

EVALUATION OF THE USE OF TELEHEALTH IN ARGYLL & BUTE



Final Report

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EXECUTIVE SUMMARY

Context and Project Aims

The Argyll & Bute Telehealth Project evolved as a development from the existing Telecare Service. Key aims of the project were:

- To expand the use of technology to support long term conditions.
- To develop expertise in local staff to use remote monitoring as part of patient care.
- To expand the specialist knowledge available in one locality by developing practitioners with a special interest in the project areas.
- To link the work on monitoring long term conditions to the reduction in crisis admissions to hospital for this patient group.
- To monitor in conjunction with other agencies the effectiveness of this work.
- To showcase Argyll and Bute as an innovative and forward thinking Partnership area.
- To assist patients to manage their long term conditions.

Three types of Telehealth initiative were trialled: home Telehealth Pods for patients with COPD on the Isle of Bute and Isle of Luing; surgery Telehealth Pods for more general patient monitoring in Oban, and Rothesay on the Isle of Bute; and community Telehealth Pods in Oban and the Isle of Luing. These touch screen Pods, provided by Telehealth Solutions, are designed to enable patients to measure and record a range of key variables, including their own weight, body mass index (BMI), oxygen saturation, pulse and blood pressure without clinical supervision.

Information gathered from the patient home Pod is sent by wireless or broadband to the Telehealth Solutions secure server, maintained by a third party and behind the NHS firewall. Nominated community nursing teams check this website daily and are alerted to any changes in the patient's condition, to enable appropriate patient follow up where necessary. The surgery Pods are configured to transfer patient data instantaneously into the electronic patient record system. The community Pods, which are mainly being used for patients with hypertension, have been designed to gather information specific to each person's health needs. Patient data are transferred onto a secure, NHS firewalled website for health professionals (primarily community nurses) to review. If the results are outwith agreed parameters the community nurses will be alerted and a response will be triggered.

Evaluation

The evaluation was designed to determine progress against the original project objectives and to inform any future rollout of such systems across NHS Highland. A mixed methods approach was adopted including both quantitative and qualitative data collection.

The quantitative study collected information on user satisfaction and on the impact of providing the Pods, acknowledging that the total number of users to date is small, thus precluding statistical significance testing. Actual usage of the Pods was recorded. For COPD patients, hospital admissions, GP and A&E attendances were recorded. Satisfaction questionnaires were distributed to users of the systems and to staff involved in delivering the programme. One questionnaire was distributed per subject and no reminders were given. A questionnaire was also sent to carers of patients.

Qualitative interviews were conducted with individuals involved in delivering the telehealth Pod services. Interviewees were selected based on involvement and experience with the home, surgery or community Pods. Ten interviews were conducted, primarily with healthcare professionals and managers, but also including a sheltered housing warden.

Key Findings

Installation of the Pods was delayed so the period of use available for evaluation was short. This was due to a combination of difficulties with a previous supplier and an initial underestimation of the operational and technical challenges involved in implementing the systems. Thus, although the project was initiated in 2007, the home Pods were only installed in March 2009 and the community Pods in October 2009. Hence it remains too early to fully assess their clinical and organisational impact.

Users of the systems in all areas were generally older people (range 61-102 years). The mean age was 73 years in Bute, 71 years in Luing, and 82 years in the sheltered housing complex.

For the home based Pods, 17 were installed, of which 5 were subsequently removed. One patient declined the Pod. Patients with home Pods were expected to use the Pod to report daily; compliance was close to 100%. For the community based Pods, 13 patients in Luing made 50 uses out of an expected total of 130 (38%). 17 patients in sheltered housing signed on to use the Pod and were asked to attend monthly; they made 49 uses out of an expected 96 (51%). Usage tended to drop off with time.

For the COPD patients with home Pods, comparing the periods March-November in 2008 and 2009 (i.e. pre and post-Pod installation) there was a reduction in GP visits (47-28), A&E attendances (9-2) and hospital admissions related to COPD, both numbers (11-1) and days of bed occupancy (72-8). The small numbers and relatively low frequency of events precludes formal statistical significance testing of these changes.

Response rates for satisfaction questionnaires were: COPD patients 77% (14/18); hypertension patients 50% (6/12); wellbeing patients 71% (12/17); staff 86% (6/7), and carers 50% (4/8). General satisfaction with the use of telehealth Pods was high for all groups of patients, particularly the COPD patients who had home Pods. Specifically, patients felt comfortable and safe using the telehealth technology, did not find it difficult, and felt that it improved awareness of their condition and was helpful in their setting.

Qualitative feedback was also generally very positive about the use of home monitoring Pods in Argyll & Bute for patients with COPD, although a number of issues concerning training, communication, and integration with existing work patterns were identified.

Conclusions

- The time taken from project initiation to installation means that it remains too early to fully assess the clinical and organisational impact of Pod installation.
- Although similar technology and the same supplier was used for home, community and surgery Pods, the nature of the services provided differs for each of these settings, and at the time of evaluation, additional technical challenges (e.g. poor broadband links and lack of connection to GPASS) hampered the integration of the community and surgery Pods.
- Usage of the home Pods was high, whilst the community and surgery Pods were less well used when compared to target usage, but it remains early days for the latter installations; one might anticipate that usage will increase with time.
- Satisfaction with the use of telehealth Pods in Argyll & Bute is generally high; use of the home Pods for COPD show greatest satisfaction from both patient and health professional perspectives.
- Anticipatory care plans were completed in later stages of the pilot for the patients on home based Pods to allow a planned approach to crisis prevention and management, and highlighting to the out of hours service that these patients had home monitoring in place. This is intended to provide a more linked up approach to prevention of admission.
- Both the qualitative and quantitative results indicate that patients are satisfied using the telehealth Pods, finding them easy to use, improving awareness of self and being appropriate for a remote and rural setting.
- Numbers and duration of hospital admissions for COPD declined in a comparable time period following installation of the Pods. Due to the small sample size and the relatively short period of use, statistical significance of this finding cannot be determined; a larger number of subjects and more prolonged follow up would be required to establish statistical significance.

Recommendations

- The overall findings of the evaluation are positive and support continuation of the telehealth scheme.

- The home Pods have been well received and effective. The reduction in admissions observed for COPD patients supports continuation and expansion of the scheme.
- The home Pods increase the workload and responsibility of the community & district nursing teams. Future linkage of home Pods into a central location such as the Highland Hub could offer a co-ordinated response to patient alerts arising from monitoring systems. We recommend that any future development or expansion of this Telehealth Project is considered within this context.
- Aligning response protocols of the programme with staff work patterns is important.
- The potential for the surgery Telehealth Pods has not yet been achieved. Reliable, secure linkage to surgery record systems is encouraged (and was established following the evaluation period). Effectiveness of the surgery Pods should be reviewed once record linkage has been established.
- The community Pod located in the Lynn Court sheltered housing accommodation in Oban should be reviewed. Currently there are no geographical barriers to care for these patients due to its close proximity to the GP surgery. There is no evidence that this Pod is of any benefit to the residence. However, the system may be appropriate in similar settings more remote from the GP surgery.
- Staff, particularly nurses, found the early stages of the telehealth project challenging. Some of these issues could have been addressed with additional communication, support and training. Ongoing and improved communication and support is recommended.
- Dedicated time with specialists should be provided for condition specific training sessions for all team members, rather than dissemination through team leaders, which can be difficult to achieve.
- Staff involved in this project now form an important resource for NHS Scotland given their practical understanding of the issues involved in implementing this type of telehealth system. Their advice and input should be sought when similar projects are developed in other areas of NHS Highland and NHS Scotland.
- Inclusion of larger numbers of patients will permit formal statistical testing of cost benefits and efficacy of telehealth
- Further evaluation is needed to demonstrate the benefits of telehealth in small rural practices where all of the patients are already well known to the primary healthcare team

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1 BACKGROUND AND CONTEXT

1.1 Geography / Setting

Argyll and Bute Council covers the second largest geographical area of any Scottish local authority, stretching for over 100 miles from Appin in the north to Campbeltown in the south and more than 80 miles across from the island of Tiree in the west to Helensburgh in the east. The Argyll & Bute area has six towns, 25 inhabited islands, over 2,600 miles of coastline, a population of 90,500 (increasing significantly during the summer months due to the influx of tourists). Approximately 25% of the population is over the age of 60¹.

Argyll & Bute Community Health Partnership (CHP) is one of the four CHPs within NHS Highland. The CHP manages acute care, primary care, community health and mental health services across the Argyll and Bute area. These services are active across a geographical area of 2,600 square miles. This CHP serves a range of settlements including 6 towns, 46 villages, 156 small settlements and 25 inhabited islands².

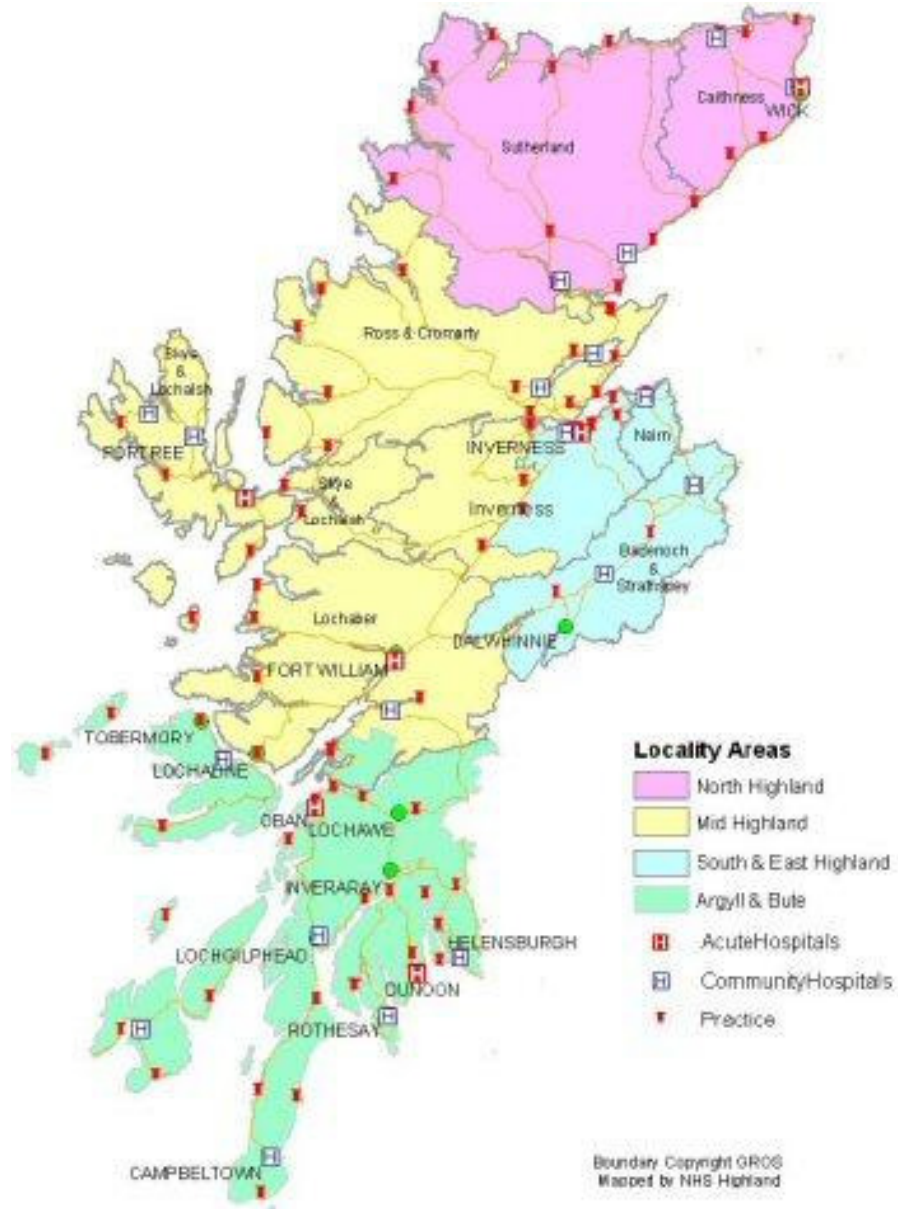
There are four Localities within Argyll & Bute Community Health Partnership. These are:

- Oban, Lorn and the Isles
- Mid Argyll, Kintyre and Islay
- Helensburgh and Lomond
- Cowal and Bute

¹ <http://www.gro-scotland.gov.uk/statistics/council-areas-map/argyll-and-bute.html>

² <http://www.nhshighland.scot.nhs.uk/CHP/ArgyllandBute/Pages/ArgyllButeCHP.aspx>

Figure 1 indicates the Argyll & Bute area as part of NHS Highland



Three key areas of Argyll & Bute were chosen to pilot the Telehealth Pods:

- The Isle of Bute
- The Isle of Luing
- Oban

1.1.1 The Isle of Bute

The Isle of Bute lies within the Firth of Clyde and is fifteen miles long and five miles wide, with a resident population of approximately seven thousand. The main town on Bute is Rothesay, accessed by a half hour ferry crossing from Wemyss Bay on the mainland. The stretch of water known as the Kyles of Bute separate Bute from the adjacent Cowal peninsula. Despite the fact the Bute is an island location, it is within reasonable proximity to specialist medical services on the mainland. However, transfer to these medical services will involve a ferry journey and if emergency medical care is required out of hours, this may involve a helicopter journey, weather permitting.

