

# THE LANCET Psychiatry

## Supplementary appendix

This appendix formed part of the original submission and has been peer reviewed. We post it as supplied by the authors.

Supplement to: Ougrin D, Corrigall R, Poole J, et al. Comparison of effectiveness and cost-effectiveness of an intensive community supported discharge service versus treatment as usual for adolescents with psychiatric emergencies: a randomised controlled trial. *Lancet Psychiatry* 2018; published online May 3. [http://dx.doi.org/10.1016/S2215-0366\(18\)30129-9](http://dx.doi.org/10.1016/S2215-0366(18)30129-9).

## SITE Study Appendix

Supporting information for *Review of alternatives to inpatient care* by Kwok, Yuan, & Ougrin

### Search Strategy

(Settings of care)

1. Ambulatory Care
2. Outpatient
3. Residential Treatment, or equivalent
4. Day Care, or equivalent
5. Home Care Services
6. Hospitalization, or equivalent
7. Psychiatric Hospital, or equivalent
8. Community Service, or equivalent
9. Inpatient
10. Community Mental Health Service, or equivalent
11. Hospital Admission, or equivalent
12. Treatment
13. Intervention
14. Psychotherapy
15. Treatment Outcome
16. Early Intervention
17. Crisis Intervention
18. Foster Home Care, or equivalent
19. Continuity of Patient Care, or equivalent
20. Child Health Services, or equivalent
21. Or/1-20

(Diagnostic categories)

22. Asperger's or Autism or Pervasive Developmental Disorder, or equivalent
23. Attention Deficit Disorder, or equivalent
24. Mental Disorder, or equivalent
25. Psychopathology
26. Antisocial personality disorder or borderline personality disorder or obsessive-compulsive personality disorder or dependent Personality Disorder or histrionic personality disorder or passive-aggressive personality disorder or schizoid personality disorder or schizotypal personality disorder or personality disorder, or equivalent
27. Affective disorders, psychotic or schizoaffective disorder or affective psychosis or capgras syndrome or psychotic disorder or psychoses, substance-induced or psychosis or schizophrenia or catatonic schizophrenia or schizophrenia disorganized type or paranoid schizophrenia or paranoid disorder or paranoia psychosis or dissociative disorder or delirium, or equivalent
28. Alcohol-related disorder or alcohol withdrawal or alcohol abuse or drug abuse or drug dependence or drug addiction or substance-related disorder or substance abuse or inhalant abuse, or equivalent
29. Eating disorder or anorexia nervosa or bulimia or binge-eating disorder
30. Adjustment disorder or agoraphobia or anxiety disorder or separation anxiety or obsessive-compulsive disorder or panic attack or phobia or stress disorders, posttraumatic stress disorder, or equivalent

31. Depression or major depression or dysthymia or affective disorder or mood disorder, or equivalent
32. Bipolar Disorder or cyclothymia or oppositional defiant disorder or conduct disorder, or equivalent
33. Self-injurious behavior or suicidal behavior or suicidal ideation or suicide or attempted suicide, or equivalent
34. Or/22-33

(Combination of search)

35. 21 AND 34

## **Economic evaluation additional methods**

### ***Resource use***

As discussed in the main paper, resource use was collected using the Child and Adolescent Service Use Schedule (CA-SUS). There is no single version of the CA-SUS, as it is adapted for the purpose of each different study. Therefore, any researchers considering using it, please contact Professor Sarah Byford for advice on the most appropriate version.

### ***Unit costs***

Unit costs for most health and social care services were obtained from the NHS Reference costs 2014/15 (Department of Health, 2015) and Unit Costs of Health and Social Care 2015 (Curtis and Burns, 2015). Medications unit costs were estimated using an average cost per item from the Prescription Cost Analysis (Health and Social Care Information Centre, 2016) accounting for the reported number of days on that medication, and assuming the prescription lasted for one month. Pro re nata (“when necessary”) medication were not included in the evaluation.

