

## Secondary outcome 8: Cost effectiveness [Results taken from final HTA report]

**Table 16: Inpatient costs for the main Healthcare Resource Groups (HRGs).**

Code	HRG name	Elective cost (£)	Elective trim-point (days)	Non-elective cost (£)	Non-elective trim-point (days)	Costs for excess days (£/day)
<b>BZ01Z</b>	Enhanced Cataract Surgery	982	5	1,944	12	242
<b>CZ05T</b>	Tonsillectomy, 18 years and under without CC	1,083	5	1,013	5	330
<b>FZ20E</b>	Appendicectomy Procedures, 18 years and under without Major CC	2,403	5	2,379	5	268
<b>FZ24E</b>	Major Therapeutic Endoscopic Upper or Lower GI Tract Procedures, between 2 and 18 years	1,366	5	1,177	5	268
<b>FZ62Z*</b>	Endoscopic or Intermediate, Upper GI Tract Procedures, between 2 and 18 years	864	5	893	5	268
<b>FZ63Z</b>	Combined Upper and Lower GI Tract Diagnostic Endoscopic Procedures	513	5	694	5	209
<b>HA73B</b>	Minor Elbow and Lower Arm Procedures for Trauma, 18 years and under	1,192	5	1,192	5	317
<b>PA03B</b>	Febrile Convulsions, 1 year and over	659	5	584	5	288
<b>PA04A</b>	Headaches and Migraines, with CC	883	5	697	5	288
<b>PA04B</b>	Headaches and Migraines, without CC	673	5	550	5	288

<b>PA11Z</b>	Acute Upper Respiratory Tract Infection and Common Cold	566	5	484	5	288
<b>PA12Z</b>	Asthma or Wheezing	599	5	702	5	288
<b>PA17A</b>	Intermediate Infections with CC	1,121	5	1,261	8	288
<b>PA19A</b>	Viral Infections with length of stay 1 day or less	435	5	455	5	288
<b>PA21A</b>	Infectious or Non-Infectious Gastroenteritis, with CC	1,728	8	913	5	288
<b>PA25B</b>	Major Gastrointestinal Disorders without CC	1,352	5	1,103	5	288
<b>PA26B</b>	Other Gastrointestinal Disorders without CC	835	5	589	5	288
<b>PA28B</b>	Feeding Difficulties and Vomiting, without CC	828	5	551	5	288
<b>PA29Z</b>	Abdominal Pain	691	5	580	5	288
<b>PA50Z</b>	Ingestion Poisoning or Allergies	453	5	503	5	288
<b>PA58Z</b>	Examination, Follow-up, Special Screening or other Admissions, with length of stay 0 days	427	5	346	5	288
<b>PA63B</b>	Head, Neck and Ear Disorders with length of stay 1 day or more, with CC	1,524	5	994	5	288
<b>PA67Z</b>	Diabetes Mellitus, with Ketoacidosis or Coma	1,459	10	1,055	6	288
<b>PA68Z</b>	Diabetes Mellitus, without Ketoacidosis or Coma	1,207	5	954	5	288
<b>PA69Z</b>	Nephritic and Nephrotic Renal Diseases	662	5	1,350	9	288

<b>WA21Y</b>	Other Procedures or Health Care Problems, without CC	467	5	579	5	198
<b>XB07Z**</b>	Paediatric Critical Care High Dependency	1,004	N/A	N/A	N/A	N/A
<b>XB05Z**</b>	Paediatric Critical Care Intensive Care Basic	1,670	N/A	N/A	N/A	N/A

\* Superseded in 2014-15 by FZ62A

\*\*Unbundled intensive care and high dependency HRG costs taken from National Schedule 2014-15 and uplifted by HCHS Index value of 1.7% per annum.

CC = with complications.

