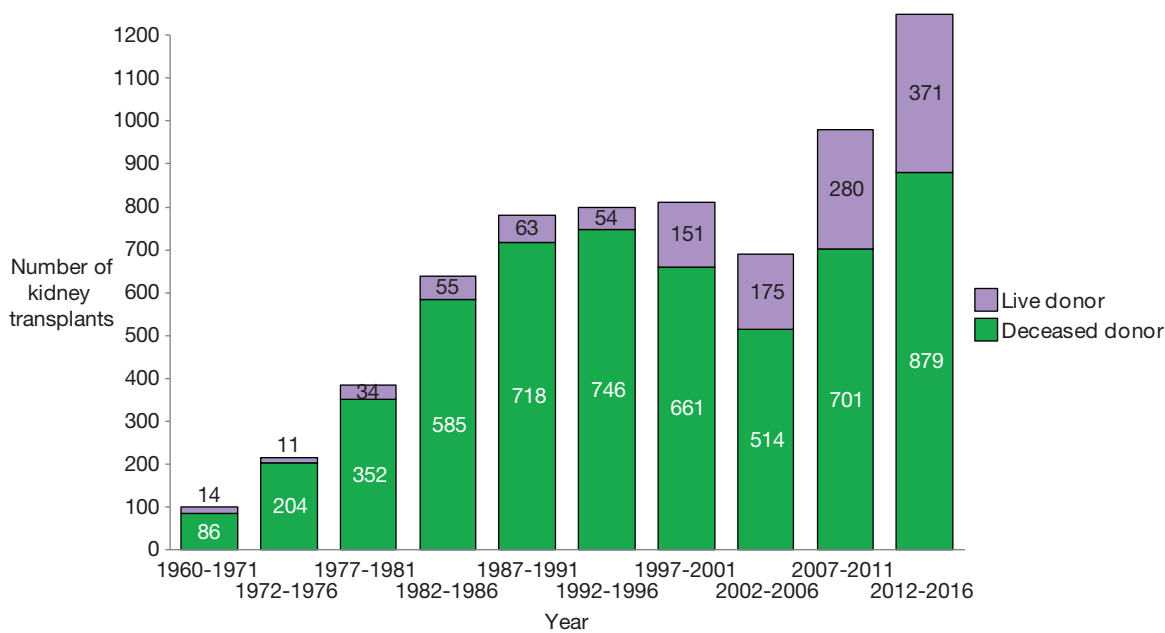


SECTION F KIDNEY TRANSPLANTATION

 This section's data are available on-line in Tableau format which enables interaction with the data: <http://www.srr.scot.nhs.uk/publications/Dashboards/Transplant.html>.

F1 Frequency of kidney transplantation in Scotland

F1.1 Frequency and donor type, kidney transplants performed in Scotland 1960-2016



Between 1960 and 31 December 2016, 6654 kidney transplants were performed in Scotland in 5631 patients with postcode of residence in Scotland at the time of transplantation.

The kidney donor was deceased for 5446 (82%) transplants, 1208 (18%) of transplanted kidneys were donated by live donors.

5601 first kidney transplants were performed, 863 second transplants, 163 third transplants and 27 fourth or subsequent kidney transplants.

213 individuals resident in Scotland have received a simultaneous kidney and pancreas transplant, 16 individuals have received a simultaneous kidney and liver transplant.

Kidney transplants performed outside of Scotland are excluded. Transplants performed in Scotland for patients not resident in Scotland are also excluded.

F1.2 Frequency, transplant type and donor type, kidney transplants performed in Scotland 2007-2016

Year of transplant	Deceased donor kidney alone		Live donor kidney		Kidney and pancreas		Kidney and Liver		Total kidney transplants
	n	%	n	%	n	%	n	%	
2007-2011	630	64.2	280	28.5	68	6.9	4	0.4	982
2012	146	64.6	63	27.9	15	6.6	2	0.9	226
2013	166	62.4	84	31.6	16	6.0	0	-	266
2014	172	65.6	74	28.2	15	5.7	1	0.4	262
2015	159	64.1	77	31.0	11	4.4	1	0.4	248
2016	158	63.7	73	29.4	16	6.5	1	0.4	248

