

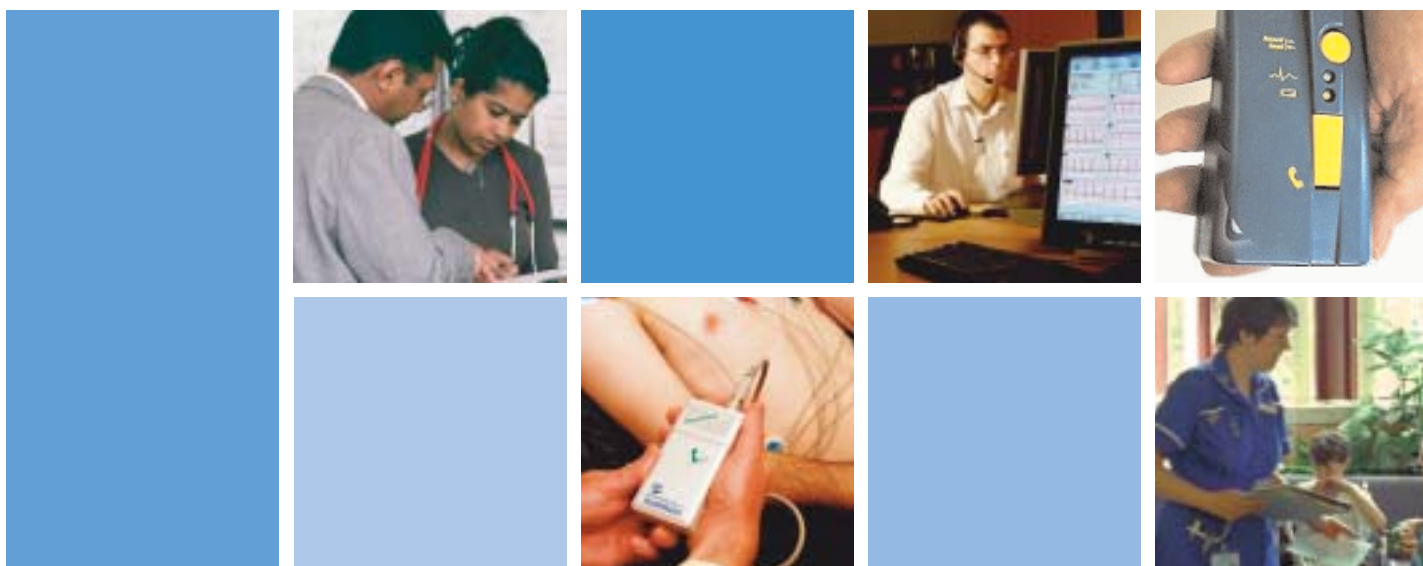


North West

Cardiac Telemedicine in Primary Care

Delivering Benefits for Patients and
the NHS in Lancashire & Cumbria

A Report for Commissioners



Ipsos MORI

Lancashire & South Cumbria Cardiac Network



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Foreword

Over the past few years technological developments have taken place which have provided new equipment and ways of working for clinicians and social care workers to provide support and care for patients in their own home, thus allowing them to remain with their families and avoiding inappropriate hospital admissions.

One such development has been the use of telemedicine equipment for undertaking cardiovascular diagnosis and monitoring for patients with cardiac conditions within the home/community environment. This report identifies the considerable benefits that may be gained by using such

technology. NHS North West, working in close collaboration with Broomwell Healthwatch, an independent sector company, funded the placement of telemedicine ECG machines in Primary Care Centres across the Cumbria and Lancashire area of the NHS North West. The Audit and Research Programme set up to monitor the effectiveness of this equipment identified that considerable benefits could be achieved for patient care and clinical diagnostics as well as gains made for the health economy. The full details are identified in the body of this report.

The service and benefits described in the following pages represent one of an increasing

number of new technological services that are available for patient care and as such helps to address one of the big challenges for the NHS, that of delivering benefits to patients, carers and professionals. It is now timely for commissioners to be embracing these services to meet the future demands of healthcare provision and it is for this reason we are sharing our findings so widely.

I hope you find the report helpful and informative for your future commissioning plans.

J Rafferty

Director of Commissioning
and Performance
NHS North West

Executive Summary

In Cumbria and Lancashire the Strategic Health Authority (now part of NHS North West) funded by development money from the then Directorate of Access and Choice at the Department of Health worked closely with Broomwell Healthwatch, a company that had already developed a telemedicine ECG interpretation service, to audit the use of this new technology in various primary care settings. The aim of this work was to establish whether there were any benefits to be gained from this new way of working.

This report publishes the results of the audit and details the opinions of clinicians who had used this telemedicine equipment to assist them in the management of their patients. This information was collected by the SHA using an audit questionnaire and by commissioning the service of Ipsos MORI to undertake a series of focus groups to collate opinion with regard to the new service.

The benefits to patients and the NHS identified by this work may be summarised as follows:

- **Patient Benefits**
 - Patients may avoid unnecessary hospital attendance
 - Patients are able to access care within their local community.
- **Operational Benefits**
 - The equipment is convenient and easy to use.
 - The equipment is lightweight and portable allowing use in varying locations
 - The system saves time for clinical and managerial staff.
- **Clinician Benefits**
 - The service provides access to prompt expertise in ECG interpretation
 - Clinicians have confidence in the accuracy of ECG interpretation which supports their clinical diagnosis
 - The service is reliable and provides 24-hour support – 365 days per year.

- **Health Economy Benefits**

- The number of inappropriate hospital attendances was reduced
- Financial savings can be re-distributed in line with local priorities.

The report also outlines the benefits as we see them of collaborative working with the independent sector and concludes with a series of recommendations to commissioners who we believe should consider use of telemedicine technology in cardiac care.

Whilst not part of the formal audit, once it became clear that this technology was supporting clinical decision making to the extent that inappropriate referrals to A&E departments were being prevented, an estimate of the potential financial savings being accumulated during the pilot was made. When extrapolated to England as a whole we suggest that the potential financial savings could be a minimum of £45 million per annum.

Section 1

The Pilot and how it was undertaken



The Pilot and how it was undertaken

1.1 Introduction

In 2005 the Cumbria and Lancashire Strategic Health Authority (C&L SHA, now part of NHS North West), supported by the Diagnostic Futures Programme at the Department of Health (DH), undertook an Audit and Research Programme to evaluate the ease of use and effectiveness of telemedicine diagnostics when used in a primary care setting.

Research such as this has been conducted elsewhere in the world, particularly in Italy (Scalvini et al 2005) and America, where workers have identified that definite patient, clinical and health economic gains may be achieved by using this equipment.

We are also aware that other centres in the UK have been using a variety of new telemedicine technologies for a number of years with considerable benefits for patient care.

In order to evaluate cardiac telemedicine in community settings, a number of GP practices as well as two established NHS walk-in centres were recruited with the support of the Lancashire and South Cumbria Cardiac Network. The network also provided advice about evaluation. Each was offered the opportunity to trial telemedicine electro-cardiograph (ECG) machines for a period of six months.

Every location was asked to use this equipment exclusively for the duration of the pilot, and, as part of the project, were asked to complete an audit questionnaire; the results of which are detailed in this report. Medical, nursing and managerial staff were also asked to take part in focus groups conducted by the Ipsos MORI organisation; the findings of which are included in section 2 of this report.

1.2 Why did we pilot Telemedicine and how did we go about it?

Within primary care, ECGs are usually undertaken by nursing staff who often have limited training in interpretation of the results. GPs may also experience difficulty in reading ECGs, as many do not see them sufficiently often to interpret complex readings or on occasion maintain their clinical competence in this area of practice. In addition, questions are raised with regard to the reliability of the ECG machine readers, which may not always give an accurate result. One of the prime aims of this pilot was therefore to investigate options that would enable GPs and other practitioners to access a reliable and accurate way to support them to interpret ECGs and so assist them with clinical diagnosis and management of the patient's health needs. It was also hoped that this technology would provide additional benefits including operational simplicity, reductions in inappropriate hospital attendance and achieve financial savings that could be re-invested in patient care.

