

**COPD REMOTE TELE-MONITORING  
A TELE-MONITORING PILOT PROJECT  
EVALUATION  
COMMERCIAL IN CONFIDENCE**



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**EUROPEAN CENTRE FOR CONNECTED HEALTH**

**COPD REMOTE TELE-MONITORING**

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**EVALUATION**

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## 1. INTRODUCTION AND BACKGROUND

### 1.1 Introduction

The Department of Health, Social Services and Public Safety's (DHSSPS) European Centre for Connected Health (ECCH) has commissioned BDO Stoy Hayward to evaluate eight tele-monitoring Service Pilot Projects, which were established in 2007/08 with an initial two year funding provision from the DHSSPS in Northern Ireland.

This report presents the evaluation of a Belfast Health and Social Care Trust ('BHSC') tele-monitoring service pilot project entitled 'COPD Remote Tele-Monitoring'.

### 1.2 Policy and Operational Context

The demographics of Western Europe, and Northern Ireland, show an almost exponential increase in the elderly population over the course of the next 20 years. Growing longevity will lead to a significant increase in chronic diseases, which in turn is expected to place additional pressures on health and social care systems across Europe. Indeed, Northern Ireland's predicted population increase of the over 75s and 85s is steeper than that predicted for the rest of the United Kingdom, adding to cost pressures on the local health economy.

In light of this increasing demand, existing approaches to patient care are unlikely to meet public expectations in relation to the quality and accessibility of the care people will require. Therefore, in order to provide high quality care in a sustainable manner within an environment of significantly increasing demand and constrained resources, a new system will be necessary to monitor chronic illnesses, as well as providing better care to patients and reducing both hospital and nursing home admissions.

The introduction of healthcare technology to effectively manage issues associated with this changing demographic profile and increasing chronic disease, has the potential to greatly improve the quality, sustainability and cost efficiency of service provision.

The overall aim of the DHSSPS is to improve the health and wellbeing of the people of Northern Ireland. In pursuing this aim through the health and social care (HSC) system, the key objective of the Department is to improve the health and well-being outcomes through a reduction in preventable disease and ill-health through the provision of effective and high quality services, equitably and efficiently, to the whole population.

To this end, DHSSPS' Regional Strategy 'A Healthier Future- A Twenty Year Vision for Health and Wellbeing in Northern Ireland 2005-2025' provides a vision of how the health and social services will develop and function over the twenty-year period. It recognises the need for health and social services to change to reflect the changing needs of the population, particularly in terms of the increasing aging population. It recognises that the range and nature of healthcare service provision will also change to reflect new ways of working, new technologies and the development of new treatments.

Whilst it is recognised the population living longer is a positive development, an increase in age-related chronic diseases is also likely to occur, which may be further exacerbated by changing behaviours. Chronic diseases and conditions such as diabetes, cancers, heart disease, respiratory diseases and arthritis look set to grow in prevalence, although it is noted that a key aim of this new Regional Strategy was the reversal of such trends in relations to these conditions.

The use of technology will be key to meeting the needs of the increasing aging population in the future, particularly in relation to chronic disease management. Associated rapid advances in technology will impact on health and social care services in terms of the provision of (potentially

costly) new forms of treatment and care. Such technologies are expected to allow some terminal illnesses to be treated as chronic conditions and also to provide cures for some chronic conditions. Furthermore, new information technologies will support service users by providing ready access to information on conditions and treatment, whilst also supporting more effective and integrated working across the health and social services.

The next twenty years are therefore likely to see a greater provision of, and emphasis on, more holistic ‘generalist’ services provided in communities or on a day patient or outpatient basis than is the case at present. These will include primary care services, chronic disease management, as well as social services maintaining and enhancing independence.

DHSSPS’ Regional Strategy indicates that the Department’s focus going forward will be on tackling chronic diseases, as well as the social and economic disadvantage that gives rise to poor health. The majority of this will be managed within a community setting in partnership with service users. Therefore, services will be focused on supporting, protecting and promoting the quality of life of those least able to protect themselves, which will include: looked after children, vulnerable older people and people with disabilities or any other form of potential barrier to living a full life.

Within the Strategy’s objectives for the development of responsive integrated services, the following objective was set out:

| Objective for Developing Responsive Integrated Services |  |  |
|---|--|--|
| Objective   | Community-Led Services   | Contribution to Vision   |
| By 2008,  | promote independence for people who require care by facilitating independent living. | Improve the quality of life and independence of people in need so that 40 per cent of all people who received care managed community services and at least 88 per cent of people aged 75 years or older are supported, as necessary, in their own homes. This will also be supported by the use of Direct Payments for social care. This objective will also be supported by a focus on telecare provided in people’s homes. |

DHSSPS’ [Primary Care Strategy](#)<sup>1</sup> recognises that the provision of a high quality primary care service has been, and will continue to be, subject to significant pressure, as the demands placed upon NI’s health service continue to grow. With this in mind, there is widespread recognition of the need to consider new ways of working, which will help meet both current and future needs.

Furthermore, the Strategy also recognises that over reliance is placed upon the hospital/acute sector. Therefore, a more responsive and dynamic primary care sector should be implemented which would provide the necessary care close to the homes of patients.

Like the Regional Strategy (as discussed previously), the Primary Care Strategy highlights the increasing growth in the elderly population as a considerable challenge. The over 85 population is expected to almost double over the next twenty years, meaning that major change will also be required in primary care provision in order to respond adequately to the needs of this group alone (as well as other’s suffering from chronic diseases), in seeking to maximise independent living and reduce the reliance on hospital and residential care.

As part of this, there will be a requirement for a much wider development of community-based alternatives to hospital admission, the establishment of flexible and innovative 24-hour crisis response services, more supported living opportunities and access to appropriately skilled and resourced community-based rehabilitation teams. This will also require an even greater emphasis on health promotion, enhanced social wellbeing and disease prevention.

<sup>1</sup> Caring for People Beyond Tomorrow: A Strategic Framework for the Development of Primary Health and Social Care for Individuals, Families and Communities in Northern Ireland

This would provide support to people in making and sustaining lifestyle changes, helping to reduce future levels of chronic illness and where necessary, supporting people to manage their own condition, again with less reliance on the hospital sector and practitioners generally. In this regard, multi-disciplinary care teams will need to be in place with greater specialisation in areas such as diabetes, respiratory illness and heart disease.

Both the Primary Care Strategy and the Regional Strategy recognise the demographic and global challenges, and the resultant need for the development of new approaches to care delivery with a focus on:

- Increased health promotion, disease prevention and early intervention to better manage demand; *and*
- Shifting the balance of care towards the community and promoting the alternatives to hospital admission.

The harnessing of new technologies to enhance health monitoring and empower patients is highlighted in both the Regional and Primary Care Strategies. Remote Monitoring therefore has the potential to play an important role in delivering services locally and facilitating care at home, as appropriate, and in the implementation of these strategies. Furthermore, specific service frameworks including Cardio Vascular and Respiratory Frameworks are currently being developed.

Remote Tele-Monitoring will contribute to ensuring that higher standards of care are made available to people with long-term conditions and should link into and be reflected in these and other service frameworks for Northern Ireland.

For 2008-09 and beyond, the Minister for Health, Social Care and Public Safety indicated an expectation that NI will see continuing and substantial improvement to services in ten priority areas (e.g. ensuring fully integrated care and support in the community; improving health and well-being; and modernising the infrastructure), with resultant progress towards the objectives and targets set out in the Programme for Government 2008-2011 and associated Public Service Agreements (PSAs).

The introduction of remote monitoring also has the potential to make a direct contribution to the achievement of the Department’s Public Service Agreement/ Priorities for Action targets as follows:

|   |
|---|
| <b>Priority 4: Ensuring Fully Integrated Care and Support in the Community (specifically under PSA 4.3):</b>  |
| <b>By March 2009:</b>   |
| <ul style="list-style-type: none"> <li>• Identify at least 1,000 people who had unplanned admission to hospital on two or more occasions during 2007-08, due to a severe or complex chronic condition.</li> <li>• Establish, in collaboration with the European Centre for Connected Health, these patients on a case management programme;</li> <li>• Identify the anticipated onflow during this period;</li> <li>• Reduce the unplanned admissions of these case-managed patients by 10%.</li> </ul> |
| <b>By 2011:</b>   |
| <ul style="list-style-type: none"> <li>• Secure a 50% reduction in unplanned hospital admissions for some 5,000 case-managed patients with severe chronic diseases (e.g. heart disease and respiratory conditions), these being the top 4% of patients who had unplanned admissions on two or more occasions in the year before they were case managed.</li> </ul>  |

### 1.3 European Centre for Connected Health

In January 2008 the Minister for Health, Social Care and Public Safety announced his intention to establish the European Centre for Connected Health (ECCH) within the DHSSPS, to promote improvements in patient care through the use of proven technology and to fast track new products and innovation in the health and social care system in Northern Ireland.

The primary purpose of the ECCH is to improve the patient and client experience, providing for better quality and more effective care. By supporting the more efficient delivery of health and care services, it will also enable the care system to better respond to the future needs of the population. In addition to this, the ECCH aims to work to secure economic gains through the growth of knowledge-based high-value added businesses in Northern Ireland serving European markets.

Furthermore, the DHSSPS recognised that the application of new technology in the health and social care system has a significant role to play in the modernisation of services. Benefits which technological solutions can provide include:

- Improved patient experience through remote monitoring of vital signs;
- Improved service responses;
- Better communication across and between multidisciplinary care teams;
- Improved patient and client access to the information that they require to manage their conditions; *and*
- Better use of resources.

New technology is also playing an increasing role in the improvement of diagnostics and treatment within the secondary care setting. Furthermore, it is increasingly recognised that getting the right information to the right people in a timely manner, can also make a significant contribution to the improvement of patient safety.

#### 1.4 **Background to the Tele-Monitoring Service Pilots**

There had been a growing volume of evidence for the use of technology in the provision of health and social care services. In particular, Home/Remote Tele-Monitoring is regarded as having the potential to offer significant benefits in the management of increasing numbers of the population with a chronic disease in the population.

**Remote Tele-Monitoring** is a clinical practice that involves remotely monitoring patients who are not at the same location as the healthcare provider. In general, a patient will have a number of monitoring devices at home, and these devices will transmit information on their vital signs via the telephone to the remote monitoring service provider and if necessary, to their healthcare provider. Portable devices are a further development of this type of technology. Remote Tele-Monitoring can be used for several clinical conditions which may require the recording of clinical parameters such as: Heart Failure; Constructive Pulmonary Obstructive Disease (COPD); Diabetes; High Risk Pregnancy; Mental Health Chronic Disease Management; Palliative Care; Asthma; and Hypertension.

The initial focus for the recently established ECCH in Northern Ireland was the development and implementation of a Remote Tele-Monitoring Service for Northern Ireland.

Furthermore, a Government target has been set to provide 5,000 people with access to Remote Tele-Monitoring Service by 2011<sup>2</sup>.

In advance of this large scale application, Minister Paul Goggins announced (on 5<sup>th</sup> December 2006) the creation of a £1m pump-priming fund for the development of Telehealth in NI. Specifically, the Minister said that the fund will be used to promote telehealth and telemedicine initiatives across the HPSS, to stimulate new thinking about how technology can be used to further the reform and modernisation of acute and community services.

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<sup>2</sup> The Terms of Reference for this evaluation indicated that the procurement exercise to secure the main provider for this service commenced in August 2008.

The pilot projects were intended to demonstrate how remote monitoring could improve patient care. In addition, the intention was to develop the experience of patients, clinicians and managers in the use of technology for the effective management of older people and those with chronic conditions.

### 1.5 Terms of Reference

The purpose of this project is to independently evaluate the main 8 of the 16 tele-monitoring pilots which were established in 2007/08 with an initial two year funding provision from the DHSSPS in Northern Ireland. Preliminary evaluation of these pilot projects will inform the development of a large-scale tele-monitoring service which is currently being procured.

The purpose of the evaluation project is to:

- Evaluate the impact on patient care in terms of quality, safety, patient experience and utilisation of resources of the investment to date;
- A number of potential benefits associated with the application of new technologies in health and social care provision have been identified. The evaluation should therefore test the extent to which the following benefits are being realised in the pilots and identify any issues or concerns:

- Improvements in the quality of care patients receive and in the quality of their life;
- Inform patient centred case management, intermediate care schemes and medicines compliance, such that patients receive more care at home rather than in a hospital, optimising the potential for independent living and enabling reductions in inpatient admissions to hospital;
- Patients receive more and better targeted proactive support, enabling them to take greater control in the management of their own disease;
- Optimal use of staffing resources; *and*
- Improved quality assurance through auditable improvements in the flow of quality and timely information.

- Identify schemes which are working well and should continue to attract funding and those which are not;
- Provide recommendations to ensure that lessons learned are transferred into the main tele-monitoring project.
- Provide a strategic overview assessment of the impact and benefits of all eight schemes; *and*
- Provide a more detailed assessment of each individual scheme to encompass the analysis of qualitative and quantitative held by Trusts and the assessment of the views and perspectives of clinicians, Trust and Board managers and service users.

In relation to data availability, the Terms of Reference indicated that Boards and Trusts would provide all relevant data to the evaluation team, to include:

- Number of patients on the scheme;
- Conditions being treated;
- Funding allocation and expenditure;
- Details on staff involved; *and*
- Patient feedback.

### 1.6 Key Issues Impacting Upon Terms of Reference

Following the commencement of the assignment, a number of key issues were identified that impacted upon the evaluation, namely:

- The rates of hospital admissions/GP visits, hospital avoidance etc are either not recorded or recorded in a limited fashion;

- The Trust has experienced substantial changes in related service provision during the period of the Tele-monitoring pilot project. The pilot have been operating within dynamic and evolving environments, with patient numbers referred to the tele-monitoring pilots increasing significantly during the pilot period; and
- There are some issues around data collection and interpretation (within and between projects).

### 1.7 Methodology

An overview of the approach undertaken to address the key aims and objectives of the evaluation is outlined below, with further detail provided in the following subsections.

- **Background research** - Before undertaking the main primary research activities, a variety of background research activities were undertaken, including establishing the logical and operational fit of the Project with DHSSPS’ strategy and the context within which it operates. A detailed analysis was also undertaken of all available data relating to the Project’s activity and performance for the period under review.
- **Primary Research** – As part of the main primary research activities the evaluation team undertook:
  - A telephone survey with participating clinicians (N=7);
  - A telephone survey with participating patients (N=20);
  - A focus group session with participating clinicians;
  - A face-to-face consultation with the BHSCT’s Tele-monitoring co-ordinator;
  - A face-to-face consultation with the Service Provider.

### 1.8 Structure of report

The remainder of this report is structured as follows:

| Section  | Content   |
|--|---|
| 2. Project Overview & Activity                               | Overview of the tele-monitoring pilot, aims and objectives, budget, participation levels.                   |
| 3. HSC Internal Evaluation                                   | Feedback from patients, clinicians and carers from HSC Internal Evaluations                                 |
| 4. Operation of Pilot  | Clinicians’ and patients’ views on the operation of the remote tele-monitoring pilot.                       |
| 5. Perceived Impact on Organisation and Resource Utilisation | The perceived impact that the tele-monitoring pilot has had on the Trust and Resource utilisation.          |
| 6. Perceived Impact on Health and Wellbeing                  | The perceived impact that the tele-monitoring pilot has had on patients’ health and Wellbeing.              |
| 7. Conclusions & Recommendations                             | Identification of the key conclusions arising from the evaluation, and recommendations for the way forward. |

## 2. COPD REMOTE MONITORING - PROJECT OVERVIEW & ACTIVITY

This section presents an overview of the Belfast Health and Social Care Trust ('BHSCT') tele-monitoring service pilot project entitled 'COPD Remote Tele-Monitoring'.

### 2.1 Background

The BHSCT's 'Remote Tele-Monitoring' pilot project was developed in early 2008 in response to a call from DHSSPS for applications for funding under its Telehealth Development Scheme. Funding was to be used to introduce Pilot Projects focused on the innovative use of tele-monitoring.

Patients with severe COPD have significant breathlessness on exertion and can be severely debilitated. Their disease is also characterised with exacerbations, often precipitated by infection, with acute deterioration in their ventilatory capacity and functional capacity. These exacerbations often result in hospital admission and patients are at increased risk of death. The average length of stay in hospital for exacerbations is 7 days. Recent focus has been on supported early discharge schemes for COPD, with improved patient clinical outcomes with reductions in hospital bed days.

It was considered, therefore, by BHSCT that a strategy of interest was the early identification of deteriorations with early appropriate intervention to try and halt progression to the point where hospital admissions is required. Self-management is defined as the involvement of the person with the chronic disease, engaging in activities that protect and promote health, monitoring and managing their symptoms and signs of illness, managing the impacts of illness on functioning, emotions and interpersonal relationships and adhering to treatment regimes. Collaborative self-management includes the ability of patients and families to apply knowledge and practice skills to optimize their health potential and quality of life in partnership with their health care team.

Self management plans based on symptoms are attractive but concern has been raised about the patient's ability to detect deterioration and their willingness to intervene with appropriate medication.

The DHSSPS recommends a case management approach to long term condition management. This is a service, led by a community respiratory team who provide proactive, coordinated care to people who have an intricate mix of health and social care needs. It provides an intense level of care, preventing people from unnecessary admission to hospital and providing more care in the person's home or community setting. It supports carers by relieving them of having to coordinate services and navigate a range of health and social care systems. It is currently part of usual care within the Belfast Trust for patients with severe COPD who have had two or more admissions to hospital with an exacerbation of their condition or other complex needs such as anxiety and depression.

It is against this background that BHSCT was interested in the use of information technology to provide structured support at a distance; combining the emphasis of a home based service on empowering the patient for self-care, with close monitoring and ready access to multi-disciplinary specialist support in primary, community or secondary care when necessary.

The COPD Remote Tele-Monitoring pilot therefore focused on chronic disease management for patients with COPD and, in some cases, co-morbidities, such as diabetes or chronic heart failure. The pilot intended to support the more effective targeting of resources and the promotion of independent living for patients with chronic diseases living in their own homes.

The project involved the use of tele-monitoring technology, triage software and clinical protocols agreed across primary and secondary care to support a case management approach for those patients in the identified target groups by respiratory consultant teams and COPD specialist teams.

This project was focused on enhancing and optimising the case management approach used by these teams to manage their patients. In particular the focus was on managing the patients across the community/hospital interface to avoid hospital admission, to reduce length of stay and to facilitate earlier discharge.

## 2.2 Project Funding

The BHSCT's 'COPD Remote Tele-Monitoring' Project received the following funding from the NI Telehealth Development Scheme.

- Revenue II – This represents an award of funding made in June 2008 (following on from the initial award in 2007/08). This funding was provided to extend the Project by allowing the introduction of 100 COPD patients to participate;
- Revenue III – This represents an additional award of funding made in October 2008. This funding was provided to allow for the recruitment of a Band 6 Research Nurse for a 15-month period (£51,400 including a 20% surcharge for goods and services) to undertake a randomised control trial evaluation of home telemonitoring of patients with severe COPD. This study will examine if a 12 week period of daily telemonitoring of patients with severe COPD will educate them to subsequently identify early signs of deterioration, thus facilitating early intervention. The study will investigate if prevention of these episodes by daily remote home monitoring (telemonitoring) improves important outcomes for people with COPD and reduces the number of admissions to hospital. The primary outcome will be admission to hospital but other important outcomes in participants with severe COPD will be examined. This strategy will be compared to self-management planning and telephone monitoring from the respiratory nurse through a case management approach to care delivered by the respiratory specialist team. In addition, the study will examine the cost effectiveness of both approaches.

## 2.3 Objectives of Remote Telemonitoring Scheme

The BHSCT's 'COPD Remote Tele-Monitoring' Project is supported by a Service Provider through a clinical triage service, using nurses employed by the Service Provider.

The objectives of the pilot scheme within the Trust were highlighted within the Contract for the Provision of Community Services 2008 as follows:

- Provide vital signs monitoring to patients with long term conditions living in their own homes;
- Through the monitoring of their vitals signs identify early signs that a patient's health is deteriorating or requires clinical intervention.
- Help to reduce GP visits.
- Help to prevent emergency admissions to hospital.
- Help reduce the length of stay for those admitted to hospital.
- Encourage patients to be more involved in the management of their health and long term condition.
- Provide GP's and clinical professionals with a day to day picture of their patients through graphical and trend reports.
- Provide patients with reassurance and allow them to remain in their own homes as long as possible thereby slowing the possible acceleration into nursing care.
- Identify early clinical signs of deterioration by the use of vital sign trends.
- Allow SE Trust to further evaluate the use of Telehealth within the community.
- To ensure health promotion questions and encouragement are also delivered by the Triage Nurses, as agreed, with Trust Nursing, and specific to the individual patient's needs.

As noted above, this is a clinical triage service, with trained nurses interpreting the patients' vital signs.

## 2.4 **Project Implementation**

### 2.4.1 Selection Criteria for Participation in the Project

The Trust has indicated that patients were selected for participation on the remote telemonitoring scheme by the specialist nursing teams. It was noted that patients identified to participate should be those willing to participate and that they must not meet any of the following exclusion criteria:

- Be physically/ cognitively unable to learn the process of monitoring and have no caregiver;
- Have behavioural problems that would leave the patient unsuitable for home monitoring;
- Refuse the home monitoring service.

The tele-monitoring schemes were to be used to support the specialist nursing teams already in place across the Trust. As part of the scheme, tele-monitoring equipment is installed in the homes of patients within the Trust catchment area. Monitoring of the patient's vital signs is then undertaken at the Service Providers premises.

Patients are initially put on 12 week block packages of care, however these may be extended into second or third 12 week blocks if considered appropriate/ necessary by the Trust specialist nursing teams.

### 2.4.2 Technical Requirements for Participation in the Project

Patients must have a landline telephone installed that allows outgoing calls to a free phone number. The telephone point must be a modern plug in socket and must also be located within 4 feet of a 240 volt wall socket. The Service Provider will provide, where possible, a temporary telephone extension lead if required and this will be securely fixed as per Trust Health & Safety and installation procedures.

If a telephone extension is required for the installation of the Telehealth equipment and the patient is not a customer of BT (British Telecom), then this work can be carried out by the Service Provider and is liable to separate billing on an agreed cost.

Where a telephone extension needs to be installed and the patients phone service is provided by BT (British Telecom), then this is normally provided free of charge under their NI Age and disability scheme but is on a case by case basis.

Calls made by the Telehealth monitor to the monitoring centre are free of charge, using a dedicated free phone number.

The Service Provider is also responsible for informing the patient on how to utilize the system correctly so that the risk of excess unplanned calls is minimised.

### 2.4.3 Home Assessment

Once patients had been identified and had consented in principle to have Telehealth, a referral was made to the Service Provider. The Service Provider then contacted the patient directly to make an appointment to call and carry out a home assessment. During this home assessment, patients are given a demonstration of the monitor and information about the project. The assessor also checked the homes suitability for the installation, and checked that the phone and electricity points were in the correct place. If patients consented to be enrolled on the project, then a suitable date for the installation was agreed and documentation including a consent form was completed.

