NHS BLOOD AND TRANSPLANT

UK SCOUT PILOT PROJECT RESULTS

SUMMARY

1 The UK Scout Pilot project was a one-year initiative to assess whether early donor management and assessment by a cardiothoracic retrieval team improves the number of cardiac donations and transplants. It ran between 1 April 2013 and 31 March 2014.

2 An evaluation of the pilot was undertaken to inform future arrangements. The proposed methods and risk adjustment were circulated at NRG and to cardiothoracic centre directors for comment. The methods were agreed as appropriate for the purpose of assessing the impact of the Scout Pilot project and comments on additional risk factors have been incorporated.

3 This paper provides a summary of the results.

Jenny Lannon
Statistics and Clinical Studies

July 2014

NHS BLOOD AND TRANSPLANT

UK SCOUT PILOT PROJECT ANALYSIS UPDATE

INTRODUCTION

1 The UK Scout Pilot project was a one year initiative to assess whether early donor management and assessment by a cardiothoracic retrieval team impacts on the number of cardiac donations and transplantation. It ran between 1 April 2013 and 31 March 2014.

2 The key aims of the project were to;
- increase the number of donor hearts retrieved and transplanted
- improve the quality of donor hearts retrieved.

3 An evaluation of the pilot was undertaken to inform future arrangements. The proposed methods and risk adjustment were circulated at NRG and to cardiothoracic centre directors for comment. The methods were agreed as appropriate for the purpose of assessing the impact of the Scout Pilot project and comments on additional risk factors have been incorporated.

4 This paper provides a summary of the results.

5 The analysis is split in to four stages, in relation to **heart** donation;

A Testing whether there has been a statistically significant difference between heart donation rates in the year commencing 1 April 2013 compared to the previous two years. The test is applied to a cohort of donors that are eligible for heart donation and risk-adjusted for differences in donor characteristics that may influence a donor's suitability for donation, hence donors in the three years can be compared in terms of donation rates.
Aim: To see whether there is any difference in heart donation rates between the year in which the scout pilot project began and the two previous years once differences in donor characteristics have been taken in to account.

B Testing whether scout teams screened attendances, i.e. whether some donors were not attended by scouts for reasons outside of the scouting criteria.
Aim: To see whether there are differences in the underlying donor characteristics of those donors who were scouted and those who were not. This will indicate whether the two groups of donors are comparable in order to compare donation rates directly.

C Testing whether there is a statistically significant difference between donation rates between those attended by scouts, those not attended by scouts, and those outside of the scouting ‘zones’. The test is applied to a cohort of donors that are eligible for heart donation and risk-adjusted for differences in donor characteristics that may influence a donor’s suitability for donation, hence donors in the three years can be compared in terms of donation rates.
Aim: To see whether there is any difference in heart donation rates between 1) scouted donors, 2) non-scouted donors within zone and 3) non-scouted donors out of zone, once differences in donor characteristics have been taken in to account.

D Analysing the results of the Scout Project questionnaire.
Aim: To assess views on the initiative and opinions on what it is the scout does that may influence donation rates.

COHORT FOR ANALYSIS

6 Results are based on donors who fall into the following cohort criteria;

- UK DBD donors who donated at least one solid organ and;
  - Age <65 years
  - Weight ≥ 30 kg
  - No past history of cardiothoracic disease
  - Cause of death was not MI or IHD
  - Consented for heart and lung donation

