Healthcare Improvement Scotland | SHTG Advice on health technologies

Advice Statement 009-18
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Advice Statement

What is the clinical and cost effectiveness of Freestyle Libre® flash glucose monitoring for patients with diabetes mellitus treated with intensive insulin therapy?

Advice for NHSScotland

It is recommended that flash glucose monitoring with Freestyle Libre® is available for individuals with diabetes who are actively engaged in the management of their diabetes and who intensively manage their condition with multiple daily insulin injections or insulin pump therapy.

In keeping with the Scottish Diabetes Group criteria, use should be restricted to those who:

- Agree to attend a locally provided flash glucose monitoring education session;
- Agree to scan glucose levels no fewer than six times per day;
- Satisfy their clinical team that they (or carer) have the required knowledge/skills to self-manage diabetes; for example, having attended a recognised diabetes structured education programme.

Clinical review timescales should be agreed to ensure that use of the device continues to support individuals' diabetes care management. NHS Boards should consider the continuation and discontinuation criteria contained within the Managed Clinical Network (MCN) leads interim position statement (see Annex 1).

Recipients should be encouraged to share data with their care team to facilitate clinical review and to contribute to local and national audit.

NHSScotland is required to consider the Scottish Health Technologies Group (SHTG) advice.

Why is SHTG looking at this topic?

Diabetes mellitus is a major cause of morbidity and mortality in Scotland with around 300,000 people diagnosed with the condition. Freestyle Libre® is a flash glucose monitoring system.

The topic was prioritised for inclusion on the SHTG work programme following a referral from the Scottish Diabetes Group.

An extended Evidence Note 81 was produced by Healthcare Improvement Scotland in response to this request. The extended Evidence Note was based on a EUnetHTA rapid review of published clinical effectiveness and safety literature, but also incorporated a range of additional evidence sources including:

- A Healthcare Improvement Scotland economic evaluation
- A patient group submission from Diabetes Scotland
- NHSScotland clinical expert input.

Background

Self-monitoring of glucose levels is essential for people with type 1 (T1) diabetes mellitus (DM), and is necessary for approximately 10% of people with type 2 (T2) DM to manage glycaemic control and adjust insulin or other medications. Currently, finger-prick self-monitoring of blood glucose (SMBG) using test strips and blood glucose meters is the most frequently used monitoring method. The recommended number of tests ranges from four to 10 per day depending on the type of diabetes and the required intensity of monitoring.

Freestyle Libre® is a flash glucose monitoring system which has two main parts: a handheld reader, and a disposable sensor which patients wear on their body. The sensor, which lasts up to 14 days, has a filament which measures glucose levels in the interstitial fluid. Patients use the reader or a mobile phone app to wirelessly scan the sensor and obtain their glucose readings. The Freestyle Libre® flash glucose monitoring system is indicated for measuring interstitial fluid glucose levels in people (aged 4 and above) with diabetes mellitus, including pregnant women. A key feature of the technology is the display of long term glucose variability and trends, rather than a series of static measurements.

Freestyle Libre® is not intended to completely replace SMBG, but offers an alternative monitoring approach. SMBG will still be required under certain circumstances such as where glucose levels are changing rapidly or where readings are not consistent with symptoms being experienced. Also, SMBG is required to meet current driving license requirements. Freestyle Libre® is not indicated for patients whose condition requires continuous monitoring of blood glucose.