### 2.4.4 Installation of Telehealth Equipment

Before the installation of the monitor in the patient's home, the referrer provides the Service Provider with a list of the patient's diagnosis, past medical history and current medication. This information, along with the personal information gathered at the assessment process, is logged onto the Call Handling System in the Care centre. An ID number is allocated to each patient.

A monitor is allocated to the patient and their personal monitoring information downloaded onto it. This includes the following:

- Patient's name;
- Monitoring start time;
- Vital signs that would be recorded;
- Any personal reminders; and
- Question and answer session.

The monitor is installed in the patient's home, normally in the presence of a relative or friend. Patients are to be given a full demonstration of the equipment and then asked to carry out a minimum of two sessions on their own to assess their skill in using the equipment.

#### 2.4.5 Patient Training

- All patients are trained on the use of the monitoring system on an individual basis by the Service Provider;
- Patients are provided with an information pack on Telehealth and leaflets which they can distribute to friends and family about the programme;
- All patients are asked to sign a patient consent form before the commencement of monitoring;
- Patients are instructed by the Service Provider that the equipment is not for emergency use and should they feel unwell at anytime they should contact their specialist nurse, GP or dial 999 in an emergency; and
- The Service Provider has been distributing questionnaires to patients where applicable, for example the St Georges Questionnaire for COPD.

#### 2.4.6 Review Process

The Service Provider is responsible for contacting patients by telephone within a few days of commencing participation as part of the remote monitoring scheme. This is to establish if further one-to-one training is required and to provide patients with reassurance.

Patients can also be contacted by the Service Provider during the pilot to complete a short telephone based questionnaire on the service. In addition, patients are asked to complete an exit questionnaire at the end of their participation on the pilot scheme for the purposes of evaluation.

#### 2.4.7 Maintenance

The Service Provider is responsible for undertaking to repair and/ or replace any faulty equipment under warranty or damaged equipment within 24 hours of the fault being reported.

#### 2.4.8 Monitoring Requirements

The Service Provider is responsible for the provision of the telehealth monitoring service at their Telehealth Care Centre. The telehealth nurse will:

- Input patient data onto the monitoring system;

- Promote and educate patient on medication compliance;
- Monitor all data from patients between the hours of 8am and 1pm;
- Act on data received which is outside the set parameters as per the agreed protocol;
- Provide telephone support to patients who need further education on how to use the monitor;
- Provide graphical and trends reports, printed and transported to the Clinician by any means requested, email, post or fax;
- Provide patients with regular reassurance calls;
- Carry out telephone based reviews;
- Compile all monthly reports; and
- To provide, on a monthly basis, and on an ad hoc basis as necessary, management reports.

#### 2.4.9 Monitoring of Patient Data

Each morning, at a dedicated time agreed with the patient, **the patient records the following vital signs** (or as agreed with the specialist nursing team):

|                          | COPD | Diabetes |
|--------------------------|------|----------|
| Pulse                    | ✓    | ✓        |
| Blood Pressure           | ✓    | ✓        |
| Body Weight              | ✓    | ✓        |
| Oxygen Saturation Levels | ✓    | N/A      |
| Temperature              | ✓    | ✓        |
| Heart Rate               | ✓    | ✓        |
| Blood Glucose            | N/A  | ✓        |
| Peak Flow                | N/A  | ✓        |

Along with these recordings, **the patients are asked by the Monitor a selection of questions** relating to their condition. The first monitor used on the programme called the Genesis from Honeywell Hommed had a selection of questions, but was limited in that only 10 could be used and the answers were set at yes and no.

The monitors have step by step instruction given in text and audio format. The following is the list that was used for COPD:

1. Are you experiencing more difficulty breathing compared to a normal day?
2. Have you developed a cough?
3. Have you been using your inhaler more than usual?
4. Have you had to limit your activities more than usual?
5. Are you out of any of your medications?
6. Did you need extra pillows to sleep last night?
7. Have you noticed any extra swelling in your feet or ankles?
8. Are you on a smoking cessation plan?

Once vital signs and answers were gathered, this data is transmitted down the patients' own phone line, dialing a free phone number to a secure server. Telehealth Nurses at the Service Provider Care Centre review this data within ten minutes of transmission and triage it against limits that have been set for each individual patient by the specialist nursing team.

If a patient's data received is within its normal limits, then no action would be taken apart, from a courtesy call to the patient which occurs every few days. If any of the data gathered, either vitals or questions fall outside the agreed limits, the Telehealth nurse phones the patients to discuss the readings and ask further questions which were agreed by the specialist nursing team at the start of the programme. In most cases, patients are asked to rest for a period and retest to see if their vitals fell back within limits.

If the second set of results are still outside the normal limits then an escalation is made to the responsible specialist nurses, via their mobile phones. This allowed the specialized nursing team to prioritise their work while on the move.

#### 2.4.10 Patient Reports

Each Monday, the Telehealth nurse faxes a report to each of the specialist nursing team members showing the vitals gathered for each of their respective patients over the previous seven days.

A monthly report is also produced by the Service Provider, providing details:

- For each individual patient, their start and finish date, by each episode of care (1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup> etc):
- Details by patient of the number of vital alerts, question alerts, telephone calls made to patients, the number of patient retests, the number of escalations to the specialist nursing team etc

The data on patient referrals for COPD can be analysed by area:

**Figure 2.1: The Service Provider – Analysis for COPD**

| Programme Activity (at 24 <sup>th</sup> March 2009)                    |  |                  |       |      |
|--|--|------------------|-------|------|
|  | South and East   | North and West   | Total |      |
| Start date of programme  | 8th Aug 2008   | 19th Aug 2008    |       |      |
| Date of report   | 24 <sup>th</sup> March 2009                                      | 24th March 2009  |       |      |
| Finish date of programme   | Still Running  | Still Running    |       |      |
| Total number of  | Individual patients on programme                                 | 29               | 28    | 57   |
|  | Patients with one telehealth episode of care                     | 29               | 28    | 57   |
|  | Patients with two telehealth episodes of care                    | 18               | 18    | 36   |
|  | Patients with three telehealth episodes of care                  | 5                | 5     | 10   |
|  | Patients currently on live monitoring at the date of this report | 16               | 15    | 31   |
|  | Vital only alerts  | 385              | 374   | 759  |
|  | Vitals & question alerts   | 200              | 174   | 374  |
|  | Question only alerts   | 147              | 123   | 270  |
|  | Telehealth consultations   | 889              | 872   | 1761 |
|  | Requests   | 321              | 356   | 677  |
| Escalations to community nursing teams                                 | 95   | 94               | 189   |      |
| Total time of telephone consultations with NHS Trust telehealth nurses | 57 Hours 15 Mins   | 56 Hours 10 Mins |       |      |
| Total number of hours worked reviewing patients                        | 684  | 651              | 1335  |      |
| Average time reviewing each patient (in hours)                         | 23.6   | 23.3             | 23.42 |      |

It is noted that the reporting system appears to be ad hoc. Details are also supplied by the Service Provider (on admissions diverted etc) which is not validated.

#### 2.5 Participation Levels - Referrals by Month

Total patient referrals are:

|              | Aug-08 | Sep-08 | Oct-08 | Nov-08 | Dec-08 | Jan-09 | Feb-09 | Mar-09 | Total |
|--------------|--------|--------|--------|--------|--------|--------|--------|--------|-------|
| Belfast COPD | 17     | 13     | 16     | 14     | 19     | 5      | 8      | 10     | 102   |

### 3. HSC INTERNAL EVALUATION

This section presents details of the findings of the internal evaluation conducted by HSC.

#### 3.1 Patient Questionnaire

21 patients returned questionnaires to Trust staff, of which 19 were COPD patients, 1 was a Diabetes patient and 1 was an asthma patient. Their responses to the questionnaires are detailed below:

| Patient Benefits   | Strongly Agree | Agree | Disagree | Strongly Disagree | N= |
|--|----------------|-------|----------|-------------------|----|
| The monitoring system assisted me in managing my health on a day to day basis  | 45%            | 35%   | 20%      |                   | 20 |
| The remote monitoring system has reduced the number of visits I made to my GP  | 16%            | 53%   | 32%      |                   | 19 |
| I believe my own monitoring of my condition has reduced the number of nurse/ community team/health professional visits   | 10%            | 60%   | 30%      |                   | 20 |
| I believe that during the monitoring period, the remote monitoring system prevented my admission to hospital or need to attend A&E Services (and/or GP Out of Hours) | 16%            | 53%   | 26%      | 5%                | 19 |
| The remote monitoring system has enabled me to better manage my own condition and become more involved in my health care   | 20%            | 60%   | 20%      |                   | 20 |
| Equipment  | Strongly Agree | Agree | Disagree | Strongly Disagree | N= |
| The monitoring system was easy for me to use   | 50%            | 50%   |          |                   | 20 |
| I consider the installation was prompt, efficient and tidy   | 47%            | 53%   |          |                   | 19 |
| I believe the monitoring questions encouraged me to think about my symptoms  | 26%            | 63%   | 11%      |                   | 19 |

The table indicate that the majority of patients that responded to the HSC questionnaire were positive about the tele-monitoring pilot, with:

- 80% of projects strongly agree or agree that the monitoring system assisted them in managing their health on a day-to-day basis;
- Two thirds of patients agree that the remote monitoring system had reduced the number of visits they had made to their GP (68%) and had prevented their admission to hospital or need to attend A&E Services (and/or GP Out of Hours) (69%);
- The majority (70%) agree that they believed that monitoring their own condition had reduced the number of nurse/ community team/health professional visits to them;
- 80% of patients agree that the remote monitoring system had enabled them to better manage their own condition and become more involved in their own healthcare. Furthermore, four fifths (89%) believed that the monitoring questions encouraged them to think about their symptoms;
- All (100%) of patients considered that the monitoring system was easy for them to use; and
- 100% considered the installation to be prompt, efficient and tidy.

Those patients who disagreed with the statements above offered the following reasons:

- The patient visited their doctor several times, and had been ‘assisted in their decision’ by the readings obtained by the monitoring equipment.
- The patient did not think about the questions as they tended to answer no to all questions as it was less trouble i.e. a yes resulted in a phone call.

- One patient suggested that in their opinion the machine was ‘a waste of tax payers money’. They suggested that with their health, no machine could help them. They stated that they needed a nurse or doctor to talk to them and no machine can do that.
- The installation was on a temporary basis and therefore ‘a bit untidy’.
- The patient found that on ‘very many occasions’, the monitor showed the comment: “error-weak signal”, so that I had to keep repeating the procedure time after time.
- The question about ‘cough’ does not ask if the ‘usual’ cough is moist. The patient suggested that the question should ask “is your cough moist in anyway” or is ‘your cough causing you any more anxiety’.
- One patient who suggested that they had confidence in managing their own illness and medication. Sated that they had on a number of occasions tested their readings ‘15 minutes before and 15 minutes after’ and at times found a lot of different readings e.g. (Oxygen B/94 – T/89 – A/93. BP B/114 – T/98 – A/112). The patient suggested that they didn’t know if it was themselves or the machine, but if they were the ‘worrying type’ they would never be off the phone to the doctor. The patient noted that they had sat on the chair for the 30 minutes and the only time they moved was to switch machine on/off.

### 3.1.1 More than one Reading

All 20 patients had to take more than one reading. Their reasons are summarised below:

| Reasons for taking more than one reading | No.       | %           |
|--|-----------|-------------|
| Asked to do so                           | 19        | 86%         |
| Reassurance                              | -         | -           |
| Other reason                             | 3         | 14%         |
| <b>Total</b>                             | <b>22</b> | <b>100%</b> |

‘Other’ reasons offered included:

- The machine rarely worked first time; and
- Due to inaccurate readings - readings were low/high.

### 3.1.2 Number of times admitted to Hospital

The patients were asked to identify how many times they had been admitted to hospital as a result of their condition since they had been on remote monitoring. Their responses are detailed below:

| No. of times admitted to hospital | No.       | %           |
|-----------------------------------|-----------|-------------|
| No times                          | 11        | 65%         |
| Once                              | 4         | 24%         |
| Twice                             | 2         | 11%         |
| Three times                       |           |             |
| Four times                        |           |             |
| Five or more times                |           |             |
| <b>Total</b>                      | <b>17</b> | <b>100%</b> |

The results indicate that two thirds (65%) of patients had not been admitted to hospital as a result of their condition since they had been on remote monitoring.

## 3.2 Carer Questionnaire

Only a small number (4 or less) carer questionnaires were returned. However, this stakeholder group was also very positive about the tele-monitoring pilot.

| Patient Benefits   | Strongly Agree | Agree | Disagree | Strongly Disagree | N= |
|--|----------------|-------|----------|-------------------|----|
| I consider remote monitoring has improved the level of care given to the person I care for.  | 50%            | 50%   |          |                   | 4  |
| I consider remote monitoring has helped prevent the person I care for being admitted to hospital.                                    | 100%           |       |          |                   | 2  |
| When assisting the person to operate the remote monitoring equipment, I found it easy to use.  | 25%            | 75%   |          |                   | 4  |
| Remote tele-monitoring gave me reassurance about the condition of the person I care for and supported me in my care for that person. |                |       |          |                   |    |

Reasons offered included:

*“It has given the family peace of mind at a time when he has been very vulnerable. I would like it to be installed again. My father has not appreciated the benefits but then I do not know if he realised how very ill he has been”.*

### 3.3 Professional Worker Questionnaire

| Patient Benefits  | Strongly Agree | Agree | Disagree | Strongly Disagree | N= |
|---|----------------|-------|----------|-------------------|----|
| Introduction of remote monitoring has decreased the number of hospital admissions relating to the patient’s chronic condition | -              | -     | 80%      | 20%               | 5  |
| Introduction of remote monitoring has decreased the number of GP visits relating to the patient’s chronic condition           | -              | 50%   | 37%      | 13%               | 8  |
| Introduction of remote monitoring has decreased the number of nurse visits relating to the patient’s chronic condition        | 12%            | 38%   | 25%      | 25%               | 8  |

The professional worker responses to the ECCH elicited some mixed responses in the BHSCT area compared to the patient and carer responses. For example, three quarters of patients (69%) and 100% of carers agreed that the remote monitoring system had prevented the patient’s admission to hospital; whereas all (100%) of the professional workers disagreed.

However both patients (79%) and half of the professional workers (50%) were in agreement that they believed that remote monitoring had reduced the number of nurse/ community team/health professional visits to the patient.

### 3.4 Conclusion

In conclusion, the remote tele monitoring system is considered to have been beneficial:

- 80% of projects agreeing (strongly agree or agree) that the monitoring system assisted them in managing their health on a day-to-day basis; and
- Two thirds of patients agreeing that the remote monitoring system had reduced the number of visits they had made to their GP (68%) and had prevented their admission to hospital or need to attend A&E Services (and/or GP Out of Hours) (69%).

The feedback from the professional workers was that they disagreed that the scheme has decreased hospital admissions, but 50% agreed that the number of GP visits had been reduced.

Overall, carers and patients agreed that the scheme had a benefit on the healthcare, with 100% of carers considering that it had improved the quality of care they provided, and 80% of patients stating that it had assisted them in managing their health on a day to day basis.

#### 4. OPERATION OF PILOT

Section 4 considers clinicians’ and patients’ views on the operation of the tele-monitoring pilot, including the patient selection and recruitment processes, the criteria that were utilised during the pilot projects, the ease of use of the equipment, and the level of support from the Service Provider.

The findings below are taken from the individual consultations with patients and clinicians. Detailed questions and findings are included in Appendix 1 (Clinical Questionnaire Statistical Analysis) and Appendix 2 (Patient Questionnaire Statistical Analysis). The relevant question from each of the Appendices is referenced in the figures below.

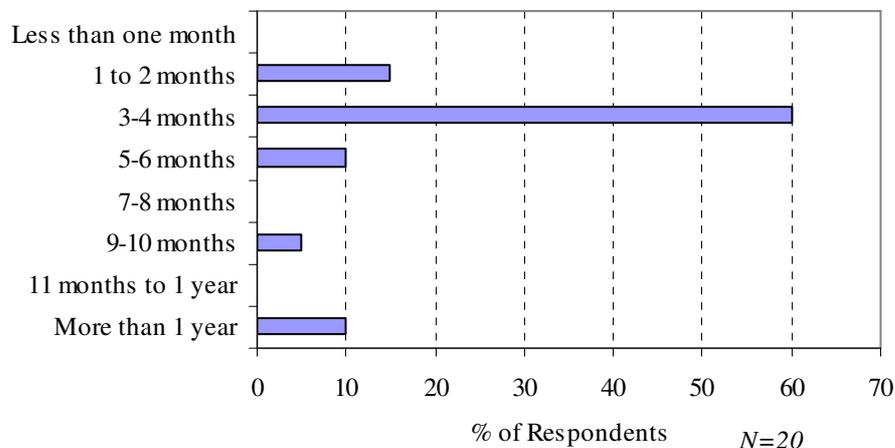
##### 4.1 Profile of Respondents

**All (100%, N=7) clinicians are responsible for Chronic Obstructive Pulmonary Disease (COPD) (Q1 - Clinician)**

Patients have been using the equipment from between one month to over one year:

- The majority of patients (60%, N=20) have been using the tele-monitoring equipment for a period of 3-4 months;
- 15% (N=20) have been using the equipment for a period of 1-2 months;
- 10% (N=20) have been using it for 5-6 months; and
- 10% (N=20) for more than one year.

**Figure 4.1: Duration of use of tele-monitoring equipment (Q2 – Patient)**



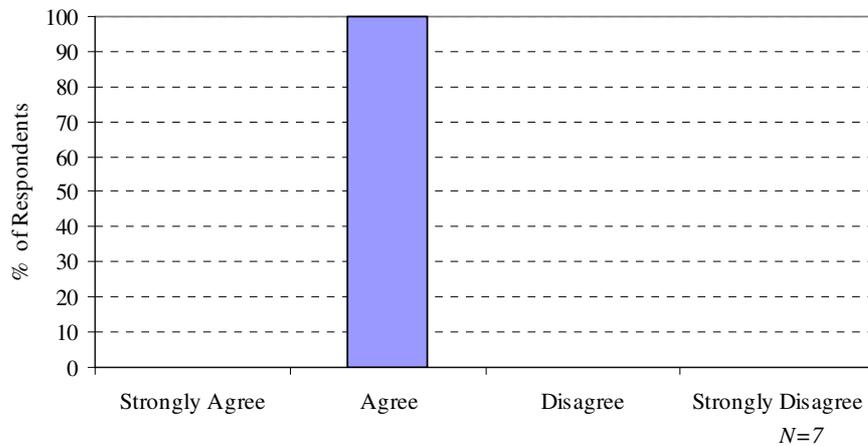
##### 4.2 Responsibility for Patient Selection

Nurses/clinicians were responsible for selecting and/or recruiting patients to participate in the pilot.

##### 4.3 Appropriateness of Patients Selected

**All (100% N=7) clinicians agree that the patients that were selected or recruited to participate in the Pilot were appropriate to participate.**

**Figure 4.2: Appropriateness of Patient Recruitment/Selection (Q2b – Clinician)**



Clinicians reported that the selection of patients has become more appropriate than at the beginning of the programme. Comments from clinicians included:

*“In the beginning, patients selected were not appropriate until we realised what worked and what did not.”*

*“Patient selection had to be reviewed, based on patients not being able to use the equipment.”*

*“In most cases selection has been appropriate.”*

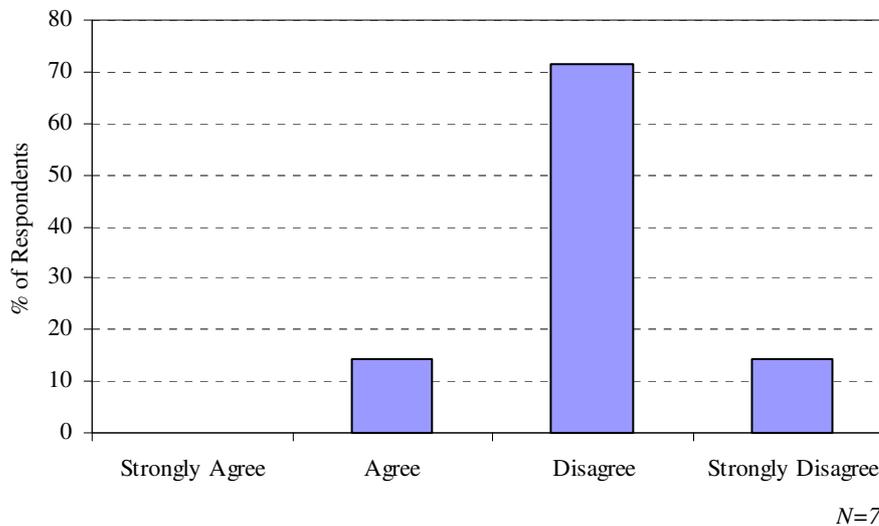
Clinician Respondents

**4.4 Appropriateness of Tele-Monitoring**

The vast majority of clinicians (86%, N=7) ‘disagreed’ or ‘strongly disagreed’ that tele-monitoring is appropriate for all patients with the primary condition that they have responsibility for. Clinicians reported that the appropriateness of the tele-monitoring treatment will depend on the severity of the patient conditions and individual patient attitude.

Clinicians noted that the appropriateness of tele-monitoring for a patient often related to the nature of the individual, in that some patients responded well and others poorly. They noted that it is often difficult to predict how a patient will respond to the equipment. However, clinicians can deselect certain patients from participation in the scheme on the grounds that that patient’s needs are too complex or that their symptoms are too severe to benefit from the equipment.

