

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 May to 30 June 2018.

SUMMARY

- 4 Whilst 113 (92%) organs with consent for research were offered for research, 51 (45%) of these organs were not used.
- 5 88 (78%) organs were offered through the research organ allocation scheme, 51% of which were used.
- 6 The number of offered research organs appears to be higher between 12pm and 12am.
- 7 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.

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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). This paper presents the results of a third 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 May to 30 June 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 both previous reviews and are summarised in **Appendix I**.

RESULTS

- 7 A summary of organs retrieved for transplantation from 1 May to 30 June 2018 is shown in **Table 1**. 15% (123) 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 May to 30 June 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	174		155	89	19	11	19	100	8	42	11	58	0	0
Liver Segments	23		18	78	5	22	4	80	4	80	1	20	0	0
Kidney	476		413	87	63	13	56	89	29	46	30	48	4	4
Pancreas	50		35	70	15	30	12	80	7	47	6	40	2	13
Islets	17		4	24	13	76	9	69	9	69	1	8	3	23
Bowel	2		2	100	0	0	0	0	0	0	0	0	0	0
Heart	21		20	95	1	5	0	0	0	0	1	100	0	0
Lungs	67		61	91	6	9	5	83	5	83	0	0	1	17
Total	831		708	85	123	15	105	85	62	50	51	41	10	8

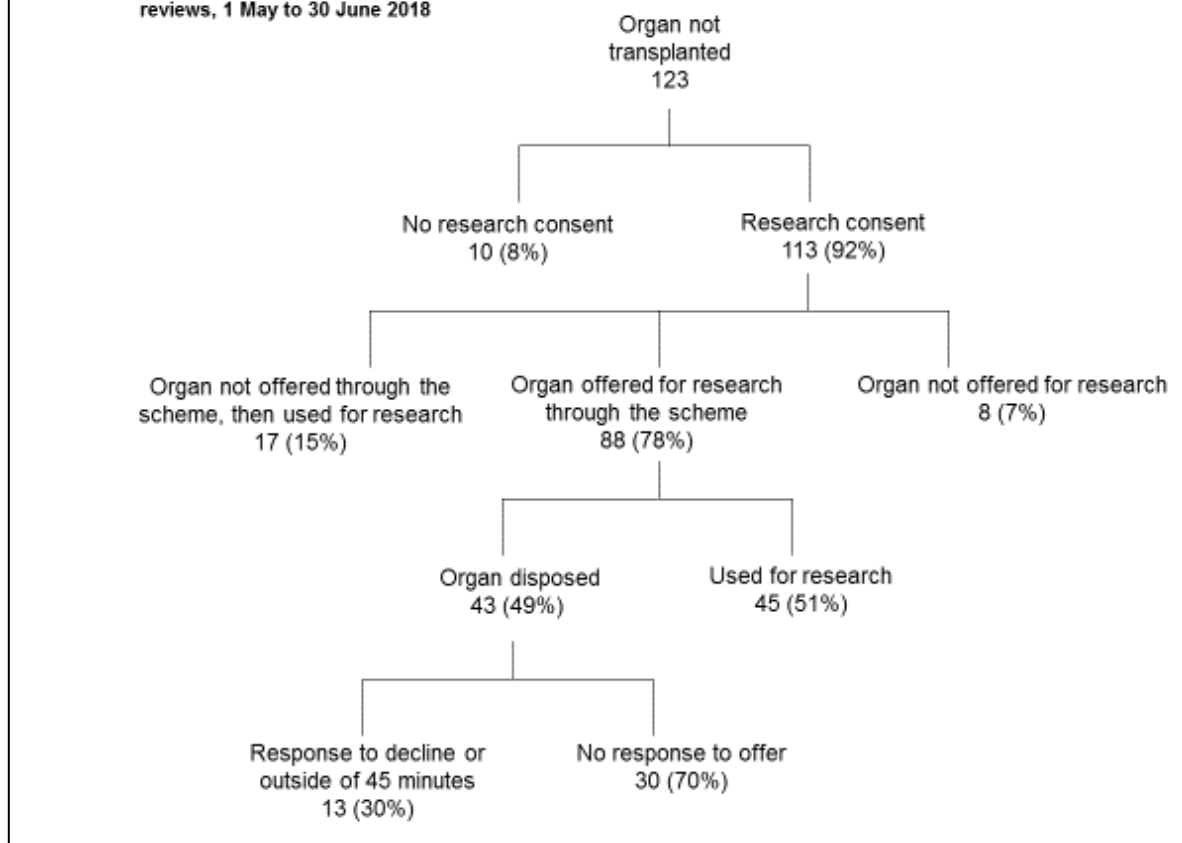
¹ Percentage of organs retrieved

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 123 organs which were retrieved and not transplanted from 1 May to 30 June 2018. Of those 123 organs that were not transplanted, 10 (8%) did not have consent for research. 88 organs were offered through the scheme, 45 (51%) of which were used for research. 43 organs were disposed of despite having research consent.

Figure 1 Tree diagram of organs that were retrieved and not transplanted: combined data from 2 month allocation reviews, 1 May to 30 June 2018



- 9 8 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**.

