COST-EFFECTIVENESS OF A REAL-TIME CONTINUOUS GLUCOSE MONITORING SYSTEM VERSUS SELF-MONITORING OF BLOOD GLUCOSE IN PEOPLE WITH TYPE 2 DIABETES ON INSULIN THERAPY IN THE UK

Authors: Isitt JJ[1], Roze S[2], Sharland H[3], Cogswell G[4], Alshannaq H[4,5], Norman GJ[4], Lynch PM[4]

Affiliations:

[1] Vyoo Agency, San Diego, CA, USA

[2] Vyoo Agency, Lyon, France

[3] Ossian Health Economics and Communications, Basel, Switzerland

[4] Dexcom, San Diego, CA, USA

[5] University of Cincinnati College of Medicine, Cincinnati, OH, USA

Corresponding author: John J. Isitt

Telephone: +1 805-630-8496

E-mail: jisitt@vyoo-agency.com

Supplementary Appendix

CHECKLIST OF REPORTING MODEL INPUT IN DIABETES HEALTH ECONOMIC STUDIES

The following study information includes a checklist for transparency as per the Mt Hood Modelling Group recommendations.[1] A trace of HbA1c progression over time in each comparator is also included for transparency of the cost-effectiveness analysis comparing rt-CGM to SMBG in people with T2D on insulin therapy in the United Kingdom.

Model Input	Checkbox	Comments
Simulation cohort		
Baseline age	☒	Table 1, page11
Ethnicity/race	☒	Table 1, page11
BMI/weight	☒	Table 1, page11
Duration of Diabetes	☒	Table 1, page11
Baseline HbA1c, lipids, and blood pressure	☒	Table 1, page11
Smoking status	☒	Table 1, page11
Comorbidities	☒	Table 1, page11
Physical activity	☐	Not included in the study design
Baseline treatment	☒	Introduction, page 2
Treatment intervention		
Type of treatment	☒	Introduction, page 5
Treatment algorithm for HbA1c over time	☒	Appendix, Table 2
Treatment algorithm for other conditions	☒	Appendix, Table 2
Treatment initial effects on baseline HbA1c	☒	Appendix, figure 1
Rules for treatment intensification	☒	Appendix, Table 2

Long-term effects (adverse effects, treatment adherence and persistence, and residual effects after discontinuation of treatment)	☒	Long-term diabetes complications, hypoglycaemia and hyperglycaemia event costs: Table 4
Trajectory of HbA1c	☒	Appendix, figure 1
Differentiated by acute event in first and subsequent years	☒	Methods, page 6 and Table 4, page 23
Cost of intervention and other costs (e.g., managing complications adverse events and diagnostics)	☒	Appendix, Table 1 Table 1, page11 Table 4, page 23
Unit price and resource use separately and give information on discount rates applied	☒	Table 1, page11 Table 4, page 23 Methods, page 7
Health state utilities		
Operational mechanics of the assignment of utility values	☒	Methods, page 7 and Table 3, page 22
Management of multi-health conditions	☒	CDM defaults and risk equations
General model characteristics		
Choice of mortality table and any specific event-related mortality	☒	Appendix, Table 1
Choice and source of risk equations	☒	Appendix, Table 1

IMPACT INVENTORY

The Impact Inventory from the 2nd Panel on Cost-effectiveness in Health and Medicine has been included here for clarification on the impacts and components included in the cost-effectiveness analyses.[2]

