



SWISS
TRANSPLANT
COHORT
STUDY

Swiss Transplant Cohort Study Report (May 2008 - December 2018)

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Disclaimer

The STCS Annual Report covers all solid organ transplantation (SOT) activities on the Swiss national level since May 2008 (and to a reduced extent also 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 center-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
FUP	follow-up
GF	graft failure
HUG	Hôpitaux Universitaires de Genève
ID	infectious disease
NHBD	non-heart-beating donor (Donation after Cardiac Death, DCD)
DBD	Donation after Brain Death
SG	Kantonsspital St. Gallen
USZ	Universitätsspital Zürich
USB	Universitätsspital Basel

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1 Comments from the centres

Inselspital Bern: Approves open publication.

Centre Hospitalier Universitaire Vaudois Lausanne: Approves open publication.

Hôpitaux Universitaires de Genève: Approves open publication.

Kantonsspital St. Gallen: Approves open publication.

Universitätsspital Basel: Approves open publication.

Universitätsspital Zürich: Approves open publication.

2 News and updates

News:

- A short description of the specific population of DCD donor recipients is included in Chapter 11.1.

Updates:

- Dialysis Registry data is used for crosscheck and update of survival status of Kidney transplantation patients post graft failure.
- The summary of pediatric patients is in Chapter 11.2.

3 Patients, transplantations and transplanted organs

Definitions applied:

- Enrolment refers to the inclusion of all patients into the Swiss Transplant Cohort Study (STCS) from 1 May 2008 until 31 December 2018. From those patients, the follow-up information from the date of transplantation until end of follow-up (date of death or censoring) is included in the report.
- First transplantation:
 - Patients with a first 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 refer to multiple organs that 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 transplantation from the pre-STCS era (before May 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.
- Human stem cell transplantations are not considered in this report.

3.1 Overview

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	5137	100.0
Single Tpx at enrolment	4895	95.3
Double Tpx at enrolment	238	4.6
Triple Tpx at enrolment	4	0.1
1st Tpx at enrolment	4584	89.2
Re-Tpx at enrolment	460	9.0
2nd Tpx at enrolment	93	1.8

Table 2: Number of patients enrolled by Tpx type

	Total	First Tpx	(%)	Re Tpx	(%)	Second Tpx	(%)
Total	5137	4584	89.2	460	9.0	93	1.8
Kidney	2906	2472	85.1	396	13.6	38	1.3
Liver	1094	1052	96.2	36	3.3	6	0.5
Lung	463	449	97.0	11	2.4	3	0.6
Heart	382	378	99.0	4	1.0	0	0.0
Islets	36	9	25.0	10	27.8	17	47.2
Pancreas	13	7	53.8	0	0.0	6	46.2
Small bowel	1	0	0.0	1	100.0	0	0.0
Kidney - Pancreas	102	96	94.1	1	1.0	5	4.9
Kidney - Kidney	51	46	90.2	0	0.0	5	9.8
Kidney - Liver	43	35	81.4	0	0.0	8	18.6
Kidney - Islets	21	20	95.2	0	0.0	1	4.8
Kidney - Heart	10	8	80.0	1	10.0	1	10.0
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	2	2	100.0	0	0.0	0	0.0
Kidney - Kidney - Pancreas	2	1	50.0	0	0.0	1	50.0
Kidney - Islets - Liver	1	0	0.0	0	0.0	1	100.0
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 implanted organs.

Table 3: Number of Tpx types

	Total	First Tpx	(%)	Re Tpx	(%)	Second Tpx	(%)
Total	5347	4584	85.7	627	11.7	136	2.5
Kidney	2980	2472	83.0	452	15.2	56	1.9
Liver	1178	1052	89.3	117	9.9	9	0.8
Lung	482	449	93.2	29	6.0	4	0.8
Heart	385	378	98.2	7	1.8	0	0.0
Islets	52	9	17.3	17	32.7	26	50.0
Pancreas	21	7	33.3	1	4.8	13	61.9
Small bowel	1	0	0.0	1	100.0	0	0.0
Kidney - Pancreas	103	96	93.2	2	1.9	5	4.9
Kidney - Kidney	51	46	90.2	0	0.0	5	9.8
Kidney - Liver	44	35	79.5	0	0.0	9	20.5
Kidney - Islets	22	20	90.9	0	0.0	2	9.1
Kidney - Heart	10	8	80.0	1	10.0	1	10.0
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	2	2	100.0	0	0.0	0	0.0
Kidney - Kidney - Pancreas	2	1	50.0	0	0.0	1	50.0
Kidney - Islets - Liver	1	0	0.0	0	0.0	1	100.0
Liver - Pancreas - Small bowel	1	0	0.0	0	0.0	1	100.0
Islets - Liver - Lung	1	1	100.0	0	0.0	0	0.0

'Liver - Pancreas - Small bowel' Tpx type was not performed as first STCS Tpx.

Table 4: Number of transplanted organs

	Total	First Tpx	(%)	Re Tpx	(%)	Second Tpx	(%)
Total	5600	4803	85.8	680	12.1	117	2.1
Kidney	3269	2726	83.4	486	14.9	57	1.7
Liver	1232	1094	88.8	122	9.9	16	1.3
Lung	491	456	92.9	30	6.1	5	1.0
Heart	396	387	97.7	9	2.3	0	0.0
Pancreas	130	107	82.3	10	7.7	13	10.0
Islets	78	31	39.7	21	26.9	26	33.3
Small bowel	4	2	50.0	2	50.0	0	0.0

Table 5: Patients' characteristics for major Tpx types

	Total*	Kidney	Liver	Lung	Heart	Kidney - Pancreas
Total no. patients	4947	2906	1094	463	382	102
Age (yrs), median	54.1	54.3	55.8	53.8	51.4	44.4
- IQR	(41.8,62.1)	(42.5,63.1)	(45.6,62)	(35.8,60.2)	(36.9,59.5)	(36.4,50)
Male gender, n (%)	3148 (63.6%)	1850 (63.7%)	733 (67%)	238 (51.4%)	271 (70.9%)	56 (54.9%)
Pediatric, n (%)	258 (5.2%)	117 (4%)	89 (8.1%)	16 (3.5%)	36 (9.4%)	0 (0%)
Observation time (yrs), median	4	4.5	3.5	3.4	3.3	5.6
- IQR	(1.7,7)	(1.9,7.4)	(1.2,6.6)	(1.5,6)	(0.9,6.6)	(3.8)
No. deaths, n (%)	727 (14.7%)	283 (9.7%)	201 (18.4%)	163 (35.2%)	74 (19.4%)	6 (5.9%)
No. patients with at least one GF, n (%)	478 (9.7%)	238 (8.2%)	113 (10.3%)	75 (16.2%)	33 (8.6%)	19 (18.6%)
- with GF, alive	237 (4.8%)	167 (5.7%)	47 (4.3%)	7 (1.5%)	2 (0.5%)	14 (13.7%)
- with GF -> death	137 (2.8%)	63 (2.2%)	38 (3.5%)	21 (4.5%)	10 (2.6%)	5 (4.9%)
- with GF - related death	104 (2.1%)	8 (0.3%)	28 (2.6%)	47 (10.2%)	21 (5.5%)	0 (0%)
Death without GF	486 (9.8%)	212 (7.3%)	135 (12.3%)	95 (20.5%)	43 (11.3%)	1 (1%)
No. patients with any ID	3428 (69.3 %)	2016 (69.4%)	745 (68.1%)	314 (67.8%)	271 (70.9%)	82 (80.4%)
- any proven/viral ID event	2575 (52.1 %)	1505 (51.8%)	546 (49.9%)	259 (55.9%)	202 (52.9%)	63 (61.8%)
- any incident cancer other than skin	407 (8.2 %)	208 (7.2%)	141 (12.9%)	40 (8.6%)	14 (3.7%)	4 (3.9%)
- any incident skin cancer	589 (11.9 %)	406 (14%)	74 (6.8%)	61 (13.2%)	40 (10.5%)	8 (7.8%)

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

3.2 STCS patient enrolment by calendar time

Figure 1 shows the patient enrolment activity by quarter from May 2008 till December 2018.

