

# Scottish School of Primary Care

GP Clusters

**Briefing**

**Paper 6**



## Improving the management of long term conditions: the role of telehealthcare

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## Collaborative Quality Improvement in General Practice Clusters

This paper is the sixth in a series that relates to areas of quality and safety on which general practice clusters could usefully focus improvement activity. Each paper summarises research, guidelines and other evidence about areas of care which can be improved, and improvement methods and interventions.

### Improving the management of long-term conditions: the role of telehealthcare

Telehealthcare is the the provision of health services at a distance using a range of technologies. These technologies range from simple telephone management to video-consulting and real-time monitoring of symptoms and physiological data. Telehealthcare has been hailed as a potential solution to managing the increasing numbers of people with long-term conditions. There is a growing evidence based on randomised controlled trials (RCTs) which suggest that for some conditions (hypertension, diabetes and congestive heart failure (CHF)) telehealthcare shows considerable promise, at least in terms of improved outcomes, but for others such as chronic obstructive pulmonary disease (COPD) outcomes have been more disappointing. This paper discusses the evidence base for quality improvement in the use of telehealthcare in long-term conditions and discusses its likely future role in primary care.

#### The problem

Currently 13.6 million people in the UK suffer from some form of long term condition. Most have more than one. By 2025 this number will double. Even if resources could be found to increase the numbers of doctors and nurses in primary care (and it is more likely that this will fall) it is clear that current methods of managing these conditions are no longer going to be sufficient. Self-management has been promoted as a potential solution to this, but the evidence for the effectiveness of self-management alone is not strong. For example, there is some evidence from trials that self-management of high blood pressure (HBP) may be effective in the short term, but not when more rigorous outcomes such as ambulatory blood pressure monitoring are applied<sup>1</sup>. The use of asthma self-management plans is associated with fewer hospital admissions but are poorly applied and adhered to in practice<sup>2</sup>. In type 2 diabetes (DM) self-monitoring has been found to be associated with increased anxiety and no improvement in HBA1C<sup>3</sup>. Patients left to self-monitor lack confidence in knowing how to respond to abnormal readings and felt abandoned by clinicians<sup>4</sup>. This has led to the suggestion that self-monitoring supervised at a distance using telehealthcare may be the solution. Evidence from randomised controlled trials has been slowly building over the years, much of it from Scotland, which has confirmed the efficacy of telehealthcare in

the management of some conditions (HBP, DM, congestive heart failure (CCF)) but not in others (chronic obstructive pulmonary disease (COPD), asthma). However, demonstrating cost-effectiveness has been more problematic and relies on modelling based on assumptions of better outcomes rather than immediate reductions in workload. This paper summarises the evidence for telehealthcare for the most common long-term conditions in which telehealthcare has been applied (COPD, HBP, CCF, DM, Asthma) and identifies the challenges still to be overcome.

### Can the management of long-term conditions be improved by telehealthcare?

#### Chronic Obstructive Pulmonary Disorder

COPD is one of the leading causes of hospital admission mainly because of exacerbations of the condition. Early identification of exacerbations and timely treatment can prevent severe deterioration and hospital admission<sup>5</sup>. Daily telemetric monitoring of symptoms, pulse oximetry and, in some cases, spirometry have been used to help identify these early exacerbations. Previous systematic reviews which relied on relatively poor quality studies had concluded that telehealthcare may be effective<sup>6</sup>. However, many of these studies were very complex and included additional nursing and medical support in their interventions which made it difficult to identify whether the telehealthcare component led to any change that had been detected<sup>7</sup>. A recent RCT conducted in Scotland<sup>8</sup> set out to separate these components and demonstrated no impact of telehealthcare on time to admission or total admission time, but it was associated with many 'false positive alerts' which lead to an increase in workload. Subsequent large high quality studies have had similar results. Analysis of the telemetric data showed that the algorithm in use was poorly predictive of serious exacerbations and research is now focussing on improving these algorithms. A 'light-touch' variation on telemonitoring encourages the patient to take and transmit readings but leaves the patient who self-monitors to call the clinician only if problems arise. The clinician can then make use of the collected data to advise the patient. Observational studies seem to suggest this is successful in terms of reducing workload but a trial is required to verify this<sup>9</sup>.

#### High Blood Pressure

Hypertension management is one of the commonest reasons for attending general practice. In Scotland, 1.2 million appointments are taken up for BP management alone (with many more appointments where BP is measured)<sup>10</sup>. Home measured BPs are more predictive of outcomes than those carried out in the surgery and are less prone to 'white-coat' effects. A large number of RCTs have been completed exploring telehealthcare management of HBP, including one in Scotland which showed a 4.3mm reduction in systolic ambulatory



blood pressure<sup>11</sup>. A recent meta-analysis concludes that the use of telehealth care is associated with a 2.4mm reduction in systolic BP<sup>1</sup>.