**Table 17: Unit costs (£) of patient contacts with healthcare <sup>84</sup>.**

Profession	Surgery	Home	Telephone, e-mail and texts	Hospital outpatient	A&E	School visit
<b>Advanced nurse including, infusion specialist, diabetes nurse</b>	22.75	37.92	9.10	45.50	30.33	37.92
<b>General practitioner (GP)</b>	64.50	87.75	26.63	-	-	-
<b>Social worker (children's services)</b>	39.50	39.50	39.50	-	-	39.50
<b>Hospital consultant</b>	-	-	22.83	68.50	45.67	-
<b>Specialist registrar</b>	-	13.68	12.00	36.00	24.00	-
<b>Community nurse</b>	38.00	38.00	38.00	38.00	-	38.00
<b>General practice nurse</b>	14.75	-	5.60	-	-	-
<b>Dietician</b>	19.00	19.00	6.33	19.00	12.67	19.00
<b>Psychologist</b>	69.50	69.50	23.17	69.50	46.33	69.50

**Table 18: Unit costs of devices and consumables.**

Consumable or device	Annual Cost	Rationale	Source
<b>Roche Pump</b>	£594	Unit cost of £2,375 with a 4 year lifespan	Supplier
<b>Roche Pump Consumables (e.g. reservoirs, cannula, batteries)</b>	£1,818		Supplier
<b>Medtronic Pump</b>	£749	Unit cost of £2,995 with a 4 year lifespan	Supplier
<b>Medtronic Pump Consumables (e.g. reservoirs, cannula, batteries)</b>	£2,377		Supplier

<b>Pen Injectors (various)</b>	£80	1 x basal and 1 x bolus at £40 each	Based on children's pen device suppliers in the UK
<b>Needles for pen devices</b>	£87	4 injections a day at a cost of £5.95 per 100 needles	BNF [26] & Regional Drug and Therapeutic Centre, Newcastle
<b>Blood Glucose Monitoring</b>	£577	NICE recommendation of 5 tests a day, Aviva strips at £15.79 per 50 tests	BNF [26] & Regional Drug and Therapeutic Centre, Newcastle

**Table 19: Unit costs of insulins taken from the British National<sup>84</sup>**

Insulin	Type	Cost (£/unit)
<b>Insulin Aspart Novorapid</b>	Short acting	0.0141
<b>Insulin Detemir - Levemir</b>	Intermediate/long acting	0.0290
<b>Novomix 30</b>	Short/intermediate acting	0.0199
<b>Insulin Lispro - Humalog</b>	Short acting	0.0166
<b>Insulin Glargine - Lantus</b>	Intermediate/long acting	0.0307
<b>Humulin M3</b>	Short/intermediate acting	0.0166

**Table 20: Resource use in the 3-month prior to randomisation.**

Item of resource use (units)	CSII (n=144) mean (95% CI)	MDI (n=149) mean (95% CI)	Difference (95% CI)
<b>Healthcare professional contacts (number of telephone calls, faxes, texts, or e-mails)</b>	3.32 (2.7, 3.97)	2.58 (1.96, 3.3)	0.74 (-0.18, 1.65)
<b>Scheduled outpatient (number of visits)</b>	1 (1, 1)	1 (1, 1)	0 (, )
<b>Unscheduled outpatient visits (number of visits)</b>	2.19 (1.77, 2.63)	1.12 (0.89, 1.37)	1.07 (0.6, 1.59)
<b>A&amp;E (number of attendances)</b>	0.77 (0.56, 0.99)	0.62 (0.42, 0.88)	0.15 (-0.18, 0.46)
<b>Other hospital e.g. ward visits (number)</b>	0.49 (0.2, 0.82)	0.44 (0.18, 0.79)	0.04 (-0.38, 0.47)
<b>GP visits (number of contacts)</b>	0.25 (0.17, 0.34)	0.21 (0.14, 0.28)	0.04 (-0.07, 0.16)
<b>Home visits (number of contacts)</b>	1 (0.78, 1.24)	0.99 (0.75, 1.25)	0.01 (-0.33, 0.34)
<b>School visits (number of contacts)</b>	0.3 (0.2, 0.41)	0.24 (0.17, 0.32)	0.06 (-0.07, 0.19)
<b>Training sessions (recorded sessions)</b>	14.6 (12.99, 16.22)	13.83 (12.7, 14.99)	0.77 (-1.17, 2.74)
<b>PA21A Infectious or non-infectious gastroenteritis, with CC</b>	0.02 (0, 0.05)	0 (0, 0)	0.02 (0, 0.04)

