

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



*This report has been prepared for, and only for DHSSPS/ECCH, and for no other purpose. We do not accept or assume any liability or duty of care for any other purpose or to any other person to whom this report is shown or into whose hands it may come save where expressly agreed by our prior consent in writing*

**May 2009**

**EUROPEAN CENTRE FOR CONNECTED HEALTH**  
**SOUTH EASTERN HEALTH AND SOCIAL CARE TRUST**  
**A TELE-MONITORING PILOT PROJECT**

**EVALUATION**

**CONTENTS**

	<b>Page</b>
1 INTRODUCTION AND BACKGROUND.....	1
2 PROJECT OVERVIEW & ACTIVITY .....	7
3 HSC INTERNAL EVALUATION.....	18
4 OPERATION OF THE PILOT.....	25
5 PERCEIVED IMPACT ON ORGANISATION AND RESOURCE UTILISATION.....	46
6 PERCEIVED IMPACT ON HEALTH AND WELLBEING.....	55
7 CONCLUSIONS AND RECOMMENDATIONS .....	<b>Error! Bookmark not defined.</b>

**APPENDICES**

- I Clinician Questionnaire Statistical Analysis
- II Patient Questionnaire Statistical Analysis
- III Glossary

## 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 South Eastern Health and Social Care Trust ('SEHSCT') tele-monitoring service pilot project.

### 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.

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.

---

<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.

## 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=6);
  - A telephone survey with participating patients (n=20);
  - A focus group session with participating clinicians;
  - A face-to-face consultation with the SEHSCT’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 has had on the trust and resource utilisation.
6. Perceived Impact on Health and Wellbeing	The perceived impact that the remote-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 PROJECT OVERVIEW & ACTIVITY

This section presents an overview of the South Eastern Health and Social Care Trust ('SEHSCT') tele-monitoring service pilot project, budget and activity levels.

### 2.1 Background

The SEHSCT's tele-monitoring service pilot project was developed in early 2007 in response to a call from DHSSPS for applications for funding under its Telehealth Development Scheme. The pilot project 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 the following services:

- Respiratory consultant teams and COPD specialist teams; and
- Diabetes Community Nurses and the Ulster Hospital Diabetes team.

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.

It was considered at the outset that telemonitoring would support more effective patient case management through the early identification of clinical changes in condition, enabling a quicker response by case managers at an earlier stage to reduce the likelihood of exacerbation of condition, and reduce the need for hospitalisation/ re-hospitalisation.

### 2.2 Project Aims, Objectives and Outcomes

#### Aims

The overall aims of the project are:

- To identify patients who are frequent and unplanned users of secondary care who would benefit from this pilot;
- To prevent their inappropriate admission to hospital;
- To support their timely discharge when an admission is unavoidable;
- To put in place tele-monitoring arrangements as part of a whole system approach to the delivery of person centred care and to establish if short term or continuous monitoring of patients is needed; and
- To establish the impact on users of greater involvement in managing their care i.e. becoming true partners in self-managing their care.

#### **Project targets - COPD Telemonitoring to December 2008**

In the Lisburn area, following an initial successful pilot of 22 patients, 12 patients with COPD had their vital signs monitored at home. These included blood pressure, weight, oxygen levels and pulse rates. In addition, the scheme provided for qualitative information to be supplied by the patient on their general health.

The Trust indicated that it was possible to bring on an additional 50 patients to the scheme. The duration would be for 12 weeks on average, at the end of which period a further 50 patients would be brought on to the scheme. In total, therefore, the expansion of the scheme would provide for an additional 100 patients to benefit from home monitoring by December 2008. To secure the additional provision, the Trust had identified a non-recurrent resource requirement of £100,000.

**Project targets - Diabetes to December 2008**

There were two pilot schemes providing for remote telemonitoring of diabetes in the Trust.

There were, at this time, 20 patients whose blood sugar levels, heart rate and oxygen levels were monitored using remote monitoring devices with the data transferred down a telephone line and captured by a remote monitoring service provider, who triggers alerts should any of the daily readings be outside their pre-determined parameters.

The Trust indicated that they could expand this scheme by bringing on a further 16 patients in June and July 2008. Monitoring was usually for a fixed period at the end of which period a new cohort of patients would be brought on to the scheme. By December 2008, this would allow for an additional 32 patients to have had access to remote telemonitoring for their condition. To secure the additional provision, the Trust had identified a non-recurrent resource requirement of £32,000.

**Projected Participation levels and Budget**

The projected level of participation at the outset was summarised:

Scheme	Current Position	Additional Patients		Additional Resource Requirement
		By end June/ end July 08	Total by end December 08	
COPD Remote Telemonitoring	12	50	100	£100,000
Diabetes Remote Monitoring	20	16	32	£32,000

Following from this, the following monies were secured (for this pilot study) as follows:

	Pilot Extension £	No of additional patients
COPD Remote Monitoring	44,050	100
Diabetes Remote Monitoring	30,240	36

The total patients and costs for the SEHSCT telehealth projects were therefore:

	Total number of patients who will have accessed the service by March 2009	Allocation £
Commencement of Chronic Heart Failure	20	22,600
COPD	150	56,700
Diabetes – remote monitoring	46	13,608
Diabetes – Di@I-log	200	42,450
Telehealth Support	-	-
	<b>416</b>	<b>135,438</b>

**This evaluation is in respect of the COPD and Diabetes Remote Monitoring project.**

It is noted that an allocation of £60k was made available on a non-recurring basis for the 2008/09 year and in addition for the 2009/10 year to facilitate and support the introduction of remote monitoring at a local level.

### 2.3 Objectives of Remote Telemonitoring Scheme

The service provided a clinical triage service, using nurses employed by the designated Service Provider.

The objectives of the pilot scheme within the Trust were highlighted within the Contract for the Provision of Community Services 2008/ 2008 (with the Service Provider) 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 (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 acre (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

A summary schedule is also prepared monthly, showing:

<b>Start date of programme</b>	
<b>Date of report</b>	
Finish date of programme	
Total number of	Individual patients on programme
	Patients with one telehealth episode of care
	Patients with two telehealth episodes of care
	Patients with three telehealth episodes of care
	Patients currently on live monitoring at the date of this report
	Vital only alerts
	Vitals & question alerts
	Question only alerts
	Telehealth consultations
	Requests
	Escalations to community nursing teams
Prevented admissions documented	
Total time of telephone consultations with NHS Trust telehealth nurses	
Total number of hours worked reviewing patients	
Average time reviewing each patient (in hours)	

#### 2.4.11 Staff Training

The Service Provider is responsible for the provision of training on telemonitoring equipment to all nursing staff who is involved in the programmes. They are also responsible for provision of any necessary demonstrations to other Trust staff who may be involved in the patients’ care i.e. Consultants or Out-of-Hours GP Services.

#### 2.4.12 Equipment

The Service Provider is responsible for the provision of the equipment listed below:

- 1x Honeywell HomMed Genesis Monitor (FDA Class II approved); or
- 1x Care Companion Monitor (FDA Class II approved);
- 1x Set of Digital Load bearing scales;
- 1x Standard Blood Pressure Cuffs (Different size cuffs can be supplied depending on patient assessment);
- 1x Spo2 Finger probes for oxygen saturation readings; and
- Ensuring the correct equipment is given to the patient.

Glucometers are supplied by the South Eastern Health and Social Care Trust. Patients therefore require some dexterity in fitting the above.

### 2.5 Participation Levels

#### 2.5.1 Referrals by Month

Referrals are reported by the start dates associated with each of the “additional” tranches of patients, ie at April 2008 and January 2009 for COPD and November 2008 and January 2009 for Diabetes. The COPD pilot is being undertaken across three Community Nursing teams, namely Lisburn area, the Downe area and the North Down area. The Diabetes pilot is being undertaken across two teams, namely the Ulster Hospital Diabetes team and the Community Diabetes team at SEHSCT. Total patient referrals are:

**Figure 2.1: Patient referrals**

Trust	Start	Finish	Disease	Total	Mar 09	Feb 09	Jan 09	Dec 08	Nov 08	Oct 08	Sept 08	Aug 08	Jul 08	Jun 08	May 08	Apr 08	Mar 08
SE Trust	Apr 08	Dec 08	COPD	100		100	100	100	82	70	44	32	18	17	16	10	7
SE Trust	Jan 09	Mar 09	COPD	57	57	40	28	11	-								
SE Trust	Nov 08	Mar 09	Diabetes	36	36	34	19	13	9								
SE Trust	Jan 09	Mar 09	Diabetes	10													
Sub total			COPD & Diabetes	203													
SE Trust	Jan 09	Mar 09	CHF	17	17	14	-										
<b>Total number of patients managed</b>				<b>220</b>													

Of the 157 COPD Patients referred to the pilot, these can be analysed by area:

**Figure 2.2: COPD referrals**

	Total	Mar 09	Feb 09	Jan 09	Dec 08	Nov 08	Oct 08	Sept 08	Aug 08	Jul 08	Jun 08	May 08	Apr 08	Mar 08
Lisburn	72	10	7	6	7	6	11	2	5	1	1	6	3	7
Downe Area	52	4	3	3	15	6	10	2	9					
North Down	33	3	2	8	7	-	5	8						
<b>Total Cumulative</b>	<b>157</b>	<b>157</b>	<b>140</b>	<b>128</b>	<b>111</b>	<b>82</b>	<b>70</b>	<b>44</b>	<b>32</b>	<b>18</b>	<b>17</b>	<b>16</b>	<b>10</b>	<b>7</b>

## 2.5.2 Analysis by COPD Patients

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

**Figure 2.3: Analysis for COPD**

		<b>COPD Lisburn</b>	<b>COPD Downe</b>	<b>North Down</b>	<b>Total COPD</b>
<b>Start date of programme</b>		<b>8 Aug 2008</b>	<b>6 Aug 2008</b>	<b>16 Sept 2008</b>	
<b>Date of report</b>		<b>24 Mar 2009</b>	<b>24 Mar 2009</b>	<b>24 Mar 2009</b>	<b>24 Mar 2009</b>
Finish date of programme		Still Running	Still Running	Still Running	Still Running
Total number of	Individual patients on programme	50	35	27	112
	Patients with one telehealth episode of care	50	35	27	112
	Patients with two telehealth episodes of care	14	24	2	40
	Patients with three telehealth episodes of care	0	5	1	6
	Patients currently on live monitoring at the date of this report	15	22	12	49
	Vital only alerts	436	383	128	947
	Vitals & question alerts	174	167	68	409
	Question only alerts	201	178	157	536
	Telehealth consultations	1,025	970	489	2,484
	Requests	388	381	133	902
	Escalations to community nursing teams	145	117	45	307
Total time of telephone consultations with NHS Trust telehealth nurses		101 Hours 39 Mins	66 Hours 18 Mins	46 Hours 18 Mins	214 hours 15 Mins
Total number of hours worked reviewing patients		1,134	690	567	2,391
<b>ANALYSIS</b>					
Percentage (%) of total COPD individual patients on programme		45%	31%	24%	100%
Percentage (%) of patients with one telehealth episode of care		45%	31%	24%	100%
Percentage (%) of patients with two telehealth episode of care		35%	60%	5%	100%
Percentage (%) of patients with three telehealth episode of care		0%	83%	27%	100%
Percentage (%) of patients currently live		30%	45%	25%	100%
Average No of vital only alerts by patient		8.72	10.94	4.74	8.45
Average No of vital and Questions alerts by patient		3.48	4.77	2.51	3.65
Average No of Question only alerts by patient		4.02	5.08	5.81	4.78
Average No of Telehealth Consultations by patients		20.5	27.7	18.1	22.1
Average No of requests by patient		7.76	10.8	4.92	8.05
Average No of escalations to community nursing teams by patient		2.9	3.3	1.6	2.74
Average time of telephone consultations with NHS Trust telehealth nurses by patient		2 Hours 2 Mins	1 Hour 53 Mins	1 Hours 42 Mins	1 Hours 54 Mins
Average time reviewing each patient (in hours)		22.7	19.7	21	21.34
Number of clinicians		o/s	o/s	o/s	o/s

### 2.5.3 Analysis by Diabetes Patients

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

**Figure 2.4: Analysis for Diabetes**

<b>South Eastern Health &amp; Social Care Trust - Programme Activity for Diabetes (at 24 March 2009)</b>				
	<b>Ulster Hospital Diabetes</b>	<b>Community Diabetes</b>	<b>Total Diabetes</b>	
<b>Start date of programme</b>	<b>12 Nov 2008</b>	<b>31 Jan 2009</b>		
<b>Date of report</b>	<b>24 Mar 2009</b>	<b>24 Mar 2009</b>	<b>24 Mar 2009</b>	
Finish date of programme	Still Running	Still Running	Still Running	
Total number of	Individual patients on programme	31	16	47
	Patients with one telehealth episode of care	31	16	47
	Patients with two telehealth episodes of care	0	0	0
	Patients with three telehealth episodes of care	0	0	0
	Patients currently on live monitoring at the date of this report	17	15	32
	Vital only alerts	144	45	189
	Vitals & question alerts	30	23	53
	Question only alerts	11	1	12
	Telehealth consultations	283	110	393
	Requests	59	20	79
Escalations to community nursing teams	15	6	21	
Total time of telephone consultations with NHS Trust telehealth nurses	12 Hours 18 Mins	4 Hours 50 Mins	17 Hours 8 Mins	
Total number of hours worked reviewing patients	396	156	552	
<b>ANALYSIS</b>				
Percentage (%) of total Diabetic individual patients on programme	66%	34%	100%	
Percentage (%) of patients with one telehealth episode of care	66%	34%	100%	
Percentage (%) of patients with two telehealth episode of care	n/a	n/a	n/a	
Percentage (%) of patients with three telehealth episode of care	n/a	n/a	n/a	
Percentage (%) of patients currently live	53%	47%	100%	
Average No of vital only alerts by patient	4.64	2.81	4.02	
Average No of vital and Questions alerts by patient	0.96	1.43	1.12	
Average No of Question only alerts by patient	0.35	0.06	0.25	
Average No of Telehealth Consultations by patients	9.12	6.87	8.36	
Average No of requests by patient	1.90	1.25	1.68	
Average No of escalations to community nursing teams by patient	0.48	0.37	0.44	
Average time of telephone consultations with NHS Trust telehealth nurses by patient	23 Mins	18 Mins	21 Mins	
Average time reviewing each patient (in hours)	12.8	9.8	11.74	
No of clinicians	o/s	o/s	o/s	

## 2.5.4 Combined Analysis by COPD and Diabetes

Figure 2.5: Combined COPD and Diabetes

South Eastern Health & Social Care Trust - Programme Activity for COPD and Diabetes (at 24 March 2009)				
		Total COPD	Total Diabetes	Total COPD and Diabetes
Date of report		24 Mar 2009	24 Mar 2009	24 Mar 2009
Finish date of programme		Still Running	Still Running	Still Running
Total number of	Individual patients on programme	112	47	159
	Patients with one telehealth episode of care	112	47	159
	Patients with two telehealth episodes of care	40	0	40
	Patients with three telehealth episodes of care	6	0	6
	Patients currently on live monitoring at the date of this report	49	32	81
	Vital only alerts	947	189	1,136
	Vitals & question alerts	409	53	462
	Question only alerts	536	12	548
	Telehealth consultations	2,484	393	2,877
	Requests	902	79	981
Escalations to community nursing teams	307	21	328	
Total time of telephone consultations with NHS Trust telehealth nurses		214 hours 15 Mins	17 Hours 8 Mins	231 Hours 23 Mins
Total number of hours worked reviewing patients		2,391	552	2,943
<b>ANALYSIS</b>				
Average No of vital only alerts by patient		8.45	4.02	7.14
Average No of vital and Questions alerts by patient		3.65	1.12	2.90
Average No of Question only alerts by patient		4.78	0.25	3.44
Average No of Telehealth Consultations by patients		22.1	8.36	18.09
Average No of requests by patient		8.05	1.68	6.16
Average No of escalations to community nursing teams by patient		2.74	0.44	2.06
Average time of telephone consultations with NHS Trust telehealth nurses by patient		1 Hours 54 Mins	21 Mins	1 Hour 27 Mins
Average time reviewing each patient (in hours)		21.34	11.74	18.5
No of clinicians		o/s	o/s	o/s

### 3 HSC INTERNAL EVALUATION

This section presents details of the internal evaluations conducted by HSC for the remote tele-monitoring project.

#### 3.1 COPD Telehealth Pre-Pilot

##### 3.1.1 Introduction to COPD Telehealth Pre-Pilot Project

The South Eastern Health and Social Care Trust in partnership with the Service Provider, initiated a project to monitor patients with COPD living at home using Telehealth technology. Funding secured at the end of 2006's financial year of £30,000 allowed the Trust to monitor a total of 22 patients.

Patients recruited to this project represented a broad cross-section of the case load for the Community Respiratory Team based at Lagan Valley Hospital in Lisburn, Co Antrim.

It was decided to monitor the patients for approximately 12 weeks and one patient for the length of the project which was 11 months. A total of 22 patients were recruited onto the project, with 17 of them providing full evidence towards the evaluation of the project. The remaining five patients were not able to provide full evidence as three deceased during monitoring and two failed to complete the project.

The Evaluation Report prepared by the Trust, dated May 2008, noted:

- A number of outcomes and goals were achieved in the project and evidence suggested that Telehealth could be used as a method of reducing hospital admissions. It appeared to promote patients to become better managers of their long term condition and ultimately enjoy a better quality of life.
- One of the five patients who failed to complete, experienced difficulties with the Telehealth equipment, due to problems understanding the question and answer sessions. This patient also left the project after eight weeks as he could not commit to daily monitoring due to holiday plans. If this patient had been able to stay at home, his difficulties could have been addressed using a different Telehealth monitor.
- Compliance of the remaining 20 patients using the Telehealth technology was 100%. All of the patients found the monitors easy to use.
- Patients on the project stated that if they were given the choice of being cared for in a hospital setting or at home, they would prefer to be cared for in their own home environment with Telehealth as a support.

During the Telehealth Project, it was found that the use of the home monitoring systems improved patient knowledge about their COPD. This directly resulted in fewer unnecessary appointments with their GP. In essence patients themselves had become ultimately better self managers.

A number of patients on the project had difficulty with their smoking cessation plan. The first monitors used in the project were limited in the questions and education provided on a daily basis. This caused a failure in addressing this high priority issue. The second phase of the project, with different technology, allowed the creation of specific questions and health education tips.

### 3.1.2 Programme Results from COPD Pre-pilot

The feedback is as follows:

#### Reduction in Hospital Admissions

Statistics	Total	Trend	Value
Total admissions before monitoring period	17		
Total admissions during monitoring period	15	Down	11.77%
Total bed days before monitoring	120		
Total bed days during monitoring	72	Down	40%
Average length of stay before monitoring	7.06 days		
Average length of stay during monitoring	4.8 days	Down	2.26 days

No change in A&E visits without admission are:

Statistics	Total	Notes
A&E Visits without admission before monitoring	7	1 Chest Pain
A&E Visits without admission during monitoring	7	1 High Blood Pressure

Note: All other attendances appeared to be with COPD.

#### St Georges Questionnaires

In order to evaluate the patient's health before and after the monitoring programme, the St Georges questionnaire was completed at the installation and uplift stages of the monitoring programme. The following are the statistics gathered from the 19 patients who were able to complete both questionnaires.

Statistics	Total	Trend	Value
Total scores before monitoring	349		
Total scores after monitoring	261	Down	25%
Total number of patients with a reduction in their score	18		
Total number of patients with an increase in their score	0		
Total number of patients with no change in their score	1		

Note: three scores missing as patients were end of life.

#### Face to Face Visits Made by the Community Respiratory Team

Statistics	Total	Trend	Value
Total face to face visits before the monitoring programme	159		
Total face to face visits during the monitoring programme	120	Down	24.53%

#### Telephone Support Calls Made to Patients by the Community Respiratory Team (CRT)

Statistics	Total	Trend	Value
Total phone calls before monitoring period	95		
Total phone calls during monitoring period	104	Up	8.66%

**GP Visits**

Statistics	Total	Trend	Value
Total GP visits before monitoring period	49		
Total GP visits during monitoring period	38	Down	22.45%
Total phone calls before monitoring period	5		
Total phone calls during monitoring period	10	Up	50%

**3.1.3 Conclusion**

In conclusion, the patients felt empowered and there was an overall improvement in their quality of life. The majority of the patients also kept their own note books of their vital signs.

