# **PDB54** Systematic literature review of utility values associated with type 2 diabetes-related complications Beaudet A<sup>1</sup>, Clegg J<sup>1</sup>, Lloyd A<sup>2</sup>

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# **Objective**

- Type 2 diabetes mellitus (T2DM) represents a major public health burden. Consequently, several T2DM treatments will be submitted to health technology assessment agencies for reimbursement over the next years and assessed according to their relative cost-effectiveness.
- The NICE reference case for the measurement and valuation of health for use in cost-effectiveness models emphases the QALY as the preferred measure of the benefit (1, 4). EQ-5D has been shown to be valid, reliable and responsive in T2DM (2). Other NICE preferences include: patient reported outcomes, tariffs elicited with the general population, UK setting.
- The reference case states that the quality and the relevance of the studies should be assessed following the same principles as that for clinical effectiveness reviews, however there are currently no agreed reporting standards to justify the selection of a set of relevant utility values. • The aim of this systematic literature review was to provide a set of utility values associated with T2DM-related complications in line with NICE reference case to be used in modelling studies.

### **Table 1.** Description of included studies

Reference	Valuation (Tariff if EQ-5D)	Statistical methods	n	Mean age	Respondent recruitment	Country
Bagust et al (5)	EQ-5D (3)	LMRM	4,641	67	Clinical trial: CODE-2 study	BL, IT, ES, NL, UK
Clarke et al. (6)	EQ-5D (3)	Tobit model	3,192	62	Clinical trial: UKPDS study	UK
Currie et al. (7)	EQ-5D (3)	Multivariate analysis	1,305	62	Postal survey	UK
Fenwick et al. (8)	EQ-5D (3)	Multivariate quantile regression model	577	66	Specialized eye clinics	AU
Glasziou et al. (9)	EQ-5D (3)	Mean values	978	67	Clinical trial: ADVANCE study	AU
Kiberd and Jindal (10)*	TT0	Mean values	17	NR	Health care workers	CA
Kontodimopoulos et al.(11)	EQ-5D (3)	LMRM	319	65	Diabetology outpatient department	GR
Langelaan et al. (12)	EQ-5D (26)	Mean values	128	42	Rehabilitation centre for visually impaired adults	NL
Laupacis et al. (13)*	TT0	Mean values	168	42	Transplant waiting list	CA
Lee et al. (14)	EQ-5D (27)	Univariate model	858	58	Outpatient clinic of university hospital	KR
Lloyd et al. (15)	EQ-5D (3)	Univariate model	122	62	Five clinical sites	UK
Marrett et al. (16)	EQ-5D (28)	Mix linear regression model	1,984	58	An Internet-based survey	US
Matza et al. (17)	EQ-5D (3)	Least square means	129	56	Advertisement in newspapers	UK
O'Reilly DJ et al. (18)	EQ-5D (28)	OLS mean regression	1,147	64	Community setting	CA
Quah et al. (19)	EQ-5D (3)	Multiple regression model	699	63	Polyclinic laboratory	SG
Redekop et al. (20)	EQ-5D (3)	OLS linear regression	1,136	65	General practitioners	NL
Smith et al. (21)	EQ-5D (28)	LMRM	2,074	66	Diabetes registry population	USA
Solli et al. (22)	EQ-5D (3)	LMRM	356	64	Diabetes Association	NO
Sullivan et al. (23)	EQ-5D (28)	CLAD model	2,039	45	Nationally representative survey	US
Vexiau et al. (24)	EQ-5D (3)	LMRM	400	62	Primary care office	FR
Wasserfallen et al. (25)	EQ-5D (3)	Mean values	455	64	19 dialysis centres	СН



## Methods

- At the scoping stage, the list of health state utility values to be captured was identified by reviewing the list of microvascular and macrovascular complications associated with T2DM and commonly used within existing models.
- The search strings combined 1) T2DM, 2) utility and 3) individual complication search terms. The literature searches were conducted on May 24th, 2012 in Medline & Medline In-Process, Embase, EconLIT and NHS Economic Evaluation Database. Results are presented in Figure 1.
- Articles were included if they reported a cohort study performed in adults reporting the effect of T2DM complications on utility values. Exclusion criteria included non-English publications, paediatric population, instruments without conversion to utility measure or the effect of a specific therapies on utility values.
- When articles presenting EQ-5D index data were available for a given complication, only these articles were included in the relevance assessment.
- A set of utility values was selected following the relevance and quality assessment. The use of values generated using a multiple regression was preferred over use of the unadjusted data. Given the high number of T2DM complications homogeneity of the estimates was considered important.

CLAD: Censored Least Absolute Deviations Estimator, LMRM: Linear Multivariate Regression Model, NR: not reported, OLS: Ordinary Least Square

### Conclusions

• This study generates utility inputs suitable for use in cost-effectiveness modelling elicited with a robust methodology. To our knowledge, it is the first review to specifically assess the appropriateness of the studies from the perspective



\* Except for the complication "renal transplant" for which no EQ-5D values could be identified.

# Results

- The articles were systematically assessed for relevance with the NICE reference case.
- The quality of the studies is reviewed in Table 1. It was possible to identify relevant values elicited with the EQ-5D for all pre-specified T2DM complications except for renal transplant following diabetic nephropathy.
- Figure 2 presents the suggested utility values for T2DM complications with the estimated 95% confidence intervals.

### **Figure 2.** Suggested utility set for T2DM modelling (95% confidence interval)

### of the NICE reference case.

- This study presents several limitations. Statistical methods used as well the reporting of variability and statistically significance measures were inconsistent across studies. The populations compared were also heterogenous.
- An area that would benefit from further research is the calculation of utility value for patients experiencing several complications, an important consideration for T2DM patients who typically develop several complications over time.
- This set of values should improve the robustness of T2DM modelling outcomes in line with NICE requirements. Clarke et al (2002) reports values for a number of complications and therefore, provides consistency across a number of complications.
- The major limitation in terms of interpreting the values is that they have been sourced from different studies, using different methodologies and populations.
- Future research could focus on eliciting a coherent set of values for T2DM-related complications in line with the NICE reference case and to define the variance around the utility value point estimates.



#### CI: confidence interval, DR: diabetic retinopathy.

\* When the minor and major hypoglycaemia disutilities were converted to an annual instead of guarterly impact, the values reported were -0.004 and -0.012.

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