The healthcare services on the on the Isle of Bute include:

- Community Hospital
- Health centre (with 7 GPs)
- Availability of helicopter emergency retrieval service
- Full time NHS dental practice
- Opticians
- Full time community pharmacy services
- Respite care and day care centres (including Victoria Hospital annex and Thomson Court)
- Several residential homes

1.1.2 The Isle of Luing

The Isle of Luing is located 16 miles south of Oban and accessible by a three minute ferry ride from North Cuan, on the southern tip of Seil Island. Seil is connected to the mainland by the famous "Bridge over the Atlantic".

The island has a population of approximately 200 people (with seasonal variations) and is served by the Seil GP surgery. Luing also has a team of trained volunteer Community First Responders who are called upon as first point of medical assistance, when the emergency services have been dispatched. There is a strong community of home care staff on the island who assist in caring for those local residents with social care needs.

1.1.3 Oban

The coastal town of Oban is located in the north of Argyll and has a population of 7,768³ and offers key services, not only to the surrounding mainland areas, but also to many of the islands. Oban is a key transport hub and provides good road

³ Scotland's Census Results Online. 2001 Census.
<http://www.scrol.gov.uk/scrol/browser/profile.jsp?profile=Population&mainArea=Argyll+%26+Bute&mainLevel=CouncilArea>

links to Fort William in the north, Glasgow and Stirling to the east and Kintyre to the south. A gateway to the islands, it also has ferry services to Mull, Lismore, Kerrera, Barra, South Uist, Colonsay, Coll, Tiree, as well as Islay in the summer. Travel to Iona and Staffa (and Jura in the summer) also begins from Oban.

The Lorn & Islands Hospital is located on the southern outskirts of Oban and forms a hub for both acute and community services within the area. The hospital was purpose built in 1997 to offer facilities previously provided from a number of smaller hospitals throughout the district. The hospital delivers a full range of facilities expected in a rural general hospital.

Oban also has sheltered housing accommodation (Lynn Court), run by Bield Housing, a registered charity. There are 43 units and the sheltered housing provides a range of services and facilities designed to meet the needs of older people. Younger people who demonstrate a need for sheltered housing are also considered, if they would benefit from the services, for example, individuals with a long term medical condition or physical disability. Personal care and support to tenants is not provided at Lynn Court but can be provided by the local council's social work staff or private agencies.

The sheltered housing properties of Lynn Court in Oban are managed by a Scheme Manager, who provides housing and landlord support to all of the tenants. This enables them to live independently within a safe and secure environment. There is also a community alarm service, which covers the development when the Scheme Manager is off duty.

1.2 Project Information & Rationale

The Argyll & Bute Telehealth Project evolved as a development from the existing Telecare Service. The group were supported by the Joint Improvement Team (JIT), which aims to provide practical support to partnerships across Scotland to deliver better health and social care services. The detailed telehealth plan for this project was developed by the project manager with assistance from the Steering Group (a group of multidisciplinary clinicians and other partners including the local Council) within Argyll and Bute.

In May 2007 several Telehealth companies were invited to Argyll & Bute to present to the Steering Group, who were keen to explore the use of Telehealth in long term condition management, in particular for patients with COPD.

Key aims of the Telehealth project were:

- To expand the use of technology to support long term conditions
- To develop local staff expertise to use remote monitoring as part of patient care.
- To expand the specialist knowledge available in one locality by developing practitioners with a special interest in the project areas.

- To link the work on monitoring long term conditions to the reduction in crisis admissions to hospital for this patient group.
- To monitor in conjunction with other agencies the effectiveness of this work.
- To showcase Argyll and Bute as an innovative and forward thinking Partnership area.
- To assist patients to manage their long term conditions

The Steering Group was also keen to pilot surgery and community telehealth Pods in suitable locations, accessible to the patient (e.g. GP surgeries/village halls) for patients with hypertension and for more general health monitoring.

A delay in implementation ensued as the commercial supplier initially chosen was subsequently de-selected and a second supplier identified. This was due to the equipment being sourced from a 3rd party and concerns regarding procurement. Following a consultation and discussion period, it was decided to pursue the development of four pilot sites across Argyll and Bute with company support from Telehealth Solutions. The project was funded through the Telecare Development Fund, enabling the purchase of monitoring equipment, funding of a Project Manager, backfill of community nurses (to dedicate time to the project) and supporting evaluation costs.

Telehealth was part of the strategy for Telecare 2007-2009 adopted by the Strategic Health and Care Partnership for Argyll and Bute, enabling close links with the Telecare programme.

1.3 The use of Telehealth in COPD and other Long Term Conditions

Chronic obstructive pulmonary disease (COPD) is an umbrella term for a number of respiratory conditions, often previously referred to as chronic bronchitis, emphysema or chronic asthma. The condition can have multiple effects on the body, causing difficulties in breathing, weight disturbances, nutritional imbalance and muscle problems. One of the common risk factors of COPD is smoking. Despite the introduction of the “Breath of Fresh Air for Scotland”⁴ tobacco control action plan introduced by the Scottish Executive (now Scottish Government) in 2004, which invoked stricter controls over smoking in public places and declining smoking rates over the past 25 years, morbidity and mortality from COPD in Scotland remain high⁵. Hence care of patients with COPD can be a challenging NHS workload for NHS staff, with over 200,000 COPD patient consultations conducted in Scotland between 2007-2008⁶.

The routine monitoring of patients with COPD has shifted in recent years, from the responsibility of General Practitioners to Practice Nurses, with Scottish

⁴ The Scottish Executive. A Breath of Fresh Air for Scotland. 2004

⁵ Scottish Public Health Observatory. COPD Key Points. March 2009.

⁶ ISD Scotland. General Practice Information Team. 2008.

statistics also recording a marked increase in the number of practice nurse contacts (rising from 38,425 in 2003/4 rising to 101,646 in 2007/8)⁶.

The use of telehealth monitoring systems is now widely recognised as an appealing method for both health care providers and patients⁷. Previous research evidence has suggested that telehealth has its place in assisting to support COPD patients from home, can be useful in reducing hospital admissions^{8,9,10} and positively effecting quality of life¹¹. Theoretically, the use of telehealth for patients in the Argyll & Bute area is consistent with the Department of Health's "Shifting the balance of Care" agenda, maximising responsive care from home settings and reducing avoidable admissions to hospital, coupled with improving access to care for remote and rural patients¹².

1.4 Project Aims and Objectives

The primary purpose of Telehealth is to support remote and rural communities and self care in the home setting; create networks of learning for clinicians to reduce professional isolation and disseminate best practice and provide local access to high quality clinical services in areas where direct specialist support is unavailable.

The objectives of the Argyll & Bute Telehealth Project, as outlined by the Telehealth Programme Initiation Document (2009) are:

- To expand the use of technology to support long term conditions
- To develop expertise in local staff to use remote monitoring as part of patient care.
- To expand the specialist knowledge available in one locality by developing practitioners with a special interest in the project areas.
- To link the work on monitoring long term conditions to the reduction in crisis admissions to hospital for this patient group.

⁷ Wootton R, Dimmick S, Kvedar J, eds. Home Telehealth: Connecting Care within the Community. London: Royal Society of Medicine Press, 2006.

⁸ Bourbeau J, et al. Reduction of Hospital Utilisation in Patients with Chronic Obstructive Pulmonary Disease. Archives of Internal Medicine 2003;163:585-591.

⁹ Pare G, Sicotte C, St.-Jules D, Gauthier R. Cost-minimization analysis of a telehomecare program for patients with chronic obstructive pulmonary disease. Telemedicine Journal and e-Health 2006 Apr; 12(2):114-121.

¹⁰ de Toledo P, et al. Telemedicine experience for chronic care in COPD. IEEE Transactions on Information Technology in Biomedicine 2006;10 (3):567-573.

¹¹ Vontetsianos T, et al. Telemedicine-assisted home support for patients with advanced chronic obstructive pulmonary disease: preliminary results after nine-month follow-up. J Telemed Telecare 2005 July 1;11(suppl_1):86-88.

¹² <http://www.shiftingthebalance.scot.nhs.uk/>

- To monitor in conjunction with other agencies the effectiveness of this work.
- To showcase Argyll and Bute as an innovative and forward thinking Partnership area.

It was hoped that the project would deliver on the following key areas:

- Provide technology to support patients with long term conditions
- Increase specialist knowledge of COPD locally
- Develop a new approach to managing long term conditions in a remote and rural community
- Strengthen links between long term conditions and emergency admissions
- Raise the Argyll & Bute profile for healthcare and innovation.

1.5 Evaluation Rationale

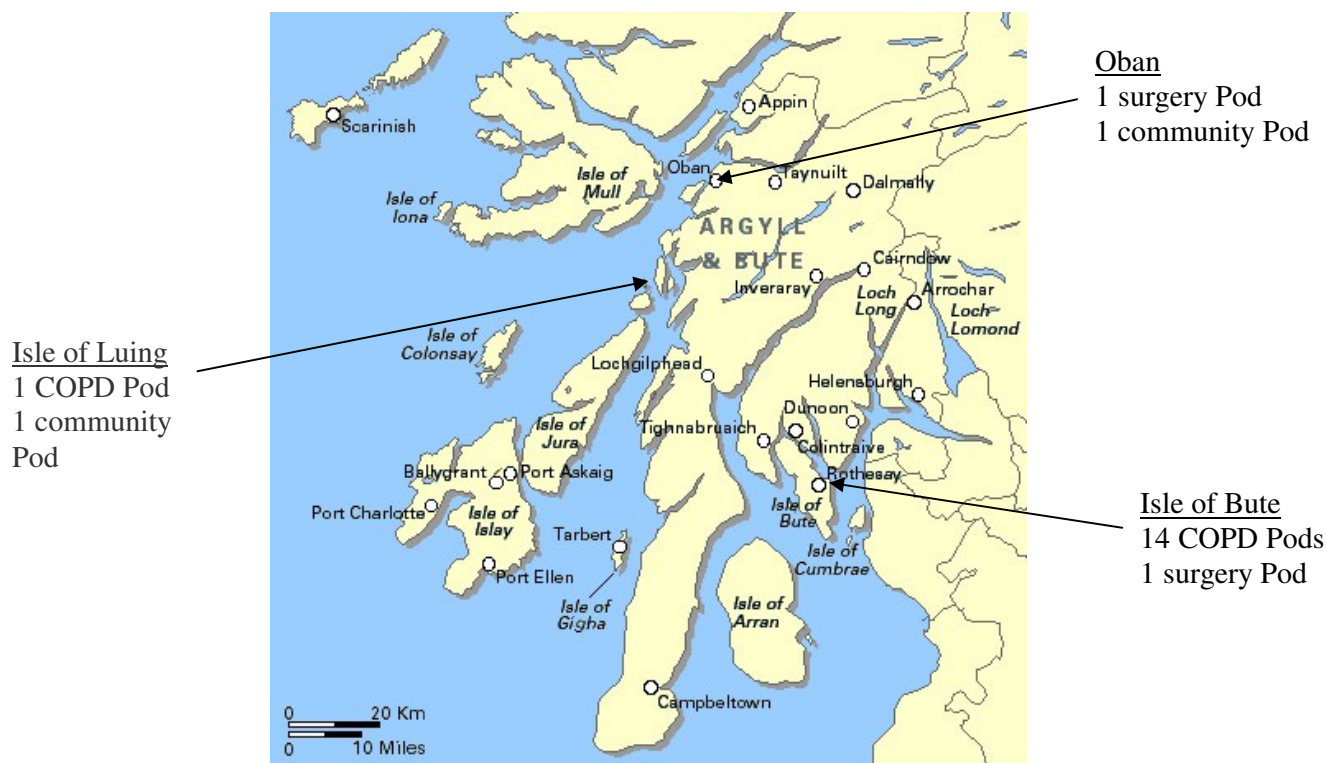
The purpose of the evaluation of the use of Telehealth in Argyll & Bute is to determine progress of the telehealth project against the original project objectives, and to identify any issues within the implementation that may have impacted on the project outcomes, with a view to informing any future rollout of such systems across NHS Highland.