F1.3a Frequency and donor type of adult kidney transplants performed in Scotland 2007-2016 by transplanting centre

Year	GLASGOW								Total
	DBD		DCD		DD		LD		
	n	%	n	%	n	%	n	%	
2007	1	1.3	0	-	52	67.5	24	31.2	77
2008	0	-	3	3.3	51	55.4	38	41.3	92
2009	6	6.6	3	3.3	67	73.6	15	16.5	91
2010	41	48.8	11	13.1	14	16.7	18	21.4	84
2011	53	54.6	14	14.4	2	2.1	28	28.8	97
2012	59	48.4	33	27.0	0	-	30	24.6	122
2013	56	39.4	41	28.9	0	-	45	31.7	142
2014	65	46.4	39	27.9	0	-	36	25.8	140
2015	59	44.0	35	26.1	0	-	40	29.9	134
2016	56	39.4	48	33.8	0	-	38	26.8	142

DBD - Deceased after brain death; DCD - Deceased after circulatory death;
DD - Deceased donor unspecified; LD - Living donor.

F1.3b Frequency and donor type of adult kidney transplants performed in Scotland 2007-2016 by transplanting centre

Year	RIE								Total
	DBD*		DCD*		DD*		LD		
	n	%	n	%	n	%	n	%	
2007	56	56.6	12	12.1	0	-	31	31.3	99
2008	63	60.0	19	18.1	0	-	23	21.9	105
2009	71	63.4	13	11.6	0	-	28	25.0	112
2010	49	52.1	17	18.1	0	-	28	29.8	94
2011	52	55.3	17	18.1	0	-	25	26.6	94
2012	45	46.4	24	24.7	0	-	28	28.9	97
2013	48	41.0	33	28.2	0	-	36	30.8	117
2014	50	45.5	29	26.4	0	-	31	28.2	110
2015	45	41.7	28	25.9	0	-	35	32.4	108
2016	38	37.6	32	31.7	0	-	31	30.7	101

* Includes combined kidney + pancreas and kidney + liver transplants.

DBD - Deceased after brain death; DCD - Deceased after circulatory death;

DD - Deceased donor unspecified; LD - Living donor.

Since 2005 kidney transplantation for adult patients in Scotland has been undertaken in two units the Glasgow renal and transplant unit (GLAS) and the transplant unit of the Royal Infirmary of Edinburgh (RIE).

Kidney transplants for patients under the care of RHC are not shown in table F1.3.

F1.4 Age of patients at the time of kidney transplantation

Year of transplant	First kidney transplants				Second and subsequent transplants			
	n	Mean Age	SD	Age Range	n	Mean Age	SD	Age Range
1960-1971	95	30.2	11.8	(8 - 64.8)	5	21.2	3.9	(15.7 - 24.9)
1972-1976	194	33.9	11.8	(10.1 - 64.2)	21	33.2	10.8	(11.6 - 55.1)
1977-1981	322	36.8	12.8	(8.5 - 66.9)	64	33.0	9.8	(13.5 - 56.3)
1982-1986	521	38.8	15.1	(2.3 - 77.5)	119	35.8	12.1	(3.4 - 68.8)
1987-1991	652	40.8	15.8	(0.3 - 75.1)	129	36.4	13.9	(5.1 - 69.4)
1992-1996	670	42.4	15.8	(2.1 - 76.1)	130	36.7	12.6	(3.9 - 66.1)
1997-2001	672	41.5	15.4	(4 - 78.3)	140	38.8	11.9	(5.2 - 71.2)
2002-2006	569	43.2	15.1	(4.2 - 78)	120	39.0	11.1	(16.4 - 64.9)
2007-2011	836	45.9	15.3	(2.4 - 78.5)	145	43.5	11.5	(18.2 - 69.2)
2012-2016	1070	48.4	14.6	(3.6 - 79.2)	180	44.5	12.1	(14.4 - 75.4)