At present most primary care centres use a conventional 12-lead ECG machine to:

- Assess patients who present with acute clinical symptoms
- Evaluate progress in the clinical condition of patients with long-term conditions such as hypertension or diabetes
- As a screening tool to provide clinical data prior to an outpatient referral.

These machines take a recording and then produce a paper tracing for the clinician (usually doctor) or the machine's inbuilt electronic reader to interpret.

1.3 How does the Telemedicine technology work?

Telemetric 12-lead ECG machines are used in an identical manner as conventional machines but, with this equipment, the recording obtained is transmitted wirelessly along a land-based phone line to a call centre where a team of clinically trained staff are available 24 hours a day, 365 days per year to interpret the results. During

transmission, the team are in constant communication with the patient's doctor, nurse or paramedic and, having awareness of the clinical situation, are then able to provide an accurate interpretation and provide an immediate result to support delivery of quality patient care.

1.4 Pilot Methodology

Telemedicine ECG machines were placed in 15 General Practices and two walk-in centres within the area in the North West of England covered by the Cumbria & Lancashire SHA. Centre selection was made at random, the clinical teams at each location being given the option to take part in the work. The final decision to participate was made by the clinicians following demonstration of the ECG equipment and service. The distribution of the participating centres by Primary Care Trusts (PCTs) is shown in table 1. The PCTs identified are those in existence prior to the re-configuration in October 2006.

Table 1 - Centre distribution by Primary Care Trust

Primary Care Trust
Blackpool (1)
Fylde (3)
Wyre (1)
Chorley & South Ribble (3)
West Lancashire (2)
Hyndburn & Ribble Valley (1)
Blackburn with Darwen (1)
Morecambe Bay (1)
North Cumbria (2)
Blackpool Walk-in Centre
Skelmersdale Walk-in Centre

The practices and walk-in centres were distributed across the Cumbria and Lancashire SHA area with most PCTs being represented in the project. The audit included practices of varying patient list sizes (3800 – 15600), number of General Practitioners (2 – 5) and organisational complexity.

It was however identified by the project team that a greater number of centres in Lancashire elected to be included than in Cumbria.

The centres were asked to use the telemetric ECG machines in the same manner as their usual equipment so that no change in practice would take place to influence the results.

The machines were funded through the project for each centre for a six-month period with the requirement that, on each occasion of usage, the clinician undertaking the investigation would complete a basic audit questionnaire and that the clinical staff agreed to take part in a focus group conducted by the Ipsos MORI organisation at the end of the project period.

The format of the questionnaire was designed to identify the objectives of the audit and to ensure that the workload of the clinician would not be increased, so aiding their compliance in recording the required information.

The basic audit questionnaire is shown below:

1.5 How were the ECGs interpreted?

The project team commissioned Broomwell Healthwatch, an independent sector company based in Manchester, to supply the telemedicine ECG machines and offer GPs and other healthcare professionals access to immediate, expert interpretation of ECGs by experienced cardiology-trained clinicians. Before engaging in the work programme, the team had to ensure that clinical governance and probity issues relating to NHS patient care were incorporated into the contracting arrangements.

GP surgeries using the service would send ECGs to the Broomwell Healthwatch Centre by telephone and receive back a verbal report with a full written interpretation within minutes by email or fax.

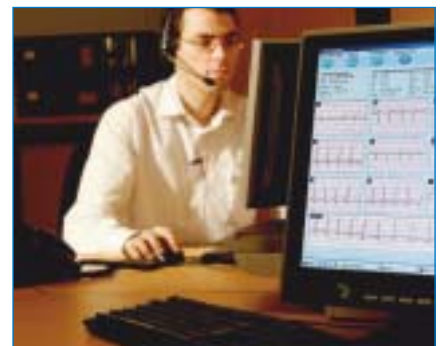
Typically, a nurse at the GP surgery or NHS walk-in centre would record an ECG on a patient at the surgery and would then telephone the Broomwell Healthwatch call centre. Cardiology staff at the centre would answer the call and receive the ECG down the telephone line and would then give an immediate verbal interpretation of the ECG. If the ECG showed any acute changes, immediate action could be taken. Following the verbal report, a full written ECG report would be sent back to the GP surgery within minutes, together with a copy of the ECG by email or fax for inclusion in the patient record.

Patient Number	Date of Birth	Clinician taking ECG	Clinical Details	Ease/Difficulties in Use	ECG Change Patient Management	Outcome
1						
2						
Etc						

The ECG machine provided is hand held and easy to use. The ECG is stored in the memory of the device and is transmitted as an acoustic (i.e. sound) signal via a telephone to the Broomwell Healthwatch centre, where it is captured and displayed on screen. The transmission time is 45 seconds. The quality of the ECG trace received by Broomwell Healthwatch is extremely high and the ECG trace along with a written report is sent to the GP surgery by email or fax (depending on the preference of the surgery).



Transmitting the ECG



Clinicians at the centre see the ECG on screen and create a full report



Recording the ECG

Staff at the Broomwell Healthwatch centre who perform the ECG interpretation are all UK practising nurses or medical staff who have had extensive cardiology experience in coronary care or other secondary care units. They are selected for their ECG interpretation skills and are subject to ongoing training, testing and audit by consultant cardiologists who provide a quality control process for the service.

1.6 Clinical Standards

Telemedicine ECGs offer an alternative means of undertaking patient diagnostics but, as this system was replacing conventional equipment, it had to be shown that patient care and safety was not being jeopardised and that, as an improved service was envisaged, benefits should be seen for patients, clinicians and the health economy.

For this reason the following criteria were set:

- On no occasion should patient safety be compromised by equipment or system failure or confidentiality be breached due to problems of data transfer
- The new equipment and service should be at least as reliable and as easy to use in clinical practice as conventional ECG machines and should represent an improvement in patient care.

1.7 Consistency Check

Towards the end of the audit analysis Broomwell supplied a breakdown of the outcomes of 2750 calls that they had dealt with in preceding years. The audit team extracted 55 patients who attended one of the walk-in centres from this group and directly compared the decisions made about their care setting with figures from Broomwell’s national data. Local data showed a remarkable degree of consistency when compared to Broomwell’s larger co-hort. We believe that although the local audit numbers are small, they are a true reflection of the overall findings of this work.

Data Source	Remain within Primary Care	Refer to Hospital	Total Number of calls
Local Audit Data	82%	18%	55
Broomwell National Data	86%	14%	2750

Section 2

The Ipsos MORI research



The Ipsos MORI research

2.1 Introduction

Cumbria and Lancashire SHA felt it important that part of the evaluation of this pilot should include qualitative assessment and be independent of local players.

For this reason it commissioned Ipsos MORI to undertake four focus groups which included GPs, nurses and managers who had direct experience of using this service. In addition a detailed telephone interview was conducted with Broomwell Healthwatch.

Ipsos MORI's report is published in full in this section.

A Review of Attitudes to Telemedicine ECG Equipment across the North West – Outcome Focus Group studies conducted by Ipsos MORI

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Executive summary

Overwhelmingly, the practice staff we spoke to in both Lancashire and Cumbria say they find telemetric ECG equipment very user-friendly. Furthermore, they say that it works very well and report no technical problems whatsoever.

Importantly, practice staff say that patients are unanimously positive about the equipment, and that they trust the technology. Most impressed are those patients in Lancashire who have not previously been able to have an ECG at their local surgery, but are now able to undergo the procedure at their local surgery, rather than making a (often long) trip to hospital.

Practice staff in both Cumbria and Lancashire staff feel that one of the main benefits of using the equipment is its portability. As the equipment is hand-held it opens up the possibilities of conducting ECGs whilst on home visits. In particular, staff in Cumbrian practices feel that performing ECGs in the patients home could one of the main ways of using telemetric ECG equipment. They do stress however, that in order for this to be effective it must be possible to transmit the ECG down a mobile telephone line.