All unit costs applied in the economic evaluation, and the sources of these unit costs, are listed in Table 1.

**Table 1: Unit costs and sources applied to resource use**

<b>Resource</b>	<b>Unit</b>	<b>Cost (£)</b>	<b>Source</b>	<b>Notes</b>
<b>Accommodation</b>				
Foster care	per day	88	1	Based on £614.60 per week.
Staffed accommodation (day only)	per day	68	2	Based on £76 per day at 2010 prices, inflated to 2015 prices, voluntary sector residential care (staffed hostel) for people with mental health problems.
Staffed accommodation (staffed day and night)	per day	414	1	Based on £2,900 per resident week in voluntary / private sector care homes for children.
<b>Inpatient</b>				
Children's Psychiatric inpatient Unit	per bed day	665	3	Mental health tab - currency code: CAMHSAPC - Children and Adolescent Mental Health Services, Admitted Patients.
Children's Psychiatric Intensive Care Unit	per bed day	761	3	Mental health tab - currency code: CAMHSAPC - Children and Adolescent Mental Health Services, Admitted Patients, Psychiatric Intensive Care Unit.
Acute Adult Inpatient Unit	per bed day	365	3	Non-elective Inpatient tab - currency code: WD22Z - All patients between 19 and 69 years with a Mental Health Primary Diagnosis, treated by a Non-Specialist Mental Health Service Provider. Based on cost of £1992 stay for average 5 day stay.
<b>Outpatient</b>				
Community Mental Health Team	per contact	37	1	Based on £37 per hour per team member assuming one hour appointment.
Child and Adolescent Mental Health Team	per contact	42	1	Generic single-disciplinary CAMHS team, based on £42 per hour per team member, assuming one hour appointment.
Early Intervention Team	per contact	39	1	Based on £39 per hour assuming one hour appointment.
Southwark Child & Family	per contact	40	1	Children's social worker, based on £40 per hour assuming one hour appointment.
Forensic Psychology	per contact	235	1	Forensic community contact.
Youth Offending Team	per contact	40	1	Based on £40 per hour per team member assuming one hour appointment.
Psychology	per contact	98	1	Based on one CBT session.
<b>Day patient</b>				
Day patient	per day	318	3	Mental health tab - currency code: CAMHSDC - Children and