F1.5 Year of first kidney transplant and diagnosis group

Year of transplant	Glomerulo-nephritis		Interstitial		Multisystem		Diabetes		Unknown	
	n	%	n	%	n	%	n	%	n	%
1960-1971*	39	41.5	27	28.7	9	9.6	0	-	19	20.2
1972-1976	83	42.8	69	35.6	19	9.8	0	-	23	11.9
1977-1981	121	37.6	136	42.2	37	11.5	5	1.6	23	7.1
1982-1986	140	26.9	208	39.9	71	13.6	39	7.5	63	12.1
1987-1991	188	28.8	240	36.8	99	15.2	46	7.1	79	12.1
1992-1996	189	28.2	237	35.4	95	14.2	80	11.9	69	10.3
1997-2001	178	26.5	255	37.9	85	12.6	63	9.4	91	13.5
2002-2006	138	24.3	209	36.7	68	12.0	82	14.4	72	12.7
2007-2011	182	21.8	329	39.4	102	12.2	106	12.7	117	14.0
2012-2016	261	24.4	403	37.7	131	12.2	164	15.3	111	10.4

* One patient who received a first kidney transplant between 1960-1971 has missing PRD

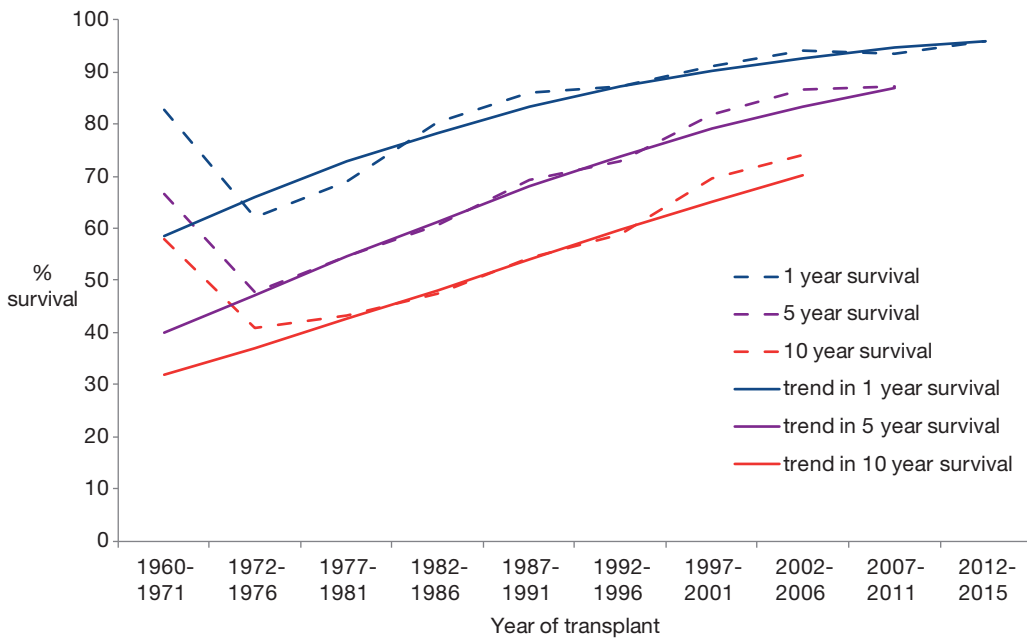
F2 Transplanted Kidney Survival

F2.1 Graft survival of first kidney transplants by year of transplantation 1960 - 2015						
Year of transplant	Grafts surviving 1 year		Grafts surviving 5 years		Grafts surviving 10 years	
	n	%	n	%	n	%
1960-1971	62	83	38	67	29	58
1972-1976	101	62	70	48	55	41
1977-1981	205	69	156	55	114	43
1982-1986	401	80	279	61	196	48
1987-1991	531	86	396	69	279	54
1992-1996	559	87	437	73	315	59
1997-2001	592	91	508	82	400	70
2002-2006	523	94	443	87	345	74
2007-2011	762	94	674	87	/	/
2012	183	97	/	/	/	/
2013	212	97	/	/	/	/
2014	218	96	/	/	/	/
2015	190	95	/	/	/	/

Survival of first kidney transplants only, for transplants performed in Scotland, are shown in the table.

