

# **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 December 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.
- 5 The proportion of discarded organs available with research consent/authorisation is substantially higher than in previous years; 40% in 2017 and 46% in 2018. Mostly abdominal organs which are being discarded.
- 6 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. Although three pancreas and kidney studies received no organs for their research in 2018.

**Cathy Hopkinson**  
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**April 2019**

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### 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. Within this paper we assess the availability of organs for research and identify the number of organs received by each research study.

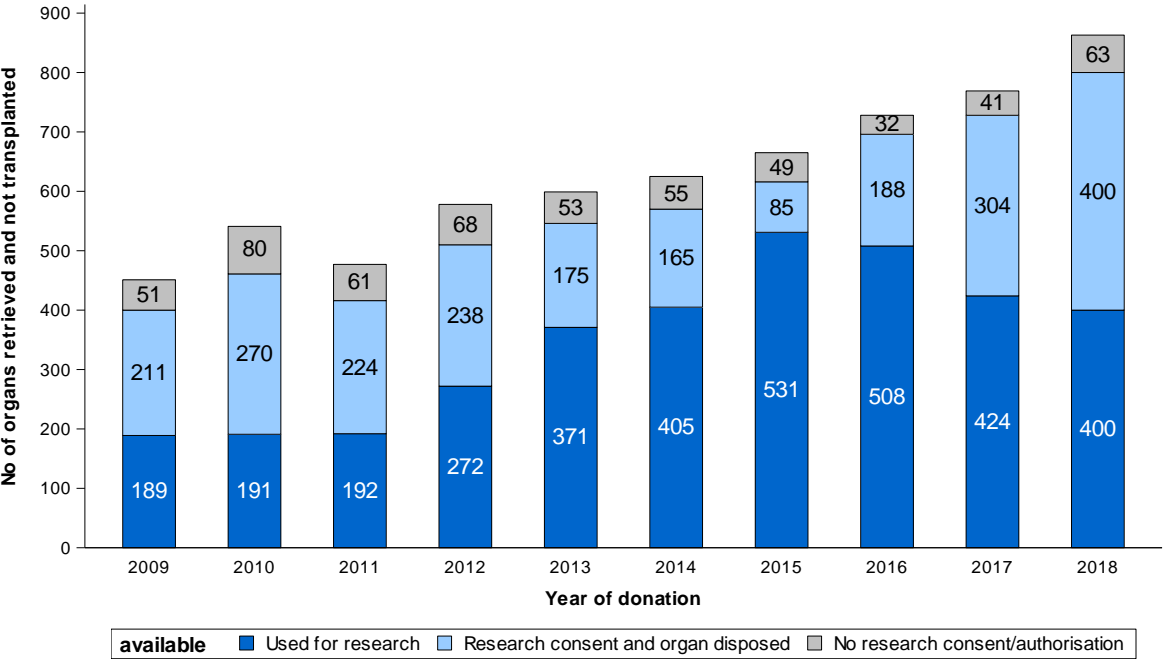
#### DATA AND METHODS

- 2 Organs that were retrieved and not transplanted were analysed for UK donors between 1 January 2009 and 31 December 2018. Research outcome was split into three categories: No research consent, used for research and organ disposed of with research consent.
- 3 Organs that were used for research in 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 April 2019.
- 4 Livers isolated for hepatocytes (transplanted or not transplanted) have been excluded from this analysis.

