

**Advice Statement 008/17****September 2017****What is the clinical effectiveness, cost effectiveness and safety of home and mobile health monitoring in addition to usual care compared with usual care for adults with diabetes (Type 1 and Type 2)?**

This advice has been produced following completion of evidence note 71 by Healthcare Improvement Scotland, in response to an enquiry from the Quality and Efficiency Support Team (QuEST) and the Scottish Centre for Telehealth and Telecare.

**Background**

Approximately one in 20 people in Scotland have some form of diabetes: around 90% of these are type 2 diabetes (T2D) diagnoses. Diabetes is a long-term condition which is associated with elevated blood glucose and leads to an increased risk of cardiovascular and microvascular complications. Management of diabetes in adults involves control of blood glucose, which may be through medication, diet and lifestyle changes.

The Scottish Government has published a [Scottish Diabetes Action Plan \(2010\)](#) and [Diabetes Improvement Plan \(2014\)](#), which include a key focus on people with diabetes managing their own condition in partnership with their healthcare teams.

Home and mobile health monitoring (HMHM) is variously defined. The Scottish Centre for Telehealth and Telecare considers it to be the use of digital remote monitoring technology to enable patients outside of the hospital environment to receive, record and relay clinically relevant information about their current health and wellbeing, to inform or guide self-management decisions by the patient and to support diagnosis, treatment and care decisions by professionals.

HMHM is a complex intervention, involving multiple technological, behavioural and healthcare components. The evidence identified consisted of diverse populations, technologies and usual care comparator design and settings, making assessment challenging. Determination of the components of a home and mobile health type intervention which may be most effective was beyond the scope of this review.

**Clinical effectiveness**

- Two systematic reviews were considered. There was widespread heterogeneity among the included studies within these reviews, including how well participants' diabetes was usually controlled, which technological devices and care settings were used in interventions, the extent and delivery of clinical feedback, and the duration of interventions and study follow-up periods (range 3-60 months).
- The evidence was consistent in demonstrating a reduction in HbA1c. In a meta-analysis comprising 13 RCTs (n=4,207) [two in Type 1 (n=145), six in Type 2 (n=1,180), three in Type 1 and 2 (n=2,362), two unspecified (n=520)], the pooled mean difference between patients receiving HMHM and those receiving usual care alone was -0.44% (95% Confidence Interval (CI) -0.26% to -0.61%). In

a second meta-analysis of 35 RCTs (T2D only), the pooled mean difference was -0.37% (95% CI -0.25% to -0.49%).

- A pragmatic observational study (n=3,521), undertaken across nine regions in Europe using the model of assessment for telemedicine in which the Scottish Centre for Telehealth and Telecare participated, found that HMHM reduced HbA1c more than usual care: absolute mean difference -0.22% (CI -0.14 to -0.31); p<0.001), though methodological limitations may have introduced bias and the authors advised that this should be taken in to account when considering the result.
- It is unclear whether the reductions in HbA1c are clinically significant, sustainable, and independent of other aspects of diabetes management or therapy.

### **Safety**

- No evidence was identified to determine whether there was a difference in the safety of HMHM compared with usual care alone.

### **Cost effectiveness**

- No evidence was identified relating to the cost-effectiveness of HMHM compared with usual care alone.

### **Patient aspects**

- A qualitative interview study conducted alongside a UK RCT reported that a supported telemonitoring intervention in Scotland was accepted well by participants and led to an increase in motivation to improve self-management.
- The pragmatic observational study of telemedicine in European countries including Scotland used a telephone questionnaire to assess patient satisfaction. Patients were generally very satisfied with the intervention and felt their care was enhanced, but were indifferent (neither agreed nor disagreed) in relation to a statement which proposed to them that the intervention could substitute usual care.

### **Organisational aspects**

- A qualitative study conducted alongside a UK RCT interviewed healthcare professionals and reported that some concerns were raised about cost and workload.

### **Conclusion**

- HMHM lacks a universal definition, and the secondary literature included in the evidence note was heterogeneous, preventing definitive conclusions.
- Evidence suggested an association between the use of HMHM and improvement in blood glucose control, but there was a lack of cost-effectiveness evidence and longer term evaluation.
- It is unclear whether the reductions in HbA1c are sustainable, clinically significant and independent of other aspects of diabetes care.

### **Further research**

- Future research should be designed to address the current methodological weaknesses in the evidence base; with well described patient characteristics, HMHM technologies, and service models, including duration of intervention and level of clinical feedback.
- Patient satisfaction with the intervention should be consistently evaluated.

- Extended follow up of the interventions is advocated to evaluate longer-term clinical outcomes.
- Further research into the cost effectiveness of the technology is required.

**Advice context:**

*The status of SHTG Advice Statements is 'required to consider'.*

*No part of this advice may be used without the whole of the advice being quoted in full. This advice represents the view of the SHTG at the date noted.*

*It is provided to inform NHS boards in Scotland when determining the place of health technologies for local use. The content of this Advice Statement was based upon the evidence and factors available at the time of publication. An international evidence base is reviewed and thus its generalisability to NHSScotland should be considered by those using this advice to plan services. It is acknowledged that the evidence constitutes only one of the sources needed for decision making and planning in NHSScotland. Readers are asked to consider that new trials and technologies may have emerged since first publication and the evidence presented may no longer be current. SHTG Advice Statements are considered for review on a 2-yearly basis. The evidence will be updated if requested by the clinical community, dependent on new published reports. This advice does not override the individual responsibility of health professionals to make decisions in the exercise of their clinical judgment in the circumstances of the individual patient, in consultation with the patient and/or guardian or carer.*

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