Clinical effectiveness

- In two randomised controlled trials (RCTs), use of Freestyle Libre® by adults with well-controlled T1 DM (n=241) or by people with poorly controlled T2 DM (n=224) reduced time in hypoglycaemia and hypoglycaemic events at six months when compared with standard SMBG. These reductions were statistically significant. Time in hypoglycaemia and hypoglycaemic events were defined using a surrogate endpoint of sensor glucose readings less than 3.9mmol/L (70mg/dL).
- The RCTs also reported that:
    - For people with well-controlled T1 DM, glycaemic control (as measured by HbA1c) was not statistically significantly different between study arms.
    - In a subgroup analysis, of people with poorly-controlled T2 DM aged under 65 years (n=142), glycaemic control (HbA1c) significantly improved in those using Freestyle Libre® compared with those using SMBG; there was a statistically significant reduction in HbA1c. The effect was absent when data from participants of all ages were considered.
    - When compared with SMBG, Freestyle Libre® improved treatment satisfaction as measured by the Diabetes Treatment Satisfaction Questionnaire (DTSQ). No statistically significant difference between the study groups was found in the Diabetes Distress Scale (DDS) score or overall Diabetes Quality of Life Questionnaire (DQoL) score.
- Methodological weaknesses mean that RCT findings may be considered at risk of bias.

Safety

- The proportion of participants in the two RCTs experiencing serious adverse events was similar between those using SMBG and Freestyle Libre®.
- In the two RCTs and in two small observational studies (n=72, n=89) sensor site symptoms were commonly reported by Freestyle Libre® users. In the RCT in people with T1 DM 39% of people using the device reported at least one sensor site symptom. Both RCTs excluded participants with known allergy to medical grade adhesives.

Cost effectiveness

- A small number of published cost analyses and cost effectiveness analyses indicated that Freestyle Libre® may be cost-effective in people with T1 and T2 DM treated with intensive insulin and self-monitoring their blood glucose levels. However, a lack of transparency and generalisability to the Scottish setting meant that no conclusions could be drawn from the published literature.
- A Healthcare Improvement Scotland economic evaluation was carried out to model the impact of Freestyle Libre® on costs and benefits compared with SMBG. The results indicate that Freestyle Libre® is likely to be cost effective for people treated with

intensive insulin therapy in both the T1 and T2 DM populations, with incremental cost effectiveness ratios (ICERs) falling within commonly accepted willingness-to-pay thresholds.

- The ICER for Freestyle Libre® compared with SMBG ranged from £2,459 to £12,340 per quality-adjusted life year (QALY) in T1 DM and from £4,498 to £18,125 in T2 DM, depending on the modelling approach used.
- One-way sensitivity analyses indicated Freestyle Libre® was still likely to be cost-effective under a wide range of scenarios and cost saving against SMBG when a mean number of eight blood glucose tests per day was assumed. Probabilistic sensitivity analysis also indicated a high probability of Freestyle Libre® being cost-effective.
- The following uncertainties should be considered when interpreting the results: heterogeneity associated with the evidence sources used within the economic evaluation; use of a surrogate measure from the RCTs for real-life symptomatic hypoglycaemic events; methods used to capture utility gain and patient preference associated with the device. Further details are provided within the extended Evidence Note.
- Longer term data are not currently available to inform comprehensive modelling of long term treatment effects. In the T2 DM population there is greater uncertainty surrounding the cost effectiveness conclusions.
- Assuming an uptake rate of 30% in year 1 rising to 50% by year 5, the budget impact of Freestyle Libre® in NHSScotland was estimated to be £3.3m in year 1 rising to £6.8m by year 5 in the T1 DM population and £5.5m rising to £11.4m in the T2 DM population. This increase was attributed to the incremental cost of monitoring of £370 per T1 DM patient and £544 per T2 DM patient. These figures do not include the potential resource savings to the NHS linked to the decreased frequency of severe hypoglycaemia requiring medical assistance resulting from Freestyle Libre® use.

Patient and social aspects

A patient organisation submission was received from Diabetes Scotland that collated information from a UK patient survey, focus group findings and experiences of use of Freestyle Libre® as reported by users of their helpline and online forum. The following key points emerged:

- People with experience of using Freestyle Libre® have reported improved quality of life, as it allows them to carry on their daily lives with greater ease and confidence. This helps reduce the stress and anxiety of managing diabetes and has a beneficial impact both for the patient and for the wider network of family and carers.
- Using Freestyle Libre® may particularly benefit people in jobs where regular finger-prick testing is not always practical.