**Figure 4.3: Appropriate for Primary Condition (Q3a – Clinician)**



Comments from clinicians included:

*“It depends on the severity of the illness, patients’ age, and mental capacity.”*

*“If the condition is severe it is no use for the patient.”*

*“Some patients can not self manage.”*

Clinician Respondents

Clinicians provided some characteristics of patients that tele-monitoring is appropriate for or not appropriate for:

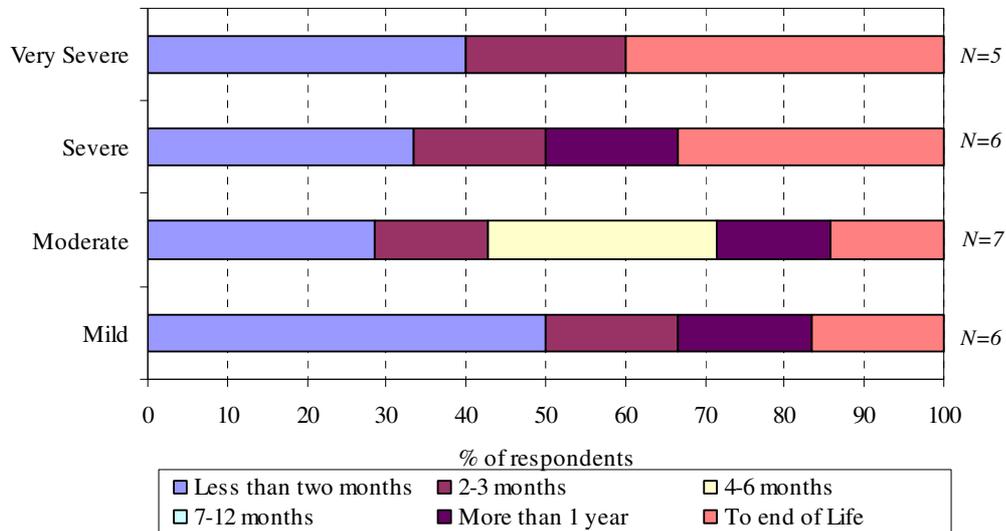
| <b>Characteristics</b>         | <b>Appropriate For and why?</b>  | <b>Not Appropriate For and why?</b>  |
|--------------------------------|--|--|
| <b>Age</b>                     |  | <ul style="list-style-type: none"> <li>• Very elderly people – unless they have a carer</li> </ul>                                       |
| <b>Disease status/severity</b> |  | <ul style="list-style-type: none"> <li>• Severe status – complex needs</li> <li>• It leads to a greater number of escalations</li> </ul> |
| <b>Patient Agility</b>         | <ul style="list-style-type: none"> <li>• Mild / moderate conditions</li> </ul> | <ul style="list-style-type: none"> <li>• Some conditions, manual dexterity - may not be able to use equipment</li> </ul>                 |

**4.5 Appropriate Timescale for Patients’ use of Tele-Monitoring**

Clinicians provided views on the most appropriate timescale for the following types of patients to use tele-monitoring equipment:

4.5.1 COPD

**Figure 4.4: Timescale of tele-monitoring use for varying levels of COPD Severity (Q6a – Clinician)**



- Half of the clinicians (50%, N=6) stated that patients with ‘mild’ COPD should use the tele-monitoring equipment for ‘less than 2 months’;
- Almost three-quarters of the clinicians (72%, N=7) stated that patients with ‘moderate’ COPD should use the tele-monitoring equipment for between 0-6 months, ‘less than 2 months’ (29%), ‘2-3 months’ (14%) and ‘4-6 months’ (29%);
- Half of clinicians (50%, N=6) stated that patients with ‘severe’ COPD should use the tele-monitoring equipment for between 0-3 months, 33% ‘less than 2 months’ and 17% ‘2-3 months’. However, 50% also stated that patients should use the equipment for ‘more than one year’ (17%), ‘to the end of their life’ (33%); and
- Three-fifths of clinicians (60%, N=5) stated that patients with ‘very severe’ COPD should use the tele-monitoring equipment ‘less than 2 months’ to ‘2-3 months’, 40% stated that very severe patients should use it ‘to end of life’.

4.6 Improvements to Patient Selection

Clinicians suggested some improvements that could be made to the Patient selection process, including:

- Units should be available to nurses/clinicians to enable them to demonstrate to patients how to use the equipment;
- Classes could facilitate mass demonstrations;
- The selection criteria needs to be researched so we can target who will benefit;
- There should be greater GP input; and
- It is not helpful to be given a quota to fill. The project should be more incorporated into an ongoing case management of patients.

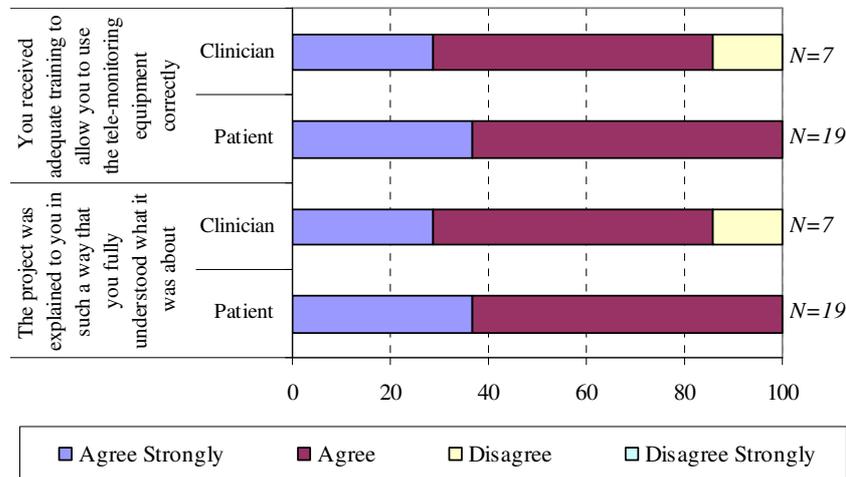
4.7 Satisfaction with Project Implementation

4.7.1 Information and Training

Whilst the majority of clinicians (86%, N=7), and all patients (100%, N=19) ‘strongly agreed’ or ‘agreed’ that the pilot project was explained to them in such a way that they fully understood what it was about, the results indicate that patients’ and clinicians’ views are positive in relation to the

training offered in the use of the tele-monitoring equipment. That is, most clinicians (86%, N=7) and all patients (100%, N=19) were in agreement that they had received adequate training to allow them to use the equipment correctly.

**Figure 4.5: Implementation of the tele-monitoring project (Q3a – Patient/Q7a – Clinician)**



As demonstrated above, patients have positive opinions towards the implementation of the tele-monitoring equipment.

**4.7.2 Processes relating to Ordering Equipment**

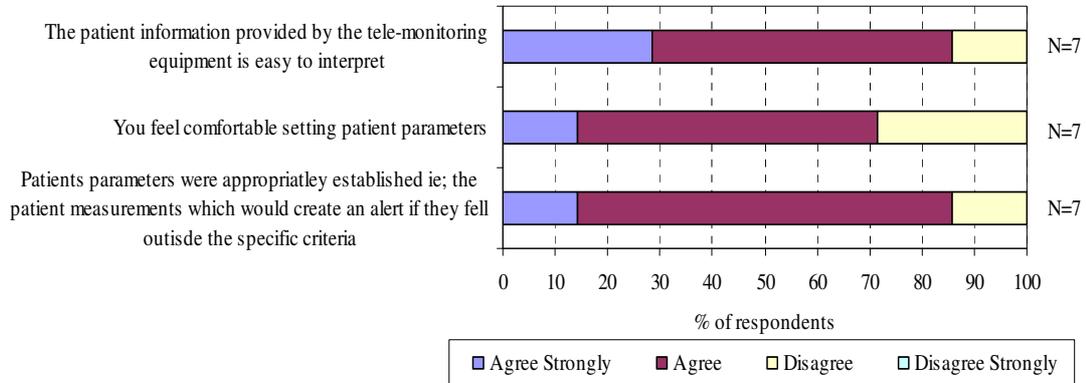
All clinicians (100%, N=6) either ‘strongly agreed’ or ‘agreed’ that the way in which tele-monitors were ordered for placement was straightforward and efficient. **(Q7a – Clinician)**

**4.7.3 Fitting of Equipment**

Clinicians had positive experiences/views as to whether the tele-monitoring equipment was fitted in a timely manner for patients. All clinicians (100%, N=4) ‘agreed’ that the Tele-Monitoring equipment was fitted in a timely manner. Only one patient (5%, N=20) believed the equipment was not installed in an efficient manner. **(Q3a – Patient/Q9a – Clinician)**

4.7.4 Issues around Patient Parameters

**Figure 4.6: Implementation of the tele-monitoring project (Q7a – Clinician)**

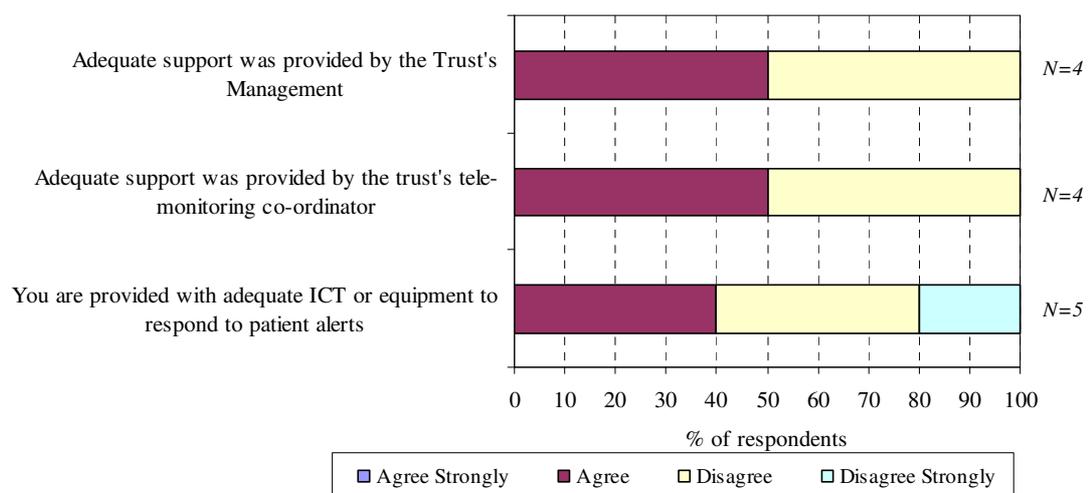


Generally, clinicians were positive about aspects of the Project that related to patients’ parameters. Key points to note include:

- The vast majority of clinicians (86%, N=7) ‘strongly agreed’ or ‘agreed’ that the patients parameters were appropriately established i.e. the patient measurements which would create an alert if they fell outside the specific criteria;
- The vast majority of clinicians (86%, N=7) ‘strongly agreed’ or ‘agreed’ that the patient information provided by the tele-monitoring equipment is easy to interpret; and
- Almost three-quarters (71%, N=7) ‘strongly agreed’ or ‘agreed’ that they feel comfortable setting patient parameters, 29% disagreed that they were comfortable setting patient parameters.

4.7.5 Level of Support Offered

**Figure 4.7: Implementation of the tele-monitoring project (Q7a – Clinician)**



Again, clinicians were generally positive about the level of support that was provided to them during the implementation of the tele-monitoring project:

- Half of clinicians (50%, N=4) ‘agreed’ that adequate support was provided by the Trust’s tele-monitoring co-ordinator and the Trust’s management; and

- Two-fifths (40%, N=5) ‘agreed’ that they are provided with adequate ICT or equipment to respond to patient alerts. However, three-fifths of clinicians (60%, N=5) ‘disagreed’ or strongly disagreed with this statement.

Clinicians reported that adequate information was not provided to GPs and that they have not all had contact with the Trust tele-monitoring co-ordinator.

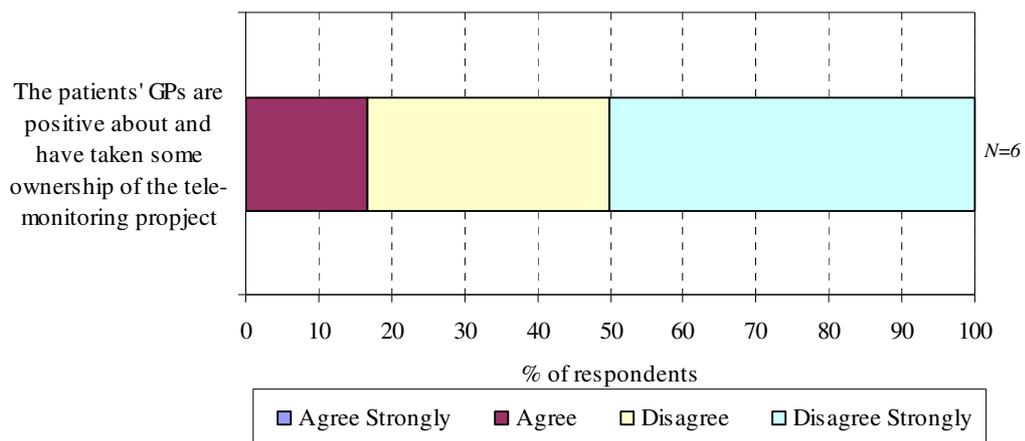
*“The Trust did not provide GPs, Social Workers etc with enough information and training on the equipment.”*

Clinician Respondent

**4.7.6 Degree of GP Ownership**

Most clinicians disagree that patients' GPs are positive about and have taken some ownership of the tele-monitoring project. The vast majority of clinicians (83%, N=6) ‘disagreed’ or ‘strongly disagreed’ that patients' GPs are positive about and have taken some ownership of the tele-monitoring project. However, 17% of clinicians ‘agreed’ that this was the case.

**Figure 4.8: Implementation of the tele-monitoring project (Q7a – Clinician)**



Clinicians reported that GPs have generally not taken ownership of the project. Comments from clinicians included:

*“GP opinion varies but generally there is no ownership. No extra resources were provided such as more staff.”*

Clinician Respondents

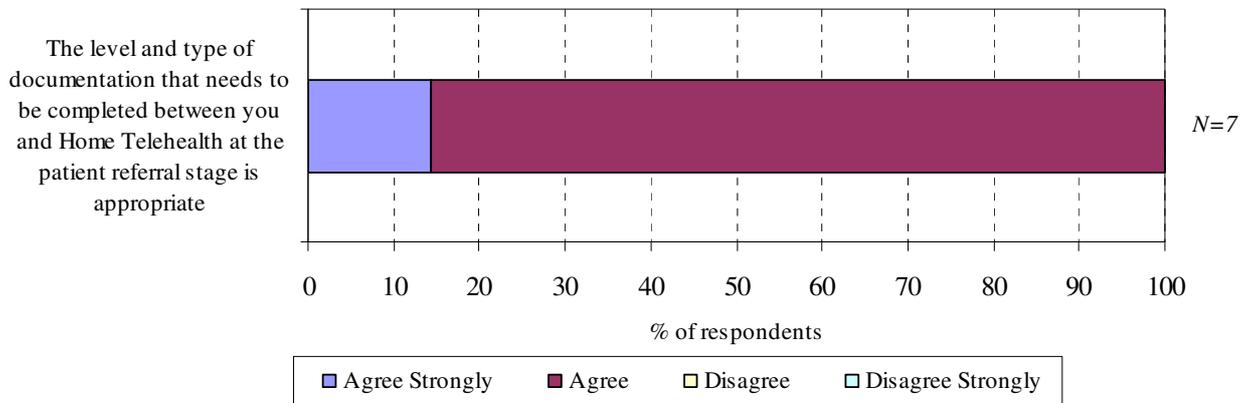
**4.8 Satisfaction with the Service provided by the Service Provider**

As part of the Remote Tele-Monitoring Service, a contract was awarded to a service provider for a clinical triage service.

**4.8.1 Documentation at Patient Referral Stage**

All clinicians (100%, N=7) agreed that the level and type of documentation that needs to be completed between them and the Service Provider at the patient referral stage is appropriate.

**Figure 4.9 Clinicians’ views on the level and type of documentation at the patient referral stage (Q8a – Clinician)**

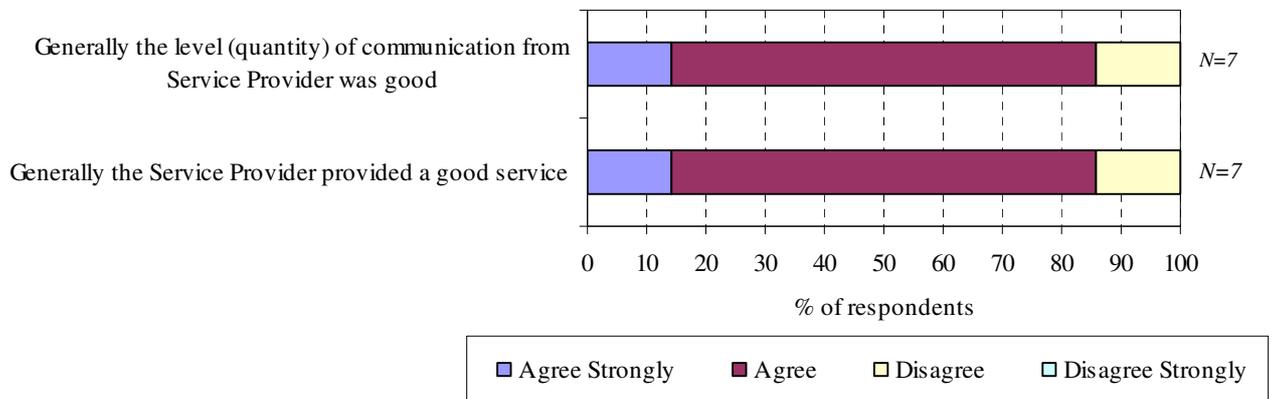


4.8.2 The Support provided by the Service Provider

**Clinicians’ agree that the Service Provider service and communication was good:**

The survey results indicate that clinicians’ views on the support provided by the Service Provider are positive. That is, two-thirds (86%, N=7) of clinicians ‘agreed’ that the level (quantity) of communication from the Service Provider was good, and 86% (N=7) ‘agreed’ that in general ‘the Service Provider provided a good service’.

**Figure 4.10: Clinicians’ views the Service Provider service and communication (Q8a – Clinician)**



Some clinicians reported that there was a lot of administration involved in the process and that communication could be improved.

*“Communication was ok during the week but at the weekends there was no communication and in some cases patients have ‘taken bad’ and been brought to hospital, or in a few cases died, without the nurses even hearing anything was wrong.”*

*“It would be better to group the alerts and call with a few at a time.”*

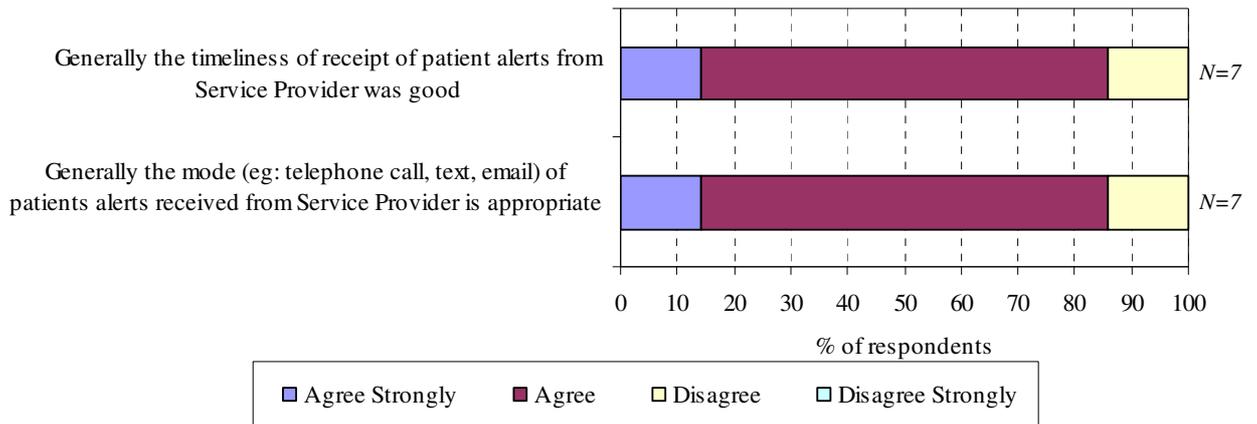
*“We could have more communication with regards to some patients, others less. We asked them to use the team bleep, but the Service Provider are still contacting by telephone.”*

Clinician Respondents

4.8.3 Mode & Timeliness of Patient Alerts

Generally, clinicians were positive about the mode and timeliness of patient alerts:

**Figure 4.11: Clinicians’ views on the mode and timeliness of patient alerts (Q8a – Clinician)**

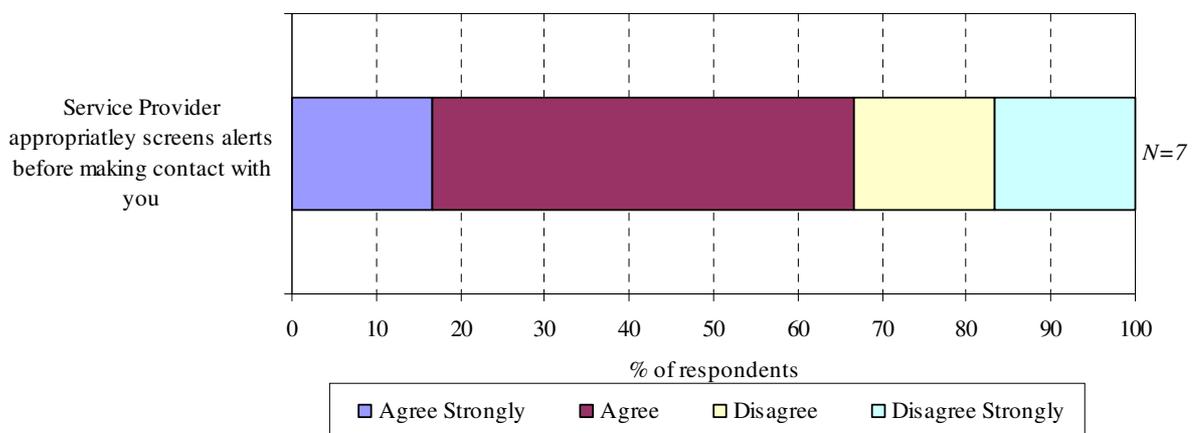


Most (86%, N=7) clinicians ‘agreed’ that the timeliness of receipt of patient alerts from the Service Provider was good. Furthermore, 86% (N=7) ‘agreed’ that the mode (e.g. telephone call, text, email) of patient alerts received from the Service Provider was appropriate.

4.8.4 Appropriate screening of alerts

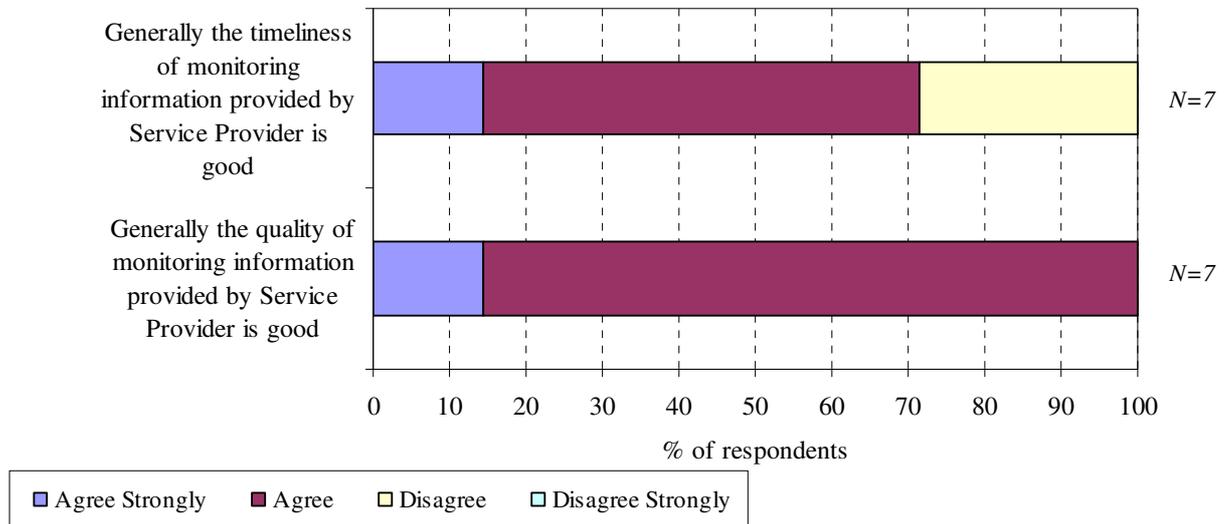
**Clinicians generally agree that the Service Provider appropriately screens alerts before making contact with them** – Two-thirds of clinicians (67%, N=6) agreed that the Service Provider appropriately screens alerts before making contact with them. One-third (33%, N=6) ‘disagreed’ or strongly disagreed’ with this statement.