#### RESULTS

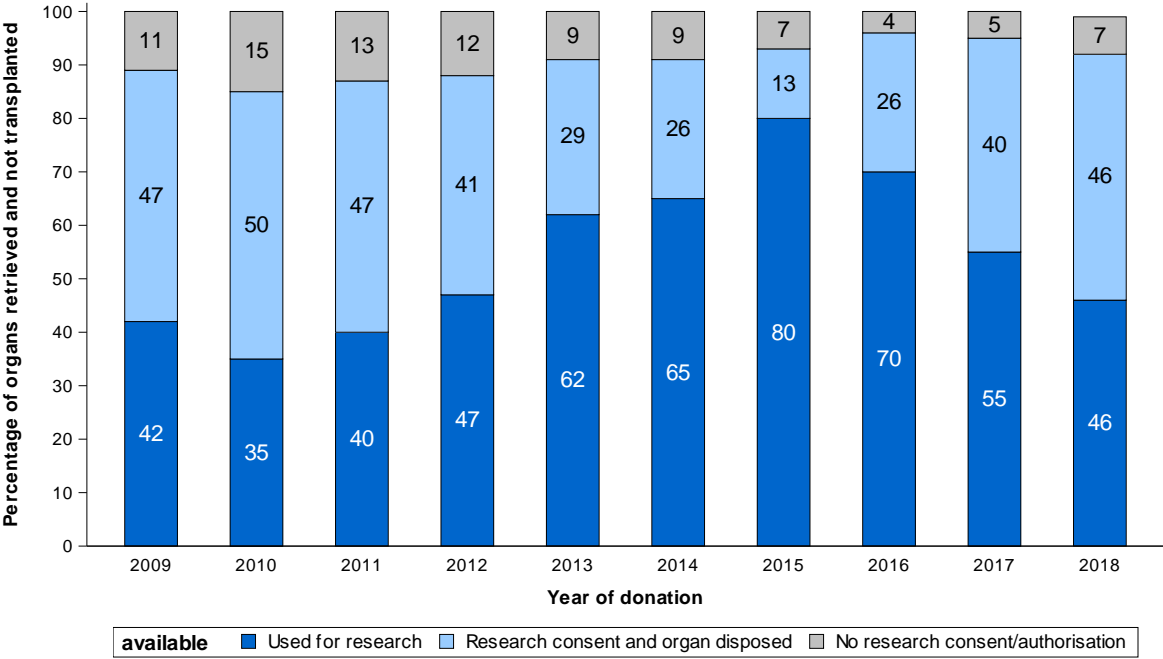
- 5 **Figure 1** shows the research outcome of UK donor organs that were retrieved and not transplanted between 1 January 2009 and 31 December 2018. Overall, the total number of organs retrieved and not transplanted has steadily increased since 2009.
- 6 In addition, the proportion of these organs that have consent/authorisation for research has generally increased since 2009. However, within the last year consent/authorisation for research has slightly dropped from 95% to 93%, as shown in **Figure 2**. The availability of organs for research was at an all-time high in 2018.
- 7 Despite a total of 863 organs available for research in 2018, only 400 (46%) were used for research. Prior to 2016, the proportion of discarded organs with research consent/authorisation had been steadily decreasing to 5% since 2010, in 2018 the proportion rose to 7%. Discard rates for research organs have increased a lot in the last couple of years to 46%, the rates are similar to those in 2011.

