

NHS BLOOD AND TRANSPLANT

RESEARCH, INNOVATION AND NOVEL TECHNOLOGIES ADVISORY GROUP

TWO MONTH REVIEW – RESEARCH ALLOCATION SCHEME

SUMMARY

BACKGROUND

- 1 A new allocation scheme for research organs went live on 20 February 2017 where studies are ranked in order of priority. Prior to this, research organs were offered to studies on a geographical basis.
- 2 A review of offering data was first carried out in 2017. This paper presents the results of a third two-month review to determine the effectiveness of the research organ allocation scheme.

DATA AND METHODS

- 3 Data collected by NHSBT for research organs is limited and does not capture the offering of research organs. Hub Operations were therefore asked to complete a spreadsheet for the purposes of this review by going through their log notes for donors where an organ was retrieved and not transplanted within a two-month period from 1 October to 30 November 2018.

SUMMARY

- 4 Whilst 156 (94%) organs with consent for research were potentially available for research, 70 (45%) of these organs were not used. 134 (86%) organs were offered through the research organ allocation scheme, 57% of which were used.
- 5 Accepted research organs tend to be accepted by a study within closer geographical proximity. The number of offered research organs appears to be higher between 12pm and 12am.
- 6 The median number of responses per offer was 1 which gave studies a good chance in receiving an organ if the study was active. This meant that studies that were lower in ranking were still able to receive an organ.

Cathy Hopkinson
Statistics and Clinical Studies

April 2019

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TWO MONTH REVIEW – RESEARCH ALLOCATION SCHEME

BACKGROUND

- 1 Until 20 February 2017, research organs were offered to studies on a geographical basis via a phone call. Now, organs are offered to research studies through a ranked allocation scheme. Research studies are ranked through a scoring system such that studies with the capabilities of improving an organ for the purposes of transplantation are given higher priority.
- 2 Research organs are now offered to all studies via text messages. These organs (providing they are retrieved for the purposes of transplantation) are allocated to the highest ranked study that responds to an offer within 45 minutes. The exception to this rule is that isolating labs are able to keep pancreas islets isolated at their lab.
- 3 A two-month review was first carried out last year (20 February to 20 April 2017), with a second review was carried out later that year (1 October to 30 November 2017) and third review (1 May to 30 June 2018). This paper presents the results of a fourth review to determine the effectiveness of the research organ offering scheme.

DATA AND METHODS

- 4 Data collected by NHSBT for research organs is limited. A spreadsheet was therefore created for the purpose of this analysis to collect fuller information including; the time of offer, reasons for not offering an organ for research, the organ location at the time of offer, studies that responded to an offer and whether they responded within 45 minutes. Hub Operations completed the spreadsheet by going through their log notes for all donors where an organ was retrieved but not transplanted within a two-month period from 1 October to 30 November 2018.
- 5 Organs that went for research and were successfully transplanted as a result are not distinguished from other routine transplants on the transplant database and can thus not be included as research organs in this paper.
- 6 Data from this two-month review have also been combined with data from all previous reviews and are summarised in **Appendix I**.

RESULTS

- 7 A summary of organs retrieved for transplantation from 1 October to 30 November 2018 is shown in **Table 1**. 18% (166) of the total number of organs retrieved were not transplanted and were potentially available to use in research.

Table 1 Summary of organs retrieved for transplantation, 1 October to 30 November 2018

