

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 last year.

DATA AND METHODS

- 2 Organs that were retrieved and not transplanted were analysed for UK donors between 1 January 2008 and 31 December 2017. Research outcome was split into three categories: No research consent, Used for research and Organ disposed of with research consent.

CONCLUSION

- 3 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 around 95% for the last two years. However, the number of discarded abdominal organs available with research consent/authorisation was substantially higher in 2017 than in previous years.
- 4 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.

Cathy Hopkinson
Statistics and Clinical Studies

March 2018

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 over the last year.

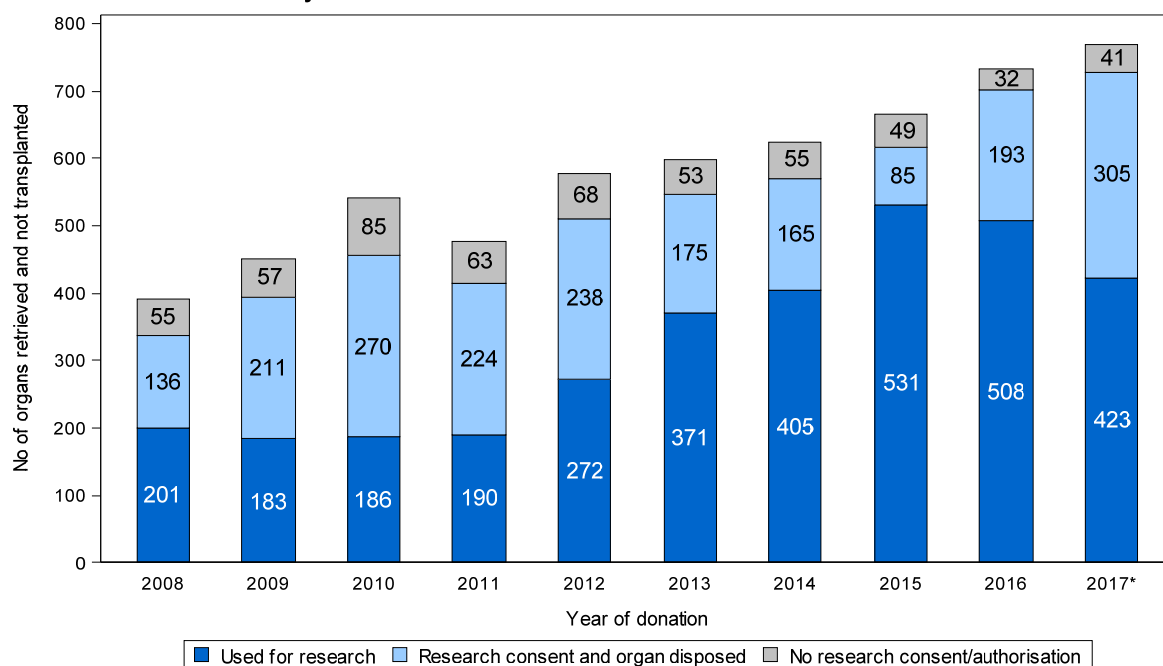
DATA AND METHODS

- 3 Organs that were retrieved and not transplanted were analysed for UK donors between 1 January 2008 and 31 December 2017. 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 2017 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 October 2017.

