Cost-effectiveness of exenatide twice daily vs insulin glargine as add-on therapy to oral antidiabetic agents in patients with type 2 diabetes in China

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TABLE 1 Data inputs: baseline patient profile and treatment effects

Baseline patient profile[a]	Inputs	Source
Patient characteristics		
Age, year	50.59 (1.81)	29,31–36
Female, %	46 (3)	30,31,34,36
Duration of diabetes, year	4.78 (0.46)	29,31,32,34,36
Height, meter	1.64 (0)	37
Current smokers, %	18 (0)	38
Modifiable risk factors		
HbA1c, %	8.77 (0.11)	29–36
Total cholesterol, mmol/L	5.5 (0.22)	31,33,34,36
HDL cholesterol, mmol/L	1.09 (0.04)	33,34,36
Systolic blood pressure, mm Hg	133.23 (1.33)	36
Weight[b], kg	78.75 (2.23)	29–36
Treatment effects of exenatide twice daily + OAD[a]	**Inputs**	**Source**
HbA1c change, %	−1.77 (0.24)	29–36
Total cholesterol change, mmol/L	−0.76 (0.32)	31,33,34,36
HDL cholesterol change, mmol/L	0.12 (0.08)	33,34,36
Weight change[b], kg	−7.33 (1.79)	29–36
Probability of symptomatic hypoglycaemia	0.068 (0.017[c])	17,29,31–36
Probability of severe hypoglycaemia	0.001 (0.003[c])	17,29,31–36
GI adverse events	0.31 (0.03[c])	29,31,33–36
Treatment effects of insulin glargine once daily + OAD[a]	**Inputs**	**Source**
HbA1c change, %	−1.59 (0.26)	29–36
Total cholesterol change, mmol/L	0.02 (0.08)	31,33,34,36
HDL cholesterol change, mmol/L	0.15 (0.1)	33,34,36
Weight change[b], kg	1.80 (0.25)	29–36
Probability of symptomatic hypoglycaemia	0.149 (0.024[c])	17,29,31–36
Probability of severe hypoglycaemia	0.003 (0.004[c])	17,29,31–36
GI adverse events	0.04 (0.01[c])	29,31,33–36
Treatment effects of insulin rescue therapy[d]	**Inputs**	**Source**
HbA1c change, %	−1.11	39
Total cholesterol change, mmol/L	0	39
HDL cholesterol change, mmol/L	0	39
Weight change, kg	1.9	39
Probability of symptomatic hypoglycaemia	0.616	39
Probability of severe hypoglycaemia	0.022	39

TABLE 2 Data inputs: annual direct medical costs for events (2014¥)

Fatal costs of complications[a]	Inputs
Ischaemic heart disease	–
Myocardial infarction	46547.02
Congestive heart failure	15479.64
Stroke	14059.41
Blind	–
End-stage renal disease	–
Amputation	18232.95
Ulcer	0
Non-fatal costs of complications[a]	**Inputs**
Ischaemic heart disease	13158.69 (479.5)
Myocardial infarction	38068.42
Congestive heart failure	14620.27 (1070.25)
Stroke	13331.72 (764.48)
Blind	14602.46 (444.85)
End-stage renal disease	14471.55 (516.84)
Amputation	20182.62
Ulcer	17483.38 (1315.17)
Maintenance costs of complications[a]	**Inputs**
Ischaemic heart disease	2982.78 (394.09)
Myocardial infarction	5926.58
Congestive heart failure	2819.93 (16
Stroke	3871.55 (66
Blind	4734.56 (43
End-stage renal disease	5068.07 (49
Amputation	3208.62
Ulcer	5309.61 (13
BMI-related prescription costs[b]	**In**
24	1
25	3
26	5
27	8
28	1
29	1
30	1
31	1
32	1
33	2
34	2
35	3
37	30420.8
38	32643.9
39	34867.
>40	37090.

Data are mean (standard error).