<b>PA67Z Diabetes mellitus, with ketoacidosis or coma</b>	0.13 (0.07, 0.2)	0.11 (0.06, 0.17)	0.02 (-0.07, 0.11)
<b>PA68Z Diabetes mellitus, without ketoacidosis or coma</b>	0.74 (0.65, 0.83)	0.72 (0.64, 0.81)	0.02 (-0.1, 0.14)
<b>PA69Z Nephritic and nephrotic renal Diseases</b>	0 (0, 0)	0.01 (0, 0.02)	-0.01 (-0.02, 0)
<b>XB05Z Paediatric critical care intensive care basic</b>	0.01 (0, 0.02)	0.02 (0, 0.06)	-0.01 (-0.06, 0.03)
<b>XB07Z Paediatric critical care high dependency</b>	0.15 (0.03, 0.32)	0.05 (0.01, 0.11)	0.09 (-0.04, 0.27)

**Table 21: Resource use in the 12-month from randomisation**

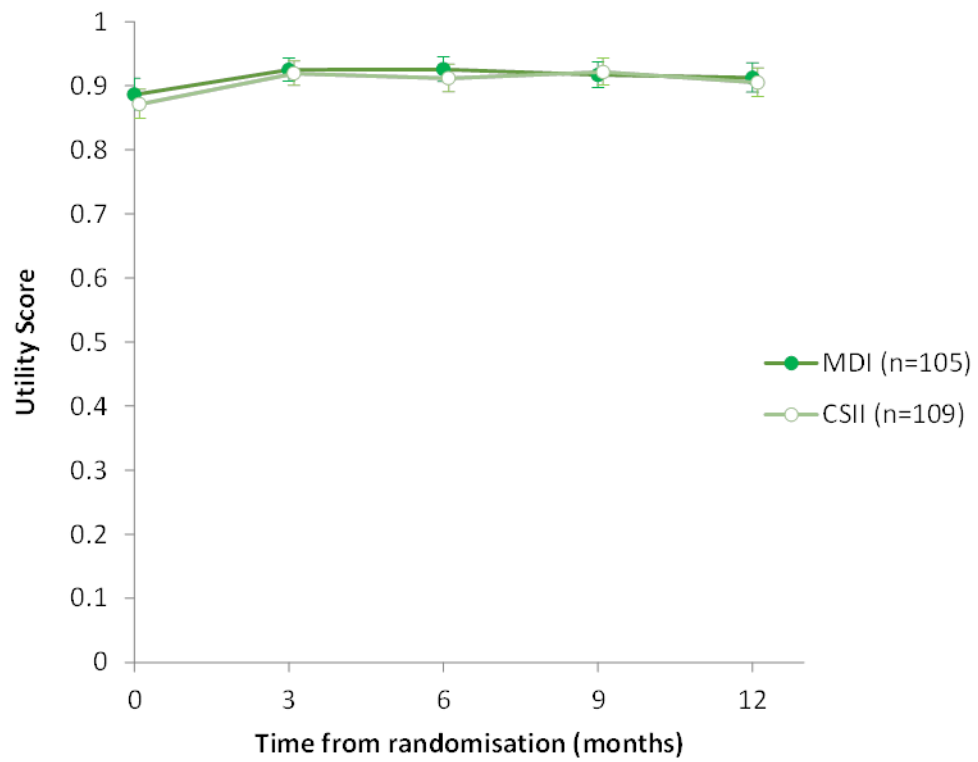
Items of resource use (units)	CSII (n=144) mean (95% CI)	MDI (n=149) mean (95% CI)	Difference (95% CI)
<b>Healthcare professional contacts (number of telephone calls, faxes, texts or e-mails)</b>	21.15 (18.31, 23.99)	16.87 (14.62, 19.25)	4.29 (0.64, 7.98)
<b>Scheduled outpatient (number of visits)</b>	4 (4, 4)	4 (4, 4)	0 (, )
<b>Unscheduled outpatient visits (number of visits)</b>	10.85 (9.6, 12.08)	10.81 (9.65, 11.98)	0.05 (-1.63, 1.73)
<b>A&amp;E (number of attendances)</b>	0.85 (0.51, 1.24)	0.4 (0.24, 0.58)	0.44 (0.07, 0.88)