RESULTS

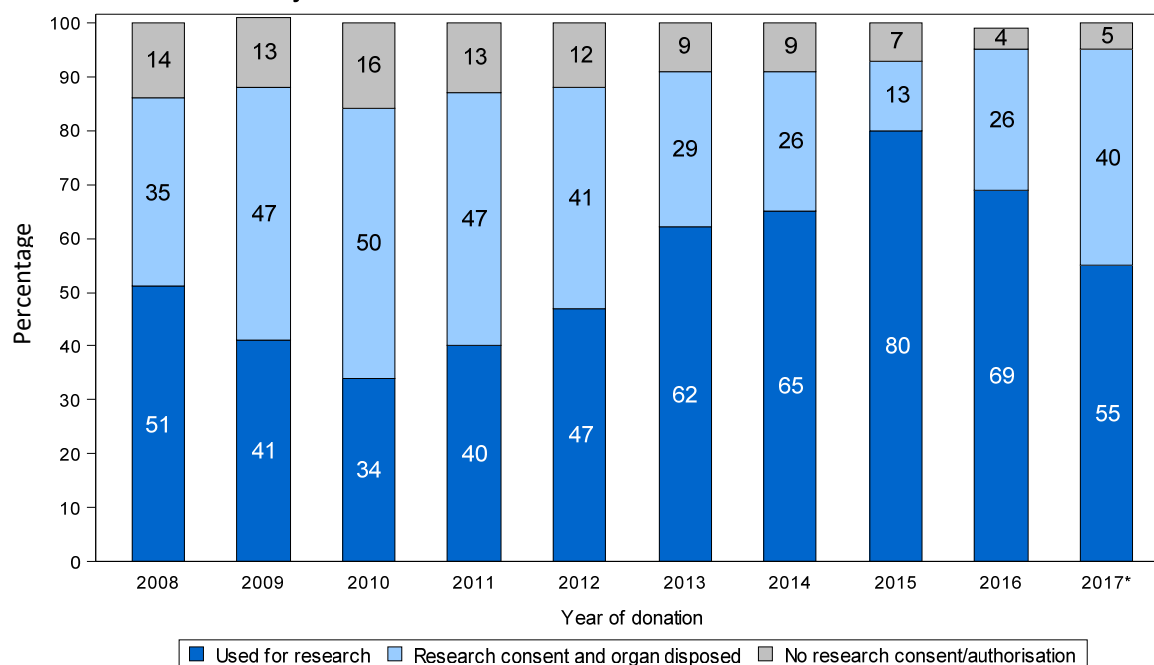
- 5 **Figure 1** shows the research outcome of UK donor organs that were retrieved and not transplanted between 1 January 2008 and 31 December 2017.
- 6 Overall, the total number of organs retrieved and not transplanted has steadily increased since 2008.
- 7 In addition, the proportion of these organs that have consent/authorisation for research has increased to around 95% for the last two years, as shown in **Figure 2**. The availability of organs for research was therefore at an all-time high in 2017.
- 8 However, despite a total of 727 organs available for research in 2017, only 423 (55%) were used for research. Prior to 2016, the proportion of discarded organs with research consent/authorisation had been steadily decreasing since 2010.

Figure 1 Number of organs that were retrieved and not transplanted by research outcome, from 1 January 2008 - 31 December 2017



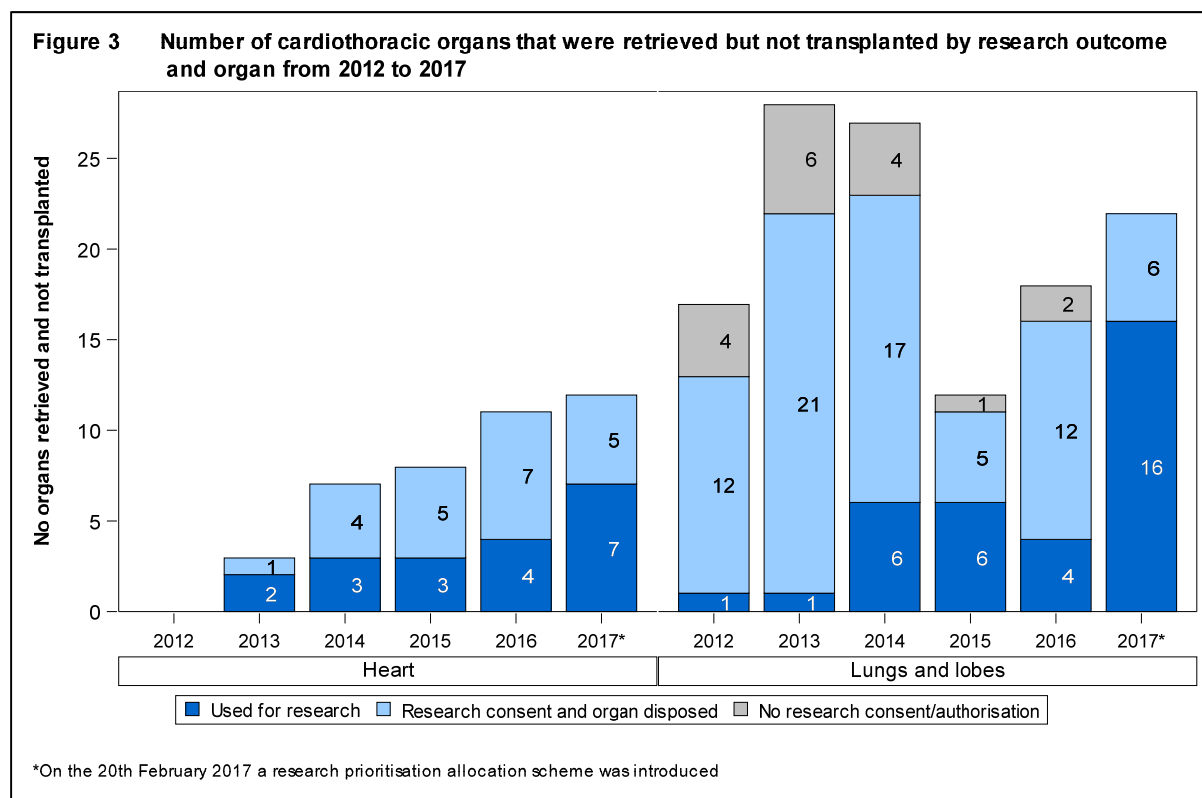
*On the 20th February 2017 a research prioritisation allocation scheme was introduced

