NHS
Blood and Transplant

ANNUAL REPORT ON PANCREAS AND ISLET TRANSPLANTATION

REPORT FOR 2024/2025
(1 APRIL 2015 – 31 MARCH 2025)

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Contents

Executive Summary

This report presents key figures about pancreas and islet transplantation in the UK. The period reported covers ten years of pancreas and islet transplant data, from 1 April 2015 to 31 March 2025. The report presents information on the number of transplants and survival analysis after first simultaneous pancreas and kidney and pancreas only transplantation on a national and centre-specific basis. Also reported on a national basis is survival analysis after islet transplantation and additional outcome measures.

Key findings

- On the 31 March 2025, there were 370 patients on the UK active pancreas and islet transplant list, which represents a 11% increase in number of patients a year earlier. The number of patients on the active pancreas transplant list increased by 7% to 323 in 2025 and the active islet transplant list increased by 52% to 47 patients in the same time period.

- There were 1506 pancreas transplants performed in the UK in the ten year period and 244 islet transplants performed in the same time period. The number of transplants from donations after brain death has decreased by 3% in the last year to 96. The number of transplants from donations after circulatory death has decreased by 25% in the last year to 46.

- The national rates of patient survival one- and five-years after first simultaneous pancreas and kidney transplant from deceased donors are 97% and 93%, respectively. These rates vary between centres, ranging from 93% to 100% at one-year and 90% to 100% at five-years. All centre rates are risk-adjusted.

- The national rates of graft survival one- and five-years after first simultaneous pancreas and kidney transplant from deceased donors are 90% and 86%, respectively. These rates vary between centres, ranging from 78% to 95% at one-year and 81% to 90% at five-years. All centre rates are risk-adjusted.

- The national rates of patient survival one- and five-years after first pancreas only transplant from deceased donors are both 100%. The national rates of graft survival at one- and five-years are both 69%.

- The national rate of ten-year patient survival from listing for deceased donor simultaneous pancreas and kidney transplant is 78%. The rates at centres range from 76% to 82%. All centre rates are risk-adjusted.

- The national rates of one- and five-years graft survival for patients receiving a first routine islet transplant are 93% and 61%. For patients with a functioning graft at one-year post-transplant, the national rate of five year graft survival was 74% for patients receiving an additional priority islet graft and 58% for patients who did not. The national rates of one- and five-years graft survival for patients receiving an simultaneous islet and kidney transplant are 79% and 34%.

- Reductions in annual rate of severe hypoglycaemic events, median HbA1c and median insulin requirements have been reported at one-year post routine islet transplant.

Use of the contents of this report should be acknowledged as follows:
Annual Report on Pancreas and Islet Transplantation 2024/25, NHS Blood and Transplant.

Introduction

This report presents information on pancreas and islet transplant activity between 1 April 2015 and 31 March 2025, for all eight centres performing pancreas transplantation and six centres performing islet transplantation in the UK. Cambridge, Cardiff, Guy's and WLRTC only perform pancreas transplants while King's College and the Royal Free only perform islet transplants. Throughout this report West London Renal and Transplant Centre is labeled as WLRTC, simultaneous pancreas and kidney transplants and simultaneous islet and kidney transplants are reported as SPK and SIK transplants, respectively.

Data were obtained from the UK Transplant Registry, at NHS Blood & Transplant, that holds information relating to donors, recipients and outcomes for all pancreas and islet transplants performed in the UK. Graft and patient pancreas survival estimates are reported at one-year post-transplant for the period 1 April 2020 to 31 March 2024 and five-year post-transplant for the period 1 April 2016 to 31 March 2020.

Islet transplant survival is measured by four key variables: graft survival, and a reduction in HbA1c, insulin requirements and the annual rate of severe hypoglycaemic events. Islet outcomes are reported at one-year post-transplant for the period 1 April 2020 to 31 March 2024, and graft survival at five-year post-transplant for the period 1 April 2015 to 31 March 2024, for the national cohort only. Graft survival at five-year post SIK transplant is reported for the period 1 April 2017 to 31 March 2024. Islet outcomes are unadjusted for risk and islet outcome data from the UK Transplant Registry is supplemented by data collected from the UK Islet Transplant Consortium.

Pancreas patient survival from listing is reported at one, five and ten years post registration for all first deceased donor simultaneous pancreas and kidney transplants between 1 January 2013 and 31 December 2024.

The centre specific results for survival estimates are adjusted for differences in risk factors between the centres. The risk models and methods used are described in the Appendix.

Patients requiring multi-organ transplants (except simultaneous pancreas and kidney or islets and kidney transplants (SPK and SIK)) are excluded from all analyses apart from the introduction. All results are described separately for pancreas and islet transplant recipients other than those presented in this introduction section. Intestinal transplants that involve a pancreas are excluded from all sections of the report.

The COVID-19 pandemic led to unprecedented challenges for UK transplantation. Concerns about the ability to care for transplant recipients, lack of access to resource because it was being used for patients in the pandemic, and the risk versus benefit for immunosuppressed transplant recipients, resulted in a major reduction in the number of organ transplants undertaken and the impact of the pandemic is still evident.

Figure 2.1 shows the number of patients on the pancreas and islet transplant list at 31 March each year between 2016 and 2025. The number of patients actively waiting for a pancreas or islet transplant has increased by 63% from 227 in 2016 to 370 in 2025, which is the highest number across the decade.

Figure 2.1 Patients on the pancreas and islet transplant list at 31 March

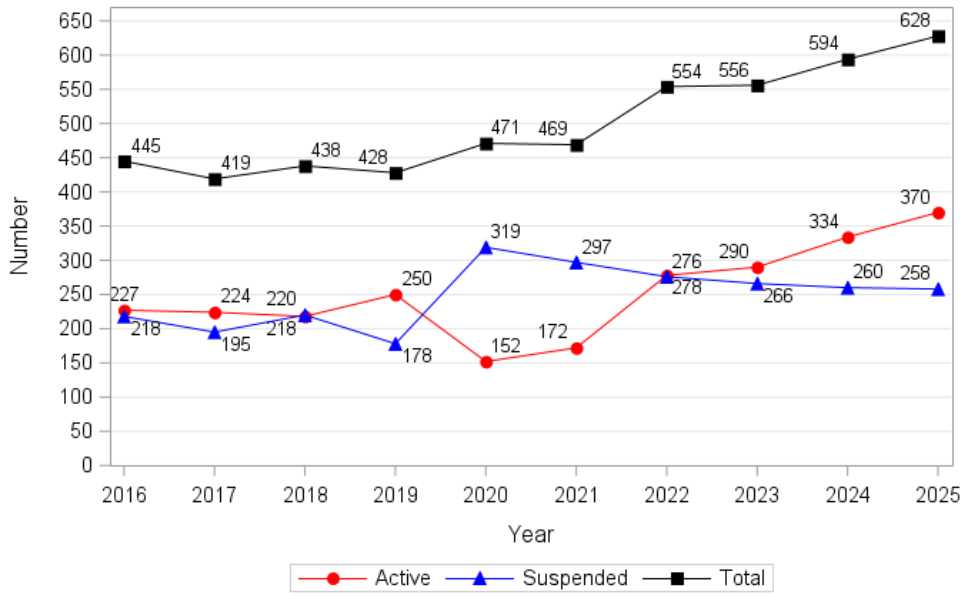


Figure 2.2 shows the number of patients on the pancreas and islet transplant list at 31 March 2025 for each transplant centre. Manchester has the largest transplant list with 135 patients registered for a pancreas or islet transplant. Of these patients, 111 are registered for a SPK, 14 for a SIK, six for an islet only and four for a pancreas only transplant. Edinburgh, Manchester and Oxford have patients waiting for an SIK transplant, 28 in total. There were no patients on the active islet list at King's College or The Royal Free at 31 March 2025.

Figure 2.2 Patients on the active pancreas and islet transplant list at 31 March 2025, by centre

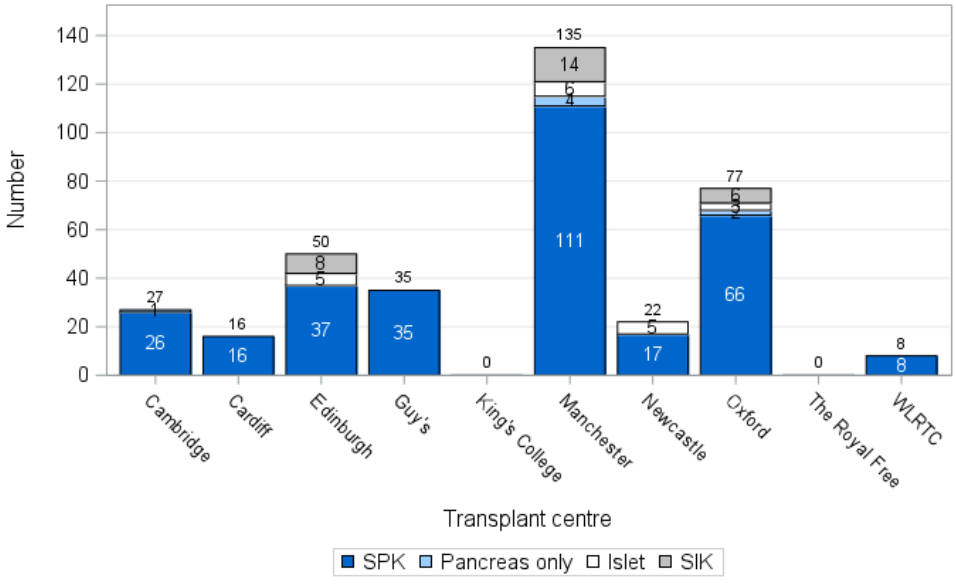


Figure 2.3 shows the total number of pancreas and islet transplants performed in the last ten financial years. Transplant numbers decreased gradually from 216 in 2015/16 to 203 in 2019/20 and then halved to 101 in 2020/21 due to the COVID-19 pandemic. In 2024/25 transplant numbers slightly decreased to 142 transplants from 160 in 2023/24. In particular, the number of pancreas only transplants decreased from 18 transplants in 2015/16 to six in 2024/25.

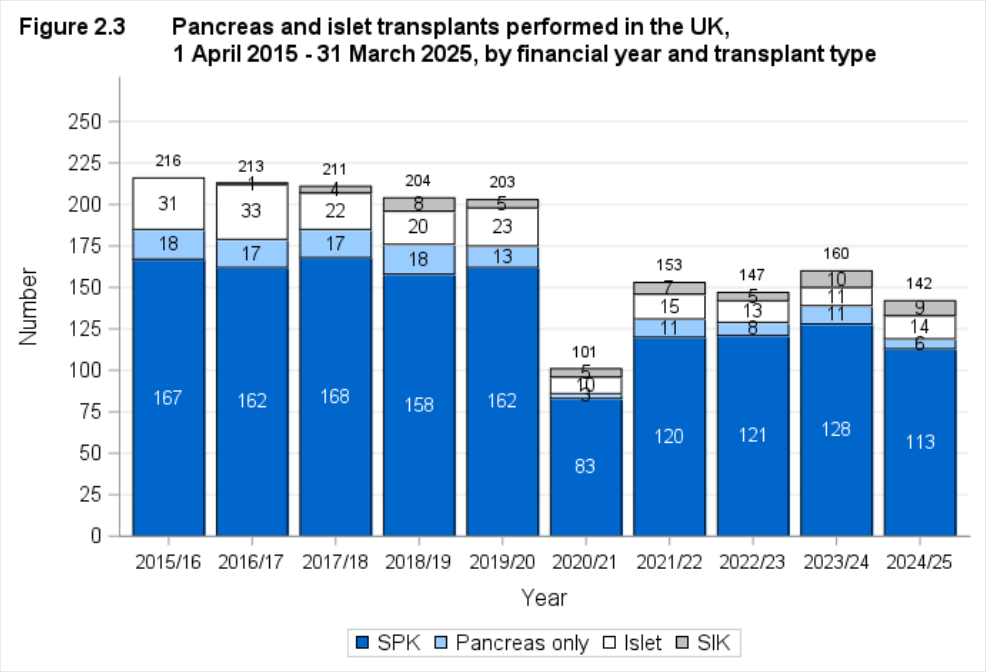


Figure 2.4 shows the total number of pancreas and islet transplants performed in 2024/25 at each transplant centre. Overall, Oxford performed the most transplants last year (40). Oxford performed the most whole pancreas (including SPK) transplants (35), whilst Edinburgh performed the most islet (including SIK) transplants (12). A total of 9 SIK transplants were performed at Manchester (3), Edinburgh (3) and Oxford (3). King's College and The Royal Free performed no transplants during this time period.

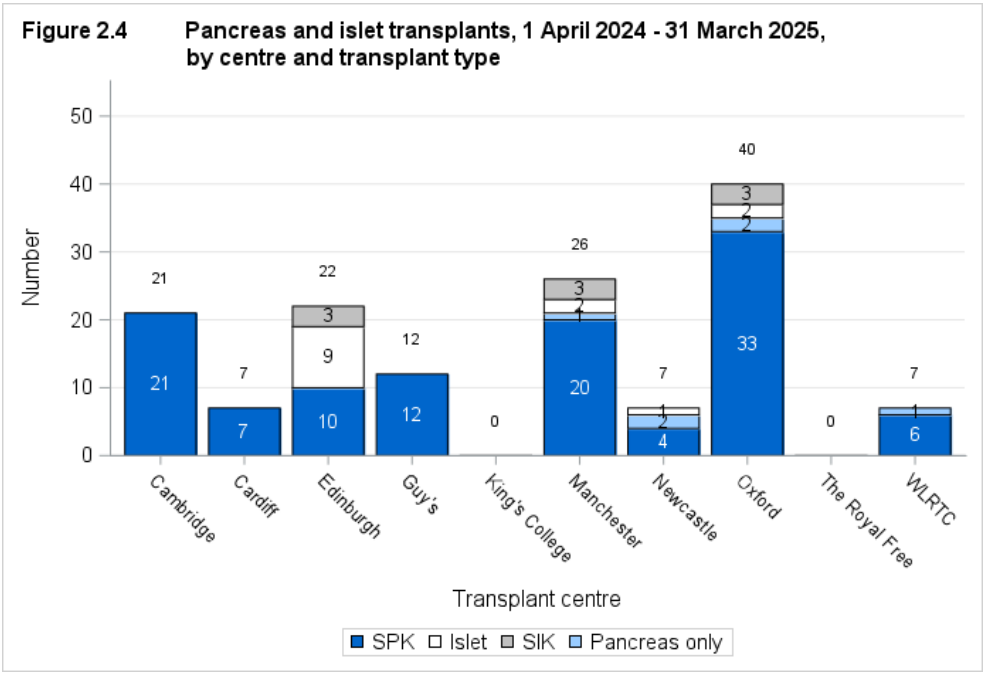
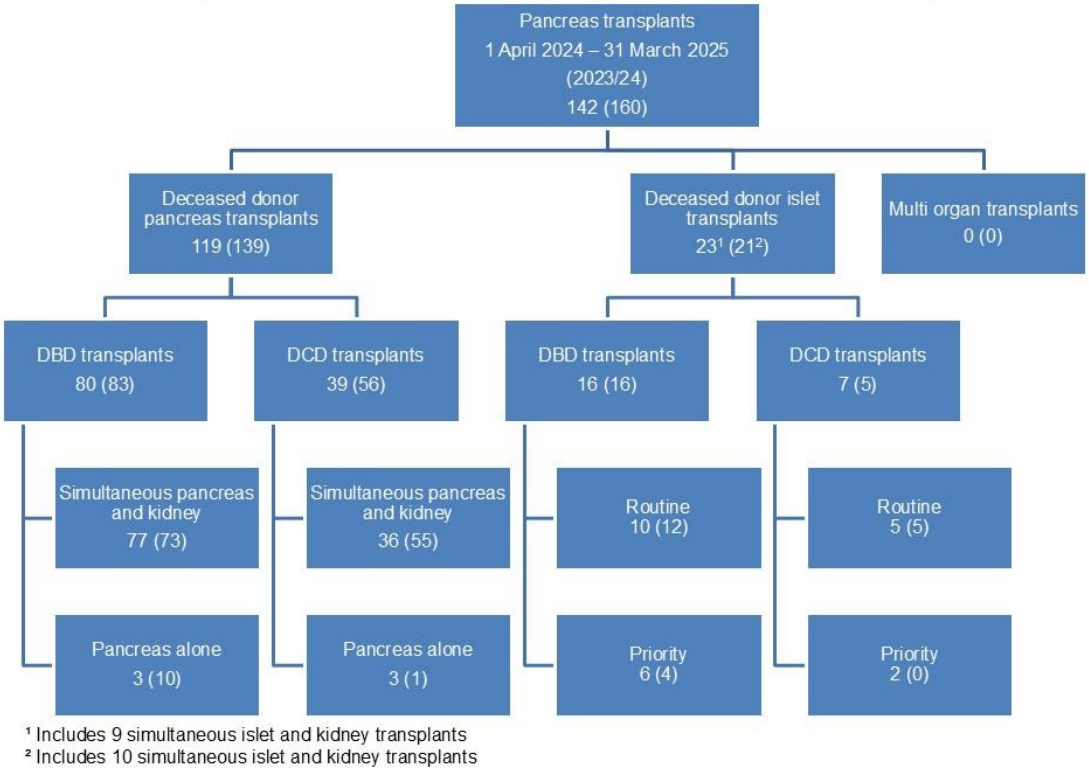


Figure 2.5 details the 142 pancreas and islet transplants performed in the UK between 1 April 2024 and 31 March 2025. Data for transplants performed in 2023/24 are also presented. The overall number of whole pancreas transplants performed in 2024/25 has decreased by 20 compared with 2023/24 to 119. The number of islet transplants has increased by two compared with 2023/24 to 23.

Figure 2.5 Pancreas and islet transplants performed in the UK, 1 April 2024 – 31 March 2025 (1 April 2023 – 31 March 2024)



[1] Includes 9 simultaneous islet and kidney transplants
[2] Includes 10 simultaneous islet and kidney transplants

Geographical variation in registration and transplant rates

Figure 2.6 shows rates of registration to the pancreas and islet transplant list per million population (pmp) between 1 April 2024 and 31 March 2025 compared with pancreas and islet transplant rates pmp for the same time period, by recipient country/NHS region of residence. **Table 2.2** shows the breakdown of these numbers by recipient country/NHS region of residence. No adjustments have been made for potential demographic differences in populations. If a patient has had more than one registration/transplant in the period, each registration/transplant is considered. Note that this analysis only considered NHS Group 1 patients.

Since there will inevitable be some random variation in rates between areas, the systematic coefficient component of variation (SCV) was used to identify if the variation is more (or less) than a random effect for the different NHS regions in England only. Only first registrations and transplants in this period were considered. The larger the SCV the greater the evidence of a high level of systematic variation between areas. Registration and transplant rates yielded an SCV of 0.0691 (p-value = 0.002) and 0 (p-value =0.999), respectively. The p-value shows the probability that an SCV of this size (or higher) would be observed by chance if only random variation existed and therefore, strong evidence of geographical variation beyond what would be expected at random for registration rates but not transplant rates. No adjustment has been made for area-specific demographic characteristics that may impact the rates of registration to the transplant list and transplantation such as age and sex. Therefore, these results should be interpreted with caution.

Figure 2.6 Comparison of pancreas and islet registration rates (pmp) with transplant rates (pmp) by recipient country/NHS region of residence

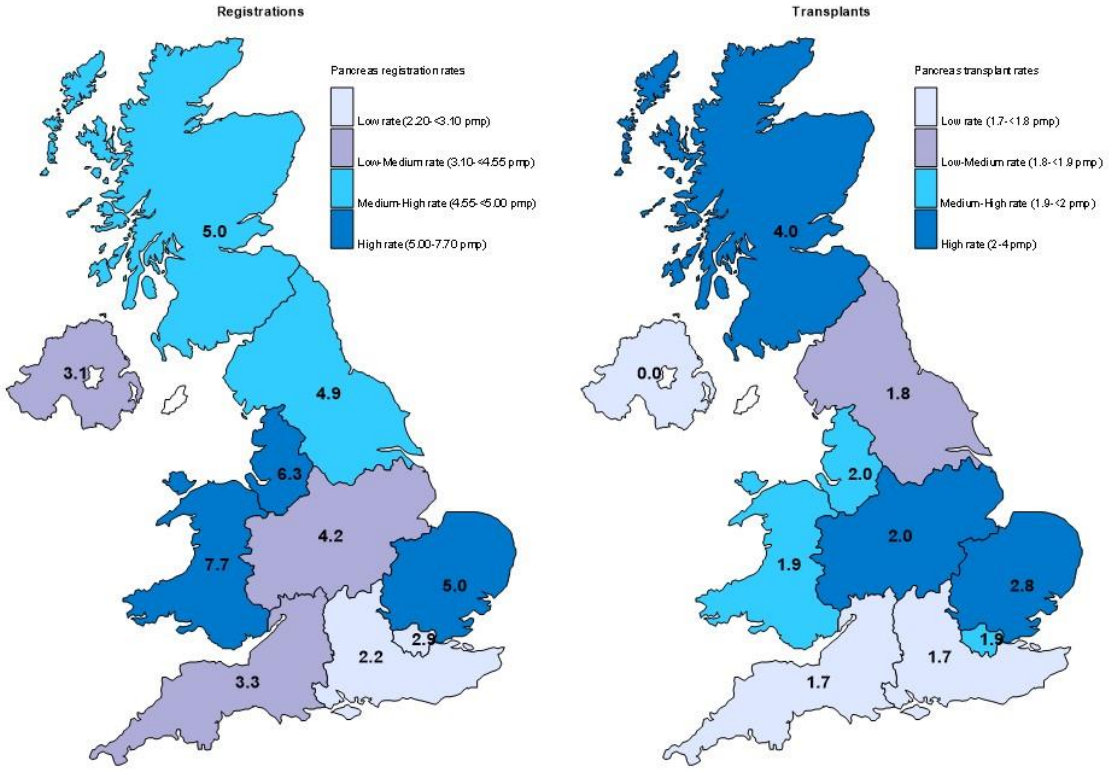


Table 2.1 Pancreas and islet registration and transplant rates per million population (pmp) in the UK, 1 April 2024 - 31 March 2025, by Country/NHS region

Country/NHS region	Registrations (pmp)		Transplants (pmp)	
North East and Yorkshire	40	(4.9)	15	(1.8)
North West	47	(6.3)	15	(2.0)
Midlands	46	(4.2)	22	(2.0)
East of England	32	(5.0)	18	(2.8)
London	26	(2.9)	17	(1.9)
South East	21	(2.2)	16	(1.7)
South West	19	(3.3)	10	(1.7)
England	**231**	**(4.0)**	**113**	**(2.0)**
Isle of Man	**0**	**(0.0)**	**0**	**(0.0)**
Channel Islands	**2**	**(11.8)**	**0**	**(0.0)**
Wales	**24**	**(7.7)**	**6**	**(1.9)**
Scotland	**27**	**(5.0)**	**22**	**(4.0)**
Northern Ireland	**6**	**(3.1)**	**0**	**(0.0)**
TOTAL[1,2]	**292**	**(4.3)**	**142**	**(2.1)**

[1] Registrations include 2 recipients whose postcode was unknown.
[2] Transplants include 1 recipient whose postcode was unknown.

Pancreas transplant list

3.1 Patients on the pancreas transplant list as at 31 March, 2016 – 2025

Figure 3.1 shows the number of patients on the pancreas transplant list at 31 March each year from 2016. The number of patients actively waiting for a pancreas transplant was the highest at 323 in 2025 an increase of 55% from 208 in 2019 prior to the COVID-19 pandemic. The number of suspended patients has gradually decreased since the spike caused by COVID-19 in 2020.

Figure 3.1 Patients on the pancreas transplant list at 31 March

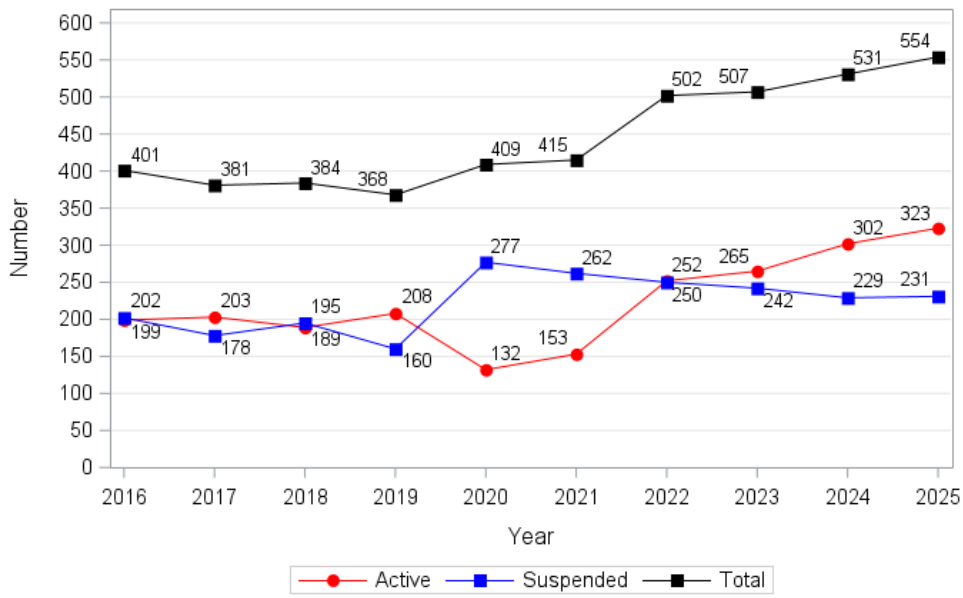


Figure 3.2 shows the number of patients on the active pancreas transplant list at 31 March 2025 by centre. Manchester had the largest proportion of the transplant list (36%), followed by Oxford with 21%.

