreed to use the technology, they reported that they were very satisfied with the telehealth services.

### 2.4.3 Engagement of Other Stakeholders

In Scotland, another major stakeholder was the Health Boards/Health and Social Care Partnerships. Despite the fact that the Health Boards were responsible for the implementation of U4H, this did not always work smoothly. One Health Board member noted that low engagement between Programme Board, senior management and clinicians in the early stages of the project resulted in a delay in recruitment of a project manager which consequently delayed user recruitment and access to services.

## Learning Points

- Appropriate and meaningful engagement with stakeholders is a fundamental step underpinning any 'at scale' service change.
- No single intervention can ensure staff engagement. Effective interventions in training, early engagement, introducing feedback loops and ensuring recognition of professional expertise.
- Stakeholder groups benefits from early feedback from patient and service impacts of the telehealth service . This builds confidence and further engagement with the changes.
- Patients and their carers need to be involved in redesigning the telehealth service in order to understand what will attract them and what will enable them to adopt technology and what their technology and service preferences are. Patient acceptability is important and could drive uptake.
- Robust mechanisms need to be in place for ongoing feedback from patients in order to continuously improve the service.
- Stakeholder management is an important part of the project which requires a structured and collaborative approach. Showing that telehealth can help with system wide problems, for example, increasing service demand is considered to be a significant enabler for large scale service change.
- Clinical engagement and lack of long term funding are the two most significant barriers to scale up. There is a need for more in depth review of which evaluation strategies and change management strategies can be used to facilitate better clinical acceptance, and can be used to evidence system wide benefits.

## 2.5 Technology and Procurement

### 2.5.1 Procurement

Procurement of the technology was unexpectedly complex, but the lessons learned here are very important in the next stage of the Scottish Home and Mobile Health Monitoring model:

- The sites separately negotiated short term contracts with suppliers. Collaborative procurement would have generated greater leverage to bargain for lower prices.
- Telehealth procurement guidelines need to be simplified and reviewed. The procurement process is complex and there are patchy arrangements between national and local procurement services. The National procurement framework only covers existing products and U4H used new products which remain outside the existing framework.
- To support continued technological requirements for expansion and adoption, new innovative approaches to procurement should be considered. Partners highlighted a number of limitations to the existing Telehealth solutions and the need for more cost effective solutions which are scalable and affordable.

The sites made note of some additional Scotland-specific barriers in the area of technology procurement:

- In NHSL, once the decision was made to go with a text messaging service, setting up the technology at the patient's end was straightforward and quick. However, it took in excess of nine months to order and obtain phones and laptops for the staff responsible for the monitoring.
- The procurement of the digitalised BGM technology was complex and time consuming due to the large stakeholder group, but in the end was successfully procured on a national basis. However, the development process was compounded by delays in product development & testing of the new integrated system.

## Learning Points

- A major barrier for many sites was that they only had a mandate to negotiate a contract for the duration of the implementation stage of the project, making it difficult to obtain the best possible price from suppliers.
- There needs to be a simplification of the procurement arrangements for Health Boards, not only to increase collective bargaining power and drive down costs but to facilitate better knowledge transfer across Scotland regarding industry, suppliers and technology offerings available.
- Public procurement processes require time and specific processes. This does not align to the necessary stages of EU projects. Enough time needs to be built into the preparatory stages to allow for assessing technology options, testing the market and negotiating with suppliers.
- Growing recognition that in many cases, technology cannot be bought off the shelf or "Plug & Play" but needs to be adapted to local infrastructure. Most sites found that there were no off-the-shelf solutions that met their needs, and consequently had to invest time and money in some degree of solution development and testing.
- Product development and testing should ideally be done either before but most importantly separately from deployment.

### 2.5.2 Deployment of Technology

Successful technology deployment needs to meet two different challenges:

- Technology – this includes getting the technology to work properly, integrated with existing infrastructure and is compatible with existing technological solutions or systems
- People – getting the key users to adopt and use the technology in clinical practice, designing and tailoring it to their needs and training them to use it effectively.

#### 2.5.2.1 Selection of Technology Solution

In most instances the technology used was quite straightforward and it worked well. Two of the sites chose to use fairly standard telemonitoring technology for monitoring CHF and COPD patients in the patient's home (BP, pulse oximeter, scale). There were minor technological issues such as problems with the calibration of the devices in the beginning, resulting in incorrect scale readings, and problems with short battery life. There were also infrastructure constraints. The

COPD/CHF solution requires internet connectivity in order to transmit and this was not universally available across Health Boards. In the NHS GGC CHF project, they discovered that younger people preferred to use a smartphone rather than a tablet – this option was not available.