An advantage of SEHSCT using the clinical triage service is that information goes initially to the Service Provider nurses. As trained nurses, they are able to interpret the vital signs. If there was a slight variation in their vital signs they telephoned the patient to establish if they had been doing anything prior to monitoring, advised them to rest and repeat their monitoring in half an hour. The CRT was only alerted when a significant difference was noted. Due to this, the patients build up a rapport with the Telehealth Nurses and overall felt they had more support.

In another pilot study running in Northern Ireland, the Respiratory nurse had to educate the patient on how to use the equipment. Also the alerts/escalations are dealt with directly by the Respiratory Team as the company which provides the service does not provide the triage system that the Service Provider provides.

The Service Provider is proving time consuming as most patients are alerting daily at present and it is the responsibility of their team to look at these daily and triage themselves. This prevents them from increasing their caseload. All the patients monitored in the morning, this enabled the Telehealth Nurses to have the information before 12 noon.

This proved very important because those patients who had alerted and required intervention were able to get treatment for their exacerbation started that day. These alerts, when acted upon by the CRT and treatment started, are counted by the Service Provider as avoided admissions to hospital.

Monitoring with the Service Provider proved very efficient for the CRT. They installed the monitors and if there were any problems, it was their responsibility to fix them. Overall the quality the patients received from the company was of a high standard.

**3.2 Evaluation – January 2009**

**3.2.1 Evaluation Questionnaire – Patient**

**37 patients (27 COPD, 4 Diabetes, 2 CHF and 4 other) returned questionnaires to Trust staff in 2009.**

Patient Benefits	Strongly Agree	Agree	Disagree	Strongly Disagree	Not Applicable
• The monitoring system assisted me in managing my health on a day to day basis	19	11			
• The remote monitoring system has reduced the number of visits I made to my GP	19	11			1
• I believe my own monitoring of my condition has reduced the number of nurse/ community team/health professional visits	18	10	1		1
• 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)	13	10	3	1	3

<ul style="list-style-type: none"> <li>The remote monitoring system has enabled me to better manage my own condition and become more involved in my health care</li> </ul>	16	11	3		1
<b>Equipment</b>					
<ul style="list-style-type: none"> <li>The monitoring system was easy for me to use</li> </ul>	20	8	2		
<ul style="list-style-type: none"> <li>I consider the installation was prompt, efficient and tidy</li> </ul>	24	6			
<ul style="list-style-type: none"> <li>I believe the monitoring questions encouraged me to think about my symptoms</li> </ul>	19	10	1		

Comments were:
<p>“I found the monitor a great boost to my confidence; in that I could see my reports and also that a health profession was looking at them as well. On the few times that my reports fell below my limits or I answered a question differently, the response time by phone call was very fast, from the monitoring staff, which had a comfort to me also the advice was reassuring and helpful. I regret still not having the monitor now it’s gone. There are times I am sure it would have been a benefit on the days I have not felt too well. It would have eased my fears.”</p> <p>“It made me feel safe as I could try to monitor my condition. It gave me an idea when things were not too good when sometimes I thought I was imaging that I was more ill as I have good days and bad days.”</p> <p>“During the monitoring period the readings indicated that a chest infection was beginning. Acting on Telehealth advice, I began an immediate course of antibiotics and increased daily steroid intake. I informed my GP accordingly who contacted me by phone the same day and visited me within 48 hours. He confirmed that the infection had been caught in time and issued me with a repeat emergency prescription for antibiotics and steroids for future use. Any time I talked to the Telehealth staff on the phone I found them to be very efficient, helpful and user friendly.”</p> <p>“GP/Nurses still visiting but not necessary to do with COPD each time-other conditions also present”</p> <p>“Unable to manage BP cuff. Had to warm hands before using sats probe. Asked to re-read BP a couple of times.</p>

30 of the 37 patients were asked to take more than one reading:

Reasons for taking more than one reading	Number of Patients
Asked to do so	24
Reassurance	3
Other reason	3
<b>Total</b>	<b>30</b>

7 patients have been admitted to hospital as a result of their condition:

	Number of Patients
No times	22
Once	5
Twice	2
<b>Total</b>	<b>29</b>

### 3.2.2 Evaluation Questionnaire – Professional Worker

22 questionnaires were returned from professional workers (responsible for 21 COPD patients, 3, for Diabetes, 1 for CHF and 5 other). Feedback was:

Quality	Strongly Agree	Agree	Disagree	Strongly Disagree	Not Applicable
<ul style="list-style-type: none"> <li>Introduction of remote monitoring has decreased the number of hospital admissions relating to the patient’s chronic condition</li> </ul>	6	11	1	1	1
<ul style="list-style-type: none"> <li>Introduction of remote monitoring has decreased the number of GP visits relating to the patient’s chronic condition</li> </ul>	6	16			
<ul style="list-style-type: none"> <li>Introduction of remote monitoring has decreased the number of nurse visits relating to the patient’s chronic condition</li> </ul>	6	13	2		1

Comments were:

“Patient did not have any hospital admissions in previous year, but previously had a couple of admissions to ICU. Due to Telehealth, the patient had an appropriate admission to hospital and did not require ICU.”

### 3.2.3 Evaluation Questionnaire – Carer

18 questionnaires were returned from carers. Feedback was:

Question to Carer	Strongly Agree	Agree	Disagree	Strongly Disagree	Not Applicable
<b>Patient Benefits</b>					
<ul style="list-style-type: none"> <li>I consider remote monitoring has improved the level of care given to the person I care for.</li> </ul>	11	7			
<ul style="list-style-type: none"> <li>I consider remote monitoring has helped prevent the person I care for being admitted to hospital.</li> </ul>	11	4	3		
<ul style="list-style-type: none"> <li>When assisting the person to operate the remote monitoring equipment, I found it easy to use.</li> </ul>	13	3			2
<ul style="list-style-type: none"> <li>Remote Telemonitoring gave me reassurance about the condition of the person I care for and supported me in my care for that person.</li> </ul>	11	7			

Comments highlighted the benefit to carers as well as issues over technical faults:

“I found it very reassuring knowing that a health professional was monitoring the results daily.”  
 “If it had of worked properly it would have been helpful”  
 “The monitor had not been installed long enough to tell and the patient operated it himself”  
 “He’s not keen on going to hospital and will avoid at all cost”  
 “The friendly and rapid follow-up to an alteration in the patient’s responses gave me great reassurance that I was not alone, experts were making informed judgments and would advise early action. My husband can deteriorate very quickly and in the past, we have not reacted quickly enough to seek help and he has ended up in hospital. He forgot that parameters were set up for him and a record was kept for comparison. Personally, I slept better which was wonderful! Otherwise I would tend to sleep lightly (or not at all) since I seem to have conditioned myself to listening to his breathing, coughing etc.”

### 3.3 First Report and Evaluation of the Ulster Community Hospital Diabetes TeleMonitoring Pilot

#### 3.3.1 Initiation of Telehealth Monitoring at Ulster Community Diabetes Team

This initial report, dated February 2009, looked at the results of utilising remote telemonitoring on 9 patients of which 8 completed the 12-week programme. Referrals were taken from the following areas:

- Hospital based Consultant Diabetologists - 2
- Hospital based Diabetes Nurse Specialists - 7
- Community based Diabetes Nurse Specialists - 0

#### 3.3.2 Monitoring

Baseline monitoring, setting limits and termination of monitoring were stated to be all carried out according to the SE Trust Telehealth Procedures.

#### 3.3.3 Results

One patient discontinued the monitoring after four weeks, as the equipment was unable to record their blood pressure.

The following are the results of the remaining 8 patients who completed the 12-week programme.

HbA1c reductions	
Total number who reduced HbA1c	<b>100%</b>
Average reduction	2.5%
Lowest reduction	1%
Highest reduction	4.2%

Blood Pressure reductions	
Total number with reduction in blood pressure	<b>75%</b>
Total number on target for blood pressure	50%
Total number started on anti-hypertensive therapy	25%

13 patients are currently on remote telemonitoring and another 7 are waiting for this to be installed.

#### 3.3.4 Summary

In terms of achieving targets and therefore health improvement, this is considered by the Specialist Diabetes team to be a very positive start.

There is an increase in workload, which can be time consuming and if specific time is not allocated for telehealth, this could prove detrimental. These resource issues may make a difference when expanding the service.

The layout of data (patient trends) could be presented in a clearer fashion.

### 3.3.5 Benefits

Benefits of the system are:

- Removes the need for constant phone calls to patients
- Triage of data by Telehealth staff alerts specialist to address any problems promptly
- It provides a wealth of information on:
  - Blood sugar
  - Blood Pressure
  - Weekly weight
- Telehealth installs and teach the patient the use of the equipment thus removing this burden from the specialist practitioner (unlike [Di@I-log](#)).
- A weekly review of data enables:
  - Insulin adjustment
  - Commencement of additional treatment
  - Change of treatment
  - Up-titration of existing medication

### 3.4 Conclusion

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

- The patients felt empowered and there was an overall improvement in their quality of life. The majority of the patients also kept their own note books of their vital signs.
- 100% of patients agree that the monitoring system has assisted them in managing their health on a day to day basis and has reduced the number of visits made to their GP, with over 75% of patients stating that it has reduced the number of hospital admissions.
- This view is also held by the clinicians, with 100% reporting a perceived reduction in GP visits and 78% reporting a reduction in hospital admissions.
- The feedback from carers was overwhelmingly positive.

## 4 OPERATION OF THE PILOT

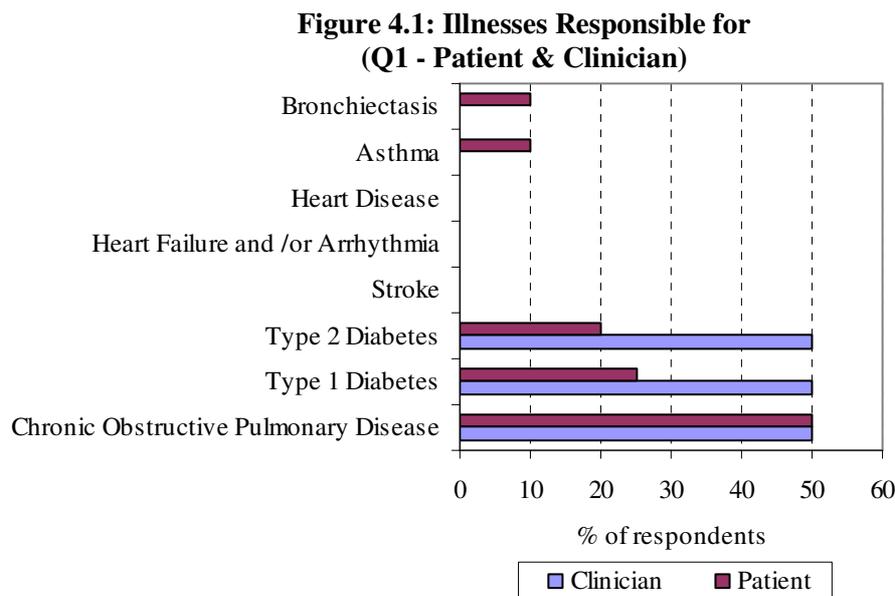
Section 4 considers clinicians’ and patients’ views on the operation of the tele-monitoring pilot, including the patient selection and recruitment processes, the criteria that were utilised during the pilot projects, the ease of use of the equipment, and the level of support from the Service Provider.

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

Of the 6 clinicians included in the consultation process, 3 (50% N=6) are responsible for Chronic Obstructive Pulmonary Disease (COPD), 3 (50% N=6) are responsible for Heart Failure/Arrhythmia, and a further 3 (50% N=6) are responsible for Type 1 Diabetes and Type 2 Diabetes.

Half (50%, N=20) of patients consulted are using tele-monitoring equipment to monitor Chronic Obstructive Pulmonary Disease (COPD), 25% (N=20) of respondents use the equipment to monitor Type 1 diabetes, 20% (N=20) use the equipment to monitor Type 2 diabetes and 10% (N=20) use the equipment to monitor asthma and bronchiectasis. Details are:

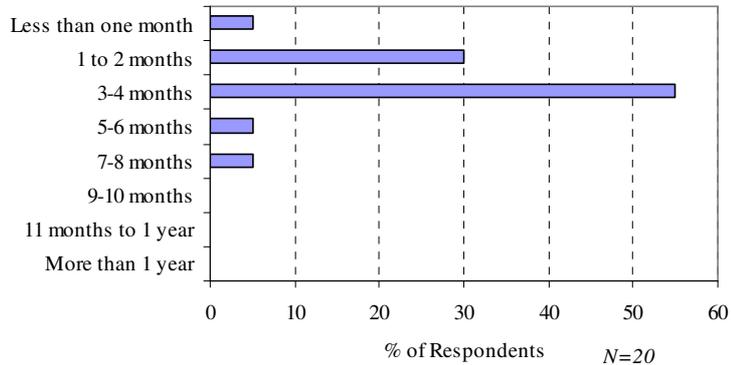


As noted in para 2.4.1, patients are initially put on 12 week block packages of care, however these may be extended into second or third 12 week blocks if considered appropriate/ necessary by the Trust specialist nursing teams.

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

- The majority of patients (55%, N=20) have been using the tele-monitoring equipment for a period of 3-4 months;
- 30% (N=20) have been using the equipment for a period of 1-2 months;
- 5% each (N=20) have been using the equipment for less than one month, 5-6 months and 7-8 months.

**Figure 4.2: Duration of use of tele-monitoring equipment (Q2 - Patient)**



It was noted by some clinicians that the 12 week period is not long enough for many patients; hence it is frequently the case that some patients enter a second or third episode of care. This is based on clinicians’ professional opinions i.e. if maintaining the patient on tele-monitoring equipment is likely to prevent hospital admission.

Similarly, clinicians report there are variances in terms of patient reactions following their discharge from the 12 week scheme i.e. some patients experience increased self-confidence and are better equipped to self-manage their condition, whilst some patients are reluctant to let the tele-monitoring equipment go.

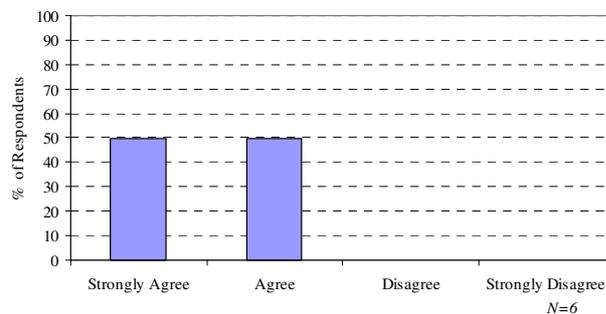
**4.2 Responsibility for Patient Selection**

All (100%, N=6) the clinician respondents stated that nurses/clinicians had been responsible for selecting and/or recruiting patients to participate in the Pilot.

**4.3 Appropriateness of Patients Selected**

**All clinicians agree that the patients that were selected or recruited to participate in the Pilot were appropriate to participate** - 50% (N=6) ‘strongly agreed’ and 50% (N=6) ‘agreed’ that the patients that were selected or recruited to participate in the Pilot were appropriate to participate.

**Figure 4.3: Appropriate Patient Recruitment/Selection (Q2b - Clinician)**



Comments from clinicians included:

*“Patients chosen were those whose condition had stabilised and who had received full education about their condition and its management.”*

*“We chose patients who were well known to the team and who met our requirements.”*

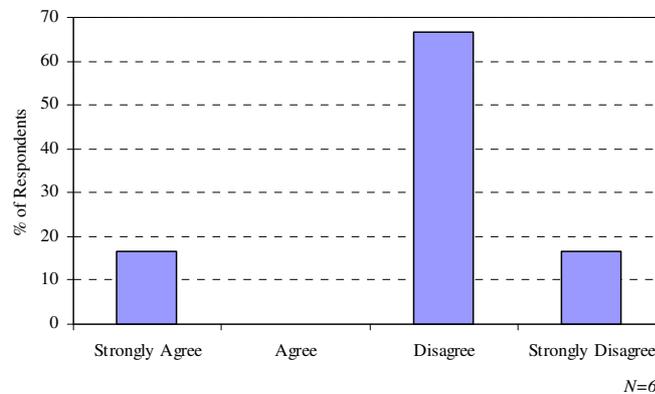
Clinician Respondents

#### 4.4 Appropriateness of Tele-Monitoring

Only 1 of the 6 clinicians ‘strongly agreed’ that tele-monitoring is appropriate for all patients with the primary condition that they have responsibility for. The clinician who strongly agreed with this statement had been involved in the pre-pilot study and thus had had a longer involvement in the tele-monitoring project. It is noted, however, that they also noted characteristics of patients that the tele-monitoring was not appropriate for.

The majority, or 83% (N=6) either ‘strongly disagreed’ or ‘disagreed’ that tele-monitoring is appropriate for all patients with 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’s condition, dexterity/agility, level of dependency and individual patient attitude.

**Figure 4.4: Appropriate for Primary Condition (Q3a Clinician)**



Comments from clinicians included:

*“It can lead to heightened anxiety and stress for the elderly; especially if they fear it is a replacement for traditional nursing care.”*

*“What must not be forgotten is that there is a lot of teaching from nurses which happens in conjunction with telemonitoring- it’s an add-on to nursing care rather than a replacement.”*

Clinician Respondents

In particular, there was concern by the Community Diabetic nurses that tele-monitoring was not appropriate for the patients that they had selected, due to the fact that there was a high level of contact with these patients anyway. The view was that whilst the programme might be more appropriate for diabetics taking insulin once daily (which is consistent with the Ulster Hospital diabetic team), these are not high users of the community nurses’ time and hence the impact on nursing contact would be minimal. Conversely, diabetics taking insulin once daily generally could adjust their insulin themselves, and hence the need to monitor this group may be less apparent. Severe diabetic patients would normally be visited twice a week, and this is continuing, as patients require changes to their medication etc.

For diabetic patients, diet is the key issue and failure to make lifestyle and behavioral choices will mean that there may be no improvements in the patient’s health under the tele monitoring programme. They also noted that diabetic patients are used to daily manual readings and the monitoring of their condition, hence the daily recording of such information and transfer of data electronically may not be a significant change to influence those who habitually fail to make dietary changes. It was noted that the Western Trust had a programme for gestational diabetic patients, who would be appropriate for tele-monitoring as they are likely to be compliant with dietary instructions.

Tele-monitoring could also work for patients on new medication, seeking weight loss, and newly diagnosed patients. Signing up to weight loss should be a condition of receiving and retaining the equipment.

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>Elderly patients can feel even more isolated</li> <li>Younger patients sometimes do not want the equipment in their home as it is a constant reminder of their condition</li> </ul>
<b>Cormorbidity</b>		<ul style="list-style-type: none"> <li>Arthritic patients can find it very difficult to handle the equipment</li> <li>Patients with reduced mental capacity would struggle to monitor regularly, although they may have carers</li> </ul>
<b>Disease status/severity</b>	<ul style="list-style-type: none"> <li>More appropriate for patients with mild to severe severity, as long as the equipment would not cause the patient any more stress</li> </ul>	<ul style="list-style-type: none"> <li>Less appropriate for patients with severe disease status – who may have complex needs, are regularly reviewed by professional healthcare workers and may not be able to use equipment</li> </ul>
<b>Patient Agility</b>	<ul style="list-style-type: none"> <li>Patients who have the manual dexterity to use the equipment</li> </ul>	<ul style="list-style-type: none"> <li>Patients who do not have the manual dexterity to use the equipment</li> </ul>
<b>Other</b>		<ul style="list-style-type: none"> <li>Blind diabetes patients, unless the equipment can speak the instructions</li> <li>Stroke patients who may not be able to speak properly</li> <li>Deaf patients can have difficulty in deciphering words when the volume is increased</li> </ul>

Comments from clinicians included:

*“Dexterity is important for patient with more limited mobility and who need to be weighed. Patients must be capable of getting onto scales in order to be weighed. A further issue is patients’ ability to attach the Blood Pressure monitor, which is attached to the finger and can be tricky”.*

*“Those with hearing or sight difficulties can find the equipment hard to use. For example, if the volume is turned up to compensate for the patients’ hearing impairment, the words can be difficult to decipher”.*

*“All patients with moderate to severe COPD disease should be considered for tele-monitoring, and those at Level 2 in their own care management plan, although not all are appropriate. Tele-monitoring is also particularly appropriate for patients who live alone, and who have just left the hospital, in order to monitor patients for early detection of infection. Those with severe COPD are likely to require one to one professional clinician care on a regular basis, thus mitigating the impact of tele-monitoring”.*

Clinician Respondents

Feedback from clinicians indicate that patients those conditions ranges from moderate to very severe were brought onto the programme, for example:

- Patients targeted by Lagan Valley Hospital largely related to palliative care, ie 11 patients deceased since the pilot commenced.
- For clinicians with responsibility for Community Diabetes, one had included patients considered to be in the “very severe” category, whilst another had included patients across varying levels of disease severity.