Grafts with insufficient follow-up and those that did not fail in patients dying within the relevant period have been excluded from the table.

F2.2 Trends in first graft survival by year of transplantation 1960-2015



Trend in 1 year survival: year to year OR 1.07 (95% CI 1.06-1.07)

Trend in 5 year survival: year to year OR 1.06 (95% CI 1.05-1.07)

Trend in 10 year survival: year to year OR 1.05 (95% CI 1.04-1.06)

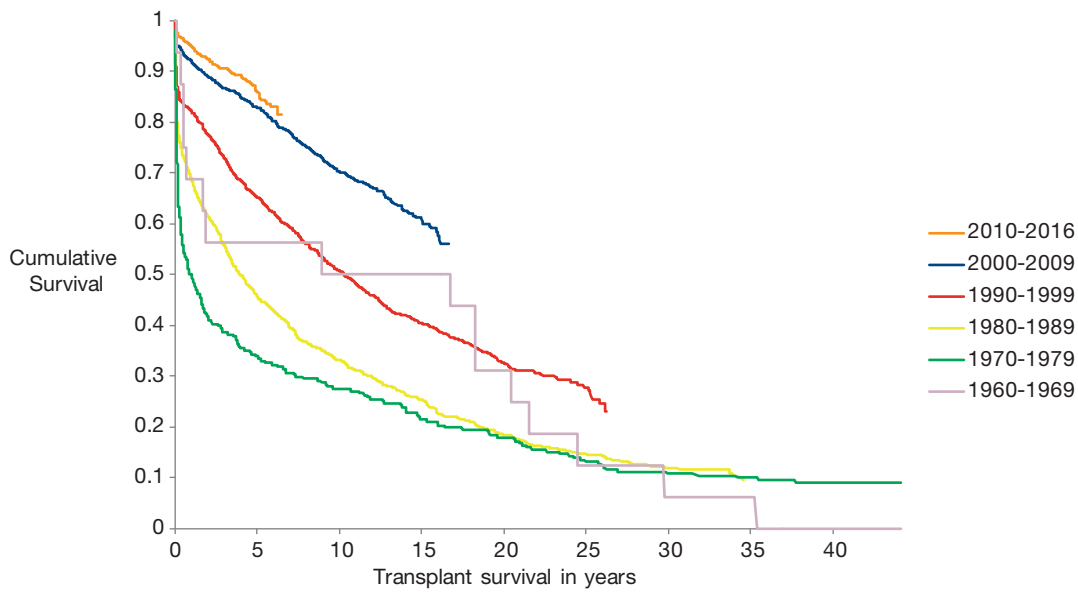
The trends in 1 year, 5 year and 10 year graft survival are all statistically significant. (Wald-statistic, df=1, p<0.001)

F2.3 Graft survival by Health Board of residence at transplantation 2006-2015

	Grafts surviving 1 year			Grafts surviving 2 years			Grafts surviving 5 years		
	Number of first kidney transplants 2006-2015	n	%	Number of first kidney transplants 2006-2014	n	%	Number of first kidney transplants 2006-2011	n	%
A&A	115	109	94.8	101	92	91.1	53	44	83.0
BORD	41	39	95.1	36	34	94.4	16	15	93.8
D&G	49	47	95.9	42	39	92.9	23	21	95.5
FIFE	123	114	92.7	110	97	88.2	70	56	83.6
FV	101	97	96.0	83	78	94.0	45	40	93.0
GRAM	183	176	96.2	167	156	93.4	95	84	91.3
GG&C	410	386	94.1	360	331	91.9	186	164	90.1
HIGH	115	111	96.5	102	96	94.1	68	62	92.5
LAN	243	233	95.9	208	192	92.3	110	98	89.1
LOTH	246	233	94.7	217	202	93.1	135	116	87.9
ORKN	4	4	100.0	3	3	100.0	3	3	100.0
SHET	4	4	100.0	4	4	100.0	3	3	100.0
TAY	111	105	94.6	94	89	94.7	56	46	82.1
WI	5	5	100.0	4	4	100.0	3	3	100.0
Scotland	1750	1663	95.0	1531	1417	92.6	866	755	87.2

Grafts with insufficient follow-up and those that did not fail in patients dying within the relevant period have been excluded from the table.