Sector	Type of Impact	Included in This Reference Case Analysis from NHS Perspective		Notes on Sources of Evidence
		Health Care Sector	Societal	
Formal Health Care Sector				
Health	Health outcomes (effects)			
	Longevity effects	■	□	Lifetime effects from the CORE diabetes model
	Health-related quality-of-life effects	■	□	Benefit of avoiding fingerstick use
	Other health effects (eg, adverse events and secondary transmissions of infections)	■	□	Benefit of avoiding acute and chronic diabetes-related complications
	Medical costs			
	Paid for by third-party payers	■	□	NHS
	Paid for by patients out-of-pocket	□	□	
	Future related medical costs (payers and patients)	■	□	Future costs and clinical outcomes were discounted at 3.5% per annum
	Future unrelated medical costs (payers and patients)	□	□	
Informal Health Care Sector				
Health	Patient-time costs	N/A	□	
	Unpaid caregiver-time costs	N/A	□	
	Transportation costs	N/A	□	
Non−Health Care Sectors (with examples of possible items)				
Productivity	Labor market earnings lost	N/A	□	
	Cost of unpaid lost productivity due to illness	N/A	□	
	Cost of uncompensated household production	N/A	□	
Consumption	Future consumption unrelated to health	N/A	□	
Social Services	Cost of social services as part of intervention	N/A	□	
Legal or Criminal Justice	Number of crimes related to intervention	N/A	□	
	Cost of crimes related to intervention	N/A	□	

Education	Impact of intervention on educational achievement of population	N/A	☐	
Housing	Cost of intervention on home improvements (eg, removing lead paint)	N/A	☐	
Environment	Production of toxic waste pollution by intervention	N/A	☐	
Other (specify)	Other impacts	N/A	☐	

CHEERS CHECKLIST[3]

Topic	No.	Item	Location where item is reported
Title			
	1	Identify the study as an economic evaluation and specify the interventions being compared.	Title
Abstract			
	2	Provide a structured summary that highlights context, key methods, results, and alternative analyses.	Abstract
Introduction			
Background and objectives	3	Give the context for the study, the study question, and its practical relevance for decision making in policy or practice.	Introduction
Methods			
Health economic analysis plan	4	Indicate whether a health economic analysis plan was developed and where available.	Methods, First Paragraph, "Model Structure"
Study population	5	Describe characteristics of the study population (such as age range, demographics, socioeconomic, or clinical characteristics).	Methods, Second Paragraph, "Simulation cohort and treatment effects" and Table 1
Setting and location	6	Provide relevant contextual information that may influence findings.	Not reported
Comparators	7	Describe the interventions or strategies being compared and why chosen.	Introduction: Fifth paragraph, Methods: "Costs and Utilities"
Perspective	8	State the perspective(s) adopted by the study and why chosen.	Methods: "Time horizon, perspective and discount rate"
Time horizon	9	State the time horizon for the study and why appropriate.	Methods: "Time horizon, perspective and discount rate"

Topic	No.	Item	Location where item is reported
Discount rate	10	Report the discount rate(s) and reason chosen.	Methods: "Time horizon, perspective and discount rate"
Selection of outcomes	11	Describe what outcomes were used as the measure(s) of benefit(s) and harm(s).	Methods: "Model Structure"
Measurement of outcomes	12	Describe how outcomes used to capture benefit(s) and harm(s) were measured.	Methods: "Costs and Utilities", Second paragraph
Valuation of outcomes	13	Describe the population and methods used to measure and value outcomes.	Methods: "Costs and Utilities", Second paragraph, Table 3
Measurement and valuation of resources and costs	14	Describe how costs were valued.	Methods: "Costs and Utilities", First and Second paragraph, Table 2
Currency, price date, and conversion	15	Report the dates of the estimated resource quantities and unit costs, plus the currency and year of conversion.	Methods: "Costs and Utilities", First paragraph
Rationale and description of model	16	If modelling is used, describe in detail and why used. Report if the model is publicly available and where it can be accessed.	Methods: "Model Structure"
Analytics and assumptions	17	Describe any methods for analysing or statistically transforming data, any extrapolation methods, and approaches for validating any model used.	Methods: "Model Structure"
Characterising heterogeneity	18	Describe any methods used for estimating how the results of the study vary for subgroups.	Methods: "Sensitivity analysis", Second paragraph
Characterising distributional effects	19	Describe how impacts are distributed across different individuals or adjustments made to reflect priority populations.	Methods: "Sensitivity analysis", Second paragraph
Characterising uncertainty	20	Describe methods to characterise any sources of uncertainty in the analysis.	Methods: "Sensitivity analysis"