Figure 1: Quarterly patient enrolment by donor type

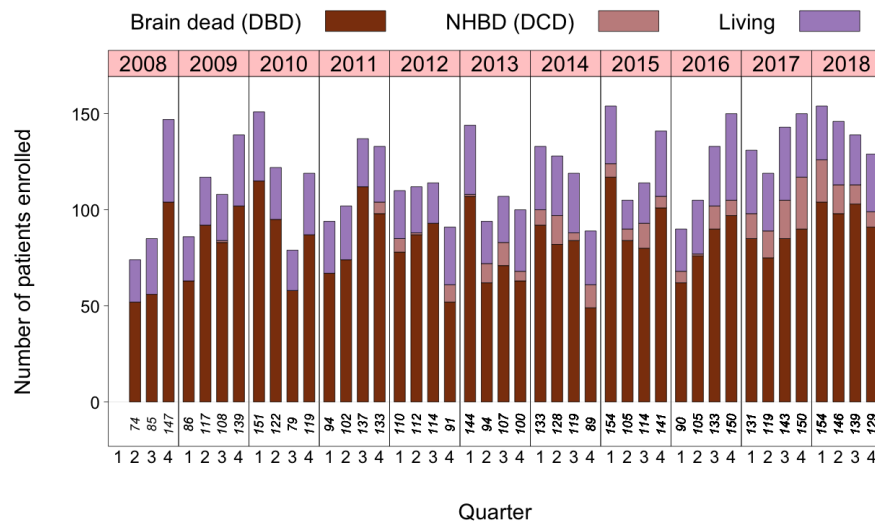


Figure 2: Cumulative patient enrolment

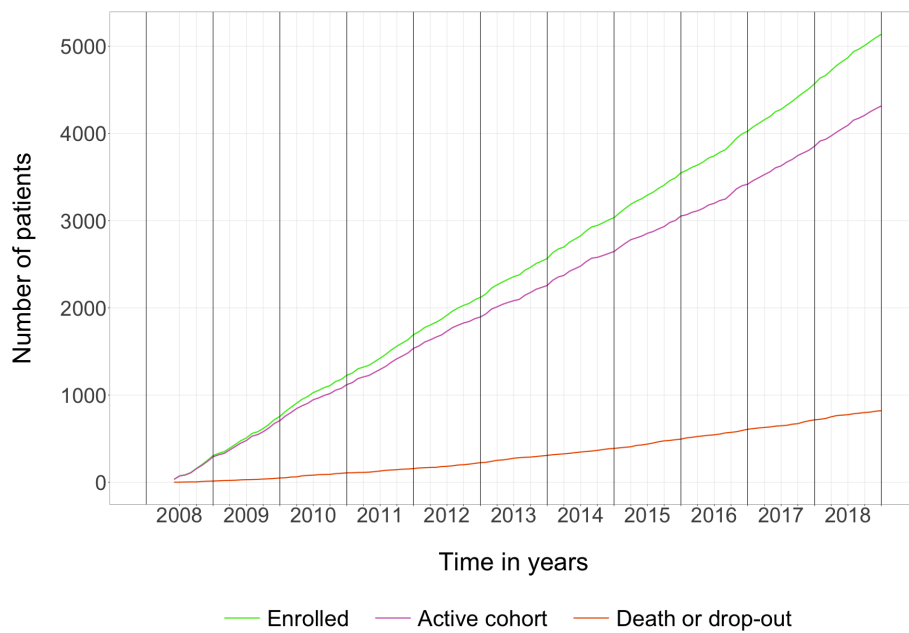
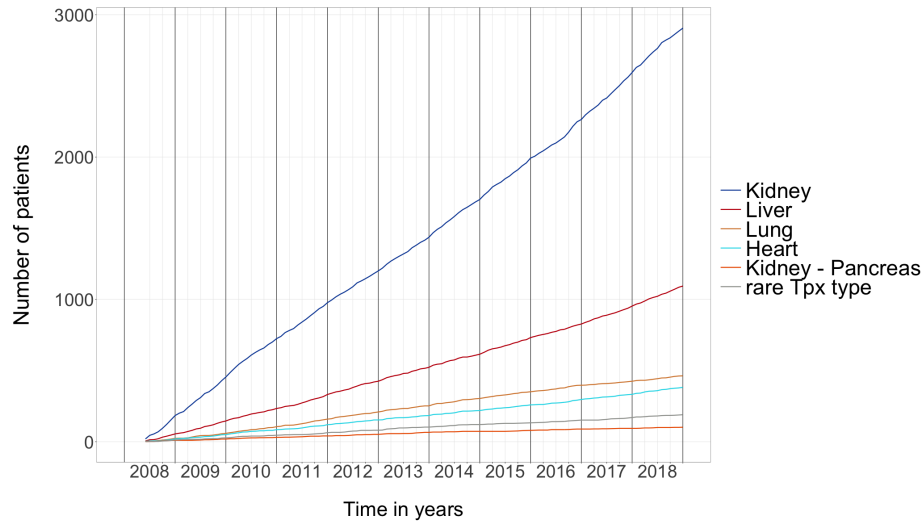
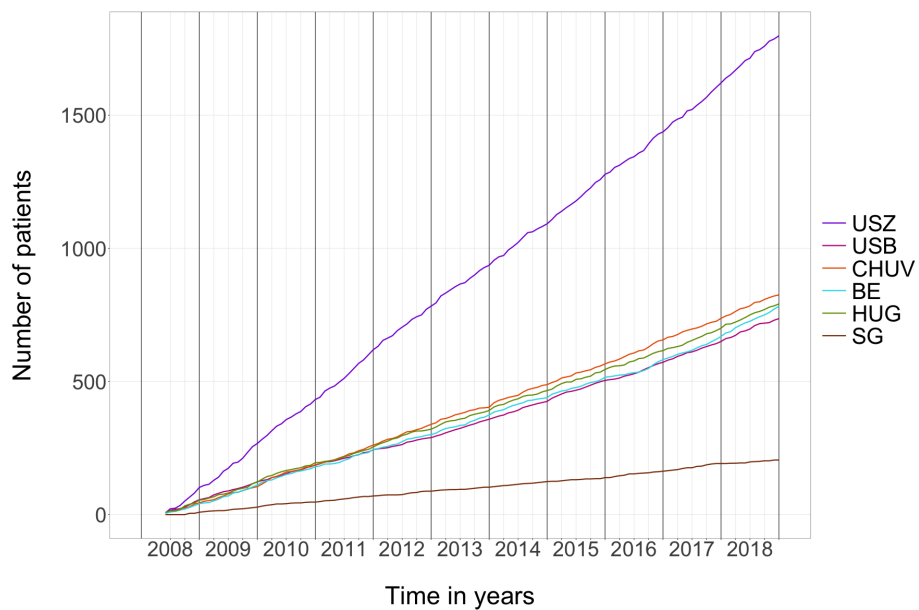


Figure 3: Cumulative patient enrolment by Tpx type



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

Figure 4: Cumulative patient enrolment by center



3.3 Transplantation activities by centre

Figure 5: Number of patients enrolled and organs transplanted

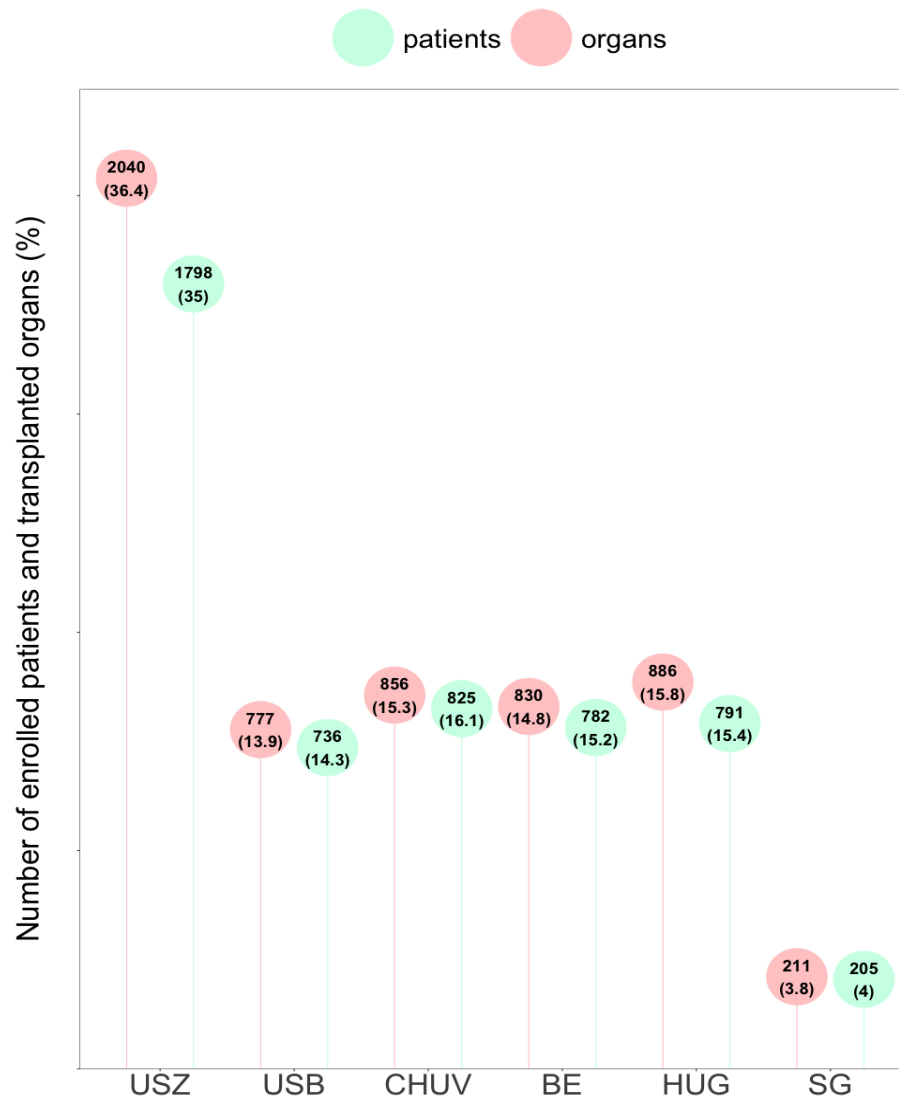
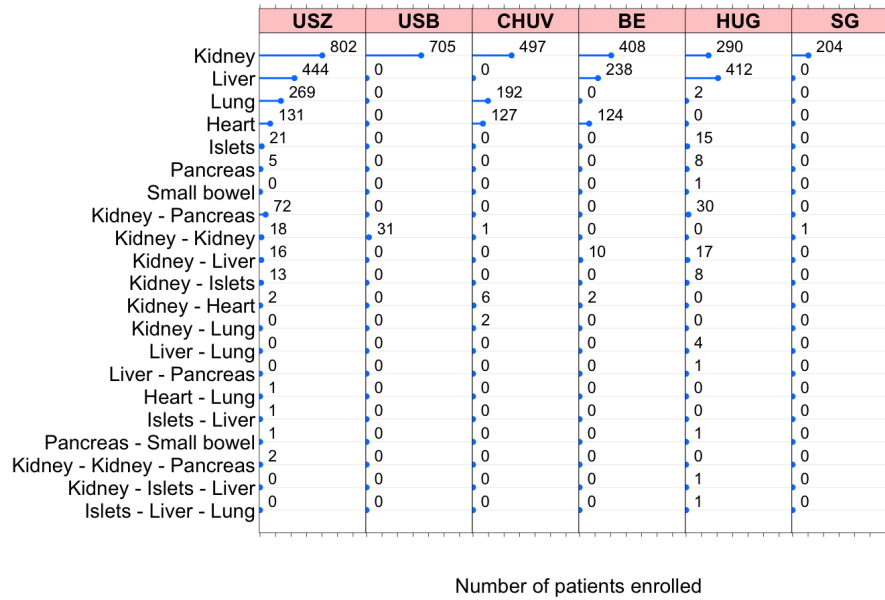
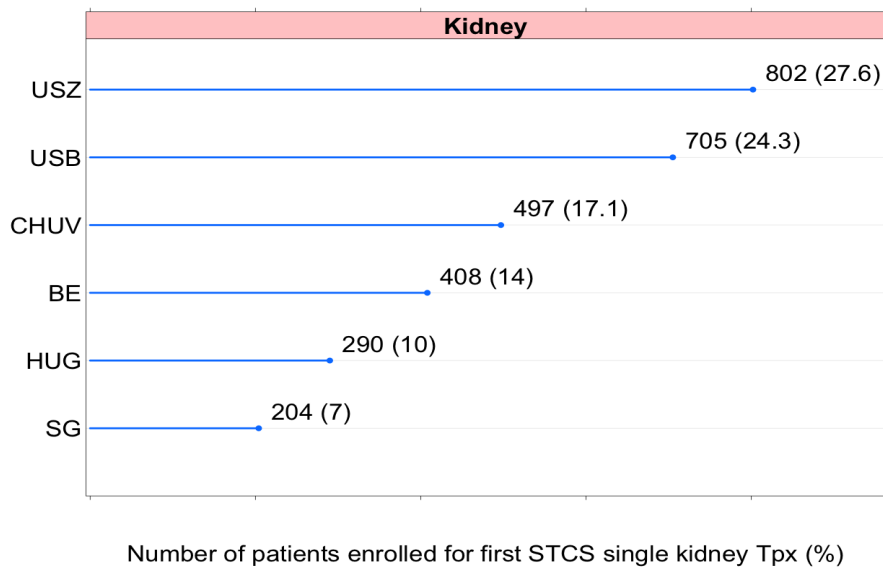


Figure 6: Number of patients enrolled by Tpx type



3.4 Kidney transplantations by centre

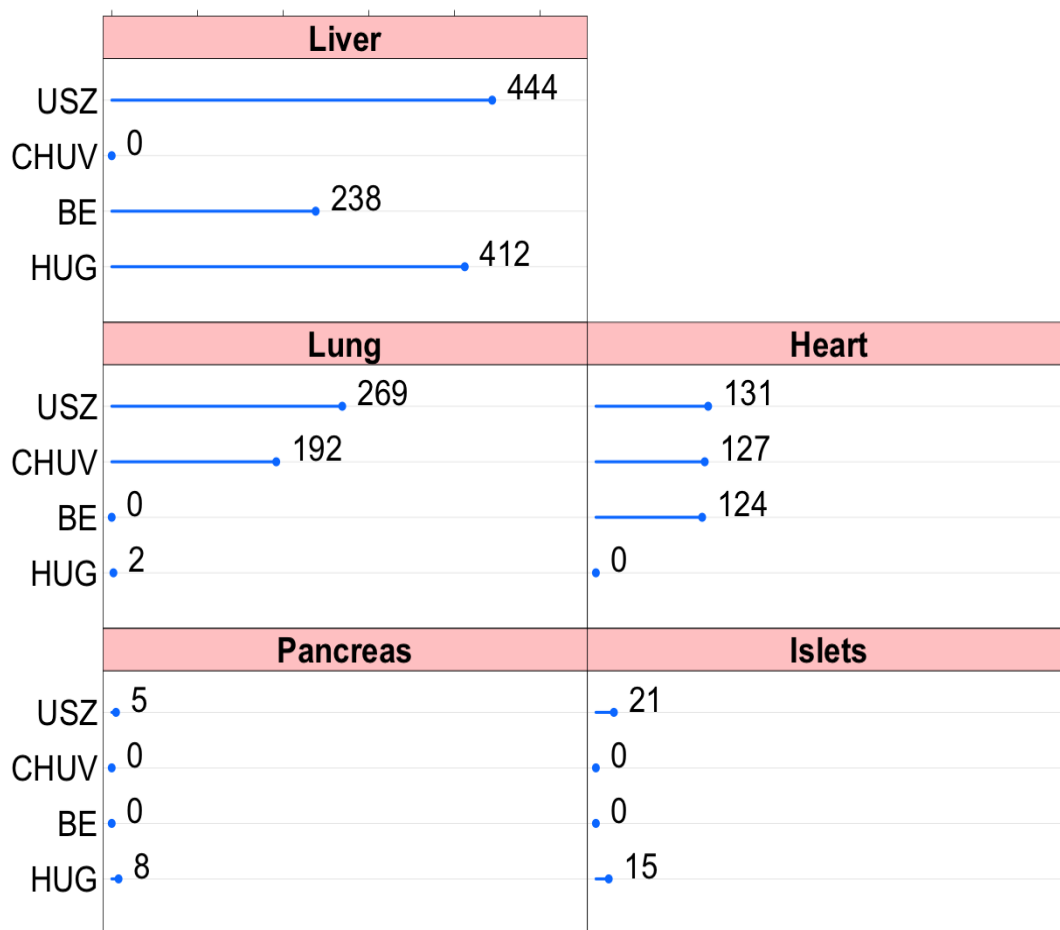
Figure 7: Number of patients with first single Kidney Tpx



3.5 Transplantations other than Kidney by centre

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

Figure 8: Number of patients with first STCS Liver, Lung, Heart, Pancreas or Islets Tpx



Number of patients enrolled for first
STCS heart, liver, lung, pancreas or islets Tpx

3.6 Single Kidney and Liver transplantation by donor type

Figures 9 and 10 show all STCS single Kidney and Liver transplantation by donor type (Donation after Brain Death (DBD), non-heart-beating donor (Donation after Cardiac Death, DCD) (NHBD), Living). Figures 11 and 12 present proportions of donor types in all single Kidney and Liver transplantation within centres.