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



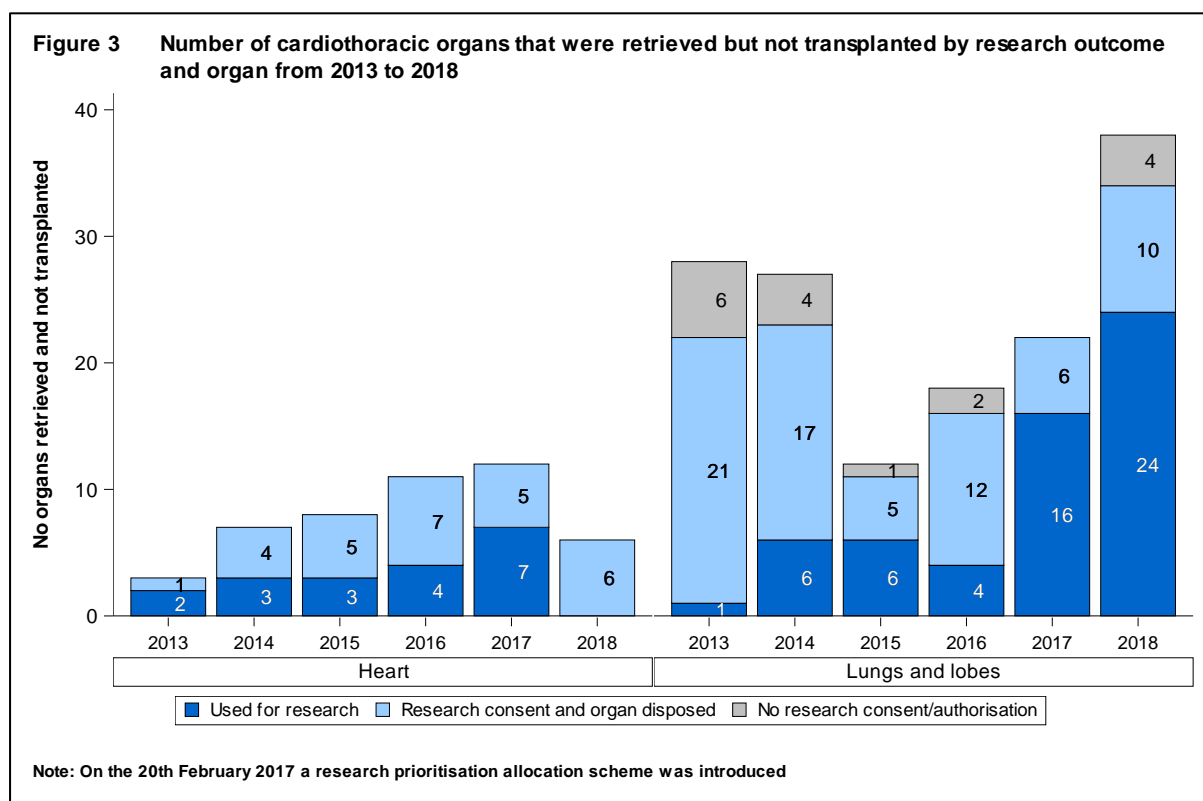
Note: On the 20th February 2017 a research prioritisation allocation scheme was introduced