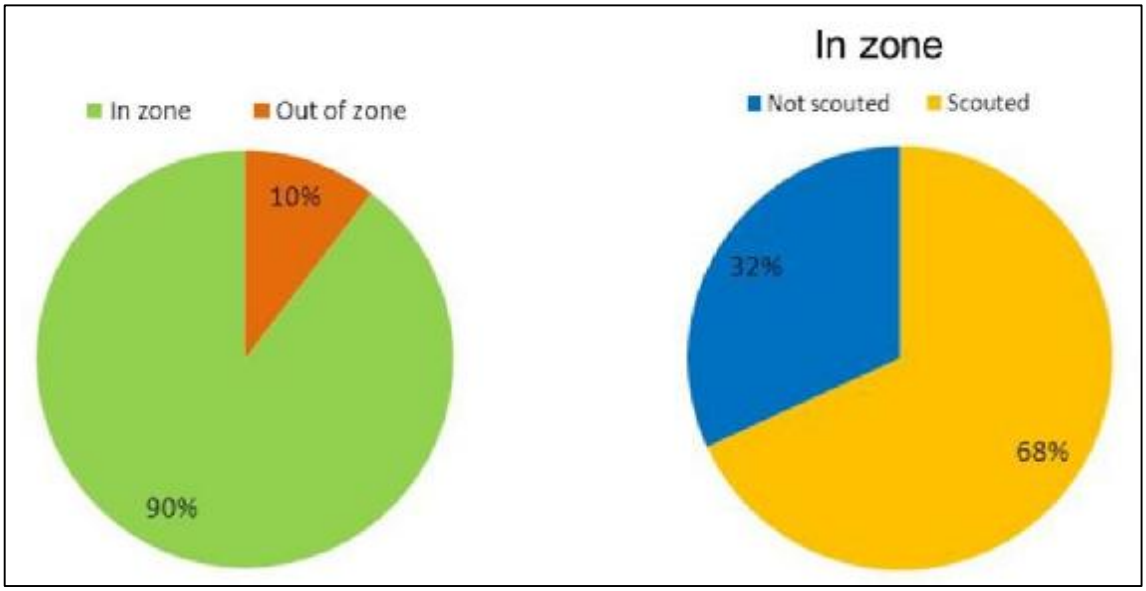
7 Criteria for the pilot were set such that scouts do not attend donors who are more than a 2 hour travel distance away from the scout team, i.e. 'out-of-zone'. There are hence three categories of donors within the cohort:
- Those who were scouted
- Those who were not scouted but were within zone
- Those who were not scouted and were out of zone

8 The number and proportion of donors within each of these categories are shown in Table 1 and Figure 1.

Table 1

	N	%
Scouted	276	61%
Not Scouted - within zone	129	29%
Not scouted - out of zone	47	10%
Total	452	100%

Figure 1



POTENTIAL FACTORS THAT MAY INFLUENCE DONATION

9 Analyses A and C involve producing a risk-adjusted multivariate model for the probability of donation. The first model uses data over three years and the second over the 1 year scout period only.

10 Analysis B involves producing a multivariate model for the probability of a scout attending. The hypothesis for this model is that scouts screen their attendances, i.e. that they may rule out attending some donors if they believe scouting will not improve the quality of the donor heart enough for retrieval/donation.

11 The list of candidate variables to test in **all three** of these models should therefore generally be the same. Logistic regression models have been developed for each analysis and the variables tested are listed in **Table 2**. Factors that are confounded with scout attendance (i.e. activities that the scout may carry out themselves) will not be tested in Analysis B and are highlighted in **Table 2**.

Table 2

Donor factors to test in Analyses A, B and C	**Notes**
Cause of death	* Intracranial haemorrhage * Trauma - accident * Hypoxic brain damage * Other
Blood group	O/A/B/AB
Past history of hypertension	Yes/No
Past history of smoking	Yes/No
Past history of diabetes	Yes/No
Sex	M/F
Height (cm)	
Weight (Kg)	
Age (years)	
PCO_2 (KPa)	
PO_2 (KPa)	
Cardiac arrest in hospital?	Yes/No
Factor tested in Analyses A and C only	(associated with activities scouts may perform themselves)
On Dobutamine? (Cardio active drug)	Yes/No
On Vasopressin?	Yes/No
On Noradrenaline? (Cardio active drug)	Yes/No
On Dopamine? (Cardio active drug)	Yes/No
On Adrenaline? (Cardio active drug)	Yes/No
On Methylprednisolone?	Yes/No
On T3?	Yes/No
Was patient optimised?	Yes/No Defined by <u>any of</u>; 1) Optimisation of the cardiac system such that donor received; a) Vaspopressin + any of the cardio active drugs b) Vaspopressin only 2) Urine output over last 24 hours is > 4 ml/Kg/hr and donor received DDAVP 3) Donor received methyl prednisolone

ANALYSIS A

Testing whether there has been a statistically significant difference between donation rates in the year commencing 1 April 2013 and the previous two years

12 There has been a substantial increase in the number of heart transplants performed in the year commencing 1 April 2013 compared to previous years. This is illustrated in Figures 2 and 3. Note that these figures include donors who fell outside of the cohort criteria in paragraph 6 as well as out-of-zone donors.