Additionally, among some small, Lancashire practices where no GP is on hand to interpret ECG readings,

speed of use and the knock-on effect of time-savings to the practice emerge as the key advantages. These practices feel they have benefited the most from the pilot and are the most enthusiastic about the advent of telemetric equipment.

Sometimes having to wait for a written report emerges as an area of concern for some practice staff, particularly in Cumbria. Staff claim to often have to wait 20-30 minutes for the report, which is perceived to have a knock-on effect on appointment times and can result in reluctance to use the equipment when they have a traditional machine which can give faster results.

The perceived cost of running the equipment emerges as a significant barrier among practice staff. In particular, staff in Cumbria feel the equipment is prohibitively expensive given the amount of likely usage, as they prefer to use their traditional equipment and to use telemetric ECG as a 'back-up'. Staff in Lancashire however, feel that the equipment 'probably' represents good value for money as it may reduce the amount of A&E admissions, and thus over time it may 'pay for itself'. However, staff feel that GPs may be unwilling to pay for the equipment as they may feel they are 'losing out' financially, and as such, staff in Lancashire

would be keen to see the local PCT fund the equipment.

Telemetric ECG equipment has had the most impact in practices that did not previously have access to traditional ECG equipment. In Lancashire practices telemetric ECG equipment has resulted some patients avoiding a visit to A&E, however, more commonly it has resulted in increased quality of patient information if the patient does go to hospital.

However, practice staff in Cumbria (who have traditional ECG machines) have not seen the same level of impact express only muted enthusiasm for the telemetric equipment. Staff report that practices that do not currently have ECG machines (or a GP able to interpret the results) should be prioritised, as the equipment is likely to have the most impact in these practices.

Looking to the future, practice staff are overwhelmingly positive about the advent of telemetric equipment in primary care. Not only would staff be keen to use the equipment for home visits but they also feel that telemedicine could be expanded to also include Spirometry and photographing skin lesions.

1. Introduction

This report contains the findings of a study conducted by the Ipsos MORI Social Research Institute on behalf of NHS North West (formerly Cumbria and Lancashire Strategic Health Authority).

1.1 Background, aims and objectives

NHS North West is conducting a pilot study of telemedicine diagnostic ECG equipment in a variety of NHS settings throughout Cumbria and Lancashire. The equipment enables patients to undergo an ECG at their local GP surgery or walk-in centre, have it transmitted via a telephone line to a specialist who analyses it, and receive a diagnosis from their GP while they wait.

A range of GP surgeries and Walk-in Centres in Cumbria and Lancashire participated in the study, the greater number being from the latter area (3 Cumbria:12 Lancashire). This balance needs consideration during the report and may need to be reviewed for future work.

The aims and objectives of this project were as follows:

- To assess the perceived effectiveness of the telemedicine technology;

- To explore the advantages and drawbacks to using the equipment;
- To examine the impact that the equipment has had;
- To gauge clinician's views of patient reactions to the use of telemedicine technology; and
- To discuss the possibilities of future usage of telemedicine equipment.

1.2 Methodology

Ipsos MORI used qualitative methods for this study. The research consisted of the following components:

- Three discussion groups with GPs, practice managers, nurses and healthcare assistants in Lancashire;
- One discussion group with nurses and a practice manager in Cumbria; and
- One in-depth telephone interview with the telemedicine provider, Broomwell Healthwatch.

All discussion group participants were taking part in the telemedicine pilot and were recruited by NHS North West, who also supplied the venues and refreshments.

The topics covered in the discussion groups were:

- Experiences of using the telemedicine ECG equipment;
- Advantages of, and barriers towards, using the equipment;
- Patient views and experiences of telemedicine;
- The perceived impact of using the equipment; and
- The future of telemedicine.

In addition to the discussion groups, Ipsos MORI conducted an in-depth telephone interview with Broomwell Healthwatch, the company responsible for providing the equipment and analysing the ECG reports. This interview covered; background to telemedicine, patient and clinicians' reactions to the equipment, and the future of telemedicine.

1.3 Presentation and interpretation of the data

Qualitative findings

It is important to note that qualitative research is designed to be illustrative rather than statistically representative and therefore provides insight into why people hold views, rather than conclusions from a robust, valid sample. In addition, it is important to bear in mind that we are dealing with people's perceptions, rather than facts.

Throughout the report, use is made of verbatim comments from participants. Where this is the case, it is important to remember that the views expressed do not always represent the views of the group as a whole, although in each case the verbatim is representative of, at least, a minority.

1.4 Publication of data

Our standard Terms and Conditions apply to this, as to all studies we carry out. Compliance with the MRS Code of Conduct and our clearing is necessary of any copy or data for publication, web-siting or press releases which contain any data derived from Ipsos MORI research. This is to protect our client's reputation and integrity as much as our own. We recognise that it is in no-one's best interests to have survey findings published which could be misinterpreted, or could appear to be inaccurately, or misleadingly, presented.

1.5 Acknowledgements

IPSOS MORI would like to thank Julie Hendry, Steve Ward and their colleagues at NHS North West for their help and assistance in the development of the project. We would also like to thank Michael and Joshua Rowe at Broomwell Healthwatch and the Practice Staff who participated in this study, without whose input the research would not have been possible.



2. Experiences of using telemetric ECG equipment

2.1 Overview

Overwhelmingly, the practice staff we spoke to in both Lancashire and Cumbria say they find the telemetric ECG equipment very user-friendly and, as such, say it is easy to train up other members of staff to use. Since using the machine requires a relatively low level of training, in most cases a nurse or healthcare assistant will use the equipment, this, in turn can free up more specialist members of staff.

“It’s brilliant. It’s quick, it’s convenient... it’s just really easy”

Lancashire practice

A minority of practice staff say that initially they were dubious about using the new equipment, however, they soon overcame this initial scepticism when they discovered how easy it is to use.

“The first couple we did I thought ‘oh gosh this is a palaver, I don’t think I fancy this’... but it’s like anything else, once you actually get into it it’s easy”

Nurse, Lancashire practice

Practice staff report no technical problems whatsoever using the telemetric ECG machines. However, some staff say that on a few occasions they have had to transmit the ECG twice due to interference.

2.2 Suggested improvements to the equipment

All practice staff we spoke to – in particular those in Lancashire – say they find the telemedicine equipment works very well, and most could not think of any further improvements they would like to see made to the current system.

One member of staff however, says that the machine holds the last ECG results until this is manually cleared. As such, the staff need to ensure that they delete the previous ECG results before using the equipment. She thinks it would be helpful if the machine could either automatically clear the previous data, or not record another ECG if the previous ECG reading is still present.

Furthermore, practice staff in Cumbria say they would like to receive speedier reports from Broomwell Healthcare. Any delay in receiving reports has a knock-on effect on appointments and can cause delays at the practice.

2.3 Benefits of using telemedicine ECG machines

For many practice staff in Cumbria and Lancashire, one of the most important benefits of the telemetric ECG equipment is its portability. Staff say their traditional ECG machines are large, bulky and as such, difficult to move. However, the new machines are much smaller, hand-held devices, allowing nurses and healthcare assistants to use them in several different rooms within the practice.

“It’s easy to transfer around the practice to different rooms. You can also take it on visits, where the machine that we had before is quite a large machine so it’s not that mobile”

Lancashire practice



"If a patient can't get upstairs you can go to them"

Lancashire practice

Similarly, practice staff in Cumbria cite portability as an important advantage, since it has the potential to be used widely in the community, for instance it gives GPs the opportunity to use the equipment for home visits and routine ECGs. This can be particularly helpful among those patients who are housebound or in care-homes.

Along with portability, the most commonly cited advantages of using telemetric ECGs among Lancashire practices (in particular those that did not have a traditional machine) are the speed of use and knock-on effect of time savings to individual practices. This is particularly helpful in those practices where GPs are not confident interpreting ECG readings.