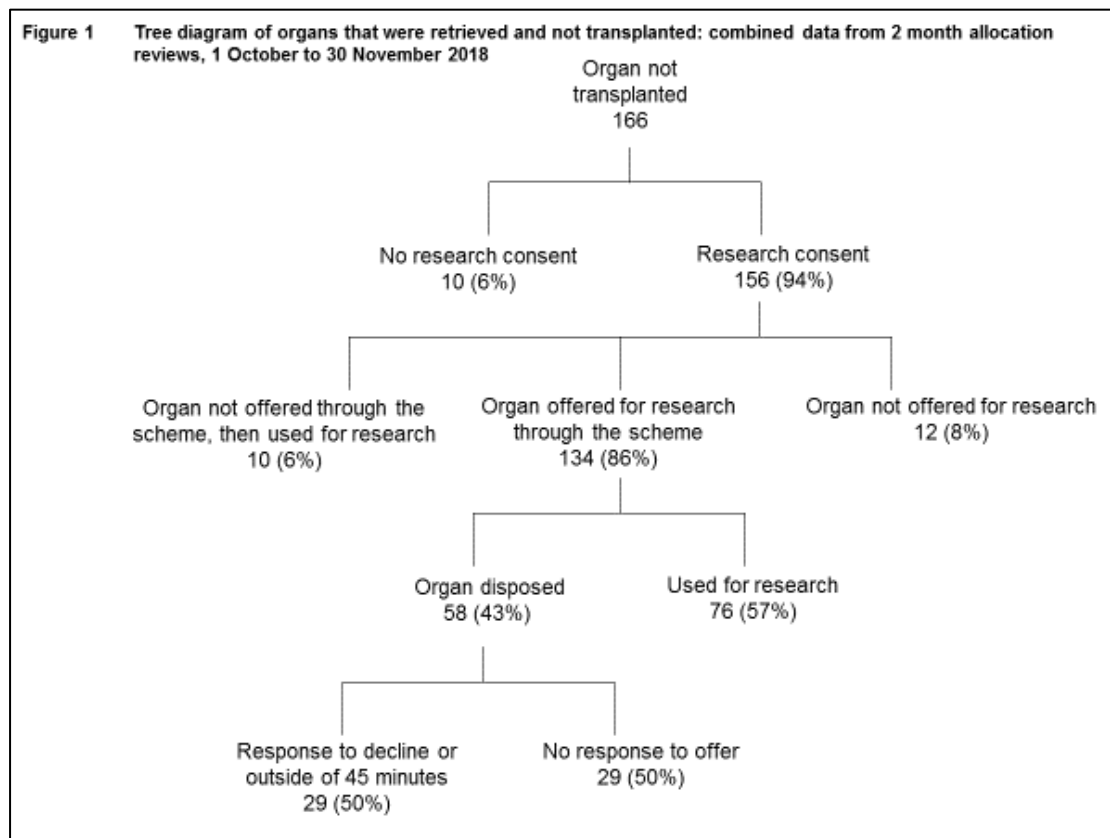
Organ	Retrieved		Transplanted		Not transplanted		Offered for research ³		Used for research		Consent and disposed		No research consent	
	N		N	% Ret ¹	N	% Ret ¹	N	% not txd ²	N	% not txd ²	N	% not txd ²	N	% not txd ²
Liver	180		151	84	29	16	27	93	20	69	7	24	2	7
Liver Segments	29		27	93	2	7	2	100	2	100	0	0	0	0
Kidney	510		432	85	78	15	72	92	38	49	36	46	4	5
Pancreas	65		30	46	35	54	29	83	13	37	21	60	2	6
Islets	17		5	29	12	71	6	50	6	50	4	33	1	8
Bowel	3		2	67	1	33	1	100	0	0	1	100	0	0
Heart	31		30	97	1	3	0	0	0	0	1	100	0	0
Lungs	71		63	89	8	11	7	88	7	88	0	0	1	13
Total	906		740	82	166	18	144	87	86	52	70	42	10	6

¹ Percentage of organs retrieved

² Percentage of organs not transplanted

³ Offered for research includes those that were not offered though the ranking system

- 8 **Figure 1** illustrates the pathway of the 166 organs which were retrieved and not transplanted from 1 October to 30 November 2018. Of those 166 organs that were not transplanted, 10 (6%) did not have consent for research. 134 organs were offered through the scheme, 76 (57%) of which were used for research. 58 organs were disposed of despite having research consent.