Figure 2

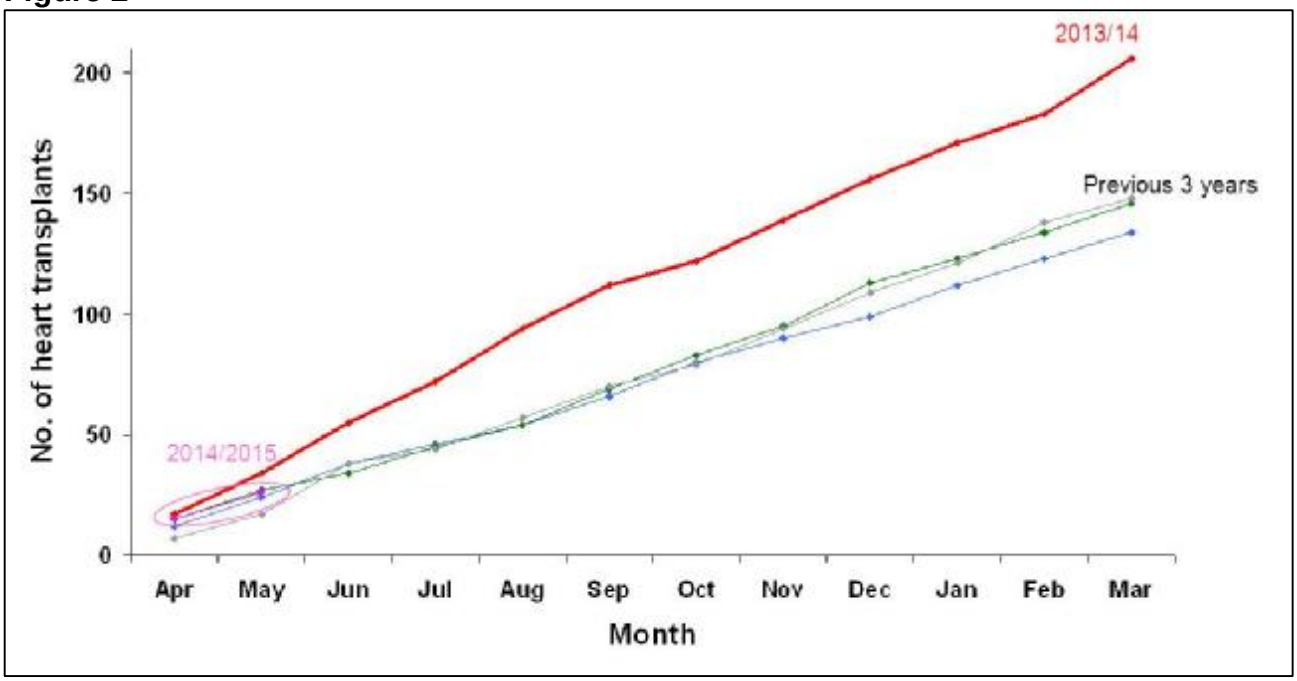
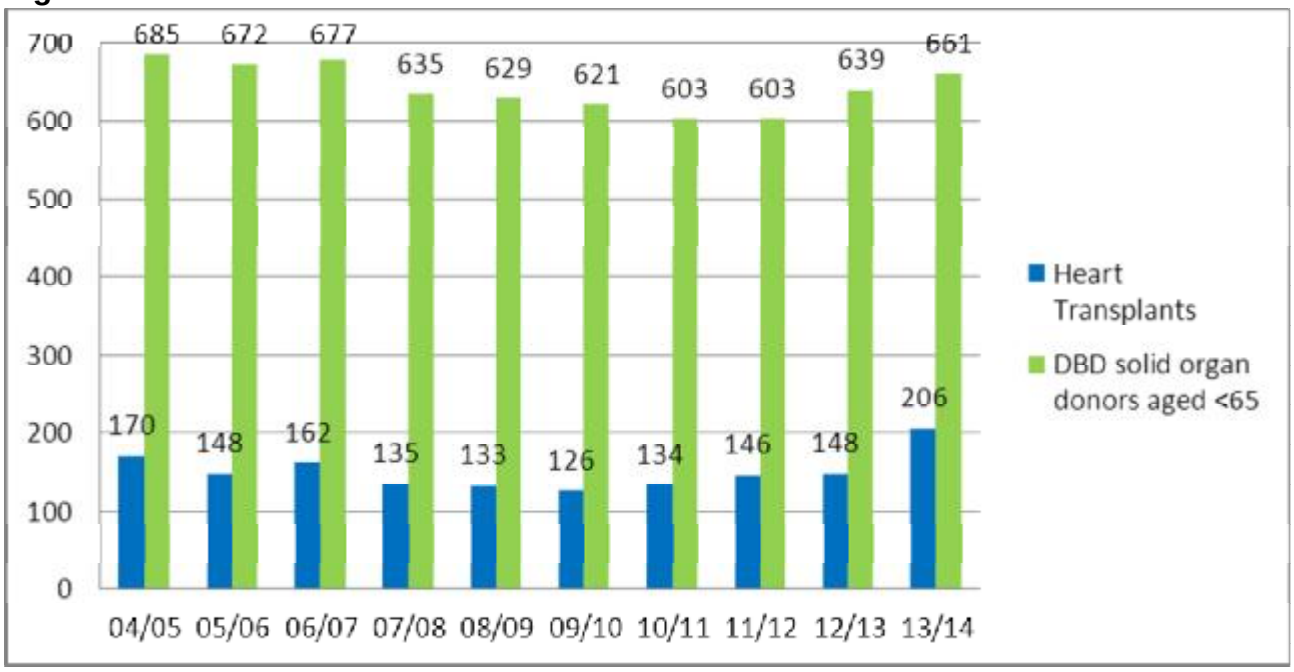


