



SWISS
TRANSPLANT
COHORT
STUDY

Swiss Transplant Cohort Study Report (January 2008 - 31 December 2024)

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Disclaimer

The STCS Annual Report covers all solid organ transplantation (SOT) activities on the Swiss national level since January 2008. The report is comprehensive and contains all combinations of simultaneous solid organ transplantations, consecutive transplantations, centre-specific activities and key outcomes of all transplantation programs including limited reporting of infectious disease and cancer occurrence. To serve the aim of comprehensive transplant outcome reporting, the report is based on unselected patient populations of the different transplant programs and transplant centres. **However, it is important to note that the report is not designed for and does not serve the purpose of centre-specific outcomes comparison.**

The Swiss Transplant Cohort Study (STCS)

List of Abbreviations

STCS	Swiss Transplant Cohort Study
BE	Inselspital Bern
CHUV	Centre Hospitalier Universitaire Vaudois Lausanne
CI	confidence interval
CumInc	cumulative incidence
GF	graft failure
HUG	Hôpitaux Universitaires de Genève
KPD	kidney paired donation (cross-over living donation)
DBD	donation after brain death
DCD	donation after cardiac death (non-heart-beating donor, NHBD)
SG	Kantonsspital St. Gallen
USZ	Universitätsspital Zürich
USB	Universitätsspital Basel
Tpx	transplantation

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1 Comments from the centres

1.1 Inselspital Bern

Approves open publication.

1.2 Centre Hospitalier Universitaire Vaudois Lausanne

Approves open publication.

1.3 Hôpitaux Universitaires de Genève

Approves open publication.

1.4 Kantonsspital St. Gallen

Approves open publication.

1.5 Universitätsspital Basel

Approves open publication.

1.6 Universitätsspital Zürich

Approves open publication.

2 Patients, transplantations and transplanted organs

2.1 Definitions applied

- The term "enrollment" refers to the inclusion of patients in the Swiss Transplant Cohort Study (STCS) from January 1, 2008, to December 31, 2024. Data is collected from these patients from the date of transplantation until the end of follow-up, which is 30 June 2025. The aforementioned data is included in the report.
- First transplantation:
 - Patients with a first solid organ transplantation in their medical history at the time of STCS enrolment
- Re-transplantation:
 - Patients with a repetition of the same type of transplantation (Re-Tpx)
 - Example: Re-Tpx of a kidney allograft after failure of a previous kidney graft
- Second transplantation:
 - Patients with a second transplantation that differs from the preceding transplantation type
 - Example: Transplantation of a pancreas following a single Kidney transplantation
- Simultaneous transplantation:
 - Simultaneous (eg double or triple) transplantation refers to a multiple organ transplantation where all the organs originate from the same donor (e.g. Kidney-Pancreas).
 - Simultaneous transplantation can be categorized as first, re- or second transplantation.
- Every transplant procedure can consist of a single or simultaneous transplantation.
- Knowledge on previous solid organ transplantations from the pre-STCS era (before January 2008) is considered. Patients may thus be enrolled within the STCS as a re- or a second transplantation.
- Sequences of previous Islets transplantations have been counted as one prior transplantation.

2.2 Overview and baseline demographic data

The following tables list the number of patients enrolled in the STCS, the number of transplantations performed, and organs transplanted. Table 1 and 2 show patients according to their first STCS transplantation.

Table 1: Number of patients enrolled

	Patients	(%)
Total number	8583	100.0
Single Tpx at enrolment	8285	96.5
Double Tpx at enrolment	295	3.4
Triple Tpx at enrolment	3	0.0
1st Tpx at enrolment	7783	90.7
Re-Tpx at enrolment	644	7.5
2nd Tpx at enrolment	156	1.8
HSCT prior to enrolment	43	0.5

Table 2: Number of patients enrolled by Tpx type

	Total	First Tpx	(%)	Re Tpx	(%)	Second Tpx	(%)
Total	8583	7783	90.7	644	7.5	156	1.8
Kidney	4937	4284	86.8	568	11.5	85	1.7
Liver	1873	1820	97.2	43	2.3	10	0.5
Lung	779	753	96.7	13	1.7	13	1.7
Heart	638	628	98.4	6	0.9	4	0.6
Islets	41	12	29.3	11	26.8	18	43.9
Pancreas	15	9	60.0	0	0.0	6	40.0
Small bowel	2	1	50.0	1	50.0	0	0.0
Kidney - Pancreas	171	164	95.9	1	0.6	6	3.5
Kidney - Liver	68	60	88.2	0	0.0	8	11.8
Kidney - Islets	28	27	96.4	0	0.0	1	3.6
Kidney - Heart	16	12	75.0	1	6.2	3	18.8
Kidney - Lung	2	1	50.0	0	0.0	1	50.0
Liver - Lung	4	4	100.0	0	0.0	0	0.0
Liver - Pancreas	1	1	100.0	0	0.0	0	0.0
Heart - Lung	1	1	100.0	0	0.0	0	0.0
Islets - Liver	1	1	100.0	0	0.0	0	0.0
Pancreas - Small bowel	3	3	100.0	0	0.0	0	0.0
Kidney - Islets - Liver	1	0	0.0	0	0.0	1	100.0
Liver - Pancreas - Small bowel	1	1	100.0	0	0.0	0	0.0
Islets - Liver - Lung	1	1	100.0	0	0.0	0	0.0

In contrast to Table 1 and 2, Table 3 and 4 list all transplantations performed and the number of transplanted organs.

Table 3: Number of Tpx types

	Total	First Tpx	(%)	Re Tpx	(%)	Second Tpx	(%)
Total	9132	7783	85.2	1082	11.8	267	2.9
Kidney	5147	4284	83.2	729	14.2	134	2.6
Liver	2061	1820	88.3	219	10.6	22	1.1
Lung	810	753	93.0	41	5.1	16	2.0
Heart	645	628	97.4	13	2.0	4	0.6
Islets	129	12	9.3	73	56.6	44	34.1
Pancreas	27	9	33.3	1	3.7	17	63.0
Small bowel	2	1	50.0	1	50.0	0	0.0
Kidney - Pancreas	175	164	93.7	3	1.7	8	4.6
Kidney - Liver	72	60	83.3	0	0.0	12	16.7
Kidney - Islets	30	27	90.0	1	3.3	2	6.7
Kidney - Heart	16	12	75.0	1	6.2	3	18.8
Kidney - Lung	3	1	33.3	0	0.0	2	66.7
Liver - Lung	4	4	100.0	0	0.0	0	0.0
Liver - Pancreas	1	1	100.0	0	0.0	0	0.0
Heart - Lung	1	1	100.0	0	0.0	0	0.0
Islets - Liver	2	1	50.0	0	0.0	1	50.0
Pancreas - Small bowel	3	3	100.0	0	0.0	0	0.0
Kidney - Islets - Liver	1	0	0.0	0	0.0	1	100.0
Liver - Pancreas - Small bowel	2	1	50.0	0	0.0	1	50.0
Islets - Liver - Lung	1	1	100.0	0	0.0	0	0.0

Table 4: Number of transplanted organs

	Total	First Tpx	(%)	Re Tpx	(%)	Second Tpx	(%)
Total	9447	8061	85.3	1157	12.2	229	2.4
Kidney	5444	4548	83.5	765	14.1	131	2.4
Liver	2144	1888	88.1	228	10.6	28	1.3
Lung	819	760	92.8	42	5.1	17	2.1
Heart	662	641	96.8	15	2.3	6	0.9
Pancreas	208	178	85.6	14	6.7	16	7.7
Islets	163	41	25.2	91	55.8	31	19.0
Small bowel	7	5	71.4	2	28.6	0	0.0

Table 5: Patients' characteristics for major Tpx types

	Total*	Kidney	Liver	Lung	Heart	Kidney - Pancreas
Total number of patients	8398	4937	1873	779	638	171
Age (yrs), median	55	55	56	55	51	44
Age (yrs), IQR	(42-62)	(43-63)	(46-62)	(43-61)	(36.2-59)	(36-51)
Age (yrs), min; max	0; 82	1; 82	0; 77	4; 73	0; 71	23; 64
Male, n(%)	5441 (64.8%)	3192 (64.7%)	1268 (67.7%)	417 (53.5%)	464 (72.7%)	100 (58.5%)
Pediatric, n(%)	388 (4.6%)	179 (3.6%)	134 (7.2%)	18 (2.3%)	57 (8.9%)	0 (0%)
Time on the waitinglist (yrs), median	1.0	1.6	0.6	0.6	0.6	1.3
- IQR	(0.3-2.3)	(0.4-3.3)	(0.2-1.2)	(0.2-1.2)	(0.2-1.3)	(0.6-2)
- min; max	0; 21.1	0; 20.7	0; 8.1	0; 9.4	0; 21.1	0; 10.4
Observation time (yrs), median	6.3	6.9	5.7	4.5	5.7	7.9
- IQR	(2.8-10.5)	(3.3-11)	(2.4-9.9)	(1.8-8.8)	(1.9-10.1)	(4.1-12.7)
- min; max	0; 17.5	0; 17.5	0; 17.5	0; 17.5	0; 17.2	0.1; 17.5
Number of deaths, n (%)	1856 (22.1%)	859 (17.4%)	500 (26.7%)	309 (39.7%)	163 (25.5%)	25 (14.6%)
Number of patients with at least one GF, n (%)	1012 (12.1%)	539 (10.9%)	241 (12.9%)	139 (17.8%)	56 (8.8%)	37 (21.6%)
Alive, with graft failure, n(%)	517 (6.2%)	375 (7.6%)	97 (5.2%)	13 (1.7%)	5 (0.8%)	27 (15.8%)
Graft failure - related death, n(%)	242 (2.9%)	13 (0.3%)	78 (4.2%)	104 (13.4%)	47 (7.4%)	0 (0%)
Graft failure -> death, n(%)	253 (3%)	151 (3.1%)	66 (3.5%)	22 (2.8%)	4 (0.6%)	10 (5.8%)
Death without graft failure, n(%)	1361 (16.2%)	695 (14.1%)	356 (19%)	183 (23.5%)	112 (17.6%)	15 (8.8%)

(*) "Total" refers to the total number of patients with Tpx presented in this table

Table 6: Donors' characteristics by donor types

	Total	DBD	DCD	Living, KPD	Living related	Living unrelated
Total no. donors	4652	2172	527	64	922	967
Donor age (yrs), median	54	53	60	52	54	54
- IQR	(43-64)	(37-65)	(50-69)	(46.8-61.5)	(44-61)	(46-62)
- min; max	0; 89	0; 89	1; 88	24; 72	1; 84	0; 79
Male gender, n (%)	2233 (48%)	1176 (54.8%)	360 (68.3%)	26 (40.6%)	348 (39.2%)	323 (34.5%)
No. organs donated, median	1	3	2	1	1	1
- min; max	1; 8	1; 8	1; 6	1; 1	1; 1	1; 1

2.3 STCS patient enrolment by calendar time

Figure 1 shows the patient enrollment activity by quarter from January 2008 till December 2024.

