

NHS BLOOD AND TRANSPLANT

RESEARCH, INNOVATION AND NOVEL TECHNOLOGIES ADVISORY GROUP

AVAILABILITY OF ORGANS FOR RESEARCH

SUMMARY

BACKGROUND

- 1 This paper investigates the pathway of organs that have been retrieved and not transplanted to assess the availability of organs for research. It also identifies the number of organs received by research studies within the latest calendar year.

DATA AND METHODS

- 2 Organs that were retrieved and not transplanted were analysed for UK deceased donors between 1 January 2009 and 31 July 2018. Research outcome was split into three categories: No research consent, used for research and organ disposed of with research consent.
- 3 Livers isolated for hepatocytes (transplanted or not transplanted) have been excluded from this analysis.

CONCLUSION

- 4 Overall, the total number of organs retrieved and not transplanted has steadily increased over time. In addition, the proportion of these organs that have consent/authorisation for research has increased to 93% in 2018 (data to 31 July). However, the proportion of discarded abdominal organs available with research consent/authorisation is substantially higher in the first 7 months of 2018 than in previous years.
- 5 Utilised research organs were distributed across many studies. This suggests that studies that were ranked lower through the allocation scheme were still able to obtain research organs.

NHS BLOOD & TRANSPLANT

RESEARCH, INNOVATION AND NOVEL TECHNOLOGIES ADVISORY GROUP

AVAILABILITY OF ORGANS FOR RESEARCH

BACKGROUND

- 1 This paper investigates the pathway of organs that have been retrieved and not transplanted. These organs are potentially available for research purposes. However, some research organs are discarded due to a lack of consent/authorisation and some for other reasons.
- 2 Within this paper we assess the availability of organs for research and identify the number of organs received by each research study during the first 7 months of 2018.

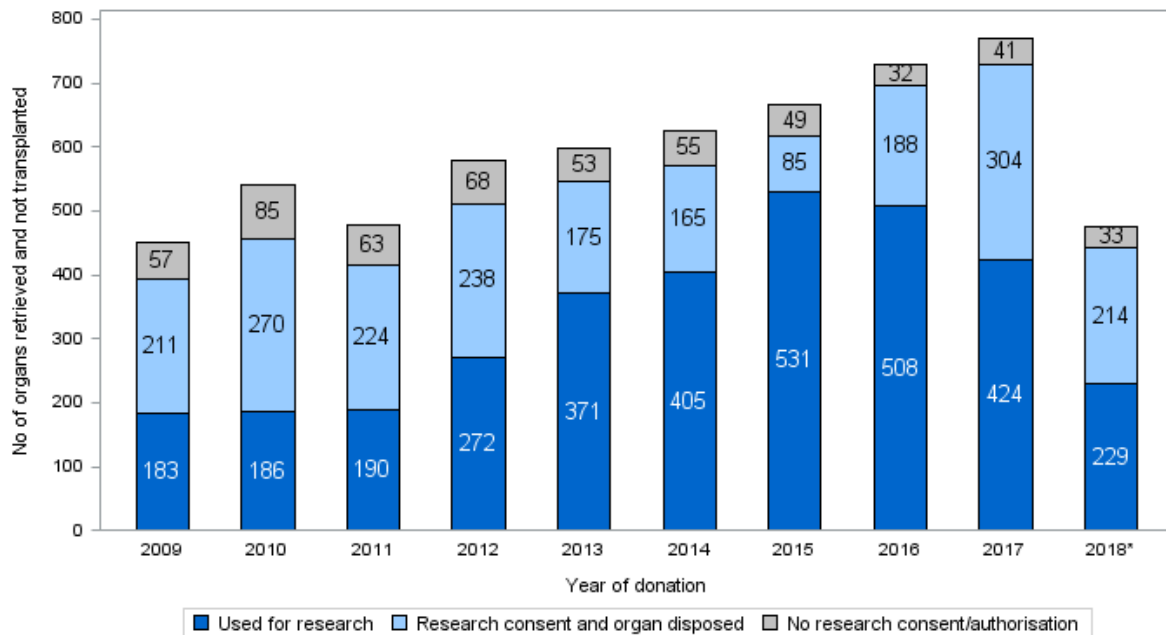
DATA AND METHODS

- 3 Organs that were retrieved and not transplanted were analysed for UK donors between 1 January 2009 and 31 July 2018. Research outcome was split into three categories: No research consent, used for research and organ disposed of with research consent.
- 4 Organs that were used for research in the first 7 months of 2018 are presented in terms of which research studies they went to. Details on each of these research studies which are listed in the **Appendix**. Study rankings are as at September 2018.
- 5 Livers isolated for hepatocytes (transplanted or not transplanted) have been excluded from this analysis.

