

# Meta-Analysis of Economic Evaluation Studies: Data Harmonisation and Methodological Issues

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## Methodology

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## Abstract

In the context of ever-growing health expenditure and limited resources, economic evaluations aid in making evidence-informed policy decisions. Cost utility analyses (CUA) are often used in this context, but limitations include pairwise contrasts, missing contrasts, and different sources or quality of data. Synthesis of CUA data from multiple studies is therefore desirable to assist policy makers, but there are many challenging methodological issues including: inconsistent reporting of results using different economic parameters, and multiple sources of heterogeneity including: setting, time horizon, perspective, modelling approaches and assumptions, currency, willingness to pay (WTP) threshold, level of country income, and input parameters. In this paper, we provide a step by step description of the methods for data harmonisation and synthesis of aggregated data from CUA studies, as well as a framework for handling heterogeneity; we demonstrate these methods using the example of agents for type 2 diabetes. These meta-analytic methods for the synthesis of economic evidence synthesis should be useful for policy makers.

## Full Text

This preprint is available for [download as a PDF](#).

## Tables

**Table 1. Selected studies and its analysis scenario**

Study	Country	Perspective	Time horizon	Reference year	Threshold	ICER	Measure of dispersion	CE-Plane	Scenario
Sinha [1]	USA	Payers	Life-time	2008	\$ 50,000	yes	none	no	5
Davies [2]	UK	Payers	Life-time	2008	£ 20,000	yes	SD	no	3
Guillermin [3]	USA	Payers	35-yrs	NA	\$ 50,000	no	SD	no	5
Lee [4]	USA	Payers	35-yrs	2011	\$ 50,000	yes	SD	no	3
Mezquita-Raya [5]	Spain	Payers	Life-time	2012	€ 30,000	yes	SD	yes	3
Steen-Carlsson [6]	Sweden	Societal	Life-time	2013	SEK 500,000	yes	NA	yes	4
Perez [7]	Spain	Payers	Life-time	2012	€ 30,000	yes	SD	no	3
Bruhn [8]	USA	Payers	50-yrs	2014	\$ 50,000	yes	SD	yes	3
Roussel [9]	France	Payers	Life-time	2013	€ 30,000	yes	95% CI & SD	yes	3
Barnett [10]	UK	Payers	Life-time	2016	£ 20,000	yes	SD	yes	3

CI, confidence interval; NA, Not available; SD, Standard deviation

**Table 2. Descriptive of the mean cost and QALY along with their incremental data of comparison between GLP1a vs DPP4i.**

Author	Cost			QALY			ICER	
	Currency	GLP1	DPP4i	ΔC	GLP1	DPP4i		ΔE
Sinha [1]	US \$	170799	167163	3636	15.2998	15.3335	-0.0337	-107893
Davies [2]	£	21793±544	19951±521	1842±751	7.52±0.11	7.34±0.11	0.19±0.15	10158
Guillermin [3]	US \$	55647	57862	-2215	9.56±0.12	9.28±0.12	0.284±0.172	-7799
Lee [4]	US \$	81444±1079	76262±1061	5182	8.825±0.117	8.624±0.115	0.201	31488
Mezquita-Raya [5]	€	54684±1250	52387±1346	2297	9.04±0.13	8.87±0.11	0.17	13266
Steen-Carlsson [6]	SEK	1360715	1304092	56624	10.53	10.15	0.38	154226
Perez [7]	€	56628±1323	52450±1394	4177	9.239±0.121	8.838±0.121	0.4	10436
Bruhn [8]	US \$	140806±1948	138583±2071	2223	9.618±0.125	9.517±0.130	0.101	22094
Roussel [9]	€	43031±1532	40472±1513	2558 (2427,2689) *	10.09±0.13	9.84±0.13	0.25 (0.24, 0.26)*	10275
Barnett [10]	£	24737±739	22362±725	2375	9.18±0.12	9.02±0.11	0.15	15423

Values in cell are mean±standard deviation; \* 95% CI, ΔC-incremental cost, ΔE-incremental QALY, GLP1a-Glucagon-like peptide 1 agonists, DPP4i- Dipeptidyl peptidase-4 inhibitors