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

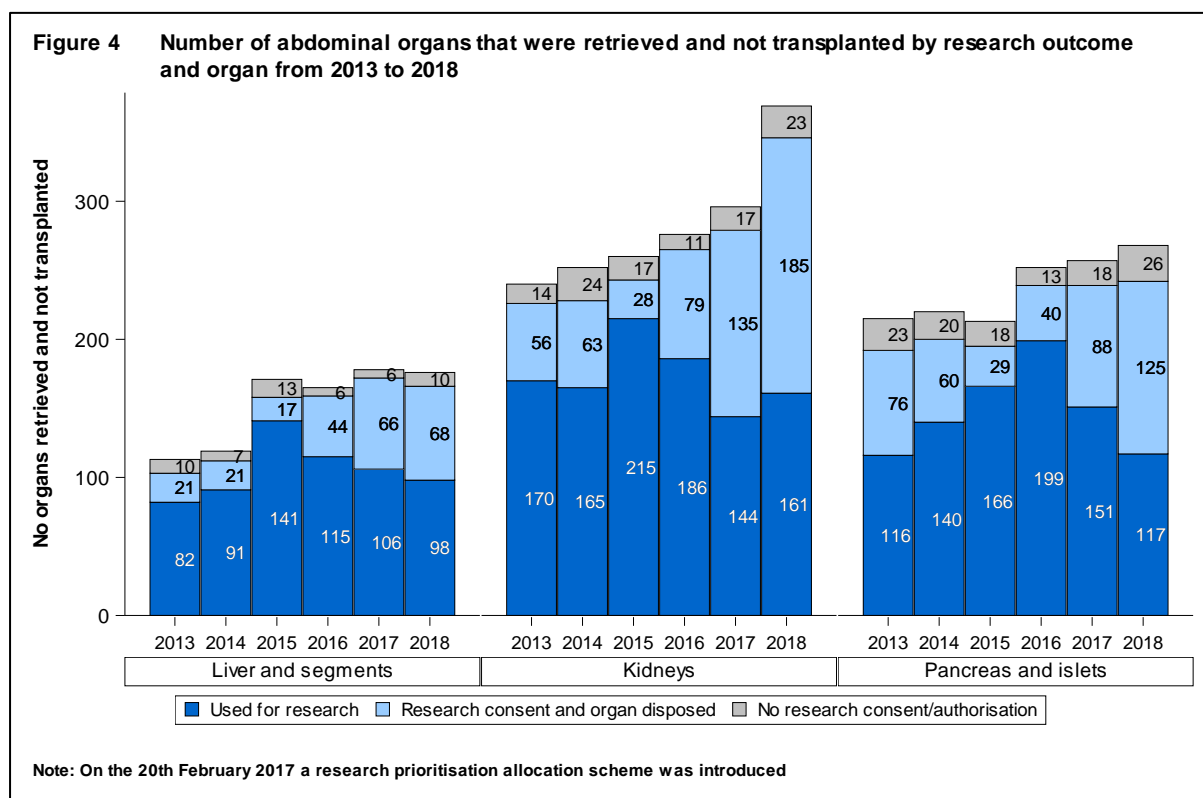


Note: On the 20th February 2017 a research prioritisation allocation scheme was introduced

- 8 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**.



- 9 The number of cardiothoracic organs available for research is small, as seen in **Figure 3**. The number of lungs available for research organs in 2018 has increased, the utilisation rate was 63%. No hearts have been utilised for research.
- 10 **Figure 4** shows that the number of abdominal organs available for research has generally been increasing particularly for kidneys. However, across all abdominal organs with the exception of liver, the proportion of discarded organs with research consent/authorisation increased substantially in 2017 and 2018.



11 **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. Although three pancreas and kidney studies received no organs for their research in 2018.

**Table 1** Cardiothoracic organs received by study in 2018

Organ	Study Number	Ranking as at April 2019	Start year	End year	Organs received	
					N	%
Hearts	67	1	2017	2022	None reported	0
Lungs	58	1	2016	2020	8	33
	66	2	2016	2020	10	42
	59	.	2016	2018	1	4
	36	Tissue bank	.	.	1	4
	Unknown study	NA	NA	NA	4	17
<b>Total</b>					<b>24</b>	<b>100</b>

Table 2 Abdominal organs received by study in 2018

Organ	Study Number	Ranking as at April 2019	Start year	End year	Organs received	
					N	%
Liver and segments	21	1	2015	2018	5	5
	35	2	2014	2018	6	6
	60	2	2016	2018	9	9
	56	3	2016	2021	3	3
	33	4	2006	2017	42	43
	50	5	2014	.	2	2
	52	5	2015	2017	7	7
	68	6	2017	2022	2	2
	36	Tissue bank	NA	NA	1	1
	62	NA	2016	2018	2	2
	Unknown study				19	19
<b>Total</b>				<b>98</b>	<b>100</b>	
Kidneys	53	1	2015	2019	None reported	0
	37	2	2015	2018	10	6
	48	2	2015	2017	3	2
	49	2	2015	2018	2	1
	63	3	2016	2018	1	1
	73	4	2018	2021	None reported	0
	2	5	2017	2022	58	36
	19	6	2007	.	16	10
	23	7	2012	2019	20	12
	40	8	2014	2024	None reported	0
	31	Tissue bank			27	17
	36	Tissue bank			5	3
	Unknown study				19	12
	<b>Total</b>				<b>161</b>	<b>100</b>
Pancreas and Islets	20	1	2005	2018	19	16
	34	2	2013		None reported	0
	50	3	2015		None reported	0
	40	4	2014	2024	None reported	0
	3	4	2017	2022	18	15
	36	Tissue bank			6	5
	45	NA	2009	2017	16	14
	46	Islet lab			10	9
	47	Islet lab	2002		16	14
	Unknown study				32	27
<b>Total</b>				<b>117</b>	<b>100</b>	
<b>Total abdominal organs</b>				<b>376</b>	<b>100</b>	

## **CONCLUSION**

- 12 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. However, the proportion of discarded abdominal organs with research consent/authorisation was substantially higher in 2017 (40%) and 2018 (46%) than in previous years.
- 13 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. Although three pancreas and kidney studies received no organs for their research in 2018.

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**April 2019**

## APPENDIX – Research studies 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