

# **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 7 months (1 January to 31 July 2019).

##### **DATA AND METHODS**

- 2 Organs that were retrieved and not transplanted were analysed for UK deceased donors between 1 January 2010 and 31 July 2019. 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 94% so far in 2019.
- 5 In 2015, the number of organs used for research was at its highest, 531 and since then has started to decline to 400 in 2018. Thus far, figures for 2019 show a similar trend.
- 6 The proportion of discarded organs where research consent/authorisation was ascertained is substantially higher than in previous years; 13% in 2015 to 47% from January to July 2019. Mostly, abdominal organs had a higher discard rate.
- 7 With the exception of pancreas, utilised research organs were distributed across many studies. This suggests that mostly studies that were ranked lower through the allocation scheme were still able to obtain research organs.

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### RESEARCH, INNOVATION AND NOVEL TECHNOLOGIES ADVISORY GROUP

#### AVAILABILITY OF ORGANS FOR RESEARCH

#### BACKGROUND

- 8 This paper investigates the pathway of organs that have been retrieved and not transplanted; these organs have the potential to be available for research purposes. However, some research organs are discarded due to a lack of consent/authorisation or 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.

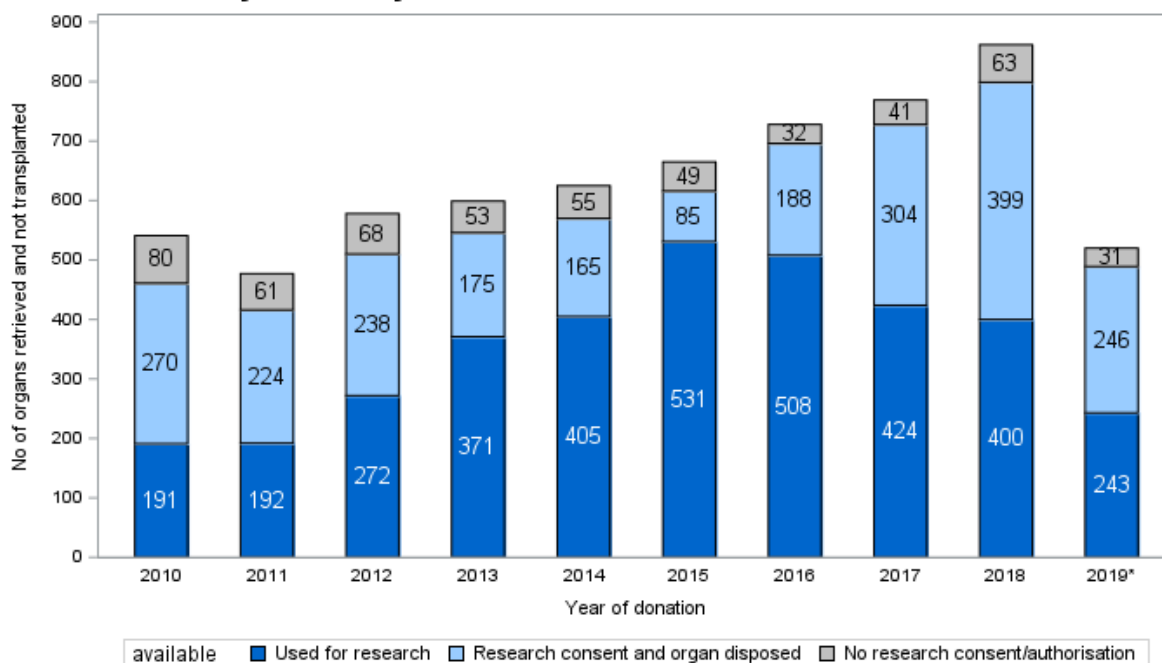
#### DATA AND METHODS

- 9 Organs that were retrieved and not transplanted were analysed for UK donors between 1 January 2010 and 31 July 2019. Research outcome was split into three categories: No research consent, used for research and organ disposed of with research consent.
- 10 Organs that were used for research in 2019 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 August 2019.
- 11 Livers isolated for hepatocytes (transplanted or not transplanted) have been excluded from this analysis.

#### RESULTS

- 12 **Figure 1** shows the research outcome of UK donor organs that were retrieved and not transplanted between 1 January 2010 and 31 July 2019. Overall, the total number of organs retrieved and not transplanted has steadily increased since 2010. The availability of organs for research was at an all-time high in 2018; thus far, figures for 2019 show a similar trend.
- 13 The proportion of potential organs available for research due to being retrieved and not transplanted are shown in **Figure 2**, by research outcome from 1 January 2010 to 31 July 2019. Consent/authorisation for research has been fairly constant in the last few years ranging from 93% to 96% and so the proportion of organs discarded due to a lack of research consent/authorisation is relatively small.
- 14 In 2015, the number of organs used for research was at its highest, 531 and since then has started to decline to 400 in 2018. Currently in 2019, 243 organs have been used for research so far. Discard rates for organs with research consent/authorisation have increased over the last few years to 47%.