Figure 1: Quarterly patient enrolment by donor type

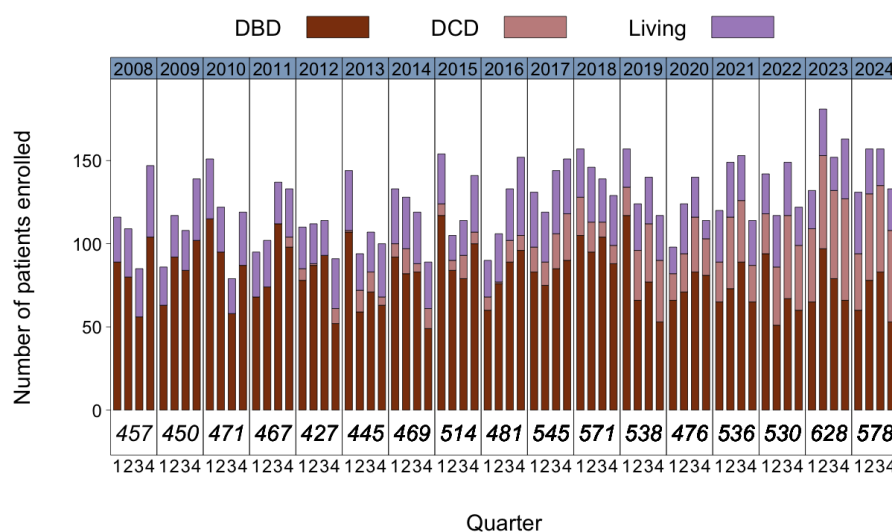
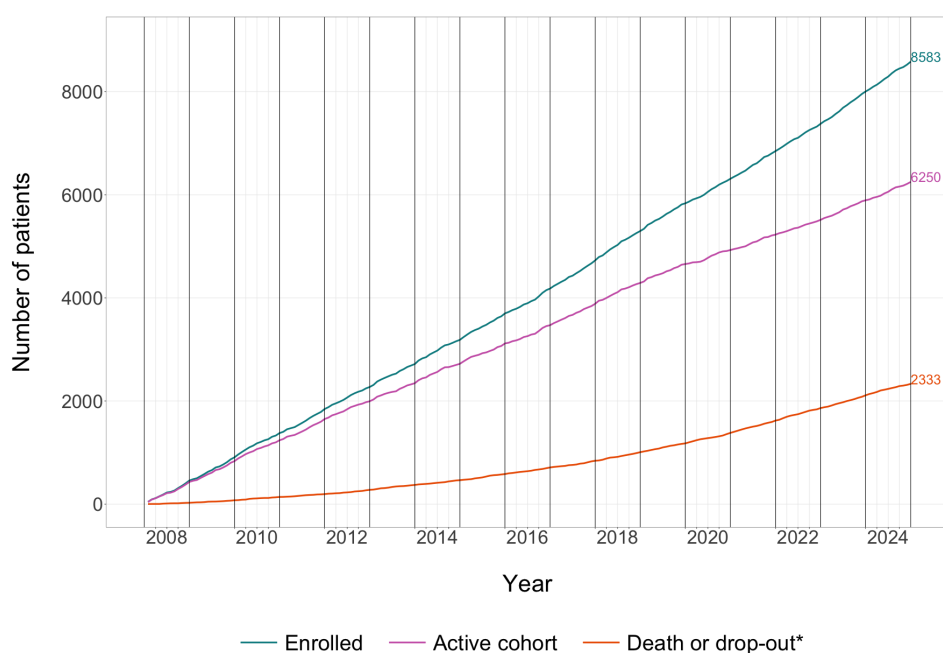
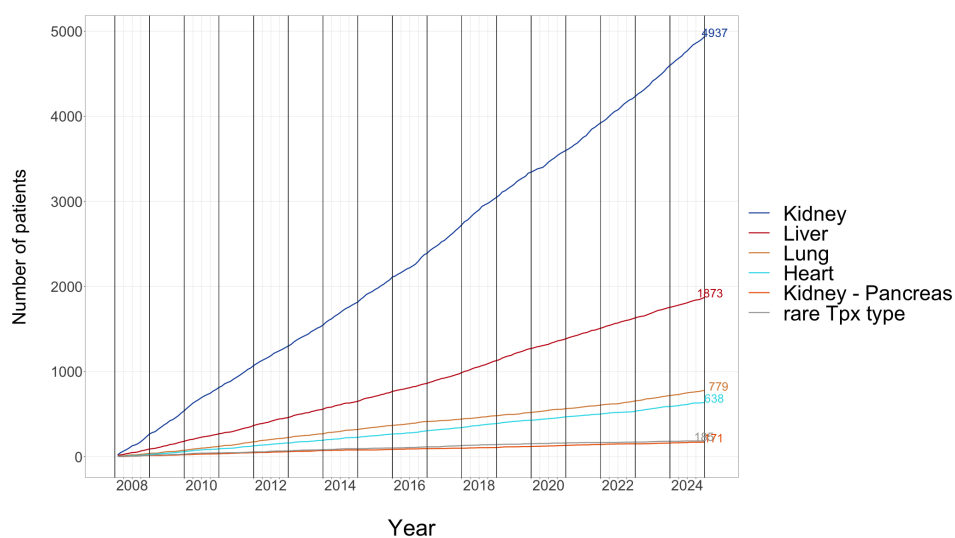


Figure 2: Cumulative patient enrolment



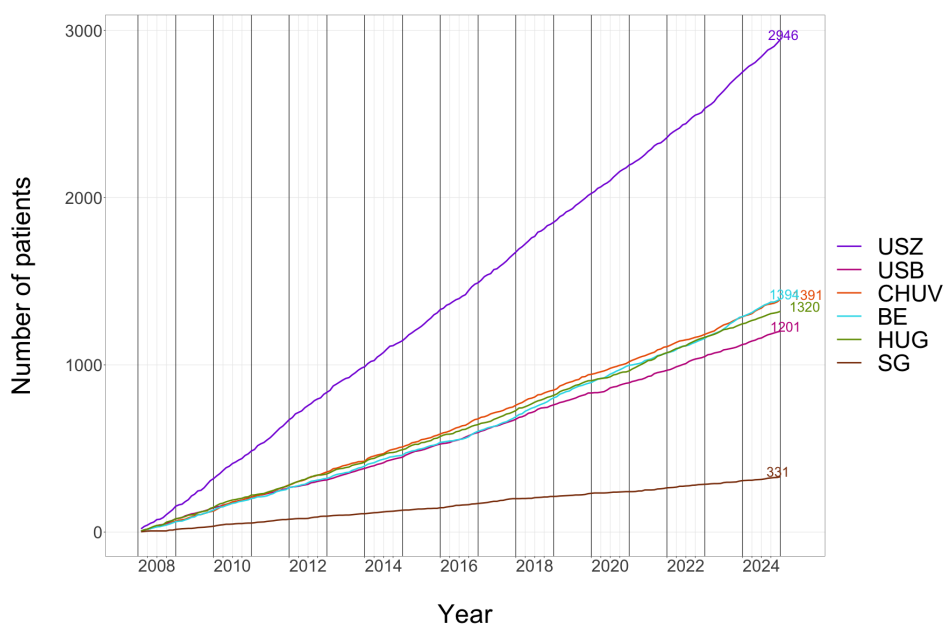
*including patients with renal Tpx failure who are no longer candidates for retransplantation.

Figure 3: Cumulative patient enrolment by Tpx type



'Rare Tpx type' includes: Islets, Pancreas, Small bowel, Kidney - Liver, Kidney - Islets, Kidney - Heart, Kidney - Lung, Liver - Lung, Liver - Pancreas, Heart - Lung, Islets - Liver, Pancreas - Small bowel, Kidney - Islets - Liver, Liver - Pancreas - Small bowel, Islets - Liver - Lung.

Figure 4: Cumulative patient enrolment by centre



2.4 Transplantation activities by centre and year

Table 7: Number of enrolled patients by year and centre

	Total	USZ	%	USB	%	CHUV	%	BE	%	HUG	%	SG	%
Total	8583	2946	34.3	1201	14	1391	16.2	1394	16.2	1320	15.4	331	3.9
2024	578	194	33.6	79	13.7	103	17.8	105	18.2	74	12.8	23	4
2023	628	218	34.7	72	11.5	105	16.7	130	20.7	81	12.9	22	3.5
2022	530	174	32.8	82	15.5	74	14	87	16.4	92	17.4	21	4
2021	536	165	30.8	75	14	90	16.8	74	13.8	109	20.3	23	4.3
2020	476	169	35.5	61	12.8	75	15.8	103	21.6	58	12.2	10	2.1
2019	538	173	32.2	71	13.2	95	17.7	92	17.1	88	16.4	19	3.5
2018	571	178	31.2	86	15.1	90	15.8	113	19.8	91	15.9	13	2.3
2017	545	184	33.8	79	14.5	82	15	87	16	84	15.4	29	5.3
2016	481	160	33.3	69	14.3	90	18.7	66	13.7	71	14.8	25	5.2
2015	514	186	36.2	79	15.4	78	15.2	77	15	79	15.4	15	2.9
2014	469	156	33.3	67	14.3	85	18.1	65	13.9	75	16	21	4.5
2013	445	153	34.4	69	15.5	64	14.4	74	16.6	70	15.7	15	3.4
2012	427	164	38.4	45	10.5	78	18.3	55	12.9	67	15.7	18	4.2
2011	467	187	40	58	12.4	74	15.8	65	13.9	60	12.8	23	4.9
2010	471	165	35	63	13.4	82	17.4	69	14.6	73	15.5	19	4
2009	450	165	36.7	67	14.9	61	13.6	70	15.6	68	15.1	19	4.2
2008	457	155	33.9	79	17.3	65	14.2	62	13.6	80	17.5	16	3.5

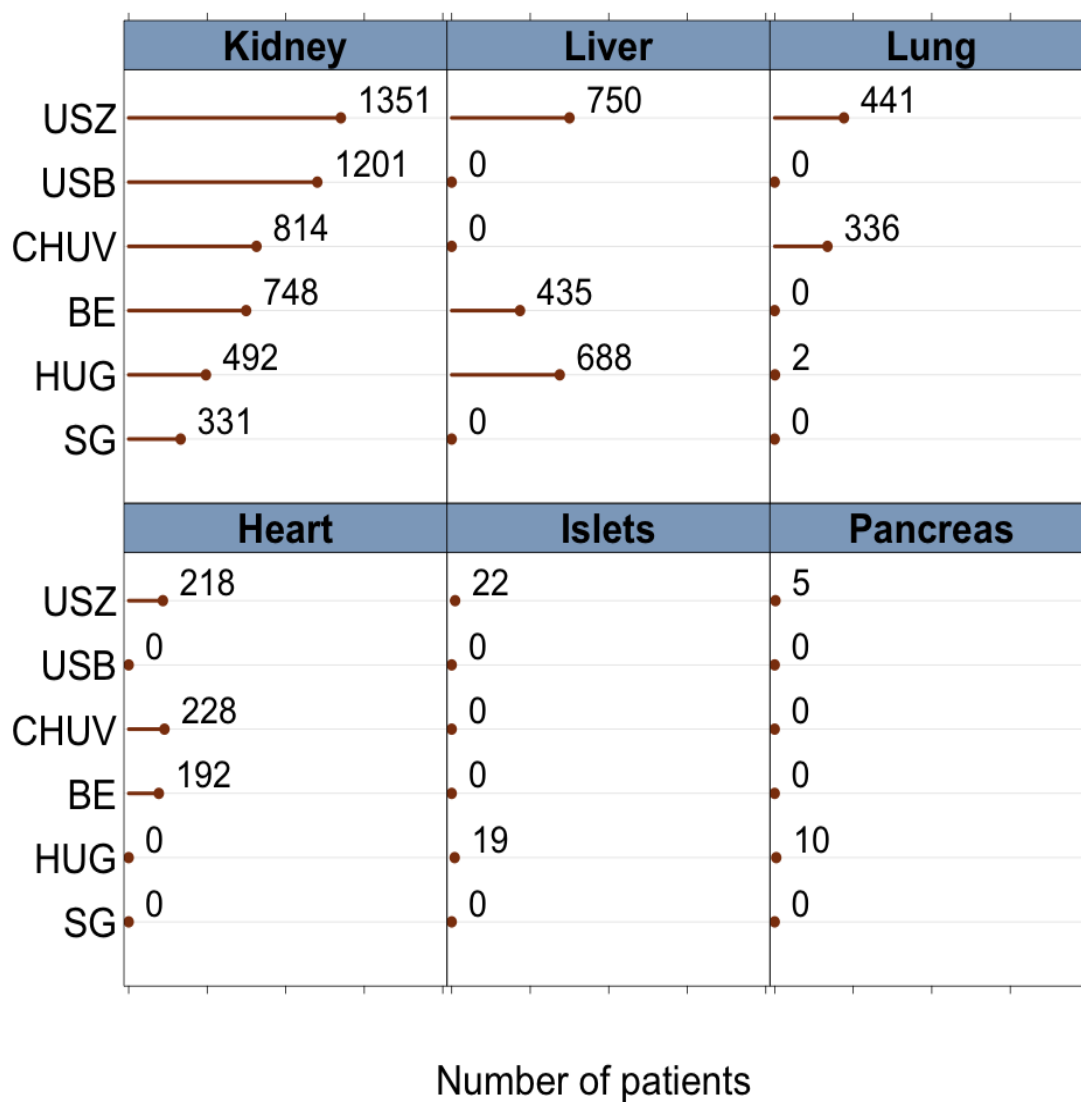
Table 8: Number of Tpx by year and centre

	Total	USZ	%	USB	%	CHUV	%	BE	%	HUG	%	SG	%
Total	9132	3149	34.5	1231	13.5	1448	15.9	1499	16.4	1463	16	342	3.7
2024	637	214	33.6	85	13.3	111	17.4	113	17.7	87	13.7	27	4.2
2023	675	236	35	74	11	111	16.4	138	20.4	93	13.8	23	3.4
2022	571	186	32.6	86	15.1	80	14	97	17	101	17.7	21	3.7
2021	586	181	30.9	77	13.1	93	15.9	90	15.4	122	20.8	23	3.9
2020	519	182	35.1	65	12.5	79	15.2	112	21.6	70	13.5	11	2.1
2019	582	179	30.8	73	12.5	101	17.4	108	18.6	102	17.5	19	3.3
2018	599	186	31.1	91	15.2	90	15	121	20.2	98	16.4	13	2.2
2017	578	197	34.1	79	13.7	86	14.9	93	16.1	93	16.1	30	5.2
2016	503	171	34	69	13.7	91	18.1	72	14.3	74	14.7	26	5.2
2015	555	199	35.9	81	14.6	83	15	82	14.8	94	16.9	16	2.9
2014	504	178	35.3	68	13.5	88	17.5	67	13.3	81	16.1	22	4.4
2013	471	167	35.5	69	14.6	66	14	78	16.6	76	16.1	15	3.2
2012	448	173	38.6	45	10	81	18.1	56	12.5	75	16.7	18	4
2011	492	197	40	60	12.2	76	15.4	71	14.4	64	13	24	4.9
2010	487	174	35.7	63	12.9	83	17	69	14.2	79	16.2	19	3.9
2009	466	173	37.1	67	14.4	64	13.7	70	15	73	15.7	19	4.1
2008	459	156	34	79	17.2	65	14.2	62	13.5	81	17.6	16	3.5

2.5 Transplantations by centre

Data from following rare transplantations are not shown: Small bowel (2, HUG), Liver - Lung (4, HUG), Liver - Pancreas (1, HUG), Heart - Lung (1, USZ), Islets - Liver (1, USZ; 1, HUG), Pancreas - Small bowel (2, HUG; 1, USZ), Islets - Liver - Lung (1, HUG) and Liver - Pancreas - Small bowel(2, USZ).