**Table 3. Describe incremental net benefit comparing GLP1i with DPP4i along with variance**

Authors	Mean INB (PPP adjusted US \$)	Variance INB
Sinha [1]	-6,058	7,58,90,095
Davies [2]	3,063	3,05,70,369
Guillermin [3]	18,452	7,58,90,095
Lee [4]	5,267	7,58,90,095
Mezquita-Raya [5]	1,529	3,66,23,523
Steen-Carlsson [6]	-11,643	4,31,66,49,739
Perez [7]	12,007	7,18,90,710
Bruhn [8]	3,077	9,68,23,864
Roussel [9]	6,373	5,54,03,868
Barnett [10]	1,172	2,45,24,439

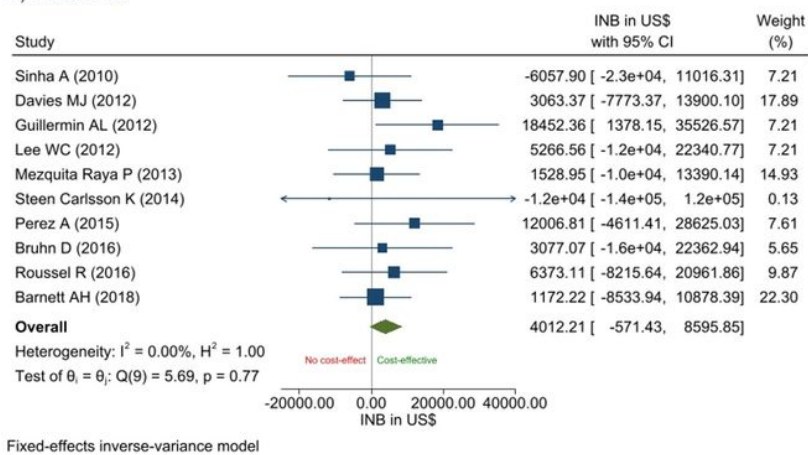
INB, incremental net benefit; PPP, purchasing power parity, GLP1a-Glucagon-like peptide 1 agonists, DPP4i- Dipeptidyl peptidase-4 inhibitors

**Table 4: The subgroup analysis results of pooling INB between the GLP1 agonists and DPP4 inhibitors**

Subgroup analysis	No. of comparisons	Pooled INB (US\$)	95% CI	p-value	I <sup>2</sup> (%)
<b>Threshold</b>					
< Median (\$49,325)	5	3,554.00	-1,825.34 to 8933.34	0.829	0.0
≥ Median (\$49,325)	5	5,226.56	-3530.74 to 13,983.86	0.393	2.4
<b>Time Horizon</b>					
Life time	7	2,663.36	-2463.30 to 7790.01	0.852	0.0
Non-lifetime	3	9,386.72	-846.73 to 19620.17	0.424	0.0
<b>Source of effectiveness</b>					
Multiple study	4	1,538.51	-8,049.60 to 11,126.62	0.742	0.0
Single study	6	4,745.01	-473.58 to 9,963.59	0.534	0.0

## Figures

a) Forest Plot



b) Funnel Plot

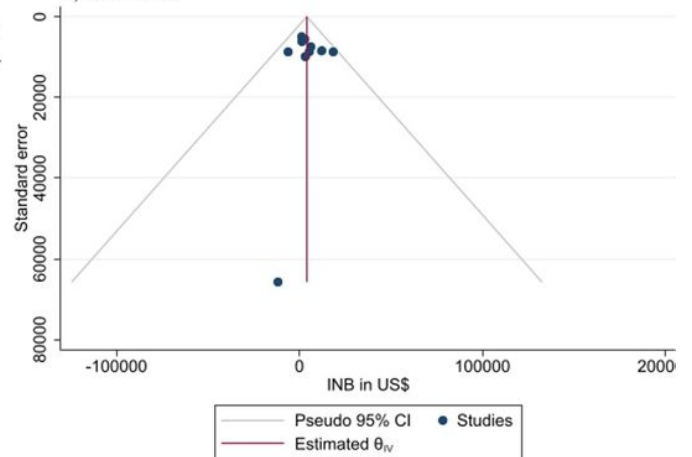


Figure 1

a) Forrest plot of pooling INBs of GLP1 vs DPP4i; b) Funnel plot of pooling INB of GLP1 vs DPP4i.