**Figure 4.12: Clinicians’ views on the appropriate screening of alerts (Q8a – Clinician)**



4.8.5 Monitoring Information

**Figure 4.13: Clinicians’ views on the quality and timeliness of monitoring information (Q8a – Clinician)**



All (100%, N=7) clinicians were in agreement that the quality, and almost three-quarters of clinicians (71%, N=7) agreed that the timeliness of monitoring information provided by the Service Provider was good.

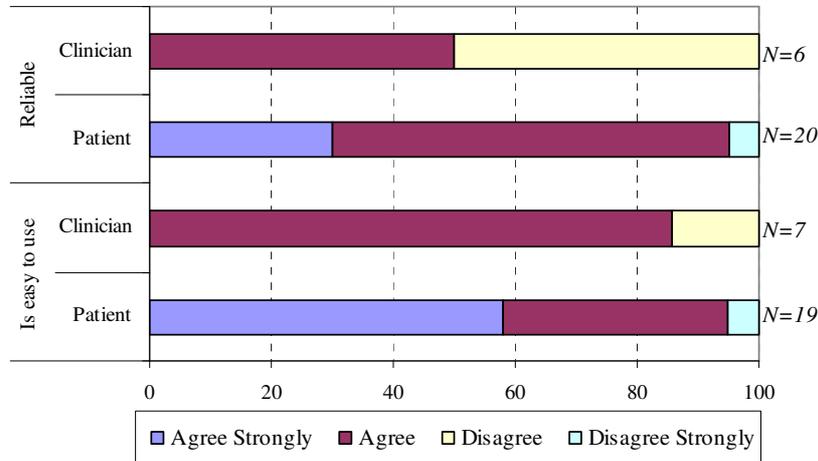
4.9 Satisfaction with the Tele-Monitoring Equipment and/or Software

4.9.1 Reliability and Ease of Use

**Patients and clinicians are largely positive about the ease of use and reliability of the tele-monitoring equipment:**

- The vast majority of clinicians (86%, N=7) and patients (95%, N=19) are in agreement that the equipment is easy to use;
- Only half of clinicians (50%, N=6) ‘agreed’ that the equipment is reliable, whereas 50% disagree. This compares to 95% (N=20) of patients which either strongly agreed or agreed that the equipment is reliable.

**Figure 4.14: Opinions on the tele-monitoring equipment (Q4a – Patient/Q9a – Clinician)**



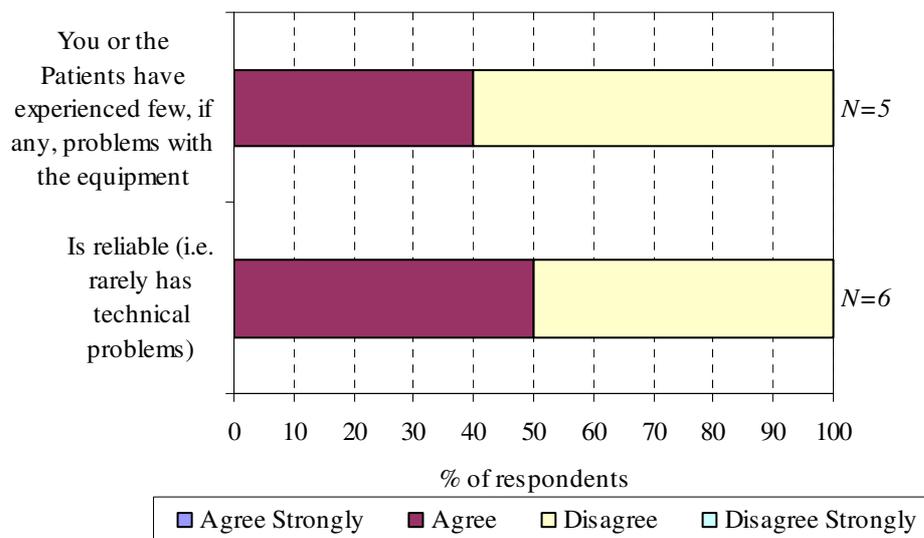
Clinicians reported that some patients have had difficulty with the equipment, particularly in taking blood pressure as patients may have difficulty putting the arm band on correctly. However, comments included:

*“Some patients have experienced a lot of difficulties relating to and altering their blood pressure and temperature.”*

Clinician Respondents

Furthermore, two-fifths of clinicians (40%, N=5) of clinicians ‘strongly agreed’ or ‘agreed’ that they or the patients have experienced few, if any, problems with the equipment.

**Figure 4.15: Clinicians’ views on aspects the tele-monitoring equipment (Q9a – Clinician)**



Clinicians reported that some patients have had difficulty with the equipment. Comments include:

*“A couple of people have had technical problems. The equipment needs a landline, more people are moving to having mobiles now instead”.*

*“Very general questions need to be more tailored. This would make the quality of information better.”*

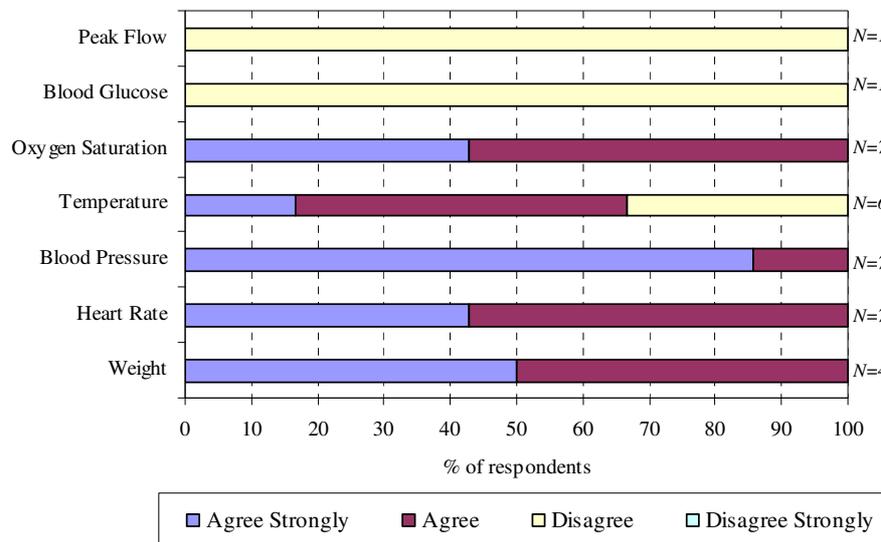
Clinician Respondents

**4.9.2 Accuracy of Readings**

Generally, both patients (95%, N=19) and clinicians were confident that the tele-monitoring equipment used provided accurate readings. **(Q4a – Patient/Q9c – Clinician)**

The specific responses provided by clinicians relating to different readings are illustrated below:

**Figure 4.16: Clinicians’ views on accuracy of tele-monitoring equipment readings (Q9c – Clinician)**



It was reported by clinicians that some patients have difficulty with the blood pressure equipment. Comments include:

*“There has been difficulty with the blood pressure cuff.”*

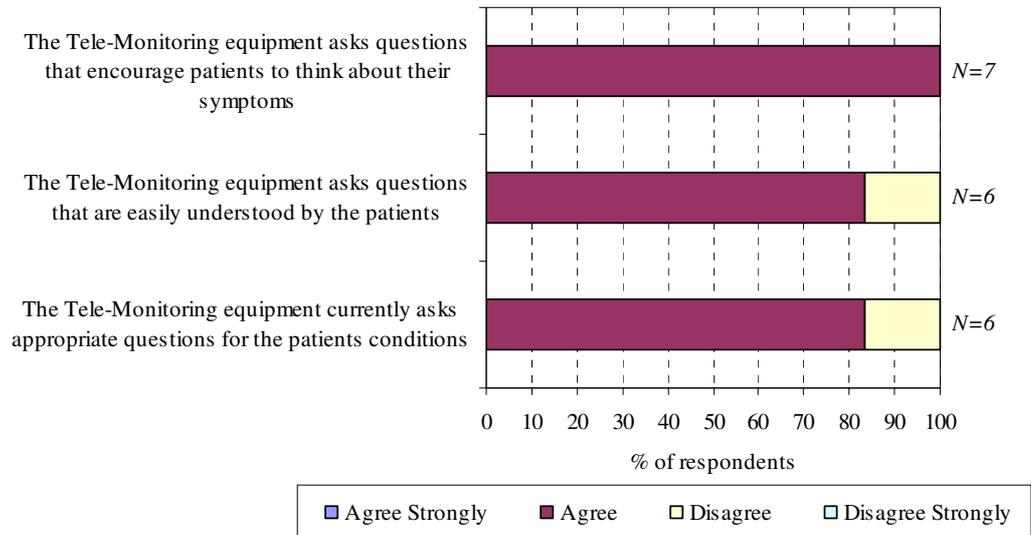
*“Generally the equipment provides accurate readings although you will always have some instances where inaccurate readings are provided.”*

Clinician Respondent

**4.9.3 Equipment – Clinicians’ Views on Questions Asked**

Generally, the clinicians were positive about the questions asked to patients whilst they used the tele-monitoring equipment.

**Figure 4.17: Clinicians’ views on aspects the tele-monitoring equipment**



- 83% of clinicians (N=6) of clinicians ‘agreed’ that the tele-monitoring equipment currently asks appropriate questions for the patients conditions;
- 83% of clinicians (N=6) ‘agreed’ that the tele-monitoring equipment asks questions that are easily understood by the patients; and
- All clinicians (100%, N=7) ‘agreed’ that the tele-monitoring equipment asks questions that encourage patients to think about their symptoms.

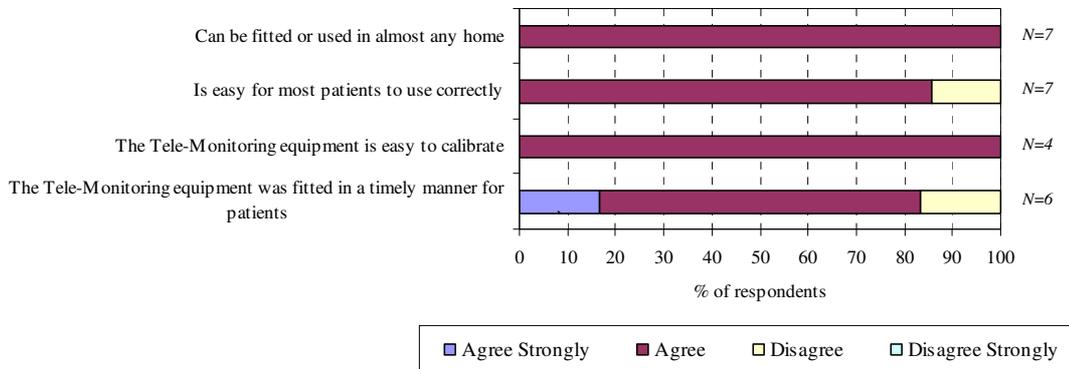
It was commented that the equipment asks very general questions which may need to be more tailored; it is the opinion of clinicians that more tailored questions would enhance the quality of information received.

4.9.4 Other aspects of Equipment – Clinicians’ Views

**Clinicians’ positive on aspects of the tele-monitoring equipment:**

- All (100%, N=7) clinicians ‘agreed’ that the tele-monitoring equipment can be fitted or used in almost any home;
- All (100%, N=4) clinicians ‘agreed’ that the tele-monitoring equipment is easy to calibrate;
- The vast majority (86%, N=7) ‘agreed’ that the tele-monitoring equipment was easy for most patients to use correctly; and
- The vast majority (83%, N=6) ‘agreed’ or ‘strongly agreed’ that the Tele-Monitoring equipment was fitted in a timely manner for patients.

**Figure 4.18: Clinicians’ views on aspects the tele-monitoring equipment (Q9a – Clinician)**



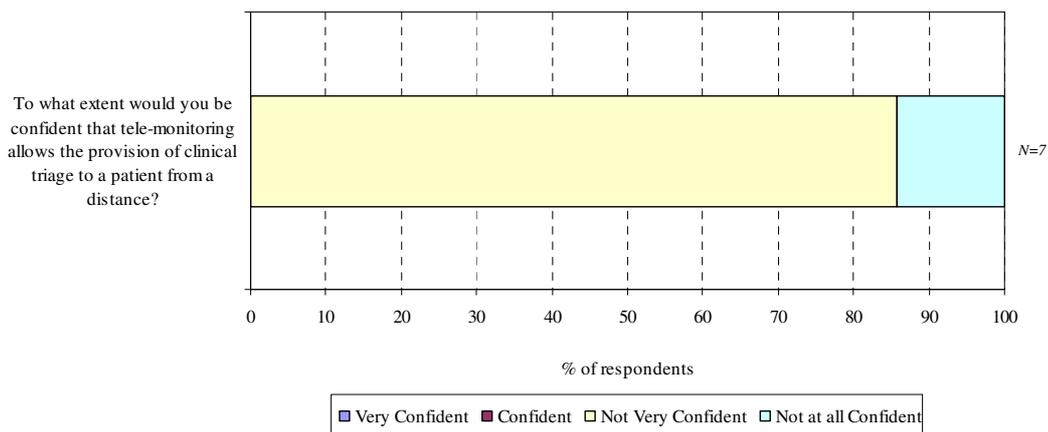
Clinicians reported that in order to have the equipment in their house the patient must have a landline; more and more people are moving towards mobile phones which may have implications going forward.

**4.10 Views relating to Clinical Triage**

**4.10.1 Satisfaction with clinical triage**

None of the clinicians were not confident that tele-monitoring allows the provision of clinical triage to a patient from a distance.

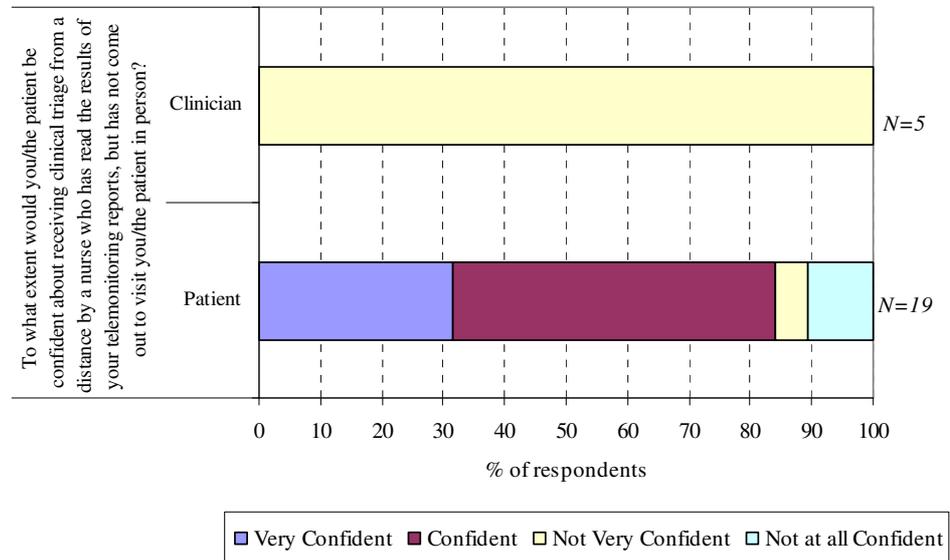
**Figure 4.19: Tele-monitoring - Clinical triage to a patient from a distance (Q18a – Clinician)**



Clinicians report that, in their opinion, an alert often results in a visit from the respiratory nurse anyway, and it is felt that they need to visit to see the patient in person. It was commented that a nurse should not be making a clinical decision over the telephone.

Interestingly, patients’ and clinicians’ views vary greatly relating to their levels of confidence as to whether tele-monitoring allows the provision of clinical triage from a nurse that has not met a patient in person.

**Figure 4.20: Tele-monitoring - Clinical triage to a patient from a distance by a nurse who has not met a Patient in person (Q11a - Patient/Q19a - Clinician)**



Almost all clinicians (100%, N=5) are ‘not very confident’ that tele-monitoring would allow the provision of clinical triage to a patient from a distance by a nurse who has not met a patient in person, whereas 84% (N=19) of patients were confident.

Clinicians reported that nurses would generally need to meet with patients to provide effective clinical triage; it was commented that otherwise it would not be possible to tell what is wrong as they would not know enough about the patient and their condition.

Clinicians were asked to indicate the types of clinical triage that would be appropriate for a nurse who has not met a Patient in person to provide over the phone and the types that would not be appropriate. Their responses included:

| Clinical triage over the Phone  |   |
|---|---|
| Appropriate for   | Not appropriate for   |
| <ul style="list-style-type: none"> <li>Mild patients that are learning about their condition;</li> <li>There is a place for it but not chronic disease management.</li> </ul> | <ul style="list-style-type: none"> <li>Severe diseases;</li> <li>Vulnerable patients – need human contact.</li> </ul> |

Clinicians reiterated the need to meet patients face-to-face and that the determination of appropriate treatment should be tailored to individual patients

**4.11 Factors Linked Most and Least**

**Clinicians and patients recorded what they like Most about the Tele-monitoring project, which included:**

| Clinicians   | Patients  |
|--|---|
| <ul style="list-style-type: none"> <li>• Reassuring to know patients are being monitored;</li> <li>• You are getting information on your patient that you would not otherwise have got – helps to identify exasperations early; and</li> <li>• The observations are there before you go out to visit.</li> </ul> | <ul style="list-style-type: none"> <li>• Easy to use and convenient;</li> <li>• Provides reassurance and ‘peace of mind’;</li> <li>• Provides continuous monitoring of conditions;</li> <li>• Provides quick and effective communication with health sector personnel; and</li> <li>• Reduces hospital visits.</li> </ul> |

**Clinicians and patients recorded what they like least about the Tele-monitoring project, which included:**

| Clinicians   | Patients  |
|--|---|
| <ul style="list-style-type: none"> <li>• Extra burden on an already very busy team;</li> <li>• Patients can become more anxious and stressed about their condition.</li> </ul> | <ul style="list-style-type: none"> <li>• Being restricted to using the system at the same time every day;</li> <li>• Continuous daily assessment can sometimes be a hindrance; and</li> <li>• Sometimes it takes a while to get working.</li> </ul> |

The build up in patients participating in the pilot are noted in Section 2. There has been a tremendous effort made to increase levels of participants, hence some clinicians have felt rushed in the implementation process.

**4.12 Clinician and Patients’ Recommendations**

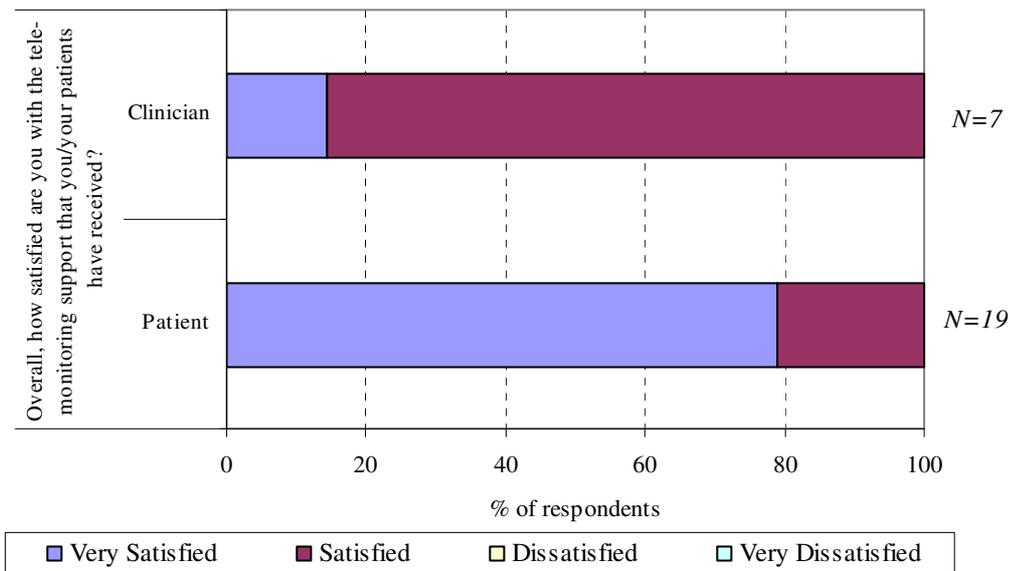
Clinicians and patients recorded recommendations for improvements on how the tele-monitoring pilot is delivered and on its content, which included:

| Clinicians  | Patients   |
|---|--|
| <ul style="list-style-type: none"> <li>• Increased training on chronic diseases;</li> <li>• Additional staff;</li> <li>• More information from the Trust to patient referrers i.e. GPs and Social Workers;</li> <li>• Need strict criteria for selecting patients to participate;</li> <li>• Be more flexible regarding the length of time patients will be using the equipment</li> <li>• A lot of older patients now have mobiles and not landlines so this presents problems.</li> </ul> | <ul style="list-style-type: none"> <li>• More flexible times – should be able to use it at a time that best suits you;</li> <li>• Improvements to the broadband interface; and</li> <li>• Contents of the questions should be addressed i.e. the question about coughing should be more specific and clear.</li> </ul> |

**4.13 Overall Satisfaction**

Overall, all (100%, N=19) patients and clinicians (100%, N=7) stated that they were ‘very satisfied’ or ‘satisfied’ with the tele-monitoring support that they received.

**Figure 4.21: Satisfaction with tele-monitoring support received (Q15a – Patient/Q24a – Clinician)**



Clinician’s state that they feel the project has been well received by patients and that it allows them to have more control over patient care as they are more aware of what is the norm for their patients.

**4.14 Conclusion and Operation of Pilot**

In conclusion, clinicians and patients are, generally, satisfied with the way tele-monitoring operates in practice.

Over 80% of clinicians are satisfied with the way that tele-monitoring operates in practice – the quality of information is perceived as being good, the timeliness of alerts is good and clinicians generally feel comfortable in setting clinical parameters. Initial teething problems have largely been addressed, with clinicians also reporting the support received from the Trust tele-monitoring Co-ordinator.

Whilst some improvements were suggested relating to the flexibility and adaptability of equipment, clinicians were generally content with the accuracy of the readings and ease of use of the equipment.