Figure 5: Number of patients with first single STCS Tpx



2.6 Single Kidney transplantation by donor type

Figure 6 and 7 show all STCS single Kidney transplantations by donor type (DBD, DCD, Living related, Living unrelated and Living, KPD) and proportions of Kidney donor types within centres. Table 9 lists the Kidney patients characteristics by donor type. Figures 8 and 9 show the enrollment of patients from KPD and DCD donation by centre.

Figure 6: Number of single Kidney Tpx by donor type

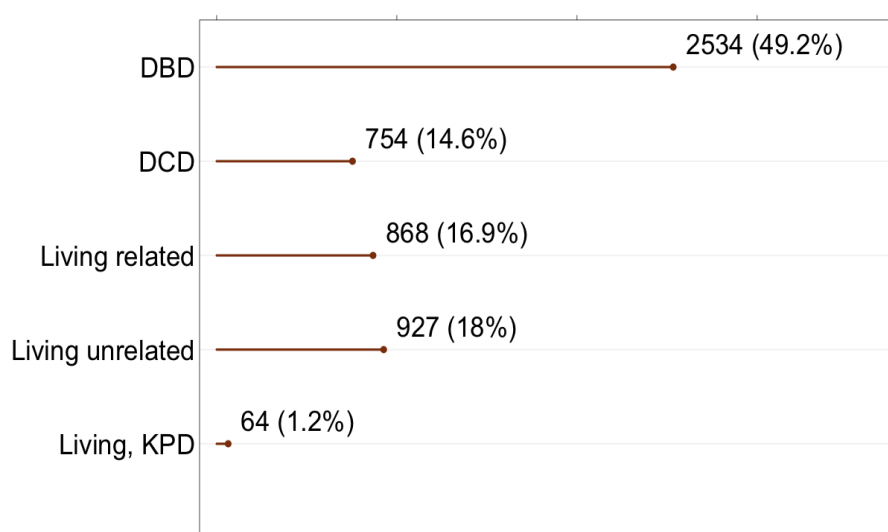


Figure 7: Distribution of donor types by centre in single Kidney Tpx

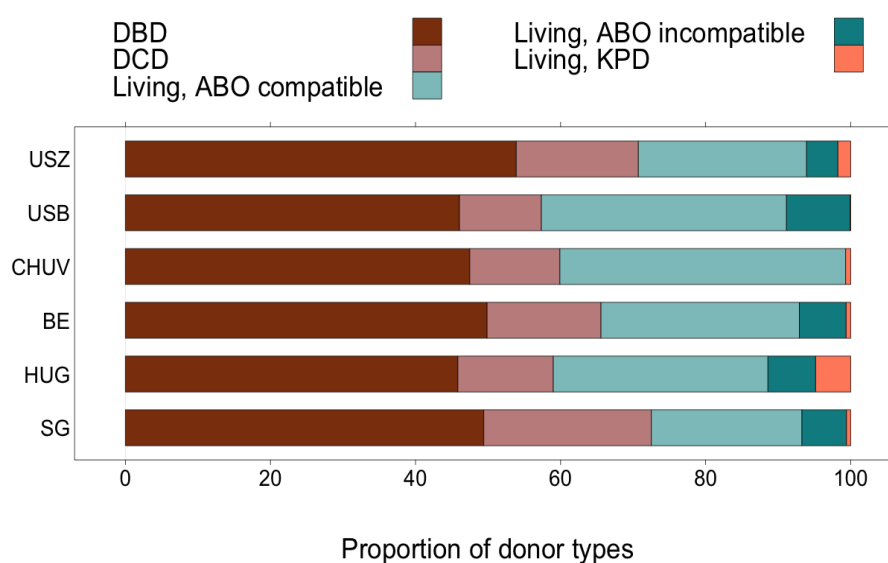


Table 9: Kidney patients' characteristics by donor type

	Total*	DBD	DCD	Living
Total number of patients	4937	2400	716	1821
Age (yrs), median	55.0	56.0	58.5	50.0
Age (yrs), IQR	(43-63)	(45-65)	(50-66)	(37-60)
Age (yrs), min; max	1; 82	1; 82	5; 81	1; 79
Pediatric, n(%)	179 (3.6%)	108 (4.5%)	7 (1%)	64 (3.5%)
Male, n(%)	3192 (64.7%)	1523 (63.5%)	448 (62.6%)	1221 (67.1%)
Donor age (yrs), median	55	55	58	55
- IQR	(45-64)	(41-65)	(48-65)	(46-62)
- min; max	0; 88	0; 88	1; 88	1; 84
Cold ischemia time (yrs), median	6.7	9.2	8.8	1.7
- IQR	(2.1-10.1)	(7.2-12.3)	(7.1-11.1)	(1.4-2.3)
- min; max	0.2; 58	0.3; 30	2.1; 40.2	0.2; 58
Time on the waitinglist (yrs), median	1.6	2.6	2.7	0.4
- IQR	(0.4-3.3)	(1.4-4.1)	(1.3-4.2)	(0.1-1)
- min; max	0; 20.7	0; 20.7	0; 15.8	0; 13.3
Observation time (yrs), median	6.9	7.3	3.4	7.9
- IQR	(3.3-11)	(3.8-11.3)	(1.6-6)	(4-11.9)
- min; max	0; 17.5	0; 17.5	0; 13.7	0; 17.5
Number of DGF, n (%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Number of deaths, n (%)	859 (17.4%)	552 (23%)	83 (11.6%)	224 (12.3%)
Number of patients with at least one GF, n (%)	539 (10.9%)	348 (14.5%)	56 (7.8%)	135 (7.4%)
Alive, with graft failure, n(%)	375 (7.6%)	238 (9.9%)	40 (5.6%)	97 (5.3%)
Graft failure - related death, n(%)	13 (0.3%)	7 (0.3%)	2 (0.3%)	4 (0.2%)
Graft failure -> death, n(%)	151 (3.1%)	103 (4.3%)	14 (2%)	34 (1.9%)
Death without graft failure, n(%)	695 (14.1%)	442 (18.4%)	67 (9.4%)	186 (10.2%)

Figure 8: Cumulative number of patients enrolled from KPD program by centre

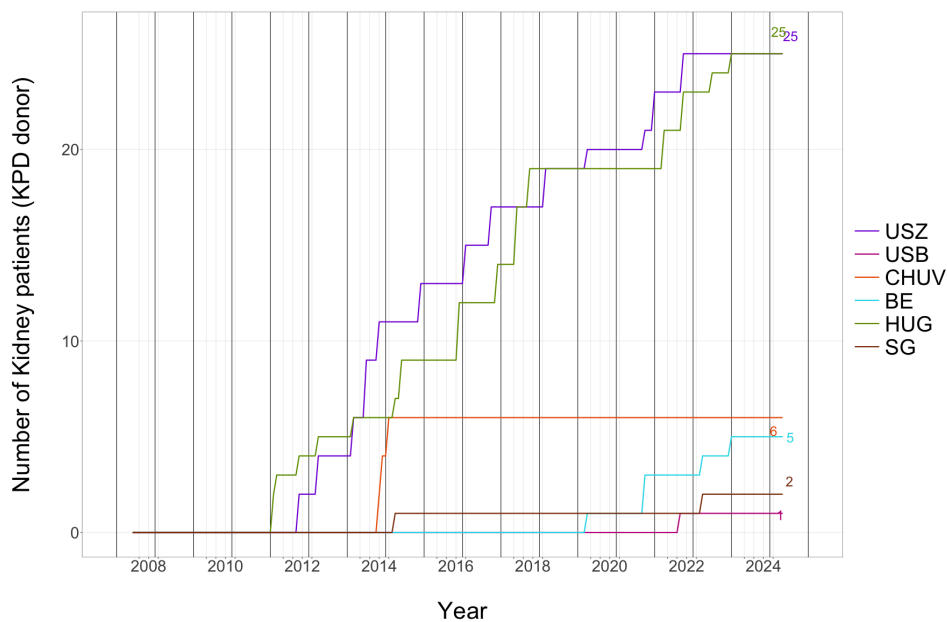
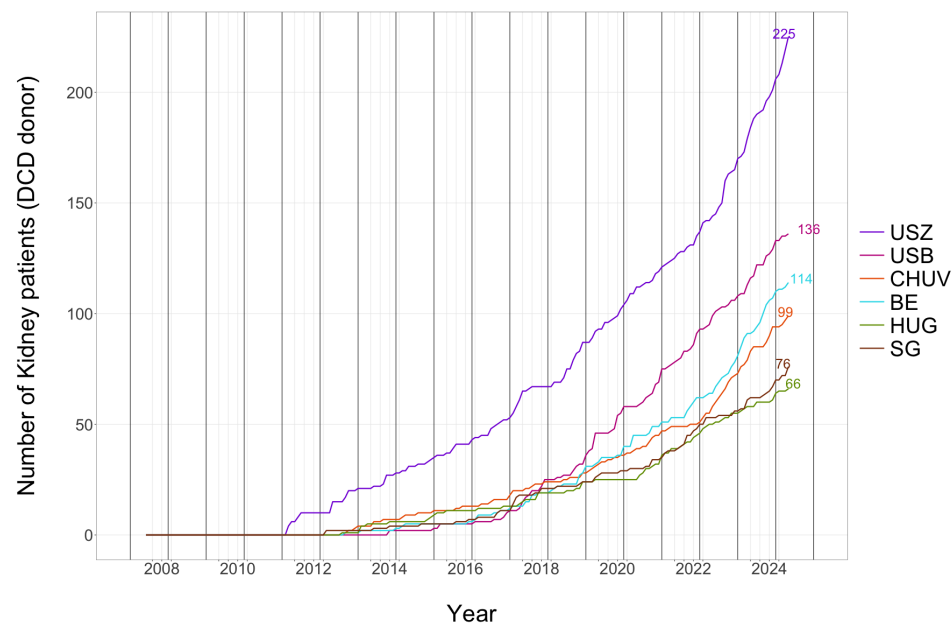


Figure 9: Cumulative number of patients with Kidney Tpx from DCD donation by centre



2.7 Single Liver transplantation by donor type

Figure 10 show all STCS single Liver transplantations by donor type and figure 11 the proportions of donor types in all single Liver transplantations within centres. Table 10 lists the Liver patients characteristics by donor type. Figure 12 shows the enrollment of patients with Liver transplantation from DCD donation by centre.

Figure 10: Number of single Liver Tpx by donor type

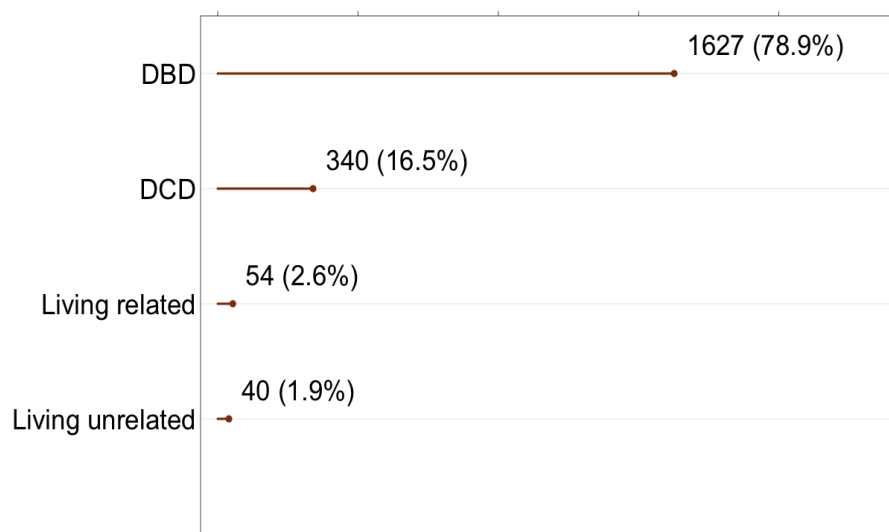


Figure 11: Distribution of donor types by centre in single Liver Tpx

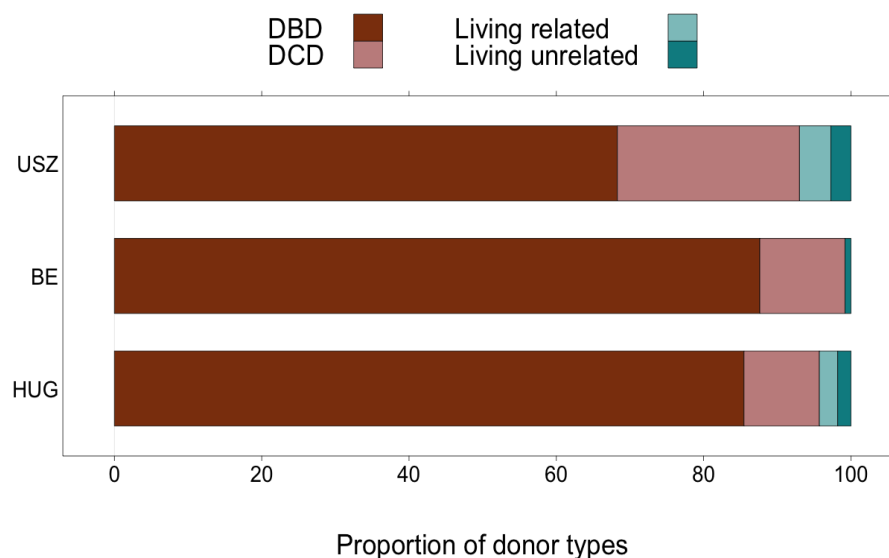
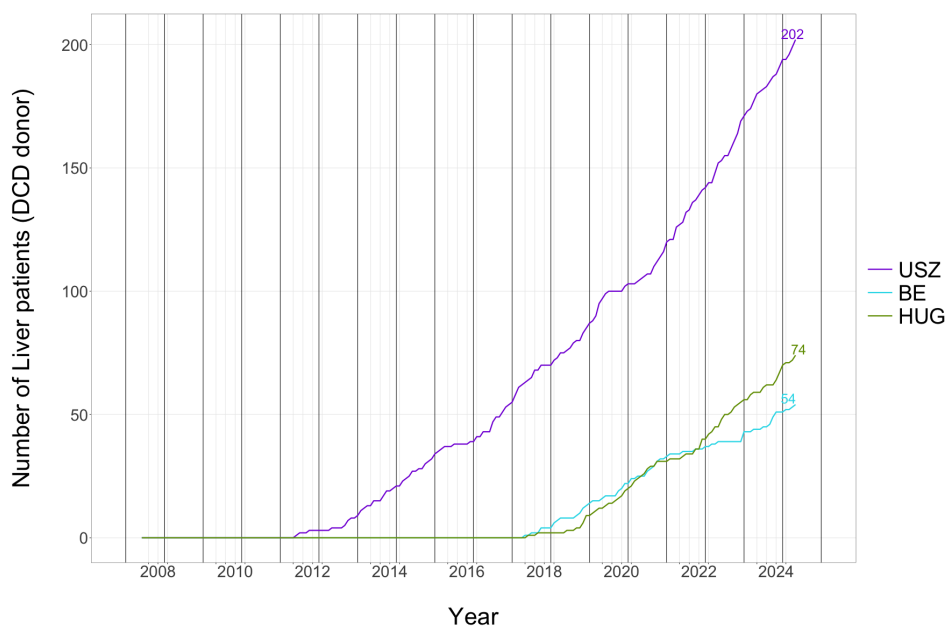