The BGM solution for diabetes was implemented as a national project in all sites, but had technological constraints that affected deployment and adoption. For example, the system needed a USB upload via PC. Its functionality did not extend to supporting uploads from a smartphone and it required broadband. Patients were initially unable to register remotely for this, so the majority of registrations took place in clinics. Home registration did become available over the project cycle. However, despite these constraints, overall HCP's reported that this type of technology needs to become a core part of the integrated service pathway specifically for newly diagnosed diabetes patients Scotland wide. The benefits to users were clear: real time BGM data displayed during consultations, enabling better decision support and more personalised support for self-management outside clinical settings. The online web based solution pioneered in U4H offers a real example of an integrated BGM solution for diabetes and offers the potential to develop into a national Diabetes BGM for Scotland**.**

#### 2.5.2.2 User Preferences and Access to Technology

Poor digital literacy and limited access to technology were reported by a number of sites as a common recruitment and adoption barrier. For the Diabetes BGM solution not all patients could utilise the system (i.e. did not have access to the internet and/or a PC at home) or were motivated to upload their BG readings independently at home out with clinics.

### Learning

Based on U4H experiences, better technology design which engages with patients and service users regarding their digital preferences, health care routines, digital literacy and skills would have the potential to significant improve the uptake and adaption of HMHM for some hard to reach groups. The earlier patients that are involved in the technology and service design the better.

#### 2.5.2.3 Simple Technology Solutions

NHSL became the first Health Board in U4H to introduce a low cost, simple technological solution which is essentially based on mobile phone texting. This decision was largely driven by the lack of broadband in a number of areas, costs and positive experiences from NHS England.

This was the least expensive of all of the telemonitoring solutions implemented, and may be a portent of future trends in sustainable telehealth. It provides flexibility to work on a patient's own device and will work with low-tech as well as high tech solutions. The added value for patients and service providers of this approach is mobility: patients can easily take their vital signs at their convenience at home, work or on holiday. The solution can generate and receive regular, automated, personalised health coaching and medication reminders via SMS based on their vital signs. Patients are often able to use their own mobile phone or tablet which improves ease of use, confidence and reduces the cost of the service.

## Key Learning Points

- A national / regional telehealth strategy or action plan, with information on relevant interoperability standards, would provide critical guidance on the selection of technology. Without a national or regional strategy, there is a risk of creating stand-alone solutions that cannot integrate effectively.
- The technology needs to function and integrate with other existing ICT systems, such as electronic patient records, or existing web services such as MyDiabetesMyWay.
- There needs to be different technology options for different people (e.g. smart phones instead of tablets or PCs) – "one size does NOT fit all".
- The use of technology has to be integrated with overall clinical care and not seen as an additional layer of service or additional task.
- The successful deployment of low cost, SMS based solution exploited in U4H may be one of the keys to significantly increasing the speed of telehealth penetration nationwide over a short timescale.
- Patients are increasingly happy to use their own technology devices to enable telehealth – Bring Your Own Device (BYOD)
- This real value to starting "small and simple" and upgrading later (minimise variability at the start). Also to recognise that the newest technology is not always the best for the task.
- Technology must fit the technological "environment" and should be customisable and easy to use for patients & staff.

# 3.0 Implementation Guidance of at Scale Deployment

This section sets out the high level guidance which has been developed as part of the U4H Project, which will be used to support the adoption and implementation of telehealth in Scotland.

The guidance is structured into five key themes : -


## How to use this guidance

These resources are aimed at telehealth Champions, Health & Care Professional's, local decision makers and service managers, and can assist;

- identification of key factors which support successful implementation and overcome known barriers to 'at scale' adoption.
- the design and development of a telehealth service which meets local service and user needs.
- the navigation of procurement and definition of technology requirements for at scale delivery.
- effective stakeholder engagement and the identification of measurable goals.