With regards to the support received from the Service Provider of the triage service, clinicians were generally positive. Over 85% of clinicians agreed agree that the Service Provider provide a good service. However, there are differences in perception between clinicians and patients in respect of the use of clinical triage – none of clinicians are confident that clinical triage is suitable for monitoring patients from a distance where the nurse has not met the patient in person. This compares to 84% of patients who are satisfied with clinical triage.

Clinicians noted the need to have a structured patient selection process and that tele-monitoring should be directed at those with the highest capacity to benefit. The patient selection process is all important, with clinicians confirming that tele-monitoring is not appropriate for all patients and that

patient selection should be dependent on the severity of the disease as well as issues relating to patient dexterity etc.

Clinicians also noted that negative aspect of operating the scheme in the absence of GP buy in to the service, with many feeling that GPs should play a role in setting clinical parameters. Whilst 86% of clinicians were of the view that patient parameters are appropriately set, it was acknowledged that in the absence of GP involvement, and, in particular, for new clinicians joining the scheme, there can be a tendency to set narrow parameters, with resultant increased alerts.

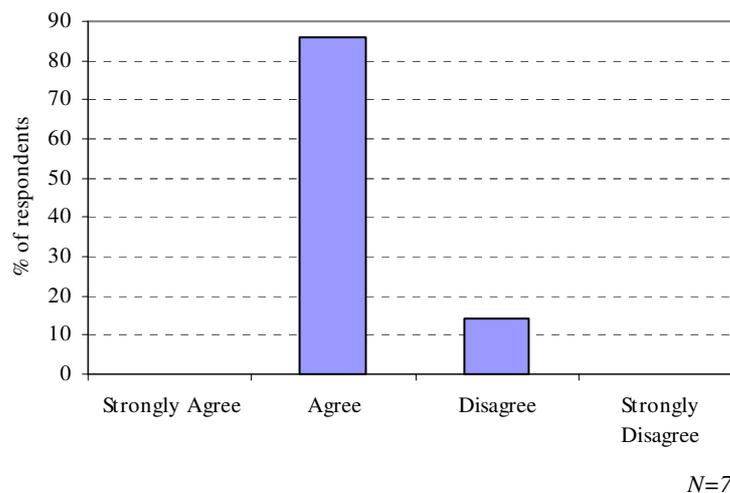
## 5. PERCEIVED IMPACT ON ORGANISATION AND RESOURCE UTILISATION

Section 5 considers the perceived impact of the tele-monitoring pilots on the Trust itself, i.e. the Organisation and the Resource Utilisation.

### 5.1 Patient-Centered

Most clinicians (86%, N=7) feel that the tele-monitoring pilot project was a patient centred service.

**Figure 5.1: Tele-monitoring pilot project a patient centred service (Q16a – Clinician)**



Clinicians suggested that the project empowers patients to better manage their illness although they noted that the support of health sector personnel cannot be underestimated.

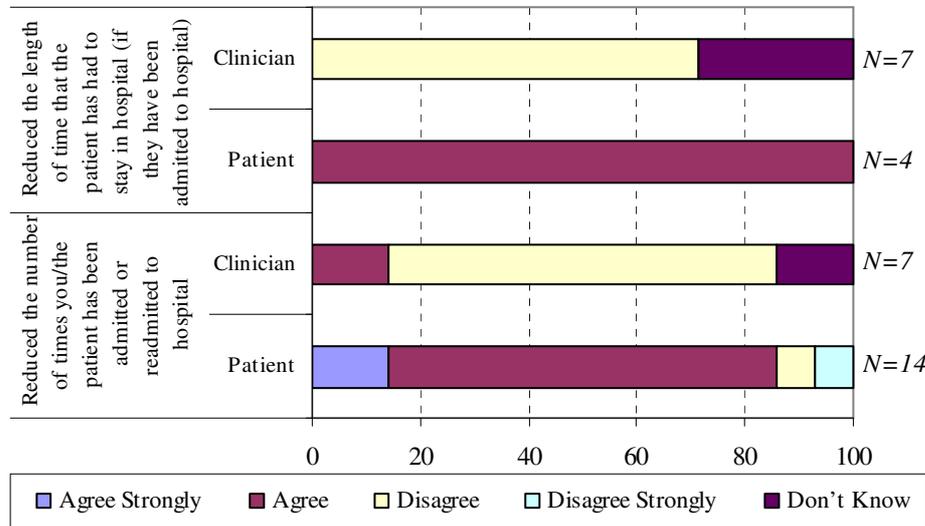
*“The project helps patients receive more care from the Trust; there is actually an increase in nurse/patient interaction.”*

Clinician Respondent

### 5.2 Perceptions on Admissions to Hospital

Patients and clinicians views vary greatly in relation to the impact that the tele-monitoring project has made on the number of times that the patients has been admitted (or readmitted) to hospital.

**Figure 5.2: Perceived impact on visits that patients have made to or received from health sector personnel (Q5a – Patient/Q10a – Clinician)**



- Whilst 86% (N=14) of patients were in agreement that the tele-monitoring project has reduced the number of times that the patient has been admitted (or readmitted) to hospital, most (71%, N=7) clinicians disagreed that this was the case or did not know. Clinicians appear sceptical about the ability of tele-monitoring to reduce the number of times the patient is admitted to hospital. Some clinicians noted that they felt, in some cases, the equipment was creating panic in patients following readings, who were then more likely to self-refer themselves to hospital.
- Furthermore, 71% (N=7) of clinicians disagreed that the tele-monitoring project has reduced the length of time that participant patients have had to stay in hospital (29% did not know), whereas all (100%, N=4) patients ‘agreed’ that the tele-monitoring project has reduced the length of time that they have had to stay in hospital.

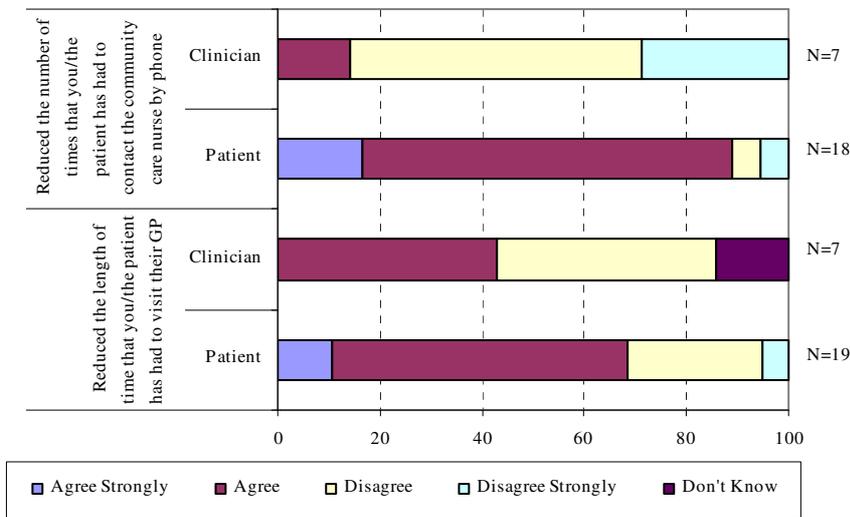
### 5.3 Perception on Referral to A&E

Whilst one-third (29%, N=7) of clinicians ‘agreed’ that tele-monitoring has reduced the number of times that the participant patients have self-referred themselves to A&E, 57% (N=7) ‘disagreed’ that this was the case, the remaining 14% stated that they did not know. (Q10a – Clinician)

### 5.4 Perception on GP visits and Community Care Nurse Contact

- Under half of clinicians (43%, N=7), agree, compared to two-thirds (69%, N=19) of patients who are in agreement that tele-monitoring reduced the length of time that the patient has had to visit their GP.

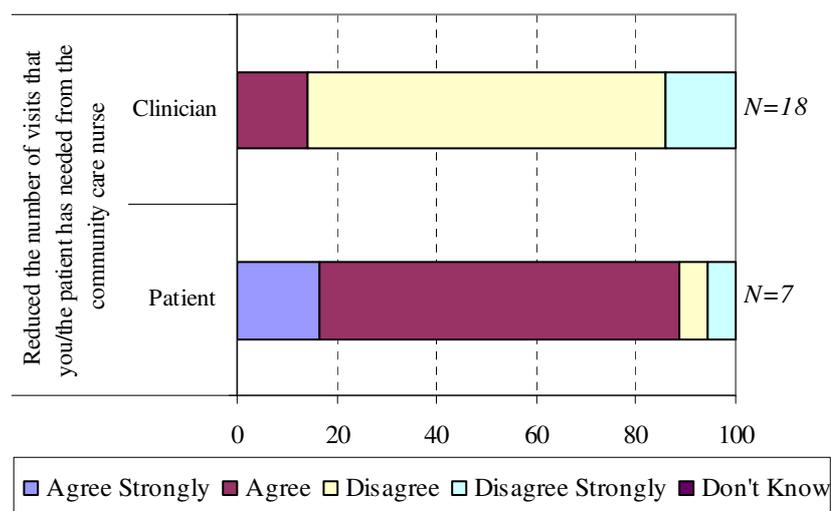
**Figure 5.3: Perceived impact on visits that patients have made to or received from health sector personnel (Q5a – Patient/Q10a – Clinician)**



Patients are more positive than clinicians about the impact that the tele-monitoring project has had on their need to draw on the support of their nurse. The vast majority of clinicians (86%, N=7) ‘disagreed’ or ‘disagreed strongly’ that tele-monitoring has reduced the number of times that participant patients have had to contact their community care nurse by phone; 14% of clinicians ‘agreed’ with this statement. This compares to 89% (N=18) of patients that either strongly agreed or agreed with this statement.

Furthermore, the majority (89%, N=18) of patients ‘strongly agreed’ or ‘agreed’ that the tele-monitoring project had reduced the number of visits that they have needed from their Community Care Nurse, whilst only two-fifths (14%, N=7) of clinicians considered that this was the case.

**Figure 5.4: Perceived impact on visits that patients have made to or received from health sector personnel (Q5a – Patient/Q10a – Clinician)**



Patients reported that the number/frequency of visits that they have made to or received from health sector personnel have reduced as they can now monitor themselves from home saving time, resources and visits to doctors, hospital, etc. and that health sector personnel only need to contact them when irregularities arise. Some clinicians have noted that in a number of cases, the patient has

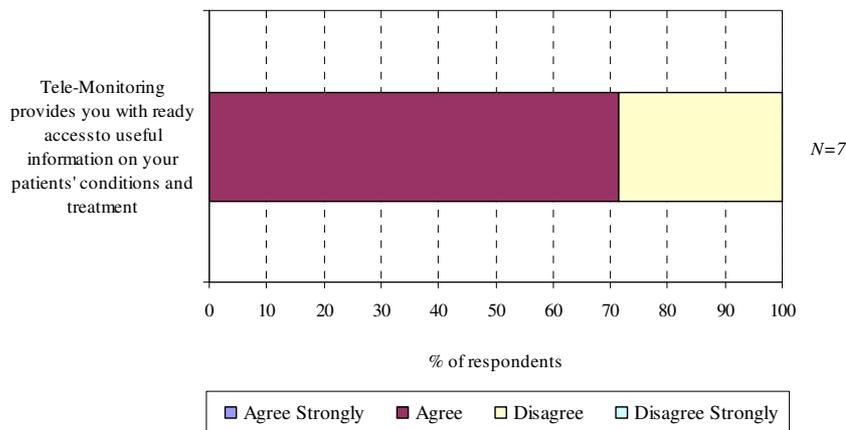
become less reliant on the hospital sector but more reliant on other health practitioner resources, such as the community care nurse.

**5.5 Impact on the Trust**

**5.5.1 Access to Information**

The majority of clinicians (71%, N=7) ‘agree’ that tele-monitoring provides them with ready access to useful information on your patients' conditions and treatment, the remaining 29% disagreed.

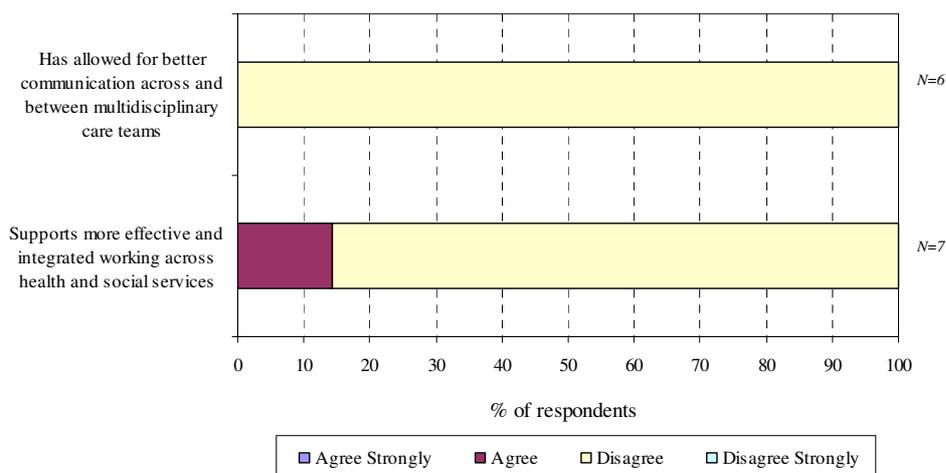
**Figure 5.5: Impact tele-monitoring has had on clinician’s Trust (Q17a – Clinician)**



**5.5.2 Promotion of Effective and Integrated Working or Better Communication**

The majority of clinicians disagree that the project supports more effective and integrated working across health and social services (86%, N=7) or has allowed for better communication across and between multidisciplinary care teams (100%, N=6).

**Figure 5.6: Impact tele-monitoring has had on clinician’s Trust (Q17a – Clinician)**



Comments include:

*“There is a lack of communication across all centres of Trust; GPs and social workers are less aware of tele-monitoring.”*

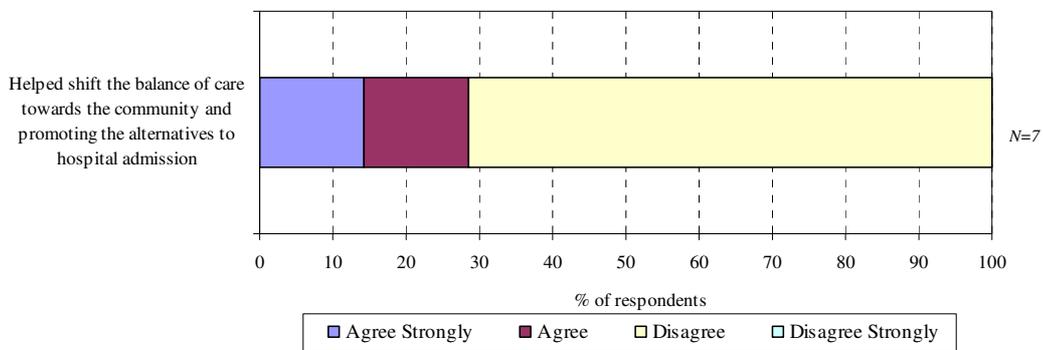
*“It has created much more work for care teams and created calls that they can not deal with.”*

**Clinician Respondents**

**5.5.3 Promotion of Alternative to Hospital Admission**

Almost three-quarters of clinicians (71%, N=7) ‘disagreed’ that tele-monitoring has helped shift the balance of care towards the community and promoting the alternatives to hospital admission. The remaining 29% either ‘strongly agreed’ or ‘agreed’ with this statement.

**Figure 5.7: Perceived impact tele-monitoring has had on clinician’s Trust (Q17a – Clinician)**

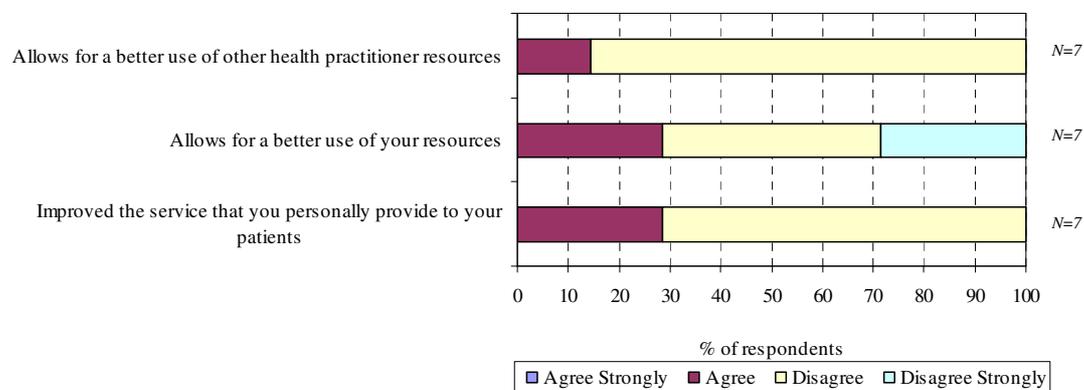


**5.5.4 Perceived impact on Resources and Service Provision**

The majority of clinicians disagree that the project:

- Allows for a better use of other health practitioner resources (86%, N=7);
- Allows for a better use of their resources (72%, N=7); and
- Improved the service that they personally provide to their patients (71%, N=7)

**Figure 5.8: Perceived impact tele-monitoring has had on clinician’s Trust (Q17a – Clinician)**



Comments include:

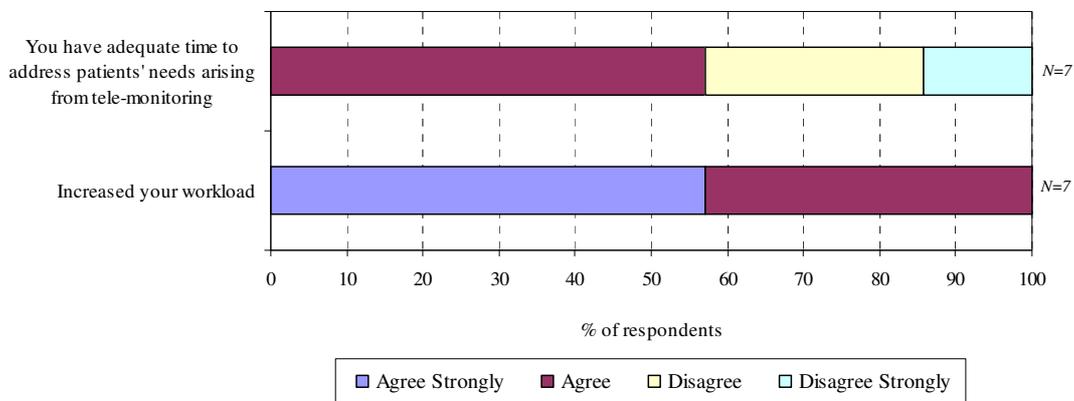
*“It can allow for better use of resources in some cases, but has increased the workload in other cases.”*

Clinician Respondents

**5.5.5 Perceived impact on Clinicians’ Workload**

All (100%, N=7) clinicians were in agreement that the project had increased their workload; whilst almost over half (57%, N=7) ‘agreed’ that they had adequate time to address patients’ needs arising from tele-monitoring.

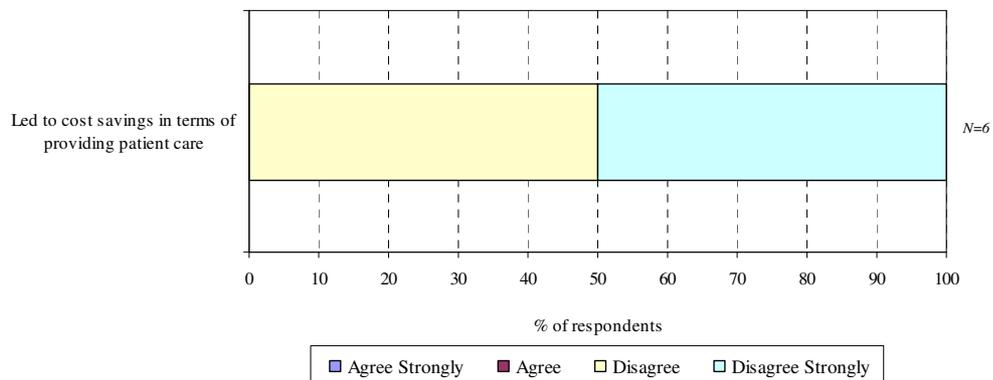
**Figure 5.9: Perceived impact tele-monitoring has had on clinician’s Trust (Q17a – Clinician)**



**5.5.6 Perceived impact on Costs**

All (100%, N=6) clinicians disagree that the project has led to cost savings in relation to the provision of patient care.

**Figure 5.10: Perceived impact tele-monitoring has had on clinician’s Trust (Q17a – Clinician)**



Comments from clinicians included:

*“There is not enough information available to comment on whether it has led to cost savings.”*

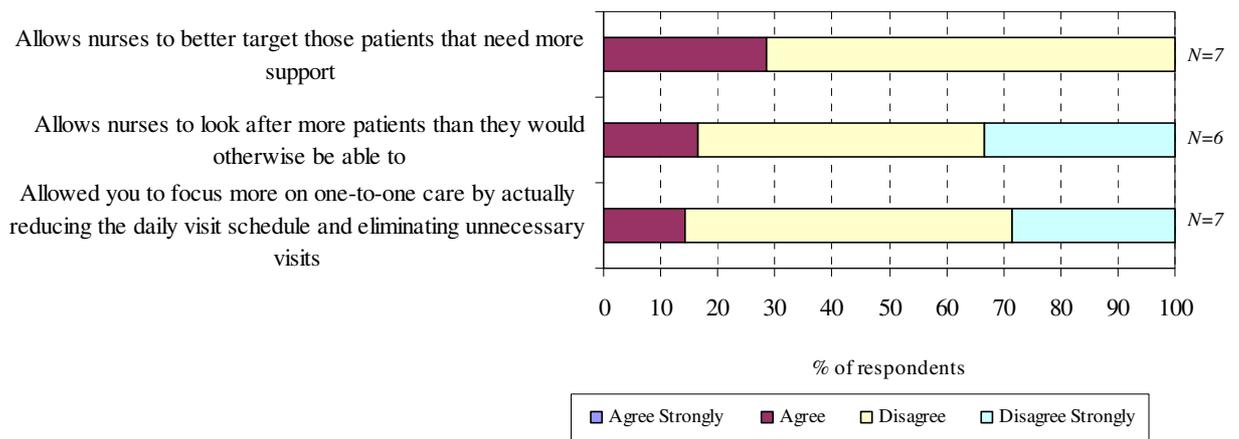
Clinician Respondent

5.5.7 Perceived impact on Nursing Care

Generally, the majority of clinicians ‘disagreed’ or ‘strongly disagreed’ that the project allowed:

- Them to focus more on one-to-one care by actually reducing the daily visit schedule and eliminating unnecessary visits (86%, N=7);
- Nurses to look after more patients than they would otherwise be able to (83%, N=6); and
- Nurses to better target those patients that need more support (71%, N=7).