<b>Other hospital e.g. ward visits (number)</b>	0.33 (0.1, 0.67)	0.26 (0.11, 0.44)	0.06 (-0.23, 0.43)
<b>GP visits (number of contacts)</b>	1.46 (1.16, 1.78)	1.2 (0.99, 1.42)	0.26 (-0.11, 0.64)
<b>Home visits (number of contacts)</b>	2.45 (1.91, 3.1)	1.99 (1.6, 2.42)	0.46 (-0.23, 1.22)
<b>School visits (number of contacts)</b>	1.4 (1.14, 1.69)	1.5 (1.19, 1.85)	-0.1 (-0.53, 0.32)
<b>Training sessions (recorded sessions)*</b>	24.79 (21.87, 27.92)	22.45 (19.38, 25.54)	2.34 (-1.89, 6.61)
<b>Insulin (mean prescribed daily units)</b>	71.61 (62.76, 81.78)	66.32 (58.81, 74.2)	5.05 (-6.6, 17.53)
<b>FZ62Z Diagnostic and intermediate procedures on the upper GI tract</b>	0.01 (0, 0.02)	0.02 (0, 0.05)	-0.01 (-0.04, 0.02)
<b>PA21A Infectious or non-infectious gastroenteritis, with CC</b>	0.01 (0, 0.03)	0.01 (0, 0.02)	0.01 (-0.01, .)
<b>PA25B Major gastrointestinal disorders without CC</b>	0.02 (0, 0.05)	0.01 (0, 0.02)	0.01 (-0.01, 0.05)
<b>PA67Z Diabetes mellitus, with ketoacidosis or coma</b>	0 (0, 0)	0.01 (0, 0.02)	-0.01 (-0.02, .)
<b>PA68Z Diabetes mellitus, without ketoacidosis or coma</b>	0.17 (0.08, 0.27)	0.07 (0.03, 0.12)	0.09 (0, 0.21)
<b>Other HRGs</b>	0.09 (0.04, 0.15)	0.07 (0.03, 0.12)	0.02 (-0.06, 0.09)