Figure 2 Percentage of organs that were retrieved but not transplanted by research outcome, from 1 January 2008 - 31 December 2017



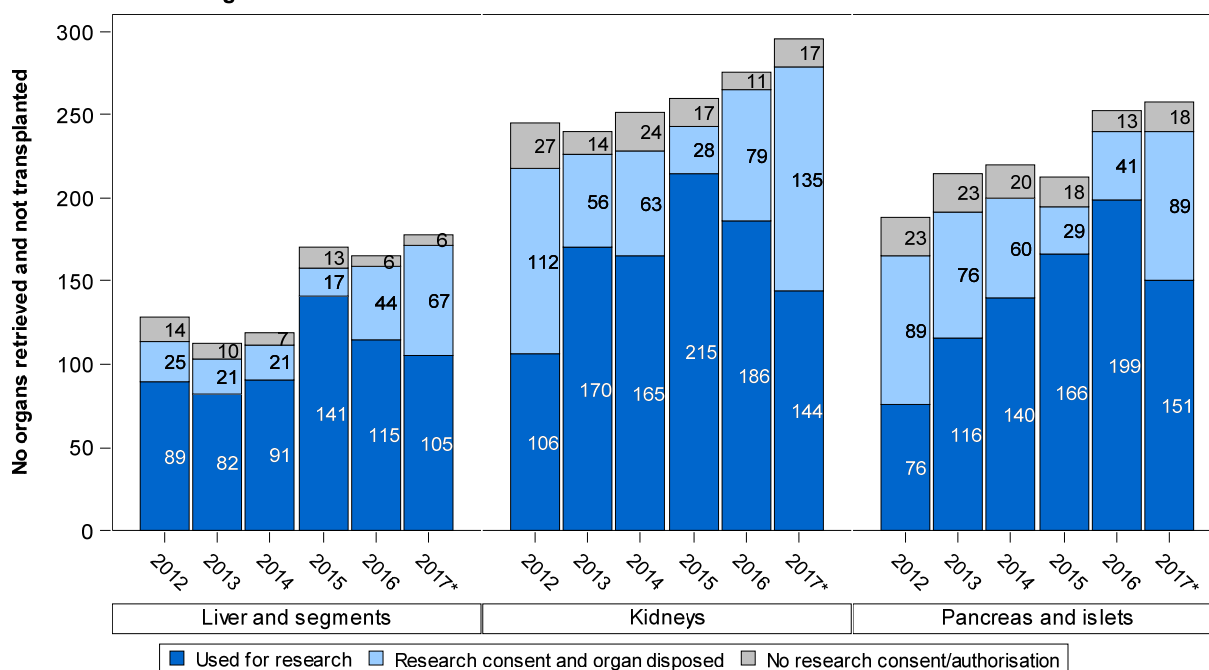
*On the 20th February 2017 a research prioritisation allocation scheme was introduced

- 9 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**.



- 10 The number of cardiothoracic organs available for research is small, as seen in **Figure 3**. However, 2017 saw the highest utilisation of these organs of all six years analysed (64% for hearts and 73% for lungs).
- 11 **Figure 4** shows that the number of abdominal organs available for research has generally been increasing. However, particularly for kidneys and pancreases, the number of discarded organs with research consent/authorisation increased substantially in 2017.

Figure 4 Number of abdominal organs that were retrieved and not transplanted by research outcome and organ from 2012 to 2017



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

12 **Table 1** and **2** show the total number of organs received by research study in 2017 split by cardiothoracic and abdominal organs, respectively.

13 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 study in 2017

Organ	Study Number	Ranking as at October 2017	Start year	End year	Organs received	
					N	%
Hearts	67	1	2017	2021	5	71
	36	NA			1	14
	Not reported		1	14		
	Total		7	100		
Lungs	66	1	2016	2020	2	13
	58	2	2016	2020	6	38
	38	NA	2014	2024	1	6
	59	NA	2016	2018	1	6
	Not reported				6	38
Total				16	100	
Cardiothoracic organs	Total				23	100