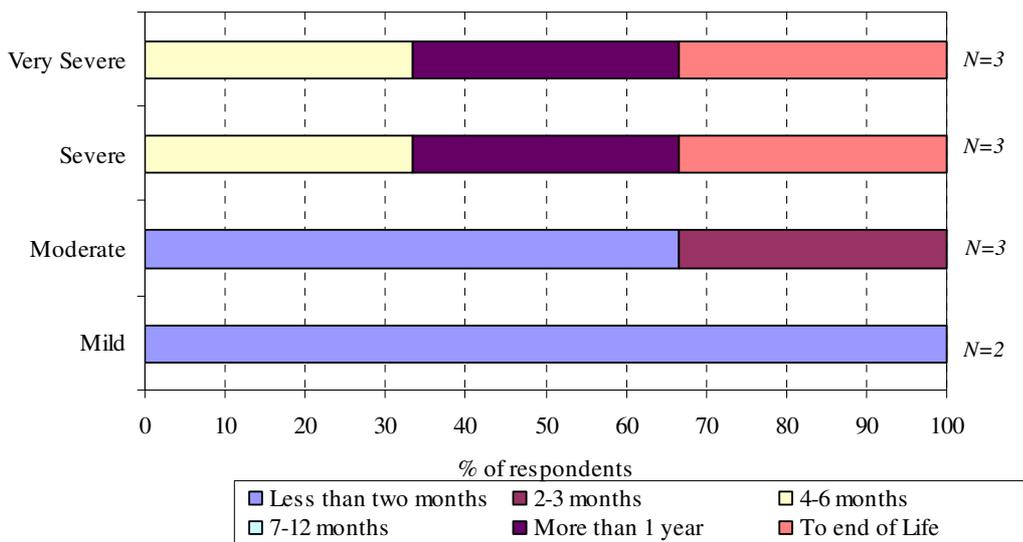
There were differing opinions as to whether or not tele-monitoring was appropriate for those at mild disease level, ie mild COPD, ie some clinicians felt that those with mild COPD should be able to manage on their existing care plan.

#### 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

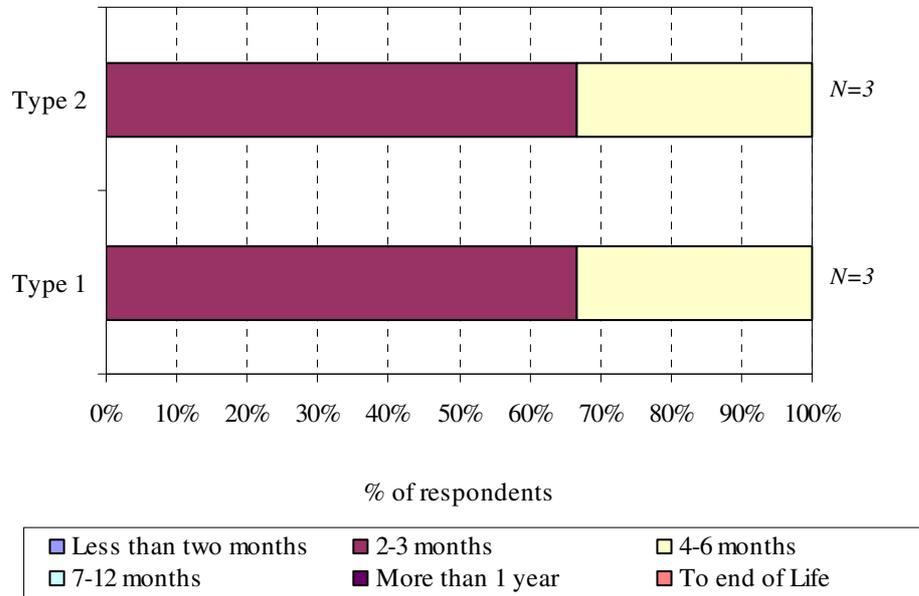
**Figure 4.5: Timescale of tele-monitoring use for varying levels of COPD Severity (Q6a - Clinician)**



- All (N=3) of the clinicians with responsibility for COPD stated that patients with ‘mild’ COPD should use the tele-monitoring equipment for ‘less than 2 months’;
- Two thirds of the clinicians (67%, N=3) stated that patients with ‘moderate’ COPD should use the tele-monitoring equipment for ‘less than two months’; 33% (N=3) stated between ‘2-3 months’;
- One third of clinicians (33%, N=3) stated that patients with ‘severe or very severe’ COPD should use the tele-monitoring equipment for between ‘4-6 months’; 33% (N=3) stated ‘more than one year’, and 33% (N=3) stated ‘to the end of their life’.

4.5.2 Diabetes

**Figure 4.6: Timescale of tele-monitoring use for varying levels of Diabetes Severity (Q6c – Clinician)**



- 67% (N=3) of the clinicians stated that patients with ‘Type 1 and Type 2’ diabetes should use the tele-monitoring equipment for ‘2-3 months; whilst 33% stated for between ‘4-6 months’.

4.6 Improvements to Patient Selection

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

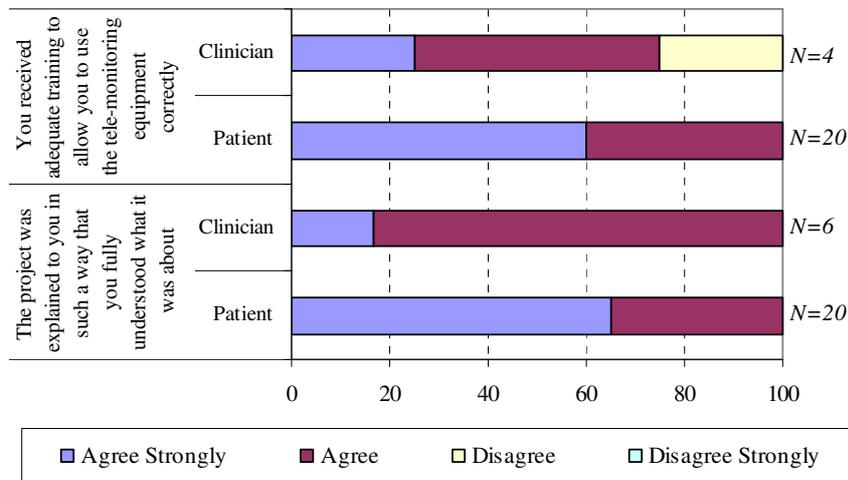
- The equipment could be used as an educational tool, for instance to help diabetes patients stop smoking and lose weight. By monitoring these characteristics, patients would see the impact of their lifestyle on their primary condition ;
- Patient selection could be improved if the equipment was adapted. The equipment should be adaptable to those people with a disability (ie sight, hearing, stroke);
- Targeting of those leaving hospital after a hospital admission, and heavy users of the community respiratory teams (excluding those with severe conditions); and
- There needs to an investment into randomised control trials to determine those patients best suited to tele-monitoring.

4.7 Satisfaction with Project Implementation

4.7.1 Information and Training

- All clinicians (100%, N=6), and all patients (100%, N=20) were in agreement that the project was explained to them in such a way that they fully understood what it was about;
- Three-quarters of clinicians (75%, N=4) and all patients (100%, N=20) ‘were in agreement that they received adequate training to allow them to use the tele-monitoring equipment. 25% of clinicians ‘disagreed’ with this.

**Figure 4.7: Implementation of the tele-monitoring project (Q7a – Clinician/Q3a – Patient)**



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

*“The nurse explained the purpose of the equipment; it was installed efficiently and I was shown how to use it.”*

Patient Respondents

There was some dissatisfaction amongst clinicians with training.

Clinicians did have observations that equipment must be approved by the Trust, and the clinician be trained on it, before they can use it. This can lead to issues for resourcing for holiday time, changes of equipment by the Service Provider etc.

**4.7.2 Processes relating to Ordering Equipment (Q7a – Clinician)**

60% (N=6) of clinicians ‘strongly agreed’ or ‘agreed’ that the way in which tele-monitors were ordered for placement was straightforward and efficient; whilst 40% (N=6) disagreed.

There were issues relating to the timeliness of installation and notification to Trust Clinicians of installation, with the clinicians’ preference being to get a text from the Service Provider on the day that the equipment is installed.

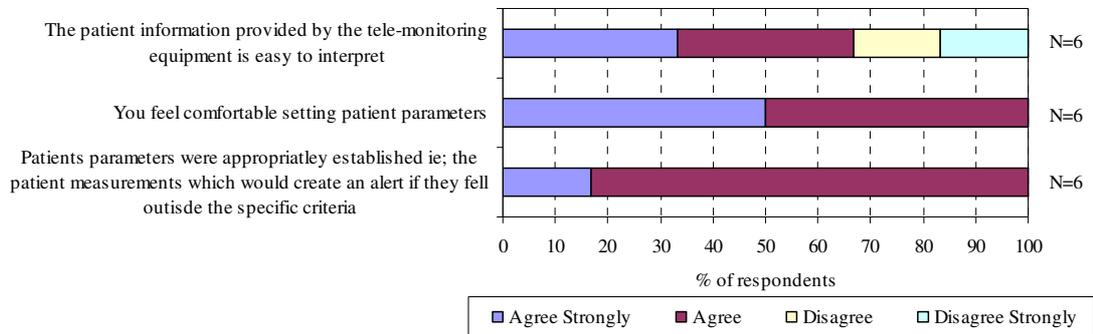
It was also noted that there should be procedures for removing equipment where the patient is in hospital, on holiday etc, subject to the cost implications of moving such equipment for a temporary period.

**4.7.3 Fitting of Equipment (Q3a – Patient)**

100% of patients either strongly agreed (60%, N=20) or agreed (40%, N=20) that the equipment was installed in their house in an efficient manner.

4.7.4 Issues around Patient Parameters

**Figure 4.8: 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:

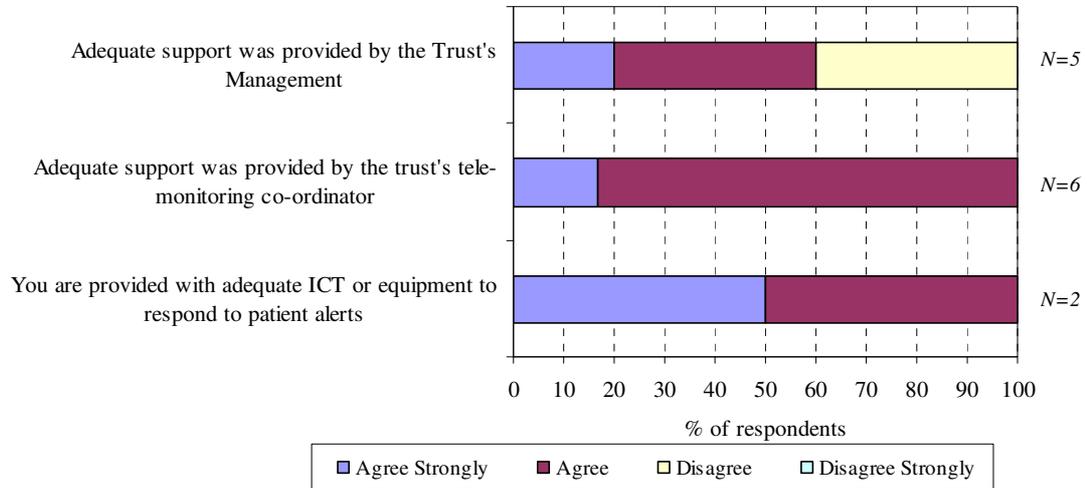
- 100%, (N=6) of clinicians ‘strongly agreed’ or ‘agreed’ that the patients parameters were appropriately established i.e. the patient measurements which would create an alert if they fell outside the specific criteria;
- 100%, (N=6) of clinicians ‘strongly agreed’ or ‘agreed’ that that they feel comfortable setting patient parameters; and
- 66% (N=6) of clinicians ‘strongly agreed’ or ‘agreed’ that the patient information provided by the tele-monitoring equipment is easy to interpret; 17% disagreed whilst 17% strongly disagreed.

Clinicians reported that there are some instances where information received is difficult to interpret (see para 5.2.5).

General clinical guidelines are utilised in setting parameters for use within the remote monitoring project, which are then tailored to individual patients. There were issues with the setting of parameters at the start of the pilots, with a lot of patients alerting on a frequent basis. It was noted that a ‘bedding in’ period was necessary in order that clinicians and patients could become familiar with the use of the scheme and more specifically, the parameters within which it operated. Clinicians reported a growing level of confidence among specialist nurses in setting parameters.

4.7.5 Level of Support Offered

**Figure 4.9: Implementation of the tele-monitoring project (Q7a – Clinician)**



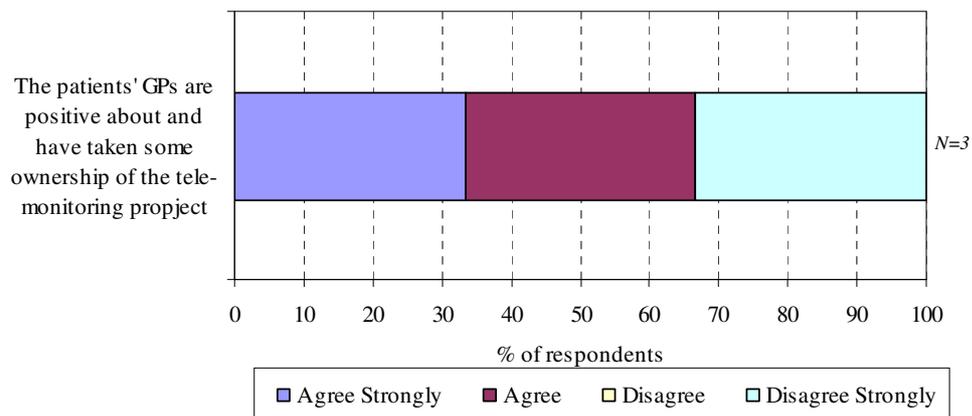
Clinicians were generally positive about the level of support that was provided to them during the implementation of the tele-monitoring project:

- 100% (N=2) ‘strongly agreed’ or ‘agreed’ that they are provided with adequate ICT or equipment to respond to patient alerts. Others noted that they do not rely on ICT for patients’ alerts, receiving a phone call to their mobile from the triage nursing team;
- 100%, (N=6) ‘strongly agreed’ or ‘agreed’ that adequate support was provided by the Trust's tele-monitoring co-ordinator;
- 60% (N=5) ‘strongly agreed’ or ‘agreed’ that adequate support was provided by the Trust's Management, whilst the remaining 40% (N=6) ‘disagreed’ that this was the case.

4.7.6 Degree of GP Ownership

Most clinicians agree that patients' GPs are positive about and have taken some ownership of the tele-monitoring project – Two thirds of the clinicians (67%, N=3) ‘strongly agreed’ or ‘agreed’ that patients' GPs are positive about and have taken some ownership of the tele-monitoring project. However, 33% of clinicians ‘strongly disagreed’ that this was the case.

**Figure 4.10: Implementation of the tele-monitoring project (Q7a – Clinician)**



It was noted that communication with GPs could be improved, for example, Lisburn now sends notification to the patient’s GP that the patient is participating in the programme and that they (the clinician) can be contacted for details of vital signs etc.

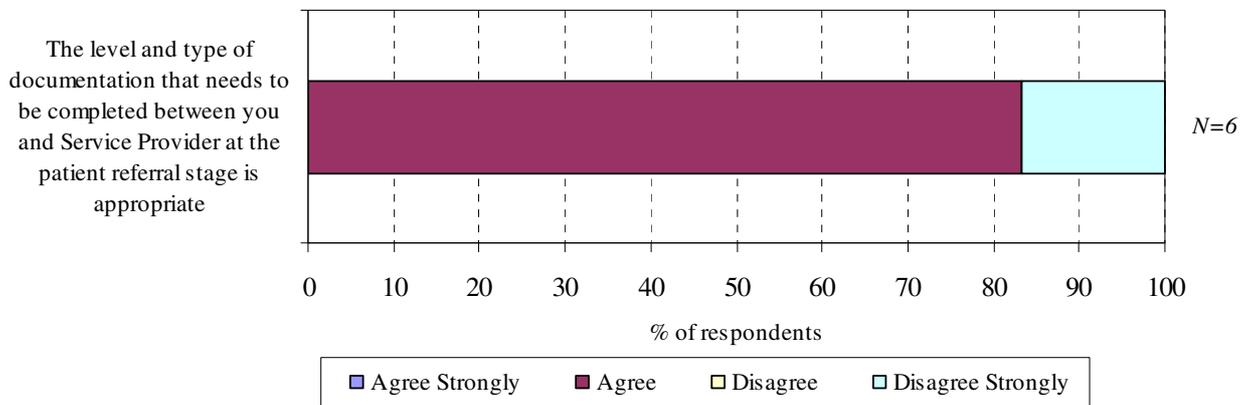
**4.8 Satisfaction with the Service provided by the Service Provider**

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**

The majority of clinicians 83%, (N=6) agree that the level and type of documentation at the patient referral stage is appropriate – whilst 17% (N=6) strongly disagreed.

**Figure 4.11 Clinicians’ views on the level and type of documentation at the patient referral stage (Q8a – Clinician)**



A referral form is filled in by the clinician, which is then sent on to the Service Provider, i.e. a separate referral form is completed for every patient. This was regarded as an administrative burden by some clinicians, in addition to their own internal Trust administrative work.

Comments include:

*“No one has looked at the appropriateness of the information provided at referral stage. The information given at this stage has remained the same over the last two years. This doesn’t mean that it is wrong, but its appropriateness should be confirmed.”*

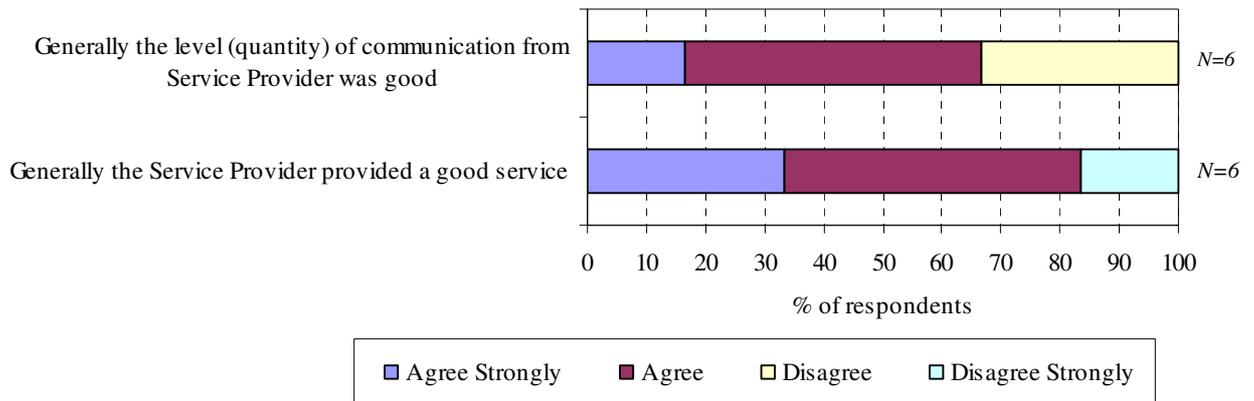
Clinician Respondents

**4.8.2 The Support provided by the Service Provider**

**Clinicians’ agree that the Tele-Health service and communication was good:**

- The vast majority of clinicians (83%, N=6) ‘strongly agreed’ or ‘agreed’ that in general the Service Provider provided a good service. However, one clinician (17%, N=6) strongly disagreed that a good service was provided; and
- The majority of clinicians (67%, N=6) ‘strongly agreed’ or ‘agreed’ the level (quantity) of communication from the Service Provider was good. However, two clinicians (33%, N=6) disagreed that communication was good.