RESULTS

- 6 **Figure 1** shows the research outcome of UK donor organs that were retrieved and not transplanted between 1 January 2009 and 31 July 2018. Please note that the final column represents only 7 months of data.
- 7 Overall, the total number of organs retrieved and not transplanted has steadily increased since 2009.
- 8 In addition, the proportion of these organs that have consent/authorisation for research has generally increased to 93% in 2018, as shown in **Figure 2**. The availability of organs for research was at an all-time high in 2017.
- 9 Despite a total of 476 organs available for research in the first 7 months of 2018, only 229 (48%) were used for research. Prior to 2016, the proportion of discarded organs with research consent/authorisation had been steadily decreasing since 2010. Since 2018, discard rates have been increasing back up again to levels similar to that seen in 2016.

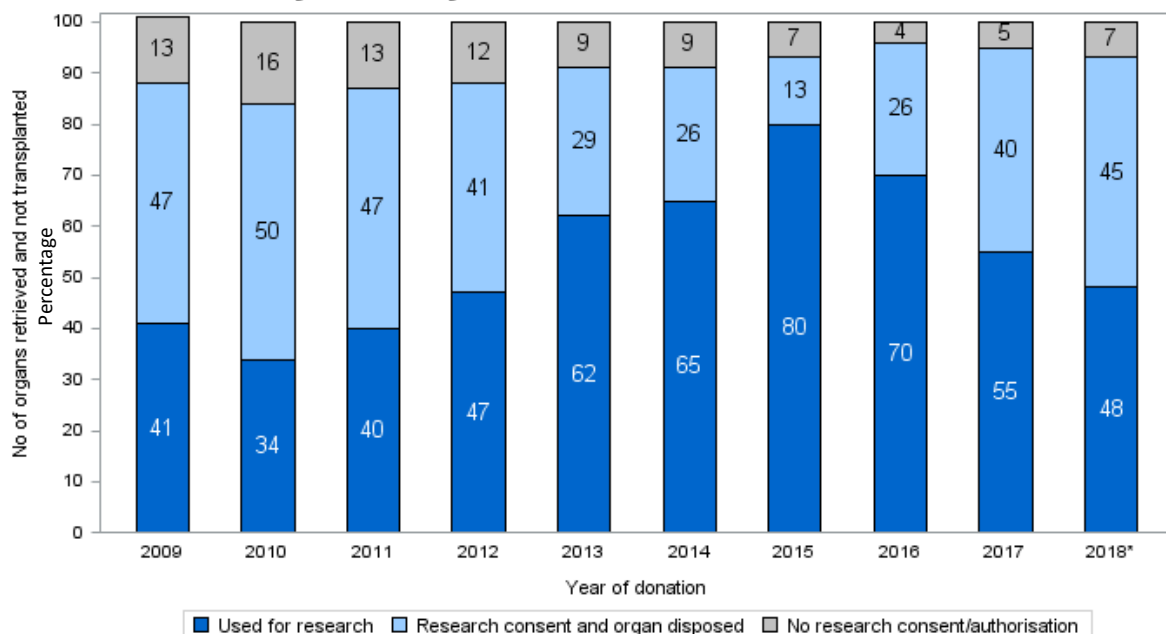
Figure 1 Number of organs that were retrieved and not transplanted by research outcome, from 1 January 2009 - 31 July 2018



Note: On the 20th February 2017 a research prioritisation allocation scheme was introduced