**Figure 1** Number of organs that were retrieved and not transplanted by research outcome, 1 January 2010 - 31 July 2019

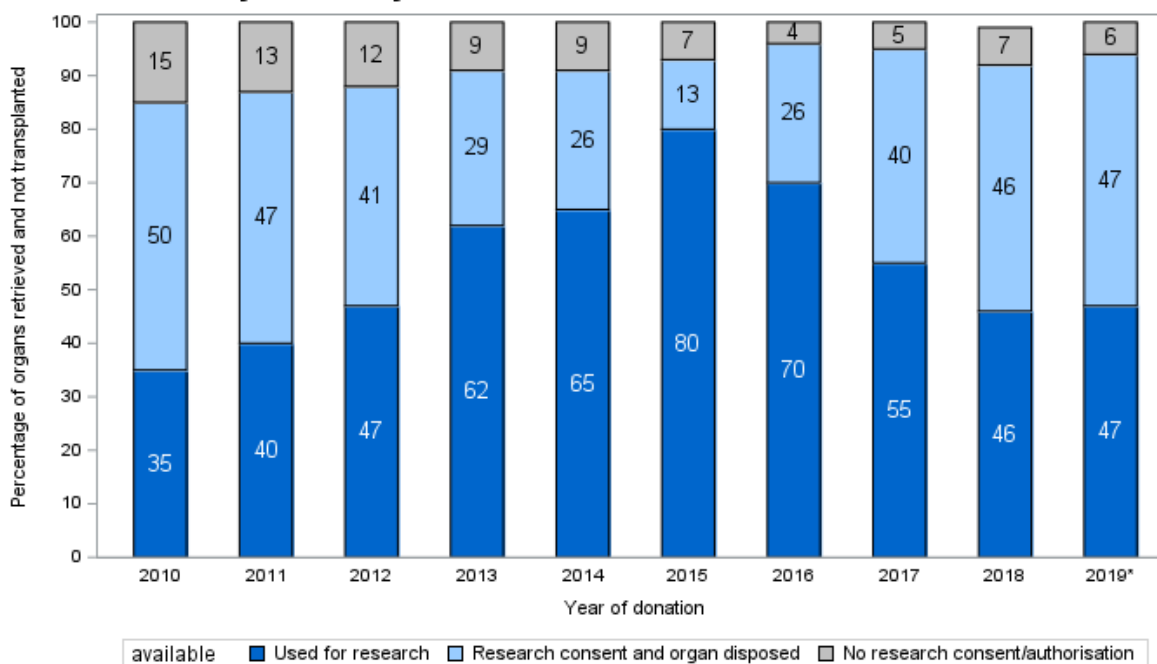


\* 1 January to 31 July 2019

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

15 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**.

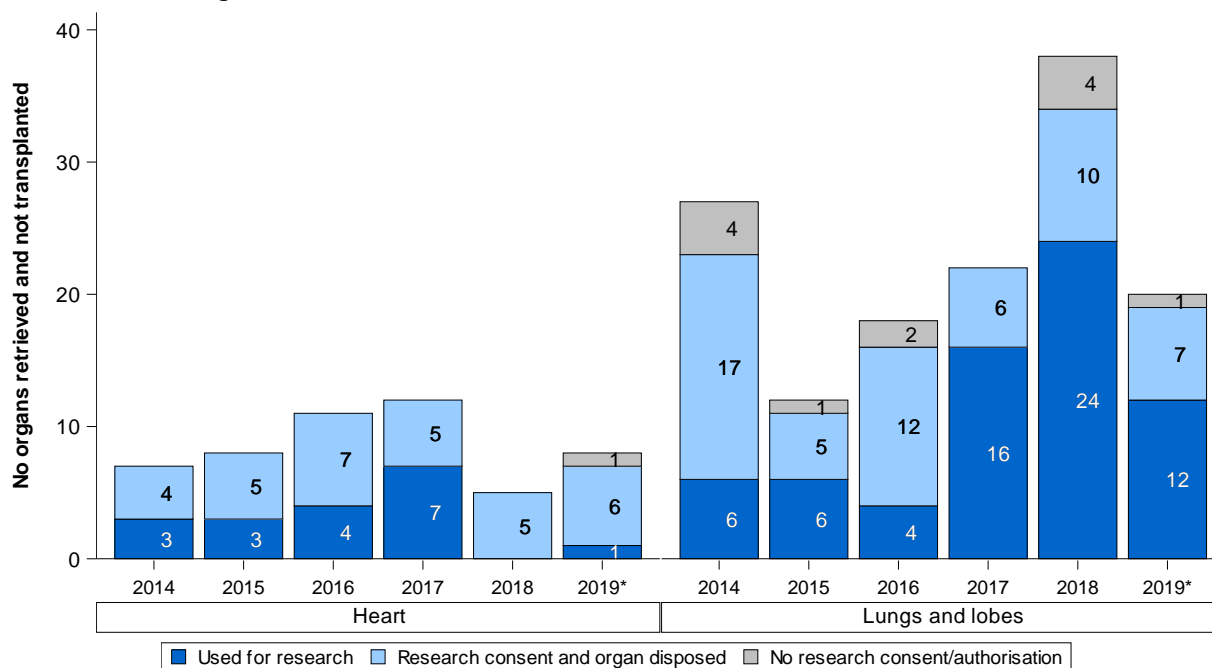
**Figure 2** Percentage of organs that were retrieved but not transplanted by research outcome, 1 January 2010 - 31 July 2019