2 SYSTEM DESCRIPTION AND IMPLEMENTATION

There are three types of Telehealth initiatives being trialled:

1. Home Telehealth Pods (on the Isle of Bute and Isle of Luing)
2. Surgery Telehealth Pods (in the mainland of Oban, and Rothesay on the Isle of Bute)
3. Community Telehealth Pods (in Oban and the Isle of Luing)

Figure 2 shows the location of Telehealth Pods in Argyll & Bute



2.1 Telehealth Monitoring – Home Pods

The Home Telehealth Pods enable daily clinical monitoring of patients in their homes, without clinical supervision. They have been designed, to give improved confidence to patients and assist patients with conditions such as asthma, heart failure, diabetes, Chronic Obstructive Pulmonary Disease (COPD), hypertension, depression, drug & alcohol addiction, obesity, smoking cessation and congestive heart failure.

The Steering Group made the decision to monitor fourteen patients with COPD on the Isle of Bute and one patient on Luing. These locations were selected primarily due to the distance patients are from the respiratory nurse specialist in Oban. Piloting the COPD home monitoring also provided an opportunity to deliver a more equitable nurse service remotely and attempt to prevent / reduce unnecessary travel across the water. It also enabled the Argyll & Bute respiratory nurse specialist (based in Oban) to expand her role supporting community nursing teams to manage remote patients with COPD.

By assisting in anticipating exacerbations, the installation of Home COPD Pods in Argyll & Bute aimed to reduce the number of acute unplanned admissions to hospitals and the number of visits to the surgery for routine tests, which could be performed on the pod.

The home Pod is designed, after teaching and support, to be installed by a nurse who then gives the necessary instruction to the patient on the use of the plug in devices attached to the Pod, e.g. SPO2 monitor. When communication to the Telehealth Solutions server is by means of wireless communication – which is the most commonly chosen method – installation only requires access to a mains socket; there is no requirement to route additional phone lines and no requirement for special siting of the equipment. However, broadband is an option where a patient currently has it installed. At the time of installation, the Pod is authenticated to the patient and each time the Pod is used, an additional check is made to verify that the correct person is using it.

Information gathered from the patient by the home Pod is sent by wireless or broadband to the Telehealth Solutions server, maintained by a third party and behind the NHS firewall. Nominated community nursing teams check this website daily and are alerted through the management screens or by SMS and/or email messages to changes in the patient's condition, to enable appropriate patient follow up where necessary. No clinical data is stored on the patient's pod, e.g. CHI number or date of birth, although a history of device readings e.g. SPO2 is available to them, in graph form, on the pod to encourage patient self management.

The parameters of each home Pod are configured by the clinical team, according to the needs of an individual patient, with support from the Telehealth Solutions team. Currently, any requested changes to the patient parameters have to be done through Telehealth Solutions, although this is planned to change with the new customer interface.

2.2 Telehealth Monitoring – Surgery Pods

There are currently two surgery Telehealth Pods in operation in Argyll & Bute, one based in the reception area of Lorn Medical Centre in Oban and another at the Rothesay Health Centre on Bute. These touch screen Pods are designed to enable patients to measure and record a range of key variables, including their own weight, body mass index (BMI), oxygen saturation, pulse and blood pressure without clinical supervision. Peripherals are added to the Pod to enable vital signs

to be measured such as simple sphygmomanometer / arm-in blood pressure cuff and scales.

The surgery Telehealth Pods are configured to READ codes (a standard method of coding clinical conditions) and transfer patient data instantaneously into the electronic patient record system (although at the time of the evaluation this data transfer facility had yet to be installed).

The surgery Pod is designed to save time for clinician and patient, enable the GP to spend more valuable time in consultation with patients, reduce recording errors and increase the regularity of tests performed. Clinicians can advise patients to use the surgery Pod to perform specific tests, or in the case of new patients, the Pods have the potential to carry out a New Patient Check (intended for Oban medical practice). Furthermore, patients can also be asked to perform tests (e.g. blood pressure) prior to obtaining repeat prescriptions and in advance of their appointment with a doctor.

The Surgery Pod can capture the changing personal details of the patients, such as address or telephone number, which aims to free up the reception staff, allowing them to deal with more pressing queries and reducing queue times. The information gathered from the Surgery Pod check-up also assists in the maintenance of Quality and Outcomes Framework (QOF) points for the surgery, and each machine can be configured to help with specific QOF requirements to optimise practice performance by providing the information required by their Health board.

2.3 Telehealth Monitoring – Community Pods

There are two community Telehealth Pods in operation, based in the community hall on the Isle of Luing and another in sheltered housing accommodation in Oban (within close proximity to the Oban GP surgery). It was decided that a community Pod would be useful on the Isle of Luing, to enhance the community / health professional relationship for patients with hypertension. Due to the older population on the island, this was identified as a prevalent condition that did not get regular monitoring, and was often only checked on visits to the surgery for other reasons. The installation of this pod involved engagement with the wider community of the island through the community council. The objective of this was to gain the islands ‘ownership’ of the pod and involvement in their own health, therefore promoting the self management aims of the CHP.

It was also felt important to trial a Pod in a sheltered care environment, as the project was aiming to demonstrate the maximum benefit from the use of Telehealth so a wide variety of settings was seen as important. Lynn Court was chosen as it was of sufficient size and was known to generate significant workload for the GP surgery.

The community Pods, which are primarily being used for patients with hypertension, have been designed to gather a set list of information specific to

each person's health needs. The Pods are individualised with a swipe card so each patient has their own protocol, in relation to identified health needs, as per their assessment and clinical decision making. In Lynn Court the protocol was titled 'wellbeing' as it gathered a series of question responses about general health as well as hypertension, as this was identified as appropriate for this patient group, when gathering the patient data to set up the pod.

Patient data are then transferred onto a secure, NHS firewalled website for health professionals (primarily community nurses) to review. If the results are outwith the agreed parameters the community nurses will be alerted (via an email facility), as well as an alert reading on the triage screen of the website, and prompted to respond appropriately. To access this website professionals need a password and user name. Other professionals such as consultants and OOH GPs can also access the readings, with their user name, to inform other consultations.

Each patient can also view their history of recordings on the Pod – this is intended to increase their awareness of their condition and encourage a self management approach.

2.4 System Implementation

2.4.1 Implementation - Home Pods

The 15 home Telehealth Pods were installed in March 2009. However the actual installation process took longer than anticipated and the protocols took extended time to be uploaded. The pod installation took much more time than expected, this was due to technical difficulties on the day and used far more community nursing time than had been foreseen. A review between supplier and project members helped identify the reasons for this to try and prevent delays in future installations (documented in the lessons learnt log).

2.4.2 Implementation - Surgery Pods

A week long implementation was planned w/c 9th March 2009 for the Telehealth Pod in Lorn Surgery (Oban) and the Telehealth Pod in Rothesay surgery on Bute. The surgery Pod was installed in both locations during this week. However in Oban there was no access to a power socket, although the position of the Pod within the surgery was ideal in other respects. This had to be rectified with the provision of a socket, and resulted in a small installation delay.

At this point in the implementation phase the promised link with GPASS, the patient management system used within the Practice, was not available and printers were used at both locations as a temporary measure. The Pods should have linked directly into the GPASS via a data point to allow transfer of data in a safe and timely manner to the patient management system. However as this was not available, due to design issues within the supplier, printers were installed. Patients were asked to print out their results and hand to receptionists for

inputting. This used additional time for the reception staff and was not as confidential as the project required. This has had a significant effect on the use and functionality of the Pods.

It was difficult to begin the work to customise the surgery Pods over the next few months without the GPASS link, so developments with both surgery Pods stalled. For evaluation purposes, it was more difficult to quantify the usage of the pod in any reasonable format without the ability to view these interactions through the GPASS system.

2.4.3 Implementation - Community Pods

During summer 2009 discussions took place with the sheltered housing accommodation regarding position and installation of the Pod, selection and recruitment of the patients occurred, as well as engagement with the nursing team and GPs at the local health centre. The choice of sheltered accommodation for the Pod changed several times based on clinician opinion of the residents. Lynn Court in Oban was finally selected, which on reflection may have been located too close to the local GP surgery. In October 2009 the sheltered accommodation Pod was installed. A lot of time was spent with the Lynn Court residents to demonstrate and support them in use of the Pod.

Within the same timeframe engagement with clinicians at the medical centre for selection and recruitment for patients on Luing was taking place. Community council meetings were accessed to encourage the community in ownership of their community hall Pod. Training and support with the nursing team, (who did have long term sickness in the team) continued. The Luing Community Hall Pods went live in October 2009. A broadband connection was required for the hall on Luing. There were problems with installation due to the rural location, identifying funding to do it and meeting the security requirements of NHS IT. Broadband proved intermittent on Luing from a provider point of view and initial set up of the billing address was incorrect resulting in disconnection twice. Localised power cuts also affected the Pod; a local champion was identified to test it weekly. All of these issues had a cumulative effect on the smooth installation of the Pod; (all were reviewed by the project team and documented in the lessons learnt log).

Local work was carried out to ensure 24hr access to the hall via a keysafe and safety of the Pod when the hall was in use for other functions, by housing this in a purpose built cabinet. This was funded by the project, and was a good example of the location specific issues than can arise.

Luing patients were recruited individually via the practice register and SPARRA data. After initial challenges of connectivity, this Pod appeared to run well without any further problems.

2.5 Project Development

By January 2008 the pilot sites were confirmed. It took another 4-5 months to work through the IT governance issues which had been identified. A large amount of work was undertaken with the supplier to ensure all documentation relating to the IT aspects of the project was robust and available.

Background work continued whilst the IT specifications were confirmed. This involved development of patient selection criteria, confirmation of protocols, scoping local COPD registers and engagement with staff, as well as the commencement and roll out of pulmonary rehabilitation classes.

In December 2008 a stakeholder event was held, opened by the CHP General Manager. The event was attended by a wide cross section from all partners involved in the project - NHS Highland, Argyll and Bute council, Scottish Centre for Telehealth (SCT), Centre for Rural Health, Telehealth solutions and JIT. The focus of the day was on exploring the benefits of telehealth and was very well evaluated. The use of key stakeholders in this event was very beneficial in identifying potential challenges and their solutions. This was aimed at greater partner ownership of the project and the change in utilising technology to support practice. Also involvement in the JIT demonstrator sites project – commencing in August 2009 in Bute was beneficial for learning and sharing.

The project was managed in accordance with common structures and an implementation plan, risk register, issue log, learning log and project handbook were developed. Support was gained from other areas developing telehealth work; however what became apparent at this time was that there was no organisation pulling Telehealth together across Scotland, and there were many projects who were unaware of others working on a similar long term condition. However, at this point SCT were very supportive of the project, and did facilitate linkages to other projects. They attended regularly the steering group meetings and offered many suggestions for the benefit of the project and its evaluation.