Table 10: Liver patients' characteristics by donor type

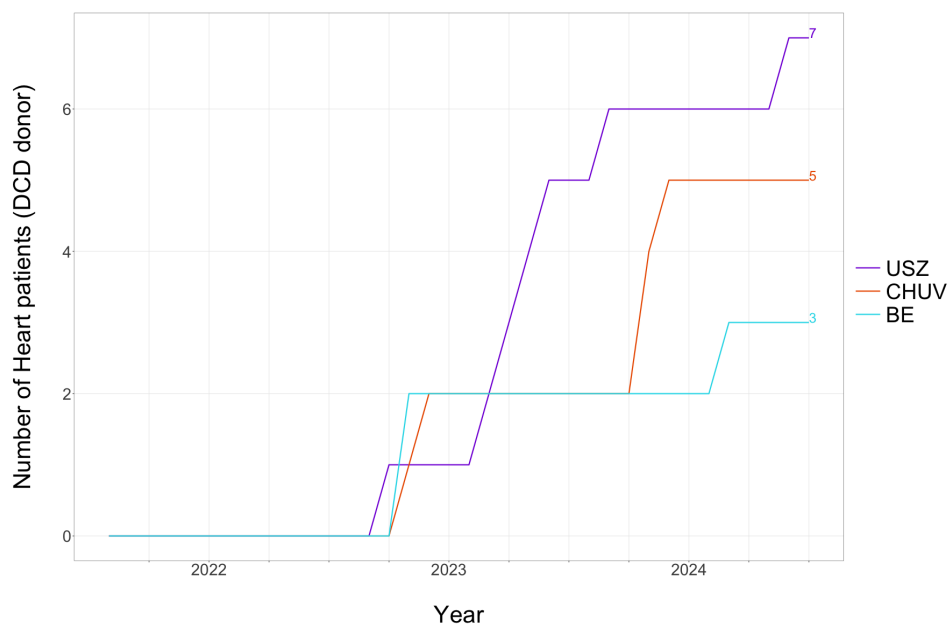
	Total*	DBD	DCD	Living
Total number of patients	1873	1451	330	92
Age (yrs), median	56	55	60	52
Age (yrs), IQR	(46-62)	(44-62)	(53-64)	(38.8-60)
Age (yrs), min; max	0; 77	0; 77	22; 73	0; 70
Pediatric, n(%)	134 (7.2%)	125 (8.6%)	0 (0%)	9 (9.8%)
Male, n(%)	1268 (67.7%)	958 (66%)	261 (79.1%)	49 (53.3%)
Donor age (yrs), median	55	55	61	37
- IQR	(39-68)	(38-67)	(50-70)	(31-45.2)
- min; max	0; 88	1; 88	13; 88	0; 68
Cold ischemia time (yrs), median	6.6	6.5	7.4	2.1
- IQR	(5.4-8.1)	(5.3-8)	(6.3-8.9)	(1.5-2.5)
- min; max	0.6; 17.2	0.8; 17.2	3.6; 17.2	0.6; 6.7
Time on the waitinglist (yrs), median	0.6	0.6	0.7	0.5
- IQR	(0.2-1.2)	(0.1-1.2)	(0.3-1.3)	(0.3-0.7)
- min; max	0; 8.1	0; 8.1	0; 6.3	0; 4
Observation time (yrs), median	5.7	6.4	3.1	6.8
- IQR	(2.4-9.9)	(2.9-10.6)	(1.4-5.6)	(2.2-12.3)
- min; max	0; 17.5	0; 17.5	0; 12.1	0; 17.5
Number of DGF, n (%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Number of deaths, n (%)	500 (26.7%)	389 (26.8%)	74 (22.4%)	37 (40.2%)
Number of patients with at least one GF, n (%)	241 (12.9%)	157 (10.8%)	59 (17.9%)	25 (27.2%)
Alive, with graft failure, n(%)	97 (5.2%)	60 (4.1%)	28 (8.5%)	9 (9.8%)
Graft failure - related death, n(%)	78 (4.2%)	59 (4.1%)	13 (3.9%)	6 (6.5%)
Graft failure -> death, n(%)	66 (3.5%)	38 (2.6%)	18 (5.5%)	10 (10.9%)
Death without graft failure, n(%)	356 (19%)	292 (20.1%)	43 (13%)	21 (22.8%)

Figure 12: Cumulative number of patients with Liver Tpx from DCD donation by centre



2.8 Single Heart transplantation by donor type

Figure 13: Cumulative number of patients with Heart Tpx from DCD donation by centre



3 Consent status

Figure 14 presents the latest known consent status - current consent status. In Figure 15, current consent status is given proportionally within each centre. Table 11 shows patients' consent status change between enrollment and the current date. Absent (other) reasons include: Permanent illness/Too sick, Language/Communication barrier, Psychiatric disorder, Reminder process closed, Retrospectively captured patients and Other reason.

Figure 14: Patients current consent status

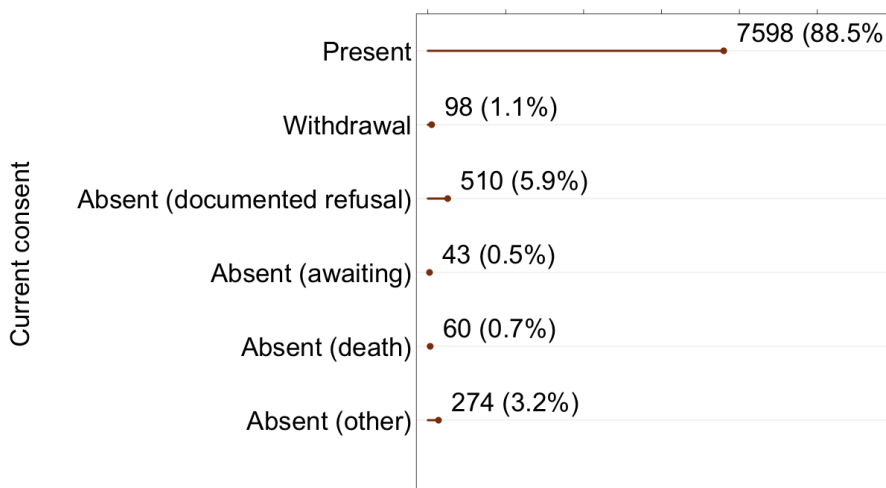


Figure 15: Patients current consent status by centre

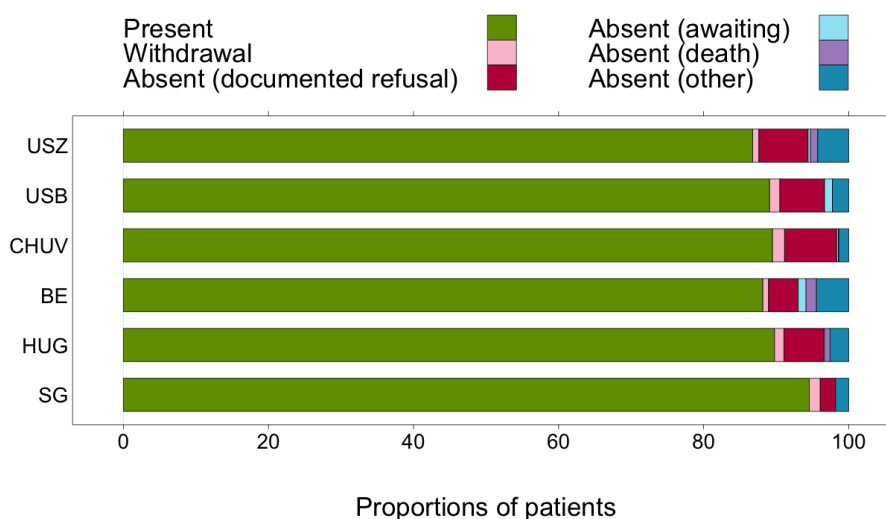


Table 11: Patients' current consent against consent status at first transplantation

	Total	C - Present	C - Withdrawal	C - Refused	C - Absent (awaiting)	C - Absent (death)	C - Absent (other)
Total	8583	7598	98	510	43	60	274
E - Present	6767	6669	85	4	3	1	5
E - Refused	418	28	1	389	-	-	-
E - Absent (awaiting)	1234	889	12	116	39	52	126
E - Absent (death)	6	-	-	-	-	6	-
E - Absent (other)	158	12	-	1	1	1	143

Remarks: 'C' stands for 'current consent status' and 'E' denotes the consent status at enrolment. Absent (other) reasons include: Permanent illness/Too sick, Language/Communication barrier, Psychiatric disorder, Reminder process closed, Other reason.

4 Mortality

4.1 Overall mortality

Table 12: Follow-up information of patients

	Follow-up
Median follow-up duration (years)	6.37
IQR (years)	2.86 - 10.46
Maximum follow-up (years)*	17.49
Number of deaths	1915
Patients with any graft failure	1058
Patients lost to follow-up**	242

* Time period from 1 January 2008 to 30 June 2025

** More details in Table 13.

Table 13: Number of patients who dropped out

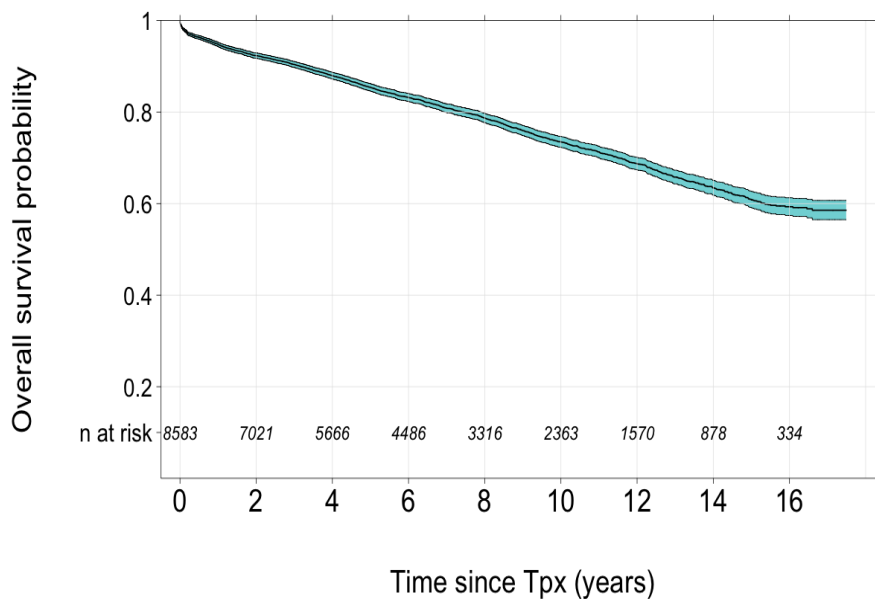
	BE	CHUV	HUG	SG	USB	USZ	Sum
Enrolled, N	1394	1391	1320	331	1201	2946	8583
Dropped out, N (%)	26 (1.9%)	73 (5.2%)	59 (4.5%)	4 (1.2%)	17 (1.4%)	63 (2.1%)	242 (2.8%)
- Heart	3	5	-	-	-	4	12
- Islets	-	-	-	-	-	2	2
- Kidney	17	59	21	4	17	30	148
- Kidney - Heart	-	1	-	-	-	-	1
- Kidney - Liver	-	-	1	-	-	-	1
- Kidney - Lung	-	1	-	-	-	-	1
- Kidney - Pancreas	-	-	1	-	-	3	4
- Liver	6	-	36	-	-	22	64
- Lung	-	7	-	-	-	2	9

Table 14: Overall mortality

Time	Mortality (%)	95% CI	No at risk	Cum. deaths
Baseline	0.0	-	8583	0
1 month	1.9	(1.6, 2.1)	8421	159
6 months	3.7	(3.3, 4.1)	8247	317
1 year	5.2	(4.8, 5.7)	7829	446
2 year(s)	7.7	(7.1, 8.2)	7021	641
4 year(s)	12.1	(11.3, 12.8)	5666	947
6 year(s)	16.8	(16, 17.7)	4486	1229
8 year(s)	21.3	(20.3, 22.3)	3316	1445
10 year(s)	26.5	(25.3, 27.7)	2363	1639
12 year(s)	31.3	(29.9, 32.6)	1570	1769
14 year(s)	36.6	(34.9, 38.2)	878	1868
16 year(s)	40.7	(38.7, 42.6)	334	1912
Overall	41.5	(39.3, 43.5)	-	1915

Remarks: 'Cum.' stands for 'Cumulative'. The 95%-CI is given for 'Mortality'. The time point 'Overall' refers to the maximal follow-up time in the STCS (from January 2008 to 30 June 2025).