				Adolescent Mental Health Services, Day Care Facilities.
<b>A&amp;E</b>				
A&E	per occurrence	141	3	Total Outpatient Attendances tab, service code 180 - Accident & Emergency.
<b>Community Services</b>				
General practitioner – home	per contact	95	1	Calculated using the GP surgery cost with the proportion of surgery to home visit taken from PSSRU 2012 - per patient out of surgery visit lasting 23.4 minutes, excluding qualification costs, including direct care staff costs.
General practitioner – surgery	per contact	37	1	Per patient contact lasting 11.7 minutes, including direct care staff costs, with qualifications.
General practitioner – telephone	per contact	22	1	Per telephone consultation lasting 7.1 minutes, including direct care staff costs, without qualification.
Practice nurse (nurse in GP surgery)	per contact	12	1	Based on £47 per hour assuming 15-minute appointment.
District nurse, health visitor, midwife or school/college nurse	per contact	15	1	Nurse specialist: £58 per hour of patient-related work, excluding qualifications, assuming 15.5 minute consultation time (from advanced nurse).
Clinical psychologist	per contact	139	1	Based on £139 per hour, assuming a one hour appointment.
Counsellor (NHS, school/college or private)	per contact	61	4	Based on £59 per consultation, inflated to 2015/16.
Social worker	per contact	55	1	Based on £55 per hour assuming one hour contact.
Family support worker	per contact	51	1	Based on £51 per hour of client related work, assuming a one hour appointment.
Accommodation key worker	per contact	43	1	Based on £43 per hour of contact for a re-ablement service, assuming one hour per appointment.
Drug/alcohol support worker	per contact	49	1	Per clinic consultation.
Advice service e.g CAB, housing association, careers advice	per contact	41	1	Costed as occupational therapist, £41 per hour assuming one hour per appointment.
Helpline e.g Samaritans, MIND, Childline	per contact	4.23	5	Based on £3.88 cost per contact in 2010-11, inflated to 2015 prices.
<b>Medication</b>				
Medication	per item	8.55	6	Net ingredient cost per Item - National tab
<b>Supported discharge service day patient service</b>				
Day patient	per week	2226	3	Mental Health tab - currency code: CAMHSDC - Children and Adolescent Mental Health Services, Day Care Facilities, based on £318 per day.
Sources: 1: Curtis, L. 2015. Unit Costs of Health and Social Care 2015. Personal Social Services Research Unit: University of Kent. 2: Curtis, L. 2010. Unit Costs of Health and Social Care 2010. Personal Social Services Research Unit: University of Kent. 3: Department of Health, 2015. NHS reference costs 2014/15. URL: <a href="https://www.gov.uk/government/publications/nhs-reference-costs-2014-to-2015">https://www.gov.uk/government/publications/nhs-reference-costs-2014-to-2015</a> (accessed 12/10/16). 4: Curtis, L. 2012. Unit Costs of Health and Social Care 2012. Personal Social Services Research Unit: University of Kent. 5: Samaritans: Annual Report 2010-2011 <a href="http://www.samaritans.org/sites/default/files/kcfinder/files/Annual%20Report%202011.pdf">http://www.samaritans.org/sites/default/files/kcfinder/files/Annual%20Report%202011.pdf</a> 6: Health and Social Care Information Centre. 2016. Prescription Cost Analysis: England 2015. Available at: <a href="http://content.digital.nhs.uk/catalogue/PUB20200">http://content.digital.nhs.uk/catalogue/PUB20200</a> Last accessed: 06/10/2016				

### ***Approach to missing data***

To explore the potential impact of excluding non-responders in the economic evaluation, we examined the socio-demographic and clinical characteristics of those included in the complete case analyses and those in the full sample. A secondary analysis was carried out with missing 6-month total costs and outcomes imputed using multiple imputations in Stata (version 14) and including baseline clinical and sociodemographic variables.

**Clinical evaluation additional results**

Descriptive analysis of all outcomes, including number of patients with data, mean, SD, median, IQR and range, is reported in Table 1.

**Table 1 Descriptive characteristics**

	N	Mean	95% Confidence Interval for Mean		Median	SD	Range	IQR
			Lower Bound	Upper Bound				
Total number of inpatient days baseline	<b>TAU</b>							
	53	51.43	16.90	85.97	20.00	128.261	928	29
	<b>SDS</b>							
Total inpatient days (6 months follow up)	<b>TAU</b>							
	53	84.32	57.86	110.78	50.00	98.275	420	300
	<b>SDS</b>							
CGAS Baseline	<b>TAU</b>							
	53	46.79	43.74	49.84	44.00	11.325	48	16
	<b>SDS</b>							
CGAS (6 months follow up)	<b>TAU</b>							
	50	59.74	54.79	64.69	59.50	17.840	61	30
	<b>SDS</b>							
SDQ Baseline	<b>TAU</b>							
	50	16.84	14.90	18.78	17.50	7.000	26	9
	<b>SDS</b>							
SDQ (6 months follow up)	<b>TAU</b>							
	41	16.17	13.94	18.40	16.00	7.290	31	9
	<b>SDS</b>							
CHASE (6 Month Follow up)	<b>TAU</b>							
	36	51.14	46.06	56.21	51.00	15.538	66	19
	<b>SDS</b>							
CHASE (6 Month Follow up)	<b>TAU</b>							
	45	55.38	51.29	59.47	58.00	14.004	54	23
	<b>SDS</b>							

CGAS=Clinical Global Assessment Scale, SDQ=Strengths and Difficulties Questionnaire (self-reported), CHASE= Child and Adolescent Service Experience; , SD=Standard Deviation, IQR=Interquartile Range