**Figure 4.12: Clinicians’ views on the Service Provider and Communication (Q8a – Clinician)**



Comments include:

*“We were not told when, exactly, one of our patients was using the equipment, the patient had to tell us themselves.”*

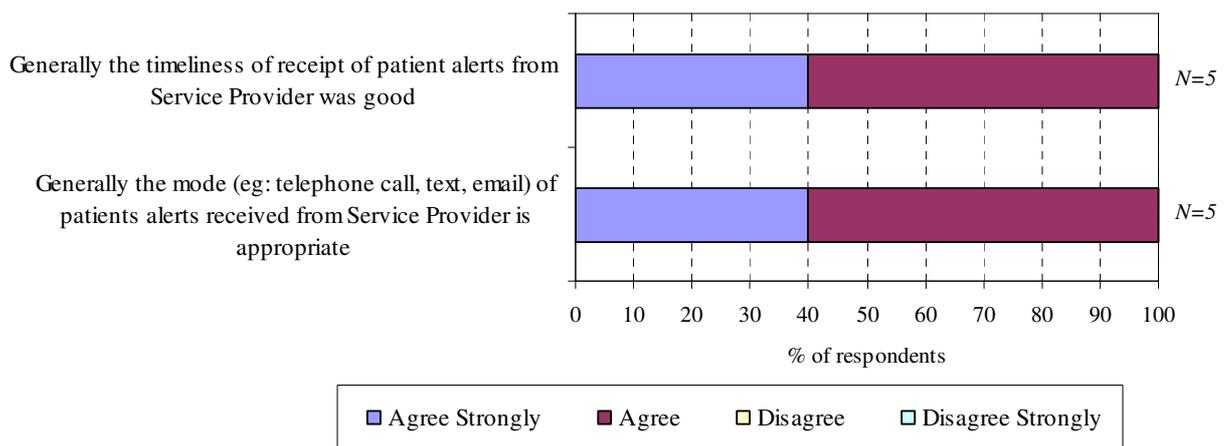
*“The level of communication is good. I get a phone call to my mobile from one of the triage nurses when one of my patients’ alerts. Every Monday, I receive a printout by email from the previous week which provides details on trends”*

Clinician Respondents

**4.8.3 Mode & Timeliness of Patient Alerts**

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

**Figure 4.13: Clinicians’ views on the mode and timeliness of patient alerts (Q8a – Clinician)**



100% (N=5) of clinicians ‘strongly agreed’ or ‘agreed’ that the timeliness of receipt of patient alerts from the Service Provider was good and that the mode (e.g. telephone call, text, email) of patients alerts received from The Service Provider is appropriate.

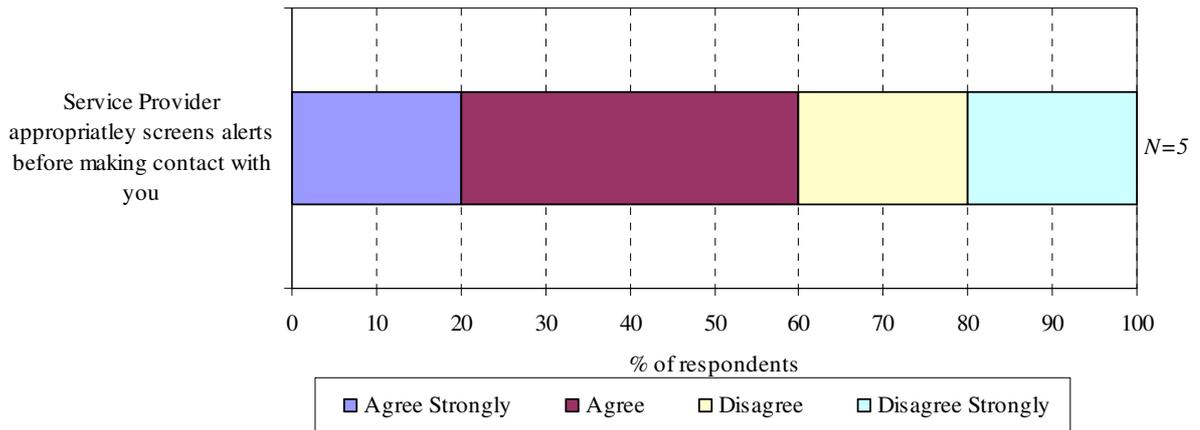
*“Alerts provide the patient ID number but not the name and address (for confidentiality reasons). I need to have patient details with me.”*

Clinician Respondents

4.8.4 **Appropriate screening of alerts**

The majority of clinicians agree that the Service Provider appropriately screens alerts before making contact with them – 60% of clinicians (N=5) ‘strongly agreed’ or ‘agreed’ that the Service Provider appropriately screens alerts before making contact with them. However, 20% (N=5) ‘disagreed’, whilst 20% (N=5) ‘strongly disagreed’.

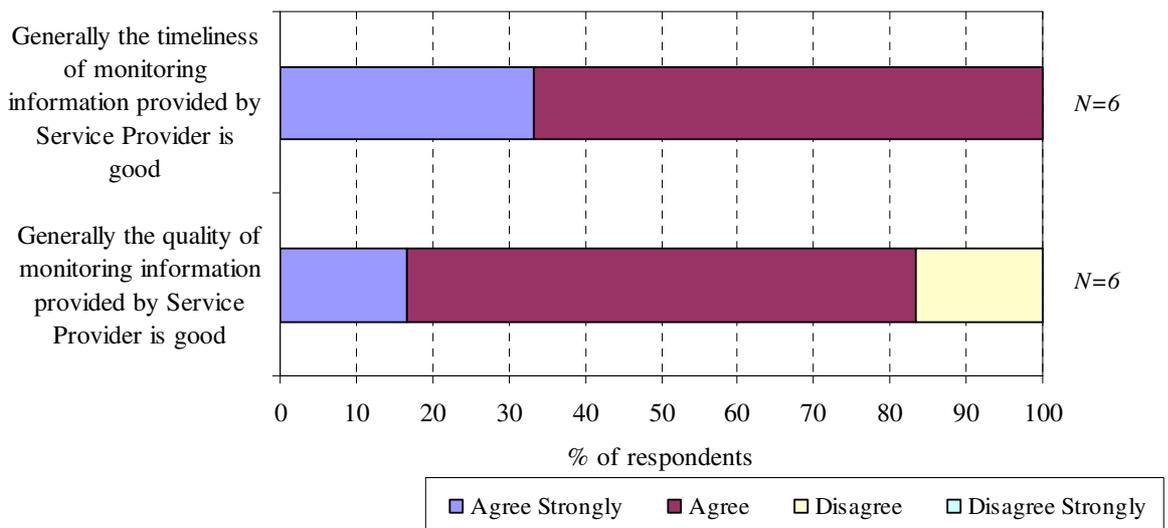
**Figure 4.14: Clinicians’ views on Service Provider appropriately screens alerts (Q8a – Clinician)**



It was acknowledged that the majority of alerts sent through by the Service Provider are relevant, ie most are vetted correctly by the triage nurses.

4.8.5 **Monitoring Information**

**Figure 4.15: Clinicians’ views on the quality and timeliness of monitoring information (Q8a – Clinician)**



The vast majority (84%, N=6) clinicians ‘strongly agreed’ or ‘agreed’ that the quality of monitoring information provided by the Service Provider is good; 17% (N=6) disagreed, whilst 100% (N=6) ‘strongly agreed’ or ‘agreed’ that the timeliness of monitoring information provided by the Service Provider is good.

For example, for COPD, patients participating as part of the remote monitoring project have their data reviewed during the weekly Trust Multi-Disciplinary Team (MDT) meeting. Trust staff receive this data every Monday by email (used to be by fax), including all patient vital signs and statistics.

Comments include:

*“We are getting more information on vital signs. We never had this level of information before.”*

Clinician Respondents

It was noted that where a second reading is done, the printouts on a Monday still give the first reading with an explanation that this is incorrect. It was considered preferable that the correct reading was included for the trend analysis etc.

There were some concerns over the presentation of information received on a Monday morning:

*“The format by which information was received is not considered to be appropriate. All readings are in one line, when I would prefer to get morning readings together, evening readings together, to see the trend. Hence, I have to write these out manually.”*

Clinician Respondents

Furthermore, clinicians require information on the timing of the readings, and if before or after meal times. It is noted that there are four readings a day but only the morning reading is recorded on the weekly printout.

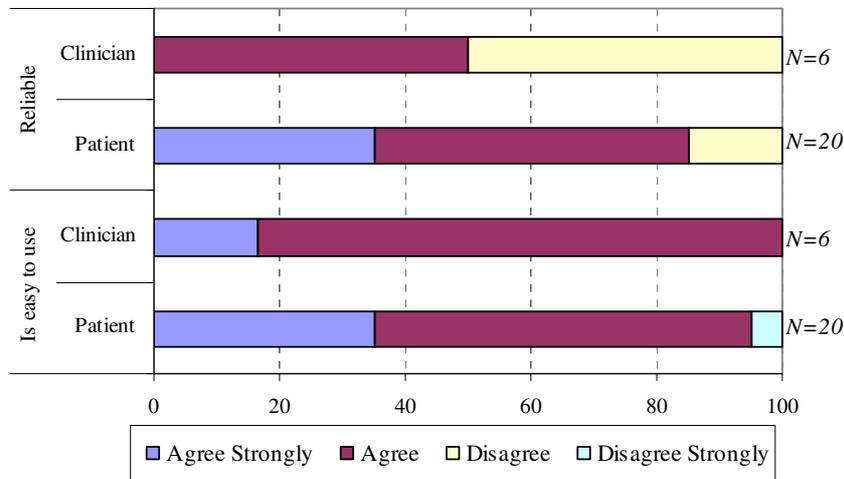
#### 4.9 Satisfaction with the Tele-Monitoring Equipment and/or Software

##### 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:**

- Half of clinicians (50%, N=6) and almost 85% (N=20) of patients were in agreement that the equipment is reliable, whereas 50% and 15% of clinicians disagreed; and
- All clinicians (100%, N=6) and almost all patients (95%, N=20) are in agreement that the equipment is easy to use.

**Figure 4.16: Opinions on the tele-monitoring equipment (Q9a – Clinicians/Q4a – Patients)**



Comments include:

*“A patient has had difficulty with measuring saturations. Whilst it may be that the patient’s hands are unusually cold, an earlobe probe was requested but not yet received”*

Clinician Respondents

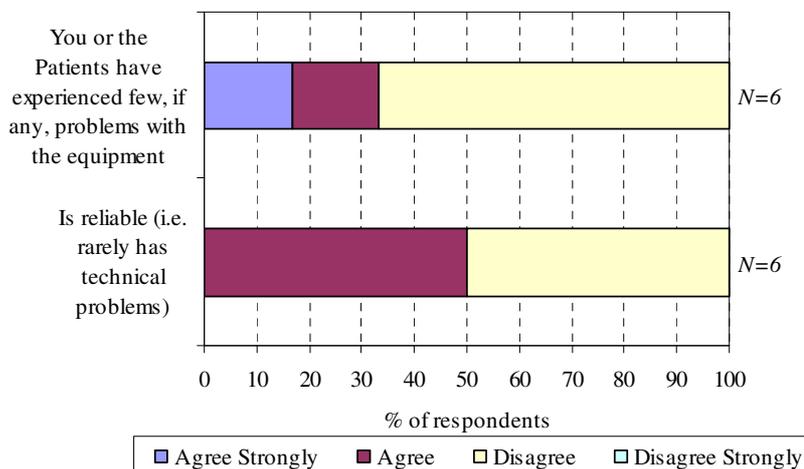
There are concerns over reliability, and problems with the tele-monitoring equipment.

It was noted that it typically takes patients between one week and 10 days to get used to the Remote Monitoring scheme. Patients fear that they will not be seen by their community nurse and require reassurance that they will still be able to see the team.

Other comments in relation to reliability are:

- Half of clinicians (50%, N=6) ‘agreed’ that the equipment is reliable (i.e. rarely has technical problems), 50% disagreed.
- The majority of clinicians (67%, N=6) ‘disagreed’ that they or the patients have experienced few, if any, problems with the equipment. The remaining 33% of clinicians (N=6) agreed.

**Figure 4.17: Clinicians’ views on aspects the tele-monitoring equipment (Q9a – Clinicians)**



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

*“There should be more flexibility in the question choice.”*

*“In the majority of cases, questions could be more specific. Composite questions are difficult to answer and often result in creating unnecessary alerts”*

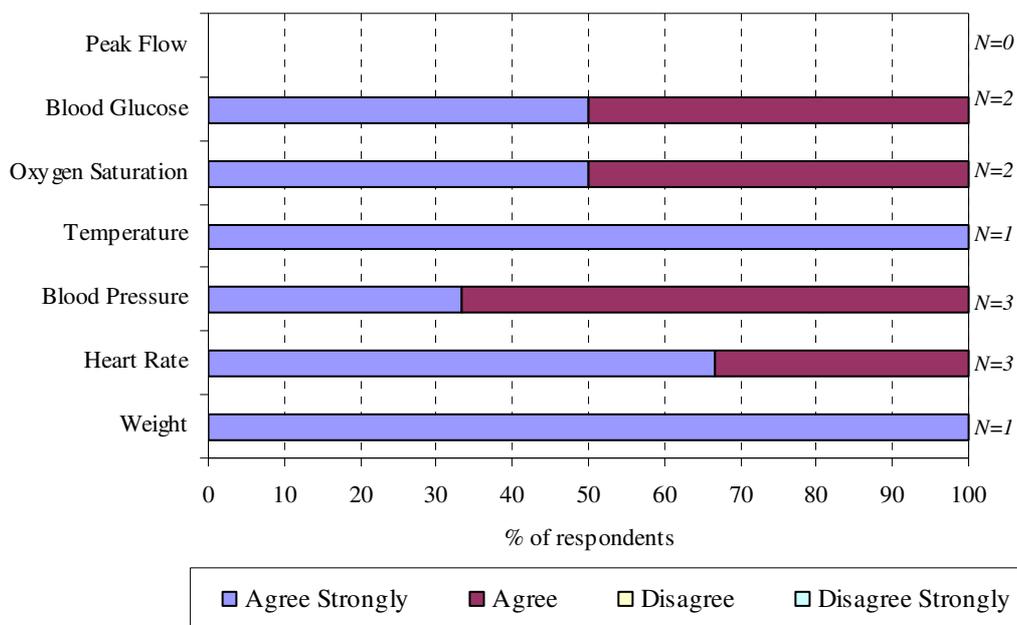
Clinician Respondents

**4.9.2 Accuracy of Readings**

**Clinicians’ are positive about the accuracy of tele-monitoring equipment readings** - The majority of clinicians ‘agreed’ or ‘strongly agreed’ that the tele-monitoring equipment provided accurate readings:

95% (N=19) of patients either strongly agreed or agreed that the equipment provides accurate readings, a small minority (5%) disagreed with this statement. **(Q4a - Patients)**

**Figure 4.18: Clinicians’ views on accuracy of tele-monitoring equipment readings (Q9c – Clinicians)**



Comments include:

*“For the blood pressure reading, I have sometimes wondered if this is accurate. If the patient’s arms are too thin, a different BP cuff size is needed – there needs to be a wider range. The reading is also always taken when the probe is first attached, rather than say, after a short delay, as the patient might initially be adjusting this on their finger to ensure that it is fitted properly”*

*“If the readings are “out of the norm” there is generally a request to the patient by the Service Provider for a second reading. The readings might be wrong because of something the patient has done, ie rushed to the monitor (affecting saturations), leant on wall (affecting weight) etc. The printouts on a Monday will say why there is a follow up but don’t give an explanation”*

*“Whilst I generally agree that the weight reading should be accurate, weight is often the most inconsistent reading.”*

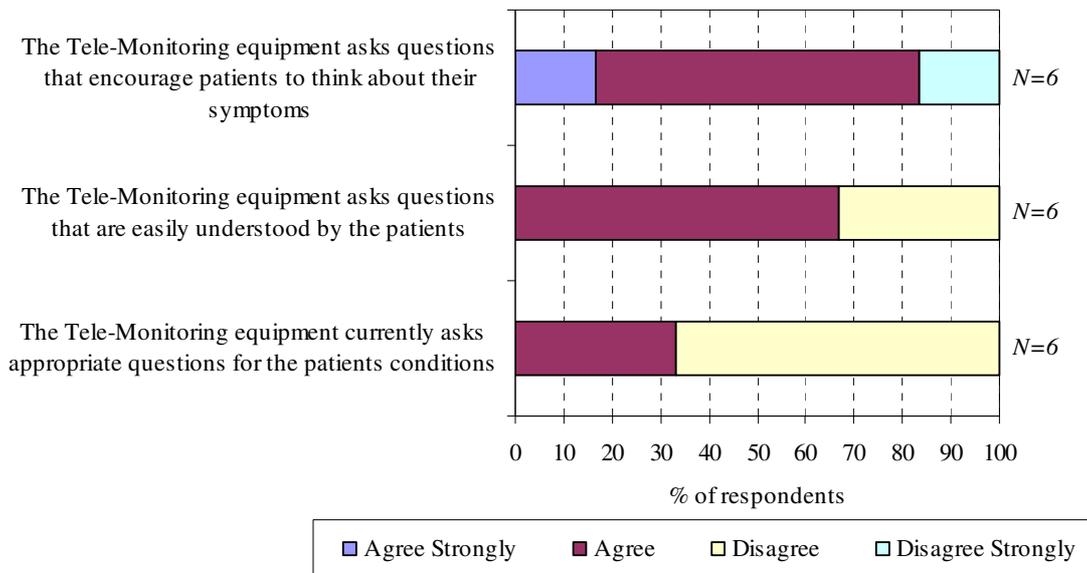
*“Not all readings are required, but are taken anyway.”*

Clinician Respondents

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

The clinicians had mixed views as to the questions asked to patients whilst they used the tele-monitoring equipment.

**Figure 4.19: Clinicians’ views on aspects the tele-monitoring equipment (Q9a – Clinicians)**



- The vast majority (83%, N=6) ‘strongly agreed’ or ‘agreed’ that the tele-monitoring equipment asks questions that encourage patients to think about their symptoms. The remaining 17% (N=6) ‘strongly disagreed’ that this was the case;
- 67% of clinicians (N=6) ‘agreed’ that the tele-monitoring equipment asks questions that are easily understood by the patients; whilst 33% (N=6) disagreed; and
- The majority (67%, N=6) of clinicians ‘disagreed’ that the tele-monitoring equipment currently asks appropriate questions about the patients conditions; the remaining 33% (N=6) agreed.

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

*“The questions could be worded in a better manner as they are quite impersonal or open to misinterpretation, ie questions on coughing should be “are you coughing **more** than normal” and questions on inhalers should be “are you using your **blue** inhaler more than normal”. It is important to keep questions simple. When dealing with the elderly, continuing training is sometimes required to stop them getting confused.”*

*“Educational questions could be included.”*

*“There are only four or five questions appropriate for diabetes.”*

Clinician Respondents

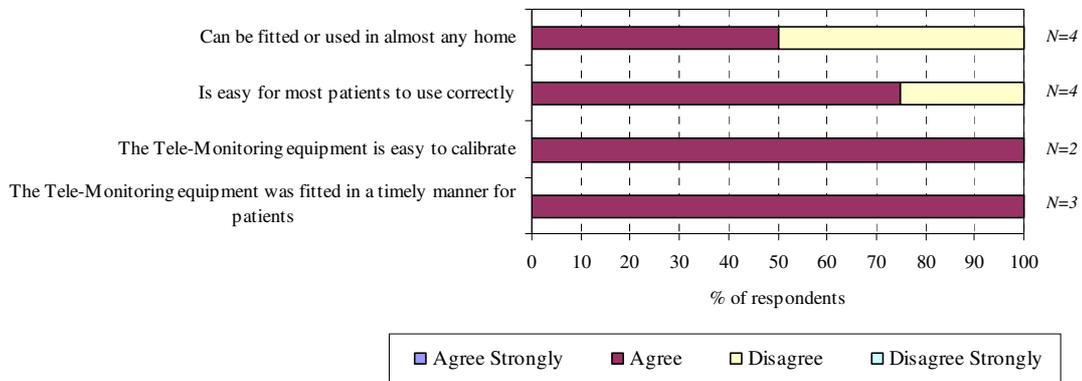
**4.9.4 Other aspects of Equipment – Clinicians’ Views**

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

- Half (50%, N=4) of clinicians ‘agreed’, whilst 50% ‘disagreed’ 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;

- Three-quarters (75%, N=4) ‘agreed’ that the tele-monitoring equipment was easy for most patients to use correctly. One clinician (25%, N=4) disagreed with this statement; and
- All (100%, N=4) clinicians ‘agreed’ that the Tele-Monitoring equipment was fitted in a timely manner for patients.

**Figure 4.20: Clinicians’ views on aspects the tele-monitoring equipment (Q9a – Clinicians)**



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

*“ The equipment can only be used with a land line – it is not suitable for patients with a mobile phone only. Hence, some patients are excluded”*

*“Where the telephone land line is in the hall, patients may have to sit here for c15 minutes to complete the monitoring. The patient must also be sitting before the monitor talks to them, to ensure that movement does not affect their oxygen saturation levels. The use of a mobile phone in the normal sitting area of a home would be preferable.”*

Clinician Respondents

There have also been issues over timeliness of the fitting of equipment.