- Respondents suggest that use of Freestyle Libre®, by supporting more effective self-management of diabetes, may lead to a reduced risk of longer-term serious health complications and associated treatment costs.

Context (includes organisational issues)

- Freestyle Libre® received regulatory approval in September 2014 and was initially available for use in seven European countries including for private purchase in the UK. Freestyle Libre® was added to the Scottish Drug Tariff on 1st November 2017. As of May 2018, seven out of 14 health boards in Scotland are awaiting this SHTG advice, while the remaining seven already have pathways and/or prescribing policies in place for Freestyle Libre® – although there is variation across the pathways. SHTG advice is intended to contribute to increased consistency in availability across Scotland; reducing the risk of inequity of access from both a geographical perspective and individuals' ability to self-fund.
- The Driving and Vehicle Licensing Agency (DVLA) currently stipulates that drivers must monitor their blood glucose levels, with test strips and a meter, within two hours of driving and every two hours while driving. It is anticipated that revised regulations for drivers with diabetes will reflect technological advances in glucose measurement and that devices suitably assessed and endorsed by medical experts may, in future, be recognised as fit for purpose.
- SCI Diabetes – a shared electronic patient record to support treatment of NHSScotland patients with diabetes – provides a mechanism through which patient data can be provided for national and local audit programmes to support the ongoing assessment of treatment options for patients with diabetes.

Further research

- There is currently a lack of data relating to use of Freestyle Libre® in children or young people with diabetes.
- Further research utilising real-world data collected within SCI Diabetes is encouraged and could be used to inform ongoing clinical and economic assessment and future decision-making surrounding the use of the device.
- Further comparative studies using cohorts more representative of the Scottish population are encouraged to help determine the effect of Freestyle Libre® on glycaemic control. Long-term outcome studies are needed to inform the impact of Freestyle Libre® on long-term complications of diabetes.
- Two ongoing RCTs were identified comparing the use of Freestyle Libre® with SMBG:

  NCT02776007, NCT03522870
- Current evidence on Freestyle Libre appears to be at assessment or long term study stage of the IDEAL-D framework.

Advice context:

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. 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.

SHTG Advice Statements will be considered for review if new evidence becomes available which is likely to materially change the advice. Stakeholders may submit a request, highlighting new evidence to shtg.hcis@nhs.net

Chair
Scottish Health Technologies Group

NICE has accredited the process used by Healthcare Improvement Scotland to produce its evidence review products. Accreditation is valid for 5 years from January 2013. More information on accreditation can be viewed at www.nice.org.uk/accreditation

Annex 1

Use of Freestyle Libre® flash glucose monitoring system

Diabetes Managed Clinical Network Lead Clinicians Position Statement January 2018

Recommendations for Continuation.
The specialist clinician should recommend ongoing use of FSL, based on evidence of continued benefit obtained as part of routine clinical review (6 monthly) within secondary care. Each patient would need to demonstrate benefit in one or more of the following over a 12 month period:

1. Continuation Criteria

- Reduction in episodes of DKA.
- Reduction in admissions to hospital.
- Reduction in episodes of severe hypoglycaemia.
- Reduction in the proportion of time spent in hypoglycaemia.
- Reversal of impaired awareness of hypoglycaemia.
- Improvement in HbA1c of 5 mmol/mol in 6 months.

2. Discontinuation Criteria any one of the following:

- Failure to achieve at least one of the criteria listed in the section above.
- Failure to attend follow up appointments.
- Failure to scan at least six times per day.
- Failure to share this data with their secondary care team.
- Failure to engage with secondary care team to optimise issues with glycaemic control.
- Failure to use testing strips and sensors as recommended.
- Evidence of greater harm than benefit on clinical and psychological health (eg increased frequency of hypos, increased psychological morbidity).