**Results by psychosis, global functioning, and ethnicity**

	White British								Other Ethnicities							
	SDS				TAU				SDS				TAU			
	Baseline		6 months Follow-up		Baseline		6 months FU		Baseline		6 months Follow-up		Baseline		6 months Follow-up	
	Valid n	Mean (SD)/N(%)	Valid n	Mean (SD)/N(%)	Valid n	Mean (SD)/N(%)	Valid n	Mean (SD)/N(%)	Valid n	Mean (SD)/N(%)	Valid n	Mean (SD)/N(%)	Valid n	Mean (SD)/N(%)	Valid n	Mean (SD)/N(%)
Hospital use	28	33.21 (58.47)	28	50.57 (51.53)	24	71.83 (185.73)	24	107.29 (112.51)	25	25.68 (17.85)	25	43.52 (40.85)	29	34.55 (39.56)	29	65.31 (81.93)
Psychoses (yes)	28	3 (10.7%)	28	5 (17.9%)	24	1 (4.2%)	24	1 (4.2%)	25	12 (48%)	25	13 (52%)	29	15 (51.7%)	29	14 (48.3%)
SDQ	28	21.96 (5.93)	27	19.04 (6.27)	23	19.57 (4.81)	17	17.29 (5.6)	25	19 (7.02)	21	15.86 (7.79)	27	14.52 (7.78)	24	15.38 (8.31)
Days not in school	n/a	n/a	24	53.96 (38.24)	n/a	n/a	21	82.76 (38.48)	n/a	n/a	21	52.86 (33.5)	n/a	n/a	25	77.08 (44.73)
CGAS	28	45.82 (8.5)	28	60.14 (15.77)	24	43.58 (9.45)	22	54.36 (15.1)	25	43.28 (8.3)	24	66.67 (17.32)	29	49.45 (12.2)	28	63.96 (18.93)
Chase	n/a	n/a	25	56.64 (11.31)	n/a	n/a	15	44.4 (16.57)	n/a	n/a	20	53.8 (16.96)	n/a	n/a	21	55.95 (13.11)
Age at 6 mo FU	n/a	n/a	28	16.32 (1.52)	n/a	n/a	24	16 (1.14)	n/a	n/a	25	16.12 (1.59)	n/a	n/a	29	16.62 (2.03)
Multiple self-harm >5	28	22 (56.4%)	25	8 (42.1%)	23	17 (43.6)	17	11 (57.9%)	24	10 (66.7%)	20	3 (37.5%)	26	5 (33.3%)	21	5 (62.5%)
Females	28	18 (64.3%)	n/a	n/a	24	18 (75.0%)	n/a	n/a	25	16 (64.0%)	n/a	n/a	29	15 (51.7%)	n/a	n/a



## **Full economic evaluation results**

### ***Follow-up and response rates***

Of the 106 participants, 74% (78/106) had intervention, CA-SUS and outcome data, plus baseline variables to be controlled for in the regression analyses, thus allowing them to be included in the complete case cost-effectiveness analysis based on QALYs. This was 77% (82/106) for the cost-effectiveness analysis based on the Children's Global Assessment Scale (CGAS). There were more SDS than TAU participants with complete data in both cost-effectiveness analyses (QALY based: 68% versus 79%; CGAS: 70% and 85%).

The mean follow-up time for participants with full data and able to be included in the cost-effectiveness analyses was almost 7 months (range 5 to 14 months). This was slightly longer for the TAU arm with a mean follow-up of 231 days (71 days SD) compared with a mean of 199 days (31 days SD) in the SDS arm. This was a statistically significant difference ( $t=2.366$ ,  $df=102$ ,  $p=0.02$ ) and is discussed in the main paper's discussion.