Table 2 Abdominal organs received by study in 2017

Organ	Study Number	Rank	Start year	End year	Organs received	
					N	%
Liver and segments	21	1	2015	2018	5	5
	62	1	2016	2018	7	7
	35	2	2014	2018	12	11
	60	2	2016	2018	11	10
	33	3	2006	2017	11	10
	50	3	2014	.	10	10
	56	4	2016	2021	6	6
	52	5	2015	2017	8	8
	18	6	2011	2018	1	1
	68	7	2017	2022	1	1
	36	Tissue bank			1	1
	33/35/62	Birmingham			8	8
	Unknown study				24	23
Total				105	100	
Kidneys	53	1	2015	2019	6	4
	37	3	2015	2018	9	6
	48	3	2015	2017	19	13
	63	4	2016	2018	8	6
	23	5	2012	2019	16	11
	2	6	2017	2022	22	15
	19	7	2007	.	2	1
	40	8	2014	2024	4	3
	30	9	2013	.	4	3
	31	Tissue bank			24	17
	36	Tissue bank			4	3
	Unknown study				26	19
	Total				144	100
Pancreas and Islets	20	1	2005	2018	9	6
	45	2	2009	2017	32	21
	50	3	2014	.	14	9
	3	5	2017	2022	3	2
	2	6	2017	2022	5	3
	36	Tissue bank	.	.	2	1
	46	NA	.	.	16	11
	47		2002	.	4	3
	64		2016	2017	13	9
	Unknown study				53	36
Total				151	100	
Total abdominal organs	Total				400	100

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 around 95% for the last two years. However, the number of discarded abdominal organs with research consent/authorisation was substantially higher in 2017 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.

Cathy Hopkinson
Statistics and Clinical Studies

March 2018

APPENDIX – Research studies ranking as at October 2017

Organ	Study	Rank	Location	Study Title
Heart	67	1	Imperial	Structural and functional analysis of intact myocardium and isolated cells from explanted hearts
Lung	66	1	Newcastle	Further Evaluation of Ex Vivo Lung Perfusion to Improve Transplantation Outcomes
Lung	58	2	Edinburgh	ENLIGHTEN - Multiplexed Optical Molecular Imaging and Sensing during Ex Vivo Lung Perfusion (EVLP)
Lung	38	NA	Harefield	Ex vivo transplant platforms used to explore the pathogenesis of acute lung injury
Lung	59	NA	Belfast	Human ex-vivo lung perfusion research consortium UK (HELP RCUK)
Liver	21	1	Cambridge	Development of pre-transplant normothermic perfusion reconditioning for human livers donated after circulatory death
Liver	62	1	Birmingham	Viability testing and transplantation of marginal livers - VITTAL
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	33	3	Birmingham	Expression and Function of Immune Regulatory Proteins in Human Liver
Liver	56	4	Edinburgh	Human Hepatic Progenitor Cells as a Source of Liver Regeneration
Liver	52	5	Newcastle	Establishing ex-vivo normothermic and hypothermic perfusion of livers for transplantation
Liver	50	6	Royal Free	Organ regeneration and disease modelling using 3D biological scaffold
Liver	18	6	Royal Free	Liver Viability Enhancement during Transportation - LIVET
Liver	68	7	King's	Hepatocyte Transplantation Project: Studies on isolated hepatocytes
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	3	Newcastle	Establishing ex vivo normothermic perfusion (EVNP) of kidneys for transplantation
Kidney	37	3	Oxford	Normothermic Perfusion of Discarded Kidneys
Kidney	63	4	Guys	Transplanting the untransplantable - extending antibody incompatible transplantation using a normothermic perfusion model with cytoprotective agents
Kidney	23	5	Cambridge	Characterisation of ischaemia reperfusion injury in human kidneys Non-transplantable Kidneys
Kidney	2	6	Cambridge	Study of renal ischaemia-reperfusion injury and its amelioration
Kidney	19	7	Bristol	Establishment of cultured human glomerular cells for study of glomerular function in vitro
Kidney	40	8	Royal Free	Identification of genes involved in renal, electrolyte and urinary tract disorders
Kidney	30	9	Hammersmith	Use of Machine Perfusion for Improving Allograft Viability
Pancreas islets	20	1	Newcastle	Process development for islet isolation targeted at enhancing islet yield and viability
Pancreas islets	45	2	Oxford	Studies of Factors Influencing the Structure and Function of Human Pancreatic Islets for Transplantation
Pancreas	50	3	Royal Free	Organ Regeneration and Disease Modelling Using 3D Biological Scaffold
Pancreas	34	4	Worcester	A pre-clinical study of human islet function to improve long-term graft survival
Pancreas	3	5	Cambridge	Study of Pancreas Function, Physiology, Pathology and Therapeutics
Pancreas islets	40	6	Royal Free	Identification of genes involved in renal, electrolyte and urinary tract disorders
Pancreas	30	7	Hammersmith	Use of Machine Perfusion for Improving Allograft Viability
Pancreas islets	46	NA	Edinburgh	Edinburgh Islet Lab - supporting various islet research studies
Pancreas islets	47	NA	King's	King's Islet lab
Pancreas	64		Oxford	Assessment and Significance of Pancreatic steatosis in pancreas transplantation and its associations with graft pancreatitis