Figure 16: Overall survival



4.2 Mortality by transplantation type and centre

In the following section only common transplantation types are presented. In Appendix B a short summary of rare transplantation types are presented.

Figure 17: Overall survival for common Tpx types

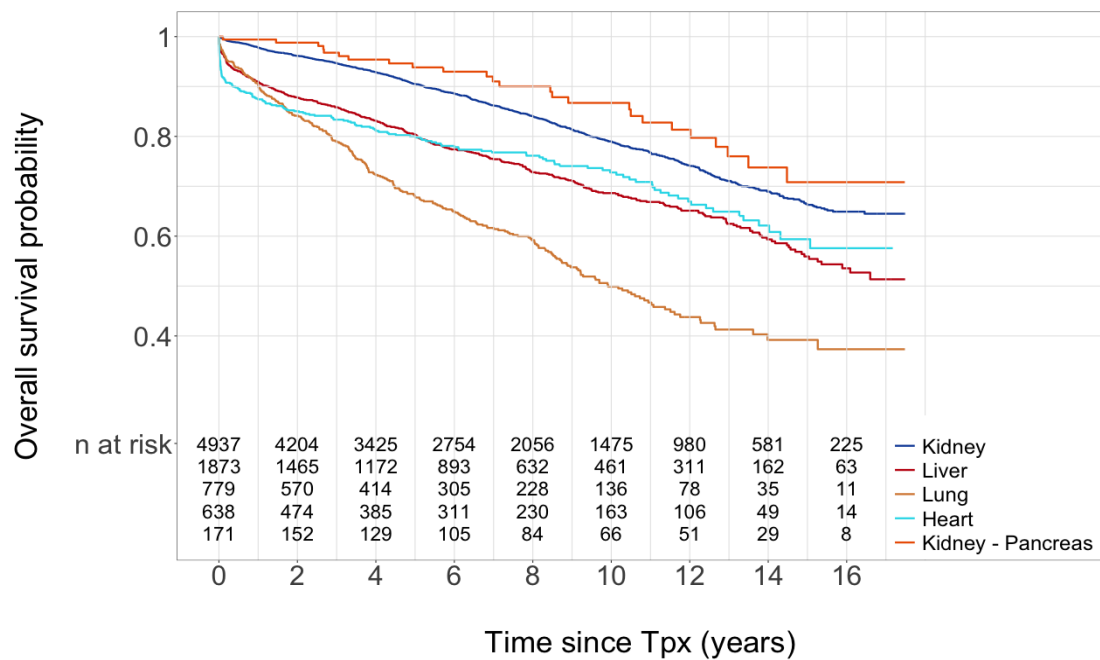


Figure 18: Overall survival for Kidney Tpx recipients by centre

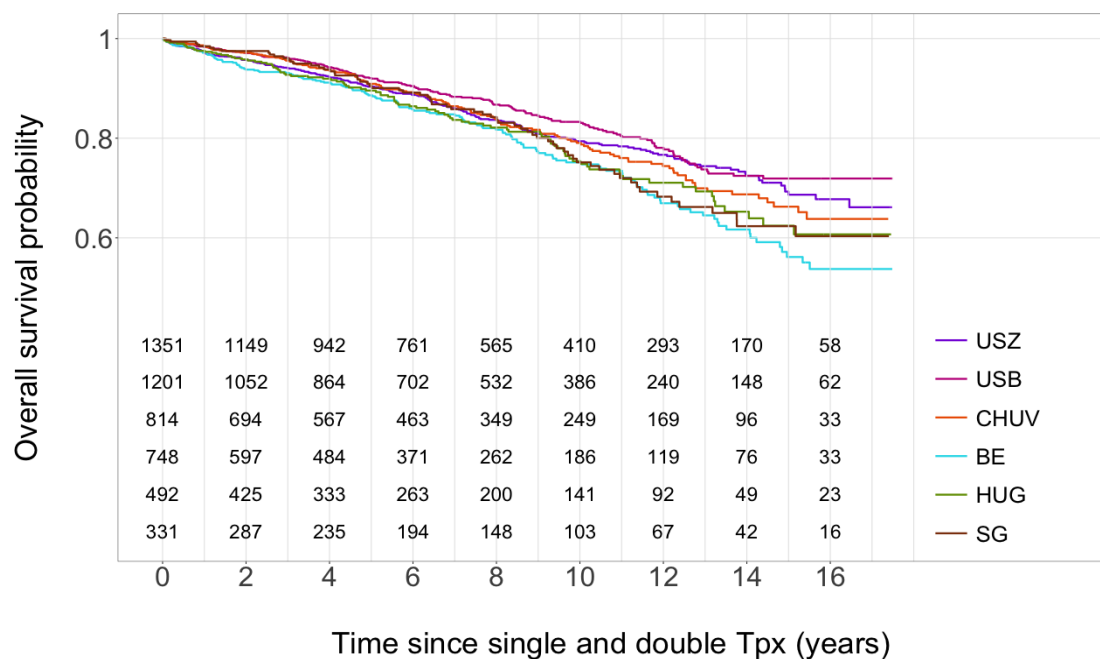
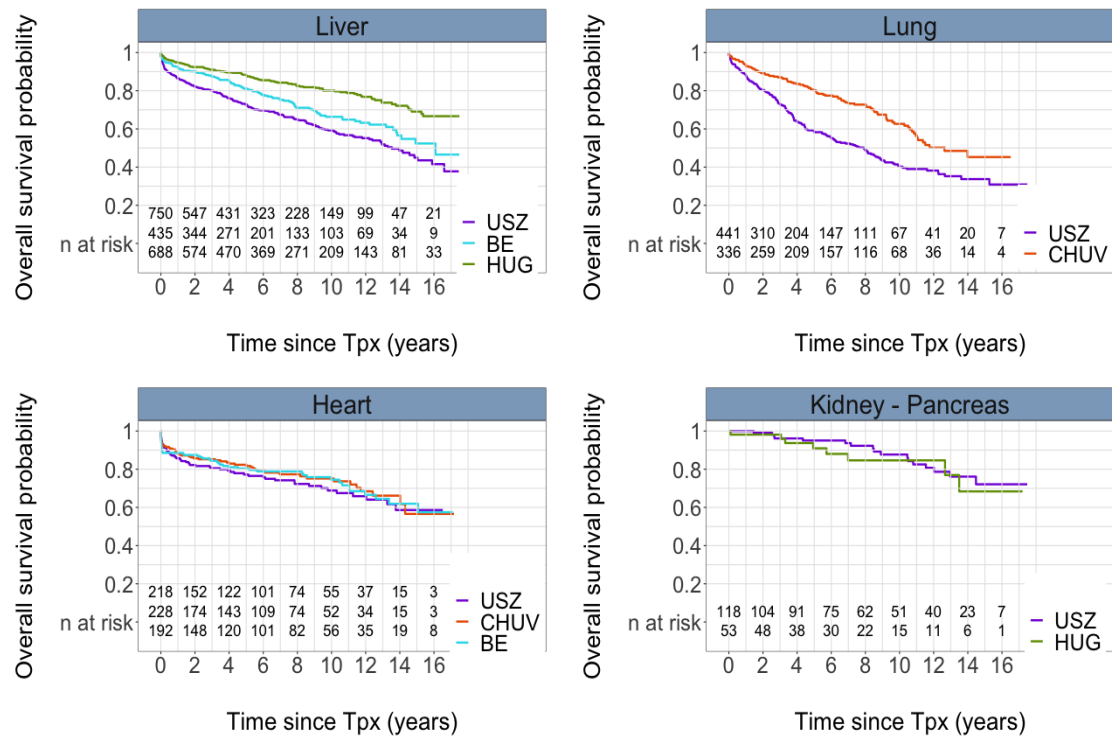
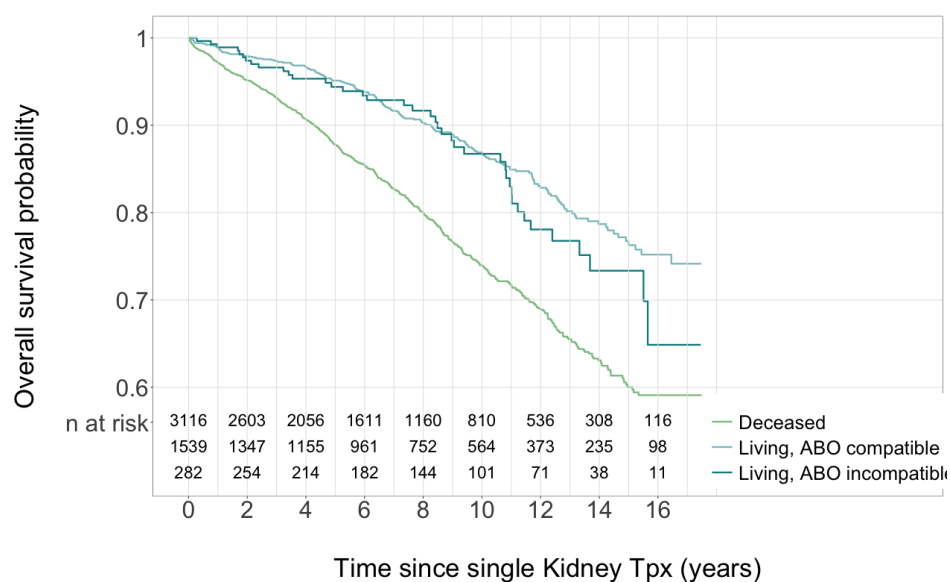


Figure 19: Overall survival for other common Tpx by centre



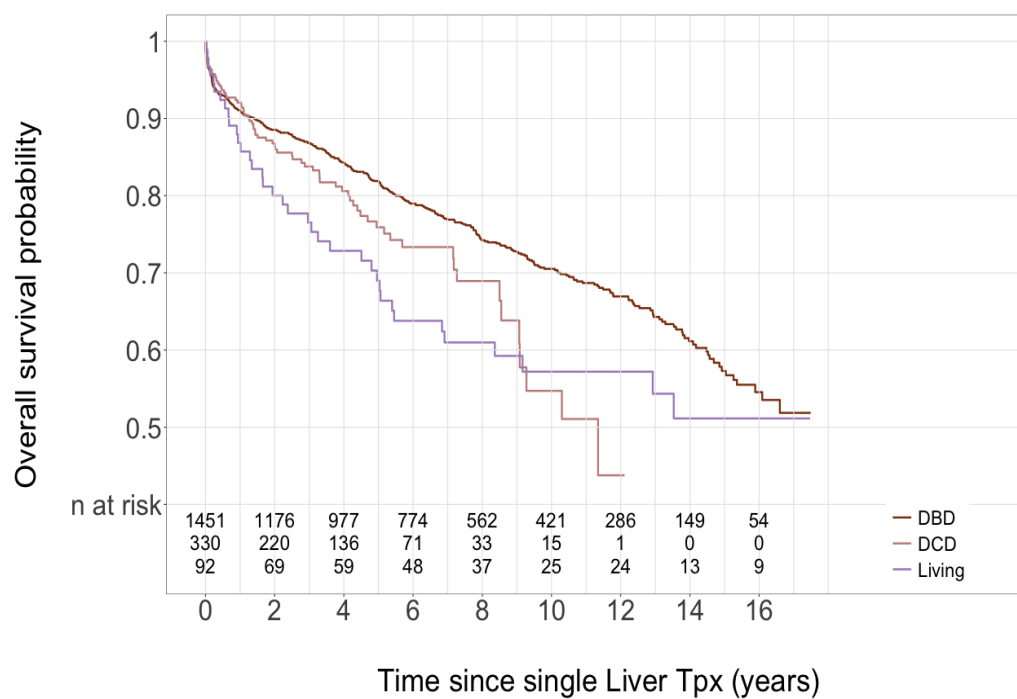
4.3 Mortality in first single Kidney transplantation

Figure 20: Overall survival for patients with first STCS Kidney Tpx by donor type and ABO compatibility of living donor organ recipients



4.4 Mortality in first single Liver transplantation recipients by donortype

Figure 21: Overall survival in patients with first STCS Liver Tpx by donor type



5 Graft failure and primary non-function

5.1 Graft failure

Graft failures (incl. grafts with primary non-function) are displayed on the layer of the transplanted organ (Tables 16 and 17). Table 15 gives a summary of numbers of graft failures on patient- and organ-level.