- 9 12 organs were not offered for research for reasons other than no research consent. Reasons for not offering an organ for research where consent had been given are shown in **Table 2**.

Reasons for not offering	N
Hub operations had been advised that organ had been disposed of	5
Unsuitable for research	2
Used for histopathology	3
Retrieved for heart valves	1
Part of pancreas taken for vessels with liver	1
Total	12

- 10 **Heatmap 1** presents the frequency of times-of-day and day-of-week that research organ offers were made. The darker the colour, the greater the number of offers. This shows that 83 (62%) offers made through the scheme were made between 12pm and 12am.

**Heatmap 1 No. Offers through the research organ allocation scheme
1 October to 30 November 2018**

	12am-3am	3am-6am	6am-9am	9am-12pm	12pm-3pm	3pm-6pm	6pm-9pm	9pm-12am	Total
Monday	2	6	1	1	2	1	0	3	16
Tuesday	4	2	0	3	2	3	1	3	18
Wednesday	0	3	2	3	3	5	7	4	27
Thursday	3	2	1	1	3	3	3	3	19
Friday	1	1	0	0	2	1	2	3	10
Saturday	5	2	2	2	3	1	4	4	23
Sunday	0	2	1	1	4	2	4	7	21
Total	15	18	7	11	19	16	21	27	134

- 11 **Heatmap 2** presents the number of organs disposed of as a proportion of the number offered through the scheme. The darker the colour, the higher the proportion of organs disposed. Utilisation of offered research organs appears to be spread across the day and the week. When combining these data with the prior review data (**Appendix 1**), there seems to be a greater utilization of organs between 3am and 3pm, and still spread across the week.

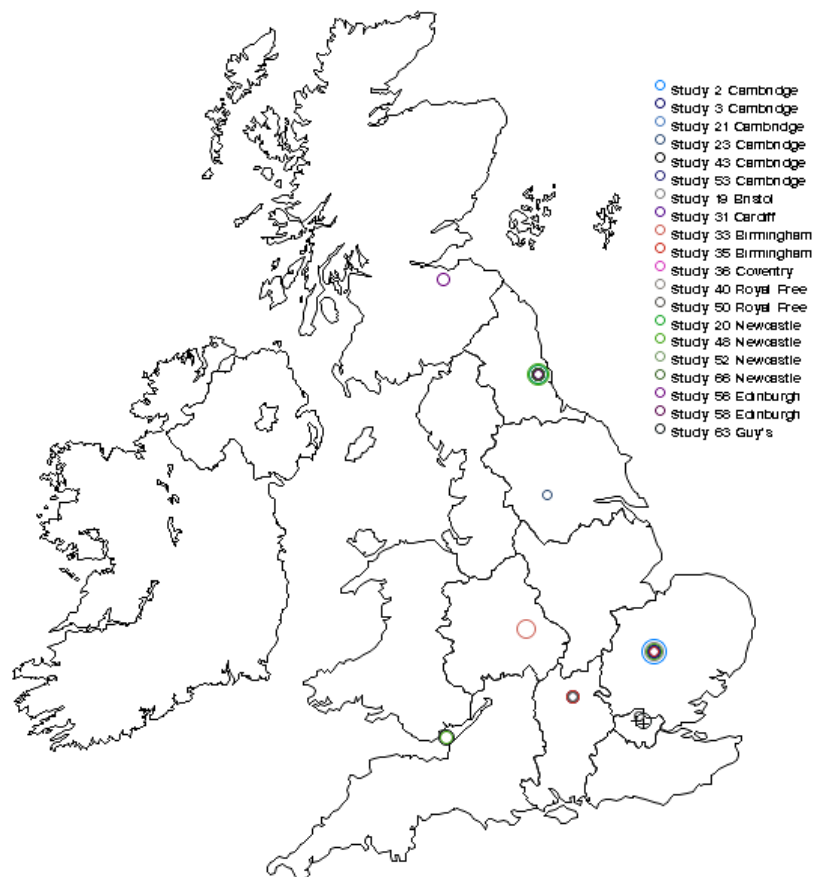
**Heatmap 2 No. organs disposed/No. organs offered for offers made through the scheme,
1 October to 30 November 2018**