[a] Non-fatal and maintenance costs were obtained from claims databas with fatal costs obtained from a published study.[47]

[b] Costs were estimated from an observational study.[43] Assumptions: t starting point BMI = 25 kg/m^2, BMI-related costs per month = ¥246. the slope (cost per month/BMI) = ¥146.6 in 2007. For BMI ≤ 23 kg/

daily + OAD was ¥5238.83, and for those on insulin glargine once daily + OAD it was ¥3797.91. The insulin cost per kg weight per

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TABLE 3 Data inputs: health utility changes for events

Health utility changes	Inputs	Source
Ischaemic heart disease	−0.09	44
[illegible]	[illegible]	44
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
BMI (per unit increase)	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
GI adverse reaction	−0.04	[illegible]

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TABLE 4 Data outputs: costs, QALYs and cost-effectiveness results for exenatide twice daily + OAD vs insulin glargine once daily + OAD in the base case analysis (per patient)

Cost-effectiveness	Insulin glargine once daily + OAD	Exenatide twice daily + OAD	Difference
Discounted cost	357268.39	239562.34	−117 706
Discounted QALYs	12.33	14.26	1.94
Discounted life-years	16.17	16.2	0.03
Cost per QALY		Dominates	−60 764
Cost per life-year		Dominates	−4 081 711

TABLE 5 Data outputs: costs, QALYs and cost-effectiveness results for exenatide twice daily + OAD vs insulin glargine once daily + OAD in the sensitivity analysis (per patient)

Sensitivity analysis	Difference in Cost, ¥	Difference in QALY	ICER, ¥
Univariate sensitivity analysis			
HbA1c threshold value for therapy switch 8.0%	−116 653	1.84	−63 363
Utility decrement per unit BMI gain halved	−117 706	1.16	−101 754
Utility weight +0.014 per unit BMI decrease and −0.014 per unit BMI increase	−117 706	0.77	−152 413
Utility change per unit BMI change = 0	−117 706	0.01	−17 993 707
BMI-related prescription costs halved	−60 093	1.94	−31 022
BMI-related prescription costs = 0	−2480	1.94	−1280
Weight loss with exenatide twice daily + OAD was regained after 2 years	−21 333	0.58	−36 614
All hypoglycaemias of both drugs are severe events	−118 073	1.94	−60 856
Hypoglycaemia of insulin glargine once daily + OAD = exenatide twice daily + OAD	−117 691	1.93	−60 832
Cost of severe hypoglycaemia halved	−117 662	1.94	−60 741
Utility decrement of hypoglycaemia doubled	−117 706	1.95	−60 446
GI adverse events in insulin glargine once daily + OAD = exenatide twice daily + OAD	−117 706	1.96	−60 116
Cost of GI adverse events ¥200	−117 542	1.94	−60 679
Cost of GI adverse events ¥1000	−116 887	1.94	−60 341
Utility decrement of GI adverse events doubled	−117 706	1.9	−61 792
Discount rate (costs and benefits) 5%	−96 222	1.56	−61 639
Model time horizon set to be 10 years	−58 638	0.86	−67 877
Model time horizon set to be 20 years	−96 428	1.59	−60 833
Model time horizon set to be 30 years	−116 261	1.9	−61 248
Therapy discontinuation rates of exenatide twice daily are 34.7% and insulin glargine once daily are 38.3% based on published real-world data[20]	−119 039	1.97	−60 541
Use UKPDS 82 risk equations to run model	−138 408	2.29	−60 338
Annual additional disutility due to one more daily injection with exenatide twice daily set at 0.01	−117 706	1.91	−61 687
Multi-way sensitivity analysis			
Use alternative patient profile and treatment effect from head-to-head RCTs ≥24 weeks	−117 059	1.91	−61 319
BMI-related costs = 0 and utility change per unit BMI change = 0	−2480	0.01	−379 043
BMI-related costs = 0 and use of UKPDS 82 risk equations	−4290	2.29	−1870
Weight loss with exenatide twice daily + OAD was regained after 2 years and model time horizon = 20 years	−16 231	0.50	−32 568
Probabilistic sensitivity analysis	−123 945	1.90	−65 228

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