Table 15: Summary for graft failures

	N	(%)
Graft failure - total	1179	100.0
- in single Tpx	1088	92.3
- in double Tpx	85	7.2
- in triple Tpx	6	0.5
Patients with any graft failure	1069	
Patients with graft failure or death	2457	100.0
- graft failure and alive at end of follow-up	542	22.1
- graft failure followed by late death	269	10.9
- graft failure related death (at same day)	247	10.1
- death without any graft failure	1399	56.9

Table 16: Graft failures in double Tpx

	Total	Heart	Islets	Kidney	Liver	Lung	Pancreas	Small bowel
Total	85	3	12	32	6	2	28	2
Heart - Lung	2	1	-	-	-	1	-	-
Kidney - Heart	3	2	-	1	-	-	-	-
Kidney - Islets	19	-	12	7	-	-	-	-
Kidney - Liver	10	-	-	4	6	-	-	-
Kidney - Lung	1	-	-	1	-	-	-	-
Kidney - Pancreas	45	-	-	19	-	-	26	-
Liver - Lung	1	-	-	-	-	1	-	-
Pancreas - Small bowel	4	-	-	-	-	-	2	2

Remark: Only double tpx with at least one graft failure are listed.

Table 17: Graft failure and related patients' death

	Total	All GF*	(%)	GF, late death	(%)	GF related death	(%)
Total	9447	1179	12.5	300	25.4	290	24.6
Kidney	5444	599	11	166	27.7	16	2.7
Liver	2144	296	13.8	78	26.4	107	36.1
Lung	819	151	18.4	22	14.6	116	76.8
Heart	662	60	9.1	4	6.7	51	85
Islets	163	31	19	12	38.7	-	-
Pancreas	208	37	17.8	13	35.1	-	-
Small bowel	7	5	71.4	5	100	-	-

* GF: graft failure (incl. primary non-function)

5.2 Graft failure free survival

In the following, estimates of graft failure free survival are not adjusted for potential risk factors. Only the first STCS transplantation of each patient is considered.

Figure 22: Graft failure free survival for common Tpx types

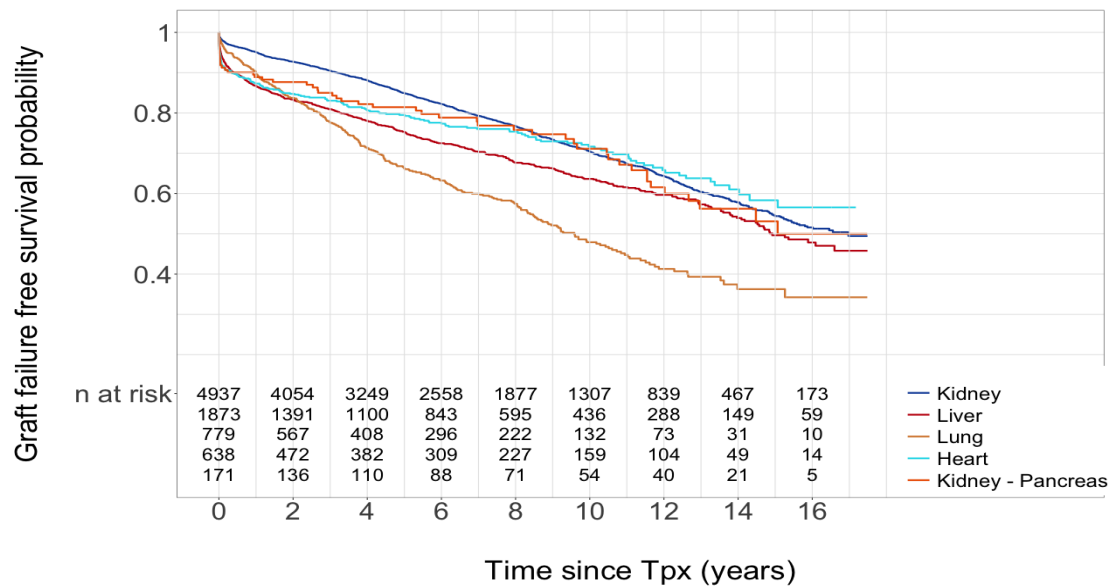


Figure 23: Graft failure free survival by centre in Kidney transplantation

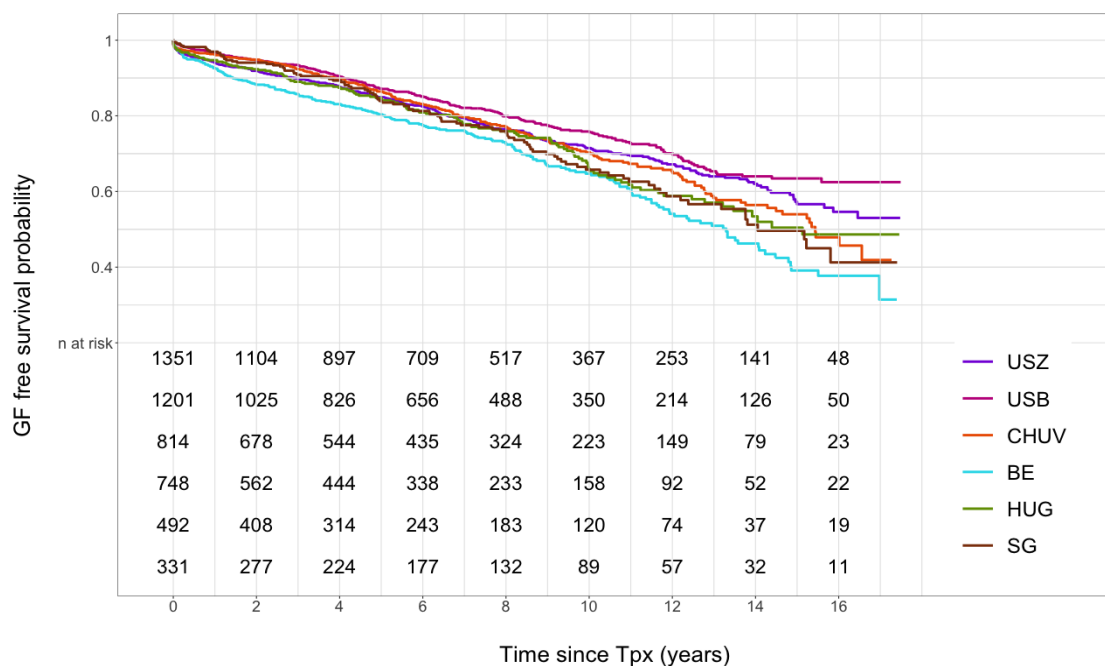


Figure 24: Graft failure free survival for common Tpx types and centre

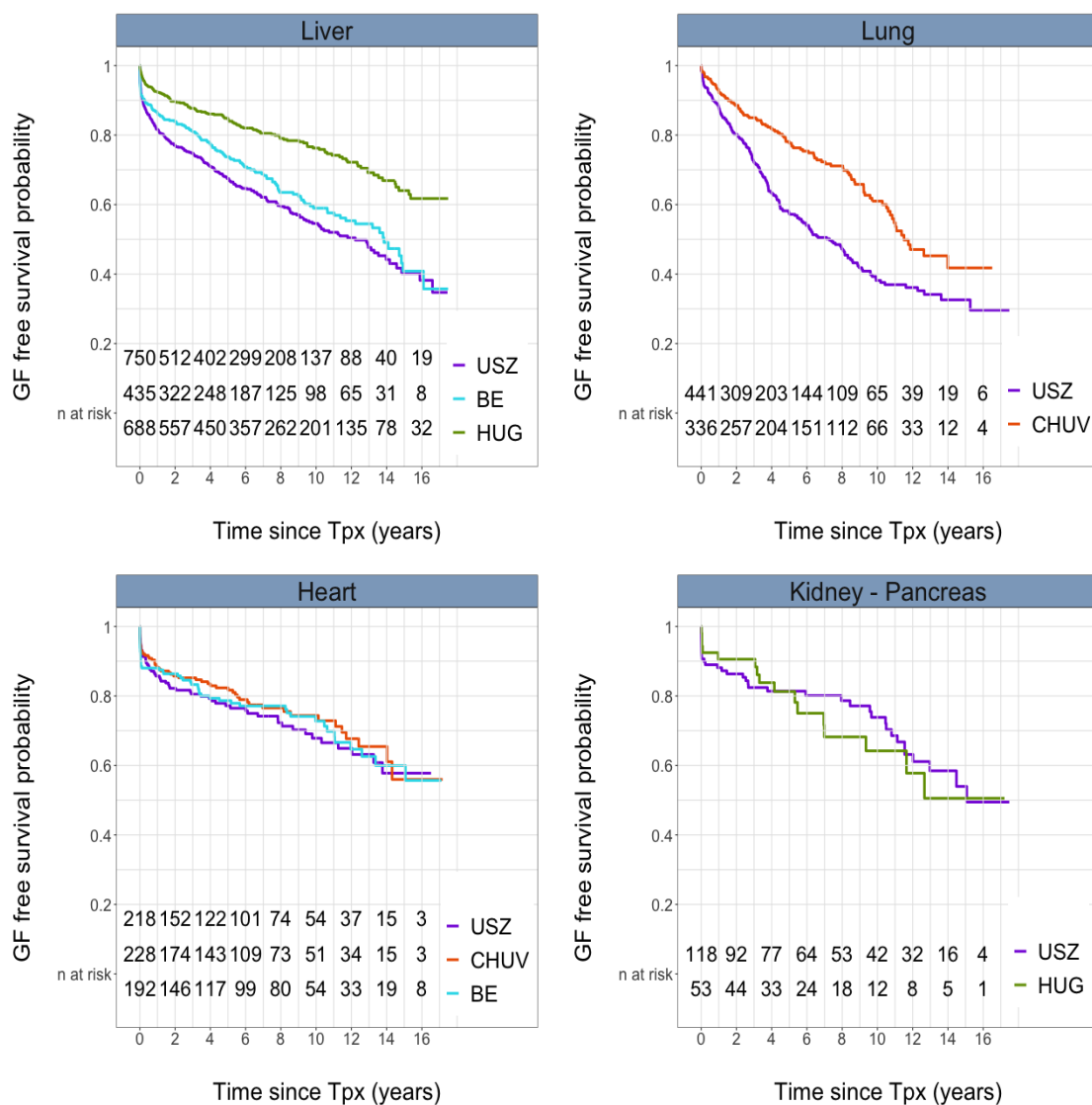
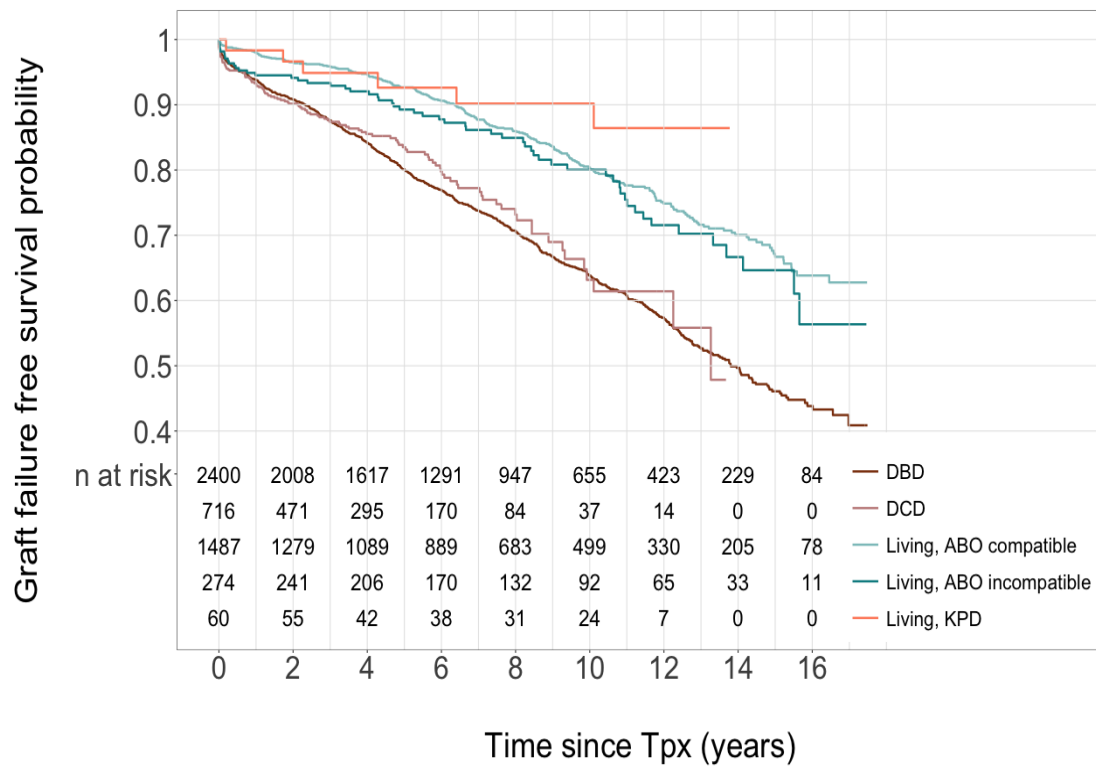


Figure 25: Graft failure free survival in patients with first STCS single Kidney Tpx by donor type and ABO compatibility of living donor organ recipients



5.3 Cumulative incidence of graft failure

The cumulative incidence (CumInc) of a graft failure is the probability for a graft failure within the reported time period. CumInc functions for graft failure are not adjusted for potential risk factors (illustrated in Figures and Tables). In Figure 26 double kidneys are counted as one kidney.