Figure 3



13 The scout project began on 1 April 2013 and so the year 2013/14 represents a change in practice. However before considering the impact of the project, it is important to understand whether donor characteristics differed between years and hence whether other underlying donor factors were attributable to the increase in heart transplants.

14 The number of DBD donors has risen over recent years (**Figure 3**). In order to see whether the increase in heart transplants is purely due to an increase in DBD donors available the proportion of UK heart donors to total UK DBD solid organ donors aged less than 65 was calculated (**Table 3**).

Table 3

	No. UK heart donors (excluding 6 domino donors and 1 DCD donor)	**No. UK DBD solid organ donors aged <65**	**% heart donors**
2004/05	165*	603	27%
2005/06	140	580	24%
2006/07	157	585	27%
2007/08	127	547	23%
2008/09	132	552	24%
2009/10	115	533	22%
2010/11	126	548	23%
2011/12	135*	531	25%
2012/13	144	574	25%
2013/14	203	605	34%

*1 donor aged ≥65

15 **Table 3** shows that the proportion of heart donors increased substantially in 2013/14 and therefore the increase in DBD was not the sole cause of the increase in heart transplants. A similar trend is seen when considering all heart donors who fell within the cohort criteria (paragraph 6).

16 All factors listed in **Table 2** were sequentially added to a logistic regression model for which the response (dependent) variable was 'heart donated (yes/no)'. A factor for 'year' was then added. The results of the model are shown in Table 4.

Table 4

Factor	**Effect**	**Mean (min, max)**	**Factor comparisons**	**Odds Ratio (Confidence Limits)**
Blood group	O and A more likely to donate than AB	-	O vs AB	10.3 (2.2, 47.9)
			A vs AB	10.6 (2.3, 49.5)
			B vs AB	5.6 (1.1, 28.1)
Past history of hypertension	No more likely to donate than yes	-	No vs Yes	1.9 (1.2, 3.0)
Cardiac arrest?	No more likely to donate than yes	-	No vs Yes	2.4 (1.6, 3.6)
On dobutamine?	No more likely to donate than yes		No vs Yes	6.1 (1.7, 22.2)
Age	Younger donors more likely to donate	42 (11 -64)	-	0.95 (0.94, 0.97)
Height	Taller donors more likely to donate	172cm (144 – 196)	-	1.04 (1.03, 1.06)
PO2	Donors with higher PO2 more likely to donate	45KPa (6 – 98)	-	1.011 (1.002, 1.02)
Year	Donors in 2013/14 more likely to donate than those in 2011/12 and 2012.13.	-	2012/13 vs 2011/12	1.0 (0.7, 1.5)
			2013/14 vs 2011/12	1.7 (1.1, 2.5)

17 If the increase in heart donations in 2013/14 was purely due to changes in donor characteristics then the 'year' factor would not be significant. Those factors that were found to be significant are listed in **Table 4**.