\*Training sessions were not included in the total cost as they were recorded as contacts with healthcare professionals

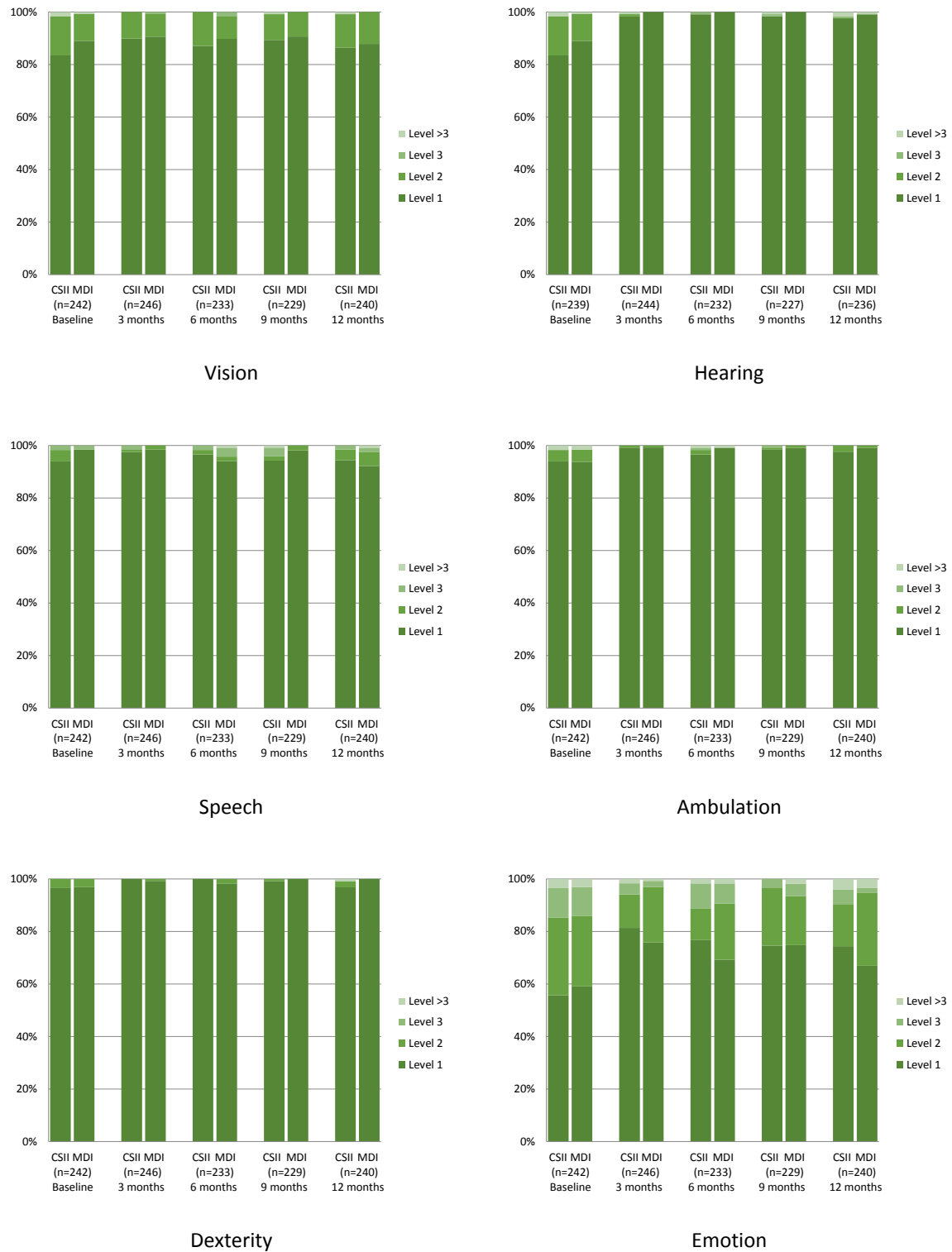
**Table 22: Disaggregated and total 12-month costs from randomisation, by intervention group.**

Items of resource use	CSII (n=144) mean £ (95% CI)	MDI (n=149) mean £ (95% CI)	Difference mean £ (95% CI)
<b>Consumables (e.g. needles, infusion sets, reservoirs)</b>	1841 (1826, 1861)	664 (664, 664)	1177 (1162, 1197)
<b>Device (pump 4-year lifespan or 2 pen devices)</b>	600 (596, 606)	80 (80, 80)	520 (516, 526)
<b>Insulin (prescribed)</b>	422 (364, 486)	482 (426, 541)	-60 (-142, 24)
<b>Healthcare professional contacts (telephone calls, faxes, texts or e-mails)</b>	138 (117, 162)	108 (92, 124)	30 (3, 59)
<b>Scheduled outpatients visits</b>	434 (434, 434)	434 (434, 434)	0 (0, 0)
<b>Unscheduled outpatient visits</b>	309 (272, 346)	328 (292, 366)	-19 (-71, 33)
<b>Inpatient stays costed from HRGs</b>	387 (245, 553)	219 (142, 306)	168 (5, 352)
<b>A&amp;E</b>	26 (16, 39)	13 (8, 19)	13 (2, 27)
<b>Other hospital e.g. ward visits</b>	3 (1, 7)	3 (1, 5)	1 (-3, 5)
<b>GP visits</b>	71 (56, 88)	57 (45, 69)	15 (-5, 35)
<b>Home visits</b>	106 (80, 138)	83 (66, 100)	23 (-9, 59)
<b>School visits</b>	53 (43, 64)	56 (44, 69)	-3 (-19, 13)
<b>Concomitant medications</b>	12 (8, 17)	15 (8, 23)	-2 (-12, 6)
<b>Total cost</b>	<b>4404 (4197, 4642)</b>	<b>2541 (2412, 2672)</b>	<b>1863 (1620, 2137)</b>