	12am-3am	3am-6am	6am-9am	9am-12pm	12pm-3pm	3pm-6pm	6pm-9pm	9pm-12am	Total
Monday	2/2	3/6	0/1	0/1	0/2	1/1	0/0	1/3	7/16
Tuesday	1/4	1/2	0/0	0/3	0/2	0/3	1/1	1/3	4/18
Wednesday	0/0	0/3	0/2	1/3	0/3	0/5	3/7	3/4	7/27
Thursday	2/3	1/2	0/1	0/1	0/3	0/3	1/3	2/3	6/19
Friday	0/1	0/1	0/0	0/0	1/2	1/1	2/2	3/3	7/10
Saturday	5/5	1/2	2/2	0/2	1/3	1/1	3/4	2/4	15/23
Sunday	0/0	1/2	0/1	0/1	3/4	0/2	3/4	5/7	12/21
Total	10/15	7/18	2/7	1/11	5/19	3/16	13/21	17/27	58/134

12 The median number of responses per offer was 1 which gave studies a good chance in receiving an organ if the study was active. This meant that studies that were lower in the ranking were still able to receive an organ.

13 **Figure 2** shows a map of the UK where studies demographically accepted organs for their research studies from 1 October to 30 November 2018. The size of the circle represents the proportion of acceptances for each study where the location of the circle is at the last known location for the research organ. Studies from the Cambridge vary in shade of blue, Birmingham were shades of orange/red and Newcastle were shades of green. The map shows that studies are mainly accepting organs within their own region, presumably as they can facilitate transport.

Figure 2 The number of accepted research organs by studies in United Kingdom from 1 October to 30 November 2018



14 **Tables 3** and **4** summarise the offers of organs for research made between 1 October and 30 November 2018 broken down by research study, for cardiothoracic and abdominal organs, respectively. The studies are ranked in order of priority as at April 2019. More information on the studies can be found in the **Appendix II**. Please note that the final study number that received an organ is entered as free text on the database and there are cases that may contain typographical errors.

15 No hearts and four lungs were offered through the scheme over this two-month period. 72 kidneys, 28 livers and 29 pancreases were offered during the same period.

Table 3 Responses to research offers for cardiothoracic organs by study, 1 October to 30 November 2018

Organ	Study Number	Ranking as at September 2018	Total offers through scheme	Offer responses in 45 minutes	Offer responses over 45 minutes	Offer responses to accept an organ	Offer responses to decline an organ	Total organs received not through scheme	Total organs received though scheme
Lungs	58	1	4	4	0	4	0	0	4
	66	2	4	2	0	0	2	0	0
	Total		4	6	0	4	2	0	4
Cardiothoracic organs	Total		4	6	0	4	2	0	4

Table 4 Responses to research offers for abdominal organs by study, 1 May to 30 June 2018

Organ	Study Number	Ranking as at September 2018	Total offers through scheme	Offer responses in 45 minutes	Offer responses over 45 minutes	Offer responses to accept an organ	Offer responses to decline an organ	Total organs received not through scheme	Total organs received though scheme
Kidneys	53	1	72	1	0	0	1	.	.
	48	2	72	3	0	3	0	.	2
	63	3	72	12	0	1	11	.	1
	40	4	72	1	0	1	0	.	1
	2	5	72	21	0	20	1	.	18
	19	6	72	13	0	13	0	.	5
	23	7	72	13	0	11	2	.	2
	31	T	72	0	1	6	8	.	6
	36	T	72	1	0	0	8	.	.
	43	T	72	2	0	0	2	.	.
	7		72	1	0	1	0	.	1
	22		72	0	0	0	0	.	2
	Total		72	68	1	56	33	.	38
Liver	21	1	28	3	0	3	0	.	3
	35	2	28	4	0	4	0	.	3
	56	3	28	3	0	2	1	.	2
	33	4	28	12	0	10	2	.	10
	52	5	28	12	0	10	2	.	3
	36	T	28	0	0	0	2	.	0
	33/35		28	4	0	1	3	.	.
	Unknown		28	1	0	1	0	.	.
Total		28	39	0	31	10	.	39	