18 **Table 4** shows that 'year' was significant such that 2013/14 was significantly different (donors in this year were more likely to donate) to 2011/13 but 2012/13 was not. This suggests that there is something that occurred/changed in 2013/14 that made donors in this year more likely to donate. Note that 16 donors were excluded from this analysis who were part of a separate Early Donor Management programme implemented before the scout project began.

ANALYSIS B

Testing whether scout teams screened attendances, i.e. whether donors with particular characteristics were more likely to be 'scouted' than others.

19 In theory, all donors that fall within the scouting criteria and are within 2 hours travel distance of the retrieval team should be attended by a scout. However for various different reasons not all donors are scouted. In particular. if the scout team is already out attending another donor when a scout is requested, a scout will not be sent for this new donor . In order to test whether most of the within zone non-scout attendances (Table 2) were due to the cardiothoracic retrieval team already out retrieving, a crude analysis was performed. This analysis considered all donors within the scout criteria who were **within zone** but were **not attended by a scout**. To identify whether the scout team were 'busy' or not, a 24 hour window prior to the donor's donation date was studied to see whether the associated cardiothoracic retrieval team first on call had planned to attend a donor elsewhere. The results are shown in **Table 5**.

Table 5

Cardiothoracic retrieval team busy?	**No. donors *within zone* not attended by a scout**	**%**
No	45	34%
Yes	86	66%

20 Table 5 implies that around a third of within zone donors not attended by a scout were not attended for reasons outside of the scouting criteria and hence scouts *may* have been screening their attendances. Screening attendances would mean that the donation rates between scouted and non-scouted within zone donors cannot be compared directly as their underlying donor characteristics differ. A logistic model was therefore developed to investigate which factors influenced scout attendance. The factors listed in Table 2 were sequentially added to the model for which the response (dependent) variable was 'scout attended (yes/no)'. Those factors that were found to be significant are listed in **Table 6**.

Table 6

Factor	**Effect**	**Mean (min, max)**	**Factor comparisons**	**Odds Ratio (Confidence Limits)**
Past history of diabetes	Scout more likely to attend if patient does not have a past history of diabetes	-	No vs Yes	3.3 (1.3, 8.5)
Height	Taller donors more likely to be attended by a scout	172 cm (144 – 196)	-	1.03 (1.01, 1.06)

21 It is highly likely that the height factor in the model is a proxy for other factors which reflect how scouts screen their attendances. As screening appears to occur, it is important that in order to compare donation rates between those scouted and not scouted, that the factors in **Table 2** are taken into account and tested in a donation model (see below).

ANALYSIS C

Testing whether there is a statistically significant difference between donation rates between those attended by scouts, those not attended by scouts, and those outside of the scouting 'zones'.

23 All donors who fell within the scouting criteria within the 12 month scout pilot period were analysed with the aim to compare donation rates between the three categories of donor;

- Those who were scouted **(S)**
- Those who were not scouted but were within zone **(Within-NS)**
- Those who were not scouted and were out of zone **(OutOfZone-NS)**

24 All factors listed in Table 2 were sequentially added to a logistic regression model for which the response (dependent) variable was 'heart donated (yes/no)'. These factors ***should*** account for all differences between donors that are not due to scout attendance. A factor for 'donor category' was then added. Those factors that were found to be significant are listed in **Table 7**.