| 3.1 Strategic Planning and Leadership Guidance | | |
|---|---|---|
| 1. | **Align telehealth service deployment with national strategic policy and clinical priorities.** Demonstrating ways in which the proposed telehealth service would support and align with these policies, priorities and system wide challenges is an important part of the process and will set the foundations for development of a compelling and robust business case. | ☐ |
| 2. | **Seek out and secure senior clinical leadership** . Lack of a clinical leader to advocate telehealth services can be one of the barriers to making progress . Leadership development should not be limited to system leaders and experienced clinical and professional leaders. Clinical teams are best placed to demonstrate where at scale adoption of telehealth will maximise patient care, optimise clinical capacity and effectively reduce demand on services. | ☐ |
| 3. | **Secure long-term strategic support for the integration of TEC from the outset.** This should not be viewed as a pilot but as phase one of an incremental implementation process which will require multiple iterations, with continuous learning and investment in evaluation and benefit realisation. Build your case for change – the case for telehealth, how it should be commissioned and Return on Investment options. | ☐ |
| 4. | **Telehealth interventions must integrate and optimise local service delivery models and practices.** Strike a balance between national priorities, local needs and organisational constraints. Use local data and intelligence to inform priorities and which patients would benefit from access to Telehealth . Use predictive modelling tools to anticipate the future use of health services and targeting of TEC at both individual and population level. | ☐ |
| 5. | **Local ownership at executive and senior operational levels.** These are the most significant enablers in supporting organisations to move beyond pilots towards deployment of sustainable Telehealth services. Without board level leadership and clinical engagement, the uptake will not be sustained and Telehealth not utilised to its full capacity. A strong emphasis on leadership is required across all level within the organisation to support cultural change. | ☐ |

| 3.2 Organisational Change and Implementation Guidance | | |
|---|---|---|
| **1.** | **Design the deployment process to meet stakeholders needs/preferences.** This process needs to be iterative and take into account stakeholder needs and preferences. User preferences are not limited to technology preferences, but include preferences with regard to who interacts with who and what time of day is most convenient for clinicians to access data and analyse trends. | ☐ |
| **2.** | **Align the telehealth service model with best practice, local guidelines and care processes.** Before designing the deployment process, an inventory needs to be taken of local guidelines and processes that are already in place and ensure that clinical algorithms are aligned and consistent. The deployment process may require some modification of these, but they should be minimised where possible. | ☐ |
| **3.** | **Clarify the objectives of the telehealth service.** The goals of the redesigned new service to be deployed needs to be established and clear to all of the stakeholders so that even if there are differences in opinion as to how the goal may be best achieved, there is consensus on what is to be achieved. | ☐ |
| **4.** | **Patient selection and Recruitment.** Select which types of patients will be most suitable for the Telehealth service and determine monitoring duration based on patient needs. Secondly, and most importantly determine at which stage in a clinical pathway Telehealth will be offered. Note transition and discharge points in pathways can be stressful for patients and this can impact on adoption of Telehealth . Understanding what patients want is an important step in the deployment planning, requiring careful consideration and monitoring. | ☐ |
| **5.** | **Ensure strong programme management is in place from the start and develop a detailed implementation plan**. In the case of telehealth, this needs to include realistic, fully costed and validated targets for the numbers of patients to be served, the staff capacity (both clinical and management) required for the scope of service planned, staff qualifications, and training. Select a programme manager with robust leadership skills and experience of deployment projects. | ☐ |
| **6.** | **Develop a communication and marketing strategy**. This needs to include a communication plan. A multi-pronged approach to marketing is recommended as a means of raising awareness, sharing the vision and overcoming resistance to change. Audiences include; HCP's who need to understand how it works and evidence of benefits; patients so to increase awareness of telehealth service and how it can enable them , managers and decision makers so to recognise the at scale contribution of HMHM in terms of supporting the management of service demand , access , prevention and self management . | ☐ |

| | | |
|---|---|---|
| **7.** | **Champions are important to initiate a project. A sustainable project needs a team as well as senior strategic leadership.** Telehealth champions are critical to getting a project or a service initiated and driving forward service change. However, in order for the service to be sustained, assemble a team with sufficient skills and abilities to implement, manage and operate the programme on a long term basis. Ultimately, the necessary organisational infrastructure has to be created to embed the service into everyday life. | ☐ |
| **8.** | **Dedicated staff.** A new project, programme or service requires dedicated staff to deliver the change. A project run by people who are participating in project activities in addition to their regular duties will be hard pressed to deploy successfully and sustain momentum. A formalised role either managerial or clinical supported by management can be more effective. | ☐ |
| **9.** | **Clinical teams need to be resourced adequately**. "Bridge" funding should be considered on a short term basis to support the process of 'at scale' delivery and start-up. Key preparation activities include service mapping, redesign, protocol development and development of evaluation measures. This will ensure momentum and provide an indication of strategic commitment to the change at a system level. | ☐ |
| **10.** | **Evaluate how the new tasks mesh with the existing work processes.** This requires exploration of the work flow of the new TEC service. Will this result in a higher work load or do they have potential to reduce workload? Are new roles necessary? How do the new roles fit in the current organisational structure? Crucially what working practices need to cease to ensure the full benefits of TEC can be optimised. | ☐ |
| **11.** | **Telehealth/Technology Enabled Care needs to be viewed as an inherent part of the service.** In order to get serious deployment, the programme needs to become a standard of care. If it is not embedded into the clinical process as standard, it will be seen by staff as added tasks and less likely to be mainstreamed. | ☐ |
| **12.** | **Secure and seek long-term funding opportunities**. A commitment to long term funding, beyond the duration of the project should be championed at the outset. Even if there is not a hard and fast "contract" to a specific sum of money, the commitment to ongoing funding aligned with strategic priorities is very important from a service planning prospective and is an important sign of an organisations commitment to delivery of at scale telehealth. | ☐ |