Telehealth is featuring highly in anticipatory care and self management, as well as gaining greater focus as part of the E health agenda. Staff knowledge of long term conditions is increasing and there is potential for the use of Telehealth in many areas of care including mental health and as a health improvement tool.

During 2009 the project gained wider recognition by linking regularly with the JIT as a demonstrator site, and now being part of the steering group for Telehealth for NHS Highland as a whole. The project also gained significant note when it won the Scottish Health Award 2009 for Innovation and Improvement.

3 EVALUATION METHODS

A mixed methods approach was adopted for the evaluation, including both quantitative and qualitative data collection.

3.1 Quantitative Methods

The quantitative data collection was designed to obtain information on user satisfaction and on the impact of providing the Pods, acknowledging that the total number of users to date is small, thus precluding statistical significance testing.

Actual usage of the Pods was recorded where possible i.e. where the system recorded incidents of use. For COPD patients, hospital admissions data were collected from the hospital admissions register while GP and A&E attendances were recorded from patient records by the project manager (LG) via GPASS.

Satisfaction questionnaires were distributed to users of the systems, including patients with COPD, hypertension and those using community Pods for wellbeing checks. A questionnaire was also distributed to staff involved in delivering the telehealth programme (See appendices 1-6). The questionnaire incorporated some questions developed specifically for this evaluation, and an adapted version of the Client satisfaction questionnaire (CSQ-8)¹³. A free text response area was also provided. One questionnaire was distributed per subject and no reminders were given. A questionnaire was also sent to carers of patients.

3.2 Qualitative Methods

Qualitative interviews were conducted with individuals involved in delivering the Argyll & Bute Telehealth Pod services. Interviewees were selected, based on involvement and experience with the home, surgery or community Pods. The Project Manager assisted with invitations to interview and appointment scheduling. All those invited to interview participated in the evaluation. A total of 10 interviews were conducted, primarily with healthcare professionals and managers, but also including a sheltered housing warden. Eight interviewees were female, two male. Table 1 describes the designation and number of interviews conducted:

¹³ [http://www.unlv.edu/centers/achievement/Client%20Satisfaction%20Questionnaire%20\(CSQ-8\).htm](http://www.unlv.edu/centers/achievement/Client%20Satisfaction%20Questionnaire%20(CSQ-8).htm)

Table 1 – Number of Interviewees by Designation

Designation	n
Remote & Rural General Practitioner	1
Community Nurse	3
Specialist Practice Nurse	1
GP Practice Manager	2
Respiratory Nurse Specialist	1
Telehealth Project Manager	1
Sheltered housing warden	1

The research team developed a semi-structured qualitative interview topic guide informed by an eHealth Implementation Toolkit (e-HIT)¹⁴. This toolkit has been primarily designed for healthcare managers to identify potential barriers and facilitators of embedding a particular eHealth innovation within a healthcare organisation. The toolkit is a decision aid for whether an eHealth application is suitable in a particular organisation. Key themes within the e-HIT toolkit include “The Intervention” (impact on clinical practice / ease of use of the system), “The Culture” and “Context” within which it is being implemented and “The Workforce” (impact on workflow / work pattern and relationship between different staff groups). These key topics were used to assist the design of the interview schedule (see appendix 7).

Interviews with participants lasted approximately forty minutes and were digitally recorded with consent, transcribed verbatim, coded and analysed descriptively using a framework approach¹⁵. The research team listened to the transcripts and independently identified emerging key themes. A full coding framework was then established and applied to all transcripts.

To assist in assessing how successful the implementation of the Telehealth Pods have been, the principles of Normalisation Process Model, developed by Carl May, were also utilised during the analysis¹⁶. The Normalisation Process Model helps to describe why some eHealth technologies “normalise” and become part of

¹⁴ Murray E, May C & Mair F. e-Health Implementation Toolkit (e-HIT). <http://www.ucl.ac.uk/pcph/research/ehealth/documents/e-HIT.xls>

¹⁵ Ritchie J & Spencer L. Qualitative data analysis for applied policy research. In Bryman and Burgess eds *Analysing qualitative data* London: Routledge 1994; 173-19.

¹⁶ May C. A rational model for assessing and evaluating complex interventions in health care. *BMC Health Serv. Res.* 2006;6: 86.

everyday routine practice, and others do not)¹⁷. It is defined by four constructs which are discussed in the results.

- Interactional workability or ‘how the work is done?’
- Relational integration or ‘how well does the system fit the work?’
- Skill-set workability or ‘who does what and can they?’
- Contextual integration or ‘how the organisation helps or hinders?’.

The research team used the NPM in an attempt to understand and interpret the qualitative data. The four constructs above are therefore discussed in the results.

4 RESULTS

4.1 Process and Outcome Measures

Users of the systems in all areas were generally older people (range 61-102 years). The mean age of users was 73 years in Bute, 71 years in Luing, and 82 years in the sheltered housing complex.

For the home based Pods, 17 were installed of which 5 were subsequently removed for a variety of reasons, some related to inappropriate selection for supply of a Pod (alcohol excess, too well, died due to unrelated cause). One patient declined the Pod – reason not given. Patients with home Pods (COPD) were expected to use the Pod to report daily, this was monitored by the nursing team and compliance was close to 100%. For the community based Pods, the 13 patients in Luing, who were asked to attend every 2 weeks and were recruited on to the system in October 2009 subsequently made 50 uses out of an expected total of 130 (38%). 17 patients in sheltered housing signed on to use the Pod and were asked to attend monthly; they made 49 uses out of an expected 96 (51%). Usage tended to drop off with time.

For the COPD patients with home Pods, comparing the periods March-November in 2008 and 2009 (i.e. pre- and post-Pod installation) there was a reduction in GP visits, A&E attendances and hospital admissions (numbers and days of bed occupancy) related to COPD as shown in table 2. The small numbers and relatively low frequency of events precludes formal statistical testing.

¹⁷ May C, Finch T, Mair F, Ballini L, Dowrick C, Eccles M, et al. Understanding the implementation of complex interventions in health care: the normalization process model. *BMC Health Serv.Res.* 2007;7:142.

Table 2: Bute Patients with Home Pods:- GP, A&E visits and Hospital admissions data, **March-November 2008** (pre-pod) and **March to November 2009** (post-pod) installation.

<i>Patient</i>	<i>GP or PN Attendances</i>		<i>A&E Attendances</i>		<i>Hospital Admissions COPD (n)</i>		<i>Hospital Admissions COPD (days)</i>	
	2008	2009	2008	2009	2008	2009	2008	2009
1	6	3	0	0	1	0	3	0
2	N/A	2	1	0	2	0	17	0
3	N/A	3	1	0	0	0	0	0
4	5	4	1	0	1	0	8	0
5*	0	0	0	0	0	0	0	0
6	2	3	2	0	0	0	0	0
7*	0	0	0	0	0	0	0	0
8*	0	1	0	0	0	0	0	0
9	4	1	1	0	2	0	10	0
10	1	0	1	0	1	0	5	0
11	2	1	0	0	0	0	0	0
12	2	0	1	0	0	1	0	8
13	8	9	1	0	0	0	0	0
14*	N/A	N/A	N/A	N/A	1	0	14	0
15*	0	0	0	0	0	0	0	0
16*	0	0	0	0	0	0	0	0
17**	17	1	0	2	3	0	15	0
Total	47	28	9	2	11	1	72	8

*Patients who had Pods installed and later removed, usually as they were too well, but in one case for non-compliance. ** This patient died during 2009 of an unrelated cause.

4.2 User Satisfaction

Response rates for questionnaires were: COPD patients 77% (14/18); hypertension patients 50% (6/12); wellbeing patients 71% (12/17); staff 86% (6/7), and carers 50% (4/8).

In general, satisfaction with the use of telehealth Pods was high for all groups of patients, particularly the COPD patients who had home Pods. As a general measure of satisfaction, the mean (SD) CSQ-8 results were: COPD patients 28.7(2.7); hypertension patients 23 (1.7), and wellbeing patients 24.5 (2.9). Considering that the maximum possible score in the CSQ-8 is 32, the patients' scores were high and consistent within groups. The COPD patients who have home Pods gave the highest satisfaction scores.

Responses to specific questions are illustrated in figures 3-7. These indicated that patients generally felt comfortable and safe using the telehealth technology, did not find it difficult, and felt that it improved awareness of their condition and was helpful in their setting. Of note, the most positive responses to specific questions were reported by the COPD patients, consistent with their higher general satisfaction scores.

Figure 3

Before Commencing Telehealth, how comfortable did you feel about your health being checked on remotely from the surgery?

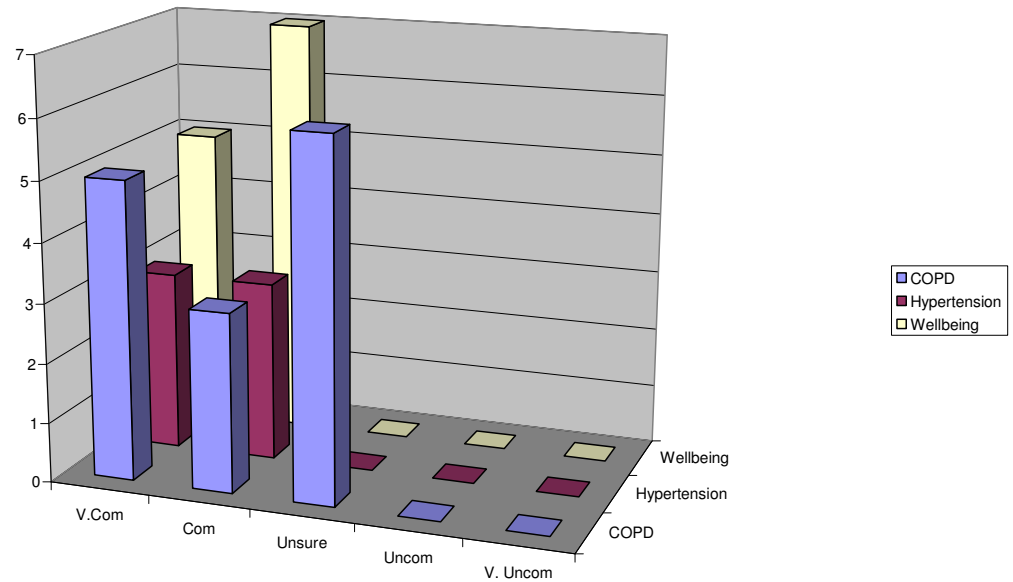


Figure 4

Did you find using the technology difficult?