### ***Service use***

Data on service use between baseline and 6-month follow-up for the sample with a completed CA-SUS at 6-month follow-up are shown in Table 1. Specialist supported discharge day patient services were used by 81% of the SDS group. The average number of weeks using the SDS was 11 (9 SD), with a range of 0-29 weeks. During the follow-up, almost all SDS and TAU participants spent time on hospital wards (100% SDS, 97% TAU). The mean number of days on an inpatient ward was 54 (SD 63) in the SDS arm and 88 in the TAU arm (SD 91). The percentage of participants using outpatient services was high (98% of the SDS arm and 92% of the TAU arm) as was the use of medication (82% of the SDS arm compared with 78% of the TAU arm) and the use of community services (78% of the SDS arm compared with 65% of the TAU arm). The use of A&E was similar between the two groups (42% in the SDS arm and 46% of the TAU arm) with the same mean of 1 use in both groups. Day patient services were used by few participants in each arm (7% in the SDS arm and 22% in the TAU arm) as was accommodation (11% in the SDS arm and 14% in the TAU arm). Accommodation used was mostly foster care (n6) with also some use of staffed accommodation (n3 staffed day and night; n1 staffed day only).

**Table 1: Resource use between baseline and 6 months**

Resource	Unit	SDS (n=45)		TAU (n=37)	
		Number (%) of users	Mean (SD)	Number (%) of users	Mean (SD)
<b>SDS specialist day patient service</b>	Weeks	43 (81%)	11 (9)	0 (0)	0 (0)
<b>Inpatient</b>	Days	45 (100%)	54 (63)	36 (97%)	88 (91)
<b>Day patient</b>	Contacts	3 (7%)	1 (2)	8 (22%)	7 (20)
<b>Outpatient</b>	Contacts	44 (98%)	22 (26)	34 (92%)	12 (9)
<b>A&amp;E</b>	Contacts	19 (42%)	1 (2)	17 (46%)	1 (2)
<b>Community</b>	Contacts	35 (78%)	7 (13)	24 (65%)	4 (7)
<b>Medication</b>	-	37 (82%)	-	29 (78%)	-
<b>Accommodation</b>	Days	5 (11%)	16 (50)	5 (14%)	19 (77)

### Costs

Table 2 reports the total health and social care costs over the period from baseline to 6-month follow-up. The mean total cost of SDS day patient services was £24,150 per participant (SD £20,102, range £0 to £64,554). Other health and social care costs were significantly lower in the SDS arm by around £29,000 (95% CI -£53,647 to -£4,396,  $p=0.021$ ). This was mostly due to the reduction in inpatient days experienced by the SDS group. In terms of total costs, the SDS group were cheaper than the TAU group (£63,621 versus £64,767), but this difference was not statistically significant (adjusted mean difference of -£3,675, 95% CI -£27,559 to £20,209,  $p=0.772$ ). Results based on imputation for missing data were similar with no changes in terms of statistical significance.

**Table 2: Cost components and total costs over the 6-month follow-up (2014/5 prices)**

Cost component	SDS		TAU		Unadjusted mean difference	95% C.I.	p-value	Adjusted mean difference <sup>§</sup>	95% C.I.	p-value
	Valid n	Mean £ (SD)	Valid n	Mean £ (SD)						
SDS day patient services	53	24,150 (20,102)	53	0 (0)	24,150	18,819 to 29,481	<0.001	24,052	18,411 to 29,693	<0.001
Other health & social care costs	45	37,601 (38,870)	37	64,767 (65,122)	-27,166	-50,905 to -3,427	0.026	-29,022	-53,647 to -4,396	0.023
Total costs – complete case	45	63,621 (39,604)	37	64,767 (65,122)	-1,146	-24,949 to 22,657	0.925	-3,675	-28,487 to 21,138	0.773
Total costs – imputed missing data	53	64,355 (36,692)	53	63,463 (55,254)	-892	-16,926 to 18,710	0.922	-612	-16,775 to 15,551	0.940

<sup>§</sup> Adjusted for covariates: baseline CGAS, baseline EQ-5D based utility, inpatient days prior to randomisation, gender, age, ethnicity, diagnosis and social class

### Outcomes

Table 3 describes the EQ-5D and CGAS results at baseline and 6 months. At baseline, the SDS arm had lower EQ-5D based utility and CGAS scores although there was no statistical difference between the groups. EQ-5D based utility, EQ-5D based QALYs and CGAS scores were similar and there were no statistically significant differences between the groups at 6 months in terms of the observed data. However, the CGAS had a bigger increase in the SDS group. Results based on imputation for missing data were similar with no changes in terms of statistical significance.