Figure 26: Cumulative incidence of graft failure

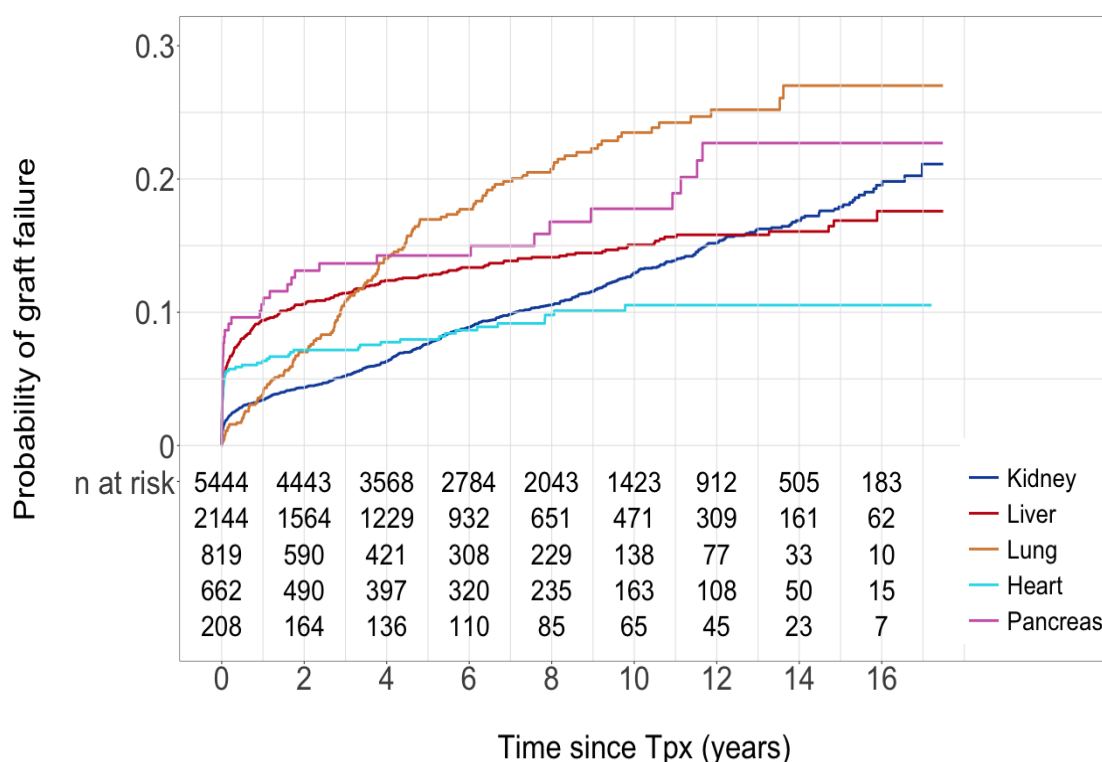


Figure 27: Cumulative incidence of graft failure of single kidney Tpx stratified by type of donation and ABO compatibility of living donr Tpx

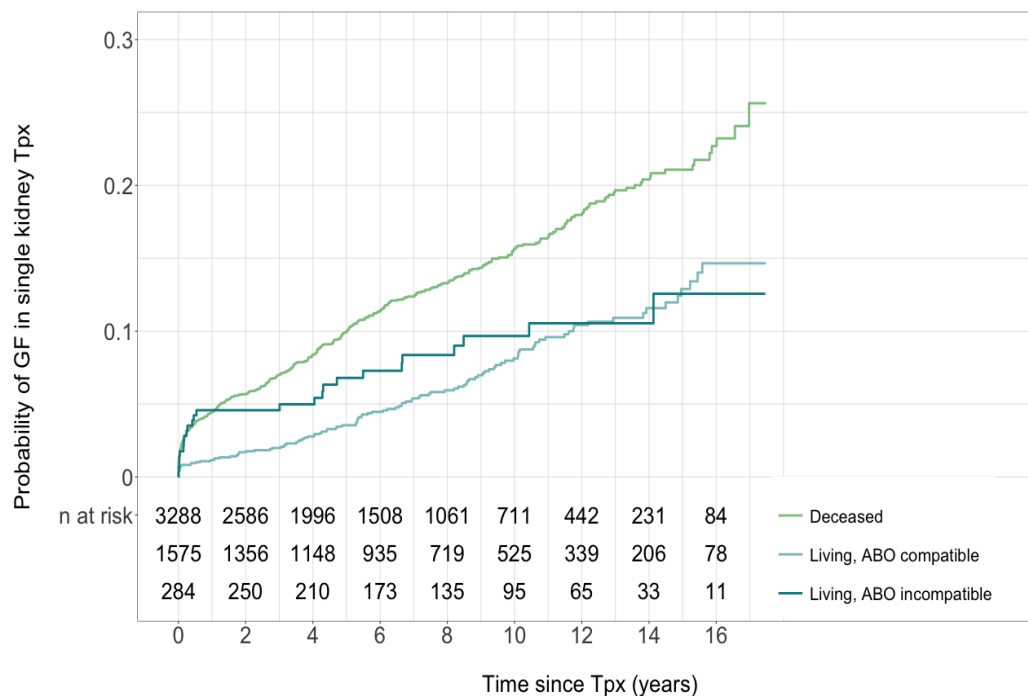
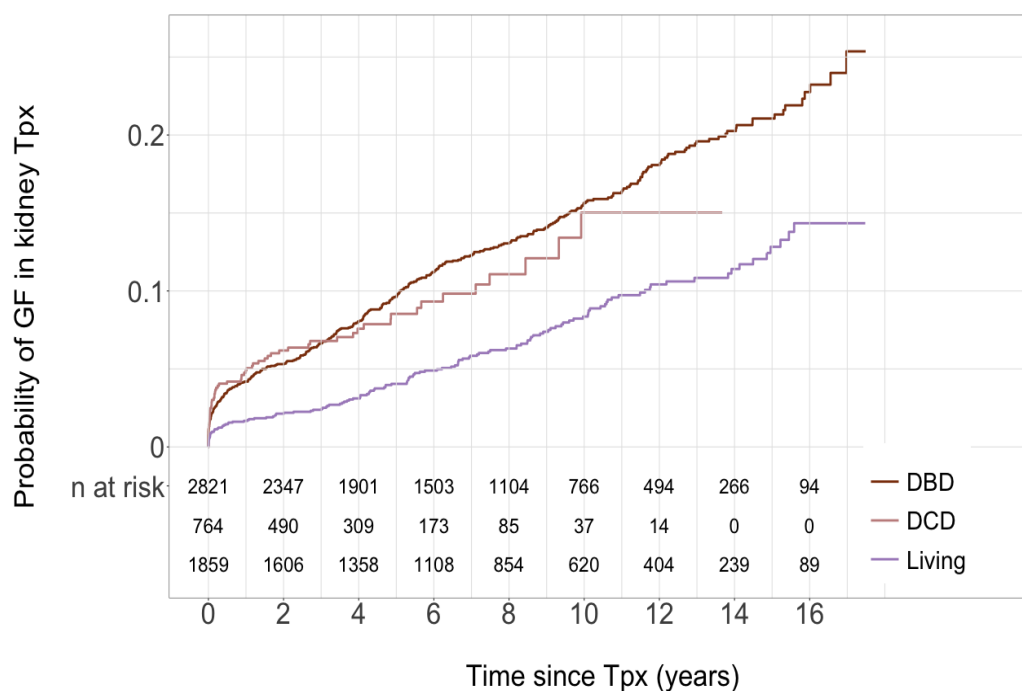


Figure 28: Cumulative incidence of graft failure for Kidney Tpx by donor type



6 Cancer

Results regarding the incidence of cancer and skin cancer have to be considered with caution as data may be incomplete at the moment.

6.1 Cancer other than skin

Table 18: Overview of patients with incident cancer

	N	%
Total number of patients	8583	
Patients with incident cancer (other than skin)	1040	12.1
- single record (% of line 2)	753	72.4
- multiple records (% of line 2)	287	27.6

Table 19: Patients with incident cancer by Tpx type

	Patients	Episodes	Median time (in yrs)*
Total	1040	1525	4.15
Kidney	535	749	4.78
Liver	319	528	3.41
Lung	99	132	3.54
Heart	47	68	5.86
Islets	6	6	5.13
Pancreas	2	3	7.79
Kidney - Pancreas	15	16	5.02
Kidney - Liver	9	13	5.58
Kidney - Islets	2	2	7.18
Kidney - Heart	2	2	2.59
Kidney - Lung	2	2	2.73
Pancreas - Small bowel	2	4	0.31

* Median time (in years) from first STCS transplantation to diagnosis of cancer
Remark: Patients are listed regarding the first STCS transplantation.

Table 20: Overview of incident cancer occurrence

	N	%
Total	1525	100.0%
Breast cancer	54	3.5%
Cancer of unknown primary origin	12	0.8%
Cervix - Uterus - Adnex	15	1.0%
Cholangiocarcinoma	5	0.3%
Colorectal cancer	44	2.9%
CTU	13	0.9%
Esophageal cancer	6	0.4%
Gastric cancer	10	0.7%
HCC	16	1.0%
Head and neck cancer	11	0.7%
Kaposi	14	0.9%
Kidney cancer	75	4.9%
Leukemia	18	1.2%
Liver cancer	140	9.2%
Liver metastasis from CRC	2	0.1%
Lung cancer	180	11.8%
Myeloid neoplasm	19	1.2%
Myeloma	8	0.5%
Neuroendocrine TU	25	1.6%
Other neoplasia	404	26.5%
Pancreas cancer	15	1.0%
Prostate cancer	127	8.3%
PTLD	178	11.7%
Sarkoma	16	1.0%
Testicular cancer	8	0.5%
Thyroid cancer	24	1.6%
Urothel/Bladder	86	5.6%

6.2 Skin cancer

Table 21: Overview of patients with incident skin cancer

	N	%
Total number of patients	8583	
Patients with incident skin cancer	1358	15.8
- single record (% of line 2)	647	47.6
- multiple records (% of line 2)	711	52.4

Table 22: Patients with incident skin cancer by Tpx type

	Patients	Episodes	Median time (in yrs)*
Total	1358	4143	5.45
Heart	92	251	6.90
Islets	10	26	5.86
Kidney	886	2849	5.31
Kidney - Heart	5	15	3.60
Kidney - Islets	8	22	4.60
Kidney - Islets - Liver	1	3	10.57
Kidney - Liver	8	49	8.96
Kidney - Lung	1	1	1.39
Kidney - Pancreas	22	65	7.90
Liver	194	409	4.35
Liver - Lung	1	1	7.18
Lung	125	425	5.50
Pancreas	5	27	4.71

* Median time (in years) from first STCS transplantation to diagnosis of skin cancer
 Remark: Patients are listed regarding the first STCS transplantation.

Table 23: Overview of incident skin cancer occurrence

	N	%
Total	4143	100.0%
Basalioma	1192	28.8%
Melanoma	139	3.4%
Other skin cancer	750	18.1%
Spinalioma	2062	49.8%

7 Specific Populations: Pediatric patients

Table 24: Number of pediatric patients (under 18) by first Tpx type

	Total	USZ	%	USB	%	CHUV	%	BE	%	HUG	%	SG	%
Total	394	126	32	8	2	47	11.9	64	16.2	145	36.8	4	1
Kidney	179	80	44.7	8	4.5	29	16.2	49	27.4	9	5	4	2.2
Liver	134	4	3	-	-	-	-	1	0.7	129	96.3	-	-
Lung	18	15	83.3	-	-	2	11.1	-	-	1	5.6	-	-
Heart	57	27	47.4	-	-	16	28.1	14	24.6	-	-	-	-
Kidney - Liver	5	-	-	-	-	-	-	-	-	5	100	-	-
Islets - Liver - Lung	1	-	-	-	-	-	-	-	-	1	100	-	-

Table 25: Number of Tpx in pediatric patients by transplantation type and centre

	Total	USZ	%	USB	%	CHUV	%	BE	%	HUG	%	SG	%
Total	436	139	31.9	11	2.5	56	12.8	69	15.8	157	36	4	0.9
Kidney	199	87	43.7	11	5.5	34	17.1	53	26.6	10	5	4	2
Liver	143	5	3.5	-	-	-	-	1	0.7	137	95.8	-	-
Lung	25	19	76	-	-	5	20	-	-	1	4	-	-
Heart	60	28	46.7	-	-	17	28.3	15	25	-	-	-	-
Kidney - Liver	6	-	-	-	-	-	-	-	-	6	100	-	-
Islets - Liver - Lung	1	-	-	-	-	-	-	-	-	1	100	-	-

Remark: Patients that are under 18 at baseline might be over 18 at the time of re or second transplantation.