Figure 9: Number of single Kidney Tpx

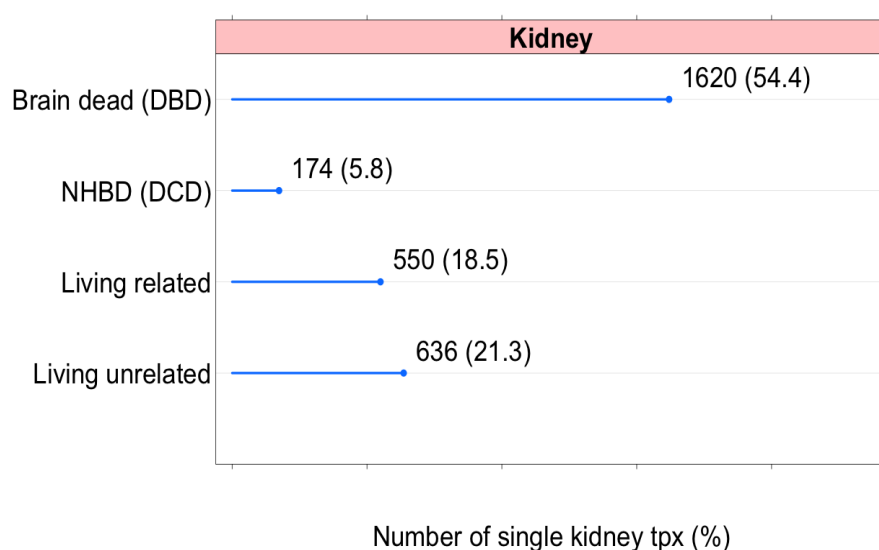


Figure 10: Number of single Liver Tpx

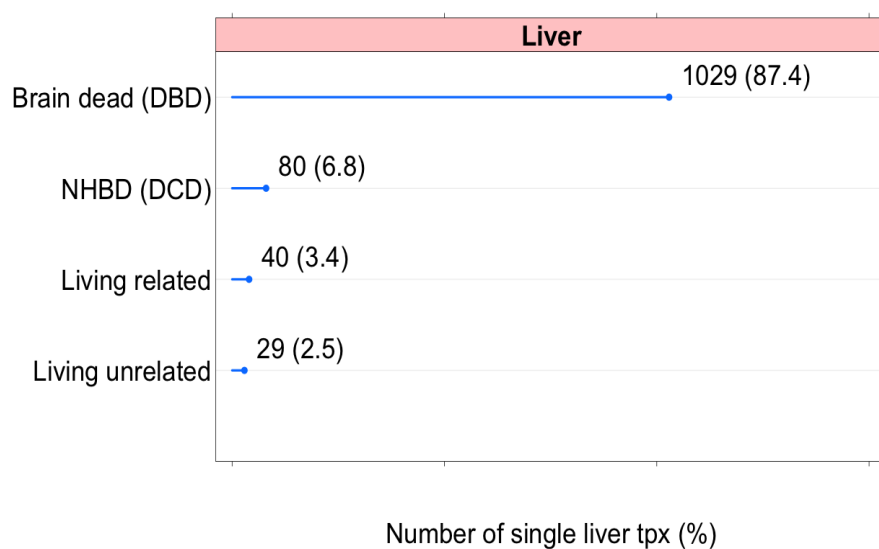


Figure 11: Distribution of donor types in all single Kidney Tpx

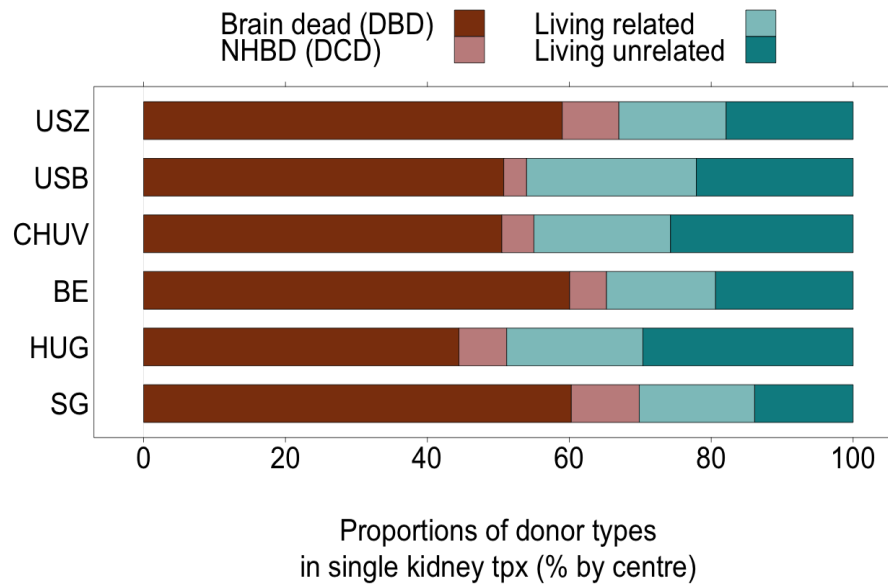
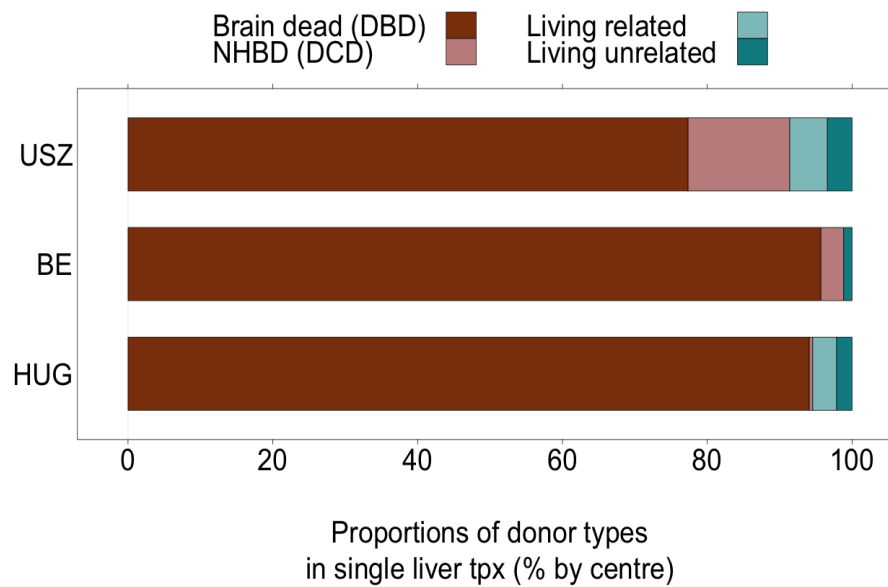


Figure 12: Distribution of donor types in all single Liver Tpx



4 Consent status

Table 6 shows patients' consent status change over time from enrolment to the current date.

Figure 13: Patients current consent status

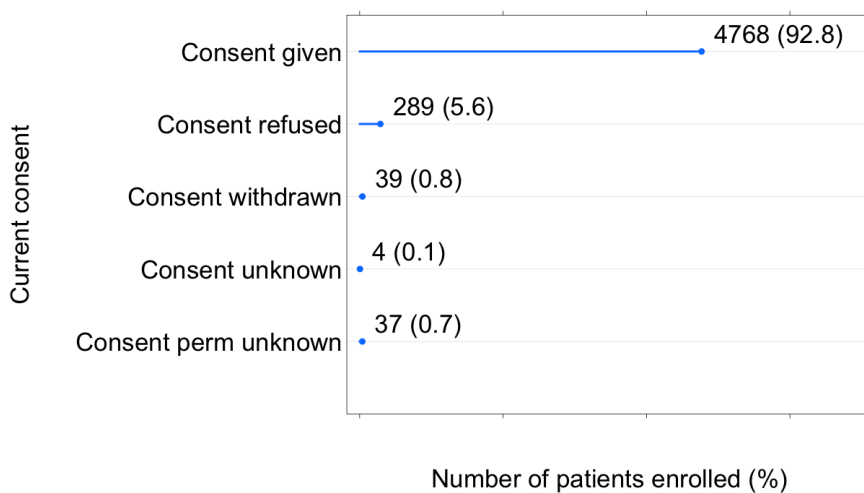


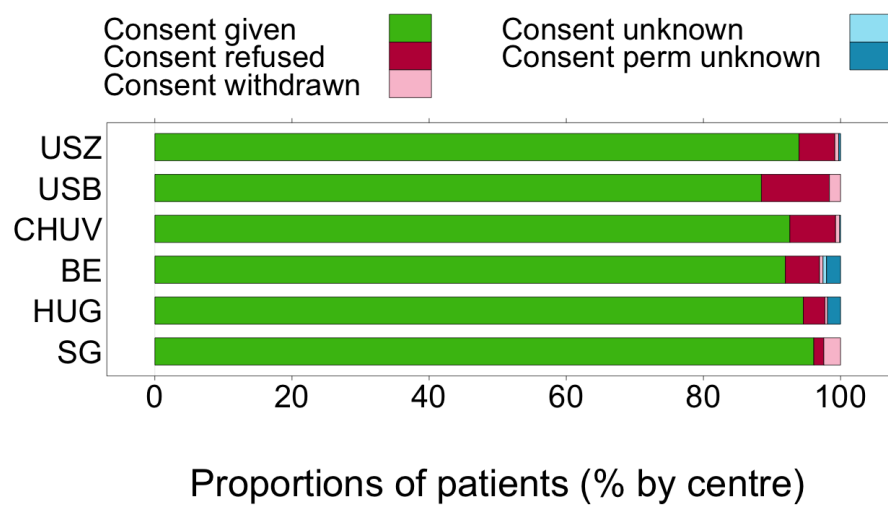
Table 6: Patients' current consent against consent status at enrolment

	Total	C-Given	C-Refused	C-Withdrawn	C-Unknown	C-Perm unknown
Total	5137	4768	289	39	4	37
E-Given	4769	4730	0	39	0	0
E-Refused	290	8	282	0	0	0
E-Withdrawn	0	0	0	0	0	0
E-Unknown	43	30	7	0	4	2
E-Perm unknown	35	0	0	0	0	35

Remark: 'C' stands for 'current consent status' and 'E' denotes the consent status at enrolment.

In Figure 14, current patients' status (i. e. last known consent status) is given proportionally within each centre.