Table 2 Reasons for not offering an organ for research where consent was given

Reasons for not offering	N
Hub operations had been advised that organ had been disposed of	3
SNOD advised to not offer on	2
Used for histopathology	3
Total	8

- 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 68 (77%) offers made through the scheme were made between 12pm and 12am.

**Heatmap 1 No. Offers through the research organ allocation scheme
1 May to 30 June 2018**

	12am- 3am	3am -6am	6am-9am	9am-12pm	12pm-3pm	3pm-6pm	6pm-9pm	9pm-12am	Total
Monday	1	2	0	1	0	3	4	1	12
Tuesday	1	0	1	3	3	5	5	1	19
Wednesday	0	0	1	0	0	3	0	5	9
Thursday	1	1	0	2	2	1	2	3	12
Friday	0	1	1	0	2	3	3	1	11
Saturday	1	1	1	0	4	2	2	1	12
Sunday	0	0	0	1	2	8	0	2	13
Total	4	5	4	7	13	25	16	14	88

- 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 May to 30 June 2018

	12am- 3am	3am -6am	6am-9am	9am-12pm	12pm-3pm	3pm-6pm	6pm-9pm	9pm-12am	Total
Monday	1/1	1/2		1/1		3/3	0/4	1/1	7/12
Tuesday	1/1		1/1	0/3	1/3	2/5	3/5	0/1	8/19
Wednesday			0/1			2/3		4/5	6/9
Thursday	1/1	0/1		0/2	0/2	1/1	0/2	1/3	3/12
Friday		0/1	1/1		2/2	2/3	2/3	1/1	8/11
Saturday	0/1	0/1	1/1		2/4	1/2	2/2	0/1	6/12
Sunday				0/1	1/2	2/8		2/2	5/13
Total	3/4	1/5	3/4	1/7	6/13	13/25	7/16	9/14	43/88

- 12 Research studies have suggested in the past that they have not always been able to facilitate an organ due to geographical location. The next allocation review paper (May 2019) will take this in to account.
- 13 Long cold ischemia times may occur due to the length of the offering process. The median time from the start of the last offer for transplantation to the time the research organ was offered was 194 minutes (IQR: 44 – 1004 minutes). Hub Operations state that offers are made for research organs as soon as all offers for transplantation have been declined by centres.
- 14 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.
- 15 **Tables 3 and 4** summarise the offers of organs for research made between 1 May and 30 June 2018 broken down by research study, for cardiothoracic and abdominal organs, respectively. The studies are ranked in order of priority as at September 2018. More information on the studies can be found in the **Appendix II**.
- 16 No hearts and two lungs were offered through the scheme over this two-month period. 55 kidneys, 18 livers and 10 pancreases were offered during the same period.
- 17 Please note that the study number of the research study that received an organ is entered as free text on the database and there are cases that may contain typographical errors. **Tables 3 and 4** are summaries of the raw data.

Table 3 Responses to research offers for cardiothoracic 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
Lungs	58	1	2	1	0	1	0	2	0
	66	2	2	2	0	2	0	0	2
	59	NA	2	0	0	0	0	1	0
	Total		2	3	0	3	0	3	2
Cardiothoracic Total organs			2	3	0	3	0	3	2

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	55	1	0	1	0	0	0
	37	2	55	3	0	0	3	0	0
	48	2	55	1	0	1	0	0	1
	40	4	55	2	0	0	2	0	0
	73	4	55	2	0	0	2	0	0
	2	5	55	14	0	13	1	0	10
	19	6	55	6	1	6	1	0	4
	23	7	55	3	0	3	0	0	3
	4		55	1	0	0	1	0	0
	31		55	10	0	4	6	0	4
	36		55	6	0	3	3	0	3
	43		55	1	0	0	1	0	0
	63		55	1	0	0	1	0	0
	Unknown		55	0	0	0	0	3	0
	Total			55	51	1	31	21	3
Liver	21	1	18	1	0	1	0	0	1
	35	2	18	1	0	1	0	0	1
	60	2	18	2	0	2	0	0	2
	50	3	18	2	0	2	0	0	1
	33	4	18	0	1	1	0	0	1
	36		18	2	0	1	1	0	1
	Unknown		18	1	0	0	1	0	0
Total			18	9	1	8	2	0	7

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	10	1	0	1	0	0	1
	3	4	10	2	0	2	0	0	2
	1		10	1	0	1	0	0	1
	36		10	1	0	1	0	0	1
	64		10	1	0	0	1	0	0
	Total			10	6	0	5	1	0
Islets	20	1	3	1	0	1	0	0	1
	3	4	3	1	0	1	0	0	1
	45		3	0	0	0	0	0	1
	47		3	1	0	1	0	0	0
	Total			3	3	0	3	0	0
Abdominal organs	Total		86	69	2	47	24	3	40