Table 4 Responses to research offers for abdominal organs by study, 1 May to 30 June 2018

Organ	Study Number	Ranking as at September 2018	Total offers through scheme	Offer responses in 45 minutes	Offer responses over 45 minutes	Offer responses to accept an organ	Offer responses to decline an organ	Total organs received not through scheme	Total organs received through scheme
Pancreas	20	1	29	4	0	4	0	.	5
	3	4	29	8	0	8	0	.	7
	36	T	29	0	0	0	6	.	.
	47	.	29	2	0	1	1	.	1
	Total		29	14	0	13	7	.	13
Abdominal organs	Total		129	121	1	100	50	.	72

CONCLUSION

- 16 156 (94%) organs with consent for research and therefore potentially available for research, 70 (45%) of these organs were not used. 134 organs were offered through the research organ allocation scheme, 57% (76) of which were used.
- 17 Accepted research organs tend to be accepted by a study within closer geographical proximity. The number of offered research organs appears to be higher between 12pm and 12am.
- 18 The median number of responses per offer was 1 which gave studies a good chance in receiving an organ if the study was active. This meant that studies that were lower in the ranking were still able to receive an organ.

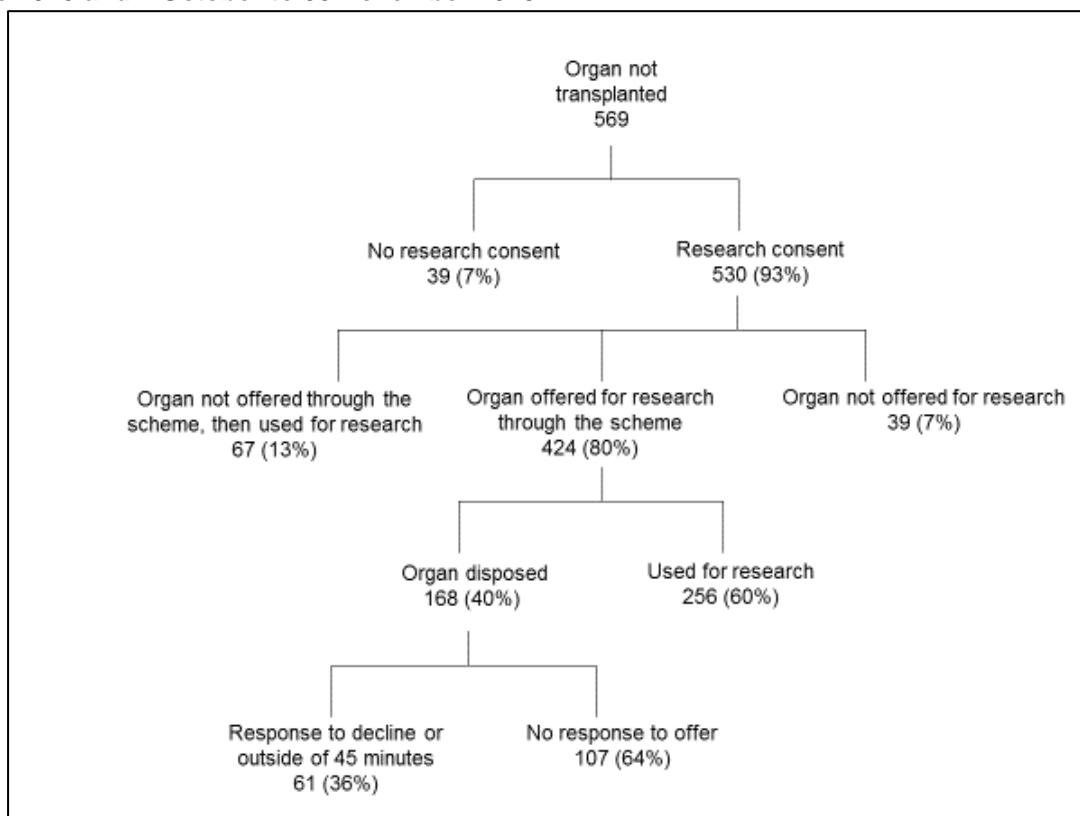
Cathy Hopkinson
Statistics and Clinical Studies