| 3.3 Evaluation and Service Improvement Guidance | | |
|---|---|---|
| 1. | **Choose an appropriate evaluation methodology and indicators**.<br>It is very important to choose an evaluation methodology that is aligned with the nature of the programme and its objectives. If the project is a service deployment project, the evaluation needs to be formative so that processes can be adjusted and realigned along the way. Evaluation and metrics / KPI's should be considered early in the process and capture through implementation phase. | ☐ |
| 2. | **Continuously evaluate performance and Implement using PDSA "improvement" cycles.**<br>The deployment process needs to be accompanied by an evaluation process which assesses performance at each stage, evaluates what has worked and what has not, identifies unanticipated obstacles, and then supports changes to improve the process. | ☐ |
| 3. | **Action Learning and collaborations can facilitate opportunities for shared learning among those involved in deployment**.<br>Encourage structured collaboration amongst telehealth stakeholders to identify and support these. Create networks and use standardised tools, methodologies and develop best practice guidelines. This may requires explicit support and backing from leaders and decision makers and should run concurrently with the implementation**.** | ☐ |
| 4 | **Consider developing logic models as a foundation for evaluation :** Experience from other large-scale programmes suggests that having a clear logic model describing the contribution of intervention is one of the active components for successful change. Logic models can also be used as a planning tool, helping to clarify thinking and define scope of programmes . | ☐ |

| 3.5 Procurement and Technology Guidance | | |
|---|---|---|
| 1. | **Focus on service led redesign rather than technology led as "one size does not fit all.**" It is important to use technology devices that are familiar to patients and fits in with the patient's life – everyday technology, simple and easy to use. Patients own preferences should be considered, including Bring Your Own Device ( BYOD). | ☐ |
| 2. | **The use of technology has to be integrated into the clinical pathway to reduced scope for duplication.** Patients and staff in the long term will be less likely to engage with and use technology in routine care if it seen as a stand-alone service. Mapping technical requirements is an important step in procurement. | ☐ |
| 3. | **Ensure telehealth solutions adopted at scale have functionality to support integration with existing ICT systems, rather than stand-alone solutions.** Before any significant investment, ensure that the telehealth solution being purchased is highly customisable, scalable, and accessible via multiple channels. This will help meet the needs of a wide spectrum of patients with single and multiple conditions and accommodate higher volumes of patients. | ☐ |
| 4. | **The procurement process.** It requires knowledge and expertise on cost modeling, technical specifications and usage data as well as awareness of the industry & market suppliers. Seek advice and work in collaboration with local and national procurement experts. | ☐ |
| 5. | **Optimise the use of national telehealth procurement frameworks**. There needs to be a balanced approach to this in order to reap the benefits of volume without reducing flexibility and ingenuity. This will also generate opportunities for more innovative procurement collaborations and stimulate market growth. | ☐ |
| 6. | **Consider leasing technology rather than purchasing.** This will allow flexibility throughout the deployment initiatives including, for example, ensure contractual flexibility to switch to a new technology or use a range of different technology solutions. Consider the use of a pre-procurement process in order to determine realistic costs for technology up front prior to support decision making and deployment planning | ☐ |
| 7. | **Technology solutions need to evolve an open standards approach to support interoperability.**<br>Moving towards more "open standards" approach offer flexibility and reliability for infrastructure connectivity. Check that the suppliers definition of interoperability is consistent with NHS Scotland's interoperability requirements. | ☐ |

# *Annex 1: People Interviewed at Each Site*

## NHS Greater Glasgow and Clyde

In NHS Greater Glasgow and Clyde**,** the investigators met with project management staff: Douglas Allan: Service Delivery manager, Anne Cochrane: Primary Care Support Nurse, John Gallagher: Business Support; with the Diabetes Team: Professor Martin McIntyre: Clinical Director for Medicine in Clyde and Consultant Physician in Endocrinology, Dr Brian Kennon: Consultant & Clinical Lead for Diabetes MCN, GGC, Judith Lyon: Diabetes Nurse Specialist, Julie Woods: Nursing Assistant. The investigators also met with members of the Renfrewshire Health and Social Care Partnership (created on April 1 2015) which included Sylvia Morrison, Head of Primary Care and Community, Jason McLaughlin, Rehabilitation Enablement Service Manager and Stephen Mc Laughlin, Clinical Director.