Figure 14: Current patients' consent status by centre



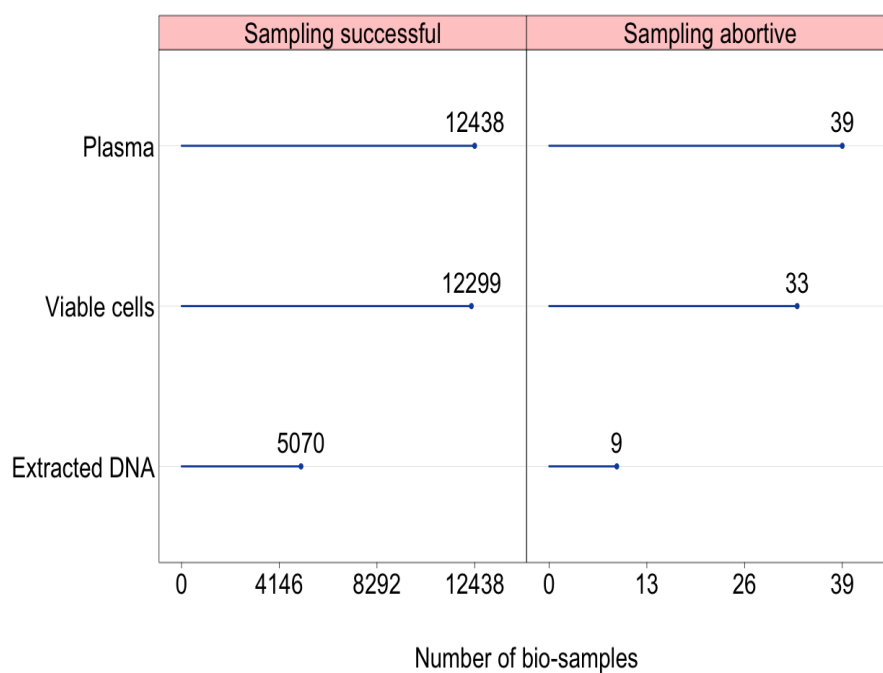
5 Bio-samples

Table 7 presents the number of patients with and without bio-samples. The consent status for patients with at least one bio-sample is at the time point of the first drawn bio-sample. Consent status at enrolment is taken for patients without any bio-samples.

Table 7: Number of patients with bio-samples

	Total	Sample (%)	No sample (%)
Total	5137	4755 92.6	382 7.4
Consent given	4787	4736 98.9	51 1.1
Consent refused	289	0 0.0	289 100.0
Consent unknown	26	12 46.2	14 53.8
Consent perm unknown	35	7 20.0	28 80.0

Figure 15: Number of bio-samples in STCS



Remark: Sampling is defined as abortive if no aliquots were stored.

Figure 16: Distribution of number of aliquots by sample type

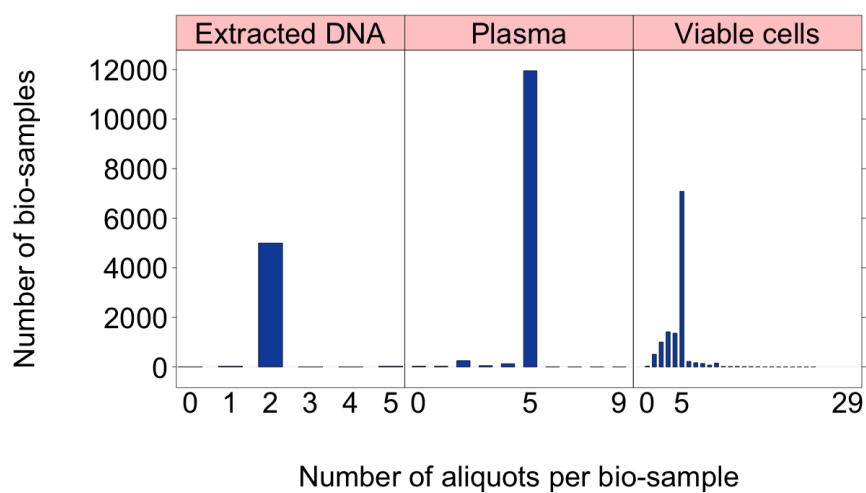


Figure 17: Number of samples by follow-up period

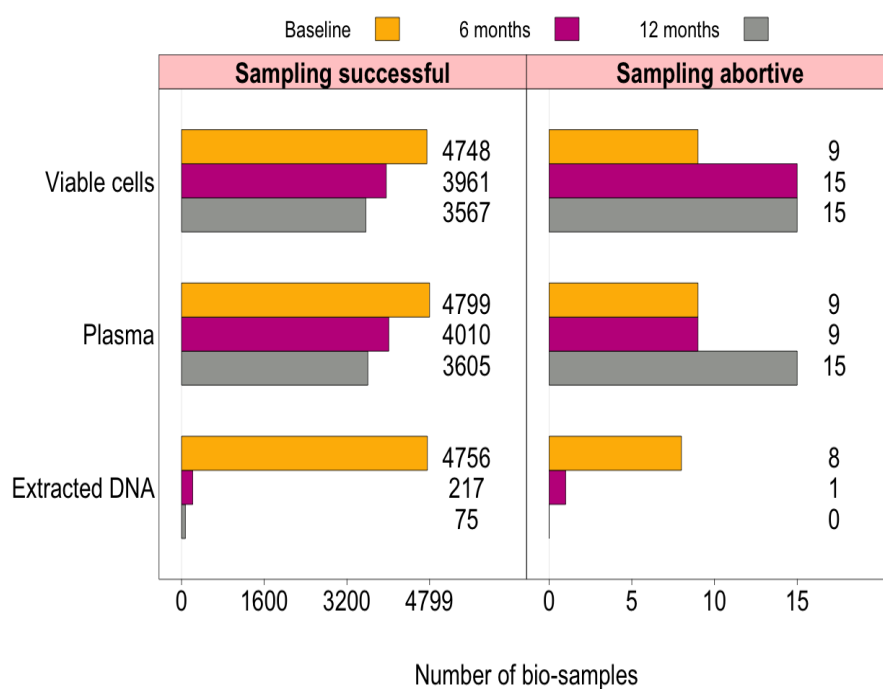
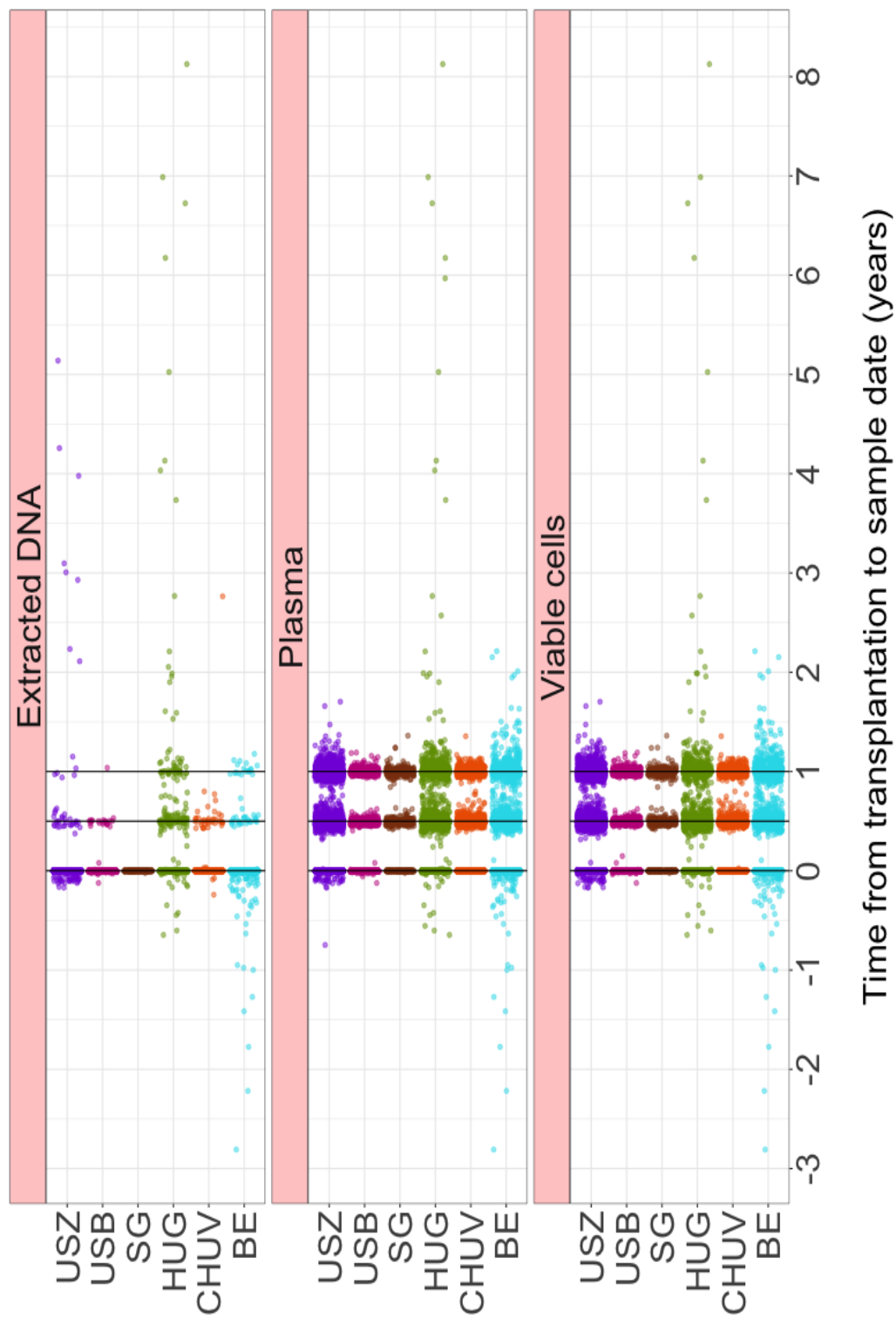


Figure 18: Distribution of sampling time



6 Infectious disease events

In Tables 8 and 9, descriptive information about patients with infectious disease (ID) events and types of ID events are given. Figure 19 gives ID event rates by transplantation and pathogen type.

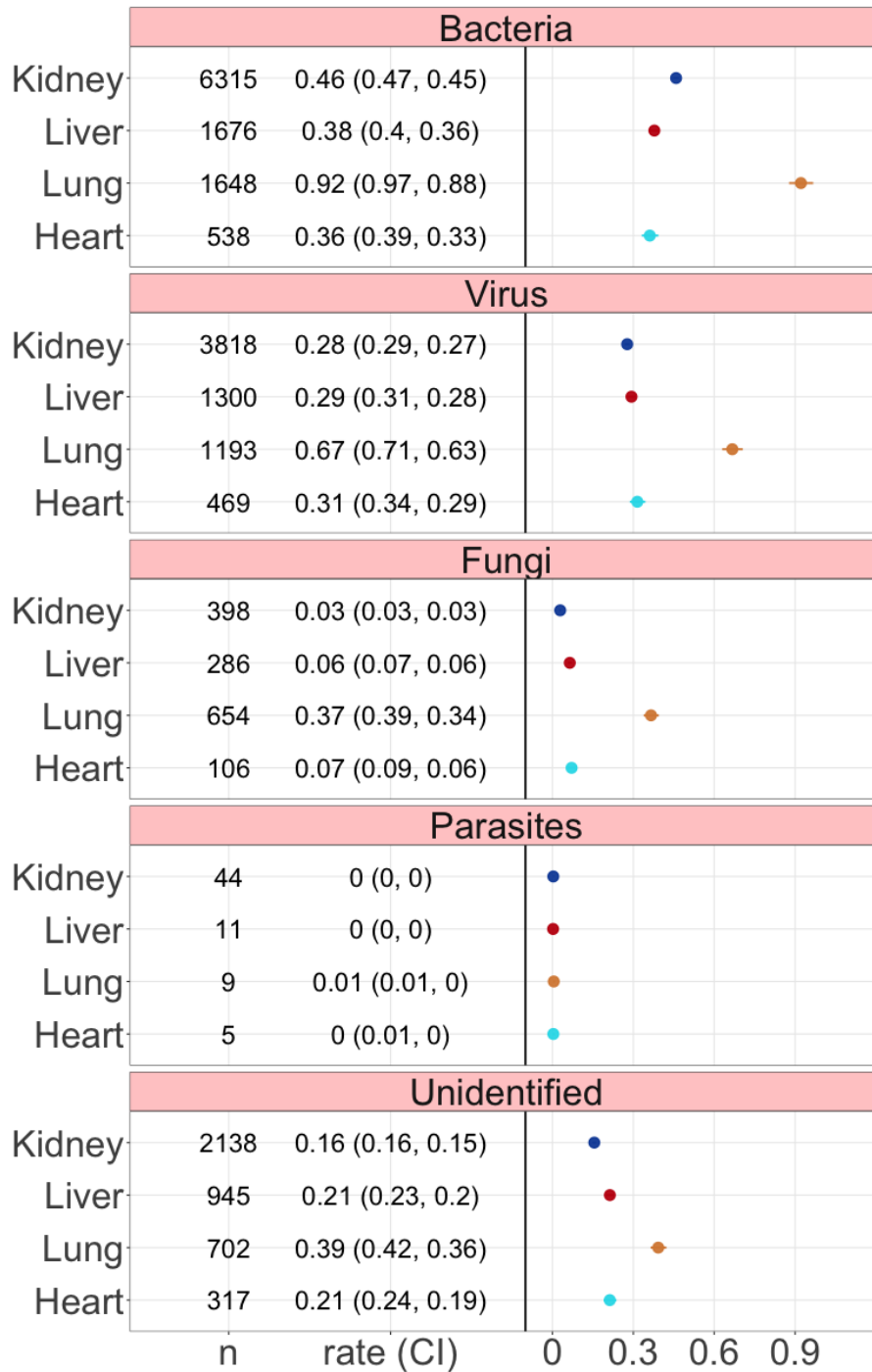
Table 8: Patients with infectious disease events