Table 7

Factor	**Effect**	**Mean (min, max)**	**Factor comparisons**	**Odds Ratio (Confidence Limits)**
Blood group	O and A donors more likely to donate than B and AB donors.	-	O vs (B or AB)	2.4 (1.2, 4.6)
			A vs (B or AB)	3.9 (2.0, 7.7)
Cause of death	Donors whose cause of death was 'Trauma – accident' more likely to donate than other donors	-	Hypoxic brain damage vs Trauma - accident	0.3 (0.1, 0.7)
			Intracranial haemorrhage vs Trauma - accident	0.3 (0.1, 0.8)
			Other vs Trauma - accident	0.6 (0.2, 1.5)
Age	Younger donors more likely to donate	42.3 yrs (11, 64)		0.97 (0.95, 0.98)
Height	Taller donors more likely to donate	172 cm (144 – 196)		1.027 (1.004, 1.05)
Past history of diabetes	Not significant. Included due to influence on scout attendance in Analysis B		No vs Yes	2.0 (0.6, 6.6)
Donor Category	**Scouted donors more likely to donate than those not scouted within zone. Donors not scouted out-of-zone more likely to donate than those not scouted within zone. No significant difference between scouted donors and those not scouted out-of-zone.**		**Within-NS vs S**	0.511 (0.311, 0.84)
			OutOfZone-NS vs S	1.121 (0.562, 2.236)

25 In terms of donor rates, there was found to be a significant difference between those potential donors who were scouted and those who were not, **within-zone**, such that donors who were scouted were more likely to donate. However, there was no significant difference between those who were scouted and those who were not, **out-of-zone**. This effect was determined after adjusting for significant factors listed in Table 2 and so differences between the underlying characteristics of donors in the three donor categories have been accounted for.

26 The results are therefore inconclusive as to whether scout attendance influences the probability of donation. The optimisation factor was also found to be not significant.

ANALYSIS D

Analysing the results of the Scout Project questionnaire to assess views on the initiative and opinions on what it is the scout does that may influence donation rates.

27 The following questions were posed through an online questionnaire for which 132 responses were received. Detailed results are tabulated in the **Appendix** but these are summarised in the paragraphs below.

- What is your role in the donation/retrieval team?
    - CLOD/ICU – medical (consultant)
    - ICU – nursing (bedside nurse)
    - ICU-nursing (nurse in charge)
    - Manager – donation
    - Manager – NORS and transplant
    - Scout/SNOD/Retrieval surgeon)

- Are you aware of the scout programme?
    - Yes
    - No

- Have you worked with scouts in the last year?
    - Yes
    - No
    - I am a scout

- To what extent do you feel the scout pilot programme has influenced the number of hearts retrieved?
    - Not at all
    - A little
    - Moderately
    - Extensively

- Please list a maximum of 5 activities that the scouts themselves perform which you feel directly improves the likelihood of heart donation.

- Do you feel the scout's presence affects the way in which work is carried out by others in ICU? If yes please state why

- How would you like to see the future of the scout programme?
    - Abandon and terminate
    - Stay as it is
    - Extend to abdominal DBD donors
    - Extend to more cardiothoracic DBD donors (e.g. >2hr travel from retrieval centre, out of zone scouting)

28 The majority of responses were given by SNODs (38%) and CLODs (17%) were making up 55% of the responses. 10 (8%) of respondents were scouts responded and 23 (17%) retrieval surgeons.

29 96% of all respondents said they were aware of the scout programme and 78% had either worked with a scout or were a scout themselves.

30 65% of all those who answered felt that the scout programme has either extensively (32%) or moderately (33%) influenced the number of hearts retrieved.

31 6 of the 10 scouts and 3 of the 22 retrieval surgeons felt the programme should be terminated. Overall however, 58% of all respondents felt that the programme should be extended to include the current out-of-zone hospitals and 24% felt the programme should stay as it is. Considering the responses from only those who had worked with scouts or who were scouts, 61% felt the programme should be extended to include the current out-of-zone hospitals and 24% felt the programme should stay as it is.

32 The most common activities that the scout carries out which respondents felt influenced retrieval were;

- Trans Oesophageal Echos
- PA catheter
- Assessment (in general)
- Expert/early donor management

33 44% of respondents felt that scouts affected the way in which work is carried out by others in ICU however most of the reasons why were positive and suggested a positive impact upon ICU work.