* 1 January to 31 July 2018

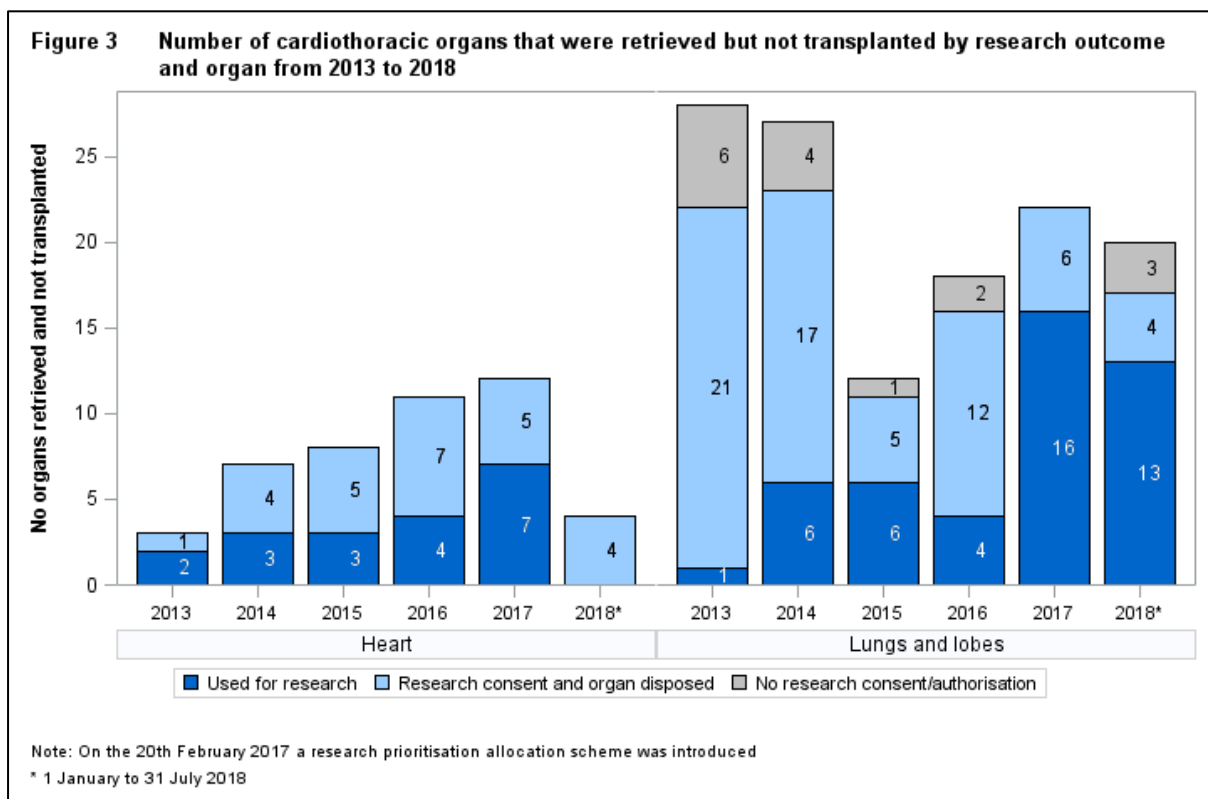
Figure 2 Percentage of organs that were retrieved but not transplanted by research outcome, from 1 January 2009 - 31 July 2018



Note: On the 20th February 2017 a research prioritisation allocation scheme was introduced