A Overall mortality by transplantation type

Table 26: Overall mortality by Tpx type

Tpx	Time	Mortality (%)	95% CI	No at risk	Cum. deaths
Kidney	Baseline	0.0	-	4937	0
-	1 month	0.3	(0.2, 0.5)	4919	16
-	6 months	1.2	(0.9, 1.5)	4867	58
-	1 year	2.2	(1.8, 2.6)	4649	107
-	2 year(s)	3.9	(3.3, 4.4)	4204	184
-	4 year(s)	7.1	(6.4, 7.9)	3425	315
-	6 year(s)	11.4	(10.4, 12.4)	2754	460
-	8 year(s)	16.0	(14.7, 17.2)	2056	588
-	10 year(s)	21.0	(19.5, 22.5)	1475	697
-	12 year(s)	25.9	(24.1, 27.6)	980	774
-	14 year(s)	31.1	(29, 33.1)	581	832
-	16 year(s)	35.1	(32.6, 37.5)	225	858
-	Overall	35.5	(32.9, 38)	-	859
Liver	Baseline	0.0	-	1873	0
-	1 month	3.4	(2.6, 4.2)	1808	64
-	6 months	6.9	(5.8, 8.1)	1738	130
-	1 year	9.0	(7.7, 10.3)	1638	168
-	2 year(s)	12.2	(10.7, 13.7)	1465	223
-	4 year(s)	16.9	(15.1, 18.6)	1172	295
-	6 year(s)	22.6	(20.5, 24.7)	893	368
-	8 year(s)	27.2	(24.8, 29.5)	632	413
-	10 year(s)	31.4	(28.7, 33.9)	461	445
-	12 year(s)	34.9	(31.9, 37.7)	311	465
-	14 year(s)	40.6	(37, 44.1)	162	486
-	16 year(s)	46.4	(41.7, 50.8)	63	498
-	Overall	48.6	(43, 53.7)	-	500
Lung	Baseline	0.0	-	779	0
-	1 month	2.7	(1.6, 3.8)	758	21
-	6 months	6.3	(4.6, 8)	730	49
-	1 year	9.8	(7.7, 11.9)	671	76
-	2 year(s)	15.9	(13.2, 18.4)	570	119
-	4 year(s)	27.7	(24.3, 31)	414	192
-	6 year(s)	35.1	(31.2, 38.7)	305	231
-	8 year(s)	40.8	(36.6, 44.7)	228	256
-	10 year(s)	50.1	(45.4, 54.4)	136	288
-	12 year(s)	56.2	(50.9, 60.9)	78	302
-	14 year(s)	60.8	(54.6, 66.2)	35	308
-	16 year(s)	62.7	(55.5, 68.7)	11	309
-	Overall	62.7	(55.5, 68.7)	-	309
Heart	Baseline	0.0	-	638	0
-	1 month	8.0	(5.9, 10.1)	587	51
-	6 months	10.5	(8.1, 12.9)	570	67
-	1 year	12.6	(10, 15.1)	535	80
-	2 year(s)	14.9	(12.1, 17.7)	474	94
-	4 year(s)	18.9	(15.7, 22)	385	114
-	6 year(s)	22.2	(18.6, 25.5)	311	128
-	8 year(s)	23.9	(20.1, 27.4)	230	134
-	10 year(s)	27.2	(23, 31.2)	163	143
-	12 year(s)	33.1	(27.8, 37.9)	106	154
-	14 year(s)	37.9	(31.6, 43.6)	49	160

-	16 year(s)	42.4	(34.4, 49.4)	14	163
-	Overall	42.4	(34.4, 49.4)	-	163
Kidney - Pancreas	Baseline	0.0	-	171	0
-	1 month	0.0	-	171	0
-	6 months	0.6	(0, 1.7)	170	1
-	1 year	0.6	(0, 1.7)	166	1
-	2 year(s)	1.2	(0, 2.9)	152	2
-	4 year(s)	4.6	(1.2, 7.9)	129	7
-	6 year(s)	7.0	(2.7, 11.2)	105	10
-	8 year(s)	10.0	(4.6, 15.1)	84	13
-	10 year(s)	13.3	(6.8, 19.3)	66	16
-	12 year(s)	18.7	(10.5, 26.1)	51	20
-	14 year(s)	26.2	(15.5, 35.6)	29	24
-	16 year(s)	29.2	(17.1, 39.5)	8	25
-	Overall	29.2	(17.1, 39.5)	-	25

B Overall mortality in patients with rare Tpx scenarios

Table 27: Overall mortality by rare Tpx scenarios

Tpx	Time	Mortality (%)	95% CI	No at risk	Cum. deaths
Islets	Baseline	0.00	-	41	0
-	Overall	49.13	(28.4, 63.8)	-	17
Pancreas	Baseline	0.00	-	15	0
-	Overall	40.00	(0.5, 63.8)	-	4
Small bowel	Baseline	0.00	-	2	0
-	Overall	50.00	(0, 87.5)	-	1
Kidney - Liver	Baseline	0.00	-	68	0
-	Overall	48.60	(22.3, 66)	-	19
Kidney - Islets	Baseline	0.00	-	28	0
-	Overall	76.86	(0, 95)	-	8
Kidney - Heart	Baseline	0.00	-	16	0
-	Overall	25.00	(0.5, 43.5)	-	4
Kidney - Lung	Baseline	0.00	-	2	0
-	Overall	0.00	-	-	0
Liver - Lung	Baseline	0.00	-	4	0
-	Overall	50.00	(0, 81.2)	-	2
Liver - Pancreas	Baseline	0.00	-	1	0
-	Overall	0.00	-	-	0
Heart - Lung	Baseline	0.00	-	1	0
-	Overall	100.00	-	-	1
Islets - Liver	Baseline	0.00	-	1	0
-	Overall	0.00	-	-	0
Pancreas - Small bowel	Baseline	0.00	-	3	0
-	Overall	66.67	(0, 93.3)	-	2
Kidney - Islets - Liver	Baseline	0.00	-	1	0
-	Overall	0.00	-	-	0
Liver - Pancreas - Small bowel	Baseline	0.00	-	1	0
-	Overall	100.00	-	-	1
Islets - Liver - Lung	Baseline	0.00	-	1	0
-	Overall	0.00	-	-	0

C Overall mortality in first Kidney transplantation

Table 28: Overall mortality in (single) kidney recipients by donor type

Donor type	Time	Mortality (%)	95% CI	No at risk	Cum. deaths
Deceased	Baseline	0.0	-	3116	0
-	1 month	0.5	(0.2, 0.7)	3100	15
-	6 months	1.5	(1.1, 1.9)	3061	47
-	1 year	2.8	(2.2, 3.4)	2903	87
-	2 year(s)	4.9	(4.1, 5.6)	2603	146
-	4 year(s)	9.3	(8.2, 10.4)	2056	256
-	6 year(s)	14.5	(13.1, 15.9)	1611	365
-	8 year(s)	20.0	(18.3, 21.7)	1160	457
-	10 year(s)	26.0	(24, 28)	810	534
-	12 year(s)	31.0	(28.6, 33.3)	536	580
-	14 year(s)	36.9	(34, 39.7)	308	619
-	16 year(s)	40.9	(37.6, 44.1)	116	635
-	Overall	40.9	(37.6, 44.1)	-	635
Living	Baseline	0.0	-	1821	0
-	1 month	0.1	(0, 0.2)	1819	1
-	6 months	0.6	(0.2, 1)	1806	11
-	1 year	1.1	(0.6, 1.6)	1746	20
-	2 year(s)	2.2	(1.5, 2.8)	1601	38
-	4 year(s)	3.5	(2.6, 4.4)	1369	59
-	6 year(s)	6.3	(5, 7.5)	1143	95
-	8 year(s)	9.5	(7.9, 11)	896	131
-	10 year(s)	13.1	(11.2, 15.1)	665	163
-	12 year(s)	17.9	(15.4, 20.4)	444	194
-	14 year(s)	22.1	(19.1, 25.1)	273	213
-	16 year(s)	26.2	(22.3, 29.9)	109	223
-	Overall	27.1	(22.9, 31.2)	-	224

D Graft failure by organ, centre and donortype

Table 29: Graft failure by organ

Organ	Time	CumInc (%)	95% CI	No at risk	Cum. GF	Cum. deaths
Kidney	Baseline	-	-	5444		0
-	1 month	1.8	(1.5,2.2)	5333		13
-	6 months	2.9	(2.5,3.4)	5226		48
-	1 year	3.4	(3,3.9)	4959		95
-	2 year(s)	4.3	(3.8,4.9)	4443		163
-	4 year(s)	6.3	(5.7,7)	3568		275
-	6 year(s)	8.9	(8.1,9.7)	2784		400
-	8 year(s)	10.5	(9.6,11.5)	2043		515
-	10 year(s)	13	(11.9,14.1)	1423		612
-	12 year(s)	15.2	(13.9,16.5)	912		682
-	14 year(s)	16.9	(15.4,18.4)	505		739
-	16 year(s)	19.5	(17.6,21.5)	183		764
-	Overall	21.1	(18.4,23.9)	0		765
Liver	Baseline	-	-	2144		0
-	1 month	5.5	(4.6,6.5)	1990		35
-	6 months	8	(6.9,9.2)	1878		89
-	1 year	9.4	(8.2,10.7)	1757		116
-	2 year(s)	10.6	(9.3,12)	1564		159
-	4 year(s)	12.4	(11,13.9)	1229		220
-	6 year(s)	13.4	(11.9,14.9)	932		287
-	8 year(s)	14.1	(12.6,15.7)	651		334
-	10 year(s)	15.1	(13.4,16.8)	471		362
-	12 year(s)	15.8	(14.1,17.6)	309		381
-	14 year(s)	16.1	(14.3,18)	161		403
-	16 year(s)	17.6	(15.1,20.2)	62		414
-	Overall	17.6	(15.1,20.2)	0		416
Lung	Baseline	-	-	819		0
-	1 month	0.9	(0.4,1.7)	795		17
-	6 months	2	(1.2,3.1)	765		38
-	1 year	3.9	(2.8,5.5)	700		54
-	2 year(s)	7	(5.4,9)	590		77
-	4 year(s)	14	(11.6,16.7)	421		114
-	6 year(s)	17.7	(14.9,20.7)	308		137
-	8 year(s)	20.7	(17.6,24)	229		151
-	10 year(s)	23.5	(20.1,27.1)	138		174
-	12 year(s)	25.2	(21.5,29.1)	77		185
-	14 year(s)	27	(22.6,31.6)	33		189
-	16 year(s)	27	(22.6,31.6)	10		190
-	Overall	27	(22.6,31.6)	0		190
Heart	Baseline	-	-	662		0
-	1 month	5.3	(3.8,7.2)	607		20
-	6 months	6	(4.4,8)	589		32
-	1 year	6.4	(4.7,8.4)	553		44
-	2 year(s)	7.2	(5.4,9.3)	490		55

-	4 year(s)	7.8	(5.8,10)	397	74
-	6 year(s)	8.7	(6.6,11.1)	320	84
-	8 year(s)	9.8	(7.5,12.4)	235	87
-	10 year(s)	10.5	(8.1,13.4)	163	95
-	12 year(s)	10.5	(8.1,13.4)	108	106
-	14 year(s)	10.5	(8.1,13.4)	50	112
-	16 year(s)	10.5	(8.1,13.4)	15	115
-	Overall	10.5	(8.1,13.4)	0	115
Pancreas	Baseline	-	-	208	0
-	1 month	8.7	(5.3,13)	189	1
-	6 months	9.6	(6.1,14.1)	187	1
-	1 year	10.6	(6.9,15.2)	181	1
-	2 year(s)	13.1	(8.9,18.1)	164	2
-	4 year(s)	14.3	(9.8,19.5)	136	7
-	6 year(s)	14.3	(9.8,19.5)	110	9
-	8 year(s)	16.8	(11.7,22.6)	85	10
-	10 year(s)	17.8	(12.4,23.9)	65	13
-	12 year(s)	22.7	(16,30.2)	45	18
-	14 year(s)	22.7	(16,30.2)	23	21
-	16 year(s)	22.7	(16,30.2)	7	21
-	Overall	22.7	(16,30.2)	0	21

Table 30: Graft failure of kidneys (in first STCS single Tpx) by donor type

Donor type	Time	CumInc (%)	95% CI	No at risk	Cum. GF	Cum. deaths
Deceased	Baseline	-	-	3288	0	0
-	1 month	2.2	(1.7,2.7)	3208	72	8
-	6 months	3.7	(3.1,4.4)	3124	122	33
-	1 year	4.5	(3.8,5.2)	2924	146	72
-	2 year(s)	5.7	(4.9,6.5)	2586	183	122
-	4 year(s)	8.4	(7.4,9.4)	1996	253	213
-	6 year(s)	11.4	(10.2,12.6)	1508	318	302
-	8 year(s)	13.3	(12,14.7)	1061	352	379
-	10 year(s)	15.7	(14.2,17.3)	711	383	442
-	12 year(s)	18	(16.2,19.8)	442	404	482
-	14 year(s)	20.4	(18.3,22.5)	231	420	516
-	16 year(s)	22.7	(20.1,25.4)	84	427	530
-	Overall	25.6	(21.3,30.1)	0	430	530
Living	Baseline	-	-	1859	0	0
-	1 month	0.9	(0.6,1.4)	1840	17	1
-	6 months	1.5	(1,2.1)	1821	27	8
-	1 year	1.7	(1.2,2.3)	1758	31	16
-	2 year(s)	2.1	(1.5,2.9)	1606	39	30
-	4 year(s)	3.1	(2.4,4)	1358	54	44
-	6 year(s)	4.9	(3.9,6)	1108	78	75
-	8 year(s)	6.3	(5.1,7.7)	854	94	107
-	10 year(s)	8.4	(6.9,10)	620	112	135
-	12 year(s)	10.4	(8.7,12.4)	404	126	160
-	14 year(s)	11.4	(9.4,13.6)	239	130	177
-	16 year(s)	14.3	(11.5,17.5)	89	137	186
-	Overall	14.3	(11.5,17.5)	0	137	187

E Technical summary

All analyses were performed using the statistical software R version 4.3.2 (2023-10-31). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL <https://www.R-project.org/>.