F2.4 Transplanted kidney survival by decade of transplantation 1960-2016



The survival curves demonstrate the transplanted organ survival, so called ‘graft survival’ not the survival of the patients receiving the transplant.

Patients are censored in the analysis if they died with a functioning kidney transplant, and on 31 December 2016.

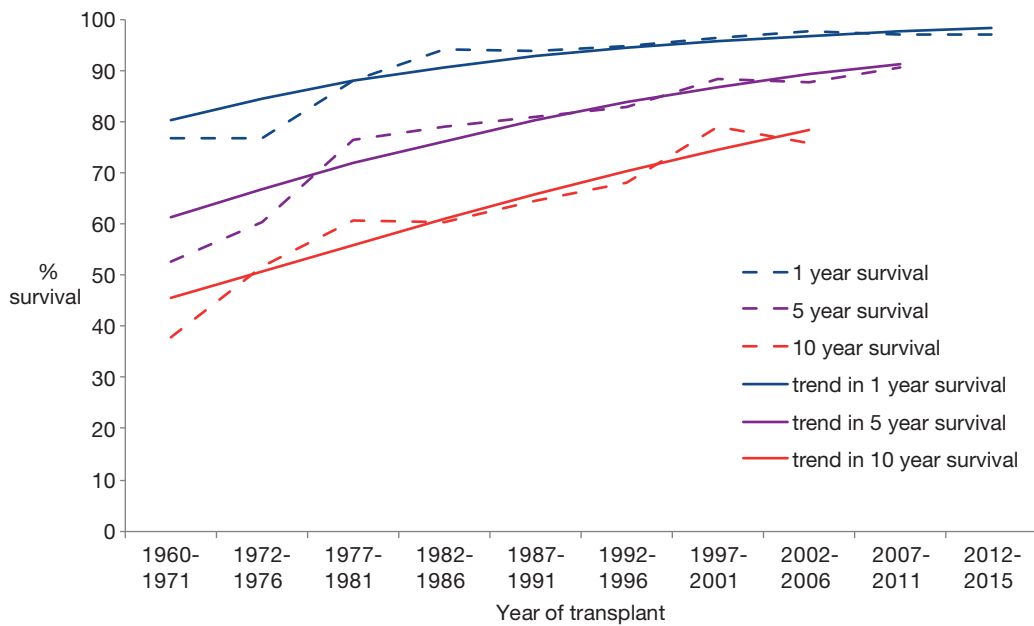
All kidney transplants undertaken in Scotland between 1960-2016 are included within the analysis.

F3 Patient survival after Kidney Transplantation

F3.1 Patient survival after first kidney transplant by year of transplantation 1960-2015						
Year of transplant	Patients surviving 1 year		Patients surviving 5 years		Patients surviving 10 years	
	n	%	n	%	n	%
1960-1971	73	76.8	50	52.6	36	37.9
1972-1976	149	76.8	117	60.3	100	51.5
1977-1981	283	87.9	246	76.4	195	60.6
1982-1986	491	94.2	411	78.9	314	60.3
1987-1991	611	93.7	527	80.8	421	64.6
1992-1996	634	94.6	555	82.8	457	68.2
1997-2001	647	96.3	594	88.4	531	79.0
2002-2006	555	97.5	498	87.5	431	75.7
2007-2011	811	97.0	757	90.6	/	/
2012	188	96.4	/	/	/	/
2013	217	96.4	/	/	/	/
2014	227	98.3	/	/	/	/
2015	201	97.1	/	/	/	/

Patient survival is reported from the time of first kidney transplant for transplants performed in Scotland. Patients with insufficient follow-up are excluded.