Topic	No.	Item	Location where item is reported
Approach to engagement with patients and others affected by the study	21	Describe any approaches to engage patients or service recipients, the general public, communities, or stakeholders (such as clinicians or payers) in the design of the study.	Not reported
Results			
Study parameters	22	Report all analytic inputs (such as values, ranges, references) including uncertainty or distributional assumptions.	Tables 1, 2 and 3
Summary of main results	23	Report the mean values for the main categories of costs and outcomes of interest and summarise them in the most appropriate overall measure.	Results: "Base case analysis", Table 4
Effect of uncertainty	24	Describe how uncertainty about analytic judgments, inputs, or projections affect findings. Report the effect of choice of discount rate and time horizon, if applicable.	Results: "Sensitivity analysis", Table 5
Effect of engagement with patients and others affected by the study	25	Report on any difference patient/service recipient, general public, community, or stakeholder involvement made to the approach or findings of the study	Not reported
Discussion			
Study findings, limitations, generalisability, and current knowledge	26	Report key findings, limitations, ethical or equity considerations not captured, and how these could affect patients, policy, or practice.	Discussion: First to Fourth paragraph
Other relevant information			
Source of funding	27	Describe how the study was funded and any role of the funder in the identification, design, conduct, and reporting of the analysis	Acknowledgements: "Funding"
Conflicts of interest	28	Report authors conflicts of interest according to journal or International Committee of Medical Journal Editors requirements.	Acknowledgements: "Conflict of interest"

SUPPLEMENTARY TABLES

Supplementary Table 1 General Model Characteristics

Algorithm	Description
Mortality rate	Combined UKPDS 68[4]
Risk equations	1. Myocardial infarction: UKPDS Outcomes Model Version 2 2. Stroke: UKPDS Outcomes Model Version 2 3. Angina: UKPDS Outcomes Model Version 2 4. Heart failure: UKPDS Outcomes Model Version 2
Model uncertainty	1. UKPDS 68 used for T2D specific health state transition probabilities. 2. Probabilistic sensitivity analysis specified with Monte Carlo 2nd order sampling, with 1000 patients and 1000 bootstrap iterations.

T2D, type 2 diabetes; UKPDS, UK Prospective Diabetes Study.

Supplementary Table 2 Treatment Algorithms

Algorithm/Characteristic	Description
HbA1c evolution overtime	Clinical Tables: Index 0; yearly progression 0.15*
Initial treatment effect HbA1c	0.56% reduction in HbA1c for rt-CGM after 12 months follow-up (based on mean adjusted difference between rt-CGM and SMBG groups)
Rules for treatment intensification (HbA1c cut-off)	Restrict to HbA1c values lower than 7.0% points
Switch treatment when HbA1c critical threshold is exceeded	Change treatment at HbA1c critical threshold of 12.0% points

HbA1c, glycated hemoglobin; rt-CGM, real-time continuous glucose monitoring.
*The yearly progression of 0.15 HbA1c units is based on the clinical tables setting in the CORE diabetes model indexed over the duration of diabetes. The clinical tables are derived from results of the of the Diabetes Control and Complications Trial (DCCT) and the Epidemiology of Diabetes Interventions and Complications study (EDIC; 1994 to present). The EDIC study represents the observational follow-up study from the DCCT.