Figure 3.2 Patients on the active pancreas transplant list at 31 March 2025, by centre

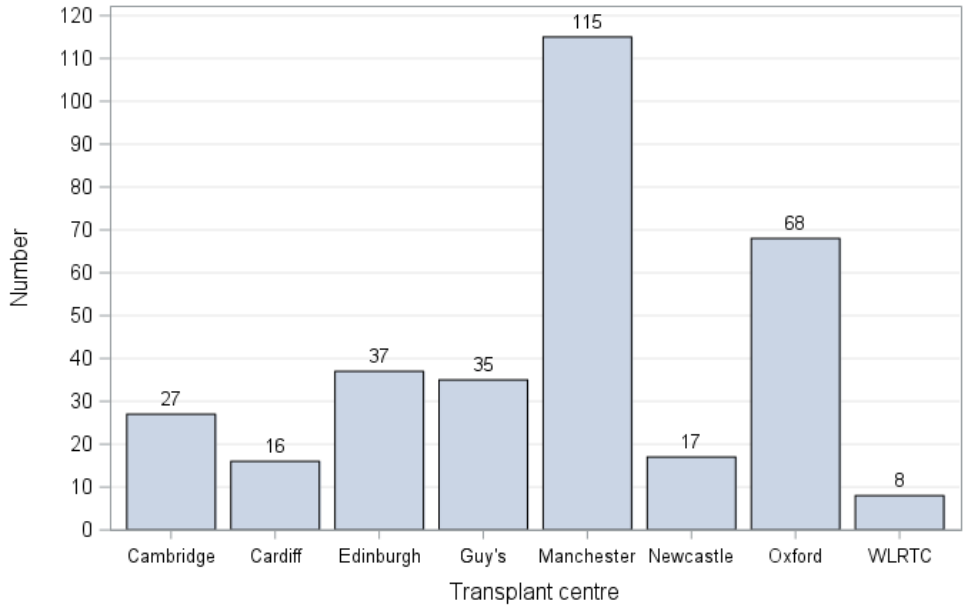
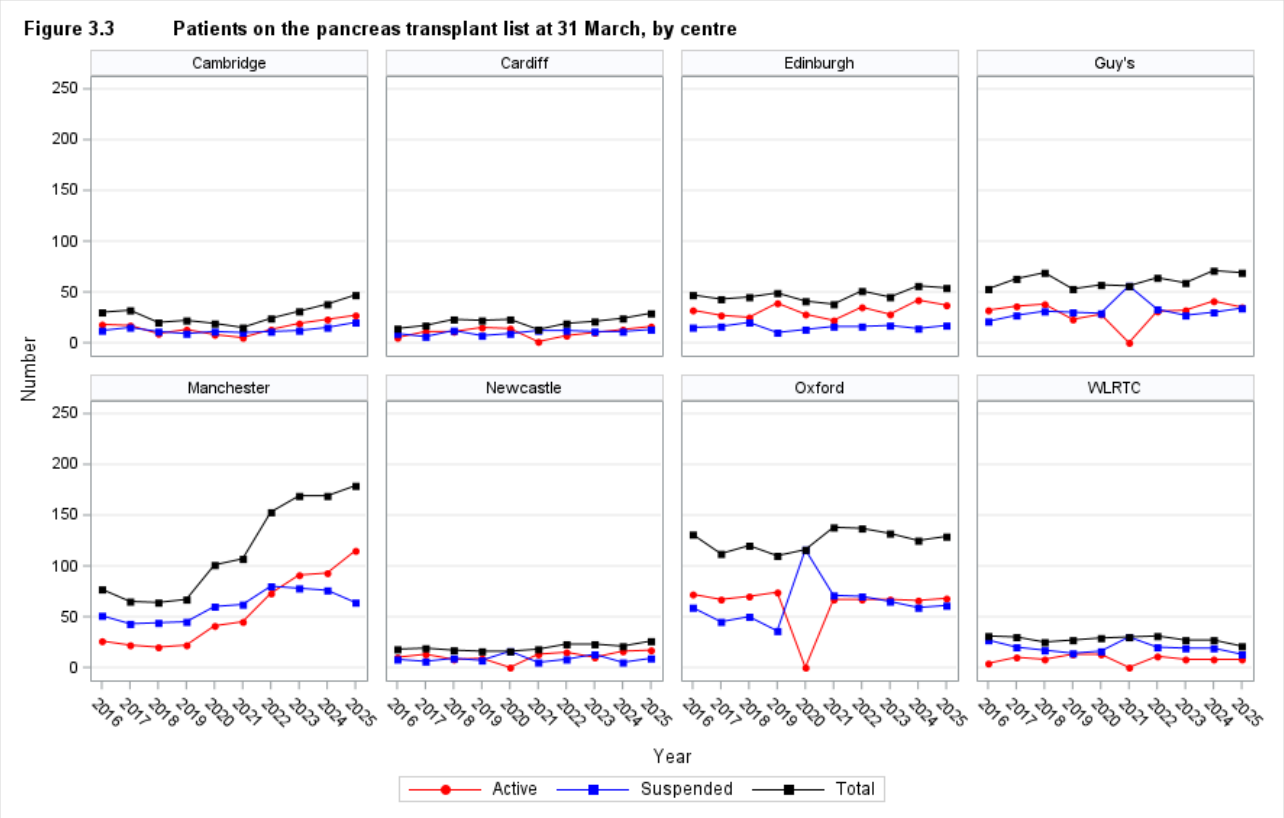


Figure 3.3 shows the number of patients on the pancreas transplant list at 31 March each year from 2016 by transplant centre. The number of patients actively waiting for a pancreas transplant at Manchester has increased in the last five years. Manchester has seen a large increase in the size of their pancreas transplant list in the last five years.



3.2 Post-registration outcomes, 1 April 2021 – 31 March 2022

An indication of outcomes for patients listed for a pancreas transplant is summarised in **Figure 3.4**. This shows the proportion of patients transplanted or still waiting one and three years after joining the list. It also shows the proportion removed from the transplant list (typically because they become too unwell for transplant) and who died while on the transplant list.

20% of 254 patients registered between 1 April 2021 and 31 March 2022 were transplanted within one year, while three years after listing 55% of patients had received a transplant. There were 3% of patients who had died waiting for a transplant within one year of listing and 7% within three years of listing.

Figure 3.4 Post-registration outcome for 254 new pancreas registrations made in the UK, 1 April 2021 - 31 March 2022

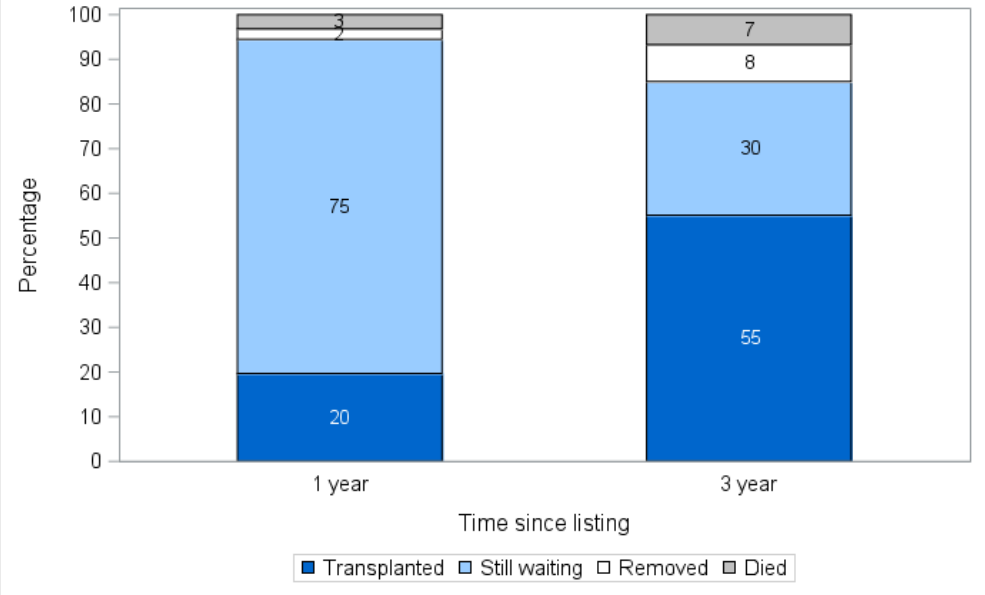
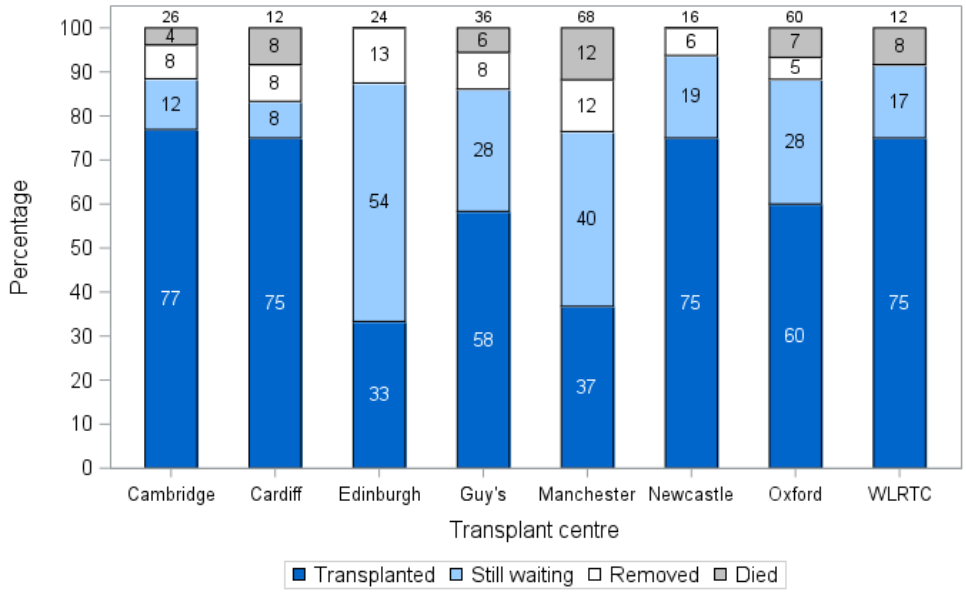


Figure 3.5 shows the proportion of patients transplanted or still waiting three years after joining the list by centre. Please note some centres had small numbers of new registrations in this time period. Three years after listing, Cambridge had transplanted 77% of their patients while Newcastle had transplanted 33%.

Figure 3.5 Three-year post-registration outcome for 254 new pancreas registrations made in the UK, 1 April 2021 - 31 March 2022, by centre



3.3 Demographic characteristics, 1 April 2024 – 31 March 2025

The sex, ethnicity, age group, sensitisation group (cRF%) and matchability points score group of patients registered on the pancreas transplant list in 2024/25 are shown by centre and overall for the UK in **Figures 3.6, 3.7, 3.8, 3.9** and **3.10** respectively. Note that all percentages quoted are based only on data where relevant information was available.

Overall, 240 patients were registered on the pancreas transplant list, 229 (95%) were waiting for a SPK transplant. Of these SPK registrations, 123, 54% were male, 72% were white, the median age was 39 years and the median cRF was 0%.

Of the 11 (5%) patients on the pancreas only transplant list, 36% were male, 73% were white, the median age was 35 years and the median cRF was 7%.

Figure 3.6 Registrations on the active pancreas transplant list, 1 April 2024 - 31 March 2025, by centre and sex

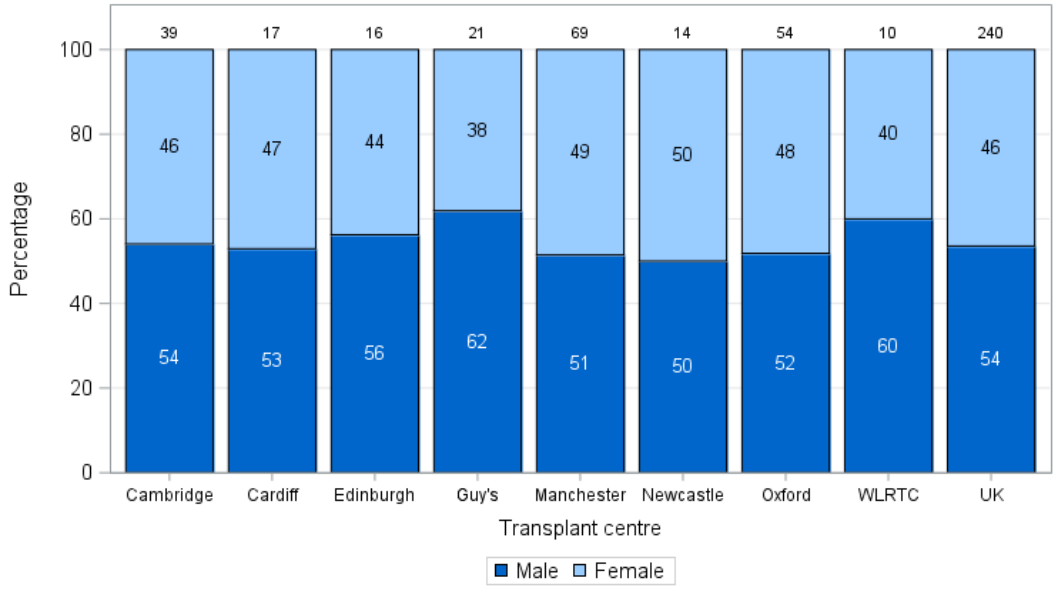


Figure 3.7 Registrations on the active pancreas transplant list, 1 April 2024 - 31 March 2025, by centre and ethnicity

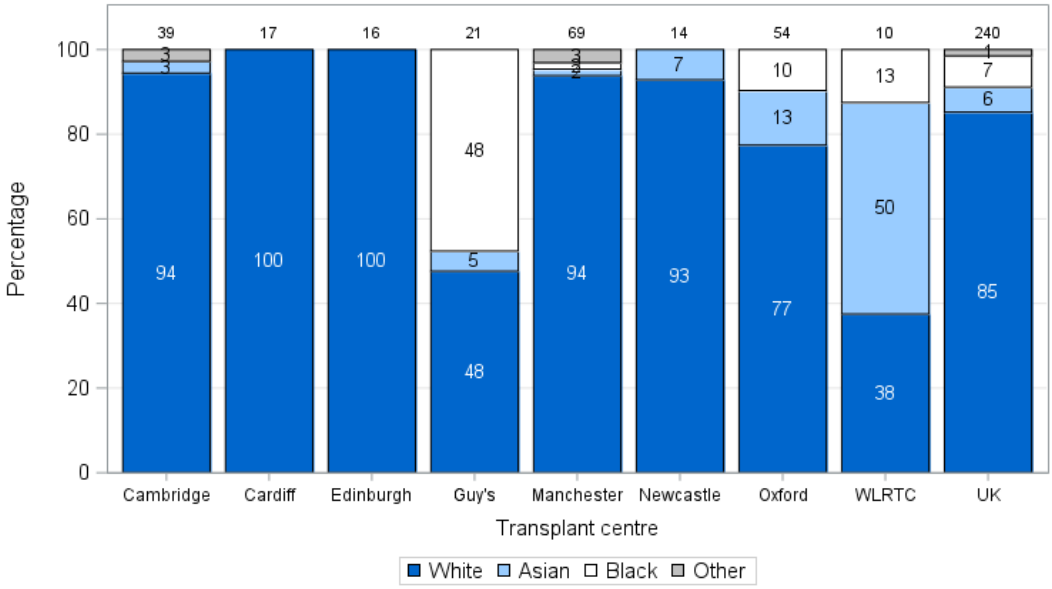


Figure 3.8 Registrations on the active pancreas transplant list, 1 April 2024 - 31 March 2025, by centre and age group

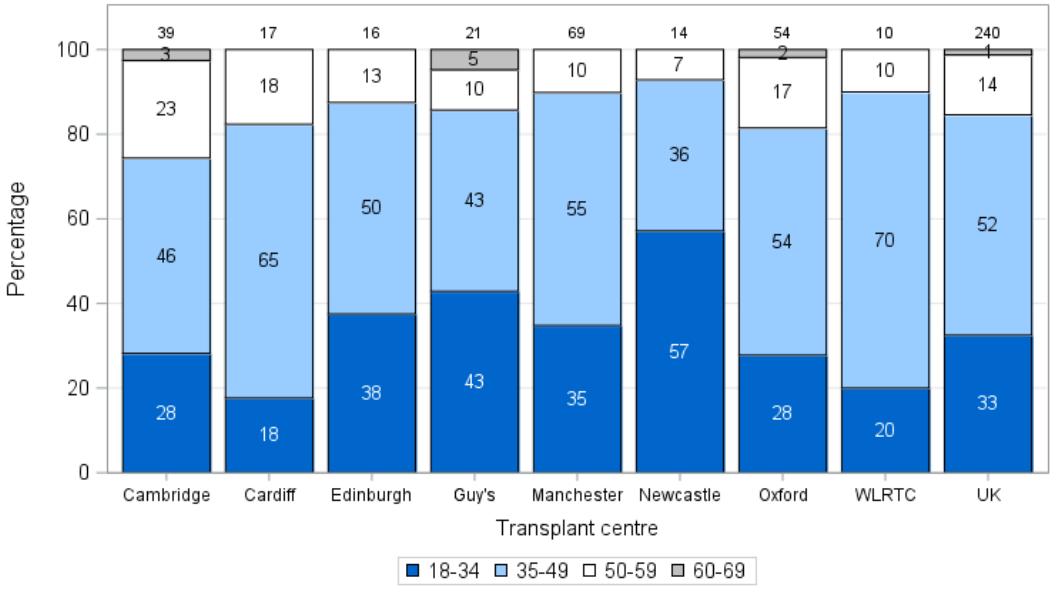


Figure 3.9 **Registrations on the active pancreas transplant list, 1 April 2024 - 31 March 2025, by centre and sensitisation group (cRF%)**

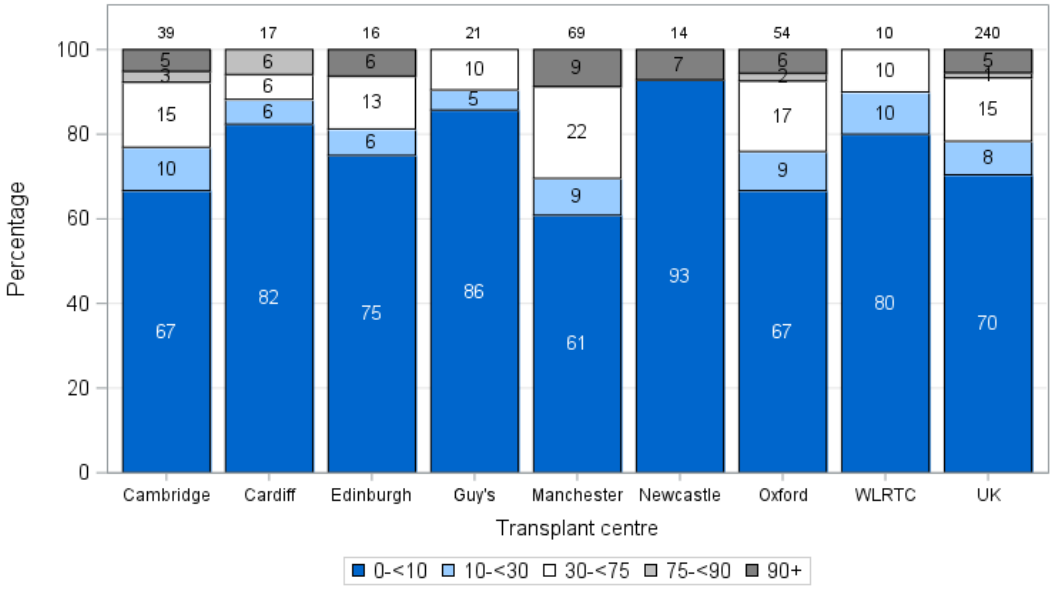
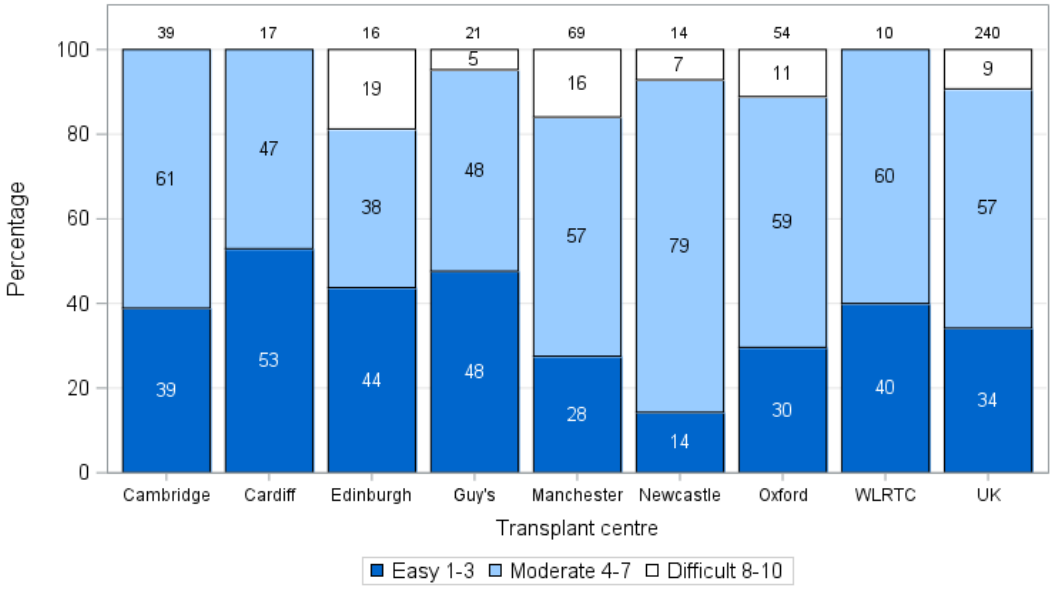


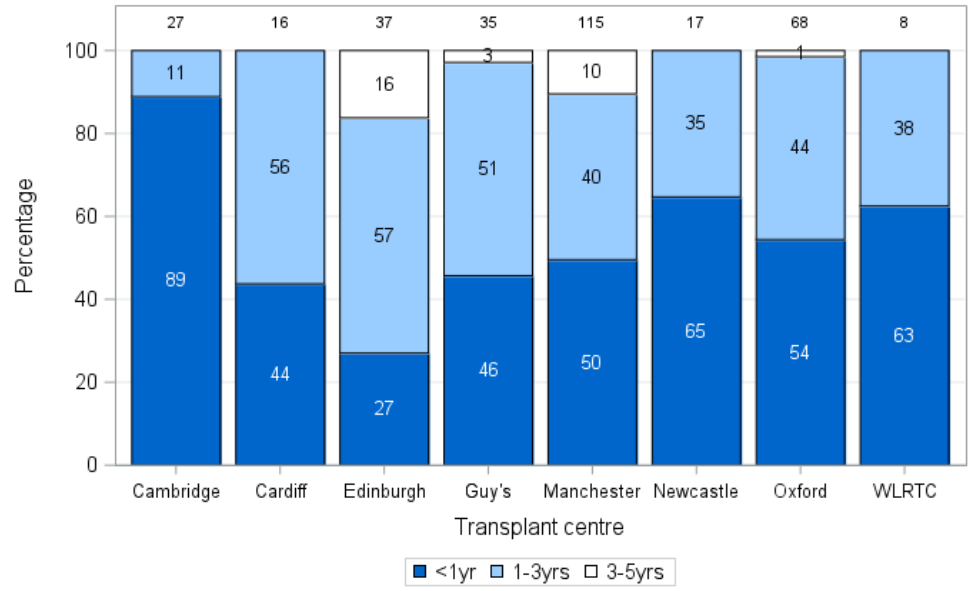
Figure 3.10 **Registrations on the active pancreas transplant list, 1 April 2024 - 31 March 2025, by centre and matchability group**



3.4 Patient waiting times for those currently on the list, 31 March 2025

Figure 3.11 shows the length of time active patients have been waiting on the pancreas transplant list at 31 March 2025 by centre. Most patients currently listed have been waiting less than one year.

Figure 3.11 Patients on the active pancreas transplant list as at 31 March 2025, by centre and grouped waiting time



3.5 Median active waiting time to transplant, 1 April 2019 - 31 March 2023

The length of time a patient waits for a pancreas transplant varies across the UK. The median active waiting time for deceased donor pancreas transplantation is calculated using the Kaplan-Meier method and is shown in **Figure 3.12** and **Table 3.1** for patients registered at each individual centre.

The median active waiting time to transplant for patients registered on the pancreas transplant list between 1 April 2019 and 31 March 2023 is 472 days. This ranged from 146 days at Cambridge to 711 days at Edinburgh.

Figure 3.12 **Median active waiting time to deceased donor transplant for patients registered on the pancreas transplant list, 1 April 2019 - 31 March 2023**

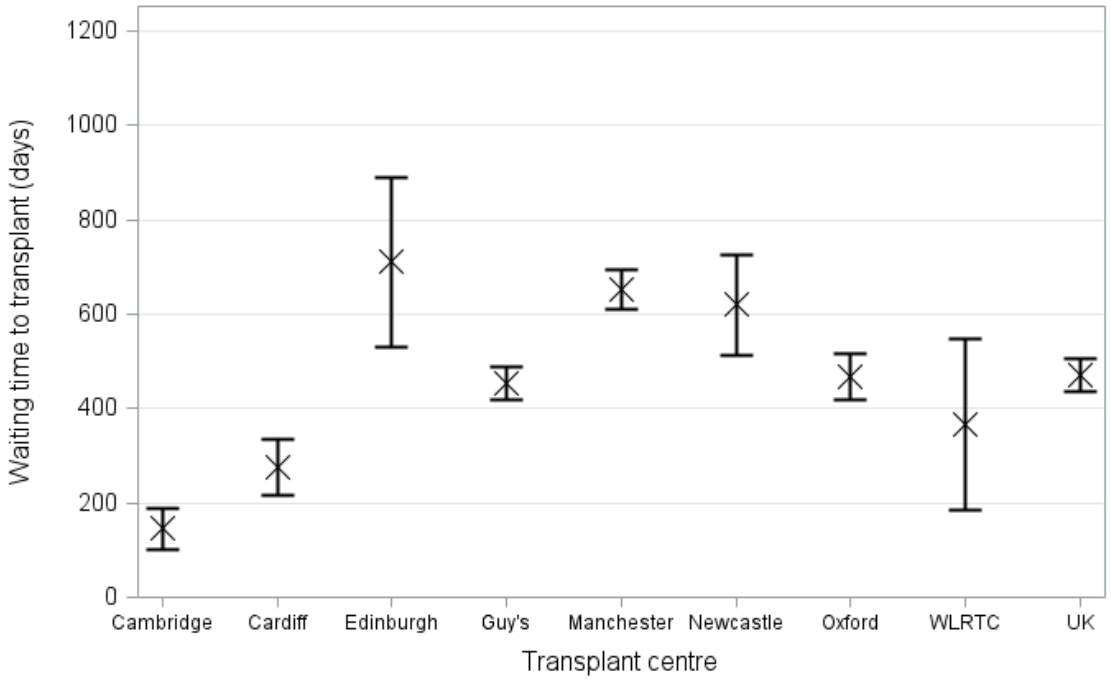


Table 3.1 **Median active waiting time to pancreas transplant in the UK, for patients registered 1 April 2019 - 31 March 2023**

Transplant centre	Number of patients registered	Waiting time (days) Median	95% Confidence interval
Cambridge	101	146	102 - 190
Cardiff	40	276	218 - 334
Edinburgh	70	711	531 - 891
Guy's	101	454	418 - 490
Manchester	209	652	610 - 694
Newcastle	37	620	514 - 726
Oxford	232	466	417 - 515
WLRTC	31	367	185 - 549
UK	**821**	**472**	**437 - 507**

Response to pancreas offers

4.1 Offer decline rates, 1 April 2022 – 31 March 2025

Pancreas offers from DBD and DCD donors whose pancreas was retrieved, offered directly on behalf of a named individual patient and resulted in transplantation were analysed separately. Any offers of pancreases declined for transplantation, pancreases offered for multi-organ or small bowel transplant were excluded, as were offers made through the fast track scheme or the reallocation of the pancreas.

Funnel plots are used to compare centre specific offer decline rates and indicate how consistent the rates of the individual transplant centres are with the national rate. Person case mix is known to influence the number of offers a centre may receive. In this analysis however, only individual offers for named patients were considered which excluded any ABO- and HLA-incompatible patients. For this reason, it was decided not to risk adjust for known centre differences in person case mix.

Figure 4.1 compares individual centre offer DBD decline rates with the national rate over the time period, 1 April 2022 and 31 March 2025. Centres can be identified by the information shown in **Table 4.1**. Edinburgh had an offer decline rate significantly higher than the national rate, all other centre decline rates were comparable with the national rate.

Figure 4.1 DBD donor pancreas offer decline rates for pancreases that resulted in a pancreas transplant, 1 April 2022 and 31 March 2025

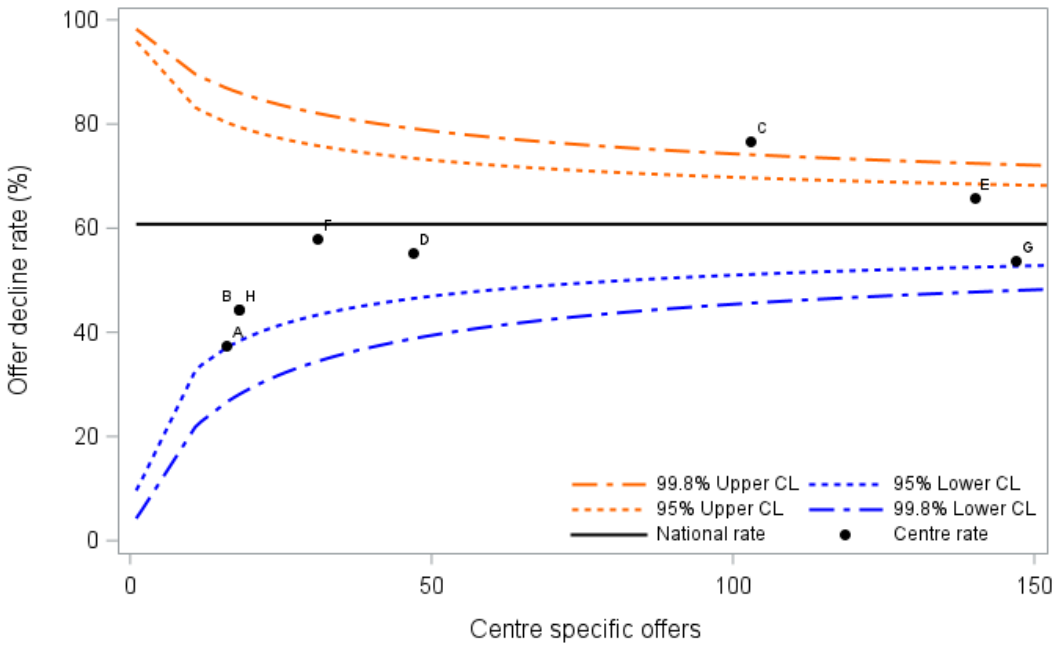


Table 4.1 compares individual centre DBD offer decline rates over time by financial year. The overall offer decline rate slightly decreased from 62% in 2023/24 to 61% in 2024/25.