CONCLUSIONS

34 There has been a substantial increase in the number of heart donations since 1 April 2013. Such an increase was not reflected in the overall number of solid organ donors. Taking into account differences in underlying donor characteristics, there is a significant increase in heart donors in 2013/14 compared to the two previous years. This suggests that there was something other than donor characteristics accounted for that changed in 2013/14 which increased the donor rate.

35 There was found to be a significant difference in donor characteristics between those donors who were scouted and those who were not, **within zone**. Those donors that were taller and had no past history of diabetes were more likely to be attended by a scout. Comparisons of donation rates between donors who were scouted and those who were not should therefore take into account these (and other) differences in donor characteristics.

36 In terms of donor rates, there was found to be a significant difference between those potential donors who were scouted and those who were not, **within-zone**, such that donors who were scouted were more likely to donate. However, there was no significant difference between those who were scouted and those who were not, **out-of-zone**. This effect was determined after adjusting for significant factors listed in Table 2 and so differences between the underlying characteristics of donors in the three donor categories have been accounted for. The results are therefore inconclusive as to whether scout attendance influences the probability of donation.

Jenny Lannon
Statistics and Clinical Studies **July 2014**

APPENDIX – QUESTIONNAIRE RESULTS

A1

What is your role in the donation/retrieval team?	Frequency	%
CLOD	23	17.42
ICU - medical (consultant)	3	2.27
Manager - Donation (Regional/Team)	6	4.55
Manager - NORS and transplant	4	3.03
Other	6	4.55
Retrieval surgeon	23	17.42
SNOD	50	37.88
Scout	10	7.58
Recipient transplant coordinator	7	5.30
Total	**132**	**100**

Role if 'Other'	Frequency
Donor Management Practitioner	1
ICU Consultant medical	1
Recipient Tx Co-ord	1
Team Manager	1
Transplant practitioner	1
Physicians assistant in donor management practice	1

A2

Are you aware of the scout programme?			
Role	**Aware?**		
	No	**Yes**	**Total**
CLOD	3	20	23
ICU - medical (consultant)	0	3	3
Manager - Donation (Regional/Team)	0	6	6
Manager - NORS and transplant	0	4	4
Other	0	6	6
Retrieval surgeon	1	22	23
SNOD	1	49	50
Scout	0	10	10
recipient transplant coordinator	0	7	7
Total	**5**	**127**	132

A3

Have you worked with scouts in the last year?				
Role	**Worked with scouts**			
	I am a scout	**No**	**Yes**	**Total**
CLOD	0	15	8	23
ICU - medical (consultant)	0	1	2	3
Manager - Donation (Regional/Team)	0	2	4	6
Manager - NORS and transplant	0	0	4	4
Other	2	1	3	6
Retrieval surgeon	3	4	16	23
SNOD	1	6	43	50
Scout	8	0	2	10
recipient transplant coordinator	0	0	7	7
Total	**14**	**29**	**89**	**132**

A4

To what extent do you feel the scout pilot programme has influenced the number of hearts retrieved?					
Role	**Extent**				
	A little	**Extensively**	**Moderately**	**Not at all**	**Total**
CLOD	8	4	4	4	20
ICU - medical (consultant)	0	1	0	1	2
Manager - Donation (Regional/Team)	0	3	3	0	6
Manager - NORS and transplant	1	1	2	0	4
Other	0	2	4	0	6
Retrieval surgeon	5	6	7	4	22
SNOD	12	19	16	1	48
Scout	5	2	2	1	10
recipient transplant coordinator	1	2	3	0	6
Total	**32**	**40**	**41**	**11**	**124**
Frequency Missing = 8					

A5

First activity recorded that the scouts themselves perform which you feel directly improves the likelihood of heart donation	Frequency
Assessment	19
Catheter	13
Drugs	1
Early/expert donor management	17
No response given	12
Nothing	11
Optimisation	7
Optimisation (fluids)	3
Optimisation (inotropes)	3
Other	19
Showing up	1
Specialist management	1
TOE	23
TOE and bronch	1
Unsure	1
Total	**132**