## NHS Ayrshire and Arran

In NHS Ayrshire and Arran, a large group of project staff members, clinicians and partners attended the lessons learned workshops. The group was chaired by Tim Eltringham, Director of the South Ayrshire Health and Social Care Partnership who is also the chair and executive sponsor for TEC (Technology Enabled Care). Participants included Kathleen McGuire: TEC Lead, Sharon Callaghan: Project Manager, Nicola Robinson: Data Analyst, Lyndsay Vallance: Programme Support Officer, Janet McKay: Clinical Lead – Heart Failure, Hugh Brown: Clinical Lead – COPD, Karen Kerr: ANP, Lorna Dunlop: GP. Diane Smith: MCN Diabetes Service Manager, Chris Black: Clinical Lead – Diabetes, Andrew Elliot: Head of Procurement, Ajay Koshti: Clinical Director for TEC, Jim McNeil: Finance Manager, Kes Khaliq: GP, Mary Urquhart: Management Lead – Medical Specialties and Libby Paton: Heart Failure Nurse Specialist.

## NHS Lanarkshire

In NHS Lanarkshire the investigators met with Lena Collins: NHSL Strategic Lead and Head of Planning and Performance, Morag Hearty: NHSL Telehealth and Telecare Project Manager, Liz Anderson: NHSL Specialist Respiratory Team leader (Early supported discharge service), Sandra Watson: NHSL Specialist Respiratory Nurse, June Currie: NHSL Service Manager Diabetes, Louise Gray: NHSL Specialist Heart Failure Nurse, Julie Brown: NHSL Specialist Heart Failure Nurse, Helen Alexander: NHSL Manager Managed Clinical Network, Diabetes and Palliative Care, Jacquie Cringles: NHSL Senior Finance Officer, Hazel Towers: NHSL Senior Information Analyst.

# Annex 2: Overview of the U4H Sites

## Greater Glasgow and Clyde (NHS GGC) (Renfrewshire & East Renfrewshire)

NHS Greater Glasgow and Clyde is one of 14 regional NHS Boards in Scotland. It is the largest NHS organisation in Scotland. It provides strategic leadership and performance management for the NHS system in the GGC area. It is responsible for the provision and management of the entire range of healthcare services including hospitals and General Practice. It serves a population of 1.2 million people and has about 38,000 employees. Healthcare services include more than 300 GP practices, 35 hospitals, over 50 Health Centres and Clinics and more than 300 pharmacies. Renfrewshire & East Renfrewshire are two local council areas within GGC. Renfrewshire has an estimated population of 175,000 people, 31 GP practices and 2 hospitals: Royal Alexandra Hospital and Dykebar Hospital. East Renfrewshire has a population of approximately 91,000 people with 15 GP practices and is served by hospitals: New Queen Elizabeth Hospital, and Royal Alexandra Hospital.

In April, 2015, the Renfrewshire Health and Social Care Partnership was created under new Scottish legislation mandating the formal integration of health and social care services. The objective of the Partnership is to provide seamless quality health and social services and ensure resources are used effectively and efficiently to deliver services.

The United4Health Project for NHS Greater Glasgow and Clyde is centered in the Royal Alexandria Hospital in Paisley. The project is subdivided into 3 projects: one for COPD, one for CHF and one for Diabetes each of which has its own separate clinical project team overseen by one United4Health Project Manager.

### Model of Care:

For COPD & CHF the model of care in GGC was very close to the "U4H" – standard telemonitoring model. COPD and CHF patients are recruited at discharge from the hospital, COPD patients receive a pulse oximeter and CHF patients receive a blood pressure cuff, pulse oximeter, and scale that transmit via Samsung tablet to the computer of the COPD and CHF project clinical teams in the hospital. In addition to the measurements from the devices, there are symptom based questions to answer on the tablet. If the measures transmitted are outside of acceptable range for the patient, the COPD nurse or the CHF nurse calls the patient by phone and based upon the conversation, decides upon next steps. Care of the patient is the responsibility of the hospital clinical team who are responsible for providing the care for these

patients on an outreach basis in the community. While there is communication with the patients' GP, the GP is not central to the care process but rather the hospital specialist.