In general the more intensive the telehealthcare intervention the better the result. Even a 2.4mm reduction if sustained would be expected to yield clinically significant reductions in stroke and myocardial infarction incidence. However, all but one of the studies was for one year or less and many involved only one fifth of those eligible to take part. It is not known if the effect would be persistent nor, if rolled out as a service, that it could be mainstreamed with similar outcomes. The evidence for cost-effectiveness is less strong and relies on modelling of cardiovascular event prevention<sup>1</sup>. Lothian is currently experimenting with a system which is integrated with the electronic record and aims to recruit 2500 people. If successful a much bigger cluster RCT in Scotland is proposed.

### Diabetes mellitus

Diabetes mellitus is a major cause of death and disability and, with the rise in obesity, is becoming much more common. Just over a quarter of a million people in Scotland have been diagnosed with diabetes<sup>12</sup>. Around 88% of diabetes is type 2 and managed mainly in primary care. Although a meta-analysis of self-management alone in 2552 participants was associated with what was considered a statistically significant but clinically insignificant 2.3mmol/mol reduction in HbA1c<sup>13</sup>, a meta-analysis of 13 RCTs of telemedicine among 4207 people with diabetes reported a significant and clinically relevant absolute decline in HbA1c level in the intervention compared to control groups (mean difference -4.8 mmol/mol) suggesting that the effect of telemonitoring is greater than self-monitoring alone<sup>14</sup>. As with HBP, studies were not prolonged and it is unclear if this effect would be sustained over time or if implemented at scale if it would be taken up by patients and practices. Large scale implementations of telehealthcare in diabetes are needed to determine this.

### Congestive Cardiac Failure

CCF is one of the commonest reasons for hospital re-admission in Scotland. Several symptoms (increased breathlessness, fatigue, ankle swelling and disturbed sleep) and physiological signs (rise in weight, pulse rate and lower blood pressure) can help predict worsening failure. Early intervention may prevent deterioration and hospitalisation and telehealthcare has been seen as a means to facilitate early detection. Telemonitoring of CCF has mainly been carried out by specialist CHF nurses rather than by primary care staff. A large number of trials have been carried out with varying results. The latest Cochrane review in 3740 participants found that non-invasive telemonitoring reduced all-cause mortality in 2148 participants (RR 0.80, 95% CI 0.68 to 0.94; (RR 0.71, 95% CI 0.60 to 0.83)<sup>15</sup>. However it had no impact on all cause hospitalisations. It is not clear as to how cost-effective telehealthcare for CCF is.

### Asthma

In a systematic review, McLean and colleagues analysed a wide range of telehealthcare interventions. Meta-analysis showed no significant improvement in emergency department use or hospitalisation at 3 months, but a significant reduction in hospitalisations compared to usual care at 12 months. No benefit was conferred with respect to reported symptoms. The authors concluded that telehealthcare was unlikely to confer benefits in mild asthma but that those at higher risk of hospitalisation may benefit<sup>16</sup>. Another Cochrane review exploring the use of asthma apps found contradictory results and concluded that evidence was insufficient to recommend the use of mobile apps for managing asthma<sup>17</sup>.

### Core elements for improvement

The biggest challenge facing telehealthcare is the evidence that it works at scale. What can be made to work for a selected group of patients within a RCT may be different when applied more generally. It is difficult to persuade health service personnel to change the way they work unless there are clear advantages to them or their patients. While the RCTs in HBP and diabetes provide strong evidence of effect, at least in the research setting, the introduction of any new system comes with a time cost, one which hard pressed NHS staff may feel they cannot contribute. Introduction of telehealthcare must therefore be well supported including training and extra time to initiate new ideas. Further work needs to be done in COPD and perhaps also in CCF to improve algorithms so that improved outcomes do not come at the expense of greatly increased workloads for front-line staff. Research in these areas is currently underway in Scotland.

### Implementation in real-life NHS practice

Clinicians should start implementing telehealth with conditions for which there is a strong evidence base with simple and inexpensive technology. HBP and diabetes being the most obvious contenders. Such implementations need to be assessed in terms of uptake and impact on workload and clinical outcomes using routinely acquired data. Likewise implementation of telehealthcare of CCF needs to be carefully assessed. Telehealthcare systems need to be integrated within current ways of working and recent work in Scotland has linked telehealth reporting systems in HBP to Docman for regular reports. This should be extendable to other conditions and other platforms such as My Diabetes My Way.

At the moment it is hard to justify the use of telehealthcare for COPD or asthma outside of research programmes. Given the major contribution these conditions make to primary care and hospital workload further research into improved algorithms and monitoring systems are justified.



## Implication for collaborative quality improvement in general practice clusters

The number of patients suffering from long term conditions in Scotland is set to double in the next 10-15 years. It is impossible to continue to look after them as we have done up until now and supported self-monitoring may manage these problems more efficiently.

General practice clusters should consider encouraging members to undertake telehealth in at least one condition (the easiest and best researched condition is HBP, but diabetes could also be considered). There are a variety of projects currently supported by the Scottish Government TEC fund (e.g. Scale-Up BP Lothian) which offer the potential to work collaboratively at relatively low cost. Advice on implementing telehealth can be found from the Scottish Centre for Telehealth and Telecare (<http://sctt.org.uk/>)

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