TARGETED LITERATURE REVIEW OF DISCRETE-CHOICE EXPERIMENT METHODOLOGY, AS APPLIED TO THERAPIES IN T2DM

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Background and objectives

> Patients' level of preference for available therapy options may affect their adherence or their willingness to begin new therapies; especially in type 2 diabetes mellitus (T2DM), where most therapies for glycemic control are self-administered daily, possibly by self-injection.
> Patient preferences have previously been measured using discrete-choice experiments (DCEs), where respondents must consider their willingness to trade off different characteristics of the offered therapies; for example by selecting a profile that is more convenient but less efficacious.
> However, the exact design and process of conducting DCEs may vary, including in terms of:
- the attributes included within profiles, and the methods of selecting these attributes;
- how levels are combined to generate profiles, and how profiles are combined to generate choice sets;
- the number of unique choice sets presented, and how these are presented to respondents.

(*see Glossary to the right for definitions of terms*)

> This targeted literature review assessed the methodology of published DCEs, and collected examples of best practice for such studies in future.

Methods

> A pre-defined search strategy was used to capture OVID-indexed literature published between 2008 and August 2018, which was then supplemented with literature from relevant conferences relating to outcomes research or diabetes (×9) (see **Table 1**).

Table 1. Sources of literature captured within the targeted literature review

OVID databases searched:		Conference proceedings searched:			
Embase	*searched 08/2018*	ISPOR (international)	*05/2018*	ADA	*06/2018*
MEDLINE®		ISPOR (Asia Pacific)	*09/2018*	EASD	*09/2017*
MEDLINE® Daily Update		IAHPR	*11/2017*	IDF	*12/2017*
PsycINFO		ICMC	*04/2017*	JDS	*05/2018*
EconLit		IHEA	*07/2017*		

> Each final inclusion fulfilled the following criteria:
- primary research publication describing a DCE or similar study, in English;
- assesses the preferences of patients with T2DM;
- assesses preferences for real or hypothetical therapies for control of glycemia, of any class (e.g. oral and/or injectable therapies; insulin and/or non-insulin therapies).

Results

> In total, 32 publications (on 30 unique studies) were included from all sources (see **Figure 1**).[1-32]
- These comprised 23 full-text publications,[2,4-8,10-22,25,28-30] and 9 conference abstracts or posters.[1,3,9,23,24,26,27,31,32]

Figure 1: PRISMA diagram of inclusions and exclusions, with characteristics of included studies

433 OVID-indexed abstracts screened → *356 excluded*
↓
77 OVID-indexed full texts screened → *54 excluded*
↓
9 conference abstracts → **32 included, reporting on 30 studies**

28 conventional DCE studies [1-6,8-25,27-32]
plus willingness to pay,[2,6,12,15,18,20,21,25,31] best-worst scaling,[3] time trade-off,[28] or Delphi panel approach[23]
1 adaptive DCE study [7]
1 study with adaptive hierarchy process [26]

11 oral and injectable [2,4,5,7,9,12,13,18-20,22,23,25]
8 injectable-only [11,17,21,27-31]
5 oral-only [8,14-16,24]

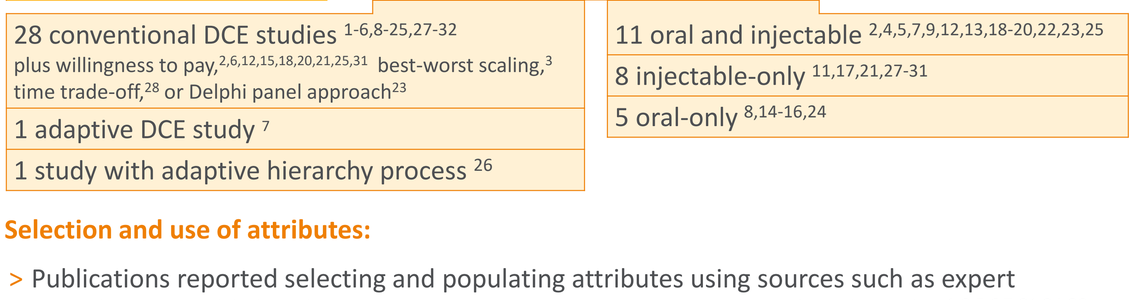
Selection and use of attributes:

> Publications reported selecting and populating attributes using sources such as expert consultation, published literature, product descriptions, and clinical trial results.[1-3,5,6 7-21,24-30]
- However, only 12 of 30 studies (40%) explicitly involved patients with T2DM in selecting or validating attributes in this initial development process.[1,6,7,12,13,17,19-21,24,26,29,30]

> 26 of 30 studies (87%) presented 5–8 attributes per profile (see **Figures 2** and **3**).[1,3-6,8-19,21-27,29-32]

Figure 2: Most common attributes presented within therapy profiles

Figure 3: Number of attributes used in each study to construct profiles



Results (continued)

Construction and quantity of choice sets:

> The number of choice sets presented to each patient varied between 1 and 27.[5,21]
- No publication reported using choice sets of any more than two profiles, or that respondents could opt out of making a selection.

How preference results were analysed:

> 16 of 30 studies (53%) used mixed logit or random parameters logit modelling to analyse results;[3,6,8-10,14-17,19,22,23,27,29,30,32]
- However, conditional logit models were also commonly used, in 11 studies.[1-3,12,13,18,20,21,25,29,30]

How DCEs were administered:

> 19 of 30 included studies (63%) were administered in the form of an online questionnaire.[1,2,5-9,14-20,22,24,25,28-30]

> In 23 of 30 studies (77%), preference results were gathered from between 100 and 400 participants,[2,7,8,10-13,21,24-28] or between 400 and 700 participants.[1,3,9,14,17-20,23,30-32]
- Only 7 studies included more than 700 participants.[4-6,15,16,22,29]

> 24 of 30 studies (80%) were explicitly funded by pharmaceutical companies.[2,4-11,14-17,20-22,24-31]

Conclusions

> At least 30 DCE studies have been conducted in T2DM in order to understand patient preference for outcomes and characteristics of therapies for glycemic control.
- This method has been used to test for preferences in oral versus injectable, injectable versus injectable, and oral versus oral comparisons.

> Commonalities between these studies provide evidence on how to design future DCEs.
- There is precedent for testing attributes such as a therapy's impact on glycaemic control, the nature of administration, hypoglycaemia risk, weight change, and risk of gastrointestinal adverse events.
- The participation of patients with T2DM in the development of a DCE should be fully explained, to reinforce the validity of the experiment (and therefore its results).
- Respondents to a DCE itself should be asked to complete choice sets of 2 profiles each, with each profile describing approximately 6 attributes of treatment.
- The DCE choice sets may be administered online.
- The preference data resulting from a DCE can be analysed with mixed-logit or random-parameters logit modelling, or conditional logit modelling.

> Together with good practice guides published by groups such as ISPOR,[33,34] the reported information provides a model approach for using DCEs to gather patient preference in T2DM.

> The DCE methodology presented here may be particularly useful in T2DM, where patient preference is likely to be an important differentiating factor between therapies, within and across drug classes and modes of treatment.

Glossary

Choice set	a collection of two or more **profiles**, that a respondent is asked to select from
↳ **Profile**	a combination of **attributes** set at specific **levels**, representing a therapy
↳ **Attribute**	a general characteristic or outcome of therapies (e.g. risk of experiencing hypoglycaemic events during treatment)
⇣ **Level**	a specific characteristic or outcome of a therapy (e.g. 50% probability of a hypoglycaemic event each week of treatment)

Abbreviations:
ADA: American Diabetes Association; DCE: discrete choice experiment; EASD: European Association for the Study of Diabetes; IAHPR: International Academy of Health Preference Research; ICMC: International Choice Modelling Conference; IDF: International Diabetes Foundation; IHEA: International Health Economics Association; ISPOR: International Society for Pharmacoeconomics and Outcomes Research; JDS: Japanese Diabetes Society; PRISMA: Preferred Reporting Items for Systematic Reviews and Meta-Analyses; T2DM: type 2 diabetes mellitus.

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