The Diabetes technology solution programme is uniquely Scottish and has been developed at the national level. All three pilot sites across Scotland have introduced the same technology software to promote centralised integration of Home Blood Glucose monitoring into two established national systems: My Diabetes My Way (MDMW)[2] and SCI Diabetes. Together with promoting patient registration on the MDMW self- management website, registered patients are given access to software to upload and view their blood glucose measurements via MDMW. Clinical staff can view the measurements on the SCI Diabetes portal (electronic Scottish Care information system) through use of Diasend[3]. In terms of deployment, the Diabetes project is subdivided into 2 cohorts: increasing the number of patient registrations to "MyDiabetesMyWay" and implementation of MDMW/Diasend encouraging patients to digitally upload and view blood glucose monitoring information and promote better shared decision support during clinical consultations.

Initially, due to technical issues, initially the majority of data was uploaded from the patients' glucose meters when they attended the hospital rather than at home. Now resolved, patients are able to upload data directly from home. Registrations to MyDiabetesMyWay self-management website were promoted throughout duration of the project by clinicians and Diabetes MCN.

[2] MyDiabetesMyWay is an online subscription-based interactive web-based site designed to help Diabetes patients manage their disease. Patients must actively enroll and then receive a user name and password. Once enrolled they can access: information about their diagnosis and treatment; lifestyle and blood test information; eye and foot screening results; medication recorded on the patient's GP computer system, clinical diary of appointments; latest results and all historical data recorded electronically; tables and graphs of the patient's information.
[3] Diasend, is a standalone system for uploading of information from most glucose meters, insulin pumps, CGMs and mobile apps

The number of patients that had been recruited at the time of the site visit was as follows:

| Disease | Deployment projections end September 2015 | Original U4H deployment Target* |
|---|---|---|
| **COPD** | 37 | 126 |
| **Diabetes** | 268 | 400 |
| **CHF** | 28 | 273 |
| **Total all intervention Groups** | 333 | 769 |
| **MDMW Registrations** | 2146 | 626 |
| **Total Deployment** | 2479 | 1395 |

*Targets as outlined in U4H Project Initiation Document, September 2013

United4Health was the first telehealth project for the hospital. It was viewed positively, as an opportunity to get a head start in implementing the national Technology Enabled Care (TEC) strategy.

### NHS Ayrshire and Arran (A&A)

NHS Ayrshire and Arran provides strategic leadership and performance management for the NHS system in the Ayrshire area. It is responsible for the provision and management of a wide range of healthcare services, and incorporates 3 new Health and Social Care Partnerships within Ayrshire, East, North and South. Ayrshire and Arran has a population of 373,700. Healthcare in Ayrshire is provided through acute care for which there are two district general hospitals, one situated in North Ayrshire (University Hospital Crosshouse), and one in South Ayrshire (University Hospital Ayr). In addition, there are 7 community hospitals across Ayrshire. Primary Care is provided by 55 General Practices, of which 15 are located in the East Ayrshire Partnership area, and twenty each in North and South Partnership areas.

### Model of Care

The model of care for the implementation of the U4H pilots was different in Ayrshire and Arran from other sites Prior to U4H, A&A had already introduced telehealth, led by the GPs for COPD patients in one local authority area. This model involved the creation of Community Wards (CW). CW are “virtual wards”, consisting of a family doctor and an advanced specialist nurse, who are directly responsible for the care of the patients. Tele-monitoring services are integrated into the CW model for COPD and act as a bridge between the hospital staff and the GP practices as well

as supporting the GP-patient relationship. Initially, there were 3 Community Wards serving different geographical locations.

The expectations were that U4H would provide them with the resources to expand this project to other areas and build on experiences so far. However, the U4H inclusion criteria focused the project towards hospital staff & necessitated hospital admission which was at odds with the *preventative* approach that had been developed. Additionally, during the U4H project, organisationally two of the CW models were dissolved with only one still functioning at the time of the site visit.

The model for care for CHF was also hybrid. While patients are recruited and referred by the hospital, the CHF nurses are community nurses who work in their local geographical area for the Health Board/Local authority are responsible for providing clinician decision support and monitoring for CHF Patients. The service delivery model for Diabetes care for U4H for patients with Type 1 Diabetes was from Diabetes centres based within secondary care. The intent was to care for the Type 2 Diabetes patients in primary care in the community through diabetes community clinics and / or GP Practices with the largest Diabetes registers. Registrations to MyDiabetesMyWay self-management website was promoted throughout duration of the project by clinicians and Diabetes MCN.