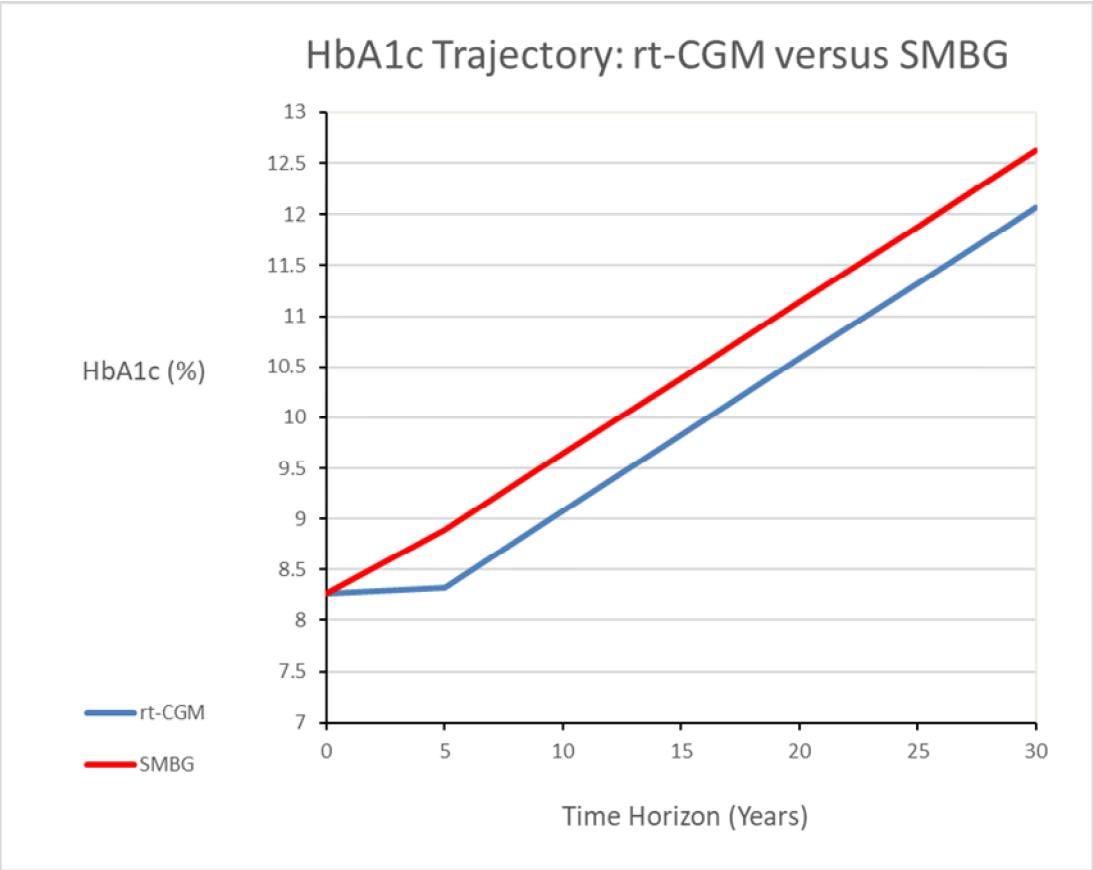
Supplementary Table 3 Annual Costs for rt-CGM and SMBG in type 2 Diabetes in the UK

	Unit cost (GBP)	Units	Net cost (GBP)
rt-CGM annual cost rt-CGM annual costs were based current U.K. prices and assumed an annual usage of 36 sensors and 4 transmitters.[5]	1,250	1	1,250
SMBG annual cost Annual costs of strips and lancets were derived from published sources.[6,7] Utilization of 3.8 times per day was sourced from DIAMOND for type 2 patients on insulin.[8]	0.2897 per test	1,387	401.81

GBP, Great British pound; rt-CGM, real-time continuous glucose monitoring; SMBG, self-monitoring of blood glucose

SUPPLEMENTARY FIGURES

Supplementary Figure 1 HbA1c Trajectory in rt-CGM versus SMBG



HbA1c: glycated hemoglobin; rt-CGM: real-time glucose monitoring; SMBG: self-monitoring of blood glucose.

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