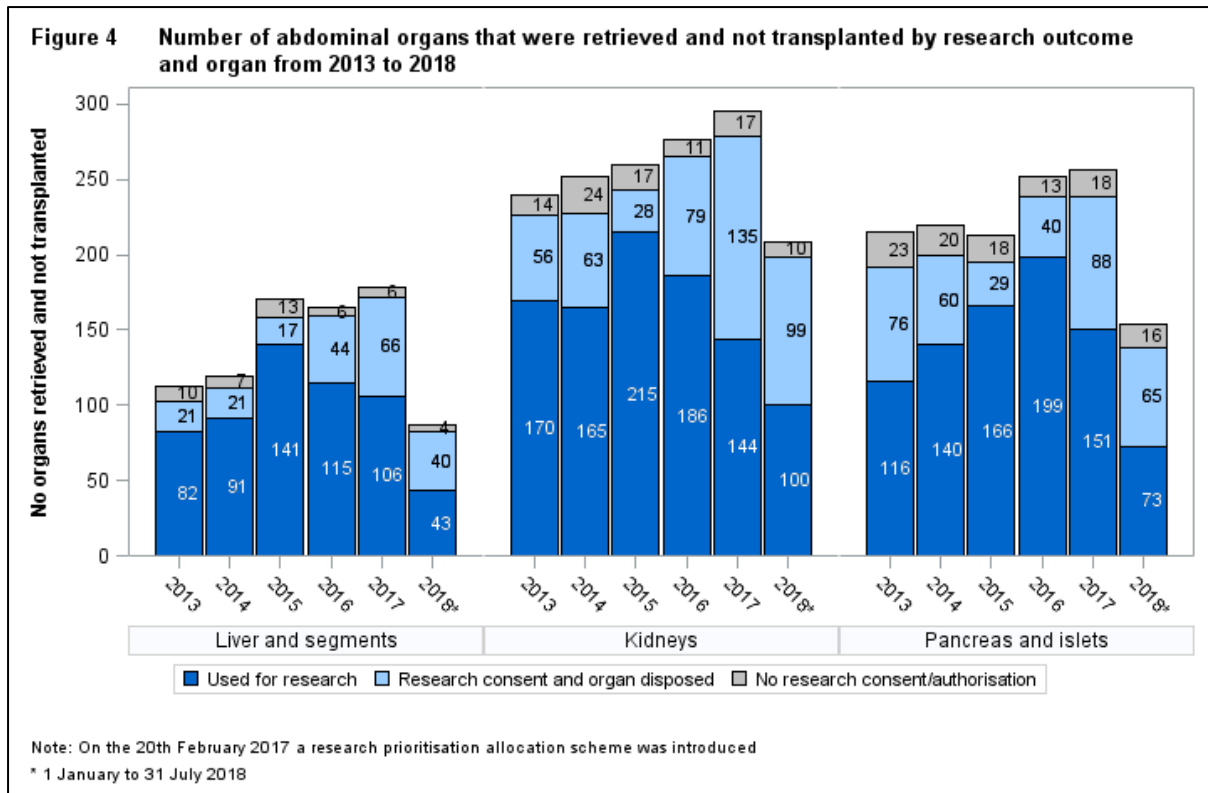
* 1 January to 31 July 2018

10 The same information from **Figure 1** (number of organs retrieved and not transplanted) is broken down by organ and illustrated in terms of cardiothoracic organs in **Figure 3** and abdominal organs in **Figure 4**.



11 The number of cardiothoracic organs available for research is small, as seen in **Figure 3**. So far in 2018, no hearts have been utilised for research, though lung utilisation for research is at 76%.

12 **Figure 4** shows that the number of abdominal organs available for research has generally been increasing. However, across all abdominal organs, the proportion of discarded organs with research consent/authorisation increased substantially in 2017 and in the first 7 months of 2018.



13 **Table 1** and **2** show the total number of organs received by research studies in 2018, for each of cardiothoracic and abdominal organs, respectively. The tables show that the research organs utilised were distributed across many studies. This suggests that lower ranked studies were still able to obtain research organs.

Table 1 Cardiothoracic organs received by research studies in 2018*

Organ	Study Number	Ranking as at Sep. 2018	Start year	End year	Organs received N	Organs received %
Hearts	67	1	2017	2022	None reported	0
Lungs	58	1	2016	2020	4	31
	66	2	2016	2020	7	54
	Unknown study	NA	NA	NA	2	15
Total					13	100

* 1 January to 31 July 2018

Table 2 Abdominal organs received by research studies in 2018*

Organ	Study Number	Ranking as at Sep. 2018	Start year	End year	Organs received	
					N	%
Liver and segments	21	1	2015	2018	1	2
	35	2	2014	2018	2	5
	60	2	2016	2018	8	18
	56	3	2016	2021	1	2
	33	4	2006	2017	17	39
	50	5	2014		2	5
	36	Tissue bank			1	2
	62	NA	2016	2018	2	5
	Unknown study				10	23
	52	5	2015	2020	None reported	0
	68	6	2017	2022	None reported	0
Total				44	100	
Kidneys	53	1	2015	2019	None reported	0
	37	2	2015	2018	10	10
	48	2	2015	2017	3	3
	49	2	2015	2018	2	2
	63	3	2016	2018	None reported	0
	73	4	2018	2021	None reported	0
	2	5	2017	2022	29	29
	19	6	2007		9	19
	23	7	2012	2019	13	13
	31	Tissue bank			15	15
	36	Tissue bank			5	5
	Unknown study				14	14
	40	8	2014	2024	None reported	0
	Total				100	100
Pancreas and Islets	20	1	2005	2018	14	19
	34	2	2013		None reported	0
	50	3	2015		None reported	0
	40	4	2014	2024	None reported	0
	3	4	2017	2022	7	10
	45	NA	2009	2017	12	16
	46	Islet lab			9	12
	47	Islet lab	2002		9	12
	36	Tissue bank			5	7
	Unknown study				17	23
	Total				73	100
Abdominal organs	Total				217	100

* 1 January to 31 July 2018

CONCLUSION

- 14 Overall, the total number of organs retrieved and not transplanted has steadily increased over time. In addition, the proportion of these organs that have consent/authorisation for research has increased to 93% in 2018 (data to 31 July). However, the proportion of discarded abdominal organs with research consent/authorisation was substantially higher in the first 7 months of 2018 than in previous years.
- 15 Utilised research organs were distributed across many studies. This suggests that studies that were ranked lower through the allocation scheme were still able to obtain research organs.

Sophie Hughes
Statistics and Clinical Studies

September 2018

APPENDIX – Research studies 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 (EVLV)
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-fattening 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