"I couldn't always interpret the ECGs... sometimes you get peculiar readings, you haven't always got a doctor available and sometime you used to be a bit anxious... 'can I leave it 'til tomorrow?' "

GP, Lancashire practice

Most practice staff in Lancashire are pleased that they usually receive the ECG report within about ten minutes of transmitting it, enabling them to slot in routine or even emergency ECGs relatively easily. However, most staff say that on a couple of occasions the ECG report has taken up to 40 minutes to arrive, which has resulted in delays at the practice.

We have had an occasion where this patient had an ECG and it obviously showed something, and the doctor was waiting for the ECG to be faxed back to us... and it didn't come through straightaway so that patient was waiting for a good 35 – 40 minutes. The doctor was waiting. He had to go on visits... whether that could be speeded up would be helpful
Nurse, Lancashire practice

Furthermore, staff at Cumbrian practices say they often have to wait 30-40 minutes for the report, which has resulted in reluctance to use the equipment, as they find their traditional ECG machines are quicker.

"It's blocking our time up, 'cos we're conscious that we've got to wait for this ECG, so you're trying to see other patients, so it could be another 20 [minutes]"

Nurse, Cumbria practice

Additionally, practice staff and Broomwell Healthwatch say the ability to undergo an ECG within a familiar environment such as their local surgery is an important benefit to patients. They feel that patients are reassured if they can deal with staff they have already built up a trusting relationship with and so tend to find the process less traumatic than going to the hospital.

"I think it's more convenient for the patients and they're going to be dealing with people that they know and have a relationship with and probably trust, rather than somebody anonymous at the hospital... They are often less stressed and anxious about coming to the surgery rather than going to the hospital"

Lancashire practice

"From the patients point of view imagine the ... anxiety of when an ambulance is called and he's sent to hospital"

Broomwell Healthwatch

In Lancashire, one GP we spoke to has a special interest in cardiology and has been able to monitor the accuracy of the ECG reports. Encouragingly, as well as the general speediness of reports, this GP was also satisfied that he found the reports on the whole very accurate.

"I think in general the reports are good and accurate...one in twelve where I've had some minor quibbling but there's been nothing major. So in general one would have to say that the reports are good and accurate and they come promptly"

GP, Lancashire practice

This specialist GP does find however, that the ECG reports received electronically are not quite as clear and easy to read as traditional ECG reports.

"My only downside is when you get the report, whereas on a normal ECG the red boxes represent 0.2 a second and they're usually divided into five... and on the tracing we get you can't see those five things... you can't accurately show that or see that... This is slightly smaller [than A4] and you lose some of the accuracy and the detail of the time markers"

GP, Lancashire practice

2.4 Drawbacks to using the equipment

By and large, practice staff in Lancashire feel that using the telemetric ECG equipment has very few drawbacks. However, some GPs have complained to Broomwell Healthwatch that their specialists sometimes give too much advice when they give the ECG report. For instance, in some cases specialists have suggested a blood pressure check or other medical procedure which has led to the GP feeling that there is an overlapping of roles. Broomwell Healthwatch are aware of this issue and in response to this, they say their specialists tend to no longer give recommendations with the ECG report.

"The only concern that we've had... the doctor and nurse team sometimes give too much advice... one of the doctors was saying 'just interpret the ECG but don't give any recommendations' "

Broomwell Healthwatch

Furthermore, one practice which has not traditionally conducted ECGs, has found that using the Telemedicine equipment eats into resourcing at the surgery. Being a

small practice with limited space and a small number of staff, they have found that conducting ECGs can be time-consuming. However, it is worth noting that all other Lancashire practices we spoke to find that the ECG equipment saves them time.

"Historically we never did ECGs because the Clifton Hospital just along the road did and practice nurse appointments are very precious... it does take up practice nurse appointments and we generally have to make it a triple appointment so 30 minutes, not because of the speed of using the ECG, it's really quite fast. It's the elderly people getting dressed afterwards and we haven't got a separate room... so the one drawback for us is that we've had to find those resources"

Lancashire practice

Although practice staff in Lancashire say that the telemetric equipment saves them time, staff in Cumbria say that waiting for the fax report costs them time. These staff say they often have to wait 30-40 minutes for the report which can hold up appointment, which has led to reluctance among staff to use this equipment when they have a traditional machine which gives them immediate results. These staff say that in order for the telemetric equipment to be efficient it is important to receive the reports within ten minutes.

"I found the delay factor of getting a fax sent through from it is the only major stumbling block with it, 'cos sometimes we've waited half an hour to get it faxed through"

Nurse, Cumbria

"The phone call never goes through first time and they always phone back and ask her to do it again"

Nurse, Cumbria

2.5 Cost as a barrier to using telemedicine ECG equipment

Practice staff in Lancashire feel that the advent of telemedicine equipment has the potential for having a massive impact on saving NHS money if it was rolled out across the country. Specifically they feel that much of the savings would result from fewer patients being admitted to hospital.

"I think it should be very cost-effective for the hospitals 'cos I think a lot of... GPs are a little bit unsure, to be on the safe side let's send them up to medical assessment... which is a phenomenal cost"

Lancashire practice

However, at a local level cost is an area of concern for many practice staff – particularly for GPs running their own practices. Although staff are generally very positive about the pilot of ECG machines and feel that the system would benefit local hospitals, the NHS as a whole and the general public, few GPs would be willing to pay for the equipment for their practice, as they feel that they would be 'losing out' personally.

"They all like the machine and they want it to continue but the downside is the cost... it would be too much for us to continue Lancashire practice We'd have to look into it and how much it was and everything else"

Lancashire practice

Practice staff in Lancashire say they feel that the ECG equipment should be funded by their local PCT, but most do not feel optimistic about receiving this funding. However, staff believe that if the cost savings already made by using the new ECG equipment and potential future savings could be measured and demonstrated then the PCTs may be more willing to fund the service.

"The PCT are saying 'well where are we going to find the money for this'? You should be doing it in-house"

Lancashire practice

I think you would need to demonstrate some cost savings Lancashire practice Indeed, most practice staff feel that the potential savings outweigh the financial costs of buying and running the equipment at a regional or national level, and therefore feel that in the long-term it would more than pay for itself.

"I think it could, long-term, actually pay for itself"

Lancashire practice

Some practice staff feel that if PCTs were to fund the equipment, those practices that do not currently have a member of staff who is able to interpret ECGs should be prioritised for funding as this is where the equipment has had, and will have, the most valuable impact. It is worth noting, however, that Cumbrian practices do not feel it is the responsibility of the PCT to fund the equipment, but that individual practices should be accountable for this.

"In a practice where the doctors weren't au fait with ECGs, having an accurate report would be very helpful, 'cos often there are subtle things which wouldn't

necessarily stand out and hit you but that are clinically important. So that's where I would see it's main benefit"

Lancashire practice

"I think it's dangerous practice to do ECGs, have them recorded in the practice and somebody look at them saying 'er, um it looks alright' without knowing. So it's very important for those practices who don't have somebody that's used to interpreting ECGs"

Lancashire practice

Although cost emerges as a significant barrier for most practices we spoke to, practice staff are uncertain how much the equipment would cost to buy and to run. Estimates for buying a telemedicine ECG machine start at a few hundred pounds ranging through to several thousand pounds. Furthermore, most staff think that it would cost the practice around £10 per ECG in addition to the general running costs such as pads, paper and telephone calls.

Despite feeling vague on how much the equipment would cost, practice staff in Lancashire feel that the telemedicine ECG machines offer the NHS 'reasonable' value for money, due to the potential for 'massive' savings nationally.

"It's probably reasonable value for money"

Lancashire practice

"It seems very cheap to me, given what cardiologists charge"

Lancashire practice

Practice staff in Cumbria however, say that the cost of running telemetric ECG machines would be prohibitively expensive bearing in mind the level of likely usage. Unless the benefits of keeping the equipment can be demonstrated to clinicians and practice managers in Cumbria they are unlikely to want to keep the equipment when the pilot ends, as currently they do not feel that the benefits of using the equipment outweigh the financial costs incurred.