Table 4.1 DBD donor pancreas offer decline rates by transplant centre, 1 April 2022 and 31 March 2025

Centre	Code	2022/23		2023/24		2024/25		Overall	
		N	(%)	N	(%)	N	(%)	N	(%)
Cambridge	A	6	(50)	4	(25)	6	(33)	16	(38)
Cardiff	B	7	(43)	8	(38)	3	(67)	18	(44)
Edinburgh	C	41	(73)	34	(85)	28	(71)	103	(77)
Guy's	D	20	(45)	13	(69)	14	(57)	47	(55)
Manchester	E	42	(64)	54	(67)	44	(66)	140	(66)
Newcastle	F	9	(67)	10	(40)	12	(67)	31	(58)
Oxford	G	57	(54)	50	(52)	40	(55)	147	(54)
WLRTC	H	5	(40)	7	(43)	6	(50)	18	(44)
UK		**187**	**(59)**	**180**	**(62)**	**153**	**(61)**	**520**	**(61)**

Centre has reached the upper 99.8% confidence limit
Centre has reached the upper 95% confidence limit
Centre has reached the lower 95% confidence limit
Centre has reached the lower 99.8% confidence limit

Figure 4.2 compares individual centre offer DCD decline rates with the national rate over the time period, 1 April 2022 and 31 March 2025. Edinburgh had an offer decline rate higher than the national rate. Centres can be identified by the information shown in **Table 4.2**.

Figure 4.2 DCD donor pancreas offer decline rates for pancreases that resulted in a pancreas transplant, 1 April 2022 and 31 March 2025

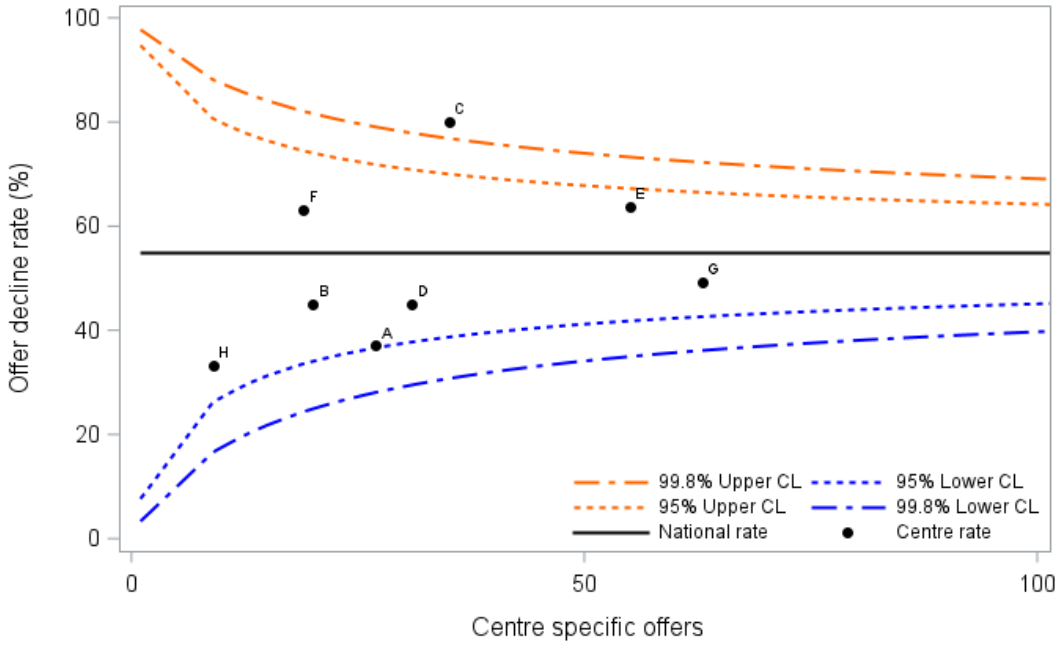


Table 4.2 compares individual DCD centre offer decline rates over time by financial year.

Table 4.2 DCD donor pancreas offer decline rates by transplant centre, 1 April 2022 and 31 March 2025

Centre	Code	2022/23		2023/24		2024/25		Overall	
		N	(%)	N	(%)	N	(%)	N	(%)
Cambridge	A	4	(50)	16	(31)	7	(43)	27	(37)
Cardiff	B	8	(50)	6	(50)	6	(33)	20	(45)
Edinburgh	C	14	(71)	14	(93)	7	(71)	35	(80)
Guy's	D	17	(47)	10	(50)	4	(25)	31	(45)
Manchester	E	9	(56)	29	(59)	17	(76)	55	(64)
Newcastle	F	8	(63)	6	(67)	5	(60)	19	(63)
Oxford	G	17	(59)	25	(44)	21	(48)	63	(49)
WLRTC	H	3	(33)	3	(33)	3	(33)	9	(33)
UK		**80**	**(56)**	**109**	**(54)**	**70**	**(54)**	**259**	**(55)**

Centre has reached the upper 99.8% confidence limit
Centre has reached the upper 95% confidence limit
Centre has reached the lower 95% confidence limit
Centre has reached the lower 99.8% confidence limit

Pancreas transplants

5.1 Pancreas transplants, 1 April 2015 – 31 March 2025

Figure 5.1 shows the total number of pancreas transplants performed in the last ten financial years, by type of donor. The first DCD pancreas transplant was performed in 2005/06 and by 2015/16 there were 49 DCD transplants (26%). In 2024/25 there were 39 DCD transplants, and the proportion of DCD pancreas transplants has decreased to 33% in 2024/25 compared to 40% in 2023/24.

In 2015/16 the number of DBD transplants was 136 (74%), however, this has decreased over the time period shown to 80 DBD transplants in 2024/25.

Figure 5.1 Pancreas transplants,1 April 2015 - 31 March 2025, by financial year and donor type

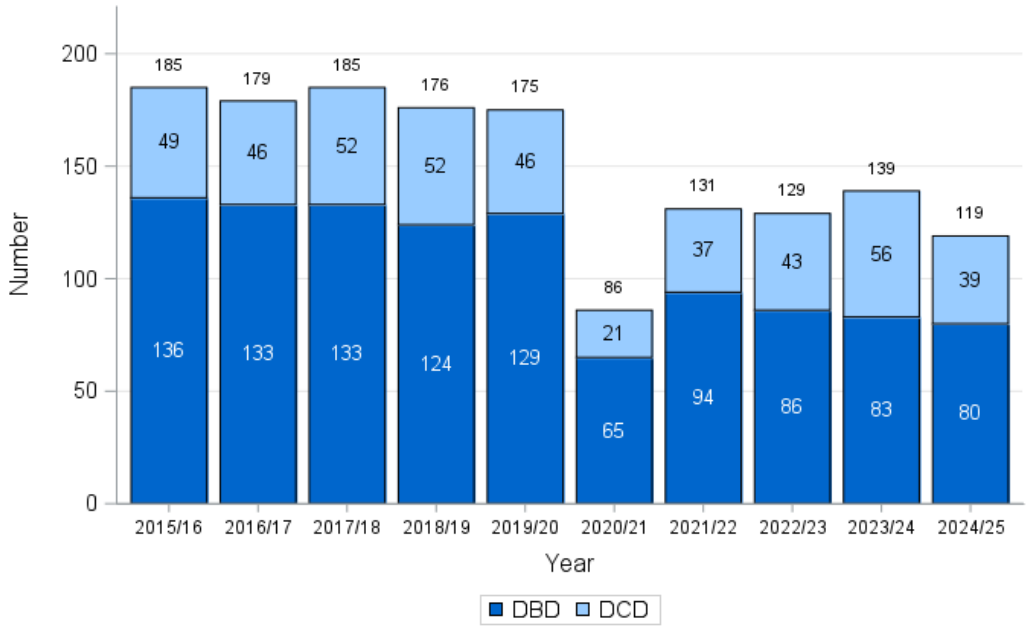


Figure 5.2 shows the total number of pancreas transplants performed in 2024/25, by centre and type of donor. The same information is presented in **Figure 5.3** but this shows the proportion of DBD and DCD transplants performed at each centre. Oxford performed the most DBD and DCD transplants (35), however Cardiff had the largest proportion of DCD transplants (57%). Newcastle performed the lowest number of transplants, six including two DCD transplants, in the last financial year.

Figure 5.2 Pancreas transplants, 1 April 2024 - 31 March 2025, by centre and donor type

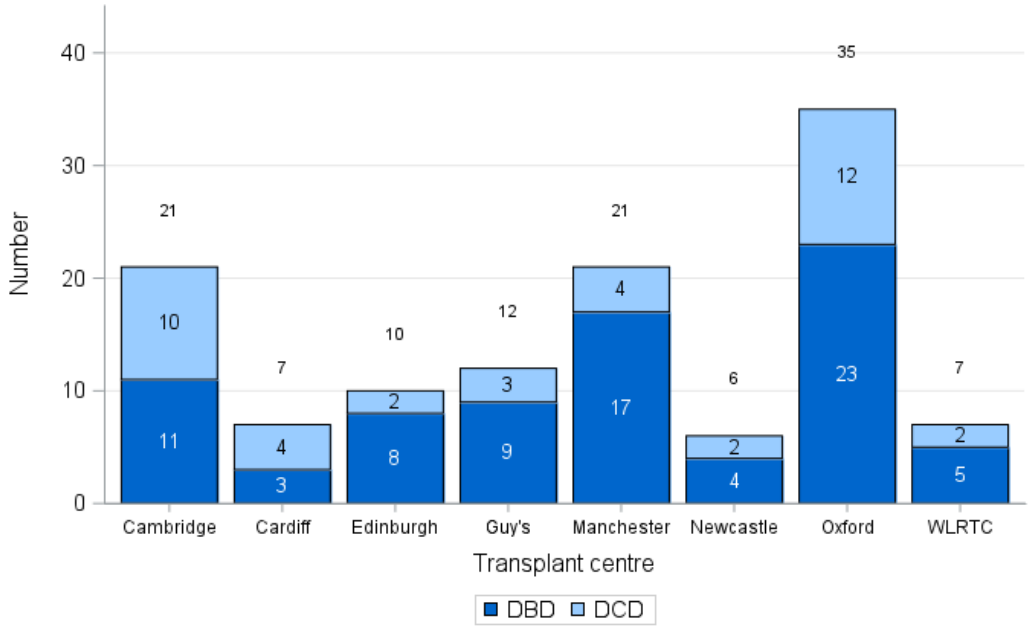


Figure 5.3 Pancreas transplants, 1 April 2024 - 31 March 2025, by centre and donor type

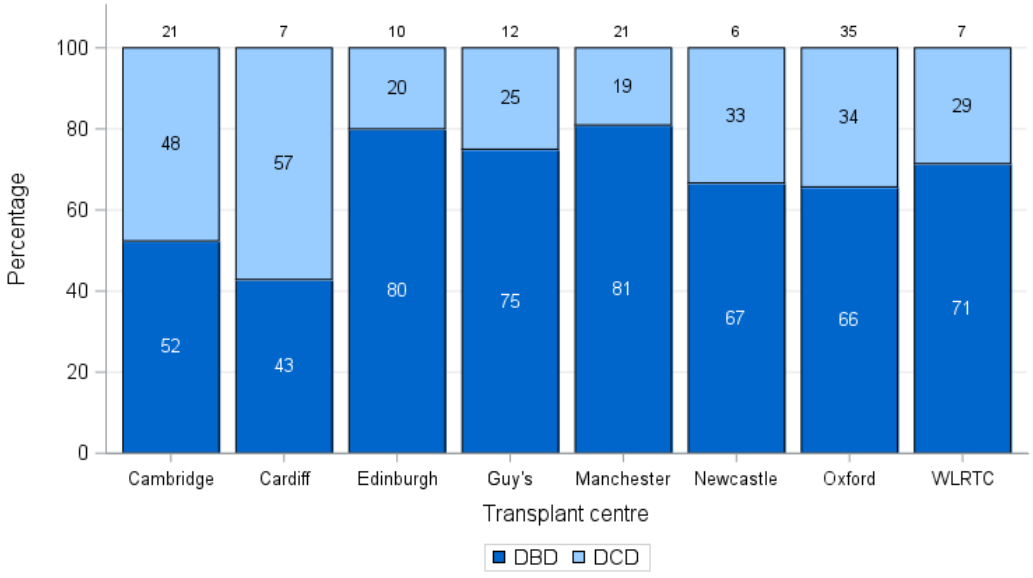
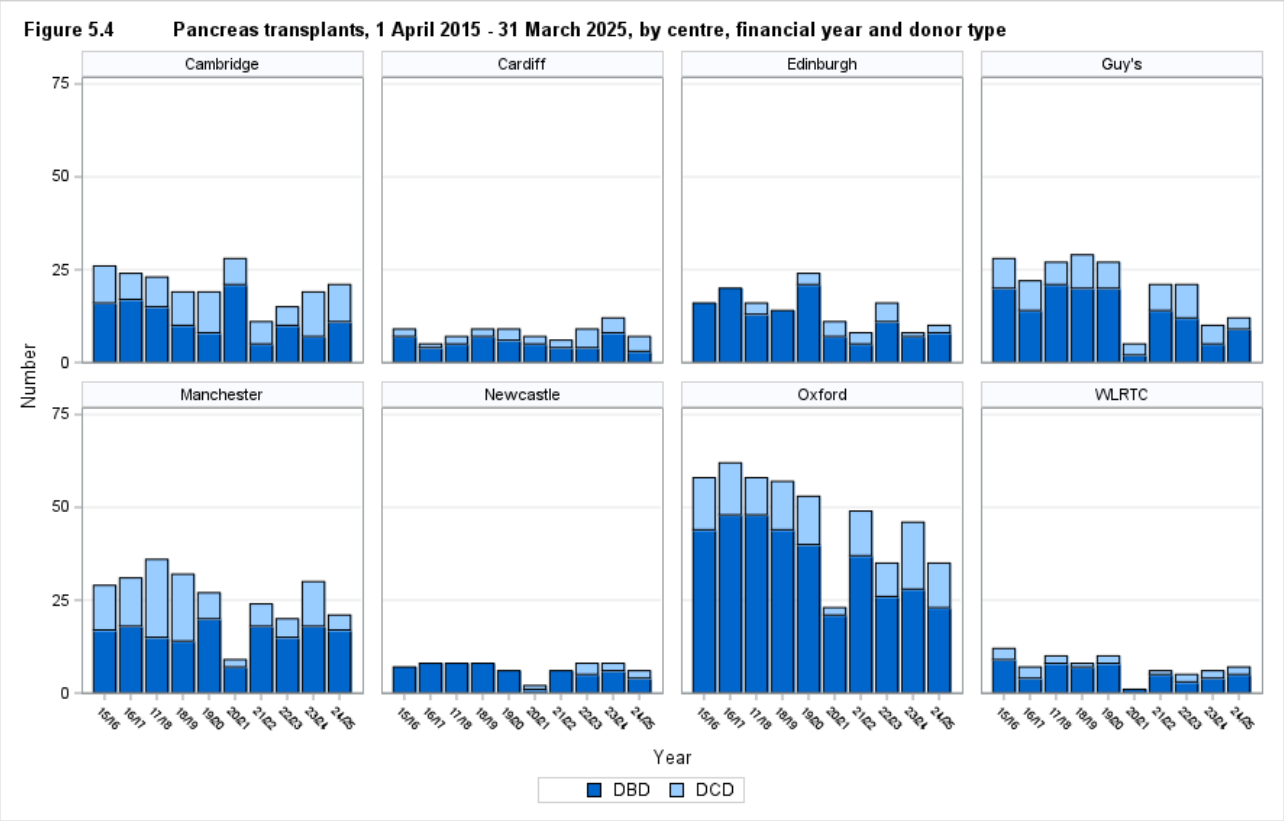


Figure 5.4 shows the total number of pancreas transplants performed in last ten financial years, by centre and type of donor. Oxford have consistently performed a large number of pancreas transplants including a number of DCD transplants over the last ten years. However, the number of transplants performed at Oxford has been steadily decreasing over the time period. All centres have performed DCD transplants in the last three financial years.



5.2 Demographic characteristics, 1 April 2024 - 31 March 2025

The sex, ethnicity, age group, sensitisation group (cRF%) and matchability points score group of transplant recipients that received a pancreas transplant in 2024/25 are shown by centre in **Figures 5.5, 5.6, 5.7** and **5.8** respectively. Note that all percentages quoted are based only on data where relevant information was available.

Overall, 119 patients were transplanted, 113 (95%) were SPK transplants. Of which 53% were male, 84% were white, the median age was 41 years, the median cRF was 1% and 17% were in the 'difficult' match group.

Of the 6 (5%) patients transplanted as a pancreas only transplant, 17% were male, 100% were white, the median age was 37 years, the median cRF was 10% and 33% were in the 'difficult' match group.

Figure 5.5 **Pancreas transplants, 1 April 2024 - 31 March 2025, by centre and sex**

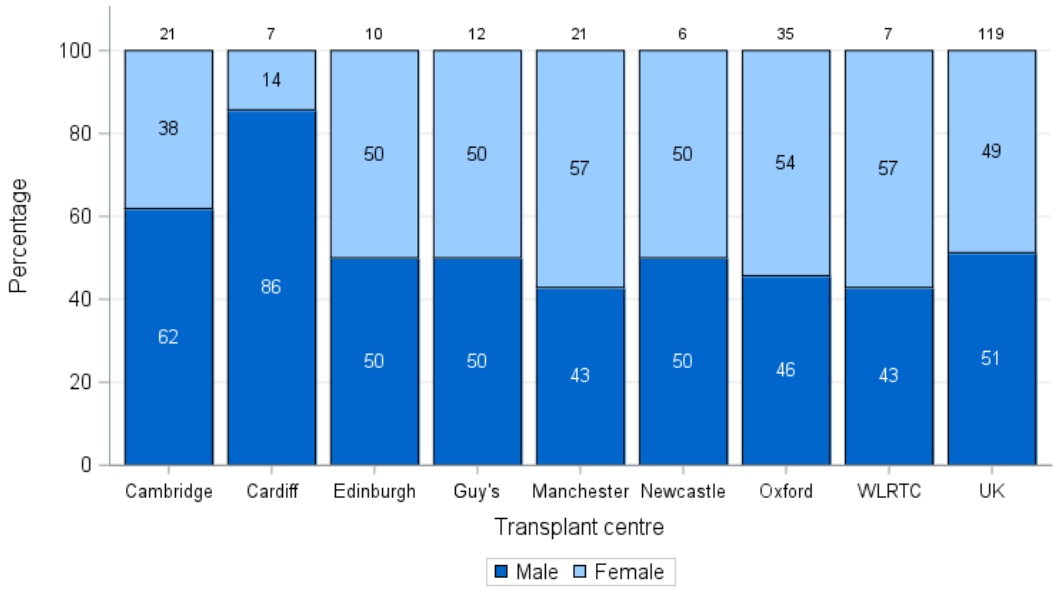


Figure 5.6 Pancreas transplants, 1 April 2024 - 31 March 2025, by centre and ethnicity

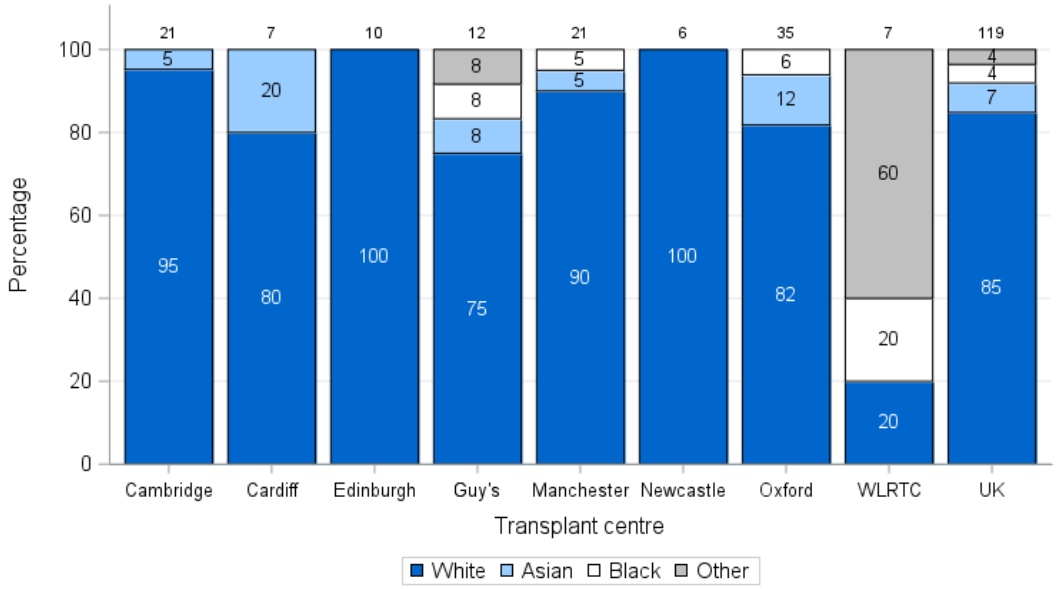


Figure 5.7 Pancreas transplants, 1 April 2024 - 31 March 2025, by centre and age group

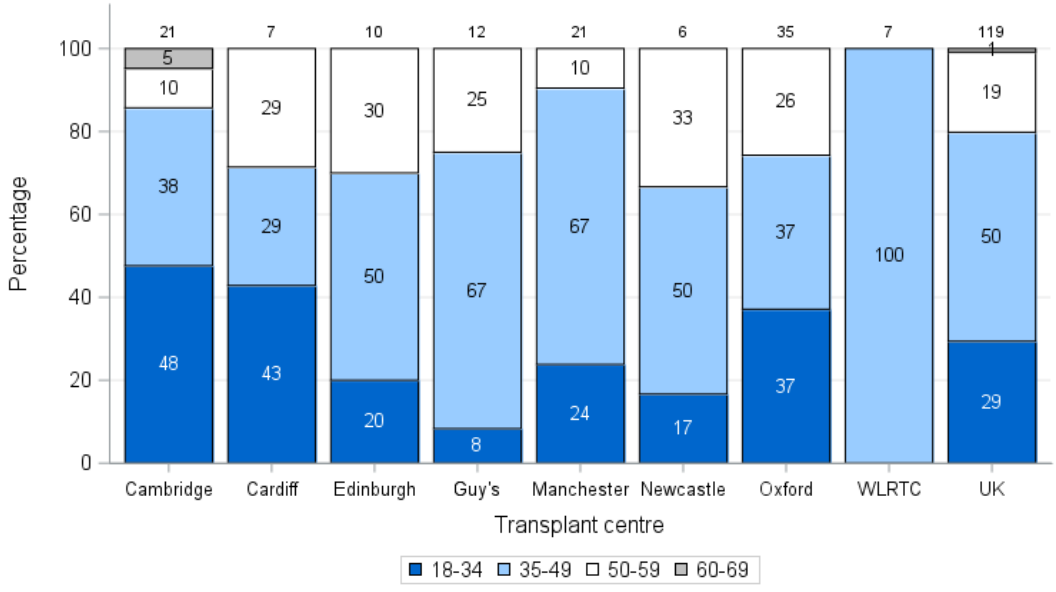


Figure 5.8 **Pancreas transplants, 1 April 2024 - 31 March 2025, by centre and sensitisation (cRF%) group**

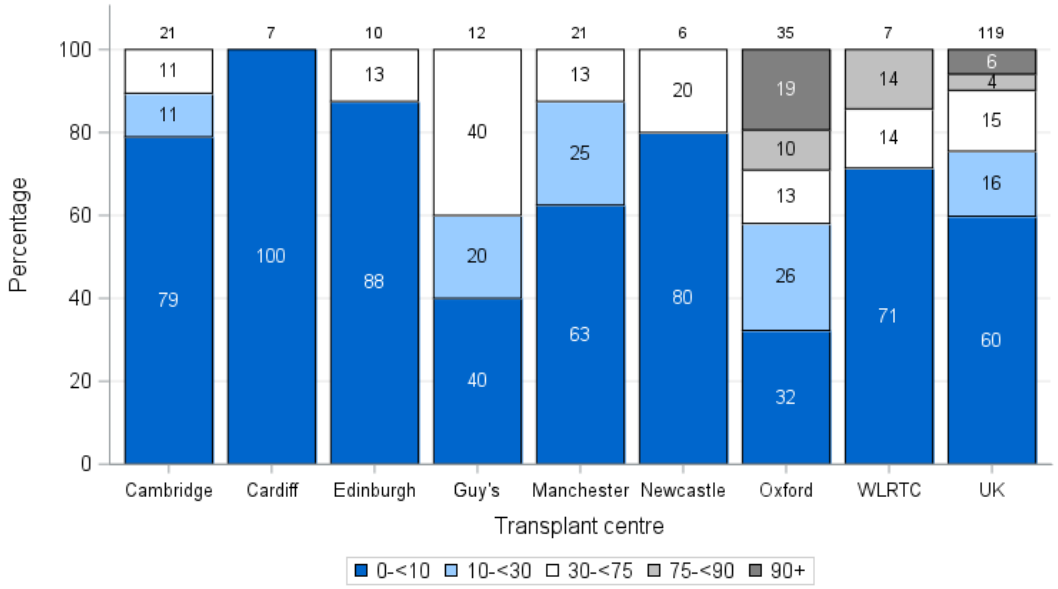
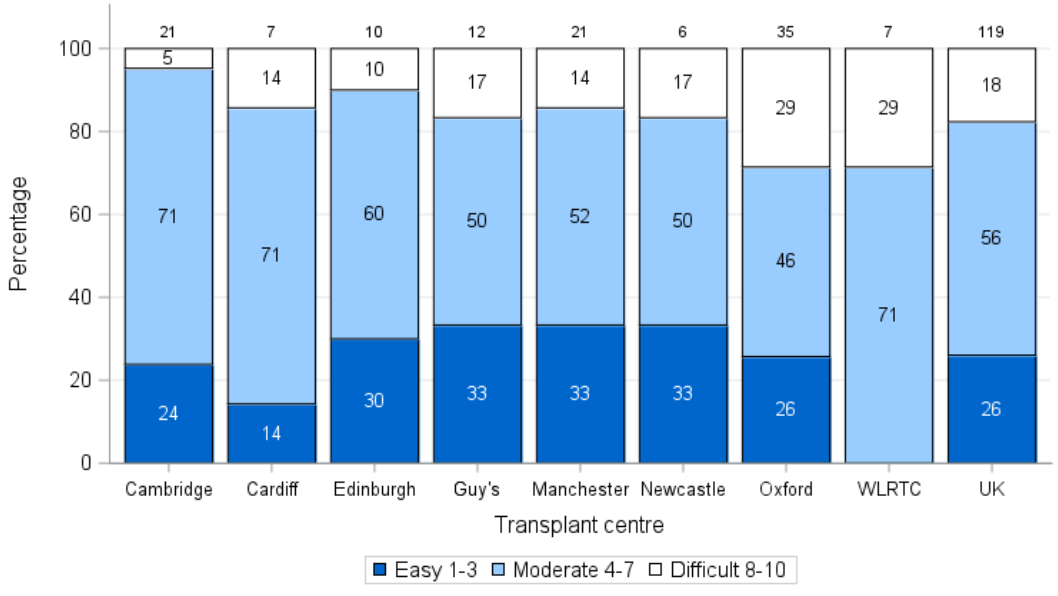


Figure 5.9 **Pancreas transplants, 1 April 2024 - 31 March 2025, by centre and matchability group**



5.3 Total preservation time, 1 April 2015 – 31 March 2025

Median total preservation times (TPT) are shown in addition to inter-quartile ranges in **Figures 5.10** to **5.15**. Fifty percent of the transplants have a TPT within the inter-quartile range (indicated by a box). Where there is only one observation to report, the single data point is represented by a circle and the median for multiple observations is represented by a line. There is some variation in average (median) TPT between different transplant centres although all centres continually try to reduce this time.