	N	% (sd)
Total number of patients	5137	
Patients with at least one ID event	3563	69.4%
- Number of ID events, mean (sd)	6.9	(6.8)
Patients with at least one proven/viral ID event	2681	52.2%
- Number of proven/viral ID events, mean (sd)	3.3	(3.3)

Table 9: Summary of infectious disease events

	N	(%)
Total number of ID events	24512	100.0
Proven disease	8677	35.4
Viral syndrome	158	0.6
Primary infection	44	0.2
Probable disease	5551	22.6
Asymptomatic	3746	15.3
Colonization	5401	22.0
Possible disease	71	0.3
Fever neutropenia	23	0.1
Information missing	841	3.4

Figure 19: Rate of infectious disease events by pathogen and Tpx type



Rate of infectious disease events

Remark: The rate of ID events is defined as the number of ID events per year of observation time. It is calculated as the number of ID events divided by the total person-years of follow up according to transplantation program. Some backlog in the reporting of ID events cannot be excluded.

7 Follow-up

Percentages in Figures 20 and 21 have to be read as proportions of transplantation for which at least the 6 month or the 12 month FUP visit was performed.

Figure 20: Number of Tpx with 6 month FUP

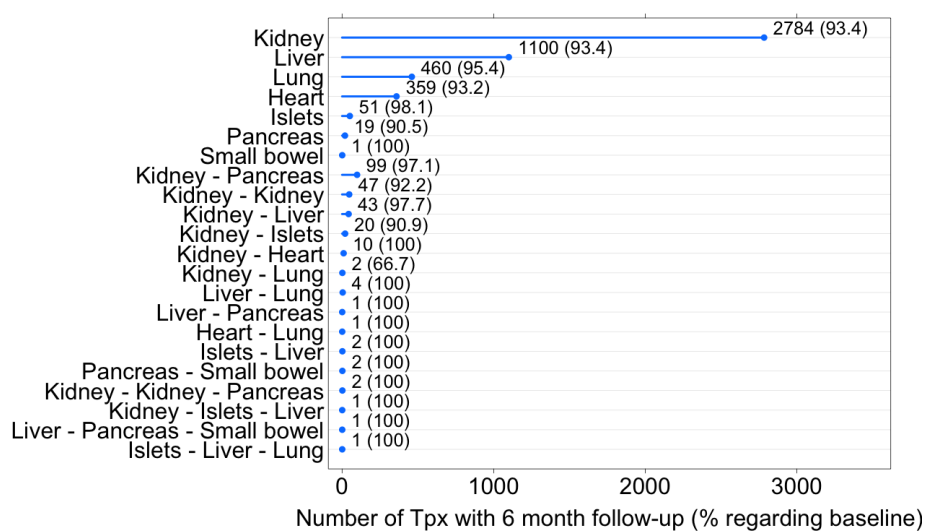
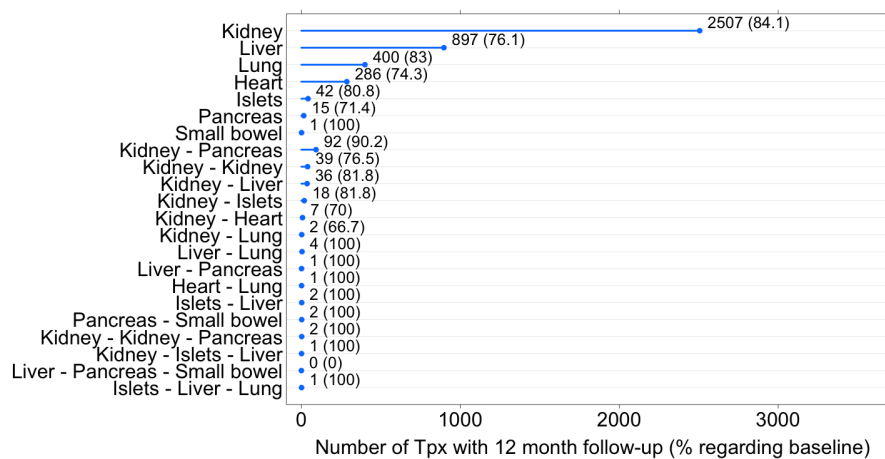


Figure 21: Number of Tpx with 12 month FUP



8 Mortality

In the following, survival probability estimates can only be descriptively interpreted since the precision is low due to the small number of patients at risk at the end of FUP. In Figure 22, the 95%-confidence interval (CI) is given. Furthermore, survival probability estimates are not adjusted for potential risk factors (in Figures and Tables).

8.1 Overall

Table 10: Follow-up information of patients

	Follow-up
Median follow-up duration (years)	4.03
IQR (years)	1.67 - 7.03
Maximum follow-up (years)*	10.66
Number of deaths	760
Patients with (at least one) graft failure	511
Patients lost to follow-up**	61

* Time period from 1 May 2008 to 31 December 2018

** More details in Table 11.

Table 11: Number of patients who dropped out by Tpx type

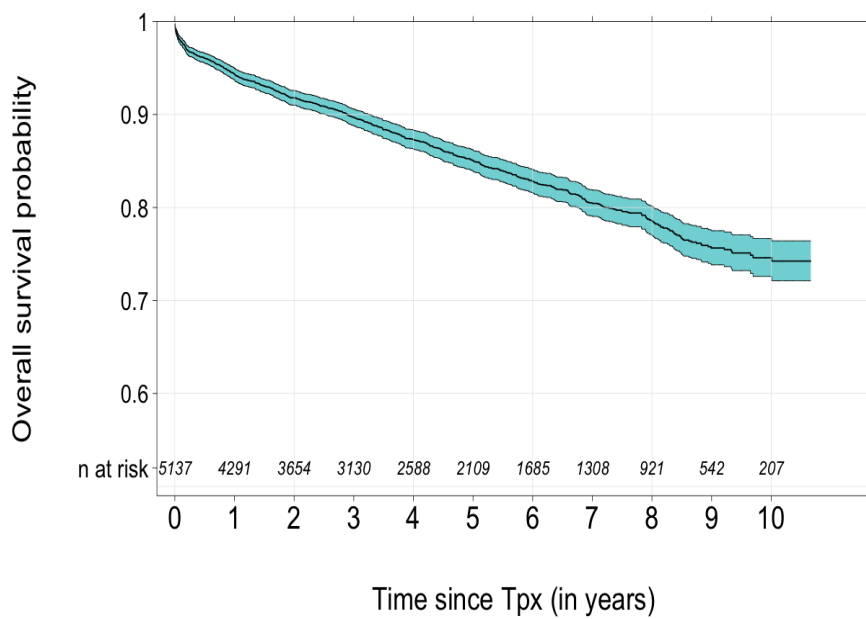
	BE	CHUV	HUG	SG	USB	USZ	Sum
Enrolled, N	782	825	791	205	736	1798	5137
Dropped out, N (%)	6 (0.8%)	8 (1%)	11 (1.4%)	0 (0%)	5 (0.7%)	31 (1.7%)	61 (1.2%)
- Heart	-	1	-	-	-	3	4
- Islets	-	-	-	-	-	2	2
- Kidney	5	5	4	-	5	14	33
- Kidney - Liver	1	-	-	-	-	-	1
- Kidney - Pancreas	-	-	1	-	-	2	3
- Liver	-	-	6	-	-	10	16
- Lung	-	2	-	-	-	-	2

Table 12: Overall mortality

Time	Mortality (%)	95% CI	No at risk	Cum. deaths
Baseline	0.0	-	5137	0
1 month	1.9	(1.6, 2.3)	4997	100
6 months	3.9	(3.4, 4.5)	4670	200
1 year	5.6	(5, 6.3)	4291	280
2 year(s)	8.2	(7.4, 9)	3654	389
4 year(s)	12.7	(11.7, 13.7)	2588	544
6 year(s)	17.2	(15.9, 18.4)	1685	657
8 year(s)	21.4	(19.8, 23)	921	725
10 year(s)	25.4	(23.3, 27.4)	207	759
Overall	25.8	(23.6, 27.9)	-	760

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 1 May 2008 to 31 December 2018).

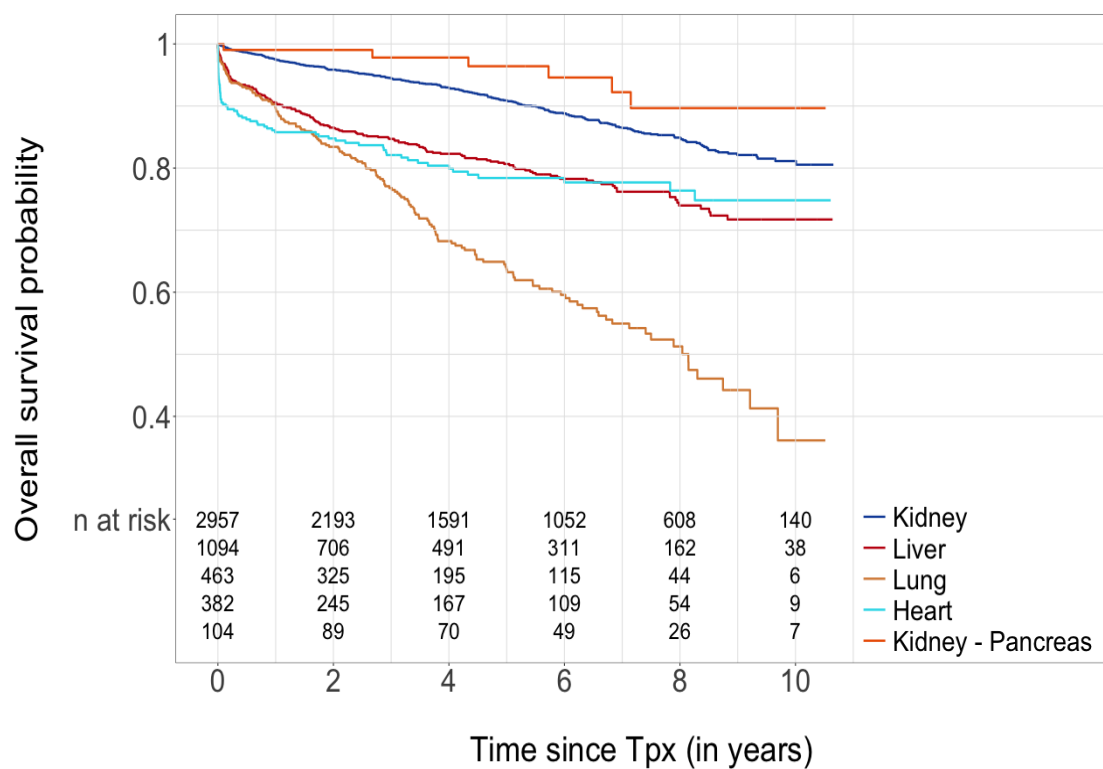
Figure 22: Overall survival



8.2 Mortality by transplantation

In the following section only frequent transplantation types are presented. In Appendix B a short summary of rare transplantation types are presented in two tables.