\* 1 January to 31 July 2019

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

**Figure 3** Number of cardiothoracic organs that were retrieved but not transplanted by research outcome and organ from 2014 to 2019

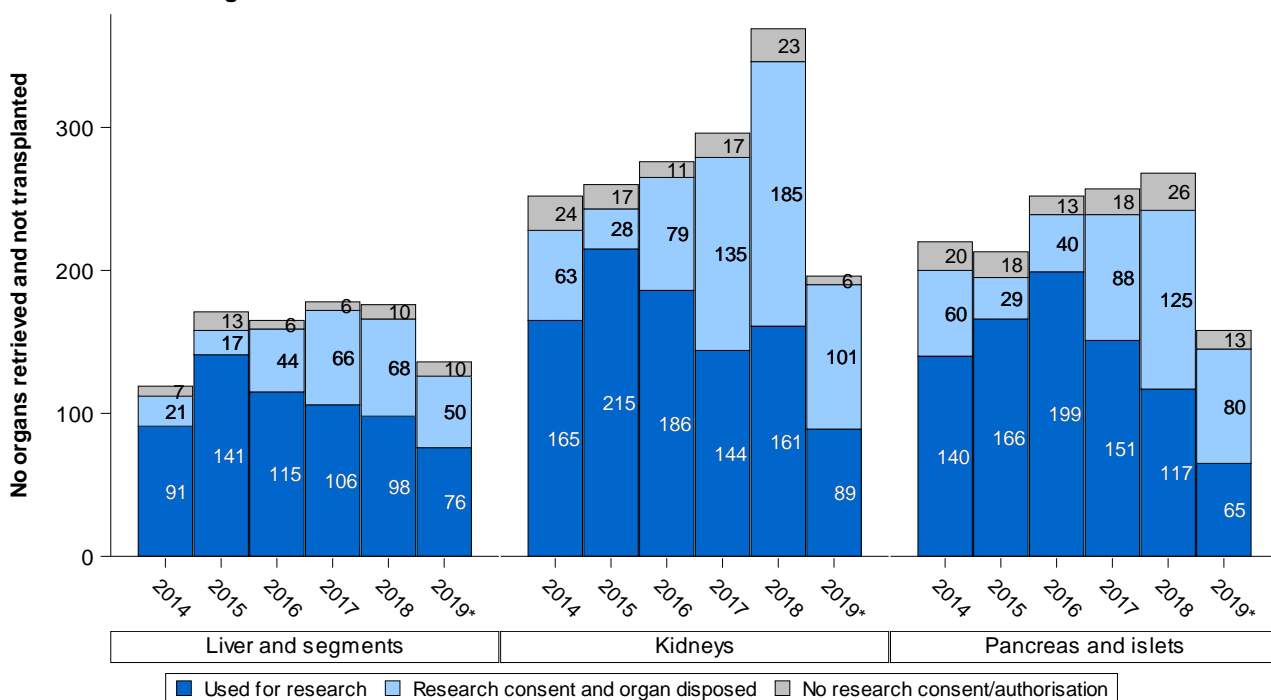


\* 1 January to 31 July 2019

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

- 16 The number of cardiothoracic organs available for research is small, as seen in **Figure 3**. So far, the number of lungs available for research in 2019 has increased, the utilisation rate was 67%. One heart has been utilised for research.
- 17 **Figure 4** shows that the number of abdominal organs available for research has generally been increasing, particularly for kidneys. Across all abdominal organs with the exception of liver, the proportion of discarded organs with research consent/authorisation has increased substantially since 2017.