"I wouldn't keep it... because I don't need it, and we've already laid out two and a half, three grand on ECG machines

ourselves... if [we] came to some agreement with the doctor taking it out or something then we would maybe consider it, but it wouldn't be for routine use"

Practice manager, Cumbria

"If someone's offering you some free kit for a couple of months... well fine, we'll try it"

Practice manager, Cumbria

Broomwell Healthwatch recognises that cost is a significant barrier for many practices, with many saying they would rely on funding. They feel strongly, however that using telemedicine equipment can offer the NHS huge financial savings.

"They're waiting for their PCTs to adopt it... They just say 'send the patient to hospital'... but they all say 'if the PCT or SHA were to pay for this, oh I'd love to have it' "

Broomwell Healthwatch

3. Patient views of telemedicine ECG equipment

3.1 Positive views from patients

Encouragingly, practice staff say that patients who have undergone an ECG using the telemedicine equipment are unanimously positive about it. Indeed, staff say they have had no negative feedback whatsoever from patients, and they feel that the equipment is 'fabulous' and that they 'love it'. Staff say that patients are especially keen to use the equipment if they have seen local media coverage.

"A few of them have seen in the paper, there was... a press release about it and a few of them have seen that 'ooh, that's what I've seen' "

Lancashire Practice

"I think if you explain to them what you're doing and how it works then I think they're quite accepting"

Lancashire practice

Importantly, staff feel that patients trust the technology, indeed staff report that even older people are becoming 'blasé' about the advances of technology as it has permeated their everyday lives. As such, they are not wary of the equipment, but instead think it is 'marvellous' that their local practice is keeping up with technological developments. Furthermore, staff say that patients have not expressed any concern about data protection and security issues.

"Older people are getting quite blasé about technology. They just accept that things move on and they get surprised all the time"

Lancashire practice

"They're quite pleased that they can see the practice moving on with technology"

Lancashire Practice

However, staff say it is important that the ECG procedure is explained fully to the patient to reassure them and put them at ease.

"It's familiarity, you can reassure them before they've gone anywhere with your verbal report... Everybody thinks it's marvellous"

Lancashire practice

Additionally, staff at Broomwell Healthwatch report that when their private patients feel reassured by having the technology at hand their symptoms can fade, as they are sometimes caused by anxiety and worry.

"People used to take themselves off to hospital three, four times a year, every time they felt chest sensations... now they rarely call us and when we call them and say 'what's happened, how come you've changed?' they say 'we feel marvellous now, because every time we wake up at night and get sensations, we know that you're at the end of the phone... so we don't actually get

any sensations'. It's psychosomatic... They still call every so often but nowhere near the frequency that they had in the past"

Broomwell Healthwatch

Practice staff in Cumbria, however, say that as their patients are used to having ECGs at their local surgery they feel largely 'indifferent' to the new equipment. A few patients have raised concerns about their data being transmitted down the phone line, but have been easily reassured by staff.

"They're used to it, it's nothing unusual... in fairly rural areas that's not unusual for the practices to have ECGs"

Nurse, Cumbria practice

3.2 Patient stories

A member of staff at a Lancashire Practice gave examples of the impact that telemedical ECG equipment has had on patient experiences.

Patient story A

In Lancashire a man aged 87 came to the walk-in centre complaining of chest pain, which he had had for 2-3 hours. As he was clinically stable, the nurse took an ECG using the telemedical equipment and within ten minutes received a report saying that the patient's heart-rate was abnormal. An urgent ambulance was arranged and the patient immediately transferred to the appropriate hospital department along with the abnormal ECG report. This speeded up his care and medical journey, and avoided him having to go through the A&E department.

Patient story B

A young man in Lancashire had been to the gym, where he had had his blood pressure taken. A member of staff had noticed that it was high without any other clinical symptoms and suggested he get it checked further by his GP.

Following this he decided to come to the Walk-in Centre as it was easier to get to than going to his GP. When the nurse practitioner took his history he revealed that his cousin had died of a cardio related illness, so the nurse took an ECG using the telemedical equipment in order to get a complete picture. The staff noticed that his ECG was abnormal, but had no previous readings to compare it to. As such the ECG report suggested that he go to see his GP for follow up. In this case, the patient avoided what would have been a costly visit to his local A&E department.

4. The impact of using telemetric ECG equipment

4.1 Overview

The impact of using telemetric ECG machines depends very much on whether or not the practice had access to traditional ECG equipment before the pilot. Those practices that did not previously have an ECG machine or did not always have a qualified member of staff on hand to interpret the results tend to have benefited most from the new equipment and are therefore most enthusiastic about it.

The Cumbrian practice staff we spoke to are used to having access to traditional ECG equipment and therefore feel that the equipment has had little impact on the day-to-day running of these practices. Often, the traditional machine is preferred as it is quicker, and the telemetric ECG equipment tends to be used as a 'second choice' or 'back-up'. Therefore, the staff working in these practices express less enthusiasm about the advent of telemedicine, as they have not seen it have much of an impact on how they manage patients or on patients themselves. In these cases the real impact could come from GPs and district nurses being encouraged to take the equipment on home visits.

4.2 Impact on clinical procedures

Practice staff say that using the telemedicine ECG equipment has meant that fewer patients are being sent to A&E departments. This is due to patients with minor ailments being diagnosed, and in some cases treated, in primary care.

However, most practice staff feel that the real impact of using the new ECG machines lies not so much with the management of the patient – which in most cases does not change – but in enhanced information. When a patient is referred to hospital having undergone an ECG at their local practice, this improves the quality of information available to hospital staff, allowing the patient to be treated more quickly and efficiently. In some cases, patients are able to by-pass A&E and are taken straight to the appropriate department as a result of already having received diagnostics in primary care.

4.3 Impact in rural areas

Telemedicine equipment is designed to be used where patients may find it difficult to access hospitals (for instance on oil rigs and in prisons). As such, some practice staff in Lancashire feel that the telemedicine ECG equipment would be particularly beneficial to patients living in rural areas, for instance those living in isolated parts of

Cumbria who may find it difficult and time-consuming to access a hospital for a routine ECG.

"I was based in Knott End... It would have been fantastic there... you've got a good half an hour or more before an ambulance can get from either Lancaster or Blackpool, and you are very isolated, so it would be very good there"

Lancashire practice

Practice staff in Cumbria, however, feel that this is a mis-conception. Staff actually working in rural practices say that most practices already use traditional ECG equipment and thus, telemetric ECG machines have had less of an impact here than in smaller, urban practices that have not previously had access to ECG machines.

"Every practice I know has got an ECG machine... it's the norm now"

Cumbria practice

“Even small practices here are as well equipped as the larger ones”

Cumbria practice

However, they feel there is the potential for telemetric ECG equipment to have an impact in rural, isolated areas if doctors and district nurses can be encouraged to take the equipment for home visits.

“I can see it being really utilised by the district nurses, although they would have to come back to the practice before they can send it down the line”

Cumbria practice

“It might be useful, say, if the doctor’s going out to someone at an emergency visit with... some type of angina”

Cumbria practice

Furthermore, in order to be a success in this context, staff feel that it is essential that the telemetric equipment is able to efficiently transmit data via a mobile telephone line.

“If they could get it dictated over a mobile, it might be quite useful on doctors’ visits... that was the way I would see us working with it”

Cumbria practice

“Staff do point out, however, that if the equipment was to be successful in this capacity it would rely on speedy reports from Broomwell. It would be reliant on them being able to turn it around very fast”

Cumbria practice

“If there was to be an urgent one then you couldn’t wait around for the paper result to come back, ‘cos its too slow”

Cumbria practice

4.4 Training

One Lancashire-based GP highlights the role that the new ECG machines can play in educating clinical staff. He feels that when registrars and house officers are in training or are

newly qualified they are not always up to speed on reading ECGs, in this instance the telemedicine ECG equipment could be used as a ‘back-up’ to their interpretation of the ECG results.