The total preservation times used for all donors, is as reported on the pancreas transplant record form and may include periods of machine perfusion; no adjustment has been made for this.

Figure 5.10 shows the median total preservation time in DBD donor pancreas transplants over the last ten years. During this time period, the overall median total preservation time was 11 hours in most years.

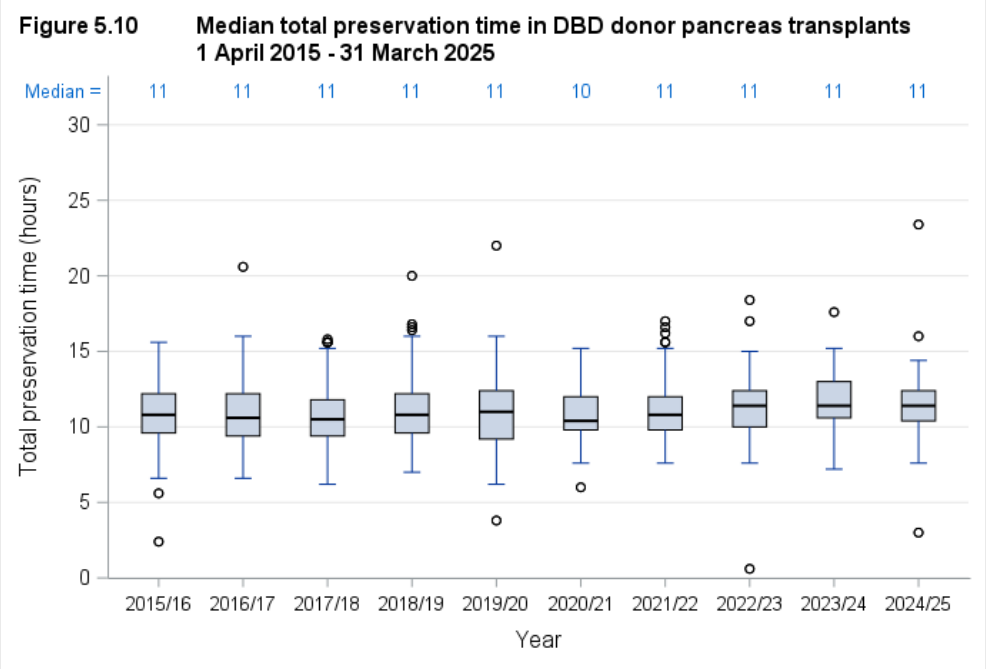


Figure 5.11 shows the median total preservation time (TPT) in DBD donor pancreas transplants in 2024/25 for each transplant centre. Please note the small numbers used in the calculations for each centre and interpret with caution. **Figure 5.12** shows the median total preservation time in DBD donor pancreas transplants over the last ten years for each transplant centre.

Figure 5.11 Median total preservation time in DBD donor pancreas transplants 1 April 2024 - 31 March 2025

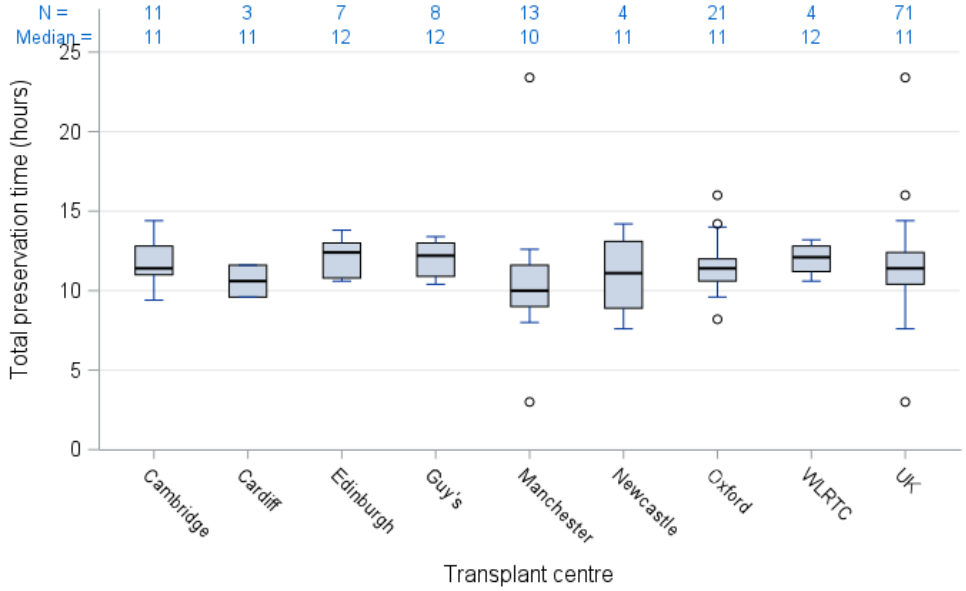


Figure 5.12 Median total preservation time in DBD donor pancreas transplants, 1 April 2015 - 31 March 2025

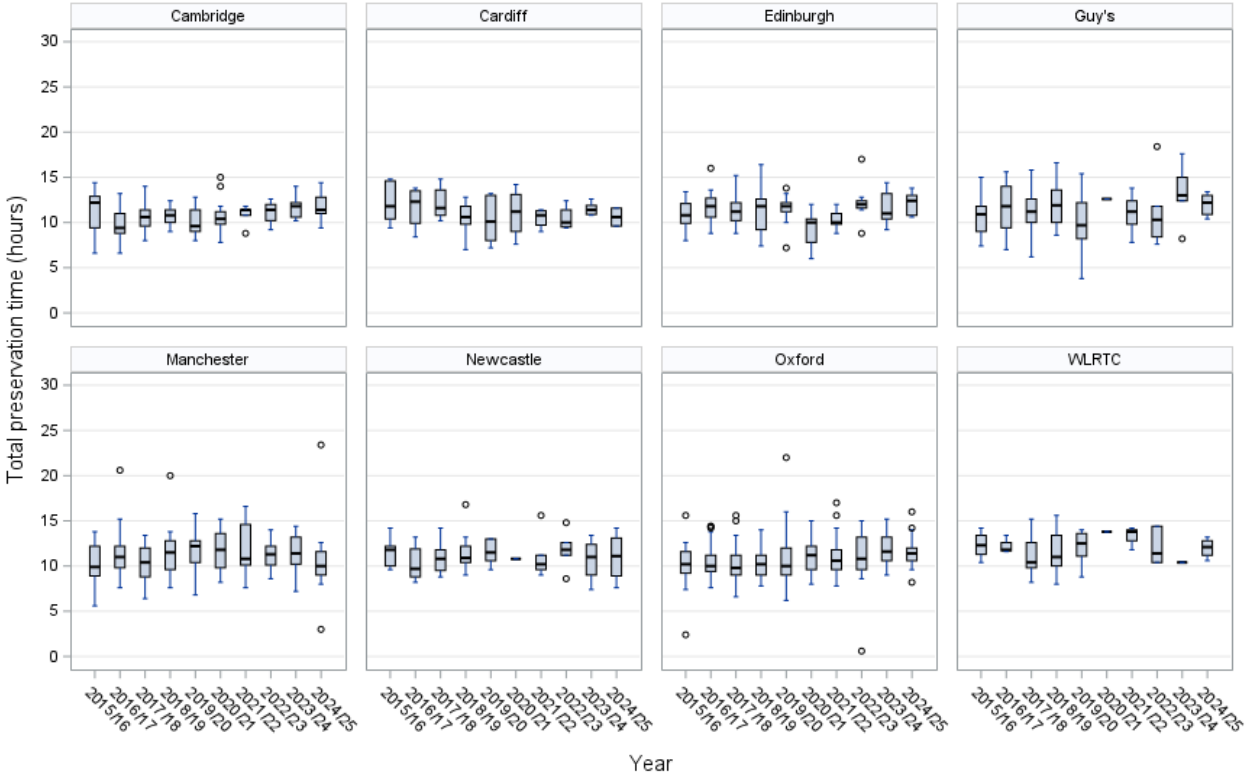


Figure 5.13 shows the median total preservation time (TPT) in DCD donor pancreas transplants over the last ten years. Most years the median TPT in DCD transplants was10 hours.

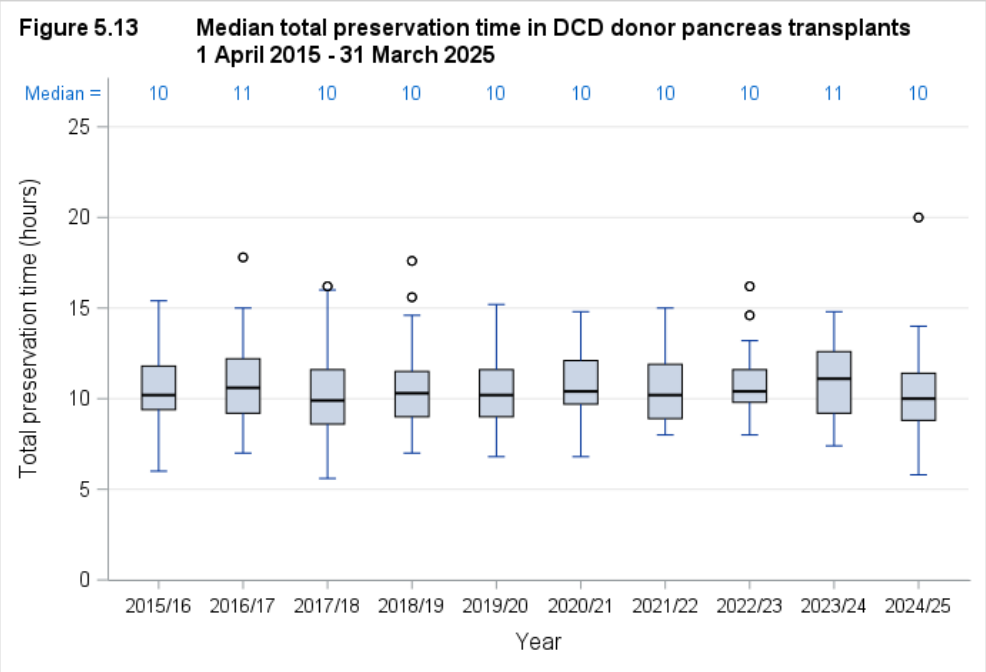


Figure 5.14 shows the median total preservation time (TPT) in DCD donor pancreas transplants in 2024/25 for each transplant centre. Please note the small numbers used in the calculations for each centre and interpret with caution.

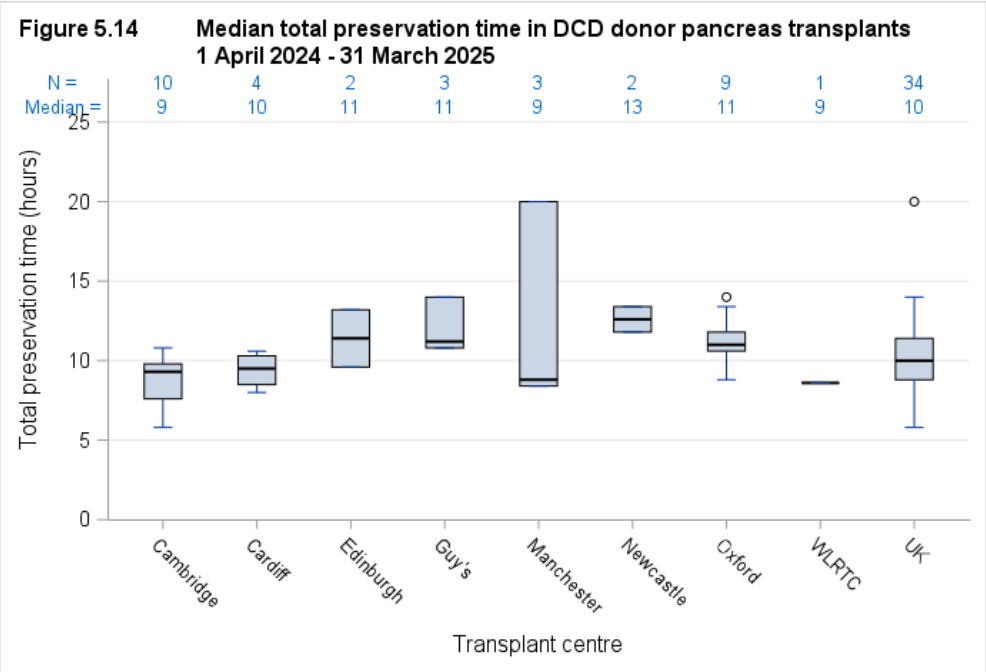
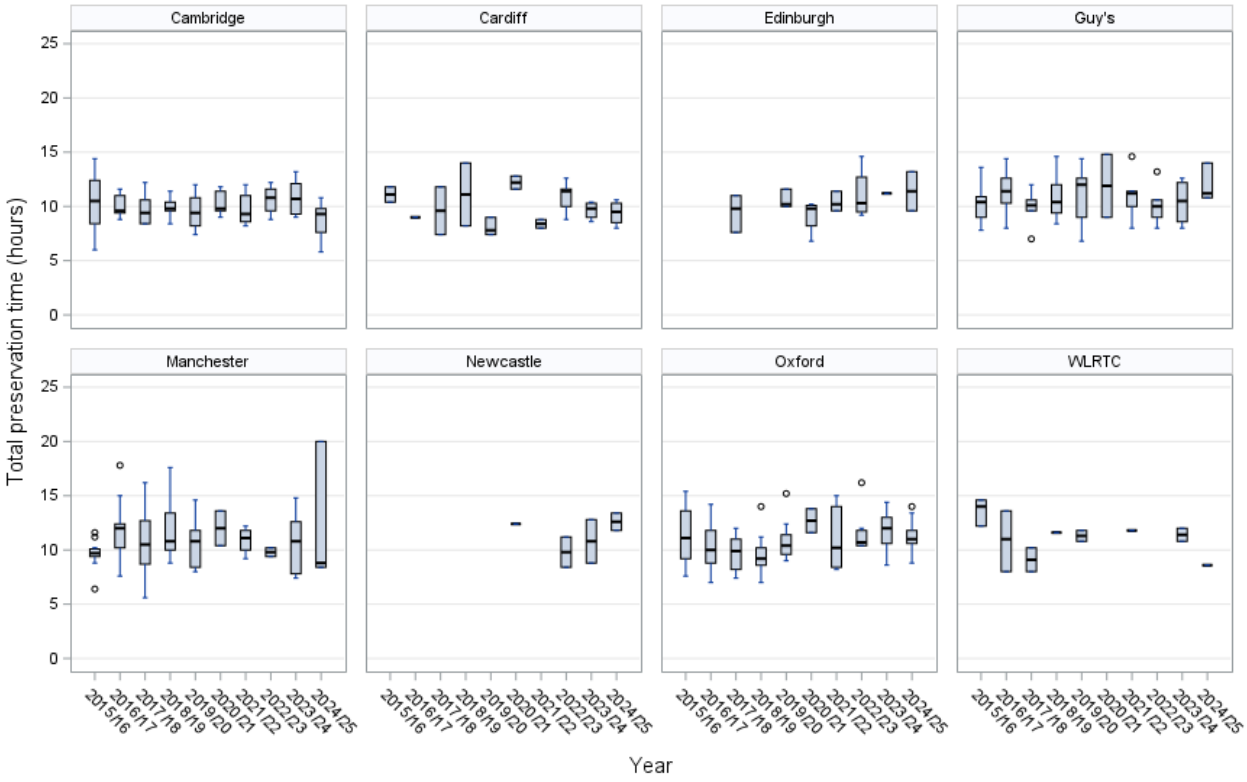


Figure 5.15 shows the median total preservation time (TPT) in DCD donor pancreas transplants for each transplant centre over the last ten years. The median total preservation time (TPT) has fluctuated in centres over the time period, due to the small number of transplants performed each year.

Figure 5.15 Median total preservation time in DCD donor pancreas transplants, 1 April 2015 - 31 March 2025



Pancreas outcomes

6.1 Deceased donor graft and patient survival for first SPK transplant

Funnel plots are used to compare centre specific risk-adjusted patient and graft survival rates and indicate how consistent these rates are with the national survival rates. Note that some patients return to local renal units for follow-up care after their transplant and although survival is reported according to transplant unit, patients may in fact be followed up quite distantly from their transplant centre. It is important to note that adjusting for patient mix through the use of risk-adjustment models may not account for all possible causes of centre differences. There may be other factors that are not taken into account in the risk-adjustment process that may affect the survival rate of a particular centre.

The survival data used for these analyses is reported to NHSBT via follow-up forms and to ensure validity of the survival rates, it is essential these follow-up forms are returned. For the cohorts analysed, all centres presented had at least 70% of follow-up returned. Follow-up form return rates by centre, for forms issued during the 2024 calendar year, are presented in Section 8.

Figures 6.1 and **6.2** compare individual centre survival estimates with the national rates for one-year patient and graft survival for deceased donor first SPK transplants. **Figures 6.3** and **6.4** compare five-year survival estimates. The funnel plots show that, for the most part, the centres lie within the confidence limits. Some of the funnel plots show some centres to be above the upper 99.8% confidence limit. This suggests that these centres have survival rates that are considerably higher than the national rate. Centres can be identified by the information shown in **Tables 6.1** and **6.2** for patient and graft survival, respectively. Note that some centres have not been presented due to low follow-up.

Figure 6.1 **Risk-adjusted one year patient survival rates for deceased donor first SPK transplants, between 1 April 2020 and 31 March 2024**

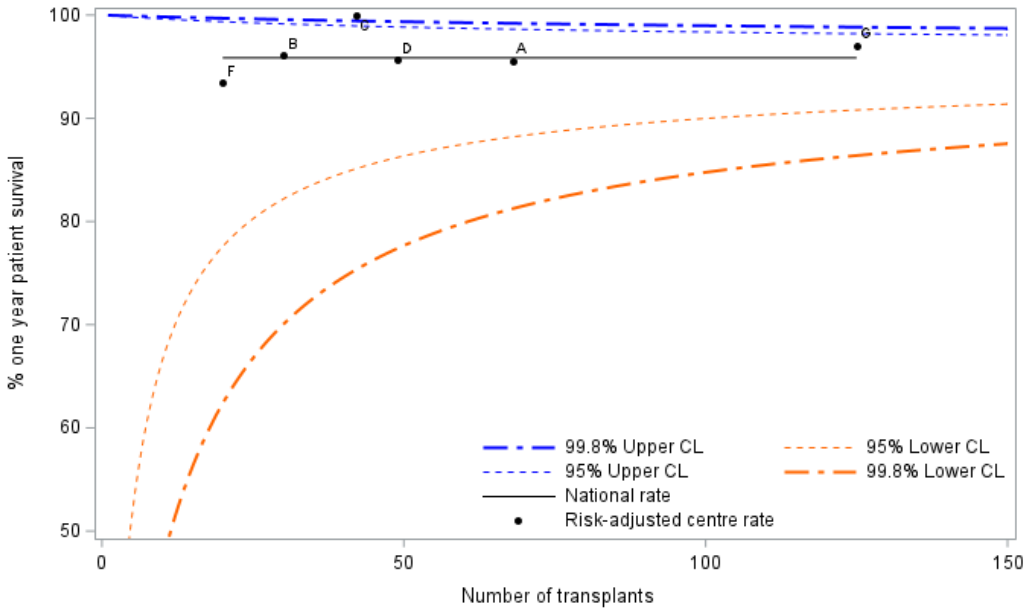


Figure 6.2 **Risk-adjusted one year pancreas graft (death censored) survival rates for all deceased donor first SPK transplants, between 1 April 2020 and 31 March 2024**

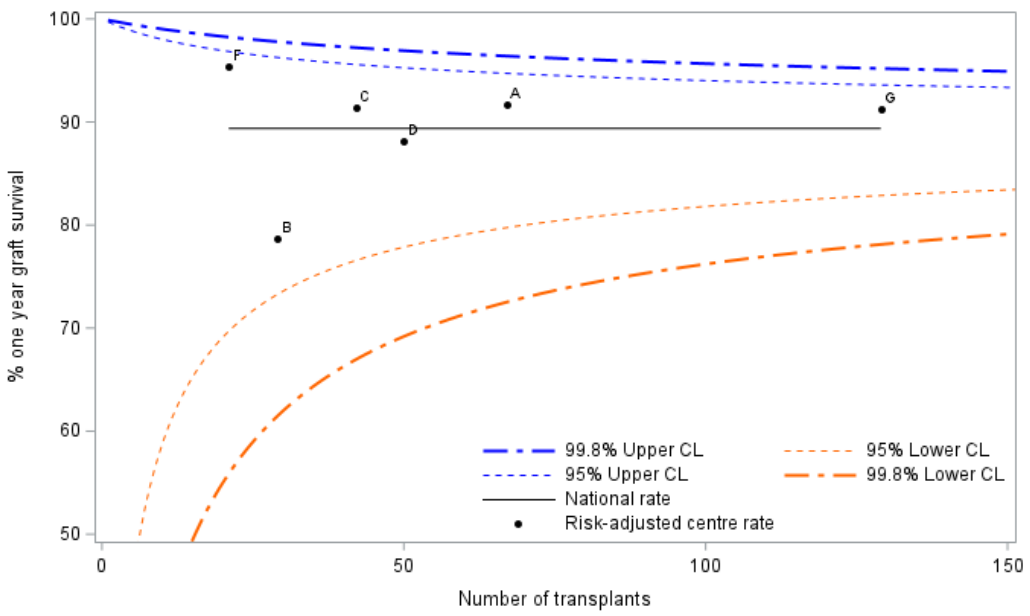


Figure 6.3 **Risk-adjusted five year patient survival rates for deceased donor first SPK transplants, between 1 April 2016 and 31 March 2020**

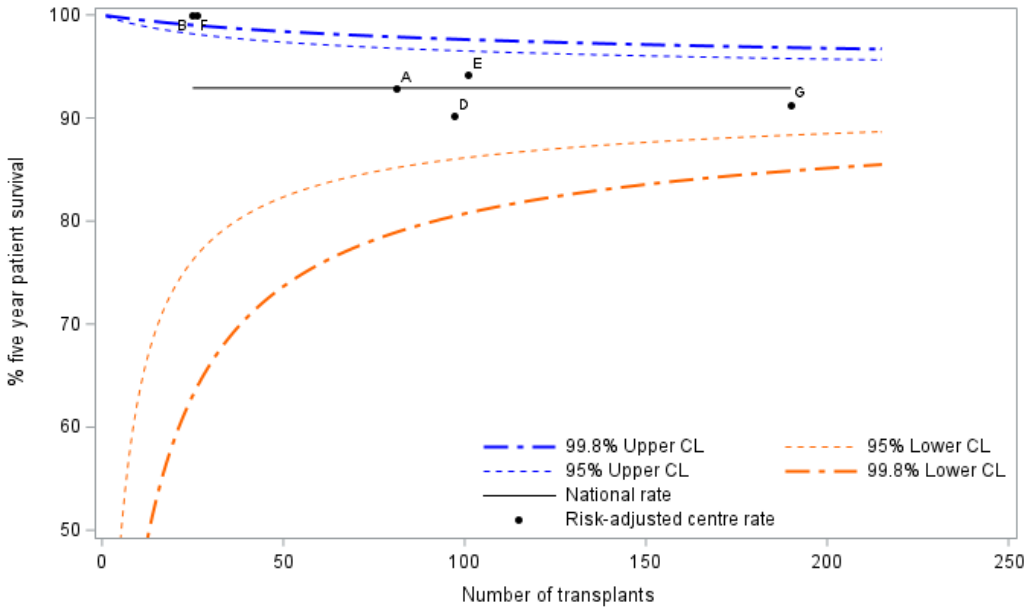


Figure 6.4 **Risk-adjusted five year pancreas graft (death censored) survival rates for all deceased donor first SPK transplants, between 1 April 2016 and 31 March 2020**

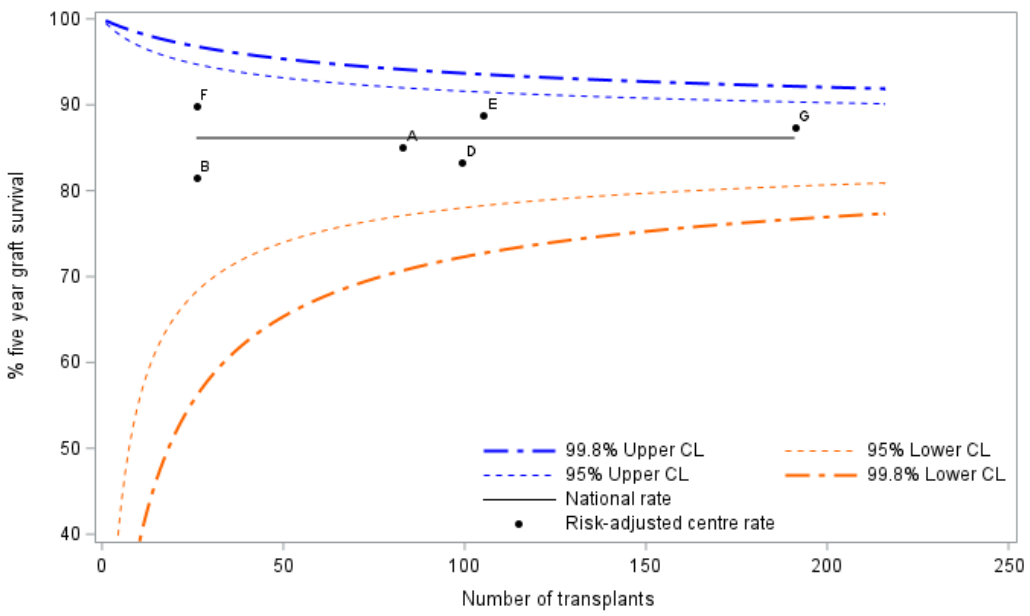


Table 6.1 **Risk-adjusted one and five year patient survival for first SPK transplants using pancreases from deceased donors**

		Patient survival					
		One-year*			Five-year**		
Centre	Code	N	%	(95% CI)	N	%	(95% CI)
Cambridge	A	68	96	(84 - 99)	81	93	(82 - 98)
Cardiff	B	30	96	(78 - 100)	25	100	N/A
Edinburgh	C	42	100	N/A	73		
Guy's	D	49	96	(85 - 99)	97	90	(81 - 96)
Manchester	E	66			101	94	(87 - 98)
Newcastle	F	20	93	(64 - 100)	26	100	N/A
Oxford	G	125	97	(93 - 99)	190	91	(86 - 95)
WLRTC	H	18			29		
UK		**418**	**96**	**(93 - 97)**	**622**	**93**	**(90 - 95)**

Centre has reached the lower 99.8% confidence limit
Centre has reached the lower 95% confidence limit
Centre has reached the upper 95% confidence limit
Centre has reached the upper 99.8% confidence limit

* Includes transplants performed between 1 April 2020 - 31 March 2024
** Includes transplants performed between 1 April 2016 - 31 March 2020

Table 6.2 Risk-adjusted one and five year pancreas graft survival for first SPK transplants using pancreases from deceased donors

		Pancreas graft survival					
		One-year*			Five-year**		
Centre	Code	N	%	(95% CI)	N	%	(95% CI)
Cambridge	A	67	92	(82 - 97)	83	85	(73 - 93)
Cardiff	B	29	79	(54 - 92)	26	82	(57 - 94)
Edinburgh	C	42	91	(75 - 98)	74		
Guy's	D	50	88	(72 - 96)	99	83	(73 - 90)
Manchester	E	66			105	89	(79 - 95)
Newcastle	F	21	95	(74 - 100)	26	90	(70 - 98)
Oxford	G	129	91	(84 - 96)	191	87	(81 - 92)
WLRTC	H	18			30		
UK		**422**	**89**	**(86 - 92)**	**634**	**86**	**(83 - 89)**

Centre has reached the lower 99.8% confidence limit
Centre has reached the lower 95% confidence limit
Centre has reached the upper 95% confidence limit
Centre has reached the upper 99.8% confidence limit

* Includes transplants performed between 1 April 2020 - 31 March 2024
** Includes transplants performed between 1 April 2016 - 31 March 2020

6.2 Deceased donor graft and patient survival for first PO transplants

National rates for one-year and five-year patient survival following first pancreas only (PO) transplant are both 100%. One-year and five-year graft survival rates are 69% (95% CI 41-86%) and 69% (95% CI 51-81%), respectively. One-year rates are calculated from transplants performed between 1 April 2020 and 31 March 2024 and five-year rates from transplants performed between 1 April 2016 and 31 March 2020. Individual centre rates are not presented due to small numbers at each centre within the cohorts.