Figure 23: Overall survival for frequent Tpx types



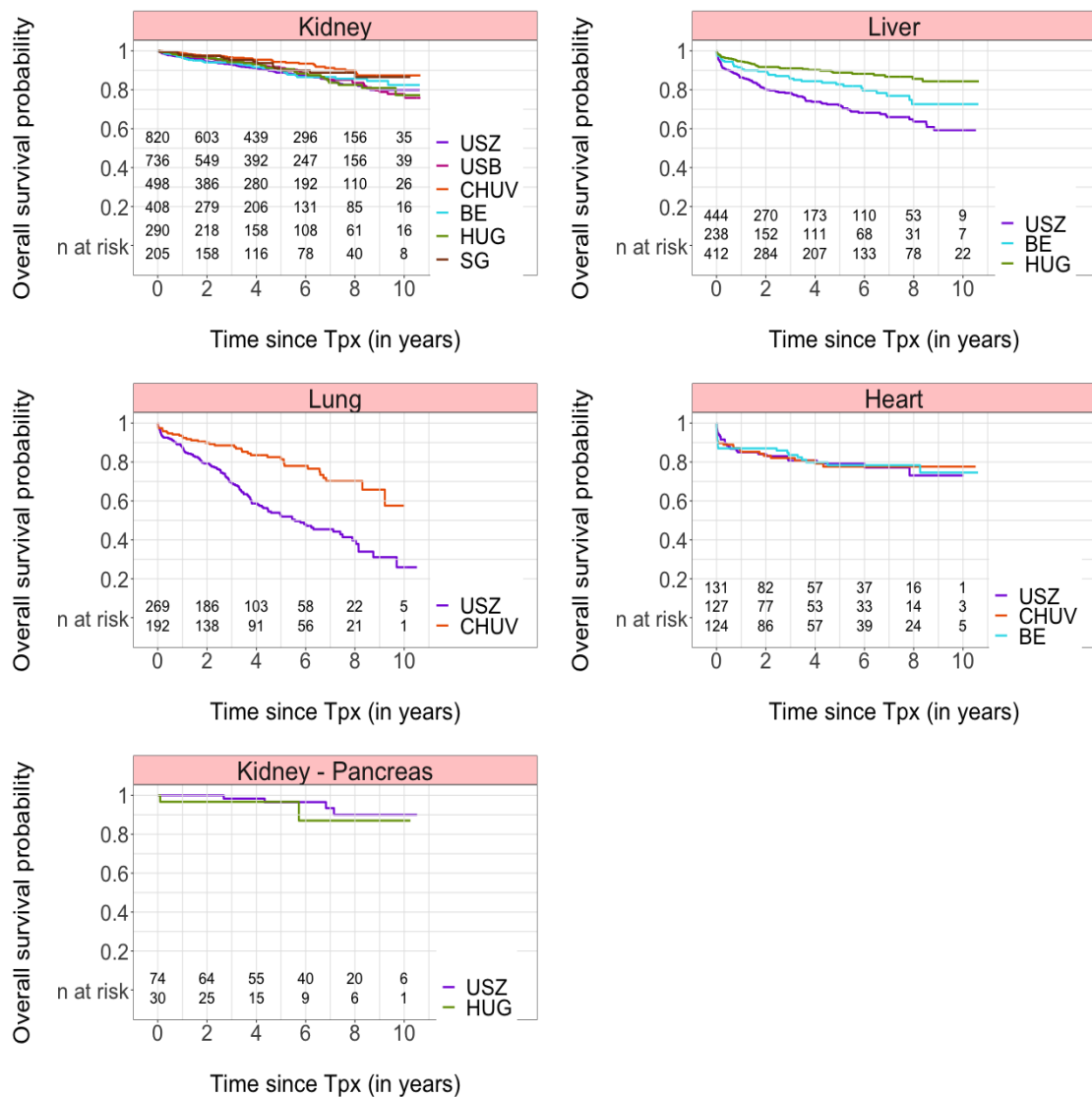
51 Kidney-Kidney Tpx are included in Kidney Tpx. 2 Kidney-Kidney-Pancreas Tpx are included in Kidney-Pancreas Tpx.

Table 13: Overall mortality by Tpx type

Tpx	Time	Mortality (%)	95% CI	No at risk	Cum. deaths
Kidney	Baseline	0.0	-	2957	0
-	1 month	0.3	(0.1, 0.5)	2923	10
-	6 months	1.3	(0.9, 1.8)	2770	39
-	1 year	2.5	(1.9, 3.1)	2564	70
-	2 year(s)	4.2	(3.4, 4.9)	2193	111
-	4 year(s)	7.1	(6, 8.1)	1591	169
-	6 year(s)	11.2	(9.8, 12.6)	1052	229
-	8 year(s)	15.1	(13.2, 16.9)	608	267
-	10 year(s)	18.9	(16.4, 21.3)	140	287
-	Overall	19.4	(16.7, 22.1)	-	288
Liver	Baseline	0.0	-	1094	0
-	1 month	3.1	(2.1, 4.1)	1051	34
-	6 months	6.8	(5.3, 8.3)	953	73
-	1 year	9.4	(7.6, 11.2)	861	99
-	2 year(s)	13.5	(11.3, 15.6)	706	135
-	4 year(s)	17.7	(15.2, 20.2)	491	165
-	6 year(s)	21.7	(18.7, 24.6)	311	185
-	8 year(s)	26.0	(22.2, 29.6)	162	197
-	10 year(s)	28.3	(24, 32.3)	38	201
-	Overall	28.3	(24, 32.3)	-	201
Lung	Baseline	0.0	-	463	0
-	1 month	3.2	(1.6, 4.8)	447	15
-	6 months	7.2	(4.8, 9.5)	411	33
-	1 year	10.4	(7.6, 13.2)	377	47
-	2 year(s)	16.6	(13, 20)	325	72
-	4 year(s)	31.8	(26.8, 36.4)	195	123
-	6 year(s)	40.4	(34.7, 45.6)	115	144
-	8 year(s)	48.7	(41.8, 54.9)	44	156
-	10 year(s)	63.9	(48.9, 74.5)	6	163
-	Overall	63.9	(48.9, 74.5)	-	163
Heart	Baseline	0.0	-	382	0
-	1 month	9.4	(6.5, 12.3)	342	36
-	6 months	12.2	(8.8, 15.4)	312	46
-	1 year	14.2	(10.6, 17.7)	280	53
-	2 year(s)	15.2	(11.5, 18.8)	245	56
-	4 year(s)	20.1	(15.6, 24.4)	167	68
-	6 year(s)	22.3	(17.4, 27)	109	72
-	8 year(s)	23.6	(18.1, 28.8)	54	73
-	10 year(s)	25.2	(18.9, 31)	9	74
-	Overall	25.2	(18.9, 31)	-	74
Kidney - Pancreas	Baseline	0.0	-	104	0
-	1 month	0.0	-	103	0
-	6 months	1.0	(0, 2.8)	101	1
-	1 year	1.0	(0, 2.8)	95	1
-	2 year(s)	1.0	(0, 2.8)	89	1
-	4 year(s)	2.2	(0, 5.2)	70	2
-	6 year(s)	5.4	(0, 10.6)	49	4
-	8 year(s)	10.3	(1.6, 18.3)	26	6
-	10 year(s)	10.3	(1.6, 18.3)	7	6
-	Overall	10.3	(1.6, 18.3)	-	6

8.3 Mortality by Tpx and centre

Figure 24: Overall survival for frequent Tpx



51 Kidney-Kidney Tpx (USZ-18, USB-31, CHUV-1, SG-1) are included in Kidney Tpx. 2 Kidney-Kidney-Pancreas Tpx (USZ-2) are included in Kidney-Pancreas Tpx. 2 Lung tpx in HUG are not included in this graph.

Table 14: Overall mortality by frequent Tpx type and centre

Tpx - centre	Time	Mortality (%)	95% CI	No at risk	Cum. deaths
Kidney - USZ	Baseline	0.0	-	820	0
-	1 month	0.4	(0, 0.8)	808	3
-	6 months	2.2	(1.2, 3.3)	757	18
-	1 year	3.3	(2, 4.5)	705	26
-	2 year(s)	5.4	(3.7, 7)	603	40
-	4 year(s)	9.0	(6.7, 11.1)	439	60
-	6 year(s)	13.0	(10.1, 15.8)	296	77
-	8 year(s)	17.4	(13.7, 21)	156	89
-	10 year(s)	20.1	(15.6, 24.3)	35	93
-	Overall	20.1	(15.6, 24.3)	-	93
Kidney - USB	Baseline	0.0	-	736	0
-	1 month	0.4	(0, 0.9)	727	3
-	6 months	1.4	(0.5, 2.2)	688	10
-	1 year	2.3	(1.2, 3.4)	635	16
-	2 year(s)	3.7	(2.3, 5.2)	549	25
-	4 year(s)	6.5	(4.5, 8.5)	392	39
-	6 year(s)	11.4	(8.4, 14.3)	247	56
-	8 year(s)	16.4	(12.4, 20.3)	156	68
-	10 year(s)	22.1	(16.6, 27.4)	39	76
-	Overall	24.1	(17.3, 30.4)	-	77
Kidney - CHUV	Baseline	0.0	-	498	0
-	1 month	0.2	(0, 0.6)	494	1
-	6 months	0.4	(0, 1)	480	2
-	1 year	1.1	(0.1, 2)	448	5
-	2 year(s)	2.4	(1, 3.9)	386	11
-	4 year(s)	4.5	(2.4, 6.6)	280	18
-	6 year(s)	6.6	(3.8, 9.2)	192	23
-	8 year(s)	10.1	(6.2, 13.9)	110	29
-	10 year(s)	12.6	(7.8, 17.1)	26	32
-	Overall	12.6	(7.8, 17.1)	-	32
Kidney - BE	Baseline	0.0	-	408	0
-	1 month	0.2	(0, 0.7)	401	1
-	6 months	1.5	(0.3, 2.7)	371	6
-	1 year	3.5	(1.6, 5.3)	335	13
-	2 year(s)	5.9	(3.4, 8.4)	279	21
-	4 year(s)	8.4	(5.3, 11.5)	206	27
-	6 year(s)	13.4	(9, 17.7)	131	36
-	8 year(s)	14.3	(9.6, 18.8)	85	37
-	10 year(s)	17.5	(10.9, 23.7)	16	39
-	Overall	17.5	(10.9, 23.7)	-	39
Kidney - HUG	Baseline	0.0	-	290	0
-	1 month	0.3	(0, 1)	289	1
-	6 months	0.7	(0, 1.6)	277	2
-	1 year	2.1	(0.4, 3.8)	253	6
-	2 year(s)	3.4	(1.2, 5.5)	218	9
-	4 year(s)	6.9	(3.5, 10.1)	158	16
-	6 year(s)	11.7	(6.8, 16.2)	108	23
-	8 year(s)	17.5	(10.9, 23.6)	61	29
-	10 year(s)	22.8	(12.5, 31.8)	16	31
-	Overall	22.8	(12.5, 31.8)	-	31
Kidney - SG	Baseline	0.0	-	205	0