April 2019

APPENDICES

APPENDIX I – Combined allocation review data from, 20 February to 20 April 2017, from 1 October to 30 November 2017, from 1 May to 30 June 2018 and 1 October to 30 November 2018.

Tree diagram of organs that were retrieved and not transplanted: combined data from 2 month allocation reviews; 20 February to 20 April 2017, 1 October to 30 November 2017, 1 May to 30 June 2018 and 1 October to 30 November 2018.

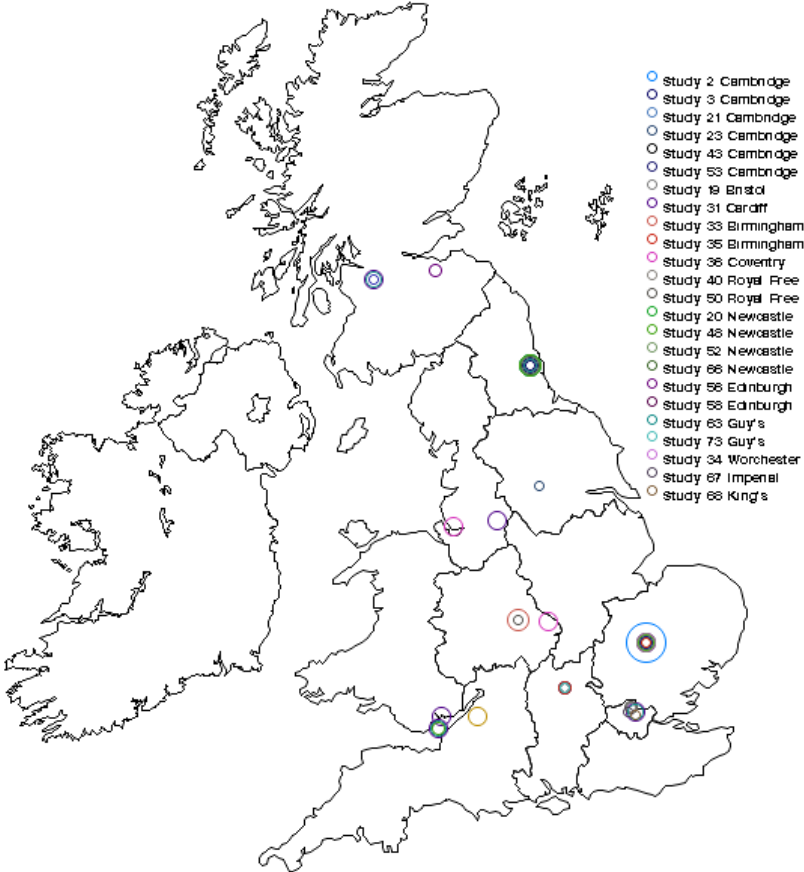


Heatmap

No. organs disposed/No. organs offered for offers made through the scheme, 20 February to 20 April 2017, 1 October to 30 November 2017, 1 May to 30 June 2018 and 1 October to 30 November 2018