Survival from listing

7.1 Patient survival from listing for SPK transplant

Survival from listing was analysed for all adult (≥ 18 years) patients registered for the first time for SPK between 1 January 2013 and 31 December 2024. Patients registered for a pancreas only or islet transplant have been excluded from this analysis. Survival time was defined as the time from joining the transplant list to death, regardless of the length of time on the transplant list, whether or not the patient was transplanted and any factors associated with such a transplant e.g. donor type. Survival time was censored at either the date of removal from the list, or at the last known follow up date post-transplant when no death date was recorded, or at the time of analysis if the patient was still active on the transplant list.

The funnel plot shown in **Figure 7.1**, uses a fixed effects Poisson regression model to compare centre specific ten-year risk-adjusted patient survival rates from the point of SPK transplant listing and indicates how consistent the rates of the individual transplant centres are with the national rate. The ten-year survival from listing rates at all centres were consistent with the national rate. Centres can be identified by the information shown in **Table 7.1**, which also shows one and five-year risk-adjusted survival rates from the point of transplant listing. Note that all rates (at one, five and ten years) were calculated from the same cohort of patients, and the number of patients remaining at risk of death after each time horizon (i.e. not already censored or deceased) is included in **Table 7.1** for reference. The ten-year survival rate for WLTRC has not been presented due to the low number of patients at risk at this time point.

Figure 7.1 **Risk-adjusted 10 year patient survival from listing for first deceased donor SPK transplant in patients registered between 1 January 2013 and 31 December 2024**

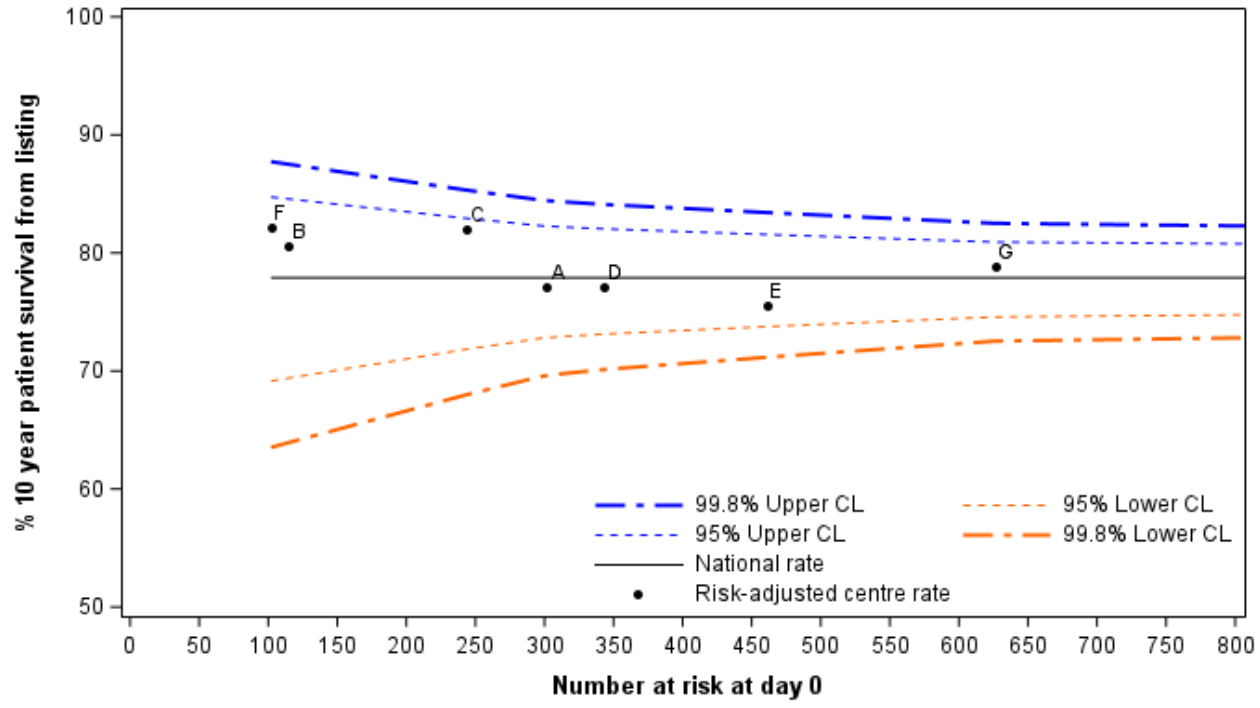


Table 7.1 Risk-adjusted 1, 5 and 10 year patient survival from listing for first deceased donor SPK transplant in patients registered between 1 January 2013 and 31 December 2024

Centre	Code	Number at risk at day 0	One year Survival rate (%) (95% CI)	One year Number at risk[1]	Five year Survival rate (%) (95% CI)	Five year Number at risk[1]	Ten year Survival rate (%) (95% CI)	Ten year Number at risk[1]
Cambridge	A	301	96 (93-98)	258	86 (80-90)	119	77 (69-83)	26
Cardiff	B	115	96 (90-99)	104	88 (78-94)	53	81 (66-89)	11
Edinburgh	C	244	97 (94-99)	233	91 (85-94)	128	82 (74-88)	24
Guy's	D	343	96 (94-98)	316	86 (81-90)	164	77 (70-83)	28
Manchester	E	461	97 (95-98)	424	86 (81-89)	176	76 (69-81)	32
Newcastle	F	102	96 (90-99)	93	89 (79-94)	45	82 (68-90)	11
Oxford	G	626	96 (94-98)	583	88 (84-90)	299	79 (74-83)	55
WLRTC[2]	H	90	96 (89-98)	90	83 (70-90)	36	-	1
UK		**2282**	**97 (96-97)**	**2101**	**87 (85-89)**	**1020**	**78 (75-80)**	**188**

Centre has reached the lower 99.8% confidence limit
Centre has reached the lower 95% confidence limit
Centre has reached the upper 95% confidence limit
Centre has reached the upper 99.8% confidence limit

[1] Number of patients with reported follow-up beyond this time point
[2] Ten-year survival rate for WLTRC has not been presented due to the low number of patients at risk

Form return rates

8.1 Pancreas form return rates, 1 January – 31 December 2024

Form return rates are reported in Table 8.1 for the pancreas transplant record, three month and one year follow up form, along with lifetime follow up (more than two years). These include all pancreas transplants performed between 1 January and 31 December 2024 for the transplant record, and all requests for follow up forms issued in this time period. Centres highlighted are transplant centres. Overall, 91% of transplant record forms issued and 62% of lifetime follow-up forms issued have been returned. Of the transplant centres, WLRTC has the lowest lifetime follow-up form return rate of 0%. Data as on the database at 29th July 2024.

Table 8.1 Form return rates following pancreas transplantation, by centre, 1 January - 31 December 2024

Centre	Transplant record		3 month follow-up		12 month follow-up		Lifetime follow-up	
	N	% returned	N	% returned	N	% returned	N	% returned
Aberdeen, Aberdeen Royal Infirmary							20	75
Airdrie, University Hospital Monklands							6	0
Bangor, Ysbyty Gwynedd District General Hosp							9	56
Basildon, Basildon Hospital							5	100
Belfast, Antrim Hospital							3	33
Belfast, Belfast City Hospital					1	0	8	0
Belfast, The Ulster Hospital							3	0
Birmingham, Birmingham Heartlands Hospital							15	0
Birmingham, Queen Elizabeth Hospital			2	0	6	0	60	2
Bodelwyddan, Glan Clwyd District General Hosp							1	0
Bradford, St Lukes Hospital							13	77
Brighton, Royal Sussex County Hospital					2	50	27	41
Bristol, Southmead Hospital					1	0	28	89
Cambridge, Addenbrookes Hospital	20	100	21	100	13	100	140	99
Canterbury, Kent And Canterbury Hospital					1	0	40	93
Cardiff, University Of Wales Hospital	5	100	10	100	11	100	71	100
Carlisle, Cumberland Infirmary							4	75
Carshalton, St Helier Hospital					2	100	25	36
Chester, Countess Of Chester Hospital							4	0
Closed - Glasgow, Glasgow Western Infirmary							1	0
County Down, Daisy Hill Hospital							5	100
Coventry, University Hospital (Walsgrave)					1	100	27	100
Crosshouse, University Hospital Crosshouse							6	100
Derby, Royal Derby Hospital					1	100	17	100
Doncaster, Doncaster Royal Infirmary					1	100	7	100
Dorchester, Dorset County Hospital							36	3
Douglas, Nobles I-o-M Hospital							5	20
Dudley, Russells Hall Hospital							4	0
Dulwich, Kings College							2	0
Dumfries, Dumfries And Galloway Royal Infirmary							3	100
Dundee, Ninewells Hospital							21	38
Edinburgh, Royal Infirmary Of Edinburgh	10	100	11	100	8	100	67	87
Exeter, Royal Devon & Exeter Hospital (Wonford)							24	79
Glasgow, Queen Elizabeth University Hospital					1	0	36	0
Gloucester, Gloucestershire Royal Hospital					1	0	20	0
Hereford, The County Hospital							6	83
Hull, The Hull Royal Infirmary							18	100
Inverness, Raigmore Hospital							14	100
Ipswich, Ipswich Hospital							4	25
Kirkcaldy, Victoria Hospital							3	100
Larbert, Forth Valley Royal Hospital							5	0

Table 8.1 Form return rates following pancreas transplantation, by centre, 1 January - 31 December 2024

Centre	Transplant record		3 month follow-up		12 month follow-up		Lifetime follow-up	
	N	% returned	N	% returned	N	% returned	N	% returned
Leeds, St James's University Hospital					1	100	25	100
Leicester, Leicester General Hospital							28	18
Lincoln, Lincoln County Hospital							6	83
Liverpool, Royal Liverpool University Hospital							9	100
Liverpool, University Hospital Aintree							1	100
London, Guys Hospital	9	100	6	83	5	100	129	91
London, Kings College Hospital					2	50	2	100
London, St Georges Hospital							6	33
London, The Royal Free Hospital					1	100	40	93
London, The Royal London Hospital (Whitechapel)			1	0	1	0	24	0
Manchester, Manchester Royal Infirmary	20	85	20	30	22	5	94	14
Middlesbrough, The James Cook University Hosp							11	91
Newcastle, Freeman Hospital	4	100	3	100	9	89	63	92
Northampton, Northampton General Hospital							24	42
Norwich, Norfolk And Norwich University Hospital							30	100
Nottingham, Nottingham University Hospitals City Campus					2	0	44	2
Omagh, Tyrone County Hospital							3	0
Oxford, Churchill Hospital	35	89	33	97	34	100	154	99
Peterborough, Peterborough City Hospital					1	0	6	0
Plymouth, Derriford Hospital							22	100
Portsmouth, Queen Alexandra Hospital							50	90
Portsmouth, St Marys Hospital							10	70
Preston, Royal Preston Hospital							29	10
Reading, Royal Berkshire Hospital							33	70
Rhyl, Royal Alexandra Hospital							2	50
Salford, Salford Royal							19	16
Sheffield, Northern General Hospital							10	100
Shrewsbury, Royal Shrewsbury Hospital							5	100
St Helier, Jersey General Hospital							2	0
Stevenage, Lister Hospital							12	0
Stoke-on-Trent, Royal Stoke University Hospital							17	41
Sunderland, Sunderland Royal Hospital							1	0
Swansea, Morriston Hospital							21	100
Truro, Royal Cornwall Hospital (Treliske)							24	0
West London Renal Transplant Centre	9	67	7	71	4	0	88	0
Westcliff On Sea, Southend Hospital							4	25
Wirral, Arrowe Park Hospital							5	0
Wolverhampton, New Cross Hospital					1	100	31	100
Wrexham, Maelor General Hospital							10	100
York, York District Hospital							16	69
Overall	**112**	**91**	**115**	**81**	**134**	**67**	**1927**	**62**

Islet transplant list

9.1 Patients on the islet transplant list as at 31 March, 2016 – 2025

Figure 9.1 shows the number of patients on the islet transplant list at 31 March each year. The number of patients active on the islet transplant list has increased by 47% from 32 on 31 March 2024 to 47 on 31 March 2025. Of the 47, 60% (28) patients were registered for an SIK transplant.

Figure 9.1 Patients on the routine islet transplant list at 31 March

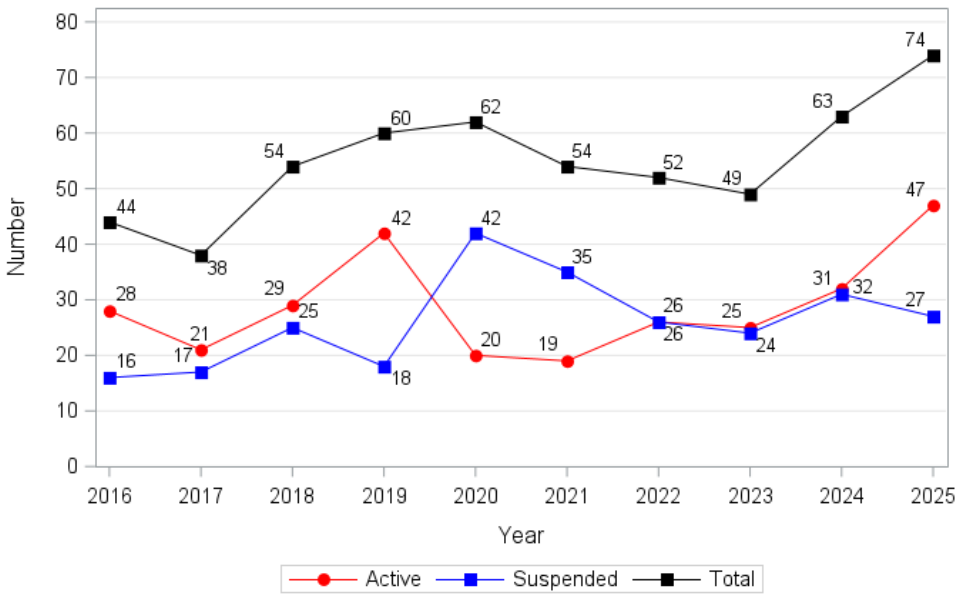


Figure 9.2 shows the number of patients on the active islet transplant list at 31 March 2025 by centre. Of the 47 patients on the active transplant list 42% were registered at Manchester, of which 14 were SIK, 28% at Edinburgh (eight SIK), 19% at Oxford (six SIK) and 11% at Newcastle, none of which were SIK. The Royal Free formally ceased being an islet centre during the 2024/25 year.

Figure 9.2 Patients on the active islet transplant list at 31 March 2025, by centre

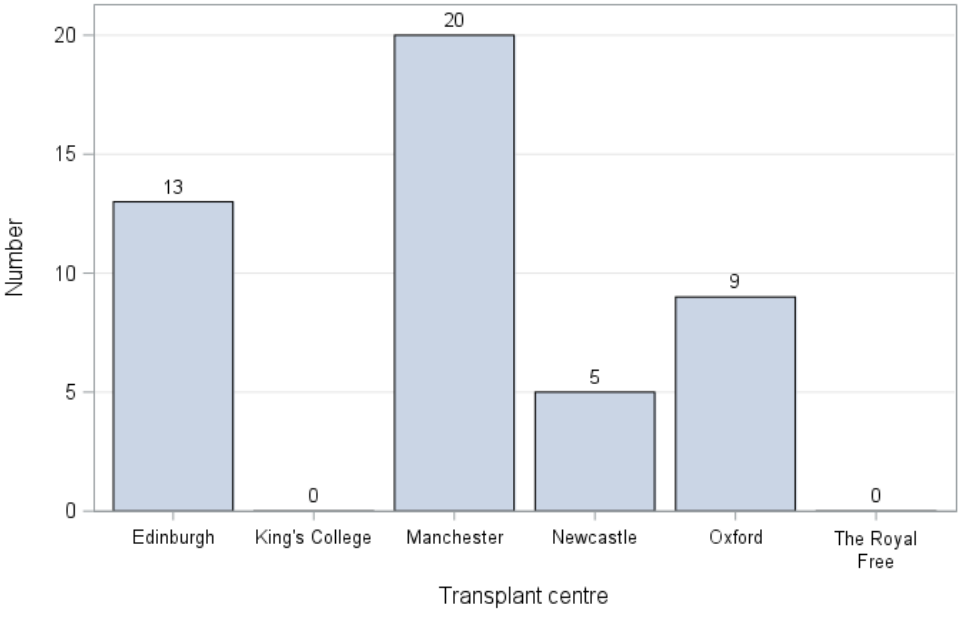
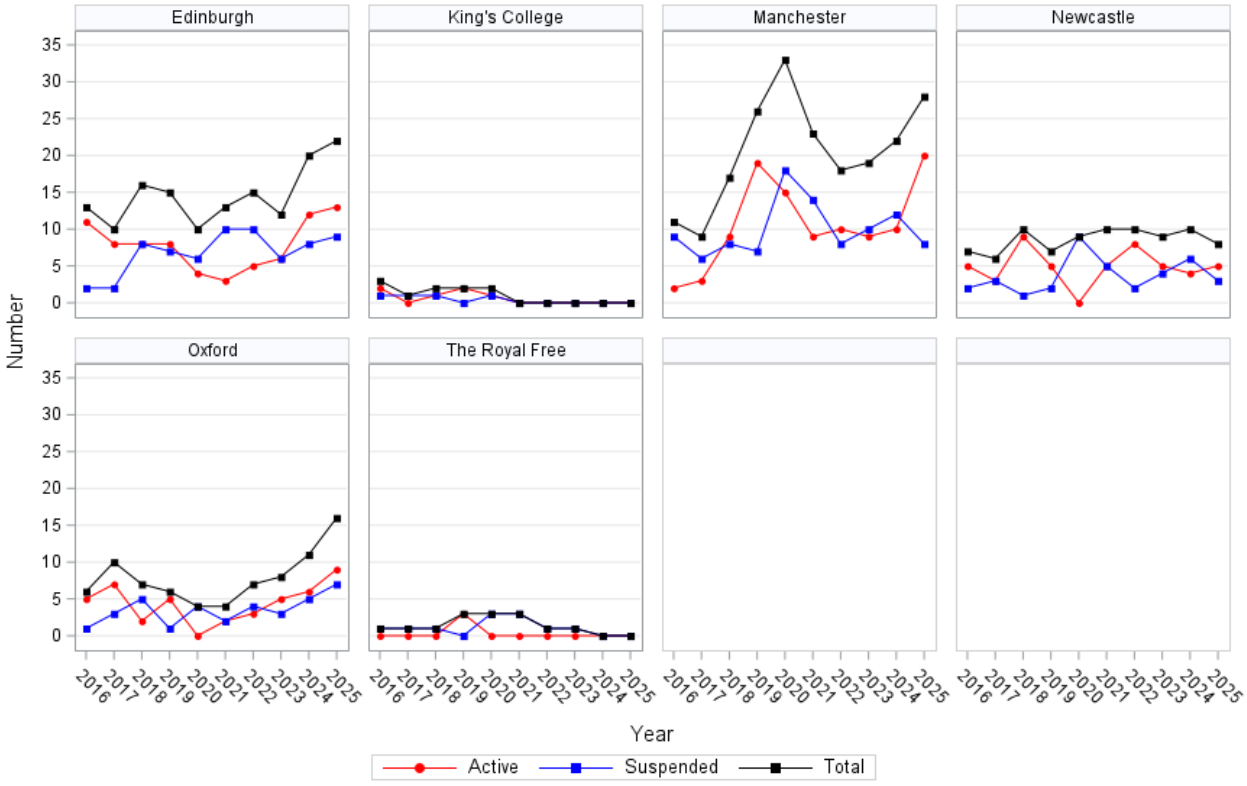


Figure 9.3 shows the number of patients on the islet transplant list at 31 March each year between 2016 and 2025 for each transplant centre. There have been very few patients registered at King's College or the Royal Free, in the time period.

Figure 9.3 Patients on the islet transplant list at 31 March, by centre



Bristol closed 31 March 2022 – patients referred to Oxford.

9.2 Post-registration outcomes, 1 April 2021 – 31 March 2022

An indication of outcomes for patients listed for an islet transplant is summarised in **Figure 9.4**. This shows the proportion of patients transplanted or still waiting one and three years after joining the list. It also shows the proportion removed from the transplant list (typically because they become too unwell for transplant) and those who died while on the transplant list.

35% of patients were transplanted within one year, while three years after listing 46% of patients had received a transplant and 19% were removed from the list.

Figure 9.4 Post-registration outcome for 37 new islet registrations made in the UK, 1 April 2021 - 31 March 2022

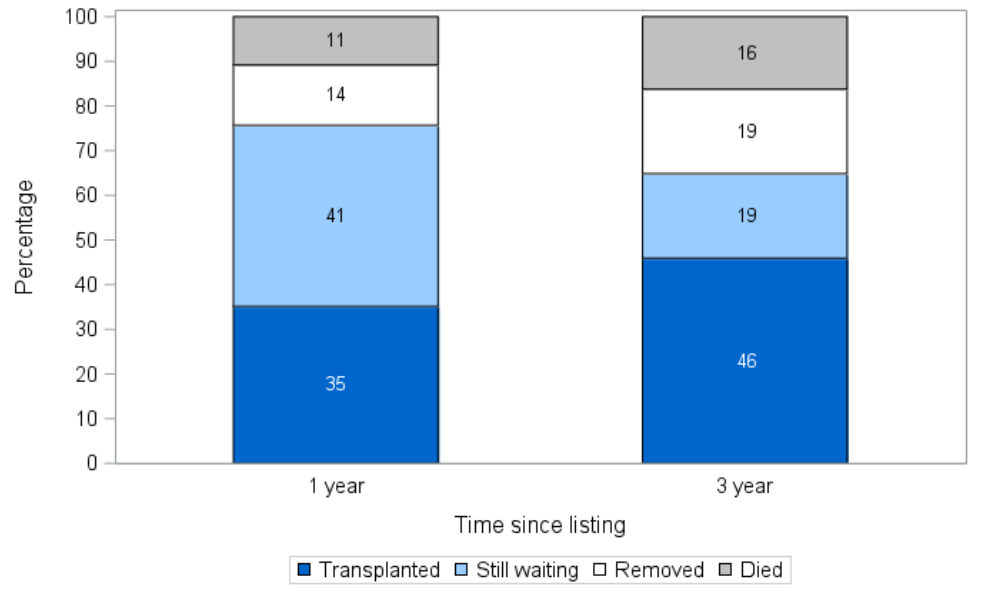
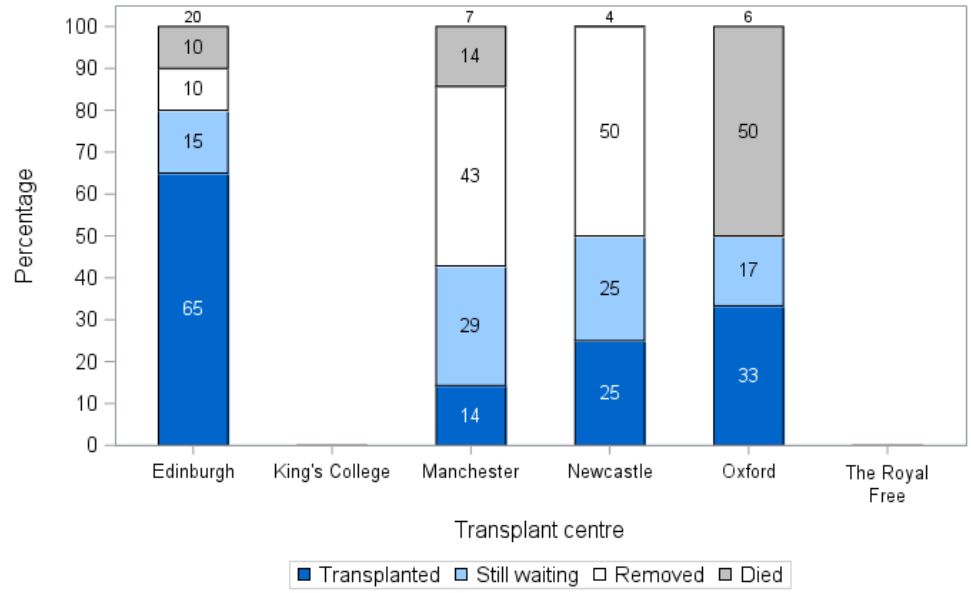


Figure 9.5 shows the proportion of patients transplanted or still waiting three years after joining the list by centre. All centres have small numbers of patient registrations in this time period so the figures should be interpreted with caution. 10%, 14% and 50% of patients registered in this time period died waiting for an islet transplant at Edinburgh, Manchester and Oxford respectively. King's College and The Royal Free registered no patients in this time period.

Figure 9.5 Three-year post-registration outcome for 37 new islet registrations made in the UK, 1 April 2021 - 31 March 2022, by centre



9.3 Demographic characteristics, 1 April 2024 – 31 March 2025

The sex and age group of patients registered on the islet transplant list during 2024/25 are shown by centre in **Figures 9.6** and **9.7**. Note that all percentages quoted are based only on data where relevant information was available.

Overall, the majority of patients registered on the islet transplant list were female (63%) and the median age was 51 years.