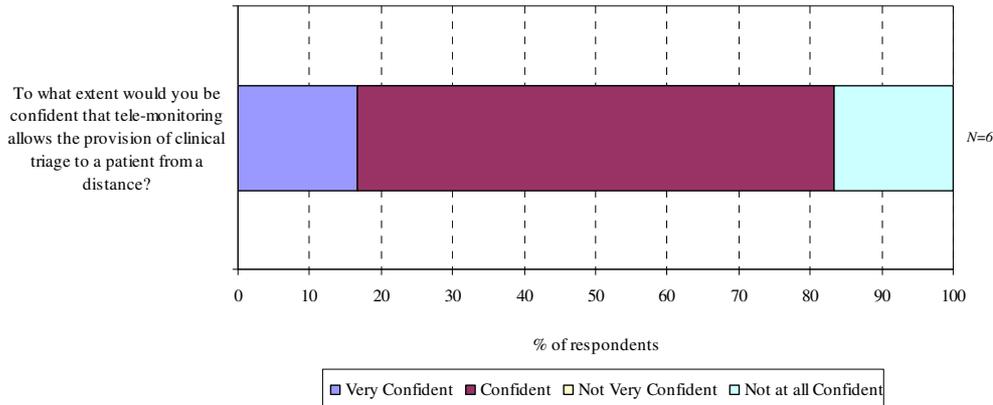
As a separate matter, there is a lack of clarity as to how long equipment should be left in the patient’s home in the event of their admission to hospital. Access to the home following admission is difficult if the patient lives alone.

#### 4.10 Views relating to Clinical Triage

##### 4.10.1 Satisfaction with clinical triage

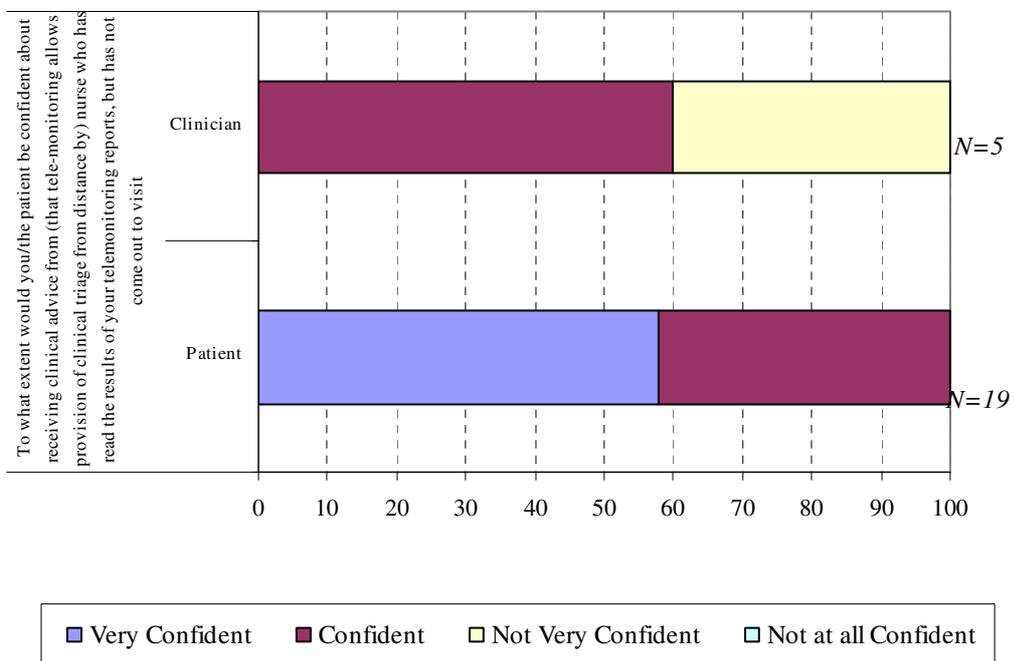
Clinicians are generally confident that tele-monitoring allows the provision of clinical triage to a patient from a distance – The majority (83%, N=6) of clinicians are ‘confident’ or ‘very confident’ that tele-monitoring allows the provision of clinical triage to a patient from a distance.

**Figure 4.21: Tele-monitoring - Clinical triage to a patient from a distance (Q18a – Clinicians)**



Clinicians and patients are also generally 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 - The majority of clinicians (60%, N=5) all patients (100%, N=19) are ‘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. A minority of clinicians (40%, N=5) feels ‘not very confident’ that tele-monitoring does allow the provision of clinical triage to a patient from a distance by a nurse who has not met a Patient in person.

**Figure 4.22: Tele-monitoring - Clinical triage to a patient from a distance by a nurse who has not met a Patient in person (Q19a – Clinician/Q11a - Patient)**



Comments include:

*“It is vital that the district nurse knows the patients personally, this cannot be the case for the triage nurses.”*

Clinician Respondents

*“I feel very confident taking the advice from any nurse but would prefer that it was a nurse that I know.”*

*“I have found that all the nurses that I have spoken to are good at their jobs and know what they are talking about.”*

*“I am happy to make changes to my insulin level based on what the nurses tell me to do over the phone.”*

Patient Respondents

Clinical triage was considered to be appropriate for instructing patients to take an extra puff (for example, for COPD patients) but not for advising on medicines.

COPD clinicians and the Service Provider have been reviewing protocols in relation to clinical triage (for example reviewing the algorithms), although it was acknowledged that this is very much an interactive process.

The lack of communication between the triage nurse and the Trust clinician is an area to be addressed. Given the regular contact between the Service Provider and the patient, some clinicians are of the view that there should be protocols for HTL to contact the clinician on matters other than alerts, ie, if the patient states that they generally feel unwell, or if the monitor is not working.

Overall, with a view to considering the Value for Money aspect of the service for the Service Provider, the Trust indicated that a comparison could be drawn with the cost of a nursing auxiliary travelling around patient homes to take similar readings, compared to the cost of the service operated in conjunction with the Service Provider. However, the question was also raised in terms of whether or not this was a realistic option and if the Trust catchment area would be able to recruit rehabilitation workers or nursing auxiliaries, given that even retailers within the North Down & Ards and Lisburn areas were able to offer more competitive remuneration packages.

It was suggested that the Trust has to consider how capacity could be increased, either through specialist provision or through providers such as the Service Provider. The other alternative to the current model of service provision was identified as triage being conducted within the Trust. If the Trust were undertaking triage, it was indicated that this would be most suitably located within GP Out of Hours Services. In addition, a query was raised as to whether or not a regional clinical triage service would be incorporated within the Regional Contract for Tele-monitoring or whether individual Trusts would be responsible for taking this forward.

It was noted that for the diabetes programme, that a specialist diabetic nurse could be employed to look at trends, ask patients about their diet, stress etc and adjust medication on a real time basis.

**4.11 Factors Liked 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>• It is generally easy for the patient to use;</li> <li>• The reassurance that tele-health nurses are monitoring the readings and contacting the patients when necessary.</li> </ul>	<ul style="list-style-type: none"> <li>• Alarm to remind you to monitor;</li> <li>• Gives you peace of mind;</li> <li>• It makes you think more about your condition and the variables affecting it;</li> <li>• How simple it was to use;</li> <li>• Security it gives, knowing you are being monitored; and</li> <li>• Direct benefits to health.</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>• It may increase the isolation of older people;</li> <li>• Sometimes patients can't use the equipment properly;</li> <li>• It does not add a great deal to patient care;</li> <li>• Equipment can need modification, ie for volume.</li> </ul>	<ul style="list-style-type: none"> <li>• Found the blood pressure probe difficult to use;</li> <li>• It has to be connected to the telephone line;</li> <li>• Can be in the way; and</li> <li>• Being tied to it and having to take readings everyday.</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.

**Clinicians reported changes to a Trust's resources that were suggested that would have improved the rollout of the pilot:**

- Being able to use different types of diabetes metre, rather than the one stipulated by the tele-health provider;
- Better provision of information and training at the outset;
- Extra Staff.

#### 4.12 Clinician and Patients' Recommendations

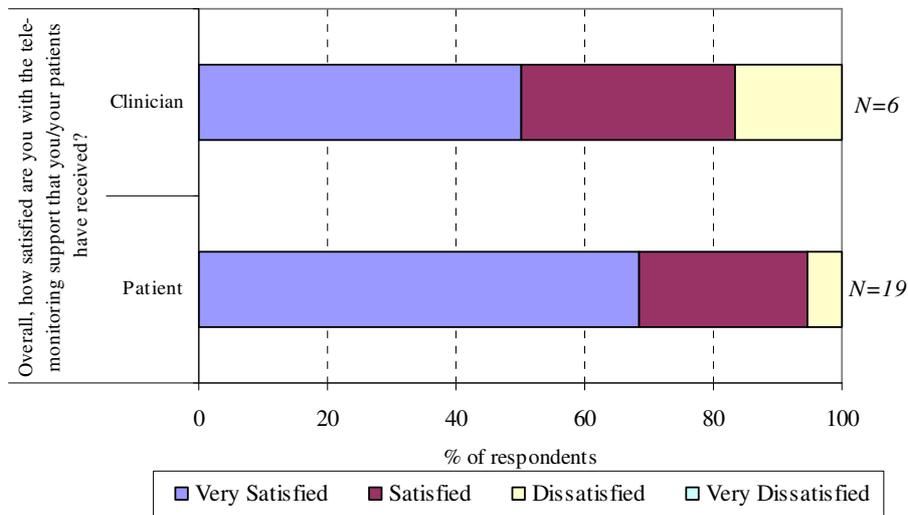
Clinicians and patients recorded recommendations for improvements on how the tele-monitoring pilot is delivered and on its content, which included:

Clinicians	Patients
<ul style="list-style-type: none"> <li>• More flexible equipment and adaptable questions;</li> <li>• Quicker installation of equipment and notification when equipment is installed;</li> <li>• Additional staff;</li> <li>• More clinician education and training;</li> <li>• Monitors for blind diabetes patients, those with hearing difficulties etc;</li> <li>• More interface with the triage nurses and feedback on the quality of referral information, questions being asked;</li> <li>• Greater buy-in at clinician stage and with GPs.</li> </ul>	<ul style="list-style-type: none"> <li>• More flexible times for monitoring especially at the weekend;</li> <li>• More notice when the machine would be removed.</li> </ul>

#### 4.13 Overall Satisfaction

The vast majority (83%, N=6) and all patients (95%, N=19) stated that they were 'very satisfied' or 'satisfied' with the tele-monitoring support that patients received.

**Figure 4.23: Satisfaction with tele-monitoring support received (Q24a – Clinicians/Q15 - Patients)**



**4.14 Conclusion and Operation of Pilots**

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

Around 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. Clinicians noted the positive buy in from GPs.

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 each of the Service Provider of the triage service, clinicians were generally positive. Over 80% 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 – 60% 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 100% 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.

Whilst all clinicians were of the view that patient parameters are appropriately set, it was acknowledged that for new clinicians joining the scheme, there can be a tendency to set narrow parameters, with resultant increased alerts.

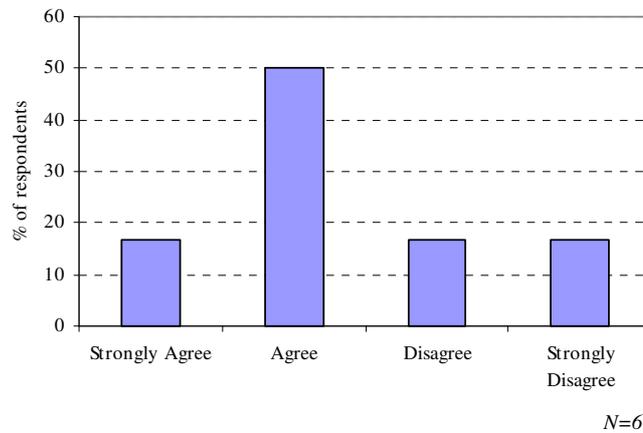
**5 PERCEIVED IMPACT ON ORGANISATION AND RESOURCE UTILISATION**

Section 5 considers the perceived impact on the tele-monitoring pilot on the trust, ie the Organisation and on Resource Utilisation.

**5.1 Patient-Centered**

The majority of clinicians feel that the tele-monitoring pilot project was a patient centred service –

**Figure 5.1: Tele-monitoring pilot project a patient centred service (16a – Clinicians)**

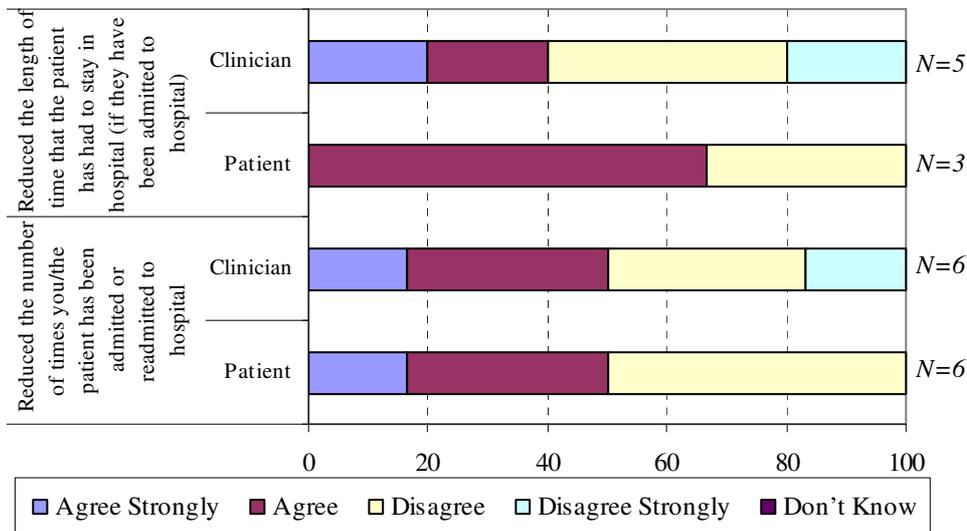


The one third of clinicians (33%, N=6) who disagreed or disagreed strongly that the tele-monitoring pilot project was a patient centred service noted that the focus was on meeting hospital targets.

**5.2 Perceptions on Admission 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 (Q10a – Clinicians/Q5a – Patients)**



- Half of clinicians (50%, N=6) and half of patients (N=19) were in agreement that tele-monitoring has reduced the number of times that the participant patients have been admitted or readmitted to hospital. The remainder disagreed;
- 40% of clinicians (N=5) and two-thirds of patients (67%, N=3) were in agreement that tele-monitoring has 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 tele-monitoring equipment).

Clinicians acknowledged the impact that remote monitoring can have on hospital admissions. For example, through alerts, they can prescribe medication, physiotherapy etc which might prevent hospital admission or mean that the patient’s period in hospital is shorter. Where patients are admitted to hospital, it is generally the case that such admissions are appropriate.

For diabetic patients, however, admissions to hospital is less applicable than for COPD patients.

### 5.3 Perception on Referral to A&E (Q10a – Clinicians)

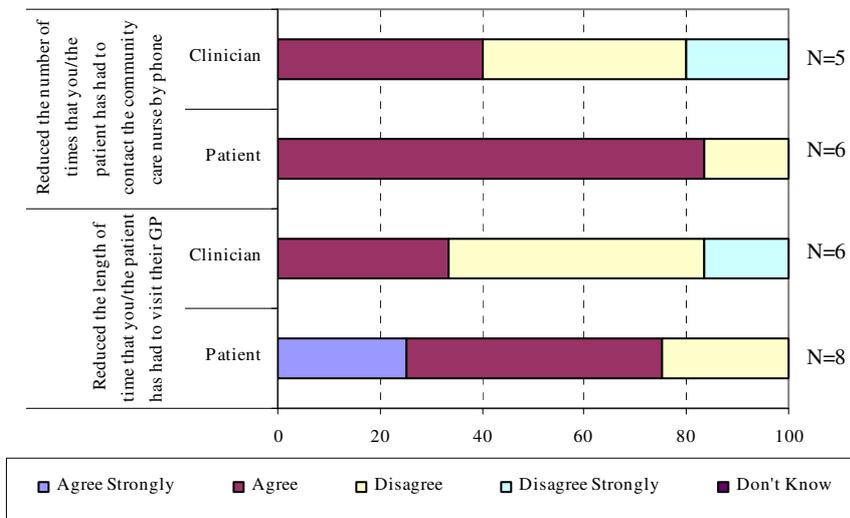
Half (50%, N=6) of clinicians ‘disagreed’ that tele-monitoring has reduced the number of times that the participant patients have self-referred themselves to A&E, one-third (33%) agreed that it had led to a reduction, whilst the remaining 17% stated that they did not know.

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

There were differences in opinion as to the impact on reductions on GP and community nursing contact:

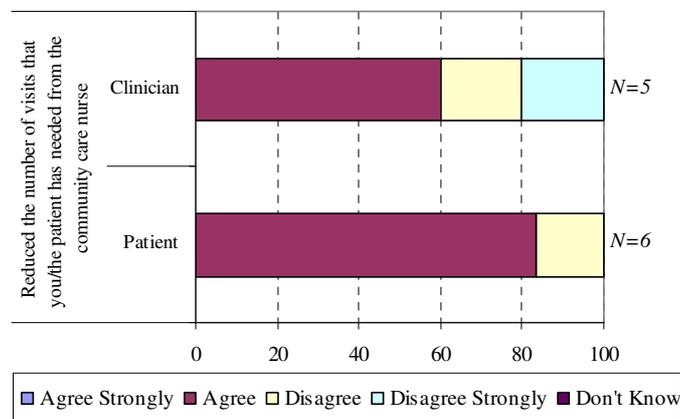
- Three-fifths of clinicians (60%, N=5) ‘disagreed’ that tele-monitoring has reduced the number of times that participant patients have had to contact their community care nurse by phone; 40% of clinicians ‘agreed’ with this statement. This compares to 83% (N=6) of patients that agreed with this statement; and
- One-third of clinicians (33%, N=6), and three-quarters (75%, N=8) of patients are in agreement that tele-monitoring reduced the number of times that the patient has had to visit their GP, two-thirds of clinicians disagree.

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



Clinicians and patients generally agree that there has been a positive impact on the number of visits that the patient has needed from the community care nurse. Three-fifths of clinicians (60%, N=5) and the majority (83%, N=6) agree that tele-monitoring has reduced the number of visits that participant patients have needed.

**Figure 5.4: Perceived Impact on visits that patients have made to or received from health sector personnel Reduction in number of visits from community care nurse (Q10a – Clinicians/Q5a – Patients)**



Some clinicians reported to disagree that their numbers of visits have reduced.

Comments include:

*“For Diabetes, I had included my most severe cases, but the level of my input has not reduced at all”*  
Clinician Respondents

It is understood that additional work has been undertaken within the Trust in relation to COPD which has included consideration of vital signs monitoring and total numbers of escalations to nursing teams specifically within the Down Hospital area. The results are being compared to the results which came out of the pre-pilot evaluation (at Section 3.1) which was undertaken at the Lagan Valley Hospital site.

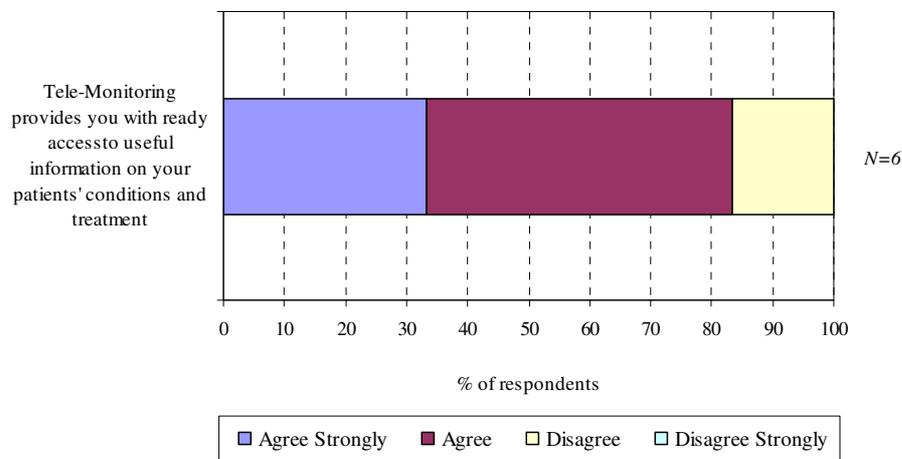
**5.5 Impact on the Trust**

**5.5.1 Access to Information**

**Clinician’s views vary regarding the impact that the tele-monitoring pilot project has had on the Trust.**

The vast majority of clinicians (83%, N=6) ‘agree’ or ‘strongly agree’ that tele-monitoring provides them with ready access to useful information on your patients' conditions and treatment, the remaining 17% disagreed.