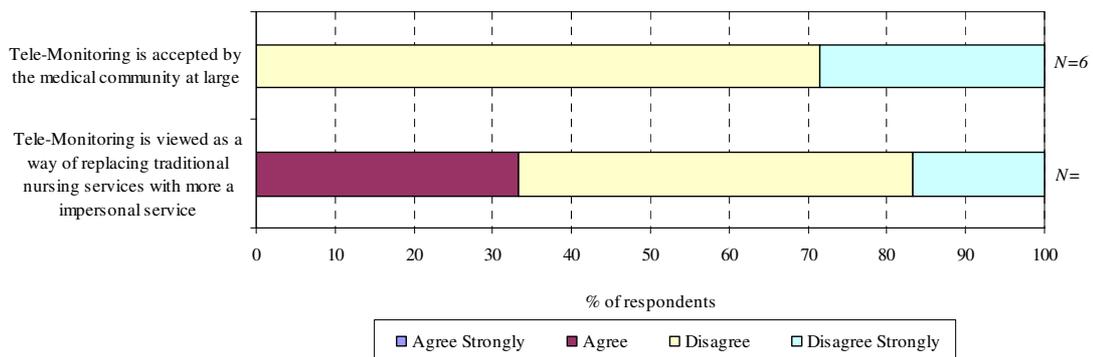
**Figure 5.11: Perceived impact tele-monitoring has had on clinician’s Trust (Q17a – Clinician)**



5.5.8 Degree to which Tele-Monitoring is Accepted

Whilst the majority (67%, N=6) of clinicians disagree that tele-monitoring is viewed as a way of replacing traditional nursing services with a more impersonal service, all (100%, N=7) do not consider that remote telemonitoring is accepted by the medical community at large.

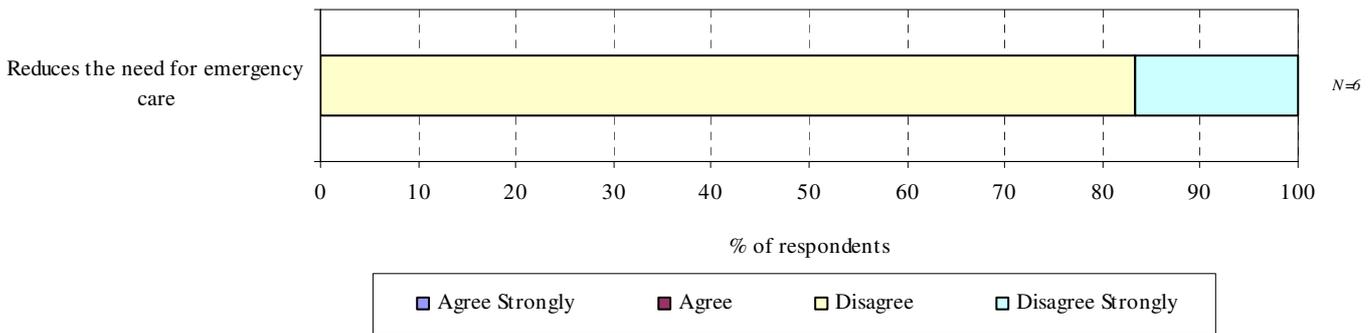
**Figure 5.12: Impact of tele-monitoring on the Trust (Q17a – Clinician)**



5.5.9 Perceived impact on Need for Emergency Care

All (100%, N=6) clinicians ‘disagreed’ or agreed’ that tele-monitoring reduces the need for emergency care.

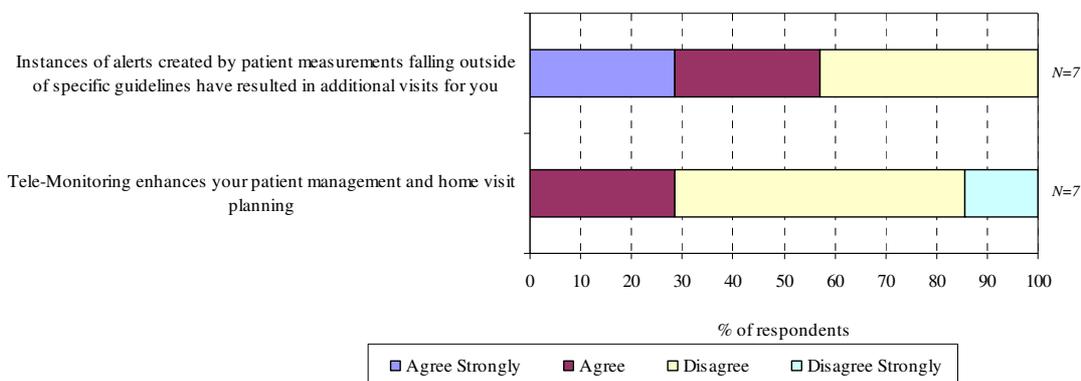
**Figure 5.13: Impact tele-monitoring has had on clinician’s Trust (Q17a – Clinician)**



5.5.10 Perceived Impact on Patient Management Visits

The majority (71%, N=7) of clinicians ‘disagreed’ that the project enhances their patient management and home visit planning. Furthermore, 57% (N=7) ‘agreed’ that instances of alerts created by patient measurements falling outside of specific guidelines have resulted in them having to make additional visits to patients.

**Figure 5.14: Perceived impact tele-monitoring has had on clinician’s Trust (Q17a – Clinician)**



5.6 Conclusion on Organisation and Resource Utilisation

In general, there were differences in perceptions amongst clinicians and patients as to the impact of remote tele- monitoring on the Trust and on resource utilisation, with a minority of clinicians reporting a positive impact, as compared to the majority of patients.

Around one third of clinicians felt that remote tele-monitoring had a positive impact on organization effectiveness. In particular, over 40% of clinicians were of the view that remote tele-monitoring had contributed to reduced visits to GPs. Almost 15% stated that they perceived it had reduced the number of admittances to hospitals and about 30% felt that it had reduced the number of self-referrals to A&E. This compares to the patient feedback, with circa 70-80% of patients reporting that the pilot

has a positive impact on utilization of Trust resources. There are similar differences in perception as to the impact on the length of time in hospital – with all patients of the view that tele-monitoring has reduced the length of time that they have had to stay in hospital, as compared to none of clinicians.

The majority of clinicians did agree that the projects had a positive impact on further developing a patient-centred case management approach, with 86% of clinicians reporting remote tele-monitoring pilot project to be a patient centred service. Generally, however, clinicians reported that patients continued to get the same, high, level of care regardless of the remote tele-monitoring scheme. Almost 30% of clinicians did report that remote tele-monitoring had led to an improvement in the service that they personally provided to the patient and that it allows nurses to better target those patients that need more support.

All clinicians were of the view that remote tele-monitoring increased their workloads, with this being a particular concern of those clinicians who were still relatively new to the scheme.

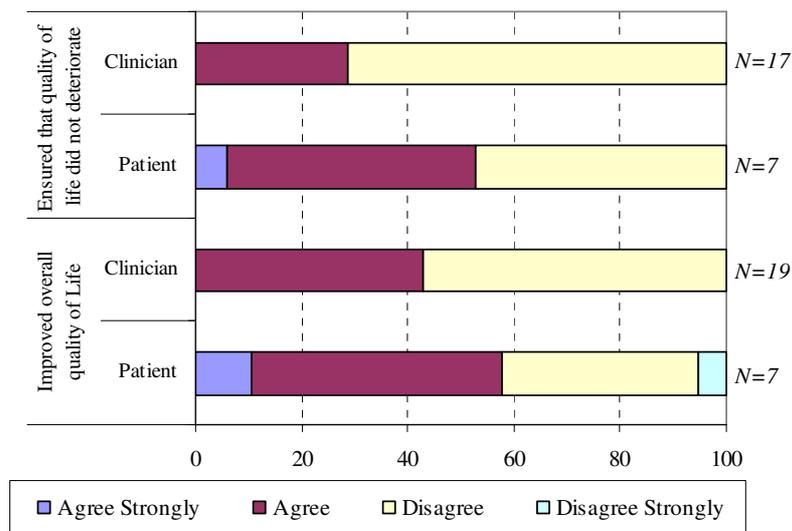
**6. PERCEIVED IMPACT ON HEALTH AND WELLBEING**

Section 6 considers the perceived impact that the tele-monitoring project has had on patients’ health and wellbeing

**6.1 Perceived Impact on Quality of Life**

Patients’ and clinicians’ views vary relating to the impact of the project on patients’ quality of life:

**Figure 6.1: Perceived Impact on life and wellbeing (Q6a patient/Q11a – Clinician)**



Only 43% (N=7) clinicians agreed that the tele-monitoring project improved patients’ quality of life, whilst the majority of patients (58%, N=19) agreed that the tele-monitoring project had improved their overall quality of life. Some clinicians note that in some cases, patients can become obsessive about the equipment and about the readings which only serves to heighten the general level of anxiety in their lives. Some clinicians have noted that they feel this represents deterioration in the person’s quality of life as a result.

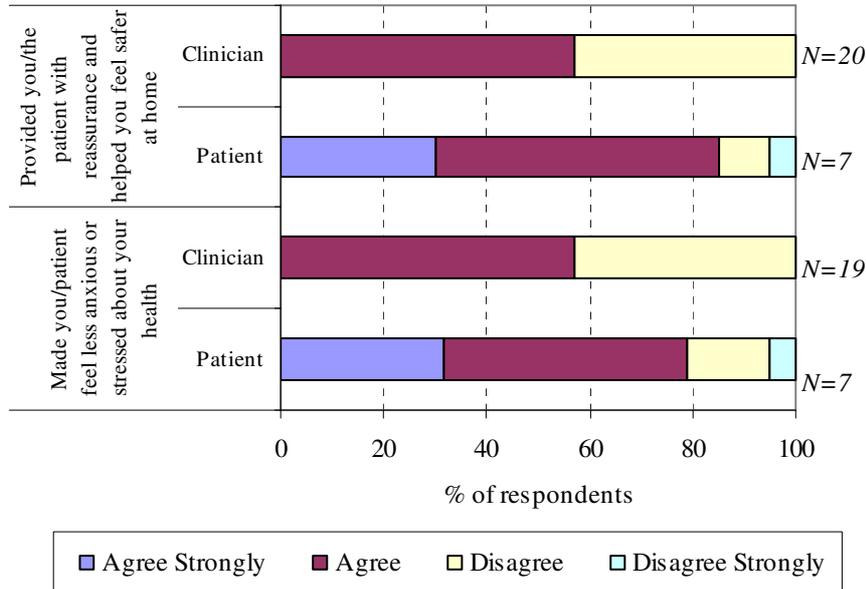
Furthermore, most (71%, N=7) clinicians disagreed that the project had ensured that patients’ quality of life did not deteriorate; whereas in contrast, half (53%, N=17) of patients ‘strongly agreed’ or ‘agreed’ with this statement.

**6.2 Perceived Impact on Levels of Stress and Anxiety**

Encouragingly, both clinicians (57%, N=7) and patients (79%, N=19) were generally in agreement that the tele-monitoring project had made patients feel less anxious or stressed about their health.

This is supported by the finding that the majority of clinicians (57%, N=7) and patients (85%, N=20) agreed that the project had provided patients with reassurance and helped them feel safer at home.

**Figure 6.2: Perceived Impact on life and wellbeing (Q6a patient/Q11a – Clinician)**



Patients reported that the equipment allows them to continuously monitor their condition which reduces anxiety and gives them ‘peace of mind’ (Q6a patient). Patients also suggested that knowing that their results are being continuously monitored encourages them to live a healthier lifestyle. Clinicians noted that the impact on the patient’s level of stress was, again, a very individual thing.

*“The equipment means that I can keep on top of my condition at home and provide myself with reassurance.”*

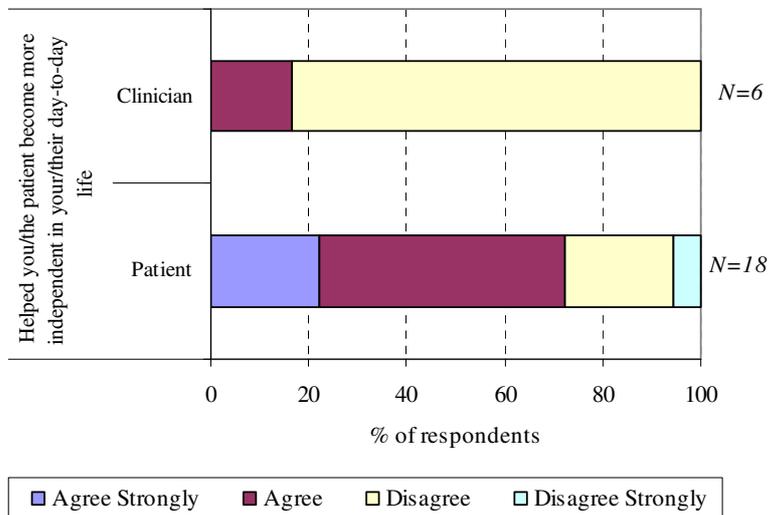
*“The project provides me with confidence that my condition is being monitored continuously which makes me feel less anxious.”*

Patient Respondents

**6.3 Perceived Impact on Patients’ Independence**

Patients and clinicians differ in their views on the impact that the project has had on patients’ levels of independence

**Figure 6.3: Perceived Impact on life and wellbeing (Q6a patient/Q11a – Clinician)**

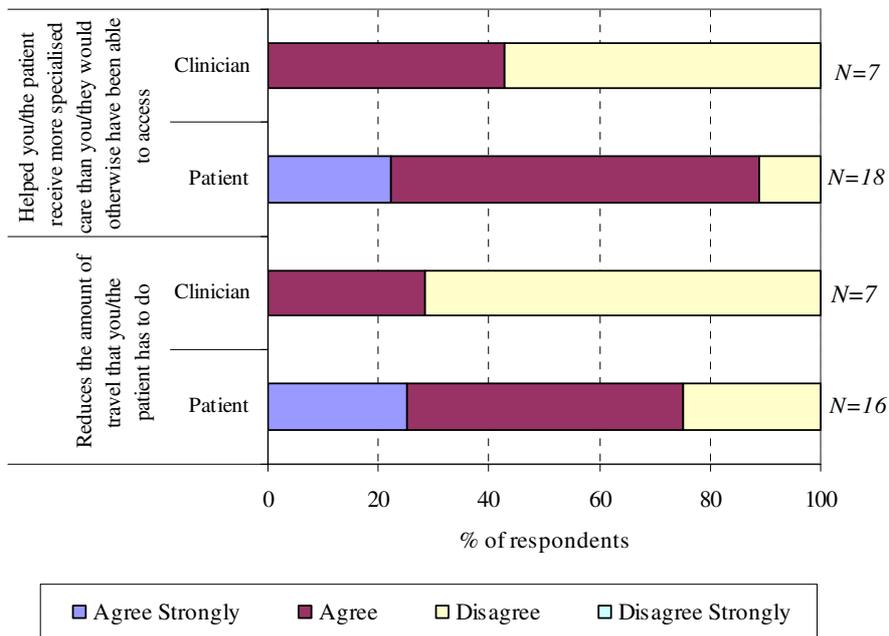


Whilst the majority (72%, N=18) of patients were in agreement that the tele-monitoring project helped them become more independent in their day-to-day life, clinicians' opinions varied considered with the vast majority of clinicians (83%, N=6) disagreeing with this statement.

**6.4 Perceived Impact on Specialist Care and Travel**

Opinions again differ in relation to the impact that the project has had on the level of specialised care that patients receive as a result of the project. Almost all (89%, N=18) patients 'strongly agreed' or 'agreed' that the project provides more specialist care - over half of clinicians (57%, N=7) do not consider that this is true.

**Figure 6.4: Perceived Impact on patients (Q9a patient/Q14a – Clinician)**

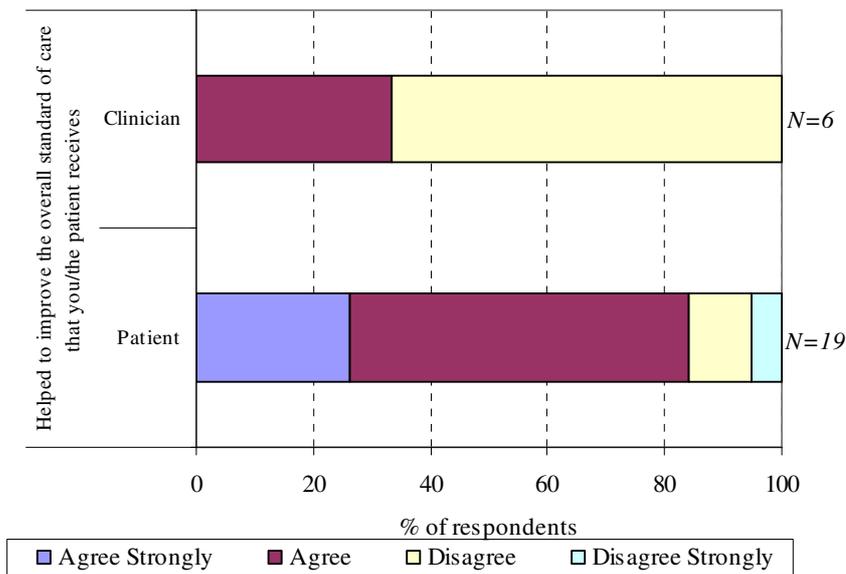


The previous finding is mirror in relation to clinicians' and patients' views that the project has had on the amount of travel that patients have to do to visit health professionals relating to their chronic conditions. Patients are again more positive with three-quarters (75%, N=16) agreeing that the project reduces the amount of travel that they have to do. Only 29% (N=7) of the clinicians consider that this is the case.

**6.5 Perceived Impact on Overall Care Received**

Two-thirds of clinicians (67%, N=6) of the clinicians do not consider that the tele-monitoring project helps to improve the overall standard of care that patients receive. In contrast, almost all (84%, N=19) patients 'strongly agreed' or 'agreed' that the project has helped to improve the overall standard of care that they receive.

**Figure 6.5: Perceived Impact on patients (Q9a patient/Q14a – Clinician)**

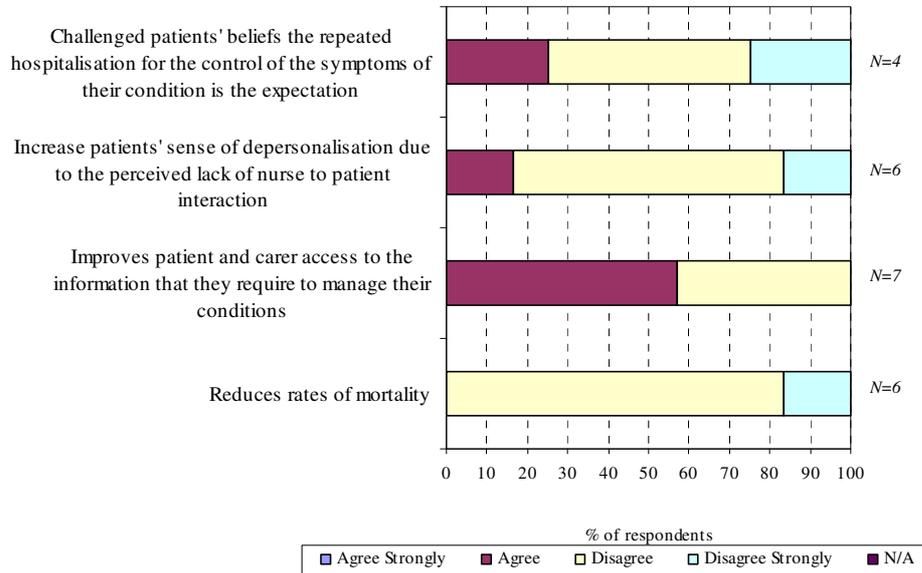


**6.6 Perceived Impact on Patients’ Beliefs, Mindsets and Mortality**

Clinicians were not positive about the impact of tele-monitoring on the following aspects of patients’ health:

- All (100%, N=6) ‘disagreed’ or ‘strongly disagreed’ that the tele-monitoring project reduces rates of patient mortality (**Q14a – Clinician**). The clinicians reported that it is difficult to reduce rates of mortality given the severity of the conditions being dealt with;
- Three-quarters of clinicians (75%, N=4) disagreed that tele-monitoring challenged patients’ beliefs that repeated hospitalisation for the control of the symptoms of their condition is the expectation (**Q14a – Clinician**).

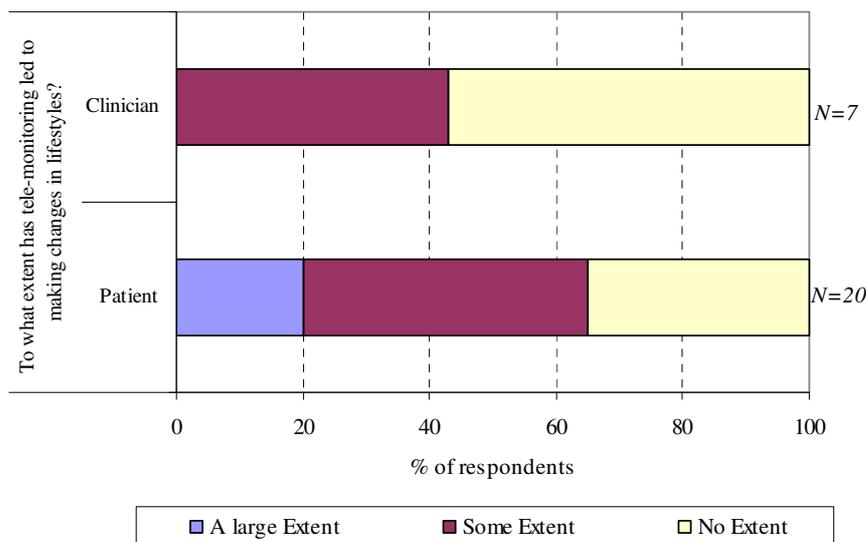
**Figure 6.6: Perceived impact on patient's health relating to the Patients' Chronic conditions (Q14a – Clinician)**



**6.7 Perceived Impact on Patients' Lifestyles**

Encouragingly, over two-fifths (43%, N=7) of clinicians stated that tele-monitoring has led to patients changing aspects of their lifestyles to 'some extent'. However, clinicians have noted that the impact on patients is a very individual phenomenon and that changes could therefore be either positive or negative. This compares to almost two-thirds of patients (65%, N=20) of patients who stated that tele-monitoring has led them to making changes in their lifestyle to a 'large extent' or to 'some extent'.