F3.2 Trends in patient survival by year of first kidney transplantation 1960-2015



Trend in 1 year survival: year to year OR 1.06 (95% CI 1.04-1.07)

Trend in 5 year survival: year to year OR 1.05 (95% CI 1.04-1.06)

Trend in 10 year survival: year to year OR 1.04 (95% CI 1.04-1.05)

The trends in 1 year, 5 year and 10 year patient survival are all statistically significant. (Wald-statistic, df=1, p<0.001)

F4 Transplant Kidney Function

F4.1 Transplanted kidney function at one year in adult recipients after first kidney transplant performed 2006-2015

Year	Transplants performed	Surviving patients with functioning graft at 1 year		Patients with creatinine result	Serum creatinine (micromole/L)		eGFR (ml/min)	
		n	%		n	Median	IQR	Median
2006-2010	708	669	94.5	635	119	100-148	54.5	42.3-66.8
2011	153	143	93.5	128	119	102-152	52.6	42.3-67.4
2012	181	176	97.2	165	119	94-143	55.5	45.3-72.6
2013	211	206	97.6	169	111	88-135	58.4	47.0-73.0
2014	215	206	95.8	186	119	95-151	54.4	41.6-67.5
2015	195	184	94.4	173	113	96-151	55.4	42.4-70.8

Patients dying within the first year post transplant are excluded.

Patients aged under 18 years at the time of transplantation are excluded.

Kidney transplants performed outside of Scotland are excluded. Transplants performed in Scotland for patients not resident in Scotland are also excluded.

F4.2 Transplanted kidney function one year in adult recipients after first kidney transplant performed 2006-2015 by primary renal diagnosis group

Recipient primary renal diagnosis group	Transplants performed	Surviving patients with functioning graft at 1 year		Patients with creatinine result	Serum creatinine (micromole/L)		eGFR (ml/min)	
		n	%		n	Median	IQR	Median
Glomerulonephritis	400	377	92.4	335	125	105-162	51.5	40.1-67.0
Interstitial	622	600	94.2	552	115	95-144	54.5	41.8-67.5
Multisystem	199	188	90.4	171	118	93-142	56.6	44.9-68.0
Diabetic nephropathy*	242	233	92.5	226	111	90-138	60.1	46.5-73.8
Unknown	200	186	89.0	172	116	98-146	55.4	44.3-69.3

* Includes patients receiving simultaneous kidney and pancreas transplant

F4.3 Transplanted kidney function one year in adult recipients after first kidney transplant performed 2011-2015 by donor type

Donor type	Transplants performed	Surviving patients with functioning graft at 1 year		Patients with creatinine result	Serum creatinine (micromole/L)		eGFR (ml/min)	
		n	%		n	Median	IQR	Median
Deceased - DBD	413	395	91.9	361	115	92-140	55.5	44.1-72.8
Deceased - DCD	250	235	90.4	216	126	103-169	47.2	35-65
Live donor	291	284	97.3	243	111	91-135	58.7	49.2-71.5

1 patient with Deceased Donor (DD) unspecified transplants within the time period has been excluded.

F4.4 Transplanted kidney function one year in adult recipients after first kidney transplant performed 2006-2015 by transplanting unit

Transplant renal unit	Transplants performed	Surviving patients with functioning graft at 1 year		Patients with creatinine result	Serum creatinine (micromole/L)		eGFR (ml/min)	
		n	%		n	Median	IQR	Median
GLAS	840	797	94.9	700	117	97-144	55.0	42.5-69.5
RIE	823	787	92.8	754	117	97-147	54.9	42.6-67.6

F5 Listing for kidney transplantation

F5.1 Percentage and prevalence per 100000 population of RRT patients with functioning kidney transplant or on transplant waiting list 31 December 2016 by NHS Board area of residence