**Table 3: EQ-5D and CGAS results at baseline and 6 months**

Cost component	SDS		TAU		Unadjusted mean difference	95% C.I.	p-value	Adjusted mean difference <sup>§</sup>	95% C.I.	p-value
	Valid n	Mean (SD)	Valid n	Mean (SD)						
<b>Baseline</b>										
EQ-5D utility	51	0.52 (0.32)	50	0.61 (0.39)	-0.09	-0.23 to 0.05	0.209	-0.05	-0.18 to 0.07	0.391
CGAS	53	44.62 (8.42)	53	46.79 (11.32)	-2.17	-5.92 to 1.58	0.254	-0.70	-4.20 to 2.81	0.700
<b>6 months</b>										
EQ-5D utility	44	0.62 (0.31)	38	0.73 (0.28)	-0.11	-0.23 to 0.02	0.094	-0.06	-0.20 to 0.09	0.437
EQ-5D based QALYs	42	0.30 (0.14)	36	0.34 (0.15)	-0.04	-0.11 to 0.02	0.205	-0.02	-0.05 to 0.02	0.392
CGAS	52	63.15 (16.66)	50	59.74 (17.84)	3.41	-3.39 to 10.22	0.317	3.71	-2.74 to 10.15	0.267
Imputed QALYs	53	0.30 (0.13)	53	0.35 (0.15)	-0.05	-0.10 to 0.00	0.057	-0.02	-0.04 to 0.01	0.173
Imputed CGAS	53	63.28 (16.28)	53	59.85(17.36)	3.43	-2.99 to 9.85	0.286	4.48	-1.54 to 10.49	0.137

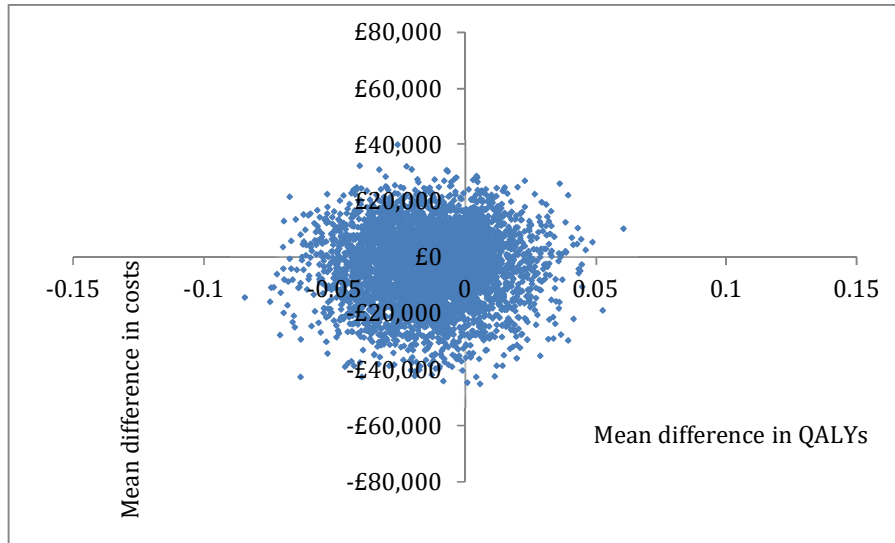
<sup>§</sup> Adjusted for covariates: baseline CGAS, baseline EQ-5D based utility, inpatient days prior to randomisation, gender, age, ethnicity, diagnosis and social class.