Figure 9.6 Registrations on the active routine islet transplant list, 1 April 2024 - 31 March 2025, by centre and sex

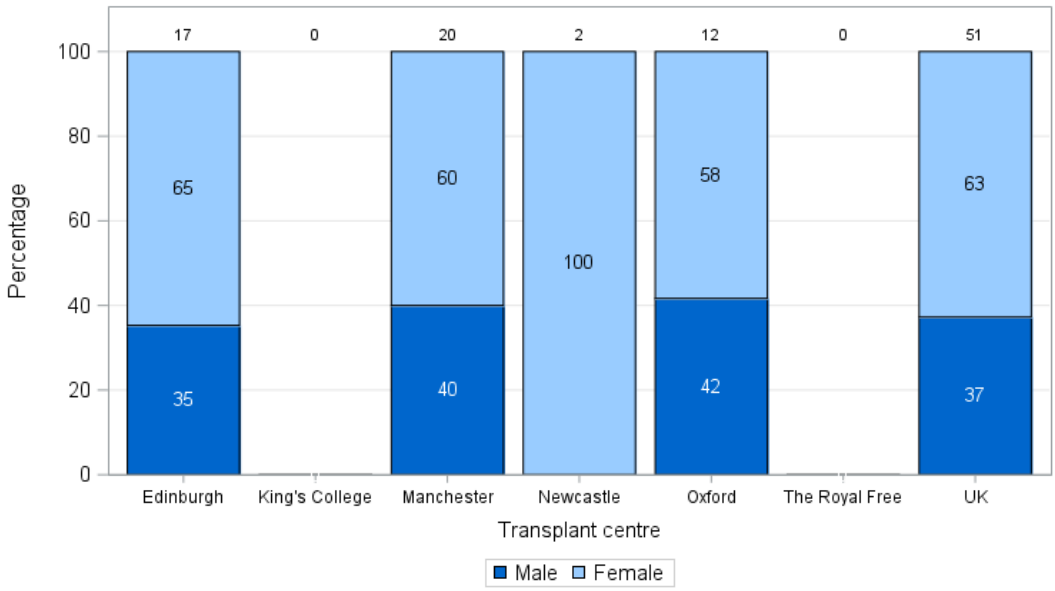
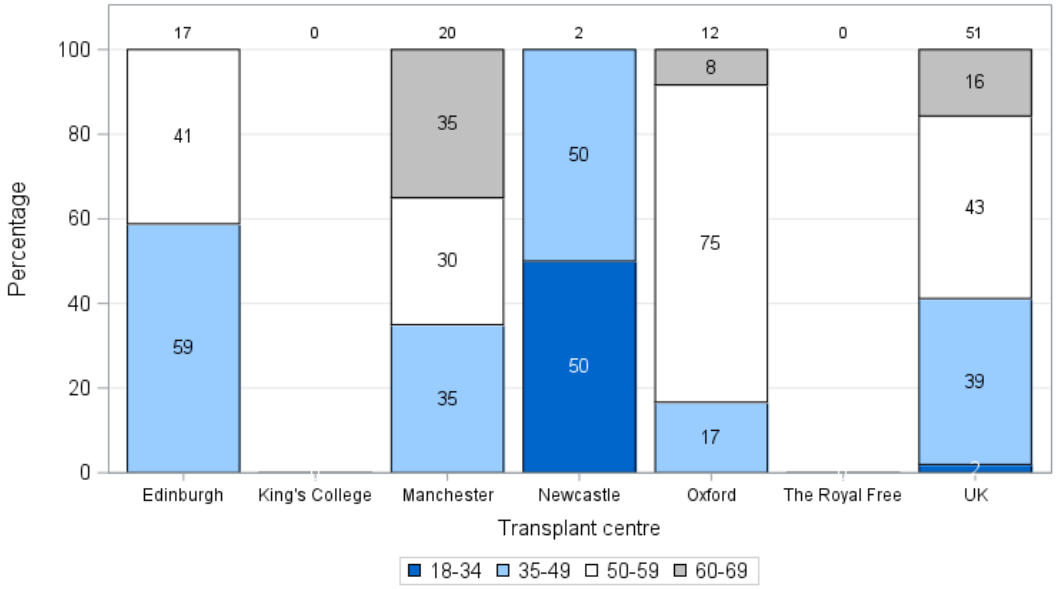


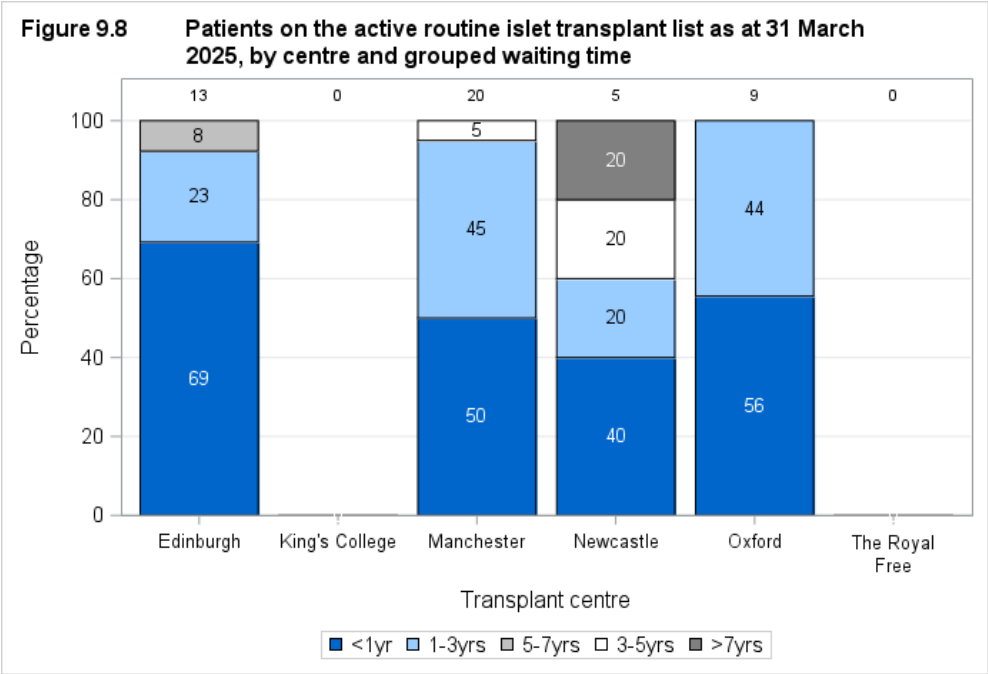
Figure 9.7 Registrations on the active routine islet transplant list, 1 April 2024 - 31 March 2025, by centre and age group



9.4 Patient waiting times for those currently on the list, 31 March 2025

Figure 9.8 shows the length of time patients have been waiting on the islet transplant list at 31 March 2025 by centre. One patient with high levels of sensitisation at Newcastle has been waiting longer than seven years for a routine islet alone transplant.

Figure 9.8 Patients on the active routine islet transplant list as at 31 March 2025, by centre and grouped waiting time



9.5 Median active waiting time to transplant, 1 April 2019 - 31 March 2023

The length of time a person waits for routine islet transplant varies across the UK. The median active waiting time for deceased donor islet transplantation is calculated using the Kaplan-Meier method and is shown in **Figure 9.9** and **Table 9.1** for patients registered at each individual unit.

The median active waiting time to transplant for patients registered on the islet transplant list between 1 April 2019 and 31 March 2023 is 317 days (around 10 months). The median active waiting time is not shown where less than 10 patients are registered.

Figure 9.9 **Median active waiting time to deceased donor transplant for routine registered patients on the islet transplant list, 1 April 2019 - 31 March 2023**

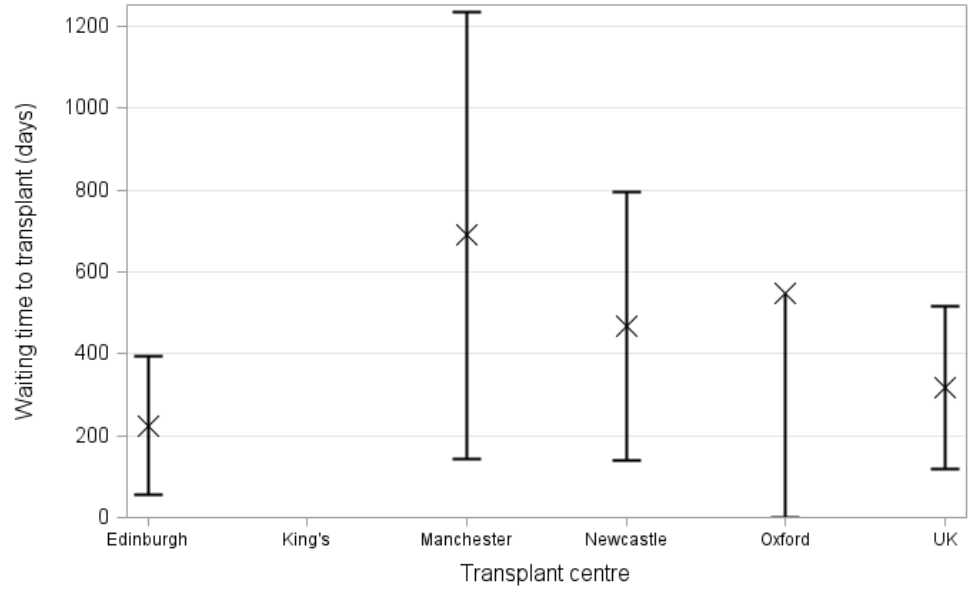


Table 9.1 **Median active waiting time to islet transplant in the UK, for patients registered 1 April 2019 - 31 March 2023**

Transplant centre	Number of patients registered	Waiting time (days) Median	95% Confidence interval
Edinburgh	35	225	57 - 393
King's[1]	1	-	-
Manchester	38	689	143 - 1235
Newcastle	15	467	140 - 794
Oxford[2]	16	548	-
UK	**105**	**317**	**118 - 516**

[1]Data not presented for centres where less than 10 patients registered
[2] Insufficient data to calculate confidence interval

Response to islet offers

10.1 Offer decline rates, 1 April 2022 – 31 March 2025

Islet offers from DBD donors whose pancreas was retrieved, offered directly on behalf of a named individual person and resulted in islet transplantation are included in the analysis. Any offers of islets declined for transplantation or DCD offers were excluded, as were offers made through the fast track scheme or the reallocation of the pancreas.

Individual centre offer decline rates by financial year, 1 April 2022 and 31 March 2025 are shown in **Table 10.1**. All centres were consistent with the national offer decline rate. King's College and Royal Free had no patients registered and received no offers in this time period.

Figure 10.1 **DBD donor islet offer decline rates for pancreases that resulted in an islet transplant, 1 April 2022 and 31 March 2025**

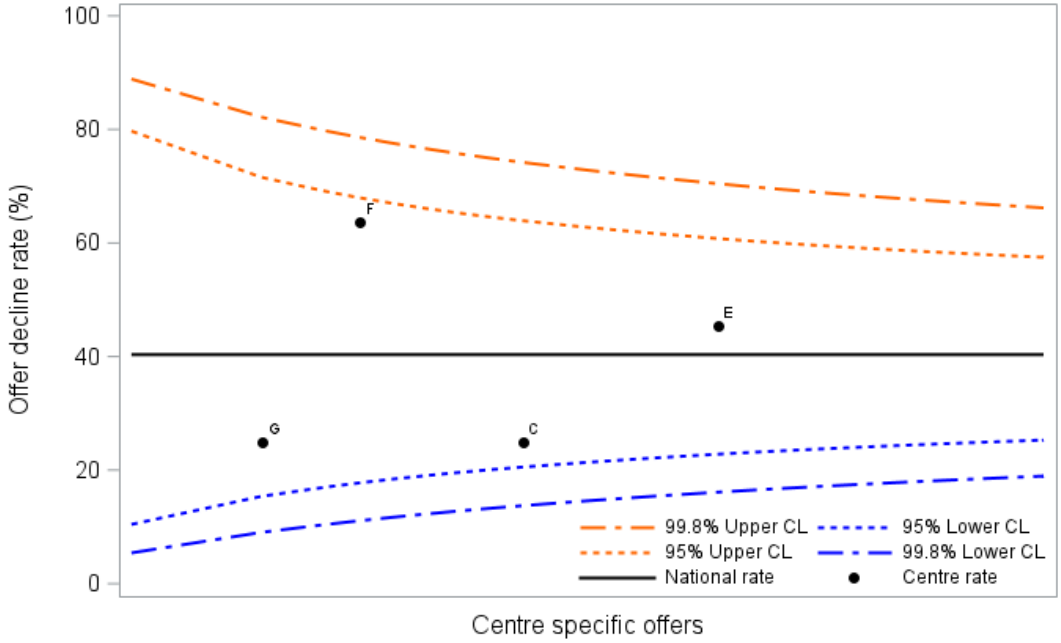


Table 10.1 **DBD donor islet offer decline rates by transplant centre, 1 April 2022 and 31 March 2025**

Centre	Code	2022/23		2023/24		2024/25		Overall	
		N	(%)	N	(%)	N	(%)	N	(%)
Edinburgh	C	3	(0)	6	(33)	7	(29)	16	(25)
Manchester	E	7	(29)	8	(63)	7	(43)	22	(45)
Newcastle	F	6	(50)	3	(67)	2	(100)	11	(64)
Oxford	G	1	(0)	2	(0)	5	(40)	8	(25)
King's	J	0	-	0	-	0	-	0	-
Royal Free	K	0	-	0	-	0	-	0	-
UK		**17**	**(29)**	**19**	**(47)**	**21**	**(43)**	**57**	**(40)**

Centre has reached the upper 99.8% confidence limit
Centre has reached the upper 95% confidence limit
Centre has reached the lower 95% confidence limit
Centre has reached the lower 99.8% confidence limit

Islet transplants

11.1 Islet transplants, 1 April 2015 – 31 March 2025

Figure 11.1 shows the total number of islet transplants performed in the last ten financial years, by type of donor. Since 2015/16, the number of islet transplants has fluctuated around 30 each year, but decreased to around 20 each year since 2020/21, following the COVID-19 pandemic.

Figure 11.1 Islet transplants,1 April 2015 - 31 March 2025, by financial year and donor type

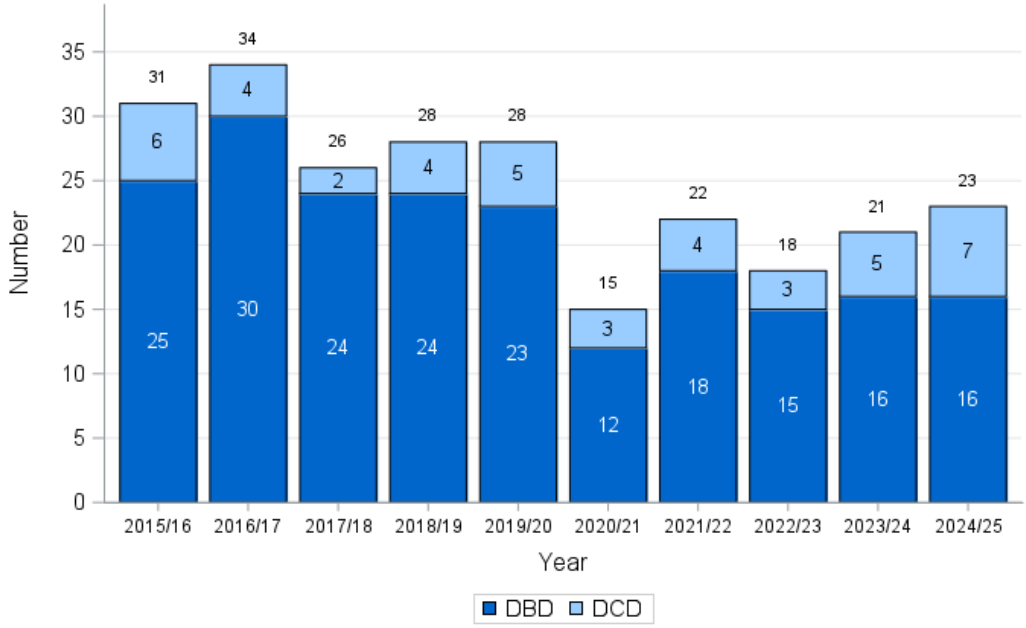


Figure 11.2 shows the total number of islet transplants performed in 2024/25, by centre and type of donor. The same information is presented in **Figure 11.3** but this shows the proportion of DBD and DCD transplants performed at each centre. Edinburgh performed the most islet transplants in 2024/25 (12), followed by Manchester and Oxford (five). Edinburgh, Manchester and Oxford performed DCD as well as DBD islet transplants at a similar proportion. Newcastle performed one DCD islet transplant in 2024/25, while Royal Free and King's College performed none.

Figure 11.2 Islet transplants, 1 April 2024 - 31 March 2025, by centre and donor type

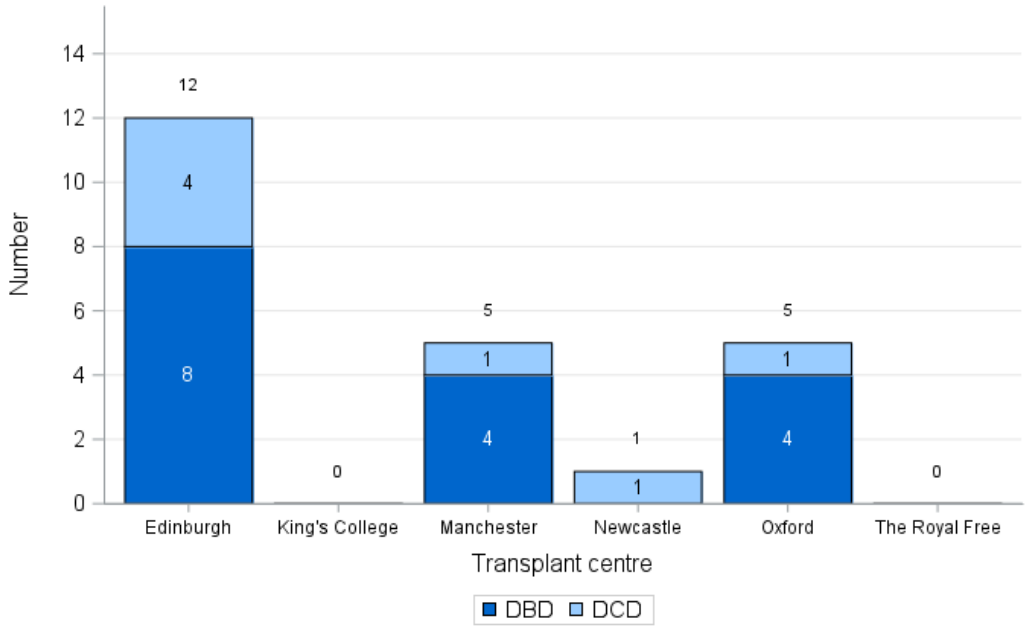


Figure 11.3 Islet transplants, 1 April 2024 - 31 March 2025, by centre and donor type

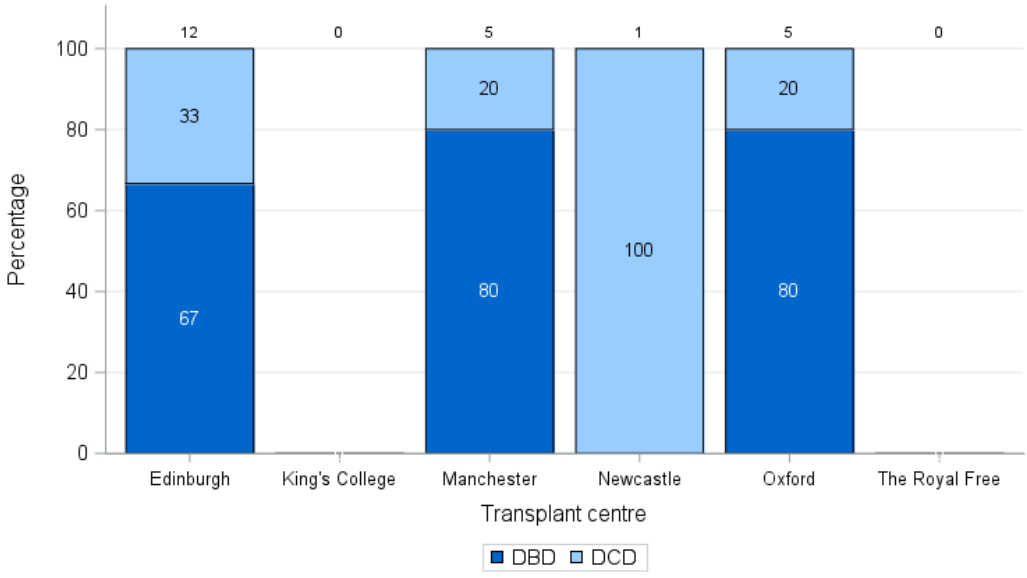
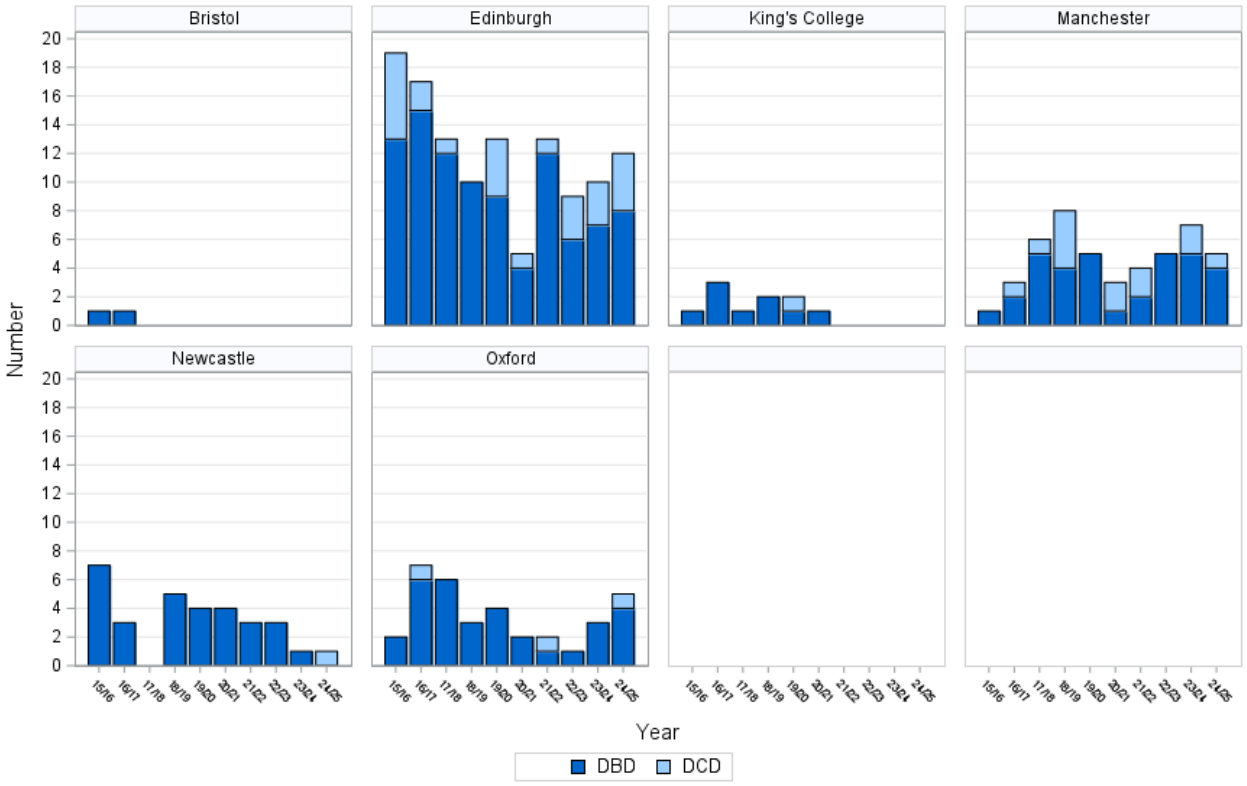


Figure 11.4 shows the total number of islet transplants performed in last ten years, by centre and type of donor. Edinburgh have consistently performed the most transplants each year while Manchester's islet transplant activity has gradually increased over the decade. Bristol are no longer performing islet transplants and have been referring patients to Oxford. Royal Free have performed no islet transplant in the last ten years.

Figure 11.4 Islet transplants, 1 April 2008 - 31 March 2025, by centre, financial year and donor type



Bristol closed 31 March 2022 – patients referred to Oxford.

11.2 Demographic characteristics, 1 April 2024 - 31 March 2025

The sex, age group, sensitisation group (cRF%) and matchability points score group of patients that received an islet transplant in 2024/25 are shown by centre in **Figures 11.5**, **11.6**, **11.7** and **11.8** respectively. Note that all percentages quoted are based only on data where relevant information was available. Overall, 23 patients were transplanted on the islet transplant list, the median age was 48 years, the majority were female 14 (61%), 73% had a sensitisation of less than 10 and 9% were in the difficult to match group.

Figure 11.5 **Islet transplants, 1 April 2024 - 31 March 2025, by centre and sex**

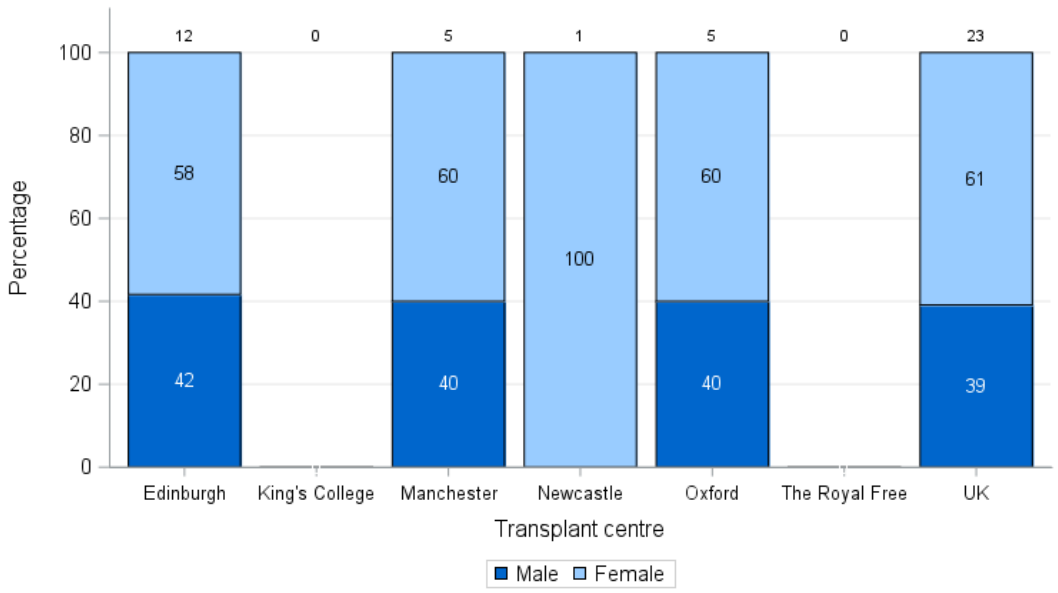


Figure 11.6 **Islet transplants, 1 April 2024 - 31 March 2025, by centre and age group**

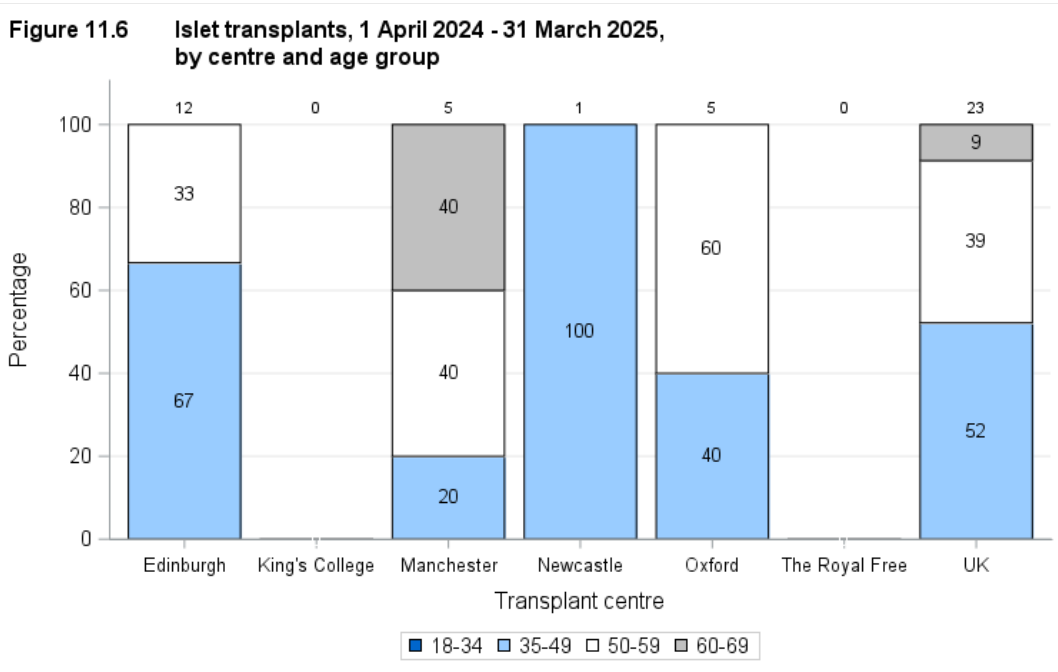


Figure 11.7 **Islet transplants, 1 April 2024 - 31 March 2025, by centre and sensitisation (cRF%) group**