Figure 5: Mean utility values (95% CI) over 12-months for the base case analysis



**Figure 6: Distribution of responses to HUI domain, by intervention group, over time**



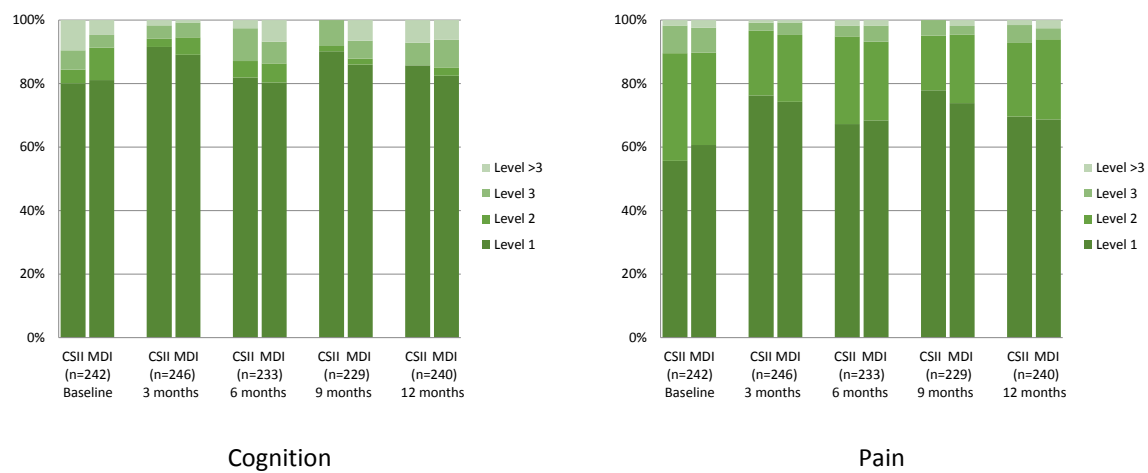
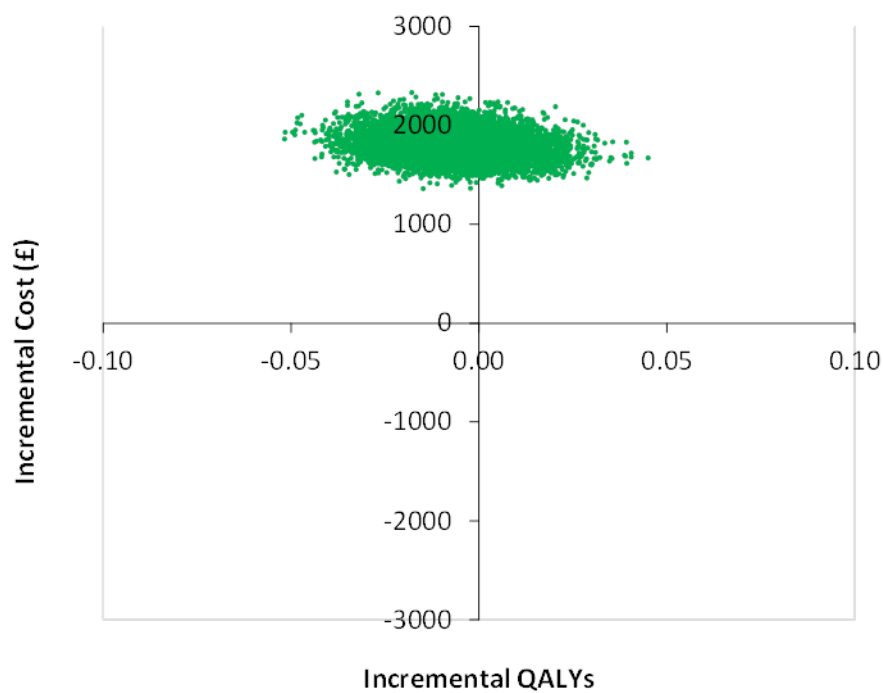
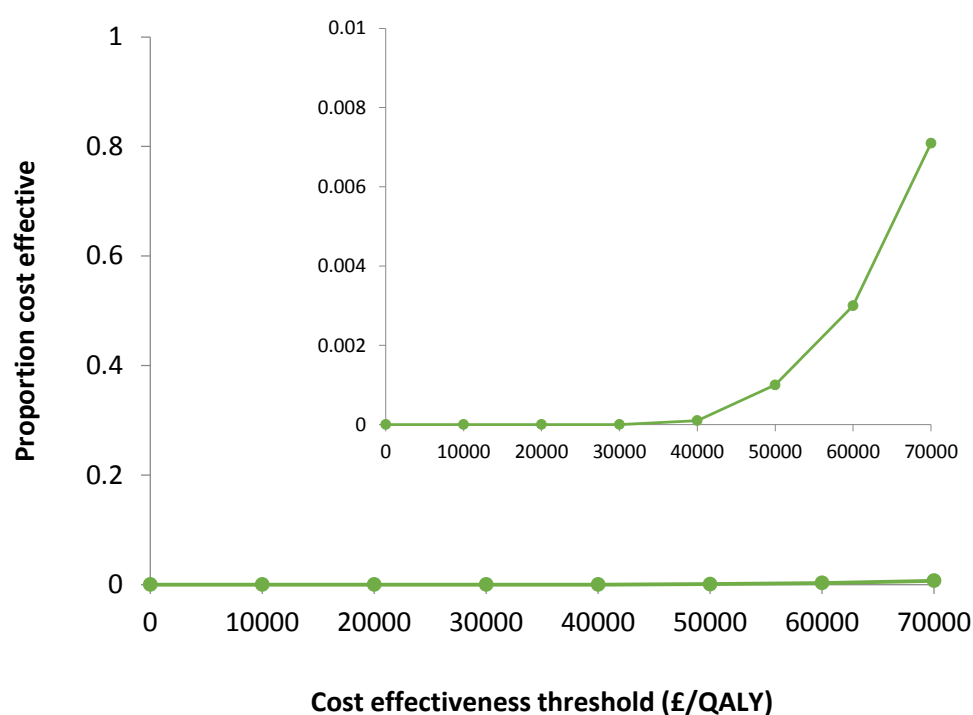