Higher EQ-5D based utility and CGAS scores indicate better outcomes.

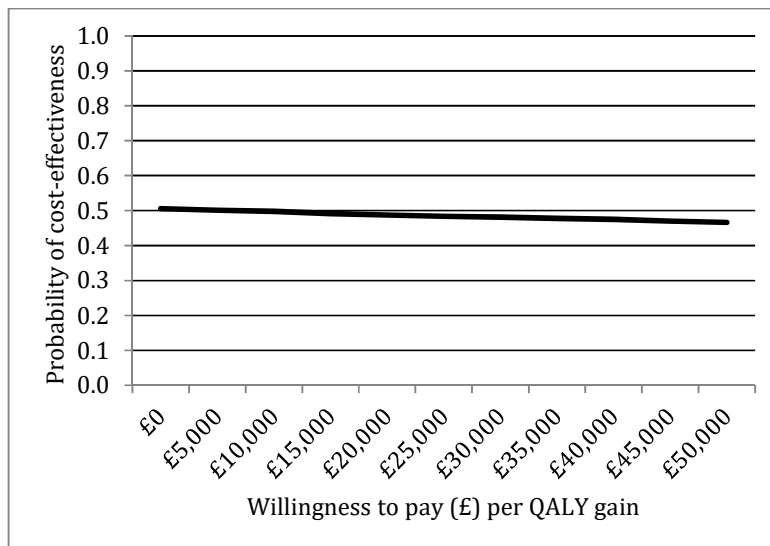
**Cost-effectiveness**

**Figure 1: Cost effectiveness plane for SDS versus TAU at 6 months based on QALYs – complete case**

Associated bootstrapped replications for cost and effect pairs on the cost-effectiveness plane. A greater proportion of scatter points lie to the left of the vertical axis (replications where the SDS group is less effective than TAU) and below the horizontal axis (replications where the SDS group is less costly than TAU)