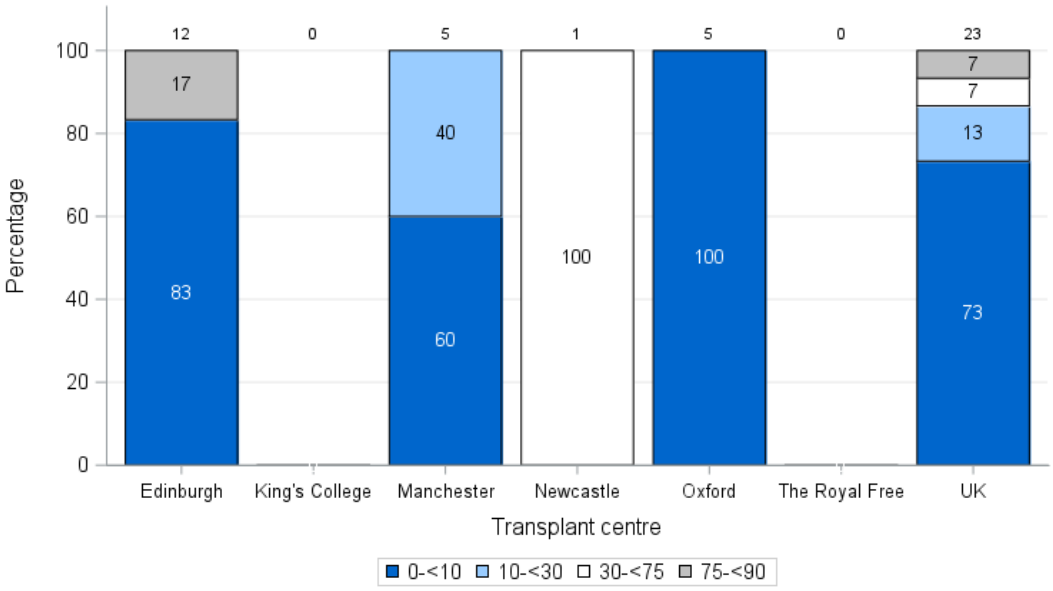
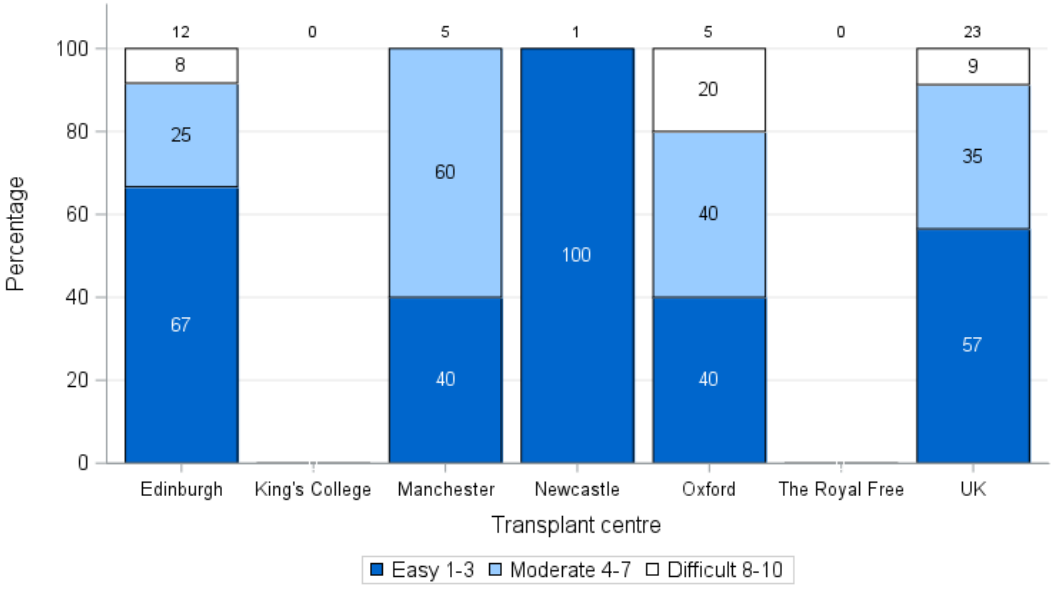


Figure 11.8 **Islet transplants, 1 April 2024 - 31 March 2025, by centre and matchability group**



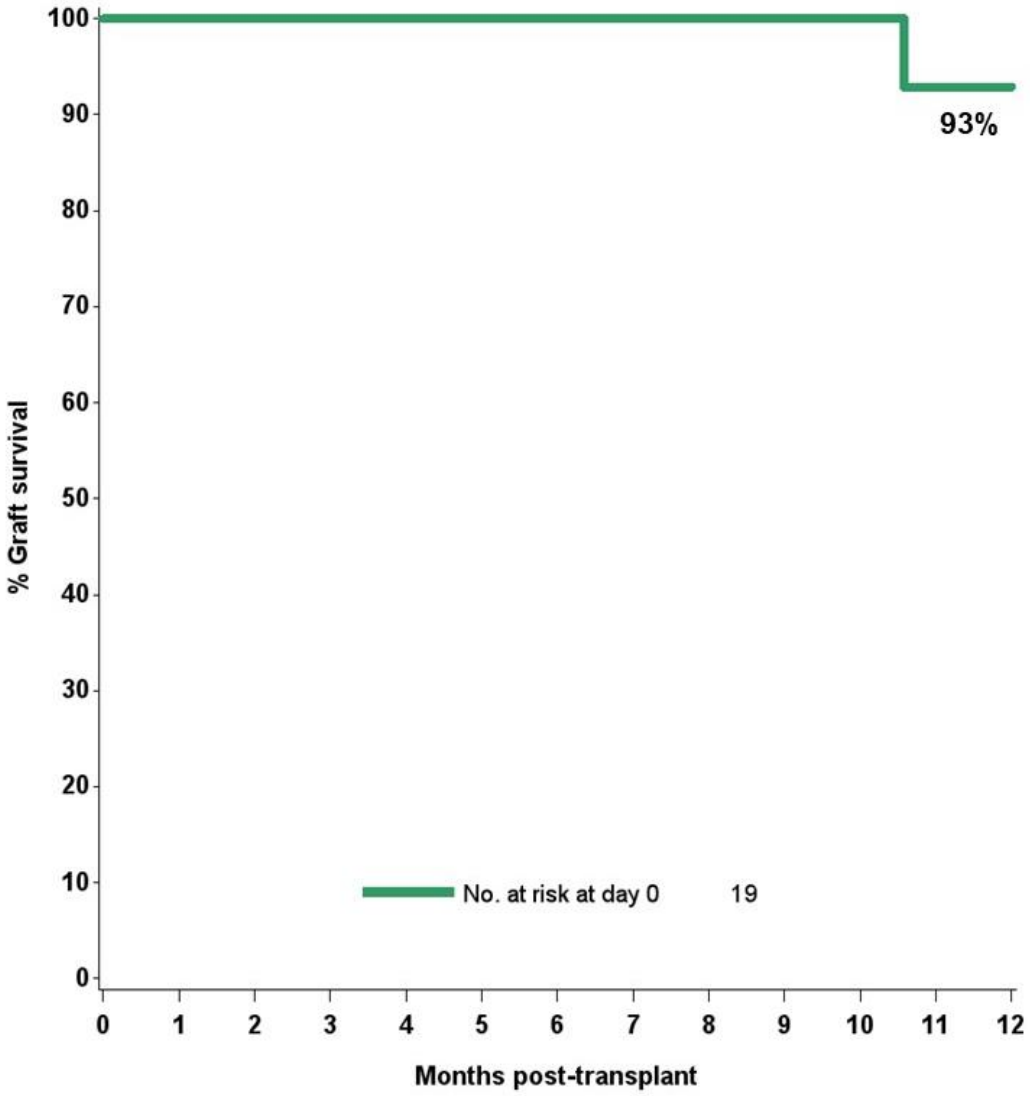
Islet outcomes

12.1 Outcome measures for routine islet transplants

Key measures of islet outcome include graft survival, annual rate of severe hypoglycaemic events, HbA1c and insulin requirements. This section includes outcomes reported to NHS Blood and Transplant for islet transplants between 1 April 2015 and 31 March 2024.

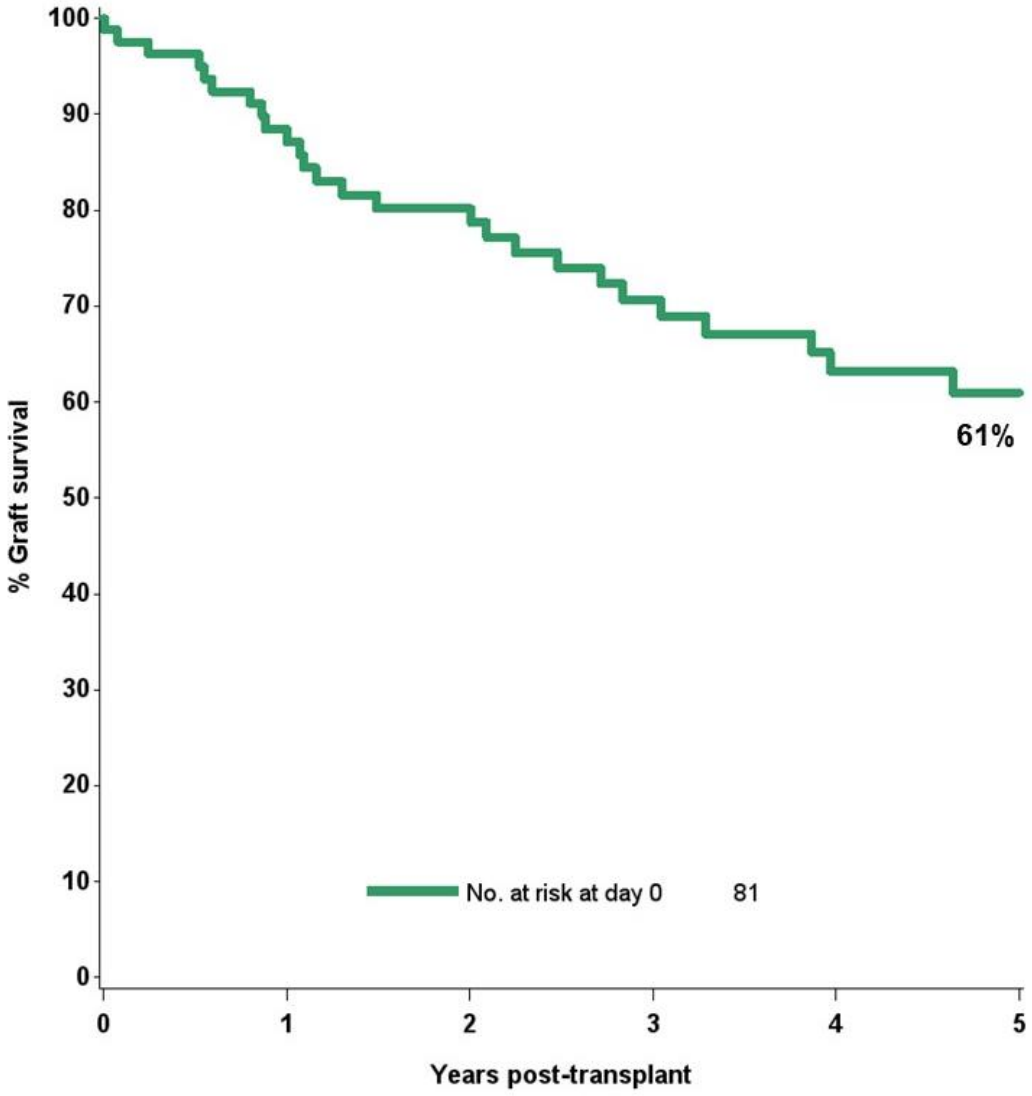
A one-year Kaplan-Meier graft survival plot for islet transplants between 1 April 2020 – 31 March 2024 is shown in **Figure 12.1**. Estimated one-year graft survival following a routine islet transplant is 93% with 95% confidence interval (CI) (59-99%). This includes patients who received only a routine graft and those patients who additionally received a priority graft.

Figure 12.1 One-year graft survival following first routine islet transplant between 1 April 2020 and 31 March 2024



A five-year Kaplan-Meier graft survival plot for islet transplants between 1 April 2015 – 31 March 2024 is shown in **Figure 12.2**. Estimated five-year graft survival following a routine islet transplant is 61% with 95% CI (48-72%). This includes patients who received only a routine graft and those who additionally received a priority graft.

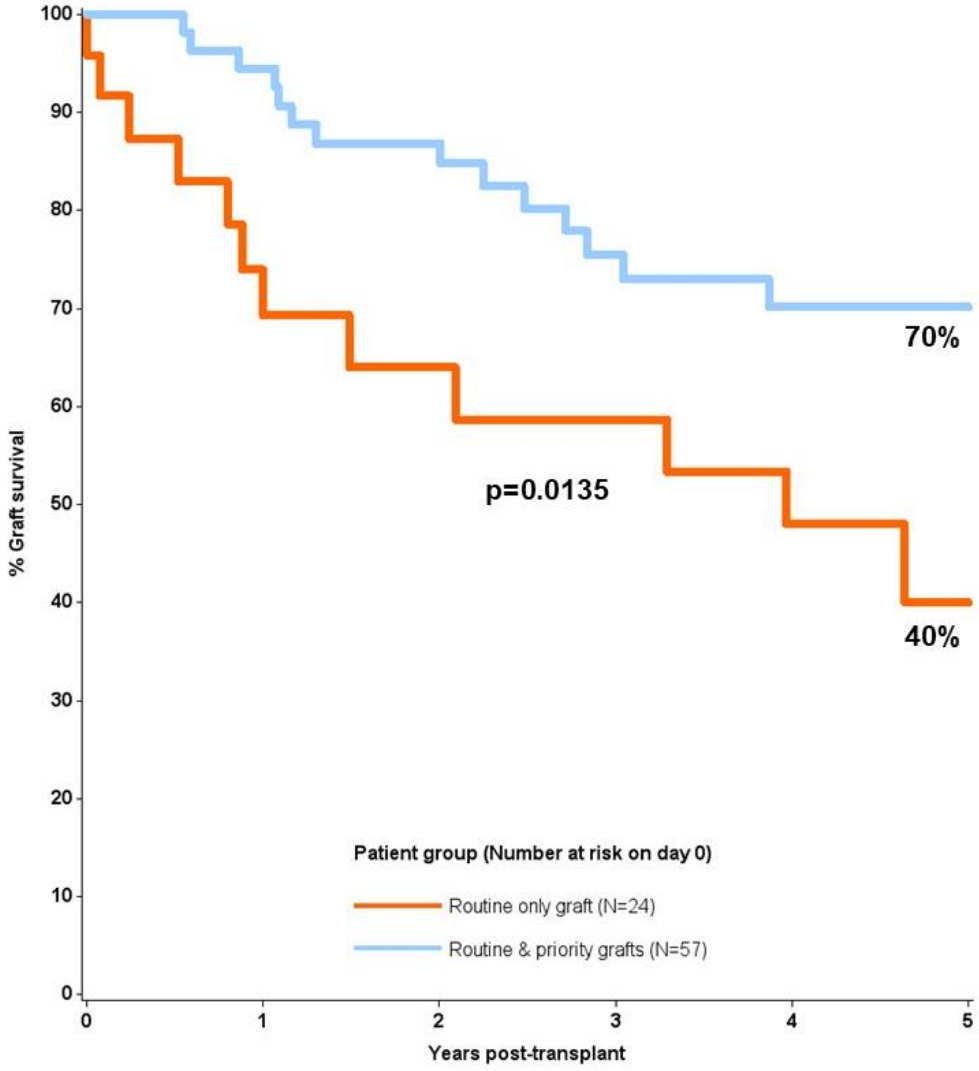
Figure 12.2 Five-year graft survival following first routine islet transplant between 1 April 2015 and 31 March 2024



Further, five-year Kaplan-Meier graft survival plots by type of graft are shown in **Figure 12.3** and **12.4**, for islet transplants between 1 April 2015 – 31 March 2024. **Figure 12.4** only includes routine grafts (routine only or routine followed by a priority) that were still functioning at one year post-transplant. In order to receive a priority (top-up) graft the patient's routine graft must still be functioning and the priority graft should be given within the first 12 months post routine transplant. Therefore, to accurately compare the two groups, i.e. those receiving a routine graft alone and those receiving a routine and subsequent priority graft, the survival estimate is conditional on one-year graft survival in both groups.

Estimated five-year graft survival (for all islet transplants) is 40% for routine only grafts, 95% CI (18-61%) and for routine followed by priority grafts is 57%, 95% CI (55-81%). This difference was statistically significant, p=0.0135.

Figure 12.3 Five-year graft survival following routine islet transplantation, by type of graft, between 1 April 2015 and 31 March 2024



Estimated five-year graft survival (for islet transplant, where the routine graft was functioning at one year) is 58% for routine only grafts, 95% CI (25-80%) and for routine followed by priority grafts is 74%, 95% CI (58-85%). This difference was not statistically significant, p=0.51.

Figure 12.4 **Five-year graft survival following routine islet transplantation, where the routine graft was functioning at one year, between 1 April 2015 and 31 March 2024**

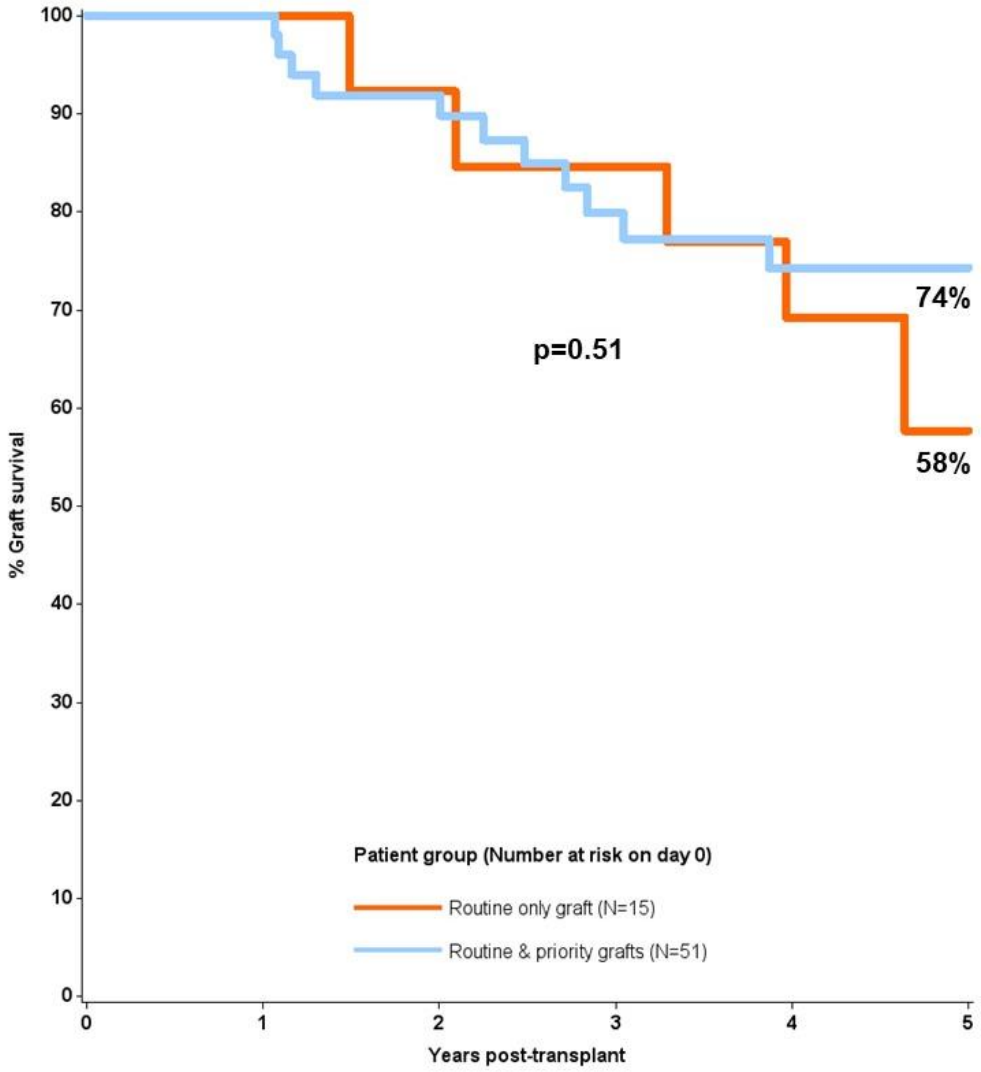


Figure 12.5 shows, for routine islet only transplants between 1 April 2020 – 31 March 2024, the median annual rate of severe hypoglycaemic events, at registration, prior to transplant (reported as number of events between registration and transplant) and at one-year post-transplant. Of the 13 patients where the number of severe hypoglycaemic events at one-year post-transplant was available, 11 (85%) experienced no severe hypoglycaemic events and two (15%) experienced one event, a reduction from the rate of events at time of transplant.

Figure 12.5 Median annual rate of severe hypoglycaemic events for routine islet only transplants, 1 April 2020 to 31 March 2024

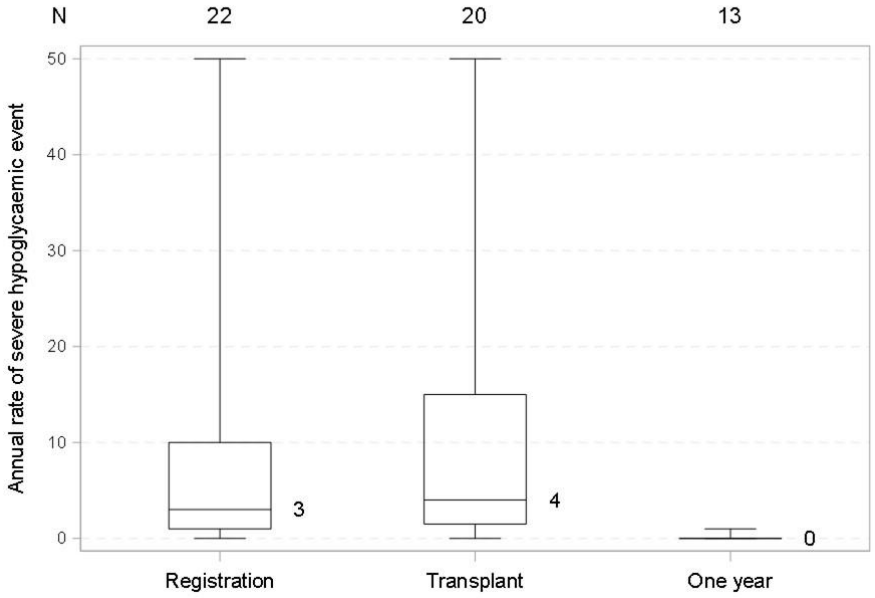


Figure 12.6 shows the reduction in median HbA1c (mmol/mol) for routine islet only transplants between 1 April 2020 – 31 March 2024. Median HbA1c dropped from 63mmol/mol prior to transplant to 54mmol/mol at one-year post-transplant. Of those 16 patients with HbA1c reported at one-year, seven (44%) had an HbA1c less than 53mmol/mol.

Figure 12.6 Median HbA1c (mmol/mol) for routine islet only transplants, 1 April 2020 to 31 March 2024

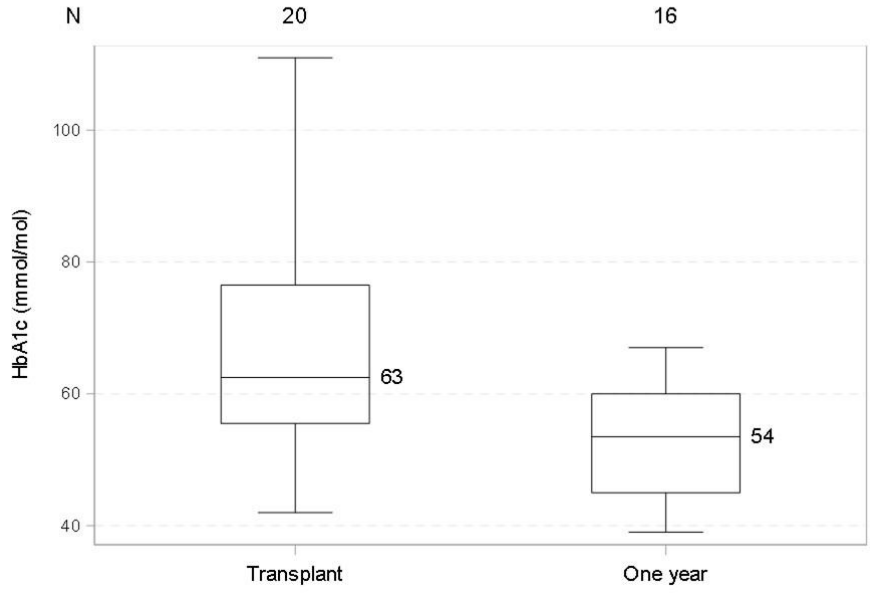
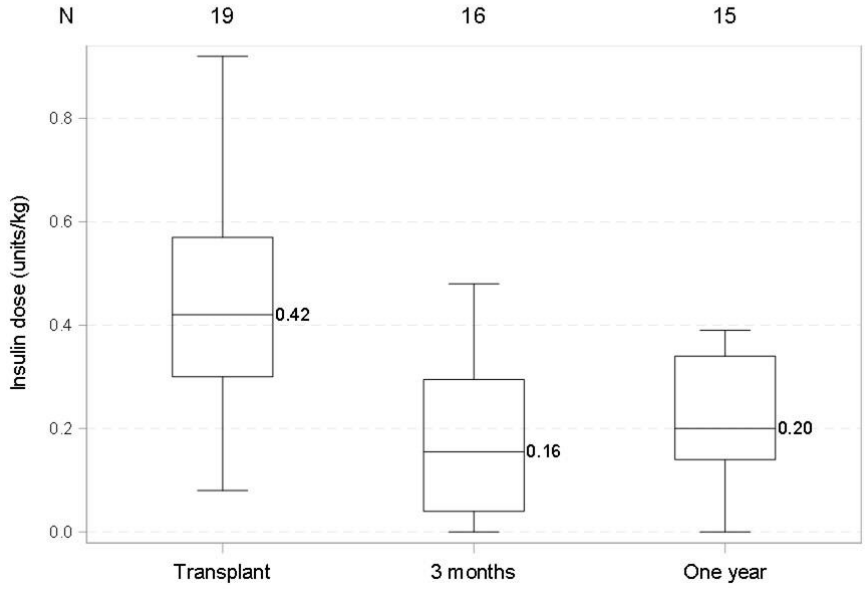


Figure 12.7 shows the median insulin dose per kilo recipient body weight at three-months and one-year post-transplant, for routine islet only transplants between 1 April 2020 – 31 March 2024. Prior to transplant the median insulin dose was 0.42 units/kg, by three-months the median dose has dropped to 0.16 units/kg and then increased slightly at one-year post-transplant with a median dose of 0.20 units/kg. Following islet transplantation, of the 14 patients where information was reported, five (36%) achieved insulin independence at some point during their first year post-transplant.

Figure 12.7 Median insulin dose per kilo of recipient weight for routine islet only transplants, 1 April 2020 to 31 March 2024

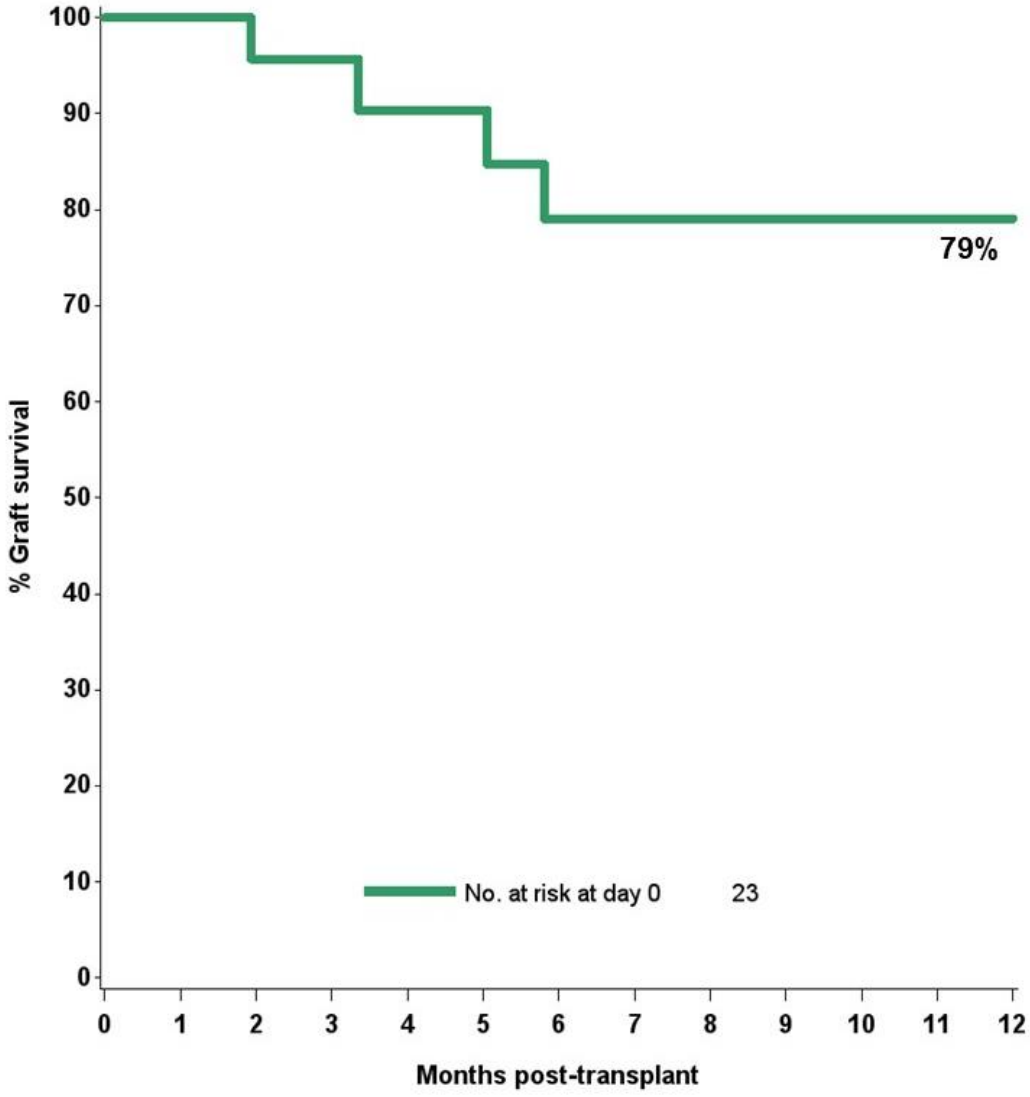


12.2 Outcome measures for SIK transplants

Key measures of SIK outcome include graft survival, annual rate of HbA1c and insulin requirements. This section includes outcomes reported to NHS Blood and Transplant for SIK transplants between 1 April 2017 and 31 March 2024, as centres were able to register patients for an SIK graft from 1 July 2016.