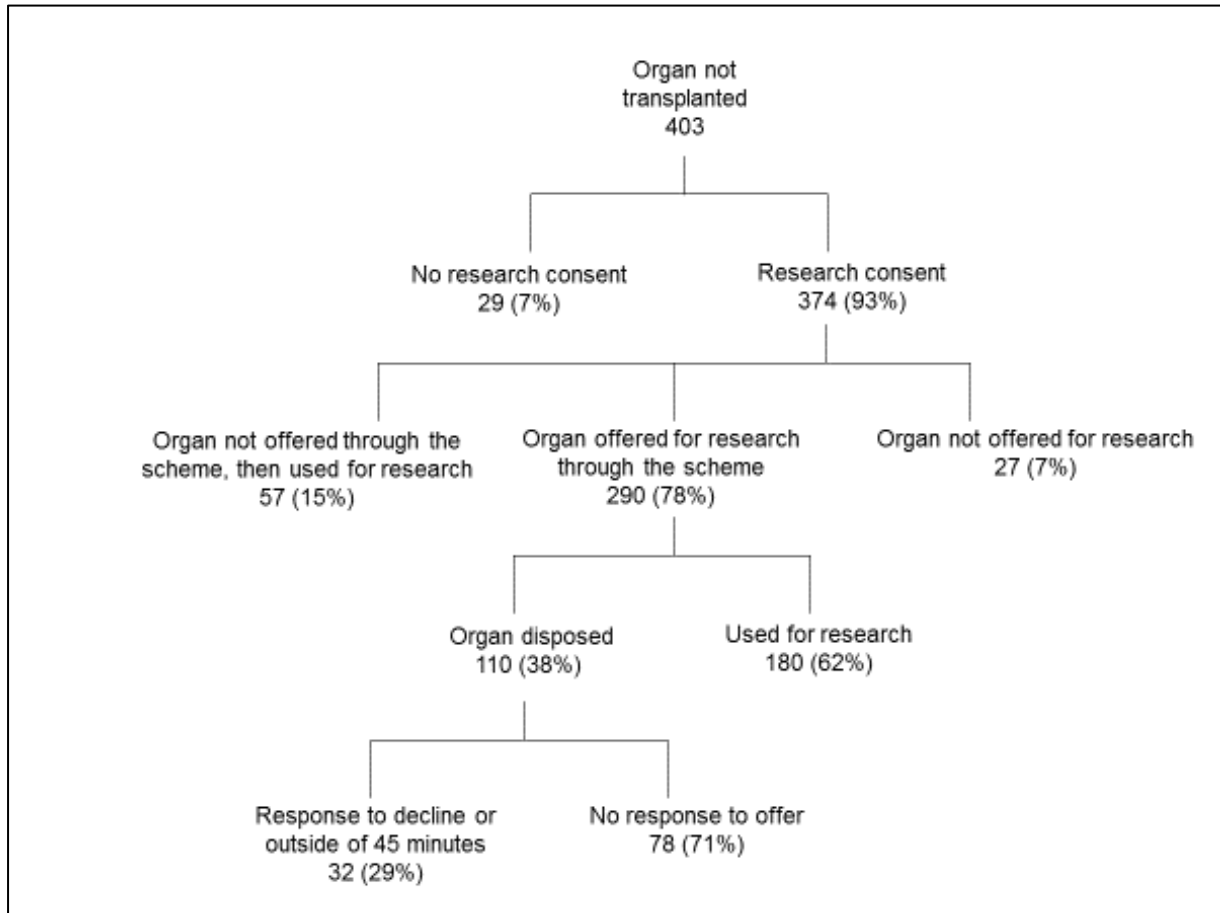
CONCLUSION

- 18 Whilst 78% (88) of organs with consent for research were offered for research, 43 (49%) of these organs were not used.
- 19 88 organs were offered through the research organ allocation scheme, 51% (45) of which were used.
- 20 The number of offered research organs appears to be higher between 12pm and 12am.
- 21 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.

APPENDICES

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



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

	12am- 3am	3am -6am	6am-9am	9am-12pm	12pm-3pm	3pm-6pm	6pm-9pm	9pm-12am	Total
Monday	1/3	1/2	0/0	2/5	0/4	3/3	0/6	5/9	12/32
Tuesday	3/4	5/6	1/3	1/10	1/5	2/9	3/12	2/7	18/56
Wednesday	1/3	0/1	1/3	0/9	3/5	2/7	0/8	6/8	13/44
Thursday	4/5	1/2	0/6	0/4	0/4	4/9	2/4	5/13	16/47
Friday	4/5	1/5	1/1	1/5	2/7	2/6	5/8	3/4	19/41
Saturday	3/4	0/1	1/1	2/4	2/5	1/7	4/8	1/4	14/34
Sunday	5/7	2/2	2/2	0/1	2/6	3/11	2/4	2/3	18/36
Total	21/31	10/19	6/16	6/38	10/36	17/52	16/50	24/48	110/290

APPENDIX II – Ranking as at September 2018

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	60	2	Oxford	Exploring the structural and functional effects of normothermic machine perfusion and de-fatting agents on human steatotic livers
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	49	2	Birmingham	A study to determine the mechanism and effect of machine perfusion on cadaveric kidneys unsuitable for 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