“From my experience a lot of the registrars and house officers coming out of hospitals aren’t particularly good at reading ECGs so from their own personal perspective they would probably welcome this”

Lancashire practice

“From a GPs point of view... for years they had not been asked to interpret an ECG report... I think they probably would’ve felt that they would need some current training and ongoing experience of doing it to feel confident that they were making the correct interpretation... I think it gives them less responsibility”

Lancashire practice

“It’s back-up really... a highly trained technician telling you this is what this means and then it’s down to the doctor to make the recommendations”

Lancashire practice

He continues to say that the ECG reports could be used as part of their training if they are used ‘critically’ to help with analysis and interpretation of ECG results.

“If they had some basic training in ECGs but used these reports critically and used them as an educational opportunity then that would be quite good”

Lancashire practice

5. Looking to the future

5.1 The future

Overwhelmingly, practice staff are optimistic about future usage of telemedicine ECG equipment in primary care. Specifically, practice staff feel the telemedicine ECG equipment has the potential for being used not just within GP surgeries and walk-in centres, but also for a greater number of home visits. Practice staff also suggest that paramedics in response cars could use the Telemedicine ECG equipment in order to ensure a speedy diagnosis.

“Paramedics in response cars... would be very useful”

Lancashire Practice

Staff in both Lancashire and Cumbria suggest that small practices that do not already have ECG equipment should be prioritised, as this is where it will have the most impact. Furthermore, the findings from this research suggest that this has been the case with the pilot.

Furthermore, practice staff feel that future usage of the equipment would save patients with minor ailments going to A&E departments and allow them to be diagnosed at their local practice.

“It would save a lot of inappropriate referrals”

Lancashire practice

The telemedicine ECG equipment may be an important part of the NHS’ move towards more diagnostics and treatment in primary care. By and large practice staff are keen to keep patients in primary care where possible however, staff (and especially GPs) do stress that if extra responsibilities are to be put within primary care, they need to be recognised.

“Community matrons could easily make use of it... and keep everything in the community”

Lancashire practice

“It’s fine getting people to do extra things, but it just has to be recognised that there is a workload issue there and to recompense”

Lancashire practice

Broomwell Healthwatch is enthusiastic about the future of the equipment in primary care. However, they feel that due to the size and complexity of the NHS and the potential large-scale of the project, it may take a considerable amount of time to roll this out across the country.

Everybody thinks it's marvellous and it's amazing and it's brilliant and just too good to be true... but still to put into practice takes time
Broomwell Telemedicine provider

Indeed, in the future Broomwell Healthwatch can see the potential for the ECG equipment to be used not just at home, but also to monitor the patient abroad whilst on holiday.

"It'll take an enormous burden off the patient... you can do it all from home... on holiday in Mallorca you can call us, in Jamaica..."

Broomwell Healthwatch

In order to maximise the impact in rural areas in the future, staff in Cumbrian practices stress the importance of transmitting data via mobile telephones, as they believe this will open up opportunities for using the kit for home visits.

However, if the data could be easily transmitted via a mobile telephone line, practice staff in Cumbria say they would be more likely to consider the equipment for future use, as they feel it would be better suited to their needs.

5.2 Expanding the range of Telemedicine ECG equipment

Broomwell Healthwatch do not anticipate any problems with expanding the company to meet demand, should the usage of the equipment increase, for instance if the project was to be rolled out throughout the UK. Indeed, they say that their technology and computer systems have been designed to expand with the business.

"At the moment we have got four stations set up, and we've got two people on duty all the time. We could easily go to five, six seven, eight, nine, ten, 20, 30, 40 stations, no problem... machinery is all scalable all computers are scalable"

Broomwell Healthwatch

Furthermore, Broomwell Healthwatch does not foresee any problems with recruiting new staff as the business grows. They say they are able to recruit staff easily, and the job has always proved immensely popular when previously advertised. They feel this is due to the job by its nature being flexible enough to appeal to doctors who, for instance, do research and so are able to fit the job in around their other work.

"Every time we have asked for staff we get loads [of application forms] back. People like the job here, especially doctor's registrars because they can do research, they can do work during the quiet times"

Broomwell Healthwatch

Looking to the future, General Practitioners can see the potential for Telemedicine innovations expanding to include Spirometry and photographing skin lesions, both of which they feel would be valuable initiatives which would save time and money and help bring diagnostics to primary care – keeping patients out of hospitals where possible.

“If you had a facility to photograph a skin lesion and send the photograph to a dermatologist who could look at it and maybe magnify it and say ‘yeah, that’s benign’ “

Lancashire practice

“Well presumably [with Spirometry] you’d do a similar thing as you’re doing with the ECGs and you’d have to interpret the breath results and the graph into something more accurate. I would think electronically that could be then sent down the phone and they could do the interpretation for you”

Lancashire practice



Section 3

Results and finance



Results and finance

3.1 Introduction

This section presents the outcomes of this work and includes a projection of potential benefits to the health economy in both service and financial terms.

3.2 Main Findings and Benefits of Telemedicine

- The audit identifies the three prime clinical indications for undertaking ECGs in the community setting as currently being practiced in Lancashire & South Cumbria.

- 1) acute symptoms (eg chest pain, shortness of breath, dizziness);
- 2) screening procedures for long-term conditions (eg hypertension);
- 3) as a pre-requisite for clinic referral (eg memory clinic).

The table below demonstrates total numbers of ECGs recorded and the clinical indication recorded during this work. It should be noted that walk-in centres provide only diagnostic services whereas, of course, primary care encompasses the full range of diagnostic and therapeutic treatment care and this accounts for the figures below.



	Number of ECGs	Acute Symptoms	Screening Procedure	Clinic Referral
Total	176	141 (80%)	22 (12.5%)	13 (7.5%)
Practices only	122	87 (71.3%)	22 (18.0%)	13 (10.7%)

- The practice nurses or walk-in centre nurses recorded all 176 ECGs (100%) at the GP surgery or walk-in centre; none were taken on domiciliary visits to the patient's home.
 - Clinicians found the equipment easy to use and were satisfied by the system and service provided
 - 165/176 (93.75%) of ECGs were undertaken easily and there were no reported problems with the data transfer or reporting mechanism.
 - 11/176 (6.25%) uses identified technical problems, which generally related to data transfer, a situation that has now been addressed. On no occasion was patient safety jeopardised.
 - 3/176 (1.7%) uses resulted in a poor trace due to problems with lead position and electrode contacts. Adjustment and repeat ECG resolved the problem. These difficulties can be encountered with a conventional ECG machine.
 - 50/176 (28.4%) occasions resulted in a change in clinical outcome based on the result of the ECG.
 - Reviewing the results from one centre in more detail showed that 9/55 (16.3%) ECGs resulted in avoidance of unnecessary use of hospital services. This diagnostic intervention supported the clinical decision-making process and hence appropriate maintenance of the patients in the community.
 - At the same centre however some of the 55 ECGs taken resulted in findings that may not have been predicted from the patient's clinical presentation, these also influenced the outcome of the consultation and included:
 - 2 unknown heart rhythm disturbances (bradycardia and tachycardia)
 - 1 significant change of myocardial infarction
 - 3 significant ECG changes requiring further assessment
 - 5 occurrences of pericarditis.
- Some patients required an appropriate hospital admission for further care but in other instances medical assessment at the centre with amendment of treatment resolved the problem.
- A copy of the ECG accompanied admissions to hospital thus improving patient care as the hospital clinicians had a baseline from which to establish a treatment plan.
 - Some centres undertook independent evaluation of the accuracy of the reports by doctors who also work as GPs with a Specialist Interest in Cardiology. This was done in addition to the audit work and was not formally evaluated, but anecdotal opinions and the report from the focus groups undertaken by Ipsos MORI (section 2) confirm the quality of the telemetric reporting.
 - Patient opinion with regard to this new service was also very favourable as, although not formally documented, the feedback to clinical staff was consistently positive. Again this is identified within the Ipsos MORI report (section 2).

Potential Local Financial Savings

Regardless of the current financial pressures within the NHS, any potential service modernisation should consider the financial implications; this report therefore attempts to quantify this. On the basis of data we have available from local work and nationally published NHS figures, we believe there is a potential financial saving to be gained from the use of telemedicine. We accept that our figures may not be fully robust but represent as close an approximation as we have been able to make using tariff figures for 2007/08. These calculations are made on the basis of outcomes for patients seen in one of the walk-in centres and, in particular, focus upon the avoidance of admission.