NHS A&A experienced unusually long delays in the procurement process. The process of negotiation with technology suppliers was complex and drawn out. When U4H commenced, the Health Board was in mid negotiation with suppliers for the COPD and CHF technology. They had already tested and evaluated services and had purchased a number of telemonitoring units. Nonetheless, as negotiations continued in order to expand the number of telemonitoring units on a leasing basis they discovered that the amounts allocated in the budget were not sufficient and additional funding was required. Concerns regarding ongoing financial sustainability of the telehealth service led to the cessation of the service until the Health Board negotiated additional funding with the Scottish Government .

For Diabetes, while the overall procurement was completed nationally, NHS A&A did not procure the equipment until May 2015 due to ongoing local clinical and financial issues with implementation. Recruitment of Type 1 Diabetes patients at the hospital level commenced in July 2015. The recruitment of Type 2 Diabetes had not yet begun at the time of the site visit due to ongoing negotiations with the GPs regarding implementation.

The number of patients recruited through U4H is as follows:

| Disease | Deployment end September 2015 | Original U4H deployment targets* |
|---|---|---|
| **COPD** | 59 | 273 |
| **Diabetes** | 106 | 400 |
| **CHF** | 128 | 449 |
| **Total all Intervention Groups** | 293 | 1,122 |
| **MDMW Deployment** | 746 | 1369 |
| **Total Deployment** | 1039 | 2491 |

*Targets as outlined in U4H Project Initiation Document, September 2013

The current leadership of the South Ayrshire Health and Social Care Partnership, who participated in the site visit from beginning to end, is very supportive of the project and of telehealth and telecare in general. The group reported that this has not consistently been the case throughout the life of the project.

### NHS Lanarkshire (NHSL)

The NHS Lanarkshire Health Board is responsible for the health care of more than 652,230 people living within the geographical areas of North Lanarkshire and South Lanarkshire making it the third largest health board in Scotland. The North Lanarkshire Health and Care Partnership has a population of 337,730 and operates across six different localities. There is one acute hospital – Hairmyres – and three community hospitals offering intermediate care and palliative care. Mental health acute care is provided by Hairmyres and Udston hospitals. Primary health care is provided in the community and includes 114 General Practitioner Practices, dentists, pharmacists, health visitors and a wide range of health professionals. NHS Lanarkshire's primary care facilities include health centers and 15 community and day hospitals.

### Model of Care

The model of care and the approach in Lanarkshire was significantly different from the other 2 sites. U4H was perceived as an opportunity as they already had specialist teams (doctors and nurses) from the hospitals in CHF and COPD working in the community including clinicians who developed the pathways for COPD and CHF. The care model was predominately nurse-led. GPs were kept informed about the progress of their patients at every stage. In contrast to the other 2 sites, which are using tablets for transmission of measurements (blood pressure, pulse, oximeter, scale) and for answering questions, Lanarkshire decided (partially due to lack of broadband in a number of areas, and partly due to their approach which was “start simple and

then upgrade") – to use a relatively simple cost-effective and affordable NHS technological solution SMS Solution which is essentially based on mobile texting.

CHF and COPD patients are given the same types of biometric devices for performing the physiological measurements as in the other sites but instead of transmission through a tablet, the patient (or his carer) transmits the results via text messages using their mobile phones. The interaction between the clinical team and the patient is based on a preprogrammed decision tree including patient self-assessment question trees that enable the patient to assess his/her own condition, send answers into SMS Solution (Simple Telehealth) and get immediate advice. The nurses receive both the biometric measures and patient responses to assessment questions and respond to the patient based upon the information they receive. The system also presents data, graphs and alerts to the clinicians if required. Patients also get reminders to complete the assessment at the predetermined intervals or other types of reminders such as reminders to get a flu shot. The nurse is able to set the system up for the patient's phone using her mobile phone, and it can be disengaged with the same ease. CHF and COPD patients are recruited post-hospital discharge and remain on the system for 6 months to a year. If they are stable then they are discharged from the programme.

The Diabetes implementation was delayed here as in the other sites because of technology. The site has used a phased approach to recruitment and so far has only registered patients to Diasend through the diabetic hospitals, mostly patients with Type 1 Diabetes. Further deployment to Community Clinics is planned. Registrations to MyDiabetesMyWay self-management website was proactively promoted throughout duration of the project by clinicians and Diabetes MCN.