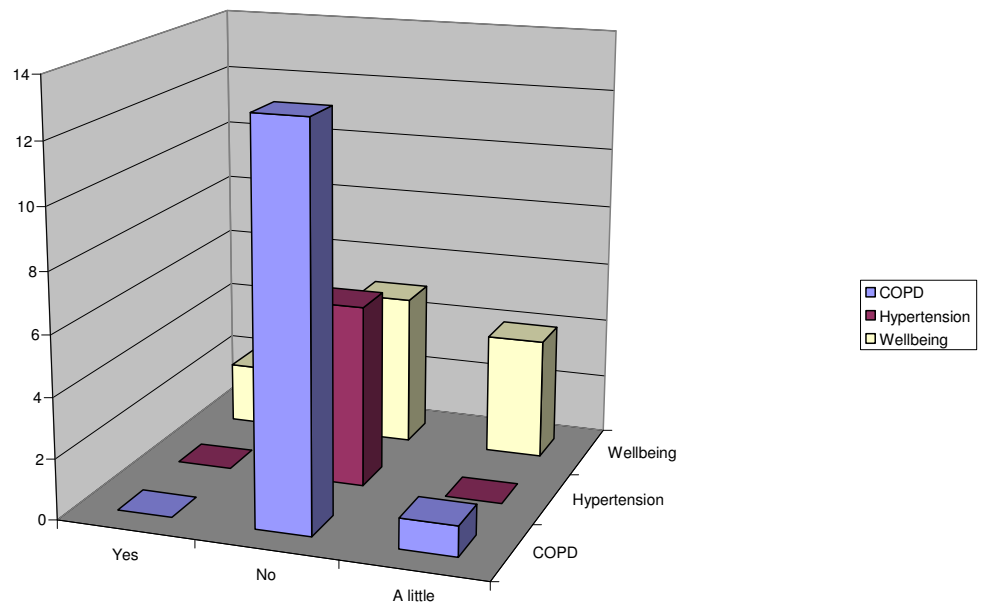


Figure 5

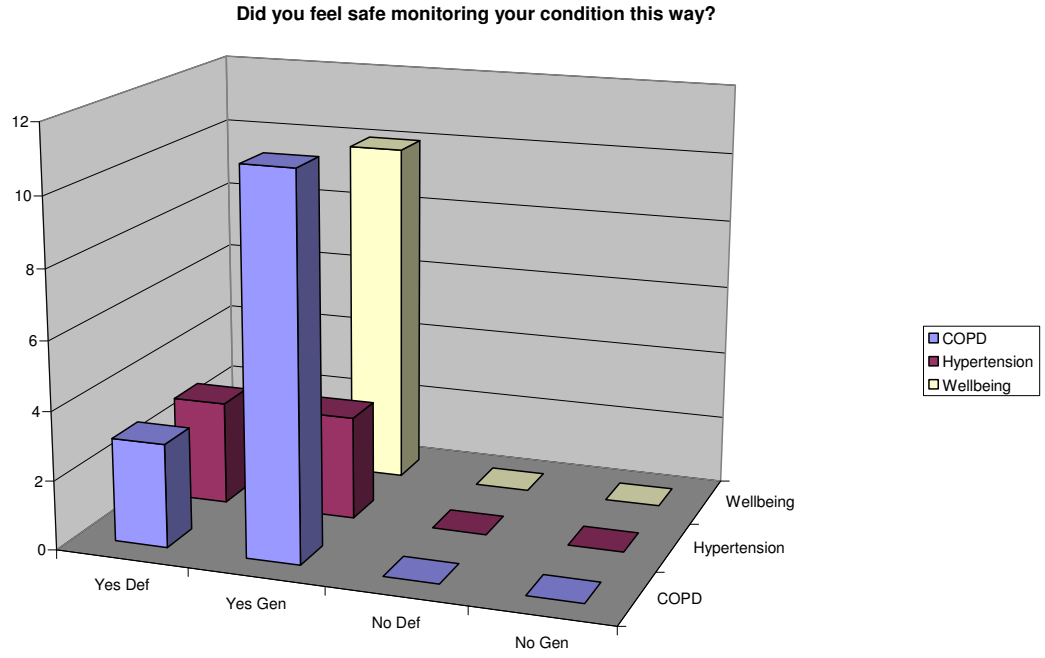


Figure 6

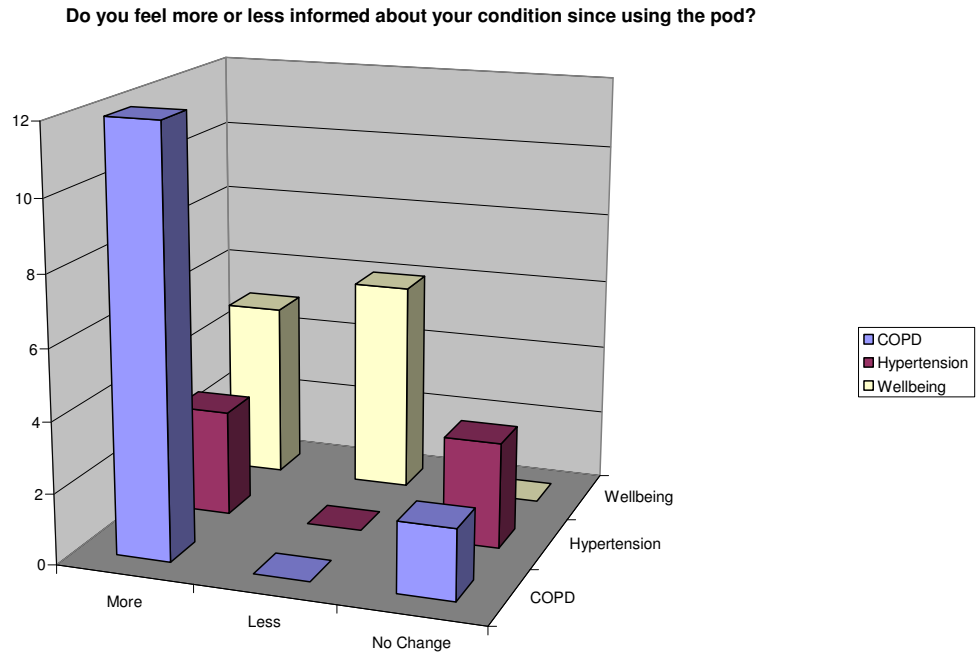
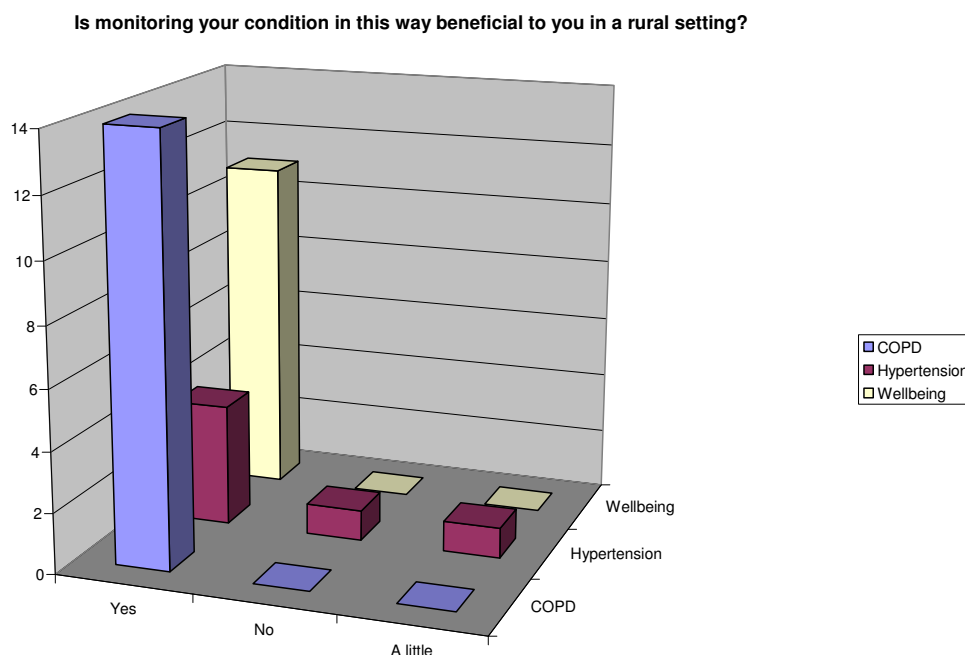


Figure 7



4 of a possible 8 carers returned a brief questionnaire and again indicated high levels of satisfaction. 3 out of 4 reported that they understood how the equipment was supposed to work prior to installation, that they had information on who to contact in the event of a problem, and that having the equipment made them less anxious about their relative (the patient). All reported that the equipment worked as explained to them, that their relative was able to operate the equipment and had adapted well to using it. Two felt that their relative seemed more independent since using the equipment.

Staff opinions among the 6 respondents were also mainly positive. In response to specific questions, 4 reported being uncomfortable with telehealth prior to the study, but none after using telehealth. Half reported that information received about telehealth was poor, and half did not think their knowledge of long term conditions had changed, although 5 reported no difficulty and one, a little difficulty, in using the technology. All felt that monitoring COPD in this way was safe and beneficial for long term conditions in rural areas. Most felt that patients were more informed about their conditions after using telehealth.

In addition to the specific questions, respondents (patients and carers) were given a free text box to record comments (see appendix 7). Staff perceptions are dealt with in more detail in the qualitative section.

4.3 Qualitative Evaluation

4.3.1 Home Monitoring Pods

Qualitative feedback was also generally very positive about the use of home monitoring Pods in Argyll & Bute for patients with COPD. Most felt it was appropriate for these patients to have the opportunity to be monitored from home by local community and district nursing teams, given that all lived in a remote or rural location.

“I would like to see more use of Telehealth Pods, for the patients they are great! ... the Pods are the way forward for people with chronic diseases” (P8)

In general the opinion of the home telehealth Pods in the longer term was that it makes the health professional task of regularly managing the patient’s conditions easier.

The Technology

Respondents felt there were few challenges with the Telehealth Solutions home monitoring technology. The touch screen Pods were described as being very easy for patients to use, “unobtrusive” for the home and a secure way of recording patient data. Two respondents described teething problems with the accuracy of the home Pod pulse oximeters, and questioned the reliability of this element of the equipment (we were informed this issue is being discussed with Telehealth Solutions).

There were no major issues with the technology itself, with the technical training delivered straightforward; however, a number of implementation challenges were identified. The time to install the equipment and the broadband connection was underestimated. This utilised more staff resources than originally planned for and resulted in project delays. In addition respondents felt that it would be appropriate for GPs to set the patient parameters on the Pods, rather than having to refer back to the suppliers.

The Patient

The positive effects that professionals felt the home Pods had on the COPD patients and the self management of their condition was a key topic that emerged during the qualitative research.

Respondents highlighted the benefits of the changing pattern of contact between the patient - health professional, the regularity of patient information and the reassurance they now experience. Staff described patients as being happy with the Telehealth support. As respondents informed the research team, they felt this group of patients now have an increased awareness of their daily physical symptoms and are able to recognise “good days and bad days”.

“I think they are more aware of their health...they are thinking about "how do I feel today? They're more aware of their illness and what to do and what not to do as the symptoms arise" (P3)

“It makes the patient examine themselves instead of just completely ignoring the way they are day to day. They have to think about how they're feeling everyday ... and when they need help, rather than before just relying on the doctor to tell them” (P2)

The general opinion amongst the respondents was that the home Telehealth Pods in Argyll & Bute have facilitated the patient - nurse relationship, despite concerns expressed from the community and district nursing teams during the early stages of implementation. They were nervous about how responsive the patient would be of both the intervention and the nurses themselves (given that this was a new caseload for staff). The response however was described as encouraging, with more regular interaction occurring, in particular by means of follow up telephone calls or home visits. Respondents discussed with the research team the regularity of contact and appropriateness of care:

“Patients get much more appropriate and timely management of their condition doing telehealth because they're not so invisible” (P1)

“They didn't have contact with healthcare professionals regularly and now they do” (P2)

The generally positive comments from staff elicited in the qualitative interviews about effects on patients are supported by responses from patients in the satisfaction questionnaires available in Appendix 6.

The Health Professional

The overall view of the health professional staff prior to and during the implementation of the home Telehealth Pods was that the intervention would increase the workload and responsibility of the nursing teams. Patients with COPD were a new caseload, never managed by nursing teams before (unless the patient presented with other symptoms such as a wound). Some staff were keen to embrace the change and others less so.

The introduction of the home Pods also disrupted internal relationships between the nursing staff themselves, especially on the Isle of Bute. This was more in relation to internal organisational (nurse grading) issues and the impact on workload / responsibility than opposition to the telehealth intervention itself. It was clear some staff did not want to take on extra responsibility. One respondent below discusses the change in work pattern and responsibility since the installation of the home Pods:

“It has certainly increased the pressure of the job because you are very much aware, with the alerts coming through daily. For example I didn’t get to check my email until the afternoon, so if there is an alert coming in the morning and you haven’t seen that until the afternoon ...there is a little bit of pressure there thinking, you need to check them in the morning. It’s not always feasible to do that. (P10)

Staff training was described as one element which could be improved and would help the nurses to become more confident with this new group of patients. Community and District nursing staff (both on Bute and Luing) commented that additional communication, education and awareness training with the nursing teams would have provided more support. One participant felt that meeting the patients face to face prior to installation would have been beneficial and helped the nurses to prepare for the change. Another respondent said:

“It’s extremely important that the nursing team get the education to support them, to support these patients because that seems to be one area that will let it down” (P2)

Due to the fact there were some nurses keen to embrace the change and others less keen, a designated “champion” with an additional COPD module qualification was assigned for the COPD Pods on the Isle of Bute. Despite the fact there was genuine enthusiasm from this “champion” it was evident the pressure and responsibility to help roll out the initiative had been unevenly distributed. Currently, collective responsibility for the home Pods is less evident on the Isle of Bute.