Tpx - centre	Time	Mortality (%)	95% CI	No at risk	Cum. deaths
-	1 month	0.5	(0, 1.4)	204	1
-	6 months	0.5	(0, 1.4)	197	1
-	1 year	2.0	(0, 4)	188	4
-	2 year(s)	2.6	(0.3, 4.8)	158	5
-	4 year(s)	5.5	(1.9, 8.9)	116	9
-	6 year(s)	10.0	(4.7, 15.1)	78	14
-	8 year(s)	11.2	(5.4, 16.6)	40	15
-	10 year(s)	13.4	(6.2, 20.1)	8	16
-	Overall	13.4	(6.2, 20.1)	-	16
Liver - USZ	Baseline	0.0	-	444	0
-	1 month	4.5	(2.6, 6.4)	423	20
-	6 months	10.0	(7.1, 12.8)	379	44
-	1 year	13.7	(10.4, 16.9)	341	59
-	2 year(s)	19.8	(15.8, 23.6)	270	81
-	4 year(s)	26.2	(21.5, 30.6)	173	99
-	6 year(s)	31.8	(26.3, 36.9)	110	110
-	8 year(s)	36.4	(29.7, 42.4)	53	115
-	10 year(s)	40.7	(32.6, 47.8)	9	118
-	Overall	40.7	(32.6, 47.8)	-	118
Liver - BE	Baseline	0.0	-	238	0
-	1 month	2.5	(0.5, 4.5)	230	6
-	6 months	5.6	(2.6, 8.5)	205	13
-	1 year	8.4	(4.7, 12)	181	19
-	2 year(s)	10.6	(6.4, 14.6)	152	23
-	4 year(s)	15.6	(10.3, 20.6)	111	31
-	6 year(s)	20.4	(13.7, 26.5)	68	36
-	8 year(s)	27.4	(17.9, 35.8)	31	40
-	10 year(s)	27.4	(17.9, 35.8)	7	40
-	Overall	27.4	(17.9, 35.8)	-	40
Liver - HUG	Baseline	0.0	-	412	0
-	1 month	1.9	(0.6, 3.3)	398	8
-	6 months	4.0	(2, 5.9)	369	16
-	1 year	5.3	(3.1, 7.5)	339	21
-	2 year(s)	8.3	(5.4, 11)	284	31
-	4 year(s)	9.8	(6.6, 12.8)	207	35
-	6 year(s)	11.8	(8.1, 15.3)	133	39
-	8 year(s)	14.4	(9.7, 18.8)	78	42
-	10 year(s)	15.7	(10.3, 20.7)	22	43
-	Overall	15.7	(10.3, 20.7)	-	43
Lung - USZ	Baseline	0.0	-	269	0
-	1 month	3.4	(1.2, 5.5)	259	9
-	6 months	8.2	(4.9, 11.4)	241	22
-	1 year	12.5	(8.4, 16.4)	220	33
-	2 year(s)	20.7	(15.6, 25.5)	186	53
-	4 year(s)	41.3	(34.5, 47.5)	103	96
-	6 year(s)	52.0	(44.2, 58.6)	58	112
-	8 year(s)	60.3	(51, 67.8)	22	119
-	10 year(s)	74.1	(58, 84)	5	124
-	Overall	74.1	(58, 84)	-	124
Lung - CHUV	Baseline	0.0	-	192	0
-	1 month	2.6	(0.3, 4.8)	187	5
-	6 months	5.3	(2, 8.4)	169	10
-	1 year	7.0	(3.3, 10.6)	156	13

Tpx - centre	Time	Mortality (%)	95% CI	No at risk	Cum. deaths
-	2 year(s)	10.1	(5.6, 14.5)	138	18
-	4 year(s)	16.5	(10.3, 22.2)	91	26
-	6 year(s)	22.0	(14.4, 29)	56	31
-	8 year(s)	29.8	(20, 38.4)	21	36
-	10 year(s)	42.4	(20.8, 58.2)	1	38
-	Overall	42.4	(20.8, 58.2)	-	38
Lung - HUG	Baseline	0.0	-	2	0
-	1 month	50.0	(0, 87.5)	1	1
-	6 months	50.0	(0, 87.5)	1	1
-	1 year	50.0	(0, 87.5)	1	1
-	2 year(s)	50.0	(0, 87.5)	1	1
-	4 year(s)	50.0	(0, 87.5)	1	1
-	6 year(s)	50.0	(0, 87.5)	1	1
-	8 year(s)	50.0	(0, 87.5)	1	1
-	10 year(s)	50.0	(0, 87.5)	-	1
-	Overall	50.0	(0, 87.5)	-	1
Heart - USZ	Baseline	0.0	-	131	0
-	1 month	5.3	(1.4, 9.1)	123	7
-	6 months	12.4	(6.5, 17.9)	106	16
-	1 year	15.0	(8.5, 21)	96	19
-	2 year(s)	16.0	(9.3, 22.2)	82	20
-	4 year(s)	19.3	(11.8, 26.2)	57	23
-	6 year(s)	22.8	(13.9, 30.8)	37	25
-	8 year(s)	26.9	(14.9, 37.2)	16	26
-	10 year(s)	26.9	(14.9, 37.2)	1	26
-	Overall	26.9	(14.9, 37.2)	-	26
Heart - CHUV	Baseline	0.0	-	127	0
-	1 month	10.2	(4.8, 15.4)	113	13
-	6 months	11.1	(5.4, 16.4)	103	14
-	1 year	14.8	(8.2, 20.9)	88	18
-	2 year(s)	16.8	(9.7, 23.3)	77	20
-	4 year(s)	20.8	(12.6, 28.3)	53	23
-	6 year(s)	22.4	(13.7, 30.2)	33	24
-	8 year(s)	22.4	(13.7, 30.2)	14	24
-	10 year(s)	22.4	(13.7, 30.2)	3	24
-	Overall	22.4	(13.7, 30.2)	-	24
Heart - BE	Baseline	0.0	-	124	0
-	1 month	13.0	(6.9, 18.8)	106	16
-	6 months	13.0	(6.9, 18.8)	103	16
-	1 year	13.0	(6.9, 18.8)	96	16
-	2 year(s)	13.0	(6.9, 18.8)	86	16
-	4 year(s)	20.2	(12, 27.6)	57	22
-	6 year(s)	21.7	(13.1, 29.4)	39	23
-	8 year(s)	21.7	(13.1, 29.4)	24	23
-	10 year(s)	25.4	(14.1, 35.2)	5	24
-	Overall	25.4	(14.1, 35.2)	-	24
Kidney - Pancreas - USZ	Baseline	0.0	-	74	0
-	1 month	0.0	-	73	0
-	6 months	0.0	-	72	0
-	1 year	0.0	-	69	0
-	2 year(s)	0.0	-	64	0
-	4 year(s)	1.7	(0, 4.9)	55	1
-	6 year(s)	3.5	(0, 8.1)	40	2

Tpx - centre	Time	Mortality (%)	95% CI	No at risk	Cum. deaths
-	8 year(s)	9.9	(0, 19.1)	20	4
-	10 year(s)	9.9	(0, 19.1)	6	4
-	Overall	9.9	(0, 19.1)	-	4
Kidney - Pancreas - HUG	Baseline	0.0	-	30	0
-	1 month	0.0	-	30	0
-	6 months	3.3	(0, 9.5)	29	1
-	1 year	3.3	(0, 9.5)	26	1
-	2 year(s)	3.3	(0, 9.5)	25	1
-	4 year(s)	3.3	(0, 9.5)	15	1
-	6 year(s)	13.0	(0, 30)	9	2
-	8 year(s)	13.0	(0, 30)	6	2
-	10 year(s)	13.0	(0, 30)	1	2
-	Overall	13.0	(0, 30)	-	2

8.4 Mortality in first single Kidney transplantation

Overall survival for patients with single Kidney transplantation as first STCS transplantation is presented separated by the donor type. In Figure 26, category 'Living' is separated in 'Living, ABO c' and 'Living, not ABO c'. The letter 'c' stands for 'compatible'.

Figure 25: Overall survival for patients with first STCS single Kidney Tpx by donor type

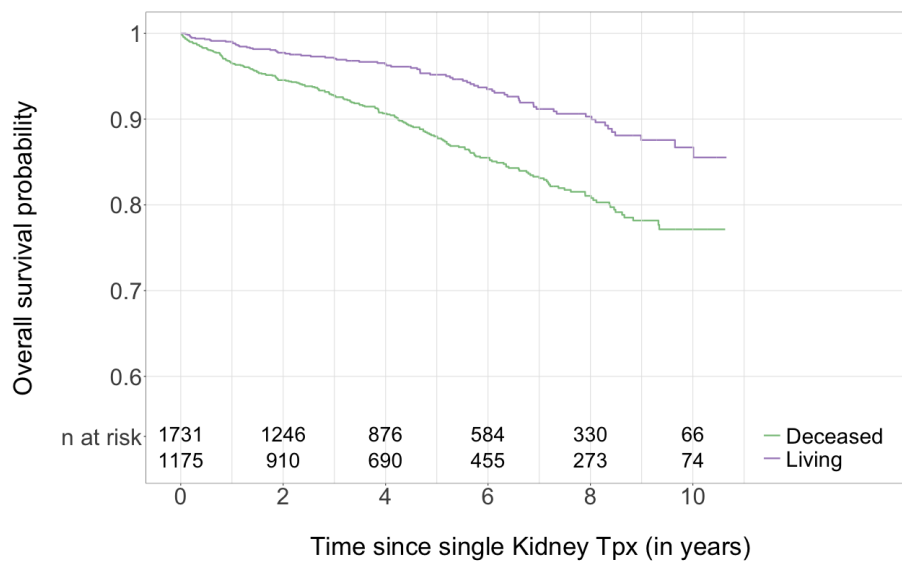


Figure 26: Overall survival for patients with first STCS single Kidney Tpx by donor type stratified by ABO compatibility

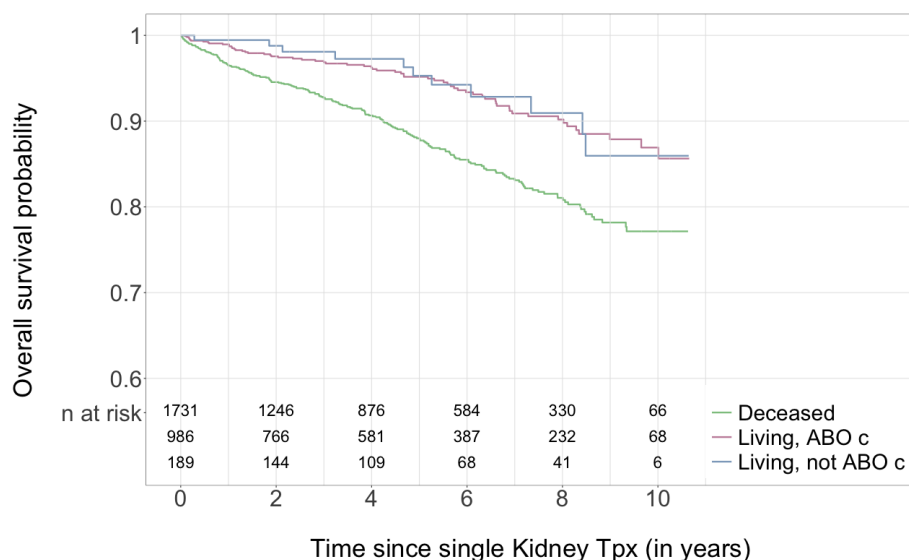


Table 15: Overall mortality in (single) kidney recipients by donor type

Donor type	Time	Mortality (%)	95% CI	No at risk	Cum. deaths
Deceased	Baseline	0.0	-	1731	0
-	1 month	0.5	(0.2, 0.9)	1709	9
-	6 months	1.7	(1.1, 2.3)	1612	29
-	1 year	3.5	(2.6, 4.4)	1473	57
-	2 year(s)	5.5	(4.3, 6.6)	1246	85
-	4 year(s)	9.3	(7.8, 10.9)	876	129
-	6 year(s)	14.5	(12.4, 16.6)	584	172
-	8 year(s)	18.9	(16.3, 21.5)	330	197
-	10 year(s)	22.9	(19.4, 26.1)	66	209
-	Overall	22.9	(19.4, 26.1)	-	209
Living	Baseline	0.0	-	1175	0
-	1 month	0.0	-	1165	0
-	6 months	0.7	(0.2, 1.2)	1113	8
-	1 year	1.0	(0.4, 1.5)	1050	11
-	2 year(s)	2.2	(1.4, 3.1)	910	24
-	4 year(s)	3.6	(2.4, 4.8)	690	35
-	6 year(s)	6.5	(4.7, 8.3)	455	52
-	8 year(s)	9.7	(7.2, 12.1)	273	65
-	10 year(s)	13.3	(9.7, 16.7)	74	73
-	Overall	14.5	(10.2, 18.5)	-	74

9 Graft failure and primary non-function

Failure and primary non-function in an allograft are considered as one, no distinction is therefore made in this section.

9.1 Graft failure

Graft failures (incl. grafts with primary non-function) are counted on organ-level (Tables 17 and 18). Table 16 gives a summary of numbers of graft failures on patient- and organ-level. In addition to, numbers of organs with primary non-function are given separately in Table 19.