The number of patients recruited through U4H is as follows:

| Disease | Projected Deployment end September 2015 | Original U4H Deployment Targets * |
|---|---|---|
| **COPD** | 105 | 440 |
| **Diabetes** | 150 | 400 |
| **CHF** | 92 | 556 |
| **Total all intervention Groups** | 347 | 1396 |
| **MDMW Registrations** | 1985 | 2404 |
| **Total** | 2332 | 3800 |

*Targets as outlined in U4H Project Initiation Document, September 2013

Across NHS Lanarkshire, there is strong enthusiastic strategic support for at scale adoption and implementation of Home Health Monitoring and Technology enabled care. There is a growing recognition of the potential for digital technology, particularly simple, low cost solutions like those adopted in U4H to support and improve many aspects of health and social care provision across the health board.

# *Annex 3: Summary of Patient Feedback*

An array of patient & carer experience narrative has been captured across the U4H Programme in Scotland. Outlined below are summary abstracts from the patients who participated in the observational visits.

### NHS Greater Glasgow & Clyde (Renfrewshire & East Renfrewshire)

The investigators visited an elderly CHF patient living at home alone demonstrated how he uses the blood pressure cuff, the pulsometer and the scale and tablet. He received training from the CHF nurse at the beginning, gets feedback on his readings and has learned what they mean so that even though he knows that when the readings are off and he can use his own judgment and take action. This patient reported that the use of the system gave him confidence in understanding his symptoms and a sense of safety and peace of mind, as it does for his family living near by.

Feedback was received from an elderly COPD patient who is no longer using the telehealth system ( the U4H COPD deployment is time limited intervention ) reported disappointed that she no longer has access to the system. She reported that the technology had given her confidence and a sense of safety knowing that someone else was also monitoring her but it also empowered her so that she could identify early on a change in symptoms and seek support.

A 48-year-old CHF patient echoed all of these same sentiments. However, he noted that he is a long time Type 1 diabetic and it was noted the wasn't yet involved in the U4H diabetes programme running in the same hospital. This provided some insight into the potential role of telehealth enabling more integration between clinical specialties for the management of people with co morbidities such as Diabetes & CHF.

### NHS Ayrshire & Arran

For this site, a group of patients accompanied by their carers participated in the lessons learned visit. One patient indicated that he had some initial hesitation to join the Community Ward Model of Care over concerns it would change the GP relationship / contact. But, the telehealth service integrated into the community ward had worked very well for the patient and his carer, both expressing positive views of the service. Patients did report some technical signal / connection issues due to the rural location of their home. However, overall, he reported that it is a "great service, confidential, with a confident professional team". The patient now has a better understanding of medication purposes, dosage and side effects.

Another patient reported that he joined the programme after a cardiac surgery. He is now using home health monitoring to support rehabilitation & return to work. It is very convenient and efficient and has allowed him to return to work on light duties early than expected. It was reported to be an excellent service, very modern and forward thinking. It's easy to use and gave him confidence in his own health and well- being. It is a regular part of his morning routine now- no waiting around and anxiety waiting for DN / HF nurse visit. Other comments made emphasised:

i. how much the patients learned about their disease from HMHM
ii. their ability to recognise early warning signs and take action to prevent an incident that might have led to hospitalisation.
iii. Carers can equally benefit from use of telehealth
iv. keep software simple and easy to use as too complicated technology will deter people from using.

With improved knowledge and awareness of levels of health and safe' level readings, generated by HMHM patients would like to have equipment to take own readings and use guidance to self-manage. In terms of improving the service, patients would like to be able to use video links to engage remotely with their GP or Nurse and have access to remote rehabilitation classes

**NHS Lanarkshire**

In NHSL, three patients were interviewed. The first was a telephone interview with a patient with CHF who is a business man who took the call from the Paris airport on his way to Asia. Because the NHSL system is based on mobile phone (SMS) texting – it is completely portable to anywhere. The system helps him to self-manage his disease. It reminds him to do his measurements and transmit them. The fact that the text will go to a professional gives him confidence as he knows that a professional is reviewing his results. The system has the flexibility to work everywhere with a feeling of safety and this enables him to lead a normal life.

The other patients lived with COPD and were very positive about the system. One patient noted that the SMS solution is "part of the family now- just a text away". The other patient explained that COPD patients very quickly panic and run to the hospital. Due to technology, the patient is now able to differentiate between shortness of breath due to panic as opposed to a lack of oxygen. Being able to review symptoms has provided high level of comfort to both the patient and carers. In addition, as the system enables an "emergency visit from HCP", the knowledge that there will be an immediate response when a problem is detected is very important. SMS based solutions are very flexible and can be tailored to the specific needs of the patient.

# "Transforming the patient experience with telehealth in Scotland"

NHS 24
140 Fifty Pitches
Cardonald
Glasgow
G51 4EB

Contact us at: sctt@nhs.net

www.sctt.org.uk
www.united4health.eu

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