Normalisation Issues (home monitoring Pods)

The majority of respondents felt the home telehealth Pods are a success for the monitoring COPD patients. It is, however, clear that all respondents are aware of the unexpected challenges they have faced during the implementation process. Only one respondent had previously been involved in a telehealth project, meaning that most were on a significant learning curve.

On reflection, no respondents were concerned about the impact the telehealth Pods would have on the relationship between the patient and the health professional (although initial concerns prior to implementation were expressed), indeed most felt that this interaction had either increased or was enhanced. The evidence suggests that home Pods in Argyll & Bute have good “interactional workability” and were described as “straightforward” and easy to use.

The “skill set workability” was thought to be well suited and appropriate for the community nurses. The Pods also provide an opportunity for the nurses to increase their knowledge about COPD and other respiratory conditions.

Most of the respondents (all community and district nurses) had concerns about the potential impact the remote monitoring will have on their future workload. The current workload was described as manageable, however there were concerns expressed if the number of COPD Pods were to be increased. The 14 COPD Pods based on the Isle of Bute have had an impact on the community and district nursing workload in particular. This may impact upon skill-set workability.

Most people thought that home telehealth for COPD patients was appropriate for the community nurses to manage and could fit in well with established working patterns, therefore demonstrating a high level of relational integration.

Additional Information

All the Bute COPD telehealth patients had an anticipatory care plan completed for them at the end of the pilot. This was linked in to work going on in NHS Highland and the Bute practice on anticipatory care. An example is shown in Appendix 8. A key out come of this work was joint approach to this by the community team and the Practice. The plans are designed to reduce hospital admissions and better improve crisis management. The ACPs are available out of hours via the NHS highland Out of Hours Hub and highlight the fact that the patient has a telehealth monitor.

4.3.2 Surgery Telehealth Pods

The Technology

The key issue, and indeed frustration, amongst the respondents about the surgery Telehealth Pods was the lack of electronic record linkage. At the time of the data collection for this evaluation, surgery Pods in Oban and Rothesay were not functioning at their full potential. They did not have the electronic (GPASS) link necessary to transfer patient data to the surgery's electronic record system. The delay in the installation of this link had a significant effect on the use of the surgery Pods. (This linkage has now been established).

The record linkage delay also affected health professional enthusiasm to practically use the technology, in its current form, despite the general enthusiasm about using Telehealth in Argyll & Bute remaining high.

Respondents felt it was too early to comment on the advantages of the surgery Pods, although potential advantages were described by most. It was evident there has been real implementation challenges with the timescale of the GPASS link installation and this has had a considerable effect on the surgery Pod progress.

Time to configure the surgery telehealth Pods to individual practice requirements was also an issue. For example, one respondent felt:

“The messages were not really appropriate to how we run our practice so there was a bit of two-ing and fro-ing in terms of changing the parameters and changing the Pod messages” (P4)

Several respondents mentioned that the Oban and Rothesay GP surgeries are unable to change the parameters of the telehealth Pods themselves (this issue was also noted for the home and community Pods). Currently, any changes to the parameters have to be done through the provider Telehealth Solutions. This cannot be updated remotely as there is no interface facility for such a measure. These respondents felt it would be a considerable advantage if GP surgeries had the ability to update the parameters on their own Telehealth Pods. (A new customer user interface-currently in test phase will allow local clinicians to do this).

The Patient

Most respondents mentioned it was too early to comment on the impact the surgery Pods have had on the patient. Respondents did however briefly discuss the initial benefits they have seen so far, the main themes being the ease of use and the added convenience the Pods offer those patients who have their blood pressure measured regularly.

The Health Professional

Currently the surgery Pods are having minimal effect on the health professional workload, but the potential to reduce workload at the same time as create convenience for the patient was recognised and discussed. One respondent described this potential to the research team:

“Take our hypertensive patients; once a year we definitely need to see them because we need to assess their compliance with their medication, to check their bloods, we need to check their weight and do all their lifestyle details etc. But the in-between check when they are needing their blood pressure done could be done easily by the Pod... we have eleven hundred people with hypertension, so we could be reducing our unnecessary consultation rate considerably”.
(P5)

Normalisation Issues (Surgery Pods)

Most respondents felt the Argyll & Bute surgery Telehealth Pods have great potential and offer convenient routine monitoring of patients. The surgery Pods have the potential to have a positive impact on the work that gets done (once the essential links are installed), indicating high interactional workability.

No respondents expressed concern that the surgery Pods would have a negative impact on the workload, therefore skill-set workability is also high. There were discussions about how accepting patients have been about the technology; highlighting a small number of relational integration issues (it is possible that

some of these issues could be addressed once the record linkage is in place and the surgery Pods are promoted fully).

Most respondents thought the surgery Pod fits in well with established working patterns within the surgeries. It was also described as easy.

4.3.3 Community Telehealth Pods

Both the community Pod in Lynn Court sheltered housing accommodation (Oban) and the Luing community hall Pod were discussed during the qualitative research. At Lynn Court 17 patients are registered to use the Pod. On Luing, the Pod is currently being used for approximately 12 patients with hypertension, with plans to include another 5 patients with CHD.

The Technology

The Lynn Court sheltered housing Pod functions in a similar manner to the surgery Pods but was designed to report back to the secure website which the district nurses would check daily. Despite the fact that the Pods are relatively easy to use the technology was described as being a significant challenge for the elderly population.

On Luing, respondents felt the Telehealth Solutions technology on Luing was, easy to use, with patient data being transferred onto a safe and reliable website for the community and district nurses to read. Any patients measuring outwith their set parameters are alerted via an email to the nursing team. This function in particular was described as beneficial. Technical training of the Luing community nurses was very brief, with one attending the Luing Pod installation.

There have been significant challenges with the reliability of the Luing Pod connection. Respondents felt patients have had challenges logging onto the system, and explained the equipment often needs “switching on and off”. There have been notable periods where the Luing Pod has not been operational.

Respondents in Luing felt that this community Pod progressed without adequate planning (introduced in winter when the community hall was often cold and inaccessible) and supportive infrastructure.

On reflection respondents felt it would be useful for guidelines to be left for patients in the event that the Pod is not functioning. In such a remote area the community nurses felt the onus unnecessarily fell on the nurses themselves when the technology fails.

These implementation issues in Luing are contested by the implementation team, who felt that a number of efforts were made to ensure adequate advanced planning. This reflects some of the change management challenges with a complex intervention.

The Patient

The feedback has been generally very negative about the Lynn Court Pod in Oban. Three key reasons were described: (1) the close proximity to the local GP surgery (across the road) (2) the very elderly age group of the residence (with few under the age of 70) and (3) the significant challenge with the technology for this group. Patients of this age group use the Pod infrequently and have found it technically challenging. At the time of the evaluation, residents of Lynn Court relied upon the staff to assist them to use it.

The research team were informed that residents are still choosing to continue making their appointment at the GP surgery, questioning the value of this particular telehealth initiative.

On Luing respondents commended the island residents for persevering with the community Pod, when there have been a number of ongoing challenges with the installation. This Pod often involves motivation for the patients to use it. Respondents felt that better communication with the island residents and planning of the installation would have been welcomed.

Despite the fact the community hall was mutually agreed to be the best location for the Pod, the hall itself has often been cold for the patient and in the early stages of implementation access to the building was often problematic. This caused inconvenience for the patients.

The Health Professional

Respondents felt the Lynn Court community Pod would have very little effect on the health professional; this was therefore not discussed during the interviews.

On Luing, additional training and support for the nursing staff would have been welcomed, although on the job support was available from the Project Manager. One respondent discussed the training issues:

“None...your learning is quite self-directed. We got the training on the Telehealth the day it was installed, which like I said was not really training in my mind and certainly more input on COPD and hypertension would have been good I think.” (P10)

Patients are informed that the Pods are not an emergency response service, and the community nurses on Luing work weekdays, therefore outwith these hours patients are asked to access services through the normal OOH route if required. Despite this, managing the patient alerts over the weekend was an additional theme which was highlighted to the research team. The community nurses mentioned that only home visits are provided on Luing at the weekends. The nurses do not work during the Out of Hours period. Possible solutions for this were discussed; some felt the Highland Hub would therefore be appropriate to support the monitoring of community Telehealth Pods.

Normalisation Issues (Community Pods)

Respondents felt there were significant challenges with the community Pod in Lynn Court, but recognised that the community Pod on Luing could have some positive impact on the work that gets done (if connectivity issues are addressed).

No respondents felt the community Pods created significant extra work but there were discussions over being responsible for patients over the weekend, highlighting some skill-set workability issues. Additional skill-set workability issues may also need to be addressed if the number of community Pods increase.

Most respondents thought this could fit in well with established working (once connection challenges addressed). Some respondents were unsure whether community Pods are effective, and although the community was persevering with the technology there were questions over whether health professionals are accepting and supportive of this technology. In this evaluation there was evidence that some health professionals are less accepting of the community Telehealth systems, questioning the validity and need for the service, therefore raising issues of relational integration.

There were no issues mentioned around contextual integration.

Table 3 summarises the application of the Normalisation Process Model to the three Telehealth services implemented in Argyll & Bute

Table 3

Telemedicine Intervention	Interactional Workability	Relational Integration	Skill-set workability	Contextual Integration
COPD Home telehealth Pods	+++	+++	+/-	N-D
Surgery telehealth Pods	+++	+ / -	+++	N-D
Community telehealth Pods	+ / -	+ / -	+ / -	N-D

+++ = High level workability or integration

--- = Low level workability or integration

+ / - = Potential workability or integration (challenges identified)

N-D= Topic did not arise

5 CONCLUSIONS AND RECOMMENDATIONS

The overall evaluation of this initiative is positive, but there are important lessons to be drawn, both for continued local implementation and for wider application of similar systems across NHS Scotland.

Conclusions

- The time taken from project initiation to installation of the Telehealth Pods and collection of the first results was unduly long. This was due to a combination of difficulties with the original supplier and an initial underestimation of the operational and technical challenges involved in implementing the systems. Thus although the project was initiated in 2007, the home Pods were only installed in March 2009 and the community Pods in October 2009, meaning that it remains too early to fully assess their clinical and organisational impact.
- Although similar technology and the same supplier was used for home, community and surgery Pods, the nature of the services provided differs for each of these, and additional technical challenges (e.g. poor broadband links and lack of connection to GPASS) have hampered the integration of the community and surgery Pods to date.
- Usage of the home Pods was high, whilst the community and surgery Pods were less well used when compared to target usage, but it remains early days for the latter installations and one might anticipate that usage will increase as people become more familiar with the systems
- Satisfaction with the use of telehealth Pods in Argyll & Bute was generally high, with COPD patients using the home Pods showing highest satisfaction from both patient and health professional perspectives
- Anticipatory care plans were completed in later stages of the pilot for the patients on home based monitors, to allow a planned approach to crisis prevention and management and highlighting to the out of hours service that these patients had home monitoring in place. This is intended to provide a more linked up approach to prevention of admission
- Both the qualitative and quantitative results indicate that patients are satisfied using the telehealth Pods, finding them easy to use, improving awareness of the self and being appropriate for a remote and rural setting.
- Numbers and duration of hospital admissions for COPD clearly declined in a comparable time period pre- and post- installation of the Pods. Due to the small sample size and the relatively short period of use, statistical significance of this finding cannot be determined; a larger number of subjects and more prolonged follow up would be required to establish statistical significance.