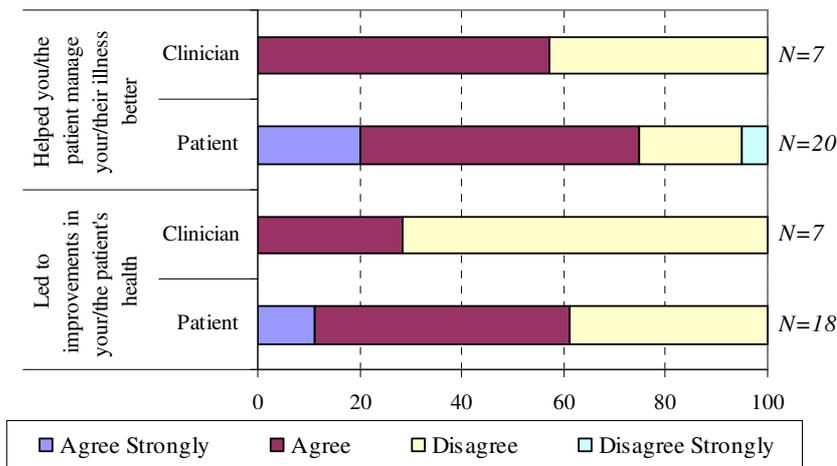
**Figure 6.7: Changes to patient lifestyle (Q10a patient/Q15a – Clinician)**



**6.8 Perceived Impact on Patients’ Health**

Whilst Patients (61%, N=18) were generally in agreement that the tele-monitoring project had led to improvements in their health, clinicians had more mixed opinions, with 29% (N=7) reporting that the project had led to improvements in patients’ health and 71% (N=7) disagreeing that this was true. Clinicians in some cases stated that they felt any improvements in the patients’ health would probably be psychosomatic and not as a direct result of using the tele-monitoring equipment. In some cases it was argued that lower stress levels as a result of reassurance gained from taking readings could be conducive to greater feelings of well-being in patients.

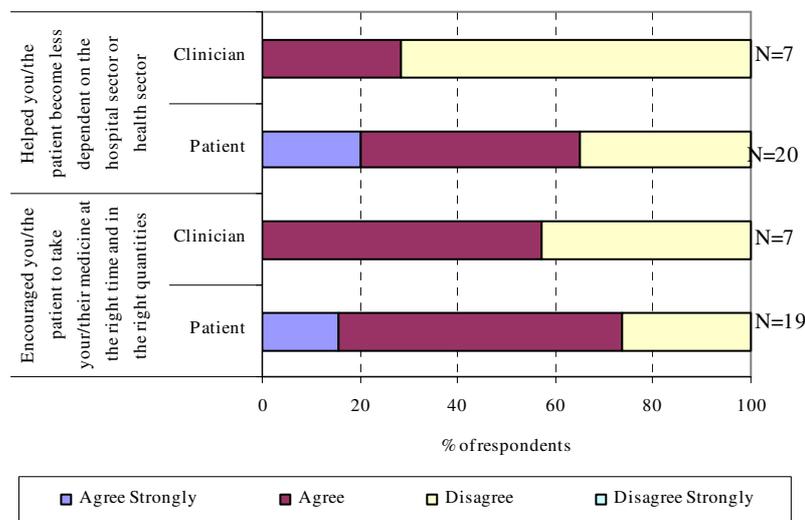
**Figure 6.8: Perceived impact on patient health (Q7a patient/Q12a – Clinician)**



**6.9 Perceived Impact on Patients’ Medicine Compliance and Reliance on Health Sector**

Most clinicians (57%, N=7) and patients (74%, N=19) ‘strongly agreed’ or ‘agreed’ that the tele-monitoring project encouraged patients to take their medicine at the right times and in the right quantities.

**Figure 6.9: Perceived impact on patient health (Q6a patient/Q12a – Clinician)**



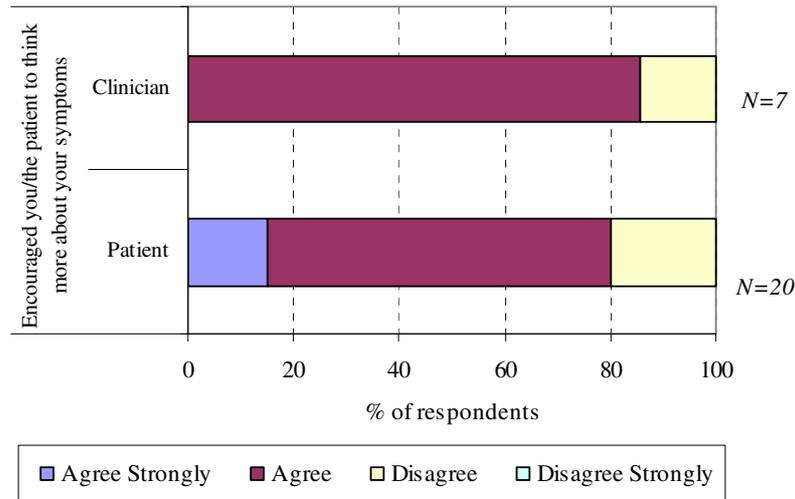
However, opinion amongst both groups of respondents was very different in relation to whether the tele-monitoring project had helped patients become less reliant on the hospital sector or health sector

practitioners in general. Three quarters (71%, N=7) of clinicians ‘disagreed’ that this was case, whilst in contrast, two-thirds (65%, N=20) of patients were in agreement that it was the case.

**6.10 Perceived impact on Patients’ Awareness of their Symptoms**

- Encouragingly, most clinicians (86%, N=7) and patients (80%, N=20) are in agreement that tele-monitoring has encouraged patients to think more about their symptoms.

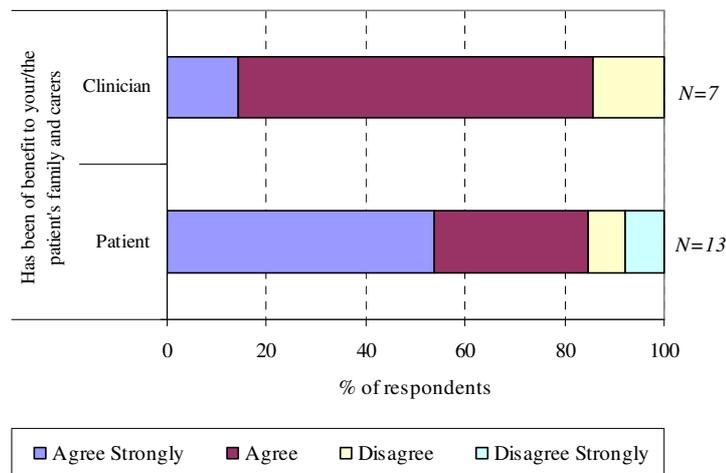
**Figure 6.10: Perceived impact on patient health (Q6a patient/Q12a – Clinician)**



**6.11 Perceived Impact on Patients’ Families and Carers**

Both clinicians (86%, N=7) and patients (85%, N=13) were generally in agreement that the tele-monitoring project has been of benefit to patients family and carers.

**Figure 6.11: Perceived impact on family and carers (Q8a patient/Q13a – Clinician)**



Both groups suggested that the project provides reassurance to family and carers and provides them with peace of mind.

*“Carers and family members now feel reassured and less anxious as they know the patient is being continuously monitored.”*  
Clinician Respondent

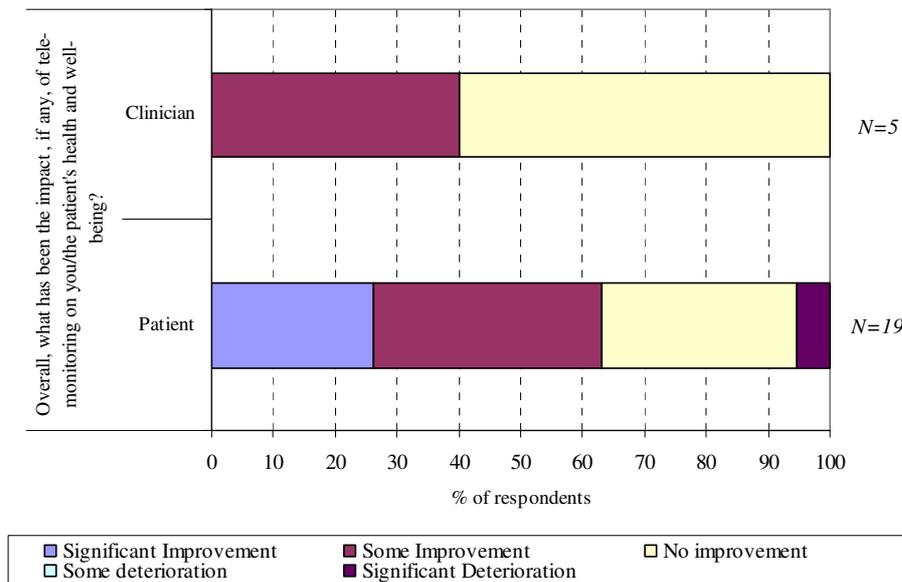
*“The project has helped relieve some of the stress of my family, has provided them with peace of mind and has made things a lot easier for them.”*  
Patient Respondents

**6.12 Overall Impact on Patient Health and wellbeing**

**Clinicians and patients positive about the impact of tele-monitoring on overall health and wellbeing:**

Overall, three-fifths (60%, N=5) of clinicians state that overall there has been ‘no improvement’ in their patients health and well being; the remaining 40% state there has been ‘some improvement’. This compares to just over three-fifths (63%, N=19) of patients who stated that overall tele-monitoring has led to a ‘significant improvement’ or ‘some improvement’ in their overall health and wellbeing.

**Figure 6.12: Perceived impact of tele-monitoring on patient health and wellbeing (Q14a patient/Q23a – Clinician)**



Clinicians reported the project has allowed patients to better control their conditions and has created awareness of symptoms and the benefits of living a healthy lifestyle.

*“The project has enabled patient conditions to be better controlled and therefore has led to improvements in their general health.”*

*“Patients are now more aware of their conditions and aim to live healthier lifestyles.”*  
Clinician Respondents

Patients reported greater confidence in managing their condition and an increased awareness of having a healthy lifestyle.

*“I have now greater confidence that I otherwise would not have had, which has led to me managing my illness better and feeling healthier overall.”*

*“I am now more health conscious which has led to me eating healthier, living a healthier lifestyle and has increased my overall level of health.”*

*“The project has made me be more conscious of my medication. I now have it under control and my blood pressure is lowering.”*

Patient Respondents

Some patients indicated that due to the severity of their condition, their health is unable to improve, whilst others have not had the equipment long enough to see any material changes in their health and well-being.

### 6.13 **Conclusion on Health and Wellbeing**

Patients and clinicians are positive about the benefits that patients have derived from the Remote Tele-Monitoring’ pilot projects, including impact upon quality, safety and patient experience. In terms of quality of care, over one third of clinicians and over 84% of patients, consider that the scheme has helped to improve the overall standard of care that patients receive. Patients report their satisfaction with the continuous monitoring with this making them feel safer and more content - over 85% of patients and 57% of clinicians report that remote tele-monitoring has provided reassurance to them and their carers and made them feel safer at home.

Patients are positive about the benefits from the Remote Tele-Monitoring’ pilot project, including the impact upon quality of life and general health and well-being. Over 58% of patients and 43% of clinicians report that remote tele-monitoring has led to an overall improvement in the patient’s quality of life and ensured that their quality of life did not deteriorate. In addition, over 40% of clinicians and 65% of patients agree that the pilot has led to patients making changes to their lifestyle and to an overall improvement in patient health and well being

## 7. CONCLUSIONS AND RECOMMENDATIONS

### 7.1 Conclusions

This section sets out the Conclusions from the evaluation of the 'Remote Monitoring' pilot project.

In terms of the external evaluation, patients are almost overwhelmingly positive about the benefits they have derived from the Remote Tele-Monitoring' pilot project, including impact upon their quality of life and general health and well-being. A significant majority of clinicians also consider that the pilots have had a positive impact in terms of quality of patient life. Similarly, a large majority of patients report that participating in the remote tele-monitoring pilots has enabled them to reduce their reliance on hospital and nursing staff, including through a reduction in hospital admissions. There is, from many of the clinicians, a concern as to the impact that remote tele-monitoring has had on the clinicians' workloads. This is coupled with a concern from the clinicians that the pilot had still not achieved buy-in from GPs within the community. Finally, in terms of the actual operation of the pilot, similar trends emerged: patients are positive as to how the remote tele-monitoring pilot had worked in practice, including their confidence in the triage service provided. Clinicians, too, report positive experiences, although concern as to their comfort with triage nursing. There were also recommendations in terms of improvements in equipment adaptability and flexibility, as well as to the patient selection process.

Specific findings are set out below.

#### 7.1.1 Impact on patient care in terms of quality, safety and patient experience

Patients and clinicians are positive about the benefits that patients have derived from the Remote Tele-Monitoring' pilot projects, including impact upon quality, safety and patient experience. In terms of quality of care, over 33% of clinicians, as compared to over 80% of patients, consider that the scheme has helped to improve the overall standard of care that patients received. This difference in perception was also prevalent in the views on clinical nursing – none of the clinicians are not confident that clinical triage is suitable for monitoring patients from a distance where the nurse has not met the patient in person. This compares to 84% of patients who are satisfied with clinical triage. Patients report their satisfaction with the continuous monitoring with this making them feel safer and more content - 85% of patients and over 55% of clinicians report that remote tele-monitoring has provided reassurance to them and their carers and made them feel safer at home.

#### 7.1.2 Impact on patient care in terms of utilisation of resources

14% of clinicians were of the view that remote tele-monitoring had contributed to reduced utilization of hospital and community services, including reduced visits to GPs (43%). This compares to the patient feedback, with circa 86% of patients reporting that the pilot has had a positive impact on utilization of Trust resources. This corresponds to the overall view of patients that the pilots have led to improvements in their health and well-being.

#### 7.1.3 Impact on Staffing Resources

Whilst circa 20% of clinicians felt that remote tele-monitoring had a positive impact on organization effectiveness, all clinicians were of the view that it increased their workload. Impact on staffing resources is also impacted by the patient selection process – inappropriate patient selection, for example, of those where disease severity will continue to warrant high intensity of specialist community care, with little impact upon resources.

Clinicians have benefitted from the support of the Trust and the Tele-monitoring Co-ordinator.

Clinicians also noted that negative aspect of operating the scheme in the absence of GP buy in to the service, with many feeling that GPs should play a role in setting clinical parameters. Whilst 86% of clinicians were of the view that patient parameters are appropriately set, it was acknowledged that in the absence of GP involvement, and, in particular, for new clinicians joining the scheme, there can be a tendency to set narrow parameters with resultant increased alerts.

#### 7.1.4 Improvements in the quality of care patients receive

Generally, clinicians reported that patients continued to get the same, high, level of care regardless of the remote tele-monitoring scheme. Circa 30% of clinicians did report that remote tele-monitoring had led to an improvement in the service that they personally provided to the patient and that it allows nurses to better target those patients that need more support.

#### 7.1.5 Improvements in the quality of patient life

Patients are positive about the benefits from the Remote Tele-Monitoring' pilot projects, including impact upon quality of life and general health and well-being. 58% of patients report that remote tele-monitoring has led to an overall improvement in their quality of life and ensured that their quality of life did not deteriorate. In addition, over 40% of patients and clinicians agree that the pilots have led to patients making changes to their lifestyle and to an overall improvement in patient health and well being.

#### 7.1.6 Impact on informing patient centred case management, intermediate care schemes and medicines compliance, optimising the potential for independent living and enabling reductions in inpatient admissions to hospital

The Project has had a positive impact on further developing a patient-centred case management approach, with 86% of clinicians reporting remote tele-monitoring pilot project to be a patient centred service.

Clinicians suggested that the project empowers patients to better manage their illness. For example, the survey indicates that the project has had a positive impact on patients' medicine compliance, with over half of the clinicians and nearly three quarters of patients reporting that remote tele-monitoring project encourages patients to take their medicine at the right times and in the right quantities. One out of six clinicians and over 70% of patients reporting that the scheme has helped patients to become more independent in their day to day life, with this having a positive impact on their quality of life and general well-being.

With 86% of patients and one out of seven of clinicians agree that the remote tele-monitoring pilot has reduced the number of times that the patient has been admitted (or readmitted) to hospital. There are similar differences in perception as to the impact on the length of time in hospital – 100% of patients are of the view that tele-monitoring has reduced the length of time that they have had to stay in hospital, as compared to none of clinicians.

#### 7.1.7 Extent to which patients receive more and better targeted proactive support, enabling them to take greater control in the management of their own disease

Clinicians were less positive about the extent to which patients receive more and better targeted proactive support under tele-monitoring. One out of the seven clinicians considering that tele-monitoring enables them to focus more on one-to-one care by eliminating unnecessary visits and allows them to look after more patients than would otherwise have done. While two out of the seven clinicians agree that it allows them to better target those patients who need more support.

However, over 75% of patients and over 57% of clinicians report that remote tele-monitoring has enabled patients to manage their illnesses better and encourages them to think more about their symptoms.

#### 7.1.8 Extent to which there is improved quality assurance through auditable improvements in the flow of quality and timely information.

Over 80% of clinicians are satisfied with the way that tele-monitoring operates in practice – the quality of information is perceived as being good, the timeliness of alerts is good and clinicians generally feel comfortable in setting clinical parameters. Initial teething problems have largely been addressed, with clinicians also reporting the support received from the Trust tele-monitoring Co-ordinator.

Whilst some improvements were suggested relating to the flexibility and adaptability of equipment, clinicians were generally content with the accuracy of the readings and ease of use of the equipment.

With regards to the support received from the Service Provider of the triage service, clinicians were generally positive. Over 85% of clinicians agreed that the Service Provider provides a good service.

#### 7.1.9 Scheme is working well and should continue to attract funding

The tele-monitoring pilot reviewed as part of this evaluation would appear to have worked well, with positive benefits reported in terms of quality of patient life and reduced utilization of Trust resources.

Accordingly, it is the evaluator's view that the scheme should be considered for further funding.

The patient selection process is, however, all important, with clinicians confirming that tele-monitoring is not appropriate for all patients and that patient selection should be dependent on the severity of the disease as well as issues relating to patient dexterity etc.

Clinicians' concerns over increased workloads should also be addressed going forward, as should their concerns as to the lack of GP commitment to tele-monitoring.

The benefits of clinical triage should be assessed, and their potential to support clinicians as the latter seek to manage their workloads.

#### 7.1.10 Recommendations to ensure that lessons learned are transferred into the main tele-monitoring project

Recommendations following the evaluation of the remote tele- monitoring pilot project are:

- Appropriate Patient selection - the focus should be on identifying those patients with the best capacity to benefit from remote tele-monitoring, with the findings disseminated throughout all of the Trusts.
- Commitment and support – there is a need to ensure that GP commitment to the tele-monitoring service, and their support for clinicians in setting patient parameters etc. This should extend also to ensure that all clinicians are bought into the service.
- Resource Utilisation – there should be a baseline assessment of the resource utilization of clinicians as they are introduced into the remote tele-monitoring scheme, so as to enable a quantitative assessment of the impact of tele-monitoring on their respective workloads. There should also be a forum, facilitated by the Tele-Monitoring Coordinators by which

difficulties faced by clinicians, and solutions identified, are shared across all of the clinicians within the Trusts. This increased level of communication will be critical to ensuring the clinicians are both supported and bought in to the tele-monitoring service. This will also ensure a Regional rather than a localized response to remote tele-monitoring.

- Flexibility of the product offering – the emphasis in selecting peripheral products for use in tele-monitoring should be on ensuring that these offer flexibility to meet the needs of the wide variety of patient characteristics and illnesses and to enforce the principle that “one size does not fit all”.
- Triage - the benefits of the clinical triage service should be assessed, the role and responsibilities of those charged with the clinical triage service and their potential to support clinicians, particularly as the latter seek to manage their workloads.

**Appendix I – COPD Remote Monitoring –  
Clinician Questionnaire Statistical Analysis**

**Q1. What conditions/illnesses do you have responsibility for?**

**(PARA 4.1)**

|   | %    | N = |
|---|------|-----|
| Constructive Pulmonary Obstructive Disease (COPD) | 100% | 7   |

**Q2b. To what extent would you agree that the patients that were selected or recruited to participate in the Pilot were appropriate to participate?**

**(PARA 4.3)**

| Strongly Agree | Agree | Disagree | Strongly Disagree | N = |
|----------------|-------|----------|-------------------|-----|
| -              | 100%  | -        | -                 | 7   |

**Q3a. To what extent would you agree that tele-monitoring is appropriate for all patients with the primary condition that you have responsibility for?**

**(PARA 4.4)**

| Strongly Agree | Agree | Disagree | Strongly Disagree | N = |
|----------------|-------|----------|-------------------|-----|
| -              | 14%   | 72%      | 14%               | 7   |

**Q6. Approximately, what is the most appropriate timescale for the following types of patients to use tele-monitoring equipment? (NB. The respondent may only be able to respond for one of these conditions, if at all).**

**(PARA 4.5.1)**

| <b>6a</b>           | <b>COPD</b> |                 |               |                    |
|---------------------|-------------|-----------------|---------------|--------------------|
|                     | <i>Mild</i> | <i>Moderate</i> | <i>Severe</i> | <i>Very Severe</i> |
| Less than two month | 49%         | 29%             | 33%           | 40%                |
| 2-3 months          | 17%         | 14%             | 17%           | 20%                |
| 4-6 months          | -           | 29%             | -             | -                  |
| 7-12 months         | -           | -               | -             | -                  |
| More than 1 year    | 17%         | 14%             | 17%           | -                  |
| To end of life      | 17%         | 14%             | 33%           | 40%                |
| N =                 | 6           | 7               | 6             | 5                  |

| <b>6b</b>           | <b>Congestive Heart Failure (CHF)</b> |                 |                  |                    |
|---------------------|---------------------------------------|-----------------|------------------|--------------------|
|                     | <i>Level I</i>                        | <i>Level II</i> | <i>Level III</i> | <i>Level IV</i>    |
|                     | <i>Mild</i>                           | <i>Moderate</i> | <i>Severe</i>    | <i>Very Severe</i> |
| Less than two month | 100%                                  | 100%            | -                | -                  |
| 2-3 months          | -                                     | -               | -                | -                  |
| 4-6 months          | -                                     | -               | -                | -                  |
| 7-12 months         | -                                     | -               | -                | -                  |
| More than 1 year    | -                                     | -               | -                | -                  |
| To end of life      | -                                     | -               | -                | -                  |
| N =                 | 1                                     | 1               |                  |                    |

**Q7a. To what extent would you agree with the following statements about how the tele-monitoring project was implemented?**

|   | Strongly Agree | Agree | Disagree | Strongly Disagree | N = |
|---|----------------|-------|----------|-------------------|-----|
| The Project was explained to you in such a way that you fully understood what it was about <b>(PARA 4.7.1)</b>  | 29%            | 57%   | 14%      | -                 | 7   |
| You received adequate training to allow you to use the tele-monitoring equipment <b>(PARA 4.7.1)</b>            | 29%            | 57%   | 14%      | -                 | 7   |
| The way in which tele-monitors were ordered for placement was straightforward and efficient <b>(PARA 4.7.1)</b> | 17%            | 83%   | -        | -                 | 6   |

|  | Strongly Agree | Agree | Disagree | Strongly Disagree | N = |
|--|----------------|-------|----------|-------------------|-----|
| <b>4.7.2)</b>  |                |       |          |                   |     |
| Patients' parameters were appropriately established i.e. the patient measurements which would create an alert if they fell outside the specific criteria ( <b>PARA 4.7.2</b> ) | 14%            | 72%   | 14%      | -                 | 7   |
| You feel comfortable setting Patients' parameters ( <b>PARA 4.7.4</b> )  | 14%            | 57%   | 29%      | -                 | 7   |
| The patient information provided by the tele-monitoring equipment is easy to interpret ( <b>PARA 4.7.4</b> )   | 29%            | 57%   | 14%      | -                 | 7   |
| You are provided with adequate ICT or equipment to respond to Patient alerts ( <b>PARA 4.7.5</b> )   | -              | 40%   | 40%      | 20%               | 5   |
| Adequate support was provided by the Trust's Telemonitoring Coordinator ( <b>PARA 4.7.5</b> )  | -              | 50%   | 50%      | -                 | 4   |
| Adequate support was provided by the Trust's Management ( <b>PARA 4.7.5</b> )  | -              | 50%   | 50%      | -                 | 4   |
| The Patients' GPs are positive about and have taken some ownership of the Telemonitoring Project ( <b>PARA 4.7.6</b> )   | -              | 17%   | 33%      | 50%               | 6   |