A one-year Kaplan-Meier graft survival plot for SIK transplants between 1 April 2020 – 31 March 2024 is shown in **Figure 12.8**. Estimated one-year islet graft survival following an SIK transplant is 79% with 95% confidence interval (CI) (53-92%). This includes patients who received an SIK graft only and those patients who additionally received a priority islet graft.

Figure 12.8 One-year graft survival following first SIK transplant between 1 April 2020 and 31 March 2024



A five-year Kaplan-Meier graft survival plot for SIK transplants between 1 April 2017 – 31 March 2024 is shown in **Figure 12.9**. Estimated five-year islet graft survival following a routine SIK transplant is 34% with 95% CI (7-64%). This includes patients who received an SIK graft only and those patients who additionally received a priority islet graft.

Figure 12.9 Five-year graft survival following first SIK transplant between 1 April 2017 and 31 March 2024

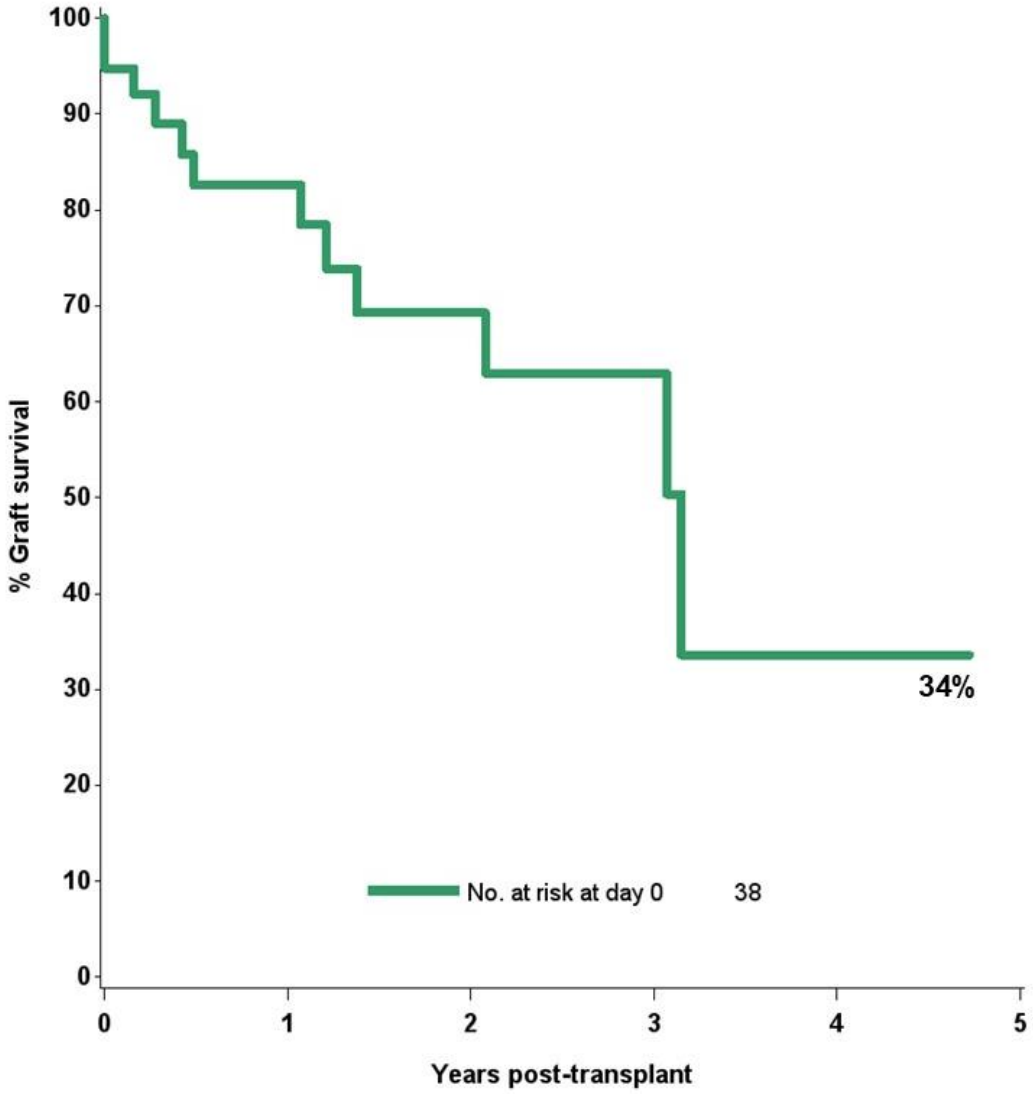


Figure 12.10 shows the reduction in median HbA1c (mmol/mol) for SIK transplants between 1 April 2020 – 31 March 2024. Median HbA1c dropped from 61mmol/mol prior to transplant to 53mmol/mol at one-year post-transplant. Of those 13 patients with HbA1c reported at one-year, six (46%) had an HbA1c less than 53mmol/mol.

Figure 12.10 Median HbA1c (mmol/mol) for SIK transplants, 1 April 2020 to 31 March 2024

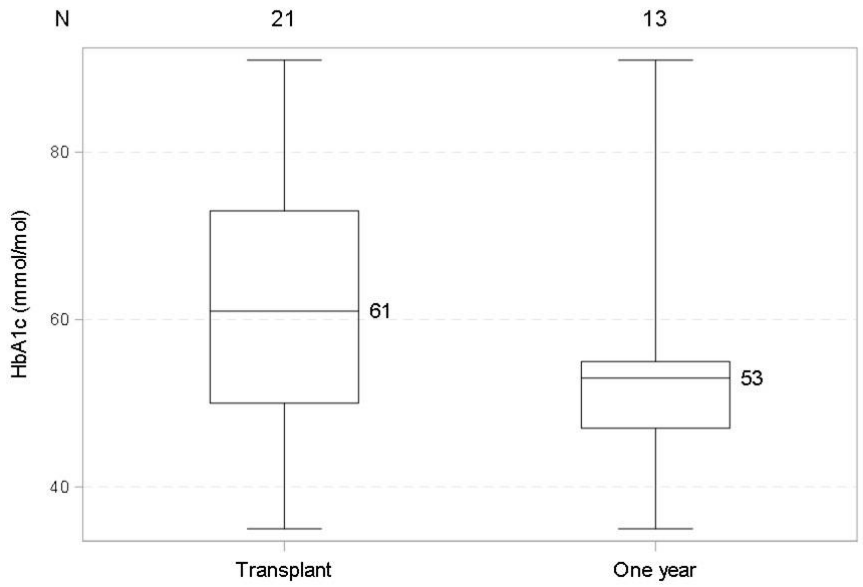
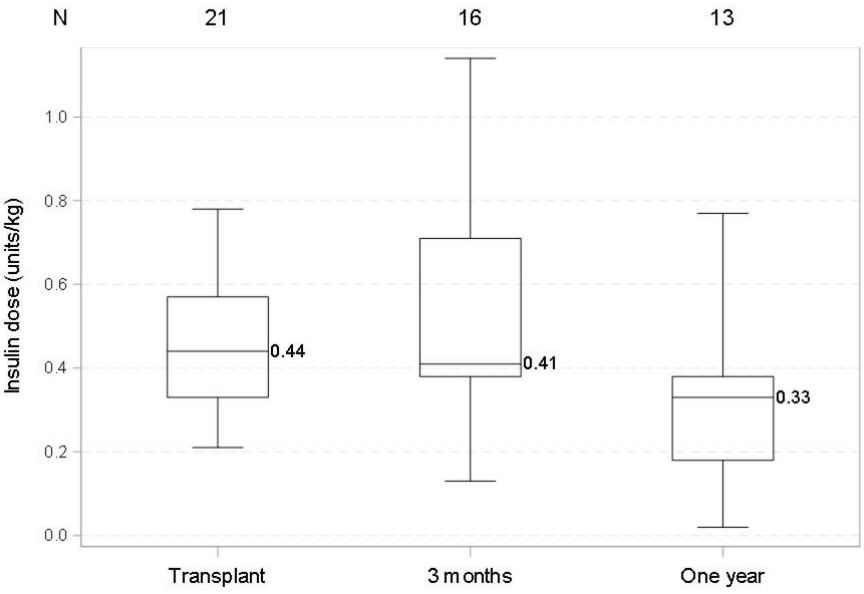


Figure 12.11 shows the median insulin dose per kilo recipient body weight at three-months and one-year post-transplant, for SIK transplants between 1 April 2020 – 31 March 2024. Prior to transplant the median insulin dose is 0.44 units/kg, by three-months the median dose has dropped slightly to 0.42 units/kg and then decreased further at one-year post-transplant with a median dose of 0.33 units/kg. Following SIK transplantation, of the 10 patients where information was reported, 1 (10%) achieved insulin independence at some point during their first year post-transplant.

Figure 12.11 Median insulin dose per kilo of recipient weight for SIK transplants, 1 April 2020 to 31 March 2024



Form return rates

13.1 Islet form return rates, 1 January – 31 December 2024

Form return rates are reported in **Table 13.1** for the islet transplant record, three month and one year follow-up form, along with lifetime follow-up (more than two years). These include all islet transplants performed between 1 January and 31 December 2024 for the transplant record, and all requests for follow-up forms issued in this time period. Centres highlighted are transplant centres. There were 71% of transplant record and 70% of lifetime follow-up forms returned. 75% of 3-month and 83% of 12-month follow-up forms were returned. Of the transplant centres, London, King's College Hospital had the lowest lifetime follow-up return rate of 0% followed by Manchester, Manchester Royal Infirmary with 38% lifetime follow-up.

Table 13.1 Form return rates following islet transplantation, by centre, 1 January - 31 December 2024

Centre	Transplant record		3 month follow-up		12 month follow-up		Lifetime follow-up	
	N	% returned	N	% returned	N	% returned	N	% returned
Bristol, Southmead Hospital							1	100
Edinburgh, Royal Infirmary Of Edinburgh	6	83	3	100	1	100	9	100
Glasgow, Queen Elizabeth University Hospital							1	0
London, Kings College Hospital							4	0
London, The Royal Free Hospital							3	67
Manchester, Manchester Royal Infirmary	6	100	3	33	3	100	8	38
Newcastle, Freeman Hospital	1	100			1	100	9	89
Oxford, Churchill Hospital	4	0	2	100	1	0	9	89
Overall	**17**	**71**	**8**	**75**	**6**	**83**	**44**	**70**

Appendix

A1 Glossary of terms

ABO
The most important human blood group system for transplantation is the ABO system. Every human being is of blood group O, A, B, AB, or one of the minor variants of these four groups. ABO blood groups are present on other tissues and, unless special precautions are taken, a blood group A pancreas transplanted to a blood group O patient will be rapidly rejected.

Active transplant list
When a patient is registered for a transplant, they are registered on what is called the 'active' transplant list. This means that when a donor pancreas becomes available, the patient is included among those who are matched against the donor to determine whether or not the pancreas is suitable for them. It may sometimes be necessary to take a patient off the transplant list, either temporarily or permanently. This may be done, for example, if someone becomes too ill to receive a transplant. The patient is told about the decision to suspend them from the list and is informed whether the suspension is temporary or permanent. If a patient is suspended from the list, they are not included in the matching of any donor pancreases that become available.

Calculated Reaction Frequency (cRF)
For a given patient with detectable HLA antibodies, the proportion blood group identical donors from a pool of 10,000 against which the recipient has HLA specific antibodies is calculated. This percentage of donors is termed the 'calculated Reaction Frequency' (cRF), more commonly referred to as the sensitisation level. Patients with no detectable HLA antibodies will have 0 sensitisation (0% cRF).

Case mix
The types of patients treated at a unit for a common condition. This can vary across units depending on the facilities available at the unit as well as the types of people in the catchment area of the unit. The definition of what type of patient a person is depends on the patient characteristics that influence the outcome of the treatment. For example, the case mix for patients registered for a pancreas transplant is defined in terms of various factors such as the blood group, tissue type and age of the patient. These factors have an influence on the chance of a patient receiving a transplant.

Confidence interval (CI)
When an estimate of a quantity such as a survival rate is obtained from data, the value of the estimate depends on the set of patients whose data were used. If, by chance, data from a different set of patients had been used, the value of the estimate may have been different. There is therefore some uncertainty linked with any estimate. A confidence interval is a range of values whose width gives an indication of the uncertainty or precision of an estimate. The number of transplants or patients analysed influences the width of a confidence interval. Smaller data sets tend to lead to wider confidence intervals compared to larger data sets. Estimates from larger data sets are therefore more precise than those from smaller data sets. Confidence intervals are calculated with a stated probability, usually 95%. We then say that there is a 95% chance that the confidence interval includes the true value of the quantity we wish to estimate.

Confidence limit
The upper and lower bounds of a confidence interval.

Cox Proportional Hazards model
A statistical model that relates the instantaneous risk (hazard) of an event occurring at a given time point to the risk factors that influence the length of time it takes for the event to occur. This model can be used to compare the hazard of an event of interest, such as graft failure or patient death, across different groups of patients.

Cross-match
A cross-match is a test for patient antibodies against donor antigens. A positive cross-match shows that the donor and patient are incompatible. A negative cross-match means there is no reaction between donor and patient and that the transplant may proceed.

Donor after brain death
Donation after brainstem death (DBD) means donation which takes place following the diagnosis of death using neurological criteria

Donor after circulatory death
Donation after circulatory death (DCD) means donation which takes place following the diagnosis of death using circulatory criteria.

Fixed effects
A fixed effects model is a type of statistical model that is used to estimate the effect of one or more categorical variables on a continuous outcome variable, while controlling for other variables. In a fixed effects model, the categorical variables are assumed to be fixed and not a random sample from a larger population. Therefore, the model is able to estimate the effect of these variables on the outcome variable, while controlling for any other variables that may be influencing the outcome.

Funnel plot
A graphical method that shows how consistent the survival rates of the different transplant units are compared to the national rate. The graph shows for each unit, a survival rate plotted against the number of transplants undertaken, with the national rate and confidence limits around this national rate superimposed. In this report, 95% and 99.8% confidence limits were used. Units that lie within the confidence limits have survival rates that are statistically consistent with the national rate. When a unit is close to or outside the limits, this is an indication that the centre may have a rate that is considerably different from the national rate.

Graft survival rate
The percentage of patients whose grafts are still functioning. This is usually specified for a given time period after transplant. For example, a five-year graft survival rate is the percentage of transplants still functioning five years after transplant. For the purposes of pancreas transplantation, graft failure is defined as a return to permanent insulin dependence while for islet transplantation graft failure is defined as a C-peptide less than 50 pmol/l.

HbA1c
HbA1c refers to glycated haemoglobin which is measured by clinicians to obtain an overall picture of an individual's average blood sugar levels over a particular period. HbA1c is a valuable indicator of diabetes control.

HLA mismatch
Human Leucocyte Antigens (HLA) are carried on many cells in the body and the immune system can distinguish between those that can be recognised as 'self' (belonging to you or identical to your own) and those that can be recognised as 'nonself'. The normal response of the immune system is to attack foreign/non-self material by producing antibodies against the foreign material. This is one of the mechanisms that provide protection against infection. This is unfortunate from the point of view of transplantation as the immune system will see the graft as just another 'infection' to be destroyed, produce antibodies against the graft and rejection of the grafted organ will take place. To help overcome this response, it is recognised that 'matching' the recipient and donor on the basis of HLA (and blood group) reduces the chances of acute rejection and, with the added use of immunosuppressive drugs, very much improves the chances of graft survival. 'Matching' refers to the similarity of the recipient HLA type and donor HLA type. HLA mismatch refers to the number of mismatches between the donor and the recipient at the A, B and DR (HLA) loci. There can only be a total of two mismatches at each locus. For example, an HLA mismatch value of 000, means that the donor and recipient are identical at all three loci, while an HLA mismatch value of 210 means that the donor and recipient differ completely at the A locus, are partly the same at the B locus and are identical at the DR locus.

Hypoglycaemia
Hypoclycaemia occurs when the level of glucose present in the blood falls below a set point and is the most common complication of insulin therapy. Severe hypoglycaemia is defined as having low blood glucose levels that requires third party assistance to treat and is classed as a diabetic emergency.

Inter-quartile range
The values between which the middle 50% of the data fall. The lower boundary is the lower quartile, the upper boundary the upper quartile.

Kaplan-Meier method
A method that allows patients with incomplete follow-up information to be included in estimating survival rates. For example, in a cohort for estimating one year patient survival rates, a patient was followed up for only nine months before they relocated. If we calculated a crude survival estimate using the number of patients who survived for at least a year, this patient would have to be excluded as it is not known whether or not the patient was still alive at one year after transplant. The Kaplan-Meier method allows information about such patients to be used for the length of time that they are followed-up, when this information would otherwise be discarded. Such instances of incomplete follow-up are not uncommon and the Kaplan-Meier method allows the computation of estimates that are more meaningful in these cases.

Matchability points score
Matchability points score is a score between 1 and 10 reflecting the difficulty with which a well-matched HLA compatible organ can be found and takes into account sensitisation and rareness of HLA type. Scores are updated annually such that 10% of waiting list patients who are easiest to match have score=1 and 10% who are most difficult to match have a score=10.

Median
The midpoint in a series of numbers, so that half the data values are larger than the median, and half are smaller.

Multi-organ transplant

A transplant in which the patient receives more than one organ. For example, a patient may undergo a transplant of a pancreas and liver. Intestinal transplants involving a pancreas are excluded from the whole report.

National Pancreas Offering Scheme
A nationally agreed set of rules for sharing and allocating deceased donor pancreases for pancreas or islet transplant between transplant centres in the UK. The scheme was introduced on 1 December 2010, revised on 11 September 2019 and is administered by NHS Blood and Transplant. Prior to December 2010 deceased donors were allocated on a centre basis.

The Pancreas Offering Scheme, from September 2019, prioritises difficult to match (100% sensitisation or matchability points score=10) and long-waiting patients in a top tier. The second tier includes all other blood group eligible patients and assigns an individual point score to all patients based on a number of clinically relevant donor, recipient and transplant related factors. The individual points score assigns more points to patients with lower levels of HLA mismatch, longer waiting times, higher levels of patient sensitisation, short travel times between retrieval to transplant centre, longer duration of dialysis and better donor to recipient age matching. In addition, donors with a lower BMI are clinically desirable for pancreas transplantation whereas donors with a higher BMI are preferable for islet transplantation. As a result, where the donor has a low BMI more points are awarded for patients waiting for a pancreas transplant and where the donor has a high BMI more points are awarded to islet patients. Patients listed nationally for either a pancreas or islet transplant are then ranked by their total points score and the pancreas is offered preferentially to the patient with the highest total number of points, no matter where in the UK they receive their treatment or whether they are waiting for a pancreas or islet transplant.

Patient survival rate
The percentage of patients who are still alive (whether the graft is still functioning or not). This is usually specified for a given time period after transplant. For example, a five-year patient survival rate is the percentage of patients who are still alive five years after their first transplant.

***p* value**
In the context of comparing survival rates across centres, the *p* value is the probability that the differences observed in the rates across centres occurred by chance. As this is a probability, it takes values between 0 and 1. If the *p* value is small, say less than 0.05, this implies that the differences are unlikely to be due to chance and there may be some identifiable cause for these differences. If the *p* value is large, say greater than 0.1, then it is quite likely that any differences seen are due to chance.

Risk-adjusted survival rate
Some transplants have a higher chance than others of failing at any given time. The differences in expected survival times arise due to differences in certain factors, the risk factors, among patients. A risk-adjusted survival rate for a centre is the expected survival rate for that centre given the case mix of their patients. Adjusting for case mix in estimating centre-specific survival rates allows valid comparison of these rates across centres and to the national rate.

Risk factors
These are the characteristics of a patient, transplant or donor that influence the length of time that a graft is likely to function or a patient is likely to survive following a transplant. For example, when all else is equal, a transplant from a younger donor is expected to survive longer than that from an older donor and so donor age is a risk factor.

Sensitisation
Potential recipients can develop a number of different HLA antibodies as a result of exposure to the different HLA through blood transfusion, previous transplants and pregnancy. Many patients however, have no detectable HLA antibodies. If a potential recipient has an antibody to an HLA then they cannot receive a transplant from a donor with that HLA, thus restricting the pool of potential donors. Patients who are clinically incompatible with the donor are excluded from the offering sequence by the Pancreas Offering Scheme.

Total preservation time (TPT)
The length of time that elapses between a pancreas being removed from the donor to its transplantation into the recipient is called the Total Preservation Time (TPT). Generally, the shorter this time, the more likely the pancreas is to work immediately and the better the long-term outcome. The factors which determine TPT include a) transportation of the pancreas from the retrieval hospital to the hospital where the transplant is performed, b) the need to tissue type the donor and cross-match the donor and potential recipients, c) the occasional necessity of moving the pancreas to another hospital if a transplant cannot go ahead, d) contacting and preparing the recipient for the transplant, and e) access to the operating theatre.

Unadjusted survival rate
Unadjusted survival rates do not take account of risk factors and are based only on the number of transplants at a given centre and the number and timing of those that fail within the post-transplant period of interest. In this case, unlike for risk-adjusted rates, all transplants are assumed to be equally likely to fail at any given time. However, some centres may have lower unadjusted survival rates than others simply because they tend to undertake transplants that have increased risks of failure. Comparison of unadjusted survival rates across centres and to the national rate is therefore inappropriate.

A2 Methods

Statistical methodology and risk-adjustment for survival rate estimation

Unadjusted and risk-adjusted estimates of patient and graft survival for pancreas and simultaneous pancreas and kidney (SPK) transplant are given for each centre. Unadjusted rates give an estimate of what the survival rate at a centre is, assuming that all patients at the centre have the same chance of surviving a given length of time after transplant. In reality, patients differ and a risk-adjusted rate that allows for these differences would give a more meaningful estimate of survival.

Computing unadjusted survival rates

Unadjusted survival rates were calculated using the Kaplan-Meier method, which allows patients with incomplete follow-up information to be included in the computation. For example, in a cohort for estimating one-year patient survival rates, a patient was followed up for only nine months before they relocated. If we calculated a crude survival estimate using the number of patients who survived for at least a year, this patient would have to be excluded, as it is not known whether or not the patient was still alive one year after transplant. The Kaplan-Meier method allows information about such patients to be used for the length of time that they are followed-up, when this information would otherwise be discarded. Such instances of incomplete follow-up are not uncommon in the analysis of survival data and the Kaplan-Meier method therefore allows the computation of survival estimates that are more meaningful.

Computing risk-adjusted survival rates

A risk-adjusted survival rate is an estimate of what the survival rate at a centre would have been if they had had the same mix of patients as that seen nationally. The risk-adjusted rate therefore presents estimates in which differences in patient mix across centres have been removed as much as possible. For that reason, it is valid to only compare centres using risk-adjusted rather than unadjusted rates, as differences among the latter can be attributed to differences in patient mix.

Risk-adjusted survival estimates were obtained through indirect standardisation. A Cox Proportional Hazards model was used to determine the probability of survival for each patient based on their individual risk factor values. The sum of these probabilities for all patients at a centre gives the number, E, of patients or grafts expected to survive at least one year or five years after transplant at that centre. The number of patients who actually survive the given time period is given by O. The risk-adjusted estimate is then calculated by multiplying the ratio O/E by the overall unadjusted survival rate across all centres.
The risk-adjustment models used were based on results from previous studies that looked at factors affecting the survival rates of interest. The factors included in the models are shown in the table below.

First transplants from deceased donors

Simultaneous pancreas and kidney (SPK) survival

1 and 5 year patient survival	Recipient age, donor type and waiting time
1 and 5 year graft survival	Recipient age, Donor age, donor type, donor BMI and waiting time

Funnel plots for comparing risk-adjusted survival rates

The funnel plot is a graphical method to show how consistent the survival rates of the different transplant centres are compared to the national rate. The graph shows for each centre, a survival rate plotted against the number of transplants undertaken, with the national rate and confidence limits around this national rate superimposed. In this report, 95% and 99.8% confidence limits were used. Units that lie within the confidence limits have survival rates that are statistically consistent with the national rate. When a unit is close to or outside the limits, this is an indication that the centre may have a rate that is considerably different from the national rate.

A fundamentally similar method was used to conduct the survival from listing analysis. The risk factors used are detailed in the table below.

First registrations for simultaneous pancreas and kidney (SPK) transplant	
1, 5 and 10 year patient survival from listing	Age, sex, grouped registration year, ethnicity, blood group, cRF>85%

Systematic Component of Variation

For a given individual who is a resident in a given NHS region registration to the transplant list is modelled as a Bernoulli trial. At the whole area level, this becomes a Binomial process which can be approximated by a Poisson distribution when rare events are modelled. Transplant counts follow similar assumptions.

To allow for the possibility that, even after allowing for area-specific Poisson rates, area differences remain, introduce an additional multiplicative rate factor which varies from area to area. Postulate a non-parametric distribution for the multiplicative factor, with variance σ^2. If the factor is one for all areas, then area differences are fully explained by the area-specific Poisson rate. If the factor varies with a nonzero variance, σ^2, then we conclude that there are unexplained area differences.

The systematic component of variation (SCV; McPherson et al., N Engl J Med 1982, 307: 1310-4) is the moment estimator of σ^2. Under the null hypothesis of homogeneity across areas, the SCV would be zero. The SCV, therefore, allows us to detect variability across areas beyond that expected by chance; the larger the SCV, the greater the evidence of systematic variation across areas.

A one-sided p-value for the hypothesis that the SCV is greater than zero versus the null hypothesis that the SCV is equal to zero was derived using a parametric bootstrap where data were simulated from the Poisson distribution that would be consistent with the null hypothesis (multiplicative rate factor is equal to one in all areas and σ^2 equal to zero). The observed SCV was then compared against this simulated data to calculate the probability that an SCV of at least this size would be observed due to chance if the null hypothesis were true.

10,000 bootstrap samples of size 7 (number of areas) were simulated, where the registration/transplant count in each area was drawn from a Poisson distribution with its expected value being the area-specific expected count (the rate of transplants/registrations in the total population multiplied by the population of the area) . The SCV was then calculated in each of the 10,000 samples and a bootstrap p-value for the SCV in the observed data was estimated as:

$$P_{boot} = \frac{1 + \#\{SCV_{sim} \geq SCV_{obs}\}}{10000 + 1}$$

where $\#\{SCV_{sim} \geq SCV_{obs}\}$ is the number of SCV values in the simulated datasets which are greater than or equal to the SCV in the observed data. This follows the simulation method given in Ibanez et al., BMC Health Services Research, 2009, 9:60. No adjustment was made for area-specific demographic characteristics that may impact the rates of registration to the transplant list and transplantation such as age and sex.

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