Recommendations

- The overall findings of the evaluation are positive and support continuation of the telehealth scheme
- The home Pods have been well received and effective. The reduction in admissions observed for COPD patients supports continuation and expansion of the scheme
- Inclusion of larger numbers of patients will permit formal statistical testing of efficacy
- The home Pods increase the workload and responsibility of the community & district nursing teams. Future linkage of home Pods into a central location such as the Highland Hub could offer coordinated response to patient alerts arising from monitoring systems. We would recommend any future development or expansion of this Telehealth Project is considered within this context.
- Aligning response protocols of the programme with staff work patterns is important. For example, for future home installations it needs to be clearly stated that most patients will do the monitoring up to lunchtime, checking by staff takes place in the afternoon and any response is elicited by the end of the day.
- The potential for the surgery Telehealth Pods has not yet been realised. Reliable, secure links to surgery record systems is encouraged (and were established following the evaluation). Effectiveness of the surgery Pods should be reviewed once record linkage has been established.
- The community Pod located in the Lynn Court sheltered housing accommodation in Oban should be reviewed. Currently there are no geographical barriers to care for these patients due to its close proximity to the GP surgery and there is no evidence that this Pod is of any benefit to the residence. However the system might be appropriate to similar settings more remote from the GP surgery.
- Many staff (particularly nursing staff) found the early stages of the telehealth project challenging. Some of these issues could have been addressed with additional communication, support and training. Ongoing and improved communication and support is recommended.
- Dedicated time with specialists should be provided for condition specific training sessions for all team members, rather than relying on dissemination through team leaders, which can be difficult to achieve.

- Staff who have been involved in this project now form an important resource for NHS Scotland given their practical understanding of the issues involved in implementing this type of telehealth system. Their advice and input should be sought when similar projects are developed in other areas of NHS Highland and NHS Scotland.
- Inclusion of larger numbers of patients will permit formal statistical testing of cost benefits and efficacy of telehealth
- Further evaluation is needed to demonstrate the benefits of telehealth in small rural practices where all of the patients are already well known to the primary healthcare team

6 APPENDICES

Appendix 1 – Hypertension Questionnaire



HYPERTENSION REMOTE MONITORING PATIENT OPINION SURVEY

Please help us improve our programme by answering some questions about the services you have received. We are interested in your honest opinions, whether they are positive or negative. *Please answer all of the questions.* We also welcome your comments and suggestions. Thank you very much; we really appreciate your help. All responses will be anonymous and used for evaluation purposes. This questionnaire should take about 15 minutes to complete.

Questions 1-10 please tick **one** option:-

1 Before commencing Telehealth, how did you feel about have your health looked at remotely from the surgery?

- 1. Very comfortable
- 2. Comfortable
- 3. Unsure
- 4. Uncomfortable
- 5. Very uncomfortable

Comments:

.....

2 After taking part in Telehealth, how do you feel about your health being looked at remotely from the surgery?

- 1. Very comfortable
- 2. Comfortable
- 3. Unsure
- 4. Uncomfortable
- 5. Very Uncomfortable

Comments:

.....
.....

3 Prior to joining the programme how do you feel about the amount of information you received about the use of the Telehealth Pod?

- 1. Very comfortable
- 2. Comfortable
- 3. Unsure
- 4. Uncomfortable
- 5. Very Uncomfortable

Comments:

.....
....

4 Has your awareness of your condition changed since using the Pod?

- 1. No, definitely
- 2. No, not really
- 3. Yes, generally
- 4. Yes, definitely

If yes please elaborate

.....

5 Did you find using the technology difficult?

- 1. Yes please explain why
.....
- 2. No
- 3. A Little

6 Did you feel safe monitoring your blood pressure this way?

- 1. No, definitely
- 2. No, not really
- 3. Yes, generally
- 4. Yes, definitely

Comments:

.....

7

Has the Telehealth Pod changed how you feel you have your BP monitored?

- 1. Yes please expand
.....
- 2. No
- 3. A Little

8

Is monitoring your BP in this way beneficial in a rural setting?

- 1. Yes
- 2. No Please expand.....
- 3. A Little

9

Do you feel more or less informed about your condition since using the Pod?

- 1. More
- 2. Less
- 3. No change

Comments:

.....

10

Has the telehealth Pod made any difference to how you manage your condition?

- 1. Yes
- 2. No
- 3. A Little

Please expand.....
.....

For the Remaining Questions please **circle** one option:-

11 How would you rate the quality of the service you have received from the Telehealth team whilst using the Telehealth Pod?

4	3	2	1
Excellent	Good	Fair	Poor

Comment:

.....
.....

12 Was the experience/service what you expected?

1	2	3	4
No, definitely	No, not really	Yes, generally	Yes, definitely

Comment:

.....
.....

13 To what extent has the Telehealth Monitoring met your BP health needs?

4	3	2	1
Almost all of my needs have been met	Most of my needs have been met	Only a few of my needs have been met	None of my needs have been met

Comment:

.....
.....

14 If a friend were in need of similar help, would you recommend our Telehealth service to him or her?

1	2	3	4
No, definitely not	No, I don't think so	Yes, I think so	Yes, definitely

15 How satisfied are you with the amount of help you have received to use the Pod?

1	2	3	4
Quite dissatisfied	Indifferent or mildly dissatisfied	Mostly satisfied	Very satisfied

16 Have the use of the Pod helped you to deal more effectively with your blood pressure?

4	3	2	1
Yes, they helped a great deal	Yes, they helped	No, they really didn't help	No, they seemed to make things worse

17 In an overall, general sense, how satisfied are you with the telehealth service you have received?

4	3	2	1
Very satisfied	Mostly satisfied	Indifferent or mildly dissatisfied	Quite dissatisfied

18 If you had any other similar long term conditions in the future would you come back to telehealth to have them monitored?

1	2	3	4
No, definitely not	No, I don't think so	Yes, I think so	Yes definitely

Please add any further comments about your experience in the box below (Optional)

Appendix 2 Wellbeing Questionnaire



WELLBEING REMOTE MONITORING PATIENT OPINION SURVEY

Please help us improve our programme by answering some questions about the services you have received. We are interested in your honest opinions, whether they are positive or negative. *Please answer all of the questions.* We also welcome your comments and suggestions. Thank you very much; we really appreciate your help. All responses will be anonymous and used for evaluation purposes. This questionnaire should take about 15 minutes to complete.

Questions 1-10 please tick **one** option:-

1 Before using the Telehealth Pod, how did you feel about have your health looked at remotely from the surgery?

- 1. Very comfortable
- 2. Comfortable
- 3. Unsure
- 4. Uncomfortable
- 5. Very uncomfortable

Comments:

.....

2 After using the Telehealth Pod, how do you feel about your health being looked at remotely from the surgery?

- 1. Very comfortable
- 2. Comfortable
- 3. Unsure
- 4. Uncomfortable
- 5. Very Uncomfortable

Comments:

.....
.....

3 How do you feel about the information about the Telehealth Pod beforehand?

- 1. Very comfortable
- 2. Comfortable
- 3. Unsure
- 4. Uncomfortable
- 5. Very Uncomfortable

Comments:

.....
....

4 Has your awareness of your general wellbeing changed since using the Pod?

- 1. No, definitely
- 2. No, not really
- 3. Yes, generally
- 4. Yes, definitely

If yes please elaborate
.....

5 Did you find using the technology difficult?

- 1. Yes please explain why
.....
- 2. No
- 3. A Little

6 Did you feel safe monitoring your well being this way?

- 1. No, definitely
- 2. No, not really
- 3. Yes, generally
- 4. Yes, definitely

Comments:

.....

7

Has the Telehealth Pod changed how you feel you have your health monitored?

- 1. Yes please expand
.....
- 2. No
- 3. A Little

8

Is monitoring your wellbeing in this way beneficial in a rural setting?

- 1. Yes
- 2. No Please expand.....
- 3. A Little

9

Do you feel more or less informed about your health since using the Pod?

- 1. More
- 2. Less
- 3. No change

Comments:

.....

10

Has the telehealth Pod made any difference to how you look after yourself?

- 1. Yes
- 2. No
- 3. A Little

Please expand.....
.....

For the Remaining Questions please **circle** one option:-

11 How would you rate the quality of the service you have received from the Telehealth team whilst using the Telehealth Pod?

4	3	2	1
Excellent	Good	Fair	Poor

Comment:

.....
.....

12 Was the experience/service what you expected?

1	2	3	4
No, definitely	No, not really	Yes, generally	Yes, definitely

Comment:

.....
.....

13 To what extent has the Telehealth Pod met your health needs?

4	3	2	1
Almost all of my needs have been met	Most of my needs have been met	Only a few of my needs have been met	None of my needs have been met

Comment:

.....
.....

14 If a friend were in need of similar help, would you recommend our Telehealth service to him or her?

1	2	3	4
No, definitely not	No, I don't think so	Yes, I think so	Yes, definitely

15 How satisfied are you with the amount of help you have received to use the Pod?

1	2	3	4
Quite dissatisfied	Indifferent or mildly dissatisfied	Mostly satisfied	Very satisfied

16 Have the use of the Pod helped you to deal more effectively with your health?

4	3	2	1
Yes, they helped a great deal	Yes, they helped	No. they really didn't help	No, they seemed to make things worse

17 In an overall, general sense, how satisfied are you with the telehealth service you have received?

4	3	2	1
Very satisfied	Mostly satisfied	Indifferent or mildly dissatisfied	Quite dissatisfied

18 If you had any other similar long term conditions in the future would you come back to telehealth to have them monitored?

1	2	3	4
No. definitely not	No, I don't think so	Yes, I think so	Yes definitely

Please add any further comments about your experience in the box below (Optional)



COPD REMOTE MONITORING PATIENT OPINION SURVEY

Please help us improve our programme by answering some questions about the services you have received. We are interested in your honest opinions, whether they are positive or negative. *Please answer all of the questions.* We also welcome your comments and suggestions. Thank you very much; we really appreciate your help. All of your replies will be anonymous and will only be used for evaluation purposes. The questions should take about 15 minutes to answer.

Questions 1-10 please tick **one** option:-

1 **Before commencing Telehealth, how did you feel about your health being checked on remotely from the surgery?**

- 1. Very comfortable
- 2. Comfortable
- 3. Unsure
- 4. Uncomfortable
- 5. Very uncomfortable

Comments:

.....
.....

2 **After taking part in Telehealth, how do you feel about your health being checked on remotely from the surgery?**

- 1. Very comfortable
- 2. Comfortable
- 3. Unsure
- 4. Uncomfortable
- 5. Very Uncomfortable

Comments:

.....
.....

3

Prior to joining the programme how do you feel about the amount of information you received about the use of the Telehealth Pod?

- 1. Very comfortable
- 2. Comfortable
- 3. Unsure
- 4. Uncomfortable
- 5. Very Uncomfortable

Comments:

.....
.....

4

Has your awareness of your condition changed since using the Pod?

- 1. No, definitely
- 2. No, not really
- 3. Yes, generally
- 4. Yes, definitely

If yes please elaborate

.....

5

Did you find using the technology difficult?

- 1. Yes please explain why
.....
- 2. No
- 3. A Little

6

Did you feel safe monitoring your condition this way?

- 1. No, definitely
- 2. No, not really

- 3. Yes, generally
- 4. Yes, definitely

Comments:.....

7

Has the Telehealth Pod changed how you feel your condition is monitored?

- 1. Yes please expand

- 2. No
- 3. A Little

8

Is monitoring your condition in this way beneficial to you in a rural setting?

- 1. Yes
- 2. No Please expand.....
- 3. A Little

Comments:

9

Do you feel more or less informed about your condition since using the Pod?

- 1. More
- 2. Less
- 3. No change

Comments:

10 Has the telehealth Pod made any difference to how *you* manage your condition including raising your own awareness?

- 1. Yes
- 2. No
- 3. A Little

Please expand.....
.....

For the Remaining Questions please **circle** one option:-

11 How would you rate the quality of the service you have received from the Telehealth team, whilst using the Telehealth Pod?