If the findings in the centre were to be replicated (as we believe they would be) then approximately 16% of potential referrals to hospital could be avoided and if 50% of these, on a conservative basis, would previously have been admitted then potential savings for a practice in their first year would be as follows:

Potential Savings		
9 (16%) of 55 A&E attendances avoided – cost per attendance = £101	£909	
4 Hospital admissions for chest pain avoided - cost per spell for patients > 69 = £1164	£4656	
Hospital Attendance Savings	£5565	
Capital and Revenue Expenditure		
1 ECG machine	£500	Capital Outlay
55 ECG readings (£20 each)	£1100	
Total	£1600	
Saving for re-investment by practice over 6 months	£3965	

These local figures assume a minimal costing for a hospital admission for chest pain alone, and have not considered financial implications of a coronary care unit admission or other intensive investigations.

They illustrate some of the potential health economy saving for service reinvestment that could be generated by one practice, although if these figures are extrapolated for those patients in the audit, savings of approximately £135,000 may have been generated by those practices in the pilot in one year.

Potential National Financial Savings

Taking the local data a stage further and matching it with Broomwell's own data, it is possible to make predictions as to the potential national savings that could be achieved. Again, conservative application of the figures has been made but it is believed that this estimate is at the lower end of potential savings to be made within the health economy by use of this technology. It is also important to stress that figures were calculated on an assumption that only 30% of patients attending A&E with a possible cardiac problem will have had contact with a primary care practitioner.



Cardiac Telemedicine in Primary Care - Delivering Benefits
for Patients and the NHS in Lancashire & Cumbria

Potential Cost Savings to the NHS by using Cardiac Telemetry		
Number	£	
18,750,000		Total annual A&E attendances - England 05/06
1,875,000		Annual cardiac related A&E attendances – estimated at 10% of total
562,500		Estimated minimum of 30% of A&E attendances generated within primary care
		16% of primary care generated A&E attendances prevented during pilot
90,000		Potential number of prevented A&E attendances
	101	PBR tariff 07/08 high A&E attendance
	9,090,000	Money saved by preventing A&E attendances
45,000		Potential number of prevented admissions if 50% of avoided A&E referrals would historically have been admitted.
	1,164	PBR Tariff 07/08 HRG E35 chest pain >69
	52,380,000	Potential saving for the NHS by avoiding inappropriate admission for chest pain
	61,470,000	Potential saving to the NHS by use of telemedicine for ECG interpretation
	20	Cost of a single Broomwell ECG interpretation
	11,250,000	Annual cost to NHS of using telemetry ECG interpretation service for all primary care generated A&E attenders with chest pain
	4,250,000	Capital cost of 1 ECG machine per practice in England - 8500 practices 2004. Royal College of GPs Fact Sheet 5 Sept 05
	15,500,000	Capital and revenue costs for year 1
	45,970,000	Potential total saving to the NHS by use of telemedicine for ECG interpretation

Section 4

The benefit of joint working between the NHS and the Independent Sector



The benefit of joint working between the NHS and the Independent Sector

4.1 Cross Sector Working

Cumbria and Lancashire SHA staff worked with Broomwell Healthwatch for a period of twelve months in developing systems and processes that would enable successful working between the NHS and the Independent Sector.

The company was set up some two years ago to provide a cardiac tele-monitoring service, whereby 12-lead ECGs and other measurements (including one lead ECGs, blood pressure and weight monitoring for heart failure) can be transmitted via telephone to a cardiac centre staffed 24 hours a day, 365 days per year by senior cardiac clinicians who offer immediate interpretation and advice to improve patient care and obviating the need for unnecessary hospital outpatient or A&E referrals.

A Medical Advisory Board, comprising of cardiologists from across the UK, provide expert clinical support.

Broomwell Healthwatch had to establish a Caldicott Guardian and to adopt its information sharing protocols to those required by the NHS. A senior nurse at the centre was appointed Caldicott Guardian and, after liaising with the SHA, established confidentiality protocols and rules for transmitting patient data which all staff adhered to. These included internet and email policies. Broomwell Healthwatch was provided with an NHS.net email address, enabling it to send secure encrypted emails to surgeries, which would not be delayed by NHS servers.

Broomwell Healthwatch had to demonstrate that standards were met regarding both staff at the centre and equipment. Staff are highly qualified, have many years experience in cardiology and ECG interpretation but nevertheless undergo a very advanced ECG course and test each year. This was created specifically for the staff at the centre by a senior cardiology consultant. The ECG equipment provided by Broomwell Healthwatch has all the necessary regulatory approvals

and complies with the requirements of the European Medical Device Directive.

Clearly there are advantages, for both parties, of working in such a partnership and the benefits from an NHS perspective were gained by taking advantage of the speed and flexibility of the private sector. The joint venture worked extremely well and was facilitated by the groundwork that took place in ensuring that clearly defined governance arrangements were in place giving confidence to all parties involved. The main areas of preparatory work involved ensuring that the technology, staffing and IT infrastructure was compatible and compliant with NHS standards and are detailed below.

In engaging with the Independent Sector it was important for staff in the NHS, who would be using the telemedicine technology, to know that it was fit for purpose and had approval by the appropriate regulatory bodies and was 'CE' marked. The staff providing the service needed to be appropriately qualified,

trained and regularly updated and this information was documented and monitored by Broomwell Healthwatch. The staff and technology employed needed to be insured against claims of malpractice or equipment failure.

In terms of ensuring that the transmission of information between the NHS and Broomwell was confidential and reliable, it was necessary to ensure that IT systems were secure and compatible with NHS requirements. In addition, the NHS and Broomwell signed up to an information sharing policy to allow patient information in faxes and emails to be passed safely between the company and the general practitioners involved in the audit.

The main issues faced by practices in using the ECG machines for patient care and transmitting data were of a technical nature such as delays in transmissions of emails due to rejection or 'spamming' in some practices, poor network infrastructure in some areas of the SHA and the occasional occurrence of surgeries having their fax machines turned off.



There were some practices who felt that the centre was giving 'too much' information/advice and it was discovered that this depended on which member of practice staff was sending the ECG readings over the telephone line and their level of clinical knowledge. Following discussion with staff at Broomwell Healthwatch this ceased to be an issue once it was brought to their attention.

Staff interpreting the ECGs prefaced all evaluations/advice with the words '...always subject to the overriding judgement of the clinician...' and this led to a feeling of joint working rather than one opinion overriding that of another.