**Figure 4** Number of abdominal organs that were retrieved and not transplanted by research outcome and organ from 2014 to 2019



\* 1 January to 31 July 2019

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

18 **Table 1** and **2** show the total number of organs received by research studies in from 1 January 2019 to 31 July 2019, for each of cardiothoracic and abdominal organs, respectively. The tables show that the research organs utilised were distributed across many studies with the exception of pancreases where research studies ranked 1 mostly received the organ. In other organ areas, lower ranked studies were still able to obtain research organs overall.

**Table 1** Cardiothoracic organs received by study from 1 January 2019 to 31 July 2019

Organ	Study Number	Ranking as at August 2019	Start year	End year	Organs received	
					N	%
Hearts	67	1	2017	2022	1	100
	<b>Total</b>				<b>1</b>	<b>100</b>
Lungs	58	1	2016	2020	6	50
	66	2	2016	2020	4	33
	Unknown study	NA	NA	NA	2	17
	<b>Total</b>				<b>24</b>	<b>100</b>

Table 2 Abdominal organs received by study from 1 January 2019 to 31 July 2019

Organ	Study Number	Ranking as at August 2019	Start year	End year	Organs received	
					N	%
Liver and segments	21	1	2015	2018	6	8
	50	2	2014	.	1	1
	52	2	2015	2017	2	3
	35	3	2014	2018	10	13
	56	3	2016	2021	8	11
	68	3	2017	2022	1	1
	33	4	2006	2017	40	53
	36	Tissue bank	NA	NA	3	4
	Unknown study				5	7
<b>Total</b>				<b>76</b>	<b>100</b>	
Kidneys	53	1	2015	2019	1	1
	48	2	2015	2017	5	6
	2	3	2017	2022	28	31
	63	4	2016	2018	2	2
	23	5	2012	2019	9	10
	73	5	2018	2021	4	4
	19	6	2007	.	16	18
	31	Tissue bank			15	17
	36	Tissue bank			6	7
Unknown study				3	3	
<b>Total</b>				<b>89</b>	<b>100</b>	
Pancreas and Islets	20	1	2005	2018	5	8
	3	1	2017	2022	21	32
	50	1	2014		2	3
	36	Tissue bank			4	6
	43	Tissue bank			1	2
	45	Islet lab	2009	2017	1	2
	47	Islet lab	2002		11	17
	Unknown study				20	31
<b>Total</b>				<b>65</b>	<b>100</b>	
<b>Total abdominal organs</b>				<b>230</b>	<b>100</b>	

## **CONCLUSION**

- 19 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 94% so far in 2019.
- 20 In 2015, the number of organs used for research was at its highest, 531 and since then has started to decline to 400 in 2018. Thus far, figures for 2019 show a similar trend.
- 21 The proportion of discarded organs where research consent/authorisation was ascertained is substantially higher than in previous years; 13% in 2015 to 47% from January to July 2019. Mostly, abdominal organs had a higher discard rate.
- 22 With the exception of pancreas, utilised research organs were distributed across many studies. This suggests that mostly studies that were ranked lower through the allocation scheme were still able to obtain research organs.

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## APPENDIX – Research studies ranking as at August 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 (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	50	2	Royal Free	Organ regeneration and disease modelling using 3D biological scaffold
Liver	52	2	Newcastle	Establishing ex-vivo normothermic and hypothermic perfusion of livers for transplantation
Liver	56	3	Edinburgh	Human Hepatic Progenitor Cells as a Source of Liver Regeneration
Liver	35	3	Birmingham	Normothermic Liver Perfusion Study (The development of NMLP for improvement of marginal human donor liver quality)
Liver	68	3	King's	Hepatocyte Transplantation Project: Studies on isolated hepatocytes
Liver	33	4	Birmingham	Expression and Function of Immune Regulatory Proteins in Human Liver
Pancreas	20	1	Newcastle	Process development for islet isolation targeted at enhancing islet yield and viability
Pancreas	3	1	Cambridge	Study of Pancreas Function, Physiology, Pathology and Therapeutics
Pancreas	50	1	Royal Free	Organ Regeneration and Disease Modelling Using 3D Biological Scaffold
Pancreas	34	2	Worcester	A pre-clinical study of human islet function to improve long-term graft survival
Pancreas	40	3	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	2	3	Cambridge	Study of Renal Ischaemia Reperfusion Injury
Kidney	63	4	Guys	Transplanting the untransplantable - extending antibody incompatible transplantation using a normothermic perfusion model with cytoprotective agents
Kidney	73	5	Guys	Mobilisation and depletion of passenger leukocytes during warm perfusion of discarded deceased donor kidneys
Kidney	23	5	Cambridge	Characterisation of ischaemia reperfusion injury in human kidneys Non-transplantable Kidneys
Kidney	19	6	Bristol	Establishment of cultured human glomerular cells for study of glomerular function in vitro
Kidney	40	7	Royal Free	Identification of genes involved in renal, electrolyte and urinary tract disorders