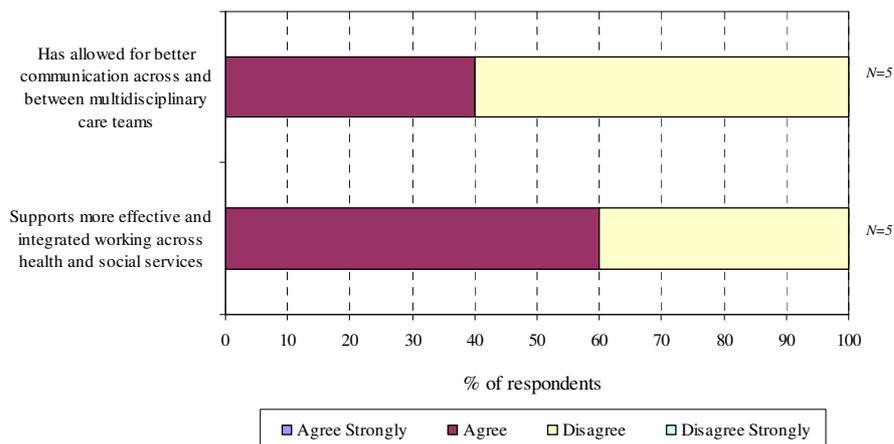
**Figure 5.5: Impact tele-monitoring has had on clinician’s Trust – access to useful information (Q17a – Clinicians)**



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

- The majority of clinicians (60%, N=5) ‘agree’ that tele-monitoring supports more effective and integrated working across health and social services;
- However 60% (N=5) ‘disagree’ that it has allowed for better communication across and between multidisciplinary care teams.

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



Comments include:

*“It has greatly increased our workload, particularly the administrative burden.”*

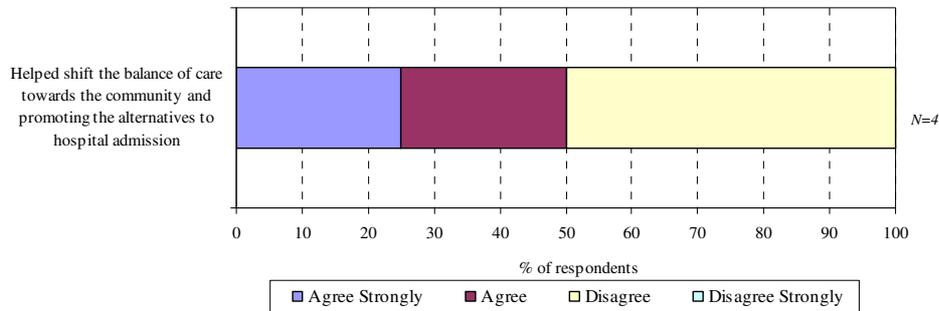
*“There is little scope for integration – tele-monitoring is the responsibility of the specialist nursing teams”*

Clinician Respondents

**5.5.3 Promotion of Alternative to Hospital Admission**

Half of clinicians (50%, N=4) agreed that tele-monitoring has helped shift the balance of care towards the community and promoting the alternatives to hospital admission. The remaining 50% (N=4) disagreed with this statement.

**Figure 5.7: Impact tele-monitoring has had on clinician’s Trust (Q17a – Clinicians)**

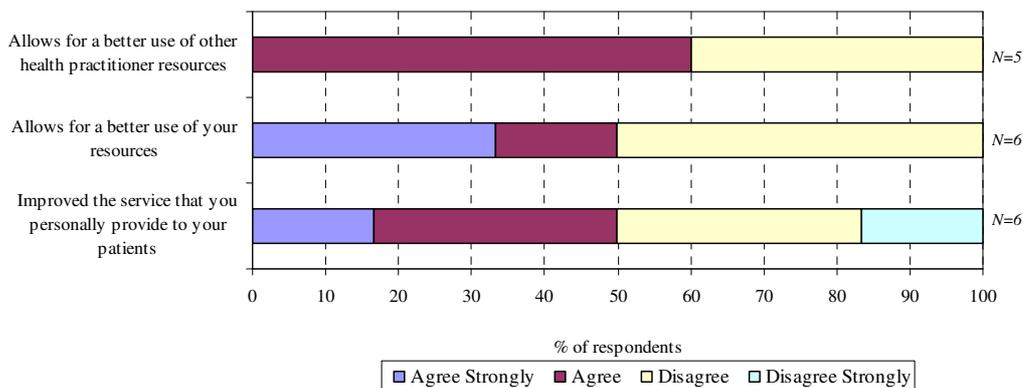


**5.5.4 Perceived Impact on Resources and Service Provision**

The majority of clinicians ‘disagree’ or ‘strongly disagree’ that tele-monitoring has impacted positively upon resources:

- Half (50% N=6) of clinicians either ‘strongly agreed’ or ‘agreed’ that tele-monitoring improved the service that they personally provide to their patients;
- The majority of clinicians (60% N=6) ‘agreed’ that tele-monitoring allows for a better use of other health practitioner resources;
- Half of clinicians (50% N=6) either ‘strongly agreed’ or ‘agreed’ that the project allows for a better use of their resources.

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



It was noted that the Ulster Hospital Diabetes team undertake a lot of clinics within the community setting and that the commencement of the remote monitoring pilot for chronic disease proved

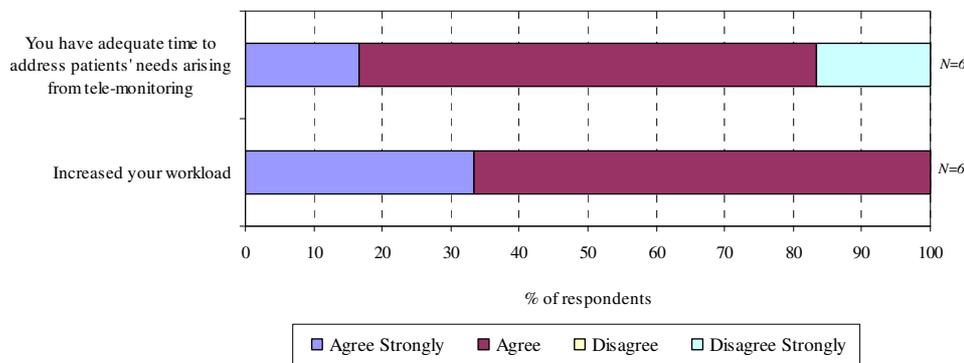
problematic for the Ulster Hospital initially, ie on receipt of patients’ alerts, the majority of clinicians would have been tied up in clinics and could not respond immediately.

The Ulster Hospital Diabetes team holds a virtual clinic on a weekly basis (Wednesdays) with all remaining patients contacted on a Thursday each week in relation to the Remote Monitoring Scheme for Diabetes. It should be noted that a considerable amount of time is saved by patients i.e. because patients do not need to attend physical clinics.

**5.5.5 Perceived Impact on Clinicians’ Workload**

Clinicians ‘agree’ or ‘strongly agree’ that tele-monitoring had increased their workload (100%, N=6); whilst (83%, N=6) agreed that they have adequate time to address patients’ needs arising from tele-monitoring, 13% (N=6) strongly disagreed with this statement:

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



Comments include:

*“The project has increased our workload, through the administration (referral system), receiving of alerts, making time to follow up with alerts. This must be balanced against more information on patients and a better service for patients”*

Clinician Respondents

Consideration has been given to the impact of telemonitoring on resources. For example, the Community Respiratory Team (CRT) for COPD at Lisburn only had one respiratory nurse and one physiotherapist. The team has been further expanded and currently consists of: 1 FTE nurse, 1 FTE physiotherapist, 0.5 FTE nurse and 0.5 FTE physiotherapists.

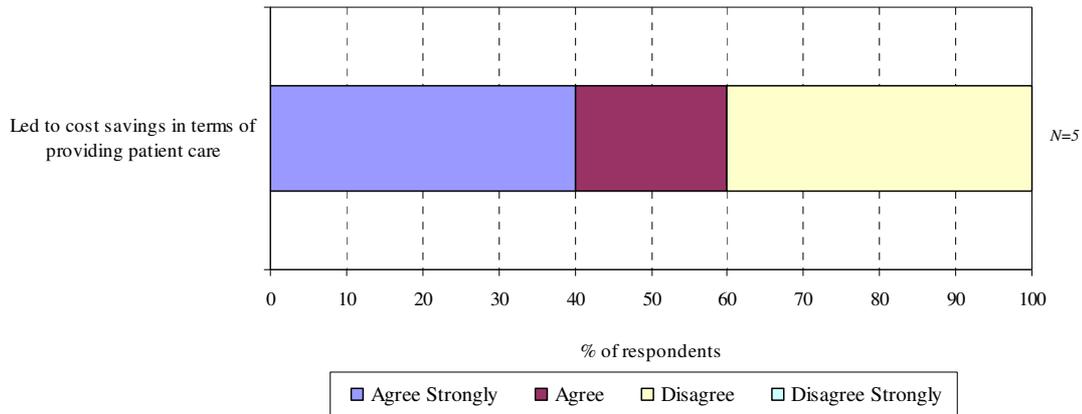
The increase in resources is the main reason that the COPD caseload has increased i.e. the active caseload has increased to include patients who would otherwise have been discharged in the absence of remote tele-monitoring schemes.

A number of clinicians feel that the remote monitoring has increased their workload, ie once a primary care team referral has been received, patients can self-refer themselves to the team if they are feeling unwell. Therefore, telehealth has helped to increase the active patient caseload.

**5.5.6 Perceived Impact on Costs**

The majority of clinicians (60%, N=5) ‘agree’ or strongly agree’ that tele-monitoring has led to costs savings in terms of providing patient care.

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

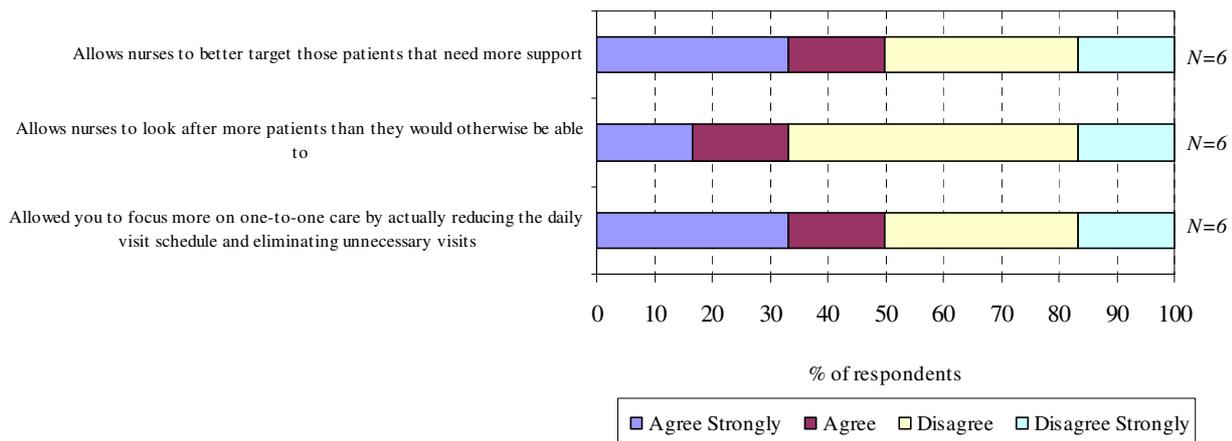


**5.5.7 Perceived Impact on Nursing Care**

There were mixed views on the impact on nursing care, with most clinicians noting that their workloads had increased:

- Half (50% N=6) of clinicians either ‘strongly agreed’ or ‘agreed’ that tele-monitoring allowed them to focus more on one-to-one care by actually reducing the daily visit schedule and eliminating unnecessary visits; the remaining 50% (N=6) either ‘strongly disagreed’ or ‘disagreed’;
- The majority (67% N=6) stated they either ‘strongly disagreed’ or ‘disagreed’ that it allows nurses to look after more patients than they would otherwise be able to; and
- Half (50% N=6) of clinicians stated the project allows nurses to better target those patients that need more support; the remainder ‘strongly disagreed’ or ‘disagreed’.

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

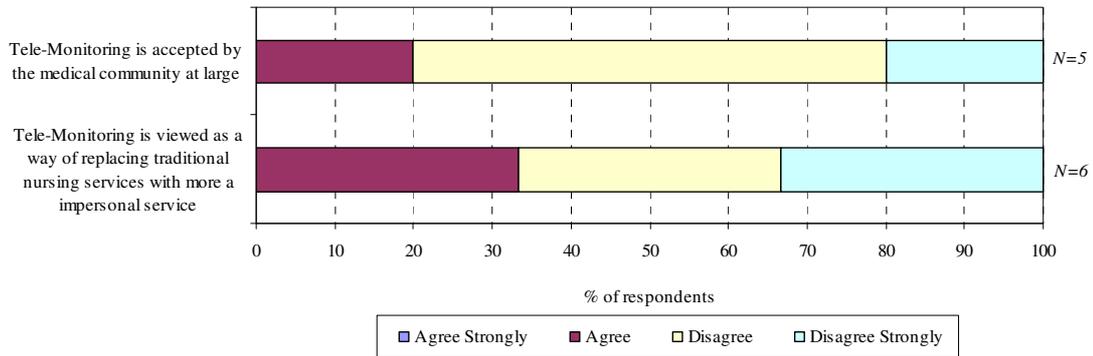


**5.5.8 Degree to which Tele-Monitoring is Accepted**

The majority of clinicians ‘disagree’ or ‘strongly disagree’ that tele-monitoring:

- Is viewed as a way of replacing traditional nursing services with more a impersonal service (67%, N=6); and
- Is accepted by the medical community at large (80%, N=6).

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

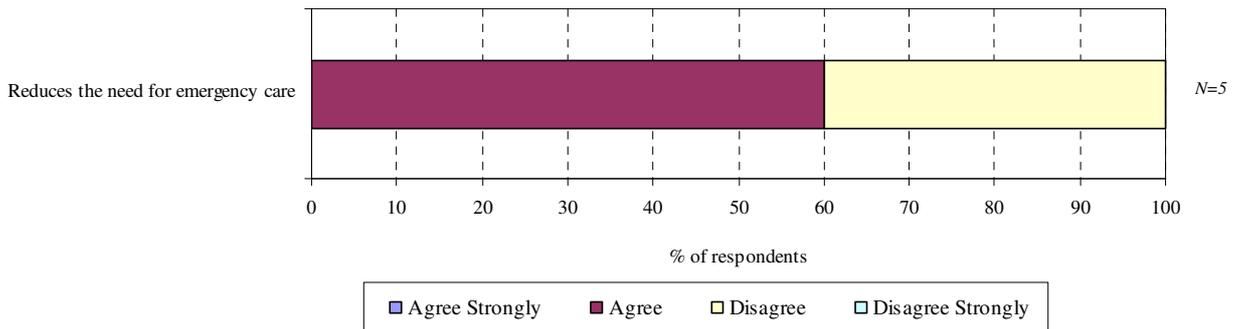


Reference is made to the lack of acceptance by the GPs and medical profession.

**5.5.9 Perceived Impact on Need for Emergency Care**

The majority (60%, N=5) clinicians ‘agreed’ that tele-monitoring reduces the need for emergency care. The remaining 40% (N=5) disagreed.

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

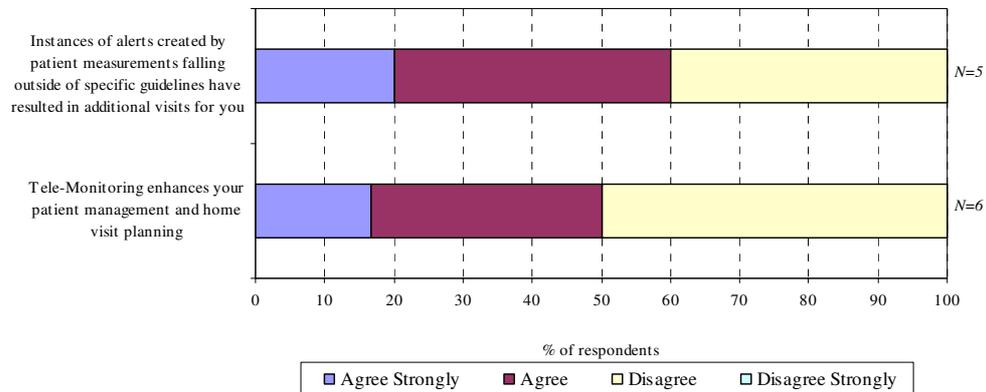


**5.5.10 Perceived Impact on Patient Visits**

Clinicians are of varying opinion as to the impact on patient visits, this correlating to the views on their workloads:

- Half (50%, N=6) ‘agreed’ or ‘strongly agreed’ that tele-monitoring enhances patient management and home visit planning, whilst the remainder disagreed;
- The majority (60%, N=5) ‘agreed’ or ‘strongly agreed’ that instances of alerts created by patient measurements falling outside of specific guidelines have resulted in additional visits for them. The remaining 40% disagreed with this.

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



## 5.6 Conclusion on Organisation and Resource Utilisation

In general, clinicians and patients both reported a positive impact of remote tele-monitoring on the Trust and on resource utilization, with nearly one third of the clinicians and circa 50% of patients reporting a positive impact.

Around 50% of clinicians felt that remote tele-monitoring had a positive impact on organization effectiveness. In particular, 50% 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 (33%). This compares to the patient feedback, with 75% of patients reporting that the pilot have has a positive impact on utilization of Trust resources, through reduced GP visits. There are some differences in perception as to the impact on the length of time in hospital – over 67% 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 40% 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 67% 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. 50% of the 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.

However, all clinicians were of the view that remote tele-monitoring increased their workloads.

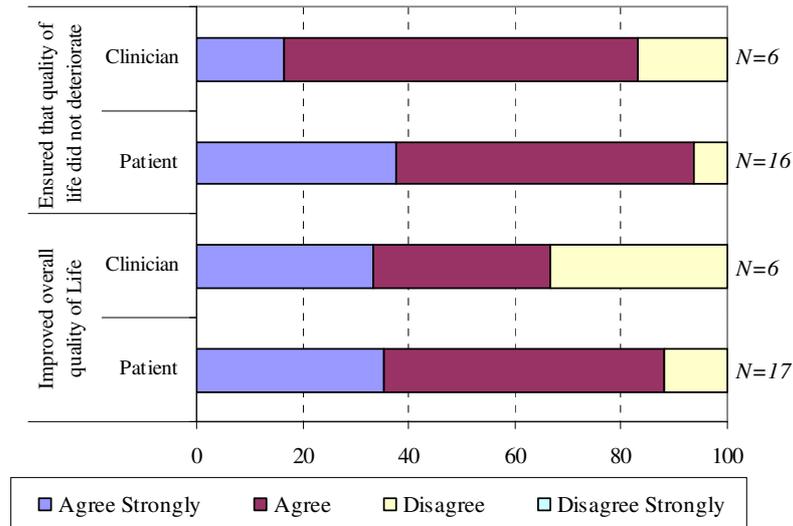
## 6 PERCEIVED IMPACT ON HEALTH AND WELLBEING

Section 6 considers the perceived impact that the remote tele-monitoring pilot has had on patients' health and wellbeing.

### 6.1 Perceived Impact on Quality of Life

Clinicians and patients report varying impacts on life and wellbeing:

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



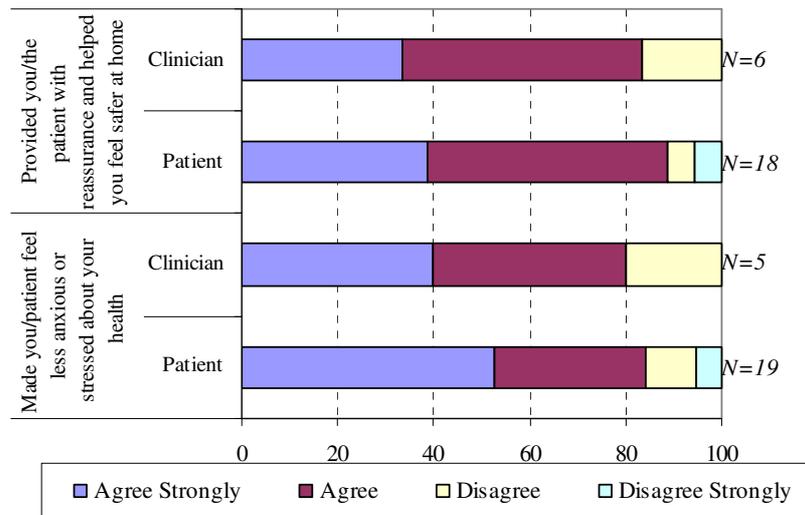
- Two-thirds of clinicians (67%, N=6) and the majority of patients (88%, N=17) are in agreement that tele-monitoring has improved their overall quality of life and
- Similarly, the majority of clinicians (83%, N=6) and patients (94%, N=16) are in agreement that tele-monitoring has ensured that their quality of life did not deteriorate.