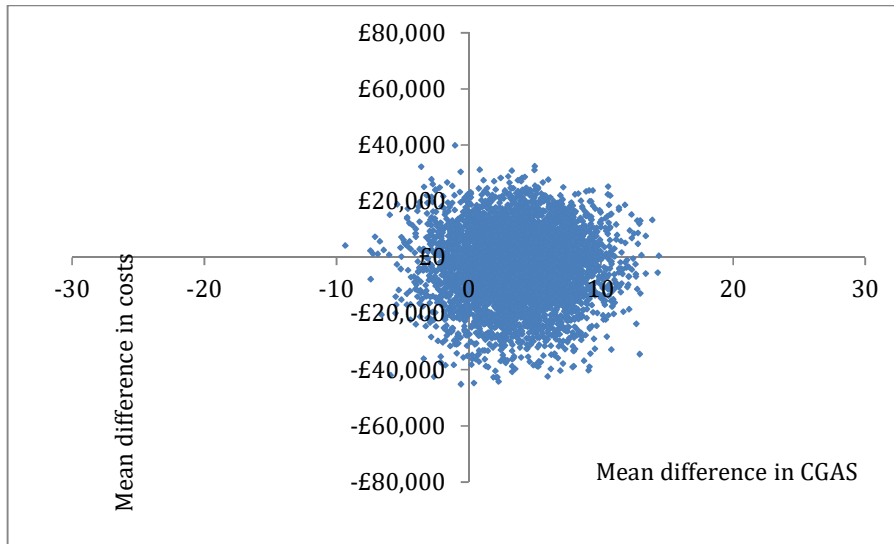


**Figure 2: Cost effectiveness acceptability curve for SDS versus TAU at 6 months based on QALYs – imputed data**

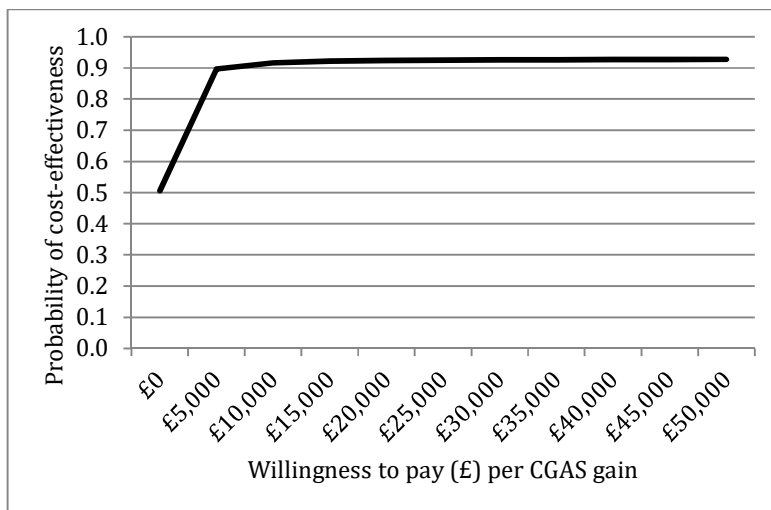


**Figure 3: Cost effectiveness plane for SDS versus TAU at 6 months based on the CGAS – complete case**

Associated bootstrapped replications for cost and effect pairs on the cost-effectiveness plane. A greater proportion of scatter points lie to the right of the vertical axis (replications where SDS is more effective than TAU) and below the horizontal axis (replications where SDS is less costly than TAU)

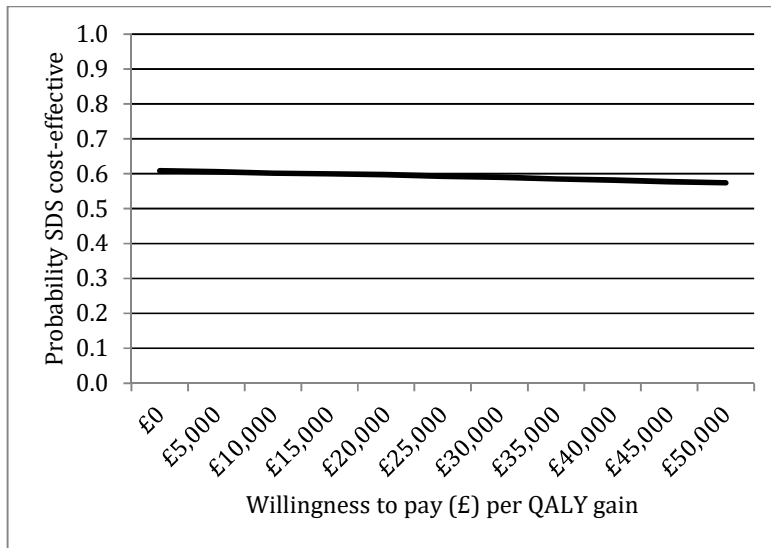


**Figure 4: Cost effectiveness acceptability curve for SDS versus TAU at 6 months based on the CGAS - imputed data**



Due to concerns regarding overfitting given the relatively large number of pre-specified covariates in the cost-effectiveness regression analyses, we re-performed the adjusted analyses with a smaller number of co-variables hypothesised to have the greatest influence on cost-effectiveness - baseline CGAS, baseline EQ-5D based utility, inpatient days prior to randomisation and diagnosis. The additional analyses made little difference to the overall results and conclusions (adjusted ICER of the QALY of £101,500 versus £183,750 in the original analysis; adjusted ICER of the CGAS of £991 – the same as the original analysis). The cost-effectiveness acceptability curves for these were also almost identical to the original results.

**Figure 5: Cost effectiveness plane for SDS versus TAU at 6 months based on QALYs – complete case based on a reduced number of co-variables in the regression analysis**



**Figure 6: Cost effectiveness acceptability curve for SDS versus TAU at 6 months based on the CGAS – complete case based on a reduced number of co-variables in the regression analysis**