**Q8a. To what extent would you agree with the following statements about the service provided by the Service Provider during the tele-monitoring project?**

| For Specific Pilots  | Strongly Agree | Agree | Disagree | Strongly Disagree | N = |
|--|----------------|-------|----------|-------------------|-----|
| Generally the Service Provider provided a good service ( <b>PARA 4.8.2</b> )   | 14%            | 72%   | 14%      | -                 | 7   |
| Generally the level (quantity) of communication from the Service Provider was good ( <b>PARA 4.8.2</b> )   | 14%            | 72%   | 14%      | -                 | 7   |
| Generally the mode (e.g. telephone call, text, e-mail) of Patient alerts received from the Service Provider is appropriate ( <b>PARA 4.8.3</b> )                       | 14%            | 72%   | 14%      | -                 | 7   |
| Generally the timeliness of receipt of Patient alerts from the Service Provider was good ( <b>PARA 4.8.3</b> )   | 14%            | 72%   | 14%      | -                 | 7   |
| Generally the quality of monitoring information provided by the Service Provider is good ( <b>PARA 4.8.5</b> )   | 14%            | 86%   | -        | -                 | 7   |
| Generally the timeliness of monitoring information provided by the Service Provider is good ( <b>PARA 4.8.5</b> )  | 14%            | 57%   | 29%      | -                 | 7   |
| The level and type of documentation that needs to be completed between you and the Service Provider at the Patient referral stage is appropriate ( <b>PARA 4.8.1</b> ) | 14%            | 86%   | -        | -                 | 7   |
| The Service Provider appropriately screens alerts before making contact with you ( <b>PARA 4.8.4</b> )   | 17%            | 49%   | 17%      | 17%               | 6   |

**Q9a. To what extent would you agree with the following statements about the tele-monitoring equipment and/or software?**

| The Tele-Monitoring Equipment .....        | Strongly Agree | Agree | Disagree | Strongly Disagree | N = |
|--|----------------|-------|----------|-------------------|-----|
| Is easy to calibrate ( <b>PARA 4.9.4</b> ) | 17%            | 67%   | 17%      | -                 | 6   |

| The Tele-Monitoring Equipment .....  | Strongly Agree | Agree | Disagree | Strongly Disagree | N = |
|--|----------------|-------|----------|-------------------|-----|
| Was fitted in a timely manner for Patients (PARA 4.7.3)                                    | -              | 100%  |          | -                 | 4   |
| Is easy for most Patients to use correctly (PARA 4.9.4)                                    | -              | 86%   | 14%      | -                 | 7   |
| Can be fitted or used in almost any home (PARA 4.9.1)                                      | -              | 100%  | -        | -                 | 7   |
| Currently asks appropriate questions for the Patients' conditions (PARA 4.9.3)             | -              | 83%   | 17%      | -                 | 6   |
| Asks questions that are easily understood by the Patients (PARA 4.9.3)                     | -              | 83%   | 17%      | -                 | 6   |
| Asks questions that encourage patients to think about their symptoms (PARA 4.9.3)          | -              | 100%  | -        | -                 | 7   |
| Is reliable (i.e. rarely has technical problems) (PARA 4.9.1)                              | -              | 50%   | 50%      | -                 | 6   |
| You or the Patients have experienced few, if any, problems with the equipment (PARA 4.9.1) | -              | 40%   | 60%      | -                 | 5   |

**Q9c. To what extent would you agree with the following statements about the tele-monitoring equipment and/or software?**

**(PARA 4.9.2)**

| It Provides accurate readings for: | Strongly Agree | Agree | Disagree | Strongly Disagree | N = |
|------------------------------------|----------------|-------|----------|-------------------|-----|
| Weight                             | 50%            | 50%   | -        | -                 | 4   |
| Heart rate                         | 43%            | 57%   | -        | -                 | 7   |
| Blood pressure                     | -              | 86%   | 14%      | -                 | 7   |
| Temperature                        | 17%            | 50%   | 33%      | -                 | 6   |
| Oxygen saturation                  | 43%            | 57%   | -        | -                 | 7   |
| Blood Glucose                      | -              | -     | 100%     | -                 | 1   |
| Peak flow                          | -              | -     | 100%     | -                 | 1   |

**Q10a. To what extent would you agree with the following statements about the impact that tele-monitoring has had on the number or frequency of visits that your patients have made to or received from health sector personnel relating to the Patients' Chronic conditions ?**

| Tele-Monitoring has.....  | Strongly Agree | Agree | Disagree | Strongly Disagree | Don't Know | N = |
|---|----------------|-------|----------|-------------------|------------|-----|
| Reduced the number of times that the participant patients have been admitted or readmitted to hospital (PARA 5.2)   | -              | 14%   | 71%      | -                 | 14%        | 7   |
| Reduced the number of times that the participant patients have self-referred themselves to A&E (PARA 5.3)   | -              | 29%   | 57%      | -                 | 14%        | 7   |
| Reduced the length of time that participant patients have had to stay in hospital (if they have been admitted to hospital since they got the telemonitoring equipment) (PARA 5.2) | -              | -     | 71%      | -                 | 29%        | 7   |
| Reduced the number of times that participant patients have had to visit their GP (PARA 5.4)   | -              | 43%   | 43%      | -                 | 14%        | 7   |

|  |   |     |     |     |   |   |
|--|---|-----|-----|-----|---|---|
| Reduced the number of times that participant patients have had to contact their Community Care Nurse by phone (PARA 5.4) | - | 14% | 57% | 29% | - | 7 |
| Reduced the number of visits that participant patients have needed from their Community Care Nurse (PARA 5.4)            | - | 14% | 72% | 14% | - | 7 |

**Q11a. To what extent would you agree with the following statements about the impact that tele-monitoring has had on your patients' life and wellbeing relating to the Patients' Chronic conditions?**

| Tele-Monitoring has.....  | Strongly Agree | Agree | Disagree | Strongly Disagree | N = |
|---|----------------|-------|----------|-------------------|-----|
| Improved Patients' overall Quality of Life (PARA 6.1)   | -              | 43%   | 57%      | -                 | 7   |
| Ensured that their Quality of Life did not deteriorate (PARA 6.1)   | -              | 29%   | 71%      | -                 | 7   |
| Made them feel less anxious or stressed about their health i.e. has provided them with 'peace of mind' (PARA 6.2) | -              | 57%   | 43%      | -                 | 7   |
| Provided them with reassurance and helped them feel safer at home (PARA 6.2)                                      | -              | 57%   | 43%      | -                 | 7   |
| Helped them become more independent in their day-to-day life (PARA 6.3)   | -              | 17%   | 83%      | -                 | 6   |

**Q12a. To what extent would you agree with the following statements about the impact that tele-monitoring has had on your patients' health relating to the Patients' Chronic conditions?**

| Tele-Monitoring has.....  | Strongly Agree | Agree | Disagree | Strongly Disagree | N = |
|---|----------------|-------|----------|-------------------|-----|
| Led to improvements in their health (PARA 6.8)  | -              | 29%   | 71%      | -                 | 7   |
| Helped them manage their illness better (PARA 6.8)  | -              | 57%   | 43%      | -                 | 7   |
| Encouraged them to take their medicine at the right times and in the right quantities (PARA 6.9)            | -              | 57%   | 43%      | -                 | 7   |
| Helped them become less reliant on the hospital sector or health sector practitioners in general (PARA 6.9) | -              | 29%   | 71%      | -                 | 7   |
| Encouraged them to think more about their symptoms (PARA 6.10)  | -              | 86%   | 14%      | -                 | 7   |

**Q13a. To what extent would you agree with the following statements about the impact that tele-monitoring has had on the patients' family or carers relating to the Patients' Chronic conditions?**

| Tele-Monitoring has.....                                      | Strongly Agree | Agree | Disagree | Strongly Disagree | N = |
|---|----------------|-------|----------|-------------------|-----|
| Has been of benefit to the families and/or carers (PARA 6.11) | 14%            | 72%   | 14%      | -                 | 7   |

**Q14a. To what extent would you agree with the following statements about the impact that tele-monitoring has had on patients relating to the Patients' Chronic conditions?**

| Tele-Monitoring .....  | Strongly Agree | Agree | Disagree | Strongly Disagree | N = |
|--|----------------|-------|----------|-------------------|-----|
| Reduces the amount of travel that they have to do to visit health professional relating to their chronic conditions (PARA 6.4) | -              | 29%   | 71%      | -                 | 7   |

|   |   |     |     |     |   |
|---|---|-----|-----|-----|---|
| Helps them receive more specialised care than they would otherwise have been able to access e.g. because of geography, transport issues or infirmity (PARA 6.4) | - | 43% | 57% | -   | 7 |
| Helps to improve the overall standard of care that they receive (PARA 6.5)  | - | 33% | 67% | -   | 6 |
| Reduces rates of mortality (PARA 6.6)   | - | -   | 83% | 17% | 6 |
| Improves patient and carer access to the information that they require to manage their conditions. (PARA 6.6)   | - | 57% | 43% | -   | 7 |
| Will increase patients' sense of depersonalisation due to the perceived lack of nurse to patient interaction. (PARA 6.6)  | - | 17% | 66% | 17% | 6 |
| Has challenged patients' beliefs that repeated hospitalization for the control of the symptoms of their condition is the expectation. (PARA 6.6)                | - | 25% | 50% | 25% | 4 |

**Q15a. To what extent has tele-monitoring led to patients making changes in their lifestyles?**

(PARA 6.7)

| A large Extent | Some Extent | No Extent | N = |
|----------------|-------------|-----------|-----|
| -              | 43%         | 57%       | 7   |

**Q15b. If changes have occurred, have these been positive or negative changes?**

| Positive | Negative | N = |
|----------|----------|-----|
| 33%      | 67%      | 3   |

**Q16a. To what extent would you agree that the tele-monitoring pilot project was a patient centred service?**

(PARA 5.1.1)

| Strongly Agree | Agree | Disagree | Strongly Disagree | N = |
|----------------|-------|----------|-------------------|-----|
| -              | 86%   | 14%      | -                 | 7   |

**Q17a. To what extent would you agree with the following statements about the impact that tele-monitoring has had on you or the Trust?**

| Tele-Monitoring .....   | Strongly Agree | Agree | Disagree | Strongly Disagree | N = |
|---|----------------|-------|----------|-------------------|-----|
| Provides you with ready access to useful information on your patients' conditions and treatment (PARA 5.5.1)                  | -              | 71%   | 29%      | -                 | 7   |
| Supports more effective and integrated working across health and social services. (PARA 5.5.2)                                | -              | 14%   | 86%      | -                 | 7   |
| Has allowed for better communication across and between multidisciplinary care teams. (PARA 5.5.2)                            | -              | -     | 100      | -                 | 6   |
| Has helped shift the balance of care towards the community and promoting the alternatives to hospital admission. (PARA 5.5.3) | 14%            | 14%   | 71%      | -                 | 7   |
| Has improved the service that you personally provide to your patients (PARA 5.5.4)  | -              | 29%   | 71%      | -                 | 7   |
| Allows for a better use of your resources (PARA 5.5.4)  | -              | 29%   | 43%      | 29%               | 7   |
| Allows for a better use of other health practitioner resources (PARA 5.5.4)   | -              | 14%   | 86%      | -                 | 7   |
| Has increased your workload (PARA 5.5.5)  | 57%            | 43%   | -        | -                 | 7   |

|  |     |     |     |     |   |
|--|-----|-----|-----|-----|---|
| You have adequate time to address patients' needs arising from tele-monitoring (PARA 5.5.5)  | -   | 57% | 29% | 14% | 7 |
| Has led to cost savings in terms of providing patient care (PARA 5.5.5)  | -   | -   | 50% | 50% | 6 |
| Allowed you to focus more on one-on-one care by actually reducing the daily visit schedule and eliminating unnecessary visits. (PARA 5.5.7)          | -   | 14% | 57% | 29% | 7 |
| Allows nurses to look after more Patients than they would otherwise be able to (PARA 5.5.7)  | -   | 17% | 50% | 33% | 6 |
| Allows nurses to better target those Patients that need more support (PARA 5.5.7)  | -   | 29% | 71% | -   | 7 |
| Is viewed as a way of replacing traditional nursing services with more impersonal service. (PARA 5.5.8)  | -   | 33% | 50% | 17% | 6 |
| Is accepted by the medical community at large (PARA 5.5.8)   | -   | -   | 71% | 29% | 7 |
| Reduces the need for emergent care (PARA 5.5.9)  | -   | -   | 83% | 17% | 6 |
| Enhances your patient management and home visit planning (PARA 5.5.10)   | -   | 29% | 57% | 14% | 7 |
| Instances of alerts created by patient measurements falling outside of specific guidelines have resulted in additional visits for you. (PARA 5.5.10) | 29% | 29% | 43% | -   | 7 |

**Q18a. To what extent would you be confident that tele-monitoring allows the provision of clinical triage to a patient from a distance?**

(PARA 4.10.1)

| Very Confident | Confident | Not Very Confident | Not at all Confident | N = |
|----------------|-----------|--------------------|----------------------|-----|
| -              | -         | 86%                | 14%                  | 7   |

**Q19a. To what extent would you be confident that tele-monitoring allows the provision of clinical triage to a patient from a distance by a nurse who has not met a Patient in person?**

(PARA 4.10.1)

| Very Confident | Confident | Not Very Confident | Not at all Confident | N = |
|----------------|-----------|--------------------|----------------------|-----|
| -              | -         | 100%               | -                    | 5   |

**Q23a. Overall, what has been the impact, if any, of tele-monitoring on your patients' health and wellbeing?**

(PARA 6.12)

| Significant improvement | Some improvement | No improvement | N = |
|-------------------------|------------------|----------------|-----|
| -                       | 40%              | 60%            | 5   |

**Q24a. Overall, how satisfied are you with the tele-monitoring support that your patients have received?**

(PARA 4.13)

| Very Satisfied | Satisfied | Dissatisfied | Very Dissatisfied | N = |
|----------------|-----------|--------------|-------------------|-----|
| 14%            | 86%       | -            | -                 | 7   |

**Appendix II – COPD Remote Monitoring –  
Patient Questionnaire Statistical Analysis**

**Q1. What conditions/illnesses is the tele-monitoring equipment being used to monitor?**

|   | %   | N = |
|---|-----|-----|
| Constructive Pulmonary Obstructive Disease (COPD) | 95% | 20  |
| Heart Failure and/or arrhythmia                   | -   | 20  |
| Heart Disease                                     | -   | 20  |
| Type 1 Diabetes                                   | -   | 20  |
| Type 2 Diabetes                                   | -   | 20  |
| Asthma  | 5%  | 20  |
| Bronchiectasis                                    | 5%  | 20  |
| Emphysema   | 5%  | 20  |

**Q2. Approximately, for how many months have you been using the tele-monitoring equipment?**

**(PARA 4.1)**

|                     | %   |
|---------------------|-----|
| Less than one month | -   |
| 1 to 2 months       | 15% |
| 3-4 months          | 60% |
| 5-6 months          | 10% |
| 7-8 months          | -   |
| 9-10 months         | 5%  |
| 11 months to 1 year | -   |
| More than 1 year    | 10% |
| <i>N</i> =          | 20  |

**Q3a. To what extent would you agree with the following statements about how the tele-monitoring project was implemented?**

|  | Strongly Agree | Agree | Disagree | Strongly Disagree | <i>N</i> = |
|--|----------------|-------|----------|-------------------|------------|
| The Project was explained to you in such a way that you fully understood what it was about <b>(PARA 4.7.1)</b> | 37%            | 63%   | -        | -                 | 19         |
| You received adequate training to allow you to use the tele-monitoring equipment correctly <b>(PARA 4.7.1)</b> | 37%            | 63%   | -        | -                 | 19         |
| The Equipment was installed in your house in an efficient manner <b>(PARA 4.7.3)</b>                           | 45%            | 50%   | 5%       | -                 | 20         |

**Q4a. To what extent would you agree with the following statements about the tele-monitoring equipment?**

| <b>The Tele-Monitoring Equipment .....</b>     | Strongly Agree | Agree | Disagree | Strongly Disagree | <i>N</i> = |
|--|----------------|-------|----------|-------------------|------------|
| Is easy to use <b>(PARA 4.9.1)</b>             | 58%            | 37%   | -        | 5%                | 19         |
| Reliable <b>(PARA 4.9.1)</b>                   | 30%            | 65%   | -        | 5%                | 20         |
| Provides accurate readings <b>(PARA 4.9.2)</b> | 42%            | 53%   | -        | 5%                | 19         |

**Q5a. To what extent would you agree with the following statements about the impact that tele-monitoring has had on the number or frequency of visits that you have made to or received from health sector personnel?**

| Tele-Monitoring has.....  | Strongly Agree | Agree | Disagree | Strongly Disagree | N = |
|---|----------------|-------|----------|-------------------|-----|
| Reduced the number of times that you have been admitted or readmitted to hospital (PARA 5.2)  | 15%            | 71%   | 7%       | 7%                | 14  |
| Reduced the length of time that you have had to stay in hospital (if you have been admitted to hospital since you got the tele-monitoring equipment) (PARA 5.2) | -              | 100%  | -        | -                 | 4   |
| Reduced the number of times that you have had to visit your GP (PARA 5.4)   | 11%            | 58%   | 26%      | 5%                | 19  |
| Reduced the number of times that you have had to contact by phone your Community Care Nurse (PARA 5.4)  | 17%            | 71%   | 6%       | 6%                | 18  |
| Reduced the number of visits that you have needed from your Community Care Nurse (PARA 5.4)   | 17%            | 71%   | 6%       | 6%                | 18  |

**Q6a. To what extent would you agree with the following statements about the impact that tele-monitoring has had on your life and wellbeing?**

| Tele-Monitoring has.....   | Strongly Agree | Agree | Disagree | Strongly Disagree | N = |
|--|----------------|-------|----------|-------------------|-----|
| Improved your overall Quality of Life (PARA 6.1)                           | 11%            | 47%   | 37%      | 5%                | 19  |
| Ensured that your Quality of Life did not deteriorate (PARA 6.1)           | 6%             | 47%   | 47%      | -                 | 17  |
| Made you feel less anxious or stressed about your health (PARA 6.2)        | 32%            | 47%   | 16%      | 5%                | 19  |
| Has provided you with 'peace of mind' (PARA 6.2)                           | 30%            | 55%   | 10%      | 5%                | 20  |
| Provided you with reassurance and helped you feel safer at home (PARA 6.2) | 30%            | 55%   | 10%      | 5%                | 20  |
| Helped you become more independent in your day-to-day life (PARA 6.3)      | 22%            | 50%   | 22%      | 6%                | 18  |

**Q7a. To what extent would you agree with the following statements about the impact that tele-monitoring has had on your health?**

| Tele-Monitoring has.....   | Strongly Agree | Agree | Disagree | Strongly Disagree | N = |
|--|----------------|-------|----------|-------------------|-----|
| Led to improvements in your health (PARA 6.8)  | 11%            | 50%   | 39%      | -                 | 18  |
| Helped you manage your illness better (PARA 6.8)   | 20%            | 55%   | 20%      | 5%                | 20  |
| Encouraged you to take your medicine at the right time and in the right quantities (PARA 6.9)              | 16%            | 58%   | 26%      | -                 | 19  |
| Helped you become less reliant on the hospital sector or health sector practitioners in general (PARA 6.9) | 20%            | 45%   | 35%      | -                 | 20  |
| Encouraged you to think more about your symptoms (PARA 6.10)   | 15%            | 65%   | 20%      | -                 | 20  |

**Q8a. To what extent would you agree with the following statements about the impact that tele-monitoring has had on your family or carers?**

**(PARA 6.11)**

| Tele-Monitoring has.....                         | Strongly Agree | Agree | Disagree | Strongly Disagree | N = |
|--|----------------|-------|----------|-------------------|-----|
| Has been of benefit to your family and/or carers | 54%            | 30%   | 8%       | 8%                | 13  |

**Q9a. To what extent would you agree with the following statements about the impact that tele-monitoring has had on you?**

| Tele-Monitoring .....  | Strongly Agree | Agree | Disagree | Strongly Disagree | N = |
|--|----------------|-------|----------|-------------------|-----|
| Saves you time   | 26%            | 47%   | 26%      | -                 | 19  |
| Reduces the amount of travel that you have to do (PARA 6.4)  | 25%            | 50%   | 25%      | -                 | 16  |
| Helped you receive more specialised care than you would otherwise have been able to access e.g. because of geography, transport issues or infirmity (PARA 6.4) | 22%            | 67%   | 11%      | -                 | 18  |
| Helped to improve the overall standard of care that you receive (PARA 6.5)   | 26%            | 58%   | 11%      | 5%                | 19  |

**Q10a. To what extent has telemonitoring led to making changes in your lifestyle?**

**(PARA 6.7)**

| A large Extent | Some Extent | No Extent | N = |
|----------------|-------------|-----------|-----|
| 20%            | 45%         | 35%       | 20  |

**Q11a. To what extent would you be confident about receiving clinical advice from a Nurse who has read the results of your tele-monitoring reports, but has not come out to visit you in person?**

**(PARA 4.10.1)**

| Very Confident | Confident | Not Very Confident | Not at all Confident | N = |
|----------------|-----------|--------------------|----------------------|-----|
| 32%            | 52%       | 5%                 | 11%                  | 19  |

**Q14a. Overall, what has been the impact, if any, of tele-monitoring on your health and wellbeing?**

**(PARA 6.12)**

| Significant improvement | Some improvement | No Change | Some Deterioration | Significant Deterioration | N = |
|-------------------------|------------------|-----------|--------------------|---------------------------|-----|
| 26%                     | 37%              | 32%       | -                  | 5%                        | 19  |

**Q15a. Overall, how satisfied are you with the tele-monitoring support that you received?**

**(PARA 4.13)**

| Very Satisfied | Satisfied | Dissatisfied | Very Dissatisfied | N = |
|----------------|-----------|--------------|-------------------|-----|
| 79%            | 21%       | -            | -                 | 19  |