	12am-3am	3am-6am	6am-9am	9am-12pm	12pm-3pm	3pm-6pm	6pm-9pm	9pm-12am	Total
Monday	3/5	4/8	0/1	2/6	0/6	4/4	0/6	6/12	19/48
Tuesday	4/8	6/8	1/3	1/13	1/7	2/12	4/13	3/10	22/74
Wednesday	1/3	0/4	1/5	1/12	3/8	2/12	3/15	9/12	20/71
Thursday	6/8	2/4	0/7	0/5	0/7	4/12	3/7	7/16	22/66
Friday	4/6	1/6	1/1	1/5	3/9	3/7	7/10	6/7	26/51
Saturday	8/9	1/3	3/3	2/6	3/8	2/8	7/12	3/8	29/57
Sunday	5/7	3/4	2/3	0/2	5/10	3/13	5/8	7/10	30/57
Total	31/46	17/37	8/23	7/49	15/55	20/68	29/71	41/75	168/424

The number of accepted research organs by studies in United Kingdom over study periods; 1 October to 30 November 2017, 1 May to 30 June 2018 and 1 October to 30 November 2018



APPENDIX II – Ranking as at April 2019

Organ	Study	Rank	Location	Study Title
Heart	67	1	Imperial	Structural and functional analysis of intact myocardium and isolated cells from explanted hearts
Lung	58	1	Edinburgh	ENLIGHTEN - Multiplexed Optical Molecular Imaging and Sensing during Ex Vivo Lung Perfusion (EVLN)
Lung	66	2	Newcastle	Further Evaluation of Ex Vivo Lung Perfusion to Improve Transplantation Outcomes
Liver	21	1	Cambridge	Development of pre-transplant normothermic perfusion reconditioning for human livers donated after circulatory death
Liver	35	2	Birmingham	Normothermic Liver Perfusion Study (The development of NMLP for improvement of marginal human donor liver quality)
Liver	56	3	Edinburgh	Human Hepatic Progenitor Cells as a Source of Liver Regeneration
Liver	33	4	Birmingham	Expression and Function of Immune Regulatory Proteins in Human Liver
Liver	52	5	Newcastle	Establishing ex-vivo normothermic and hypothermic perfusion of livers for transplantation
Liver	50	5	Royal Free	Organ regeneration and disease modelling using 3D biological scaffold
Liver	68	6	King's	Hepatocyte Transplantation Project: Studies on isolated hepatocytes
Pancreas	20	1	Newcastle	Process development for islet isolation targeted at enhancing islet yield and viability
Pancreas	34	2	Worcester	A pre-clinical study of human islet function to improve long-term graft survival
Pancreas	50	3	Royal Free	Organ Regeneration and Disease Modelling Using 3D Biological Scaffold
Pancreas	3	4	Cambridge	Study of Pancreas Function, Physiology, Pathology and Therapeutics
Pancreas	40	4	Royal Free	Identification of genes involved in renal, electrolyte and urinary tract disorders
Kidney	53	1	Cambridge	Quality assessment of Human Kidneys by Ex-vivo Normothermic Perfusion prior to Transplantation
Kidney	48	2	Newcastle	Establishing ex vivo normothermic perfusion (EVNP) of kidneys for transplantation
Kidney	37	2	Oxford	Normothermic Perfusion of Discarded Kidneys
Kidney	63	3	Guys	Transplanting the untransplantable - extending antibody incompatible transplantation using a normothermic perfusion model with cytoprotective agents
Kidney	73	4	Guys	Mobilisation and depletion of passenger leukocytes during warm perfusion of discarded deceased donor kidneys
Kidney	2	5	Cambridge	Study of Renal Ischaemia Reperfusion Injury
Kidney	19	6	Bristol	Establishment of cultured human glomerular cells for study of glomerular function in vitro
Kidney	23	7	Cambridge	Characterisation of ischaemia reperfusion injury in human kidneys Non-transplantable Kidneys
Kidney	40	8	Royal Free	Identification of genes involved in renal, electrolyte and urinary tract disorders