Reason given if 'Other'	Frequency
Accurate heart graft information the organ is offered.	1
Aid ITU care to optimise poential for donation	1
As CT team member provides trust to implanting team that organ is ok	1
Assessment of heart aids transplant surgical decision	1
Coming to see the patient themselves	1
Focused bedside care from a specialist team.	1
Forces cardiothoracic team to attend and assess patient either via scout or via surgeon	1
From reports increased retrieval	1
More active management - ventilation, fluids, inotropes	1
One to one medical care	1
PArt of transplant team	1
Specialised ICU intervention	1
Specialist knowledge	1
Stabilise for transfer to theatres	1
donor management - correct drugs according to results	1
early intervention	1
fluid management	1
if TOE is performed, accurate assessment of cardiac function	1
wean off inotropes	1
Total	**19**

A6

Second activity recorded that the scouts themselves perform which you feel directly improves the likelihood of heart donation	Frequency
Other	22
TOE	13
assessment	13
bronc	7
catheter	17
drugs	1
early/expert management	7
fluids	5
inotropes and fluids	1
no response given	28
nothing	6
optimisation	8
optimisation (inotropes)	3
optimisation and management	1
Total	**132**

Reason given if 'Other'	Frequency
'Buy-in" by virtue of being present	1
Ability to insert lines / measure data	1
Additional information to provide to recipient centres	1
Close adherance to donor optimisation pathway	1
Cvs stability	1
Difficult to say whether role of scout could be taken on by focused intensivist in donor ITU	1
Facilitate decision to retrieve/decline heart	1
Interpret information with accuracy	1
Manage in theatres	1
More invasive monitoring - PA, TOE, Bronch	1
Not saying "No" to quickly	1
PAC	1
Patchy cover in my geographical area	1
Rationalise vasopressors	1
Recommending methods to optimise treatment	1
Recommends treatments to inprove above	1
Record of clinical improvement	1
better communication with CT team	1
donor stabilization	1
focussed	1
rapid ability to respond to changes in PVR	1
stabilisation	1
Total	**22**

A7

Do you feel the scout's presence affects the way in which work is carried out by others in ICU?	Frequency
No	68
Yes	58
Total	**126**
Frequency Missing = 6	

A5

How would you like to see the future of the scout programme?					
Role	**Abandon and terminate**	**Extend to abdominal DBD donors**	**Extend to more cardiothoracic DBD donors (e.g. >2hr travel from retrieval centre, out of zone scouting)**	**Stay as it is**	**Total**
CLOD	1 0.79%	1 0.79%	9 7.14%	10 7.94%	21 16.67%
ICU - medical (consultant)	0 0.00%	0 0.00%	0 0.00%	1 0.79%	1 0.79%
Manager - Donation (Regional/Team)	0 0.00%	1 0.79%	4 3.17%	1 0.79%	6 4.76%
Manager - NORS and transplant	0 0.00%	0 0.00%	4 3.17%	0 0.00%	4 3.17%
Other	0 0.00%	0 0.00%	6 4.76%	0 0.00%	6 4.76%
Retrieval surgeon	3 2.38%	2 1.59%	11 8.73%	6 4.76%	22 17.46%
SNOD	1 0.79%	7 5.56%	34 26.98%	7 5.56%	49 38.89%
Scout	6 4.76%	1 0.79%	3 2.38%	0 0.00%	10 7.94%
recipient transplant coordinator	0 0.00%	0 0.00%	2 1.59%	5 3.97%%	7 5.56%
Total	**11** **8.73%**	**12** **9.52%**	**73** **57.94%**	**30** **23.81%**	**126** **100.00%**
Frequency Missing = 6					

How would you like to see the future of the scout programme?					
Have you worked with scouts?	**Abandon and terminate**	**Extend to abdominal DBD donors**	**Extend to more cardiothoracic DBD donors (e.g. >2hr travel from retrieval centre, out of zone scouting)**	**Stay as it is**	**Total**
I am a scout	5 3.97%	1 0.79%	6 4.76%	2 1.59%	14 11.11%
No	2 1.59%	5 3.97%	11 8.73%	6 4.76%	24 19.05%
Yes	4 3.17%	6 4.76%	56 44.44%	22 17.46%	88 69.84%
Total	**11** **8.73%**	**12** **9.52%**	**73** **57.94%**	**30** **23.81%**	**126** **100.00%**
Frequency Missing = 6					