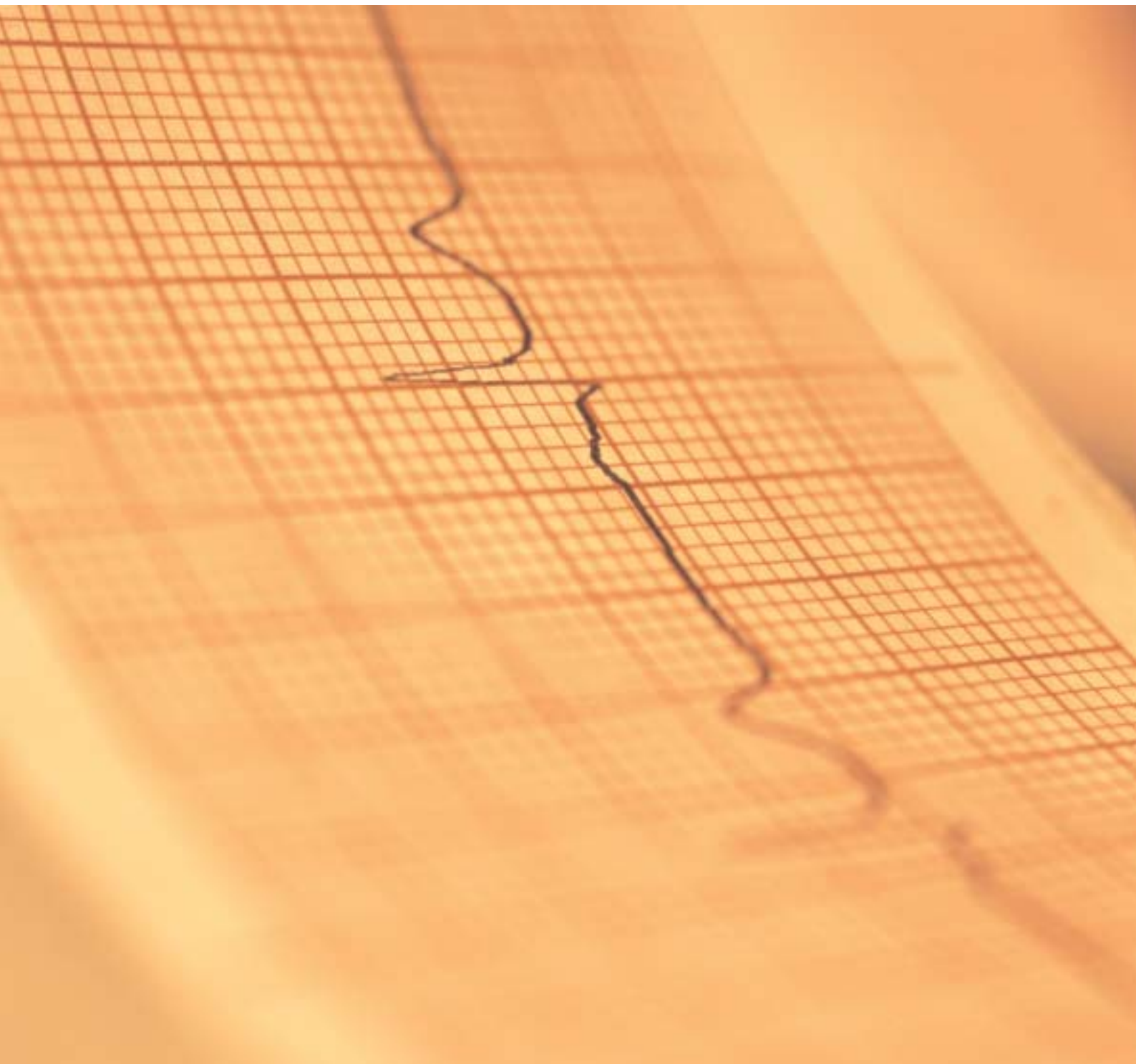
In summary, the main determinants of successful working between the NHS and Independent Sector involve open lines of communication and flexibility of approach. As a result, the NHS has benefited from the ability to use current technology and rapid resolution of issues whilst the Independent Sector has gained an insight into how the NHS operates and knowledge of how they can overcome issues of confidence and trust in engaging directly with NHS frontline staff.

Valuable lessons were learned by both parties and these barriers, having been overcome, will allow development of similar projects in the future as other groups can apply the lessons learned to their own project development.



Section 5

Conclusion and recommendations



Conclusion and recommendations

5.1 Conclusions

One of the prime aims of the research was to establish whether there were any benefits to be gained from this way of working. The audit has demonstrated that telemedicine ECG is easy to use in practice and is a valuable tool to support clinical decision-making and better outcomes for patients. As such we believe that it supports the NHS in its ability to deliver benefits to patients, carers and professionals.

The operational and governance standards set at the outset have been achieved during the pilot and indicate that in practical use the new technology is at least equivalent if not better than conventional machines. The findings also suggest that there are significant additional benefits when using the new technology in clinical practice. These include:

- **Interpretation of the result**
The telemedicine service provides accuracy, consistency and reliability for the clinicians. Many doctors find interpretation of ECGs difficult, especially for minor but potentially clinically significant

changes that can occur, nurses are not trained to interpret ECGs unless working on specialised cardiac units and so confidence for diagnosis is often placed in the conventional machine's inbuilt electronic readers which may be misdirected by electrical interference or previous changes which may no longer be relevant to the acute presentation. The use of this new service provides direct interpretation of a high quality ECG by clinical teams trained in the skill of ECG interpretation. In addition, they are aware of the patient's clinical symptoms and so can provide the treating clinician with support for the patient's management plan.

- **Nursing staff took all the ECGs identified for this work**

This is the usual practice in primary care and is relevant when considered with the feedback from the Ipsos MORI report, which identified that the immediate availability of a clinical opinion from the call centre staff with regard to the ECG enhances the decision-making process for patient care. Patients could therefore

be admitted or discharged with greater confidence by the clinical teams, either the nurses in the nurse led walk-in centres or the doctors and nurses within the general practices.

The practice and walk-in centre managers also found this service of benefit as they reported that nursing time was saved, nurses no longer needed to wait for long periods of time to access a doctor to interpret the ECG.

- GPs have responded that some admissions were not anticipated by the clinical findings but were very appropriate as hospital intervention was necessary because of the outcome of the ECG. For example, bradycardia, pericarditis, silent myocardial infarction resulted in an unexpected admission. This demonstrated that the new service provides a diagnostic tool to enable the delivery of quality patient care. We acknowledge that some unexpected hospital attendances may have occurred and that these may have had a small impact upon the financial savings but expect these to be minimal.

- The use of this new technology has allowed clinicians access to a service which the audit suggests they have used to enable patient care, provide a service within the community and reduce the need for inappropriate hospital admissions (DH 2006). Further consideration has now to be given to the provision of other community-based diagnostics, for example blood tests to further identify whether or not a patient presenting with chest pain has sustained a myocardial infarction. This would allow clinical staff to confidently keep patients in the community rather than resorting to hospital services.
- Whilst undertaking the audit and talking with clinicians and managers who were using this equipment, several comments were raised, which the author feels merit inclusion.

These were around the area of service re-design; suggestion being made that these machines could be used to provide ECG clinics within primary care and that they could be used in the community either for patients who cannot attend a medical centre due their long term

condition, the ECG being recorded in the patient's home or for emergency work in and out of hours.

5.2 Recommendations

The benefits to patient care, the support offered to primary care practitioners and the potential financial savings this technology offers present the NHS with an opportunity that should be capitalised upon. The following recommendations are therefore made:

- Primary Care Trusts and Practice Based Commissioners within NHS North West should consider funding this technology for use within all GP practices and walk-in centres in their locality. We recommend that factors to be taken into consideration should include:
 - the availability of access to expert ECG interpretation
 - confidence in the quality of the interpretation
 - immediate support to aid clinical decision making
 - the likely fall in inappropriate hospital referrals and/or admission for chest pain
 - the ability to offer care closer to home

- the potential impact upon delivery of the 18-week target through reduced outpatient referrals.

- The Lancashire and South Cumbria Cardiac Network should expand their existing ECG training programme for primary care practitioners to support effective ECG lead placement thereby maximising the quality of ECGs taken. It should also regularly review the need to offer ECG interpretation training to primary care practitioners as it is anticipated demand will fall as use of this technology increases. The remaining cardiac networks within NHS North West should discuss the requirement for such training with their constituent PCTs.
- Further evaluation of the use of this technology within other settings should be undertaken. This should include its use in patients' homes, particularly for those patients who require re-assurance and currently frequently present to A&E and medical admission units out of hours.

5.3 The Impact of and Other Uses for this Technology

This audit has focussed only upon the use of telemedicine in ECG interpretation and its potential to impact upon clinical decision making. The financial calculations were made only in relation to referrals to A&E departments and consequent potential reductions in hospital admissions.

In some places it seems GPs seeking an ECG must refer their patients for an outpatient appointment and that a move away from this would also have the potential to reduce waiting times as well as save resources. The impact upon the wider economy of offering patients rapid access to diagnostic tests locally rather than needing to travel to hospital is incalculable.

Telemedicine is also being used for monitoring other clinical conditions including arrhythmia and heart failure. An evaluation of these is now underway and will be published in the future.

The use of this technology is also being explored in the management of patients with long-term conditions including chronic obstructive pulmonary disease although this is currently at an early stage.

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