- | | | | |
|-----------|------|------|------|
| 4 | 3 | 2 | 1 |
| Excellent | Good | Fair | Poor |

12 Was the experience/service what you expected?

- | | | | |
|----------------|----------------|----------------|-----------------|
| 1 | 2 | 3 | 4 |
| No, definitely | No, not really | Yes, generally | Yes, definitely |

13 To what extent has the Telehealth Monitoring met your COPD health needs?

- | | | | |
|--------------------------------------|--------------------------------|--------------------------------------|--------------------------------|
| 4 | 3 | 2 | 1 |
| Almost all of my needs have been met | Most of my needs have been met | Only a few of my needs have been met | None of my needs have been met |

14 If a friend were in need of similar help, would you recommend our Telehealth service to him or her?

1	2	3	4
No, definitely not	No, I don't think so	Yes, I think so	Yes, definitely

15 How satisfied are you with the amount of help you have received to use the Pod?

1	2	3	4
Quite dissatisfied	Indifferent or mildly dissatisfied	Mostly satisfied	Very satisfied

16 Has the use of the Pod helped you to deal more effectively with your COPD?

4	3	2	1
Yes, they helped a great deal	Yes, they helped	No. they really didn't help	No, they seemed to make things worse

17 In an overall, general sense, how satisfied are you with the telehealth service you have received?

4	3	2	1
Very satisfied	Mostly satisfied	Indifferent or mildly dissatisfied	Quite dissatisfied

18 If you felt you need help with similar long term conditions, would you want to come back to the telehealth programme??

1	2	3	4
No. definitely not	No, I don't think so	Yes, I think so	Yes definitely

Please add any further comments about your experience in the box below (Optional)



TELEHEALTH REMOTE MONITORING CARER'S OPINION SURVEY

Please help us improve our programme by answering some questions about the services you have received. We are interested in your honest opinions, whether they are positive or negative. *Please answer all of the questions.* We also welcome your comments and suggestions. Thank you very much; we really appreciate your help. All responses will be anonymous and used for evaluation purposes. This questionnaire should take about 15 minutes to complete.

Questions 1-8 please tick **one** option:-

1. Prior to installation, did you understand how the equipment was supposed to work?

- Yes **comments:**
No
With Instruction

2. Did the equipment work as explained to you?

- Yes **comments:**
No
After adjustment

3. Was your spouse/relative able to operate the equipment?

- Yes **comments:**
No
With help
Don't Know

4. Were you given information about who to contact if you had a problem with the system?

- Yes **comments:**
- No
- Don't Know

5. In your experience, since using the equipment, has your spouse/relative improved self-management of their lung condition – this might include:

- Contacting health professionals more quickly when they become unwell **comments:**
- Taking their medication more regularly
- Having a greater understanding of their condition
- Understanding what triggers bad spells
- Other – please describe

6. In your experience, since using the equipment, has you spouse/relative adapted well to using it?

- Yes **Comments**
- No
- Don't Know

7. Does having the equipment make you feel:

- Less anxious about your spouse/relative's health **comments**
- Just as anxious about your spouse/relative's health
- More anxious about your spouse/relative's health

8. In your experience, since using the equipment have you observed any difference in the level of independence your spouse/relative enjoys?

Yes, seems more independent **comments**

No, no difference

Don't Know

Please add any further comments about your experience in the box below (Optional)

Thank you for taking part in our evaluation.

Appendix 5 – Staff Questionnaire



TELEHEALTH STAFF OPINION SURVEY

Please help us improve our programme by answering some questions about the services you have received. We are interested in your honest opinions, whether they are positive or negative. *Please answer all of the questions.* We also welcome your comments and suggestions. Thank you very much; we really appreciate your help. Answers will be anonymous and used for the evaluation purpose. This should take approximately 15 minutes to complete.

Questions 1-10 please tick **one** option:-

1 **Before taking part in Telehealth, how did you feel about using technology to monitor patient's health remotely?**

- 1. Very comfortable
- 2. Comfortable
- 3. Unsure
- 4. Uncomfortable
- 5. Very uncomfortable

Comments:

.....

2 **After taking part in Telehealth, how did you feel about monitoring patient's health remotely?**

- 1. Very comfortable
- 2. Comfortable
- 3. Unsure
- 4. Uncomfortable
- 5. Very Uncomfortable

Comments:

.....
.....

3

Prior to engaging with Telehealth how do you feel about the amount of information you received about the Telehealth Programme?

- | | | | |
|-----------|------|------|------|
| 4 | 3 | 2 | 1 |
| Excellent | Good | Fair | Poor |

Comments:

.....
.....

4

Has your knowledge of Long term conditions (especially COPD and Hypertension) changed since using Telehealth?

1. No, definitely
2. No, not really
3. Yes, generally
4. Yes, definitely

If yes please elaborate

.....

5

Did you find using the technology difficult?

1. Yes please explain why
.....
2. No
3. A Little

6

Do you feel safe monitoring COPD and/or Hypertension this way?

1. No, definitely
2. No, not really
3. Yes, generally
4. Yes, definitely

Why

.....
.....

7

Do you feel adding Telehealth to your role, has impacted on your time management?

In the first month of operation:

In this last month:

- | | | |
|--------------------------|--------------------------|----------|
| 1. Yes | <input type="checkbox"/> | Yes |
| <input type="checkbox"/> | | |
| 2. No | <input type="checkbox"/> | No |
| <input type="checkbox"/> | | |
| 3. A Little | <input type="checkbox"/> | A little |
| <input type="checkbox"/> | | |

8

Is monitoring long term conditions in this way beneficial in a rural setting?

- | | | |
|-------------|--------------------------|--------------------|
| 1. Yes | <input type="checkbox"/> | |
| 2. No | <input type="checkbox"/> | Please expand..... |
| 3. A Little | <input type="checkbox"/> | |

9

What impact do you feel using telehealth has had on the management of this group of patients?

1. More information on their condition
2. Less information on their condition
3. No change to your knowledge of their condition

Comments:

.....

10 Do you feel using telehealth has improved the patients understanding of their condition?

- 1. Yes
- 2. No
- 3. A Little

Please expand.....
.....

For the Remaining Questions please **circle** one option:-

11 How would you rate the quality of the support you have received whilst engaging with the Telehealth project?

- | | | | |
|-----------|------|------|------|
| 4 | 3 | 2 | 1 |
| Excellent | Good | Fair | Poor |

12 Was the use of telehealth what you expected?

- | | | | |
|----------------|----------------|----------------|-----------------|
| 1 | 2 | 3 | 4 |
| No, definitely | No, not really | Yes, generally | Yes, definitely |

13 Prior to telehealth implementation had you engaged with any self management training?

- | | | | |
|--------------------|---------------|----------------------|-----------------------------------|
| 4 | 3 | 2 | 1 |
| No, definitely not | No not really | Yes general training | Yes a dedicated course -
..... |

Comments:
.....

18

Do you feel if you had patients with other similar long term conditions you would refer them to telehealth for monitoring?

1

2

3

4

No. definitely not

No, I don't think so

Yes, I think so

Yes definitely

Comments:

.....

JobTitle

(Optional).....

...

Please add any further comments about your experience in the box below (Optional)

**Appendix 6 – Free Text Comments from Questionnaire:
Patient, Staff and Carers**

Hypertension patients:

“I felt it was a good idea and wanted to support it”

“As you know there have been some hiccups with the POD but if these are ironed out – I think it is a very good idea”

“Disappointed the machine not always working e.g. power cuts disable the machine”

“I think this is a very good idea with lots of potential”

“It is very convenient and no ferry fare involved”

“The system needs to be more reliable – problems with broadband and power cuts”

Wellbeing Patients:

“Very good idea”

“Blood pressure cuff felt a bit uncomfortable”

“I was shown the Pod and thought it was a very good idea, but I visit the health centre across the road so don't use it very often”

COPD Patients:

“Before was not sure how this could work but results are very positive”

“Seeing the results on the screen is first class”

“If I miss out on results the nurse can check with me by phone i.e. red alert”

“The doctor is kept up to date 24/7”

“Feedback from surgery excellent”

“I feel safe as others are aware of my general condition”

“Helps to highlight fluctuations in my condition due to activities and weather, it allows me to adjust accordingly”

“Having been a recipient of the Pod for less than a year I have been delighted with the system. It has to date (Along with the managers of the system,) been responsible for diagnosis of 3 major bouts of illness at early stages. This resulted

in fast treatment (twice without leaving home) averting severe illness and possible hospitalization.”

“Well it keeps a history of my daily condition”

“The district nurses check your readings daily and phone to see what the problem is”

“I was one of the first to receive a Pod and used it for several months but felt too well and had it removed. However if this should worsen I would not hesitate to ask to go back into the program once again”

“Every confidence now I have seen it working and using it”

“It gives early warning of changes and I can get help quickly”

“Knowing my illness is monitored every day by excellent nurses has given me great relief and the care and attention I receive from them is second to none, also the people behind the scenes are spot on too.”

“I have only one minor query, sometimes the Pod jumps questions and there is no back button to go back to the previous question”

“Now very aware of my changing condition and can act upon it”

“Before I didn’t always communicate with the surgery very well”

“I now realise the consequences of this illness”

“Equipment is very user friendly”

“ I feel very reassured that my condition.....will not deteriorate unnoticed”

“Previously I tried to struggle on without help from the doctor”

“I now take more notice of my symptoms”

“Having the Pod has meant I have avoided the need to be hospitalised on a few occasions”

Carer:

“Pleased that help is noticed at once when needed and given at once by nurses. I find this reassuring with my wife’s condition and the dedicated help from district nurses”

“It was demonstrated and I was given information”

“instructions step by step were given in writing”

“This equipment helps to alert my spouse to abnormalities”

“Equipment gives me more confidence about my spouses health”

“Spouse has more self confidence as his symptoms are bring monitored”

“My spouse has gained confidence in that he now better understands his condition and in that he has assurance that if there are any changes, these can be picked up at an early stage, before the situation gets so bad to be hospitalised. It has improved the quality of his life quite a lot”

“Equipment wasn’t explained to me, I didn’t know it had to be”

Staff:

“Encourages patients to take ownership of condition”

“Patients recognise symptoms of deteriorating health”

“Excellent IT support provided”

“All patients have reduced anxiety – prompt treatment”

“Telehealth is certainly very beneficial and gives them much needed support and treatment of their COPD”

“15 new patients have been added to DN caseloads as a result of Telehealth. These patients were not known to DN’s before”

“The telehealth project has been successful in educating patients in their chronic illness, but it must empower patients to deal with some situations themselves.”

“I would have appreciated a bit more consultation and education with all the community nurses prior to installation”

“Would like more local ownership to be able to alter patients parameters”

“Infrastructure to support Pods not fully in place before implementation, which impacted on the DN team”

“In a general overview of the service I can see the potential benefits of it for patients but my main concern would be – has this system improved the patients knowledge and understanding of their COPD enabling them to improve on their self management”

“Education about COPD and Pods should have been arranged prior to project starting”

Appendix 7 – Interview Schedule Coding Structure

1. The Intervention

- 1.1 Installation of Pods (equipment, access, location, disruption)
- 1.2 (impact on clinical practice) Disrupt HP – patient interaction
- 1.3 (impact on clinical practice) Facilitate HP – patient interaction
- 1.4 Security & reliability
- 1.5 Ease of use

2. Workforce / Work Pattern

- 2.1 Impact on workforce / role / workload
- 2.2 Education and training
- 2.3 Technical support
- 2.4 Disrupt relationships between staff groups
- 2.5 Enhance relationships between staff groups
- 2.6 Impact on travel

3. Impact on Patient

- 3.1 Effect on patient – professional interaction
- 3.2 Impact on self care
- 3.3 Quality of care
- 3.4 Convenience
- 3.5 Challenges

4. Culture within Argyll & Bute

- 4.1 Telehealth experience
- 4.2 Attitudes to change
- 4.3 Reluctance to adapt to eHealth initiatives – dreading change
- 4.4 Welcomes eHealth initiatives – embracing change
- 4.5 Positive relationships between staff
- 4.6 Negative relationships between staff
- 4.7 Opposing leaders
- 4.8 Supporting leaders
- 4.9 Innovative work culture

5. General

- 5.1 Advantages of Pods
- 5.2 Disadvantages of Pods
- 5.3 Challenges with the Pods

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