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

Clinicians and patients were in agreement that tele-monitoring makes patients less anxious and providing reassurance:

- The vast majority of clinicians (80%, N=5) and patients (84%, N=19) are in agreement that the tele-monitoring project made patients feel less anxious or stressed about their health i.e. has provided them with 'peace of mind';
- Similarly, the vast majority of clinicians (83%, N=6) and patients (89%, N=18) are in agreement that the tele-monitoring project provided patients with reassurance and helped them feel safer at home.

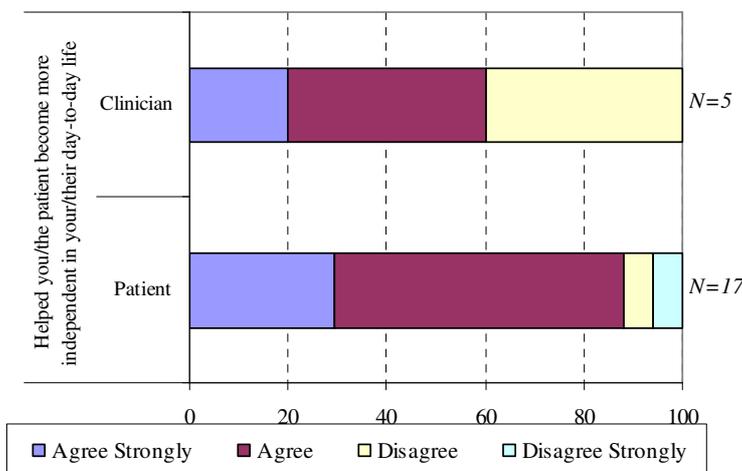
**Figure 6.2: Impact on life and wellbeing (Q11a – Clinicians/Q6a – Patients)**



### 6.3 Perceived Impact on Patients' Independence

Clinicians and patients differ in their views as to the impact tele-monitoring has had on patients' independence:

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



The majority of clinicians (60%, N=5) and the vast majority (88%, N=17) of patients are in agreement that tele-monitoring has allowed them to become more independent. A small number of patients strongly disagree with this statement.

*“There can be difficulty in getting monitors back off patients. They can become dependent on it.”*  
Clinician Respondents

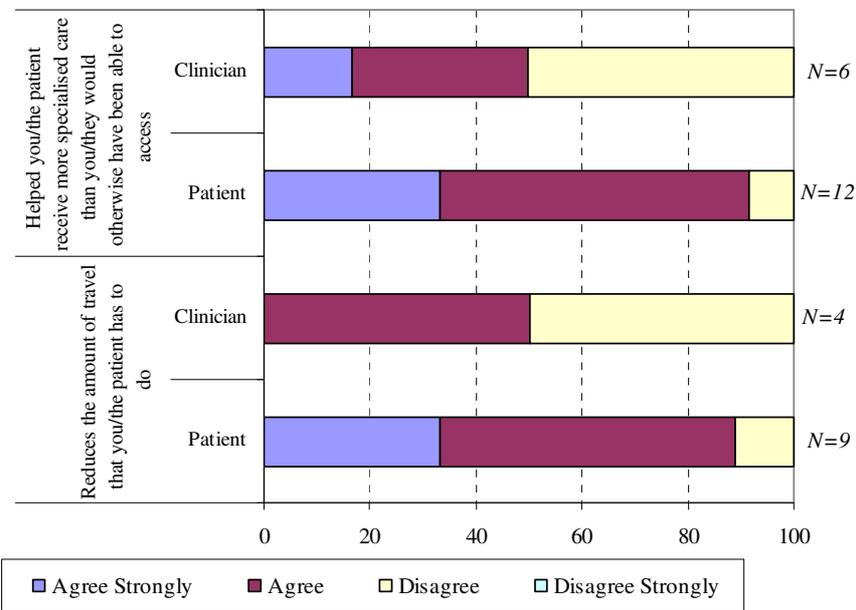
It was noted that patients with very severe conditions might not go outside of the home, or go on holidays.

The Trust would however need to have a system of notification if the equipment was likely to be idle because patients were on holiday.

## 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.

**Figure 6.4: Perceived Impact on patients (Q14a – Clinicians/Q9a – Patients)**



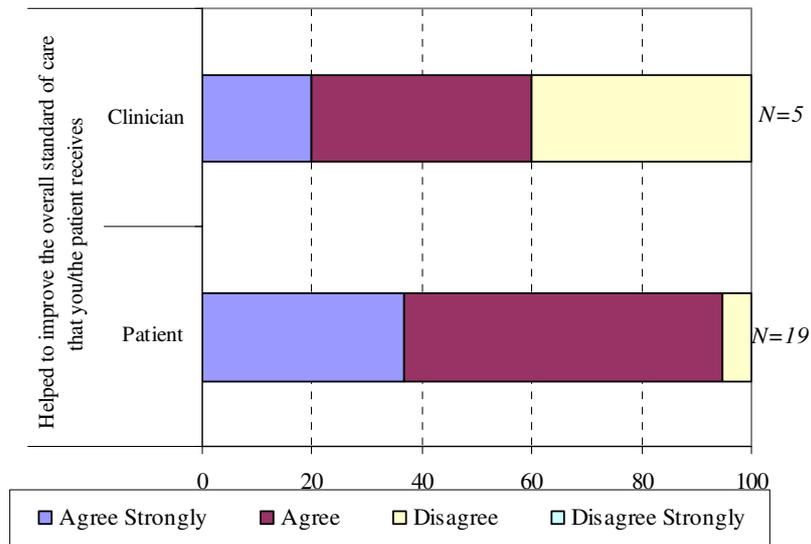
### Clinicians and patients report impact on aspects of the patient's health relating to the Patients' Chronic conditions

- Half of clinicians (50%, N=4) and the majority (89%, N=9) of patients were in agreement that the tele-monitoring project reduces the amount of travel that they have to do to visit health professionals relating to their chronic conditions;
- The majority of patients (73%, N=15) 'strongly agreed' or 'agreed' that the tele-monitoring project saves them time; and
- Half of clinicians (50%, N=17) and the vast majority (92%, N=12) of patients were in agreement that tele-monitoring helps patients receive more specialised care than they would otherwise have been able to access e.g.: because of geography, transport issues or infirmity.

## 6.5 Perceived Impact on Overall Care Received

The majority of clinicians (60%, N=5) and the vast majority (95%, N=19) of patients were in agreement, that tele-monitoring helps to improve the overall standard of care that patients receive.

**Figure 6.5: Perceived Impact on patients Helped to improve (Q14a – Clinicians/Q9a – Patients)**



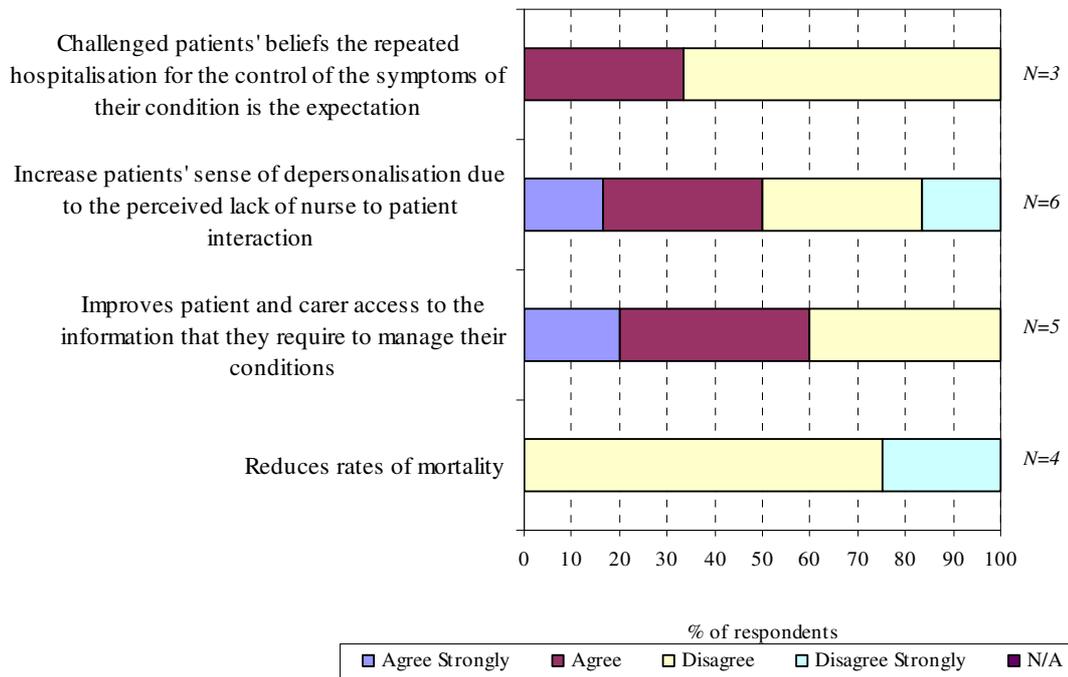
### 6.6 Perceived Impact on Patients' Beliefs, Mindsets and Mortality

Tele-monitoring has had varying impact on aspects of the patient's health relating to the Patients' Chronic conditions – The majority of clinicians ‘disagreed’ or ‘strongly disagreed’ that the tele-monitoring project:

- Reduces rates of mortality (100%, N=4);
- Increased patients' sense of depersonalisation due to the perceived lack of nurse to patient interaction (51%, N=5);
- Challenged patients' beliefs that repeated hospitalisation for the control of the symptoms of their condition is the expectation (67%, N=3);

However, the majority of clinicians (60%, N=5) ‘agreed’ that the tele-monitoring project improves patient and carer access to the information that they require to manage their conditions:

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



Comments include:

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

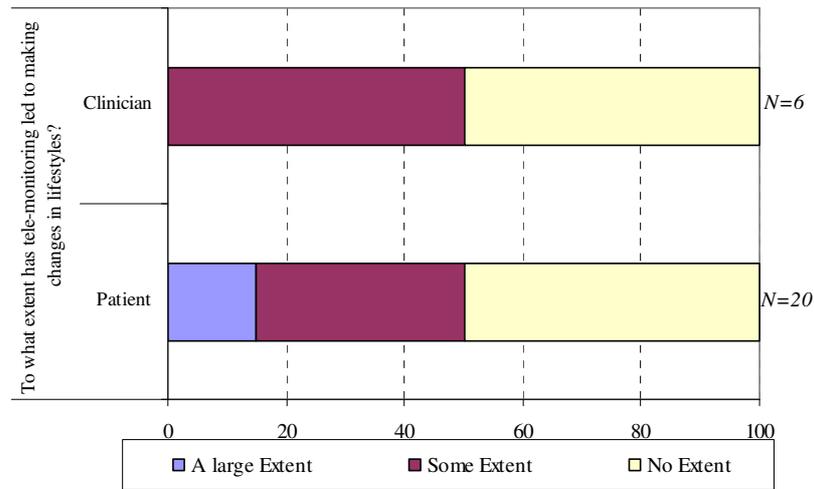
*“Patients already received a good amount of care. But possibly has opened them up to receiving more information or seeking it out for themselves.”*

Clinician Respondents

**6.7 Perceived Impact on Patients’ Lifestyles**

Half of clinicians (50%, N=20) and patients (50%, N=6) reported that tele-monitoring has changed patients lifestyles to some extent. Half of clinicians and patients disagreed that there has been an impact on the patient’s lifestyle:

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



Comments included:

*“Patients are more aware of aspects such as smoking.”*

*“It will have no impact for diabetic patients where patient compliance (with diet) is poor. It could however be a trigger to remind patients to adjust insulin themselves or for patients seeking to lose weight.”*

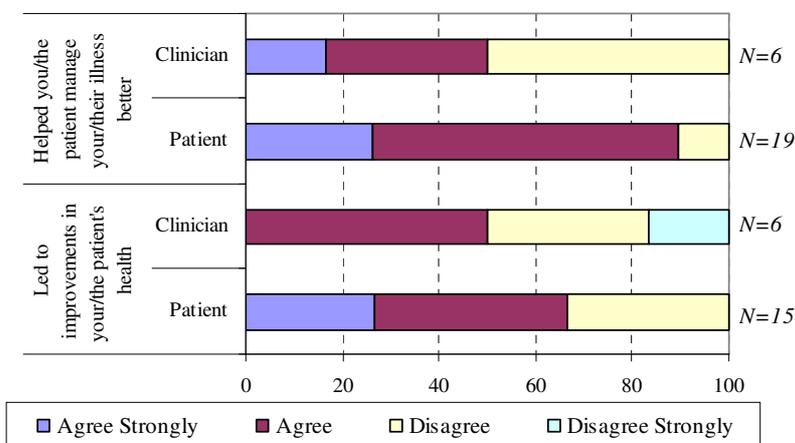
Clinician Respondents

### 6.8 Perceived Impact on Patients’ Health

Clinicians and patients report positive impacts on patients’ health:

- Half of clinicians (50%, N=6) and the vast majority of patients (89%, N=19) are in agreement that the tele-monitoring project has helped patients manage their illness better;
- Half of clinicians (50%, N=6) and two-thirds of patients (67%, N=15) are in agreement that the tele-monitoring project led to improvements in their health

**Figure 6.8: Perceived Impact on patient health (Q12a – Clinicians/ Q7a – Patients)**



Comments included:

*“Patients are monitoring their own readings. One lady picked up that her heart rate was high and notified me.”*

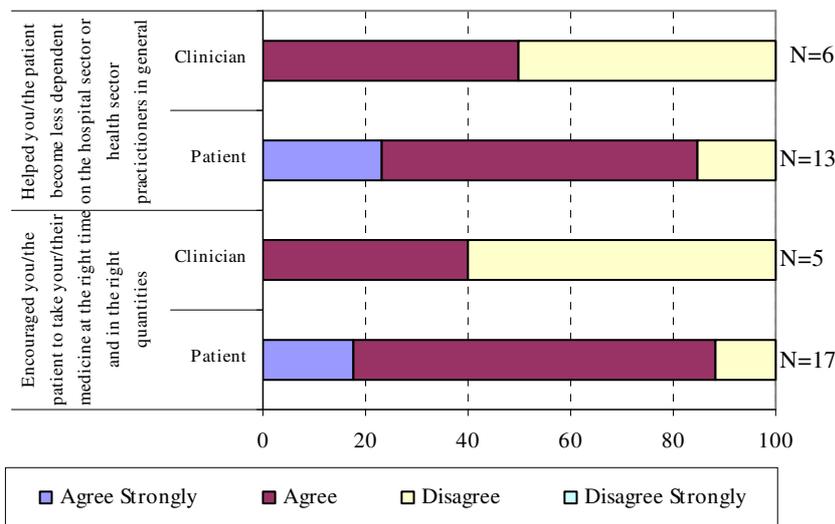
*“My diabetic patient has stopped writing down her readings in her diary. This is a backward step.”*

Clinician Respondents

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

- Two-fifths of clinicians (40%, N=5) and the vast majority of patients (88%, N=17) are in agreement that the project has encouraged patients to take their medicine at the right times and in the right quantities;
- Half of clinicians (50%, N=6) and the majority of patients (85%, N=13) agree that the tele-monitoring project has helped them become less reliant on the hospital sector or health sector practitioners in general.

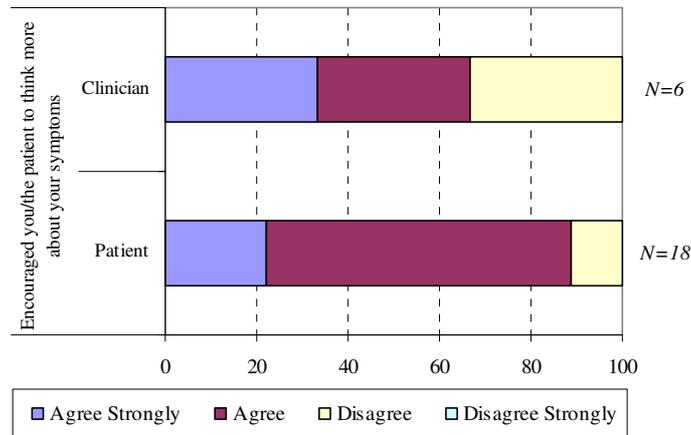
**Figure 6.9: Impact on patient health (Q12a – Clinicians/ Q7a – Patients)**



### 6.10 Perceived Impact on Patients’ Awareness of their Symptoms

Encouragingly, two thirds of clinicians (167%, N=6) and the vast majority of patients (89%, N=18) are in agreement that tele-monitoring has encouraged patients to think more about their symptoms.

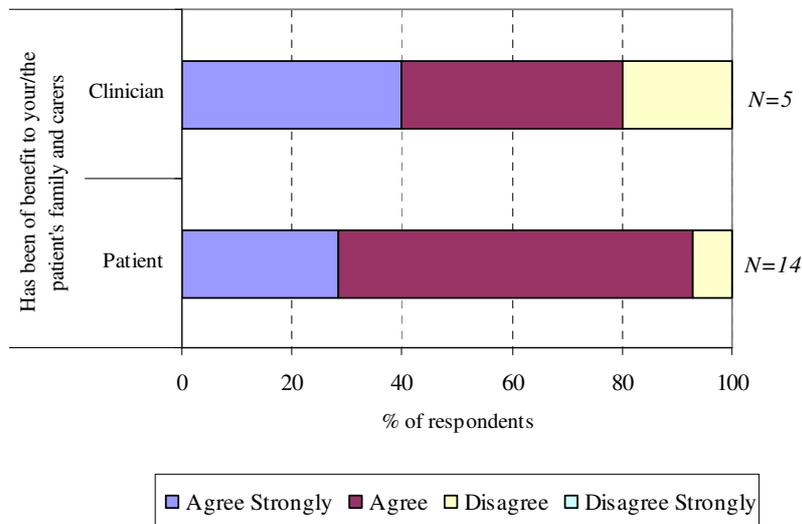
**Figure 6.10: Perceived Impact on patient health (Q12a – Clinicians/ Q7a – Patients)**



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

Moreover, the majority of clinicians (80%, N=5) and patients (93%, N=114) are 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 (Q13a – Clinicians/ Q8a – Patients)**



Comments from patients included:

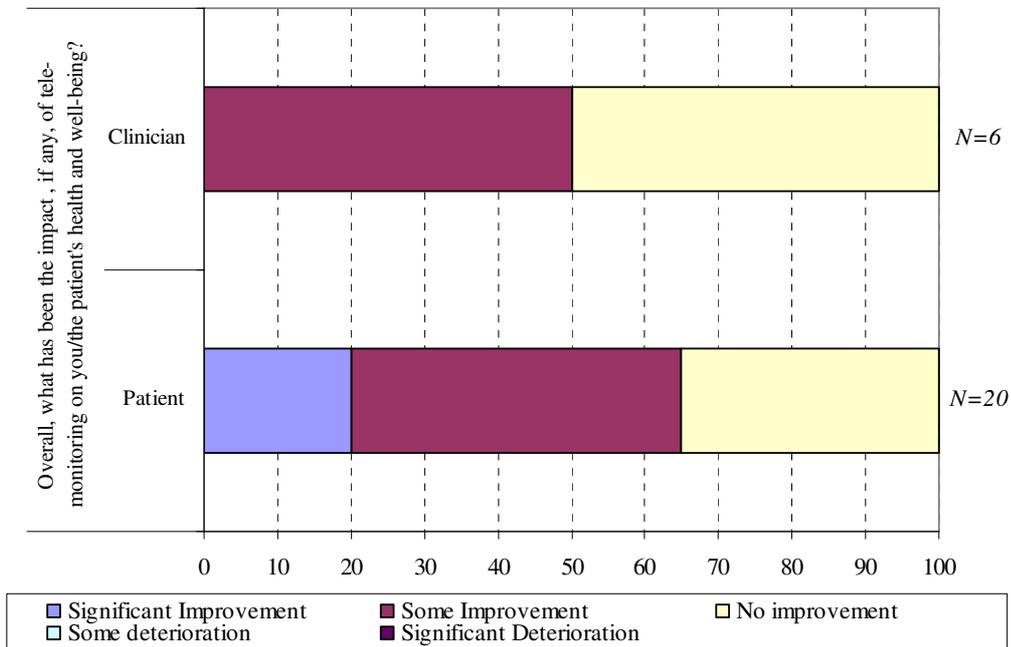
*“It gives my family great peace of mind knowing that I am being monitored.”* Patient Respondents

**6.12 Overall Impact**

**Clinicians and patients report varying impact of tele-monitoring on their overall health and wellbeing:**

- Half (50%, N=6) of clinicians state that overall there has been ‘no improvement’ in their patients health and well being; the remaining 50% state there has been ‘some improvement’. This compares to just over two-thirds (65%, N=20) of patients who stated that overall tele-monitoring has led to a ‘significant’ or ‘some improvement’ in their overall health and wellbeing.