Figure 7: Cost-effectiveness plane presenting the joint uncertainty in incremental costs and QALYs



**Figure 8: Cost-effectiveness acceptability curve indicating the probability of CSII being cost-effective for different thresholds of cost-effectiveness**



**Table 23: Incremental analysis of the cost-effectiveness of CSII**

	CSII (n=109) mean (95% CI)	MDI (n=105) mean (95% CI)	Difference mean (95% CI)	ICER
<b>Costs (£)</b>	4,404 (4,197, 4642)	2,541 (2,412, 2,672)	1,863 (1,620, 2,137)	CSII dominated
<b>QALYs</b>	0.910 (0.892, 0.927)	0.916 (0.899, 0.933)	-0.006 (-0.031, 0.018)	

**Table 24: Sensitivity analyses for different methods of calculating QALYs and consideration of missing data**

Scenario	CSII mean (95% CI)	MDI mean (95% CI)	Difference mean (95% CI)
<b>QALYs (base case)</b>	0.910 (0.892, 0.927) (n=105)	0.916 (0.899, 0.933) (n=109)	-0.006 (-0.031, 0.018)
<b>QALYs (Canadian tariffs)</b>	0.908 (0.884, 0.929) (n=105)	0.912 (0.887, 0.933) (n=109)	-0.004 (-0.036, 0.029)
<b>MICE imputed QALYs</b>	0.910 (0.896, 0.923) (n=138)	0.915 (0.903, 0.926) (n=141)	-0.004 (-0.022, 0.014)

<b>LOCF imputed QALYs</b>	0.911 (0.896, 0.925) (n=138)	0.912 (0.896, 0.926) (n=141)	-0.001 (-0.022, 0.020)
<b>Parental QALYs</b>	0.914 (0.897, 0.930) (n=105)	0.915 (0.899, 0.931) (n=109)	-0.001 (-0.024, 0.023)
<b>Child QALYs</b>	0.910 (0.892, 0.927) (n=105)	0.916 (0.899, 0.932) (n=109)	-0.006 (-0.031, 0.018)