	All RRT patients 31/12/2016	Patients with kidney transplant		Transplant or transplant listed		NHS Board population	Prevalence per 100000 population
		n	%	n	%		
A&A	395	214	54	261	66	370560	70.4
BORD	104	66	63	76	73	114530	66.4
D&G	136	75	55	101	74	149520	67.5
FIFE	340	169	50	207	61	370330	55.9
FV	263	166	63	205	78	304480	67.3
GRAM	538	297	55	352	65	588100	59.9
GG&C	1190	710	60	885	74	1161370	76.2
HIGH	308	193	63	233	76	321900	72.4
LAN	641	385	60	493	77	656490	75.1
LOTH	658	371	56	459	70	880000	52.2
ORKN	15	6	40	9	60	21850	41.2
SHET	16	8	50	8	50	23200	34.5
TAY	395	202	51	250	63	415470	60.2
WI	25	10	40	13	52	26900	48.3
Scotland	5024	2872	57	3552	71	5404700	65.7

The percentage of patients in each NHS Board area treated by all forms of RRT (PD, HD, Transplant) who are either on the transplant waiting list or have a functioning transplant are shown.

Patients who were on the transplant waiting list but had suspended rather than active status are included.

Two patients live outside of Scotland and were receiving treatment within Scottish renal units on 31 December 2016.

F5.2 Frequency of first kidney transplants and time from start of RRT to activation on transplant waiting list, by NHS Board area of residence at transplantation 2012-2016

	First Tx 2012-2016 (n)	Pre-emptive transplants (DD)		LD Tx in first year of RRT*	Patients with listing date**	Days from start of RRT to listing ***	
		Total Number	Number from DD			Median	IQR
A&A	85	20	10	15	66	52	-133-458
BORD	29	5	2	4	22	84	-62-370
D&G	28	5	2	7	23	40	-164-202
FIFE	60	7	2	8	50	128	-95-347
FV	69	15	7	14	51	87	-58-321
GRAM	105	17	4	16	85	65	-65-304
GG&C	273	57	24	53	219	15	-182-238
HIGH	59	10	4	13	43	-35	-147-220
LAN	162	28	13	25	132	177	-153-392
LOTH	122	19	10	21	101	168	-76-461
ORKN	2	-	-	1	2	-	-
SHET	3	-	-	0	3	-	-
TAY	69	14	3	18	55	98	-182-342
WI	4	2	1	1	3	-	-
Scotland	1070	199	82	196	855	70	-138-340

* Includes pre-emptive LD transplants

** Patients receiving LD pre-emptive transplants excluded

*** Truncated to -182 days

199 patients received a pre-emptive transplant in 2012-2016, 117 from a live donor (LD), 82 from a deceased donor (DD).

A further 79 patients received a LD transplant within one year of starting RRT.

Renal Association guidelines suggest that patients with progressive deterioration in renal function who are suitable for transplantation should be placed on the national transplant list within six months (-182 days) of their anticipated dialysis start date. Patients listed from transplantation for longer than six months prior to starting RRT have their duration of listing truncated to six months for the analysis.

F5.3 Time from start of RRT to activation on transplant waiting list patients starting RRT 2011-2015, by NHS Board area of residence at start of RRT

	Number starting RRT 2011-2015	Patients active on Tx waiting list by 31 Dec 2016*		Days from start of RRT to listing**	
		n	%	Median	IQR
A&A	212	67	31.6	37	-111-375
BORD	45	20	44.4	-13	-144-135
D&G	78	31	39.7	32	-182-75
FIFE	218	41	18.8	167	-96-377
FV	157	58	36.9	26	-182-236
GRAM	278	78	28.1	57	-98-413
GG&C	646	241	37.3	-11	-182-205
HIGH	137	53	38.7	-35	-159-245
LAN	350	136	38.9	119	-134 -334
LOTH	325	95	29.2	91	-118-340
ORKN	13	4	30.8	-	-
SHET	10	1	10.0	-	-
TAY	231	60	26.0	26	-182-257
WI	16	3	18.8	-	-
Scotland	2716	888	32.7	30	-154 - 293

Note: 3 patients lived outwith Scotland when they started RRT

* Patients active on transplant waiting list at any time up until 31 December 2016.

**Truncated to -182 days

Renal Association guidelines suggest that patients with progressive deterioration in renal function who are suitable for transplantation should be placed on the national transplant list within six months (-182 days) of their anticipated dialysis start date. Patients listed from transplantation for longer than six months prior to starting RRT have their duration of listing truncated to six months for the analysis.