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



**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, 60% of clinicians and 95% 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 88% of patients and 83% 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 projects, including impact upon quality of life and general health and well-being. Over 88% 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 50% 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 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 projects, 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. Nearly a third to one half of the clinicians surveyed had reported a similar benefit in terms of a reduction in hospital admissions, and length of stay in hospital. There is, from many of the clinicians, a concern as to the impact that remote tele-monitoring has had on the clinicians' workloads. Finally, in terms of the actual operation of the pilot, similar trends emerged: patients are positive as to how the remote tele-monitoring pilots had worked in practice, including their confidence in the triage service provided. Clinicians, too, report positive experiences, in relation to clinical 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 project, including impact upon quality, safety and patient experience. In terms of quality of care, over 60% of clinicians, and 95% 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 – over 40% of 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 100% 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 – 88% of patients and over 83% 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

Circa 50% of clinicians were of the view that remote tele-monitoring had contributed to reduced utilization of hospital with circa one third being of the view that it has led to reduced visits to GPs and contact with the community care nurses. This compares to the patient feedback, with circa 50% to 75% of patients reporting that the pilots have 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

Around 50% 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 of 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 all of the clinicians were of the view that patient parameters are appropriately set, it was acknowledged that 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. However, over 50% of the 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. 88% 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, 50% of patients and clinicians agree that the pilot 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 67% 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 40% of the clinicians and 89% of patients reporting that remote tele-monitoring project encourages patients to take their medicine at the right times and in the right quantities. 60% of the clinicians and 88% of patients report 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.

50% of patients and 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 perceptions as to the impact on the length of time in hospital – 75% 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 50% 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 positive about the extent to which patients receive more and better targeted proactive support under tele-monitoring. 50% of clinicians considered 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. Moreover, over 50% of the clinicians agree that it allows them to better target those patients who need more support.

However, over 89% of patients and over 50% 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. 83% 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, with further effort to consolidate GP commitment to tele-monitoring.

### **7.2 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 1- Clinician**

**South Eastern Trust**

**DHSSPS/ECCH  
Telemonitoring Service Pilots  
Clinician Questionnaire**

It is noted that the N varies as in some instances the question is not applicable to all consultees, and in some cases questions were not answered by all.

**Q1. What conditions/illnesses do you have responsibility for? (Par 4.1)**

	<b>%</b>	<b>N =</b>
Constructive Pulmonary Obstructive Disease (COPD)	50%	6
Heart Failure and/or arrhythmia	50%	6
Heart Disease	50%	6
Type 1 Diabetes	-	6
Type 2 Diabetes	-	6
Asthma	-	6
Bronchiectasis	-	6
Other	-	6

**Q2b. To what extent would you agree that the patients that were selected or recruited to participate in the Pilot were appropriate to participate? (Par 4.3)**

<b>Strongly Agree</b>	<b>Agree</b>	<b>Disagree</b>	<b>Strongly Disagree</b>	<b>N =</b>
50%	50%	-	-	6

**Q3a. To what extent would you agree that tele-monitoring is appropriate for all patients with the primary condition that you have responsibility for? (Par 4.4)**

<b>Strongly Agree</b>	<b>Agree</b>	<b>Disagree</b>	<b>Strongly Disagree</b>	<b>N =</b>
17	-	66	17	6

**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).**

<b>6a (Par 4.5.1)</b>	<b>COPD</b>			
	<b>Mild</b>	<b>Moderate</b>	<b>Severe</b>	<b>Very Severe</b>
Less than two month	100%	67%	-	-
2-3 months	-	33%	-	-
4-6 months	-	-	33%	33%
7-12 months	-	-	-	-
More than 1 year	-	-	33%	33%
To end of life	-	-	34%	34%
<b>N =</b>	<b>2</b>	<b>3</b>	<b>3</b>	<b>3</b>

<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				
2-3 months				
4-6 months				
7-12 months				
More than 1 year				
To end of life				
<i>N</i> =				

<b>6c (Par 4.5.2)</b>	<b>Diabetes</b>	
	<b>Type 1</b>	<b>Type 2</b>
Less than two month	-	-
2-3 months	67%	67%
4-6 months	33%	33%
7-12 months	-	-
More than 1 year	-	-
To end of life	-	-
<i>N</i> =	<b>3</b>	<b>3</b>

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

	<b>Strongly Agree</b>	<b>Agree</b>	<b>Disagree</b>	<b>Strongly Disagree</b>	<b><i>N</i> =</b>
The Project was explained to you in such a way that you fully understood what it was about <b>(Par 4.7.1)</b>	17%	83%	-	-	<b>6</b>
You received adequate training to allow you to use the tele-monitoring equipment <b>(Par 4.7.1)</b>	25%	50%	25%	-	<b>4</b>
The way in which tele-monitors were ordered for placement was straightforward and efficient <b>(Par 4.7.2)</b>	20%	40%	40%	-	<b>5</b>
Patients' parameters were appropriately established i.e. the patient measurements which would create an alert if they fell outside the specific criteria <b>(Par 4.7.4)</b>	17%	83%	-	-	<b>6</b>
You feel comfortable setting Patients' parameters <b>(Par 4.7.4)</b>	50%	50%	-	-	<b>6</b>
The patient information provided by the tele-monitoring equipment is easy to interpret <b>(Par 4.7.4)</b>	33%	33%	17%	17%	<b>6</b>
You are provided with adequate ICT or equipment to respond to Patient alerts <b>(Par 4.7.5)</b>	50%	50%	-	-	<b>2</b>
Adequate support was provided by the Trust's Telemonitoring Coordinator <b>(Par 4.7.5)</b>	17%	83%	-	-	<b>6</b>

Adequate support was provided by the Trust's Management (Par 4.7.5)	20%	40%	40%	-	5
The Patients' GPs are positive about and have taken some ownership of the Telemonitoring Project (Par 4.7.6)	33%	33%	-	34%	3

**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 (4.8.2)	33%	50%	-	17%	6
Generally the level (quantity) of communication from the Service Provider was good (4.8.2)	17%	50%	33%	-	6
Generally the mode (e.g. telephone call, text, e-mail) of Patient alerts received from the Service Provider is appropriate (4.8.3)	40%	60%	-	-	5
Generally the timeliness of receipt of Patient alerts from the Service Provider was good (4.8.3)	40%	60%	-	-	5
Generally the quality of monitoring information provided by the Service Provider is good (4.8.5)	17%	67%	17%	-	6
Generally the timeliness of monitoring information provided by the Service Provider is good (4.8.5)	33%	67%	-	-	6
The level and type of documentation that needs to be completed between you and the Service Provider at the Patient referral stage is appropriate (4.8.1)	-	83%	-	17%	6
<b>For the Service Provider only</b>	<b>Strongly Agree</b>	<b>Agree</b>	<b>Disagree</b>	<b>Strongly Disagree</b>	<b>N =</b>
The Service Provider appropriately screens alerts before making contact with you (4.8.4)	20%	40%	20%	20%	5

**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 (4.9.4)	17%	67%	17%	-	6
Was fitted in a timely manner for Patients (4.9.4)	25%	50%	25%	-	4

Is easy for most Patients to use correctly (Par 4.9.1)	17%	83%	-	-	6
Can be fitted or used in almost any home (Par 4.9.4)	-	67%	33%	-	6
Currently asks appropriate questions for the Patients' conditions (Par 4.9.3)	-	33%	67%	-	6
Asks questions that are easily understood by the Patients (Par 4.9.3)	-	67%	33%	-	6
Asks questions that encourage patients to think about their symptoms (Par 4.9.3)	17%	67%	-	17%	6
Is reliable (i.e. rarely has technical problems) (Par 4.9.1)	-	50%	50%	-	6
You or the Patients have experienced few, if any, problems with the equipment (Par 4.9.1)	17%	17%	67%	-	6

**Q9c. To what extent would you agree with the following statements about the tele-monitoring equipment and/or software? (Par. 4.9.2)**

It Provides accurate readings for:	Strongly Agree	Agree	Disagree	Strongly Disagree	N =
Weight	100%	-	-	-	1
Heart rate	67%	33%	-	-	3
Blood pressure	33%	67%	-	-	3
Temperature	100%	-	-	-	1
Oxygen saturation	50%	50%	-	-	2
Blood Glucose	50%	50%	-	-	2
Peak flow	-	-	-	-	0
Other	-	-	-	-	0
Other	-	-	-	-	0

**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	N =
Reduced the number of times that the participant patients have been admitted or readmitted to hospital (Par 5.2)	17%	33%	33%	17%	6
Reduced the number of times that the participant patients have self-referred themselves to A&E (Par 5.3)	-	33%	33%	17%	6
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) (Par 5.2)	20%	20%	40%	20%	5

Reduced the number of times that participant patients have had to visit their GP (Par 5.4)	-	33%	50%	17%	6
Reduced the number of times that participant patients have had to contact their Community Care Nurse by phone (Par 5.4)	-	40%	40%	20%	5
Reduced the number of visits that participant patients have needed from their Community Care Nurse (Par 5.4)	-	60%	20%	20%	5

**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 (Par 6.1)	33%	33%	33%	-	6
Ensured that their Quality of Life did not deteriorate (Par 6.1)	17%	67%	17%	-	6
Made them feel less anxious or stressed about their health i.e. has provided them with 'peace of mind' (Par 6.2)	40%	40%	20%	-	5
Provided them with reassurance and helped them feel safer at home (Par 6.2)	33%	50%	17%	-	6
Helped them become more independent in their day-to-day life (Par 6.3)	20%	40%	40%	-	5

**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 (Par 6.8)	-	50%	33%	17%	6
Helped them manage their illness better (Par 6.8)	17%	33%	50%	-	6
Encouraged them to take their medicine at the right times and in the right quantities (Par 6.9)	-	40%	60%	-	5
Helped them become less reliant on the hospital sector or health sector practitioners in general (Par 6.9)	-	50%	50%	-	6
Encouraged them to think more about their symptoms (Par 6.10)	33%	33%	33%	-	6

**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? (Par 6.11)**

Tele-Monitoring has.....	Strongly Agree	Agree	Disagree	Strongly Disagree	N =
Has been of benefit to the families and/or carers	40%	40%	20%	-	5

**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 ( <b>Par 6.4</b> )	-	50%	50%	-	4
Helps them receive more specialised care than they would otherwise have been able to access e.g. because of geography, transport issues or infirmity ( <b>Par 6.4</b> )	17%	33%	50%	-	6
Helps to improve the overall standard of care that they receive ( <b>Par 6.5</b> )	20%	40%	40%	-	5
Reduces rates of mortality ( <b>Par 6.6</b> )	-	-	75%	25%	4
Improves patient and carer access to the information that they require to manage their conditions. ( <b>Par 6.6</b> )	20%	40%	40%	-	5
Will increase patients' sense of depersonalisation due to the perceived lack of nurse to patient interaction. ( <b>Par 6.6</b> )	17%	33%	33%	17%	6
Has challenged patients' beliefs that repeated hospitalization for the control of the symptoms of their condition is the expectation. ( <b>Par 6.6</b> )	-	33%	67%	-	3

**Q15a. To what extent has tele-monitoring led to patients making changes in their lifestyles? (Par 6.7)**

A large Extent	Some Extent	No Extent	N =
-	50%	50%	6

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

Positive	Negative	N =
75%	25%	4

**Q16a. To what extent would you agree that the tele-monitoring pilot project was a patient centred service? (Par 5.1.1)**

Strongly Agree	Agree	Disagree	Strongly Disagree	N =
17	50	17	17	6

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

<b>Tele-Monitoring .....</b>	<b>Strongly Agree</b>	<b>Agree</b>	<b>Disagree</b>	<b>Strongly Disagree</b>	<b>N =</b>
Provides you with ready access to useful information on your patients' conditions and treatment <b>(Par 5.5.1)</b>	33%	50%	17%	-	6
Supports more effective and integrated working across health and social services. <b>(Par 5.5.2)</b>	-	60%	40%	-	5
Has allowed for better communication across and between multidisciplinary care teams. <b>(Par 5.5.2)</b>	-	40%	60%	-	5
Has helped shift the balance of care towards the community and promoting the alternatives to hospital admission. <b>(Par 5.5.3)</b>	25%	25%	50%	-	4
Has improved the service that you personally provide to your patients <b>(Par 5.5.4)</b>	17%	33%	33%	17%	6
Allows for a better use of your resources <b>(Par 5.5.4)</b>	33%	17%	50%	-	6
Allows for a better use of other health practitioner resources <b>(Par 5.5.4)</b>	-	60%	40%	-	5
Has increased your workload <b>(Par 5.5.5)</b>	33%	67%	-	-	6
You have adequate time to address patients' needs arising from tele-monitoring <b>(Par 5.5.5)</b>	17%	67%	-	17%	6
Has led to cost savings in terms of providing patient care <b>(Par 5.5.6)</b>	40%	20%	40%	-	5
Allowed you to focus more on one-on-one care by actually reducing the daily visit schedule and eliminating unnecessary visits. <b>(Par 5.5.7)</b>	33%	17%	33%	17%	6
Allows nurses to look after more Patients than they would otherwise be able to <b>(Par 5.5.7)</b>	17%	17%	50%	17%	6
Allows nurses to better target those Patients that need more support <b>(Par 5.5.7)</b>	33%	17%	33%	17%	6
Is viewed as a way of replacing traditional nursing services with more impersonal service. <b>(Par 5.5.8)</b>	-	33%	33%	33%	6
Is accepted by the medical community at large <b>(Par 5.5.8)</b>	-	20%	60%	20%	5
Reduces the need for emergent care <b>(Par 5.5.9)</b>	-	60%	40%	-	5
Enhances your patient management and home visit planning <b>(Par 5.5.10)</b>	17%	33%	50%	-	6
Instances of alerts created by patient measurements falling outside of specific guidelines have resulted in additional visits	20%	40%	40%	-	5

for you. (Par 5.5.10)					
-----------------------	--	--	--	--	--

**Q18a. To what extent would you be confident that tele-monitoring allows the provision of clinical triage to a patient from a distance? (Par 4.10.1)**

Very Confident	Confident	Not Very Confident	Not at all Confident	N =
17%	67%	-	17%	6

**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? (Par 4.10.1)**

Very Confident	Confident	Not Very Confident	Not at all Confident	N =
-	60%	40%	-	5

**Q23a. Overall, what has been the impact, if any, of tele-monitoring on your patients' health and wellbeing? (Par 6.12)**

Significant improvement	Some improvement	No improvement	N =
-	50%	50%	6

**Q24a. Overall, how satisfied are you with the tele-monitoring support that your patients have received? (Par 4.13)**

Very Satisfied	Satisfied	Dissatisfied	Very Dissatisfied	N =
50%	33%	17%	-	6

**Appendix 1- Patient**

**South Eastern Trust  
DHSSPS/ECCH  
Telemonitoring Service Pilots  
Patient Questionnaire**

It is noted that the N varies as in some instances the question is not applicable to all consultees, and in some cases questions were not answered by all.

**Q1. What conditions/illnesses is the tele-monitoring equipment being used to monitor? (Par 4.1)**

	<b>%</b>	<b>N =</b>
Constructive Pulmonary Obstructive Disease (COPD)	50%	20
Heart Failure and/or arrhythmia	-	20
Heart Disease	-	20
Type 1 Diabetes	25%	20
Type 2 Diabetes	20%	20
Asthma	10%	20
Bronchiectasis	10%	20
Emphysema	-	20

**Q2. Approximately, for how many months have you been using the tele-monitoring equipment? (Par 4.2)**

	<b>%</b>
Less than one month	5%
1 to 2 months	30%
3-4 months	55%
5-6 months	5%
7-8 months	5%
9-10 months	-
11 months to 1 year	-
More than 1 year	-
<b>N =</b>	<b>20</b>

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

	<b>Strongly Agree</b>	<b>Agree</b>	<b>Disagree</b>	<b>Strongly Disagree</b>	<b>N =</b>
The Project was explained to you in such a way that you fully understood what it was about <b>(Par 4.7.1)</b>	65%	35%	-	-	20
You received adequate training to allow you to use the tele-monitoring equipment correctly <b>(Par 4.7.1)</b>	60%	40%	-	-	20
The Equipment was installed in your house in an efficient manner <b>(Par 4.7.3)</b>	60%	40%	-	-	20

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

The Tele-Monitoring Equipment .....	Strongly Agree	Agree	Disagree	Strongly Disagree	N =
Is easy to use (Par 4.9.1)	35%	60%	-	5%	20
Reliable (Par 4.9.1)	35%	50%	15%	-	20
Provides accurate readings (Par 4.9.2)	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 =	N/A
Reduced the number of times that you have been admitted or readmitted to hospital (Par 5.2)	17%	33%	50%	-	6	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 telemonitoring equipment) (Par 5.2)	-	67%	33%	-	3	16
Reduced the number of times that you have had to visit your GP (Par 5.4)	25%	50%	25%	-	8	12
Reduced the number of times that you have had to contact by phone your Community Care Nurse (Par 5.4)	-	83%	17%	-	6	14
Reduced the number of visits that you have needed from your Community Care Nurse (Par 5.4)	-	83%	17%	-	6	14

**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 (Par 6.1)	35%	53%	12%	-	17
Ensured that your Quality of Life did not deteriorate (Par 6.1)	38%	56%	6%	-	16
Made you feel less anxious or stressed about your health (Par 6.2)	53%	32%	11%	5%	19
Has provided you with 'peace of mind'	56%	33%	6%	6%	18
Provided you with reassurance and helped you feel safer at home (Par 6.2)	38%	50%	6%	6%	18

Helped you become more independent in your day-to-day life (Par 6.3)	29%	59%	6%	6%	17
--	-----	-----	----	----	----

**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 (Par 6.8)	27%	40%	33%	-	15
Helped you manage your illness better (Par 6.8)	26%	63%	11%	-	19
Encouraged you to take your medicine at the right time and in the right quantities (Par 6.9)	18%	71%	12%	-	17
Helped you become less reliant on the hospital sector or health sector practitioners in general (Par 6.9)	23%	62%	15%	-	13
Encouraged you to think more about your symptoms (Par 6.10)	22%	67%	11%	-	18

**Q8a. To what extent would you agree with the following statements about the impact that tele-monitoring has had on your family or carers? (Par 6.11)**

Tele-Monitoring has.....	Strongly Agree	Agree	Disagree	Strongly Disagree	N =
Has been of benefit to your family and/or carers	29%	64%	7%	-	14

**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 (Par 6.4)	20%	53%	27%	-	15
Reduces the amount of travel that you have to do (Par 6.4)	33%	56%	11%	-	9
Helped you receive more specialised care than you would otherwise have been able to access e.g. because of geography, transport issues or infirmity (Par 6.4)	33%	58%	8%	-	12
Helped to improve the overall standard of care that you receive (Par 6.5)	37%	58%	5%	-	19

**Q10a. To what extent has telemonitoring led to making changes in your lifestyle? (Par 6.7)**

A large Extent	Some Extent	No Extent	N =
15%	35%	50%	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? (Par 4.10.1)**

Very Confident	Confident	Not Very	Not at all	N =

		<b>Confident</b>	<b>Confident</b>	
58%	42%	-	-	<b>19</b>

**Q14a. Overall, what has been the impact, if any, of tele-monitoring on your health and wellbeing? (Par 6.12)**

<b>Significant improvement</b>	<b>Some improvement</b>	<b>No Change</b>	<b>Some Deterioration</b>	<b>Significant Deterioration</b>	<b>N =</b>
20%	45%	35%	-	-	<b>20</b>

**Q15a. Overall, how satisfied are you with the tele-monitoring support that you received? (Par 4.13)**

<b>Very Satisfied</b>	<b>Satisfied</b>	<b>Dissatisfied</b>	<b>Very Dissatisfied</b>	<b>N =</b>
69%	26%	5%	-	<b>19</b>