Table 16: Summary for graft failures

	N	(%)
Graft failure - total	570	100.0
- in single Tpx	517	90.7
- in double Tpx	50	8.8
- in triple Tpx	3	0.5
Patients with at least one graft failure	515	
Patients with graft failure or death	1015	100.0
- graft failure and alive at end of follow-up	255	25.1
- graft failure followed by late death	150	14.8
- graft failure related death (at same day)	106	10.4
- death without any graft failure	504	49.7

Table 17: Graft failures in double Tpx

	Total	Kidney	Heart	Liver	Lung	Pancreas	Islets	Small bowel
Total	50	17	2	4	1	19	5	2
Kidney - Heart	1	0	1	0	0	0	0	0
Kidney - Islets	7	2	0	0	0	0	5	0
Kidney - Kidney	6	6	0	0	0	0	0	0
Kidney - Liver	7	3	0	4	0	0	0	0
Kidney - Lung	1	1	0	0	0	0	0	0
Kidney - Pancreas	22	5	0	0	0	17	0	0
Heart - Lung	2	0	1	0	1	0	0	0
Pancreas - Small bowel	4	0	0	0	0	2	0	2

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

Table 18: Graft failure and related patients' death

	Total	All GF*	(%)	GF, late death	(%)	GF related death	(%)
Total	5600	570	10.2	176	30.9	120	21.1
Kidney	3269	263	8	73	27.8	8	3
Liver	1232	139	11.3	52	37.4	35	25.2
Lung	491	84	17.1	23	27.4	54	64.3
Heart	396	35	8.8	10	28.6	23	65.7
Pancreas	130	24	18.5	7	29.2	0	0
Islets	78	21	26.9	7	33.3	0	0
Small bowel	4	4	100	4	100	0	0

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

Table 19: Number of organs with primary non-function

	Total	USZ	USB	CHUV	BE	HUG	SG
Total	80	34	5	6	18	16	1
Kidney	31	12	5	2	2	9	1
Liver	35	16	0	0	12	7	0
Lung	2	2	0	0	0	0	0
Heart	10	3	0	3	4	0	0
Pancreas	1	0	0	1	0	0	0
Islets	1	1	0	0	0	0	0
Small bowel	0	0	0	0	0	0	0

9.2 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. In Figure 27 and 28, both single Kidney and double Kidney transplantations are included as mentioned previously. Also the Kidney-Kidney-Pancreas transplantation (USZ) are included in Kidney-Pancreas transplantation. In contrast, Figure 29 shows graft failure free survival only for patients with first STCS single Kidney transplantation.

Figure 27: Graft failure free survival by major Tpx

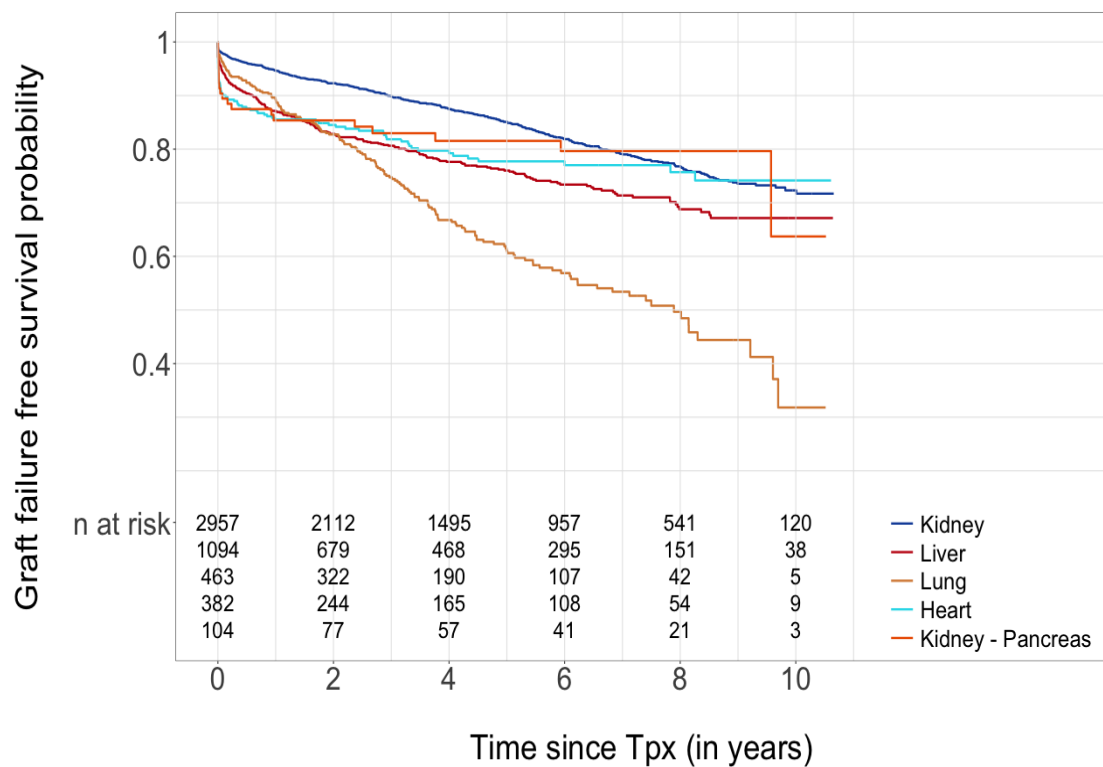


Figure 28: Graft failure free survival by major Tpx and centre

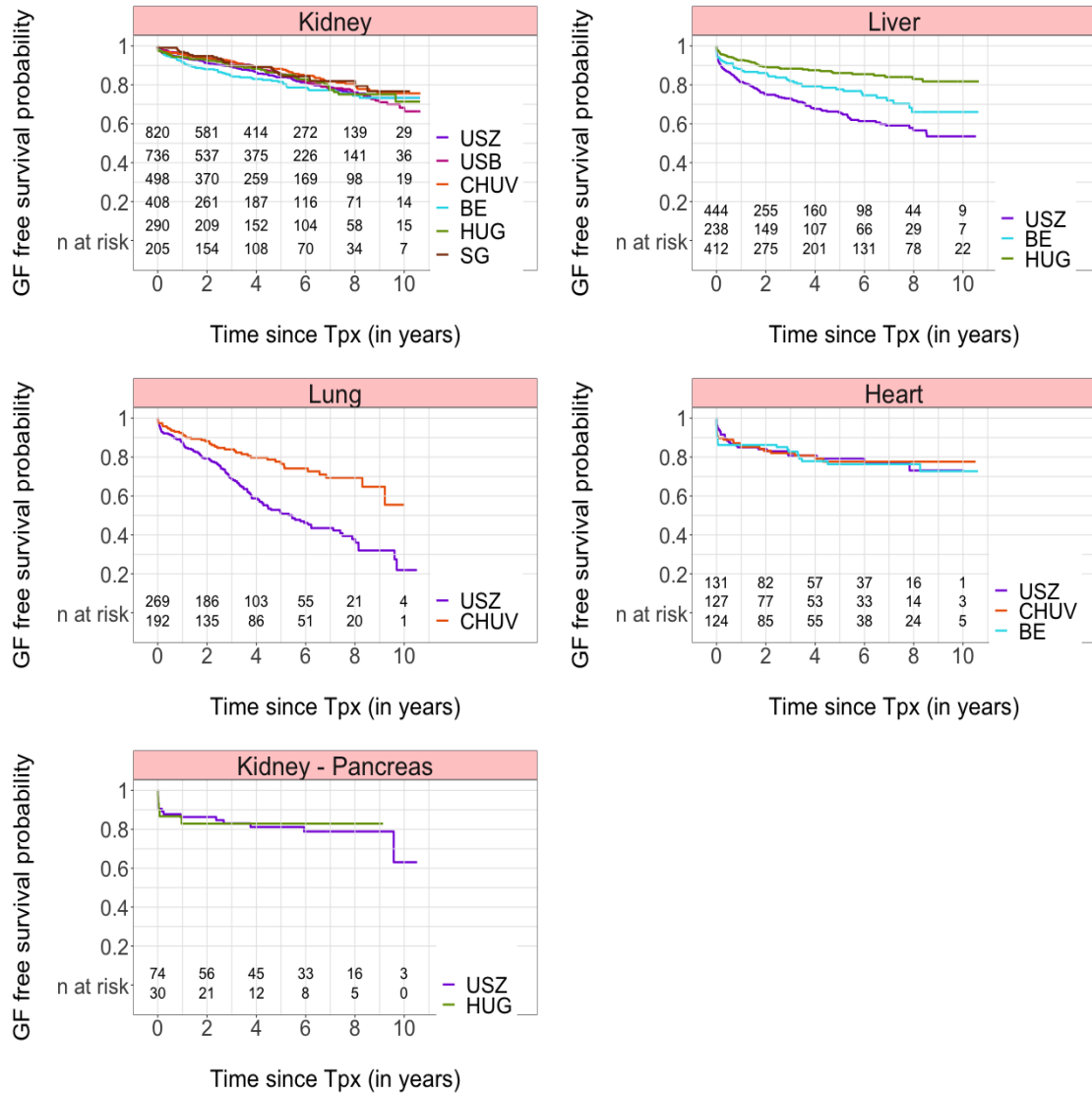
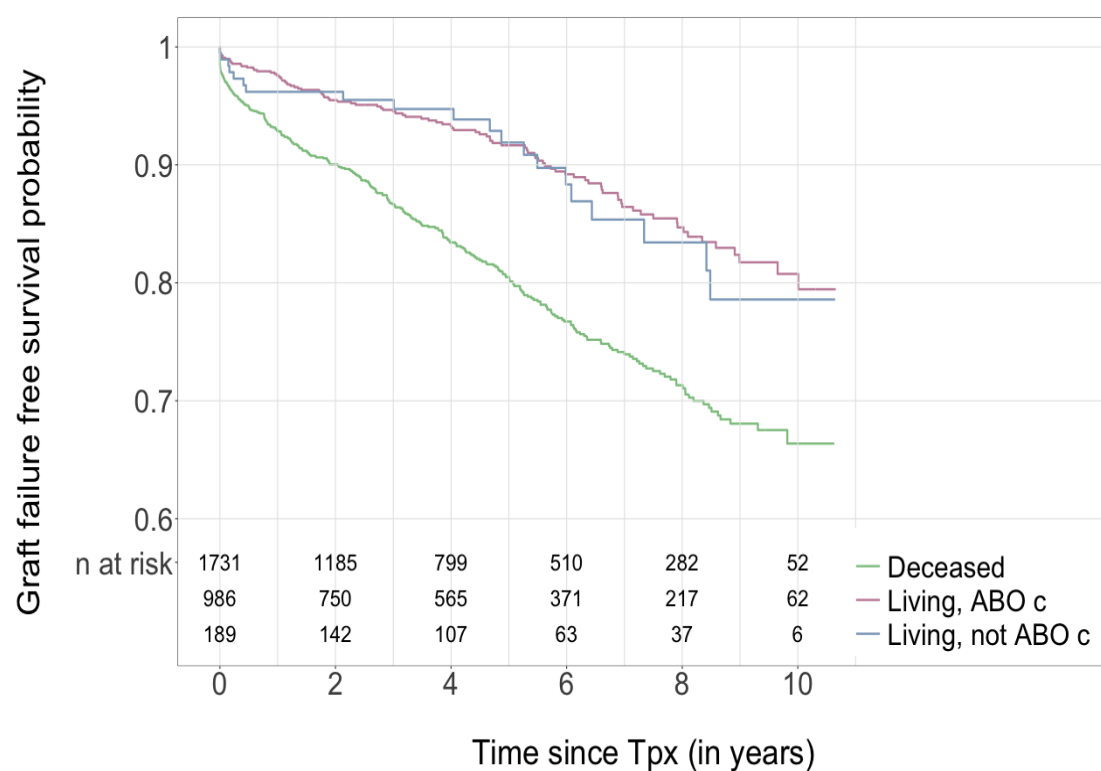


Figure 29: Graft failure free survival in patients with first STCS single Kidney Tpx by donor type (stratified by ABO compatibility)



9.3 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 30, Table 20 and Table 21 double kidneys are counted as one kidney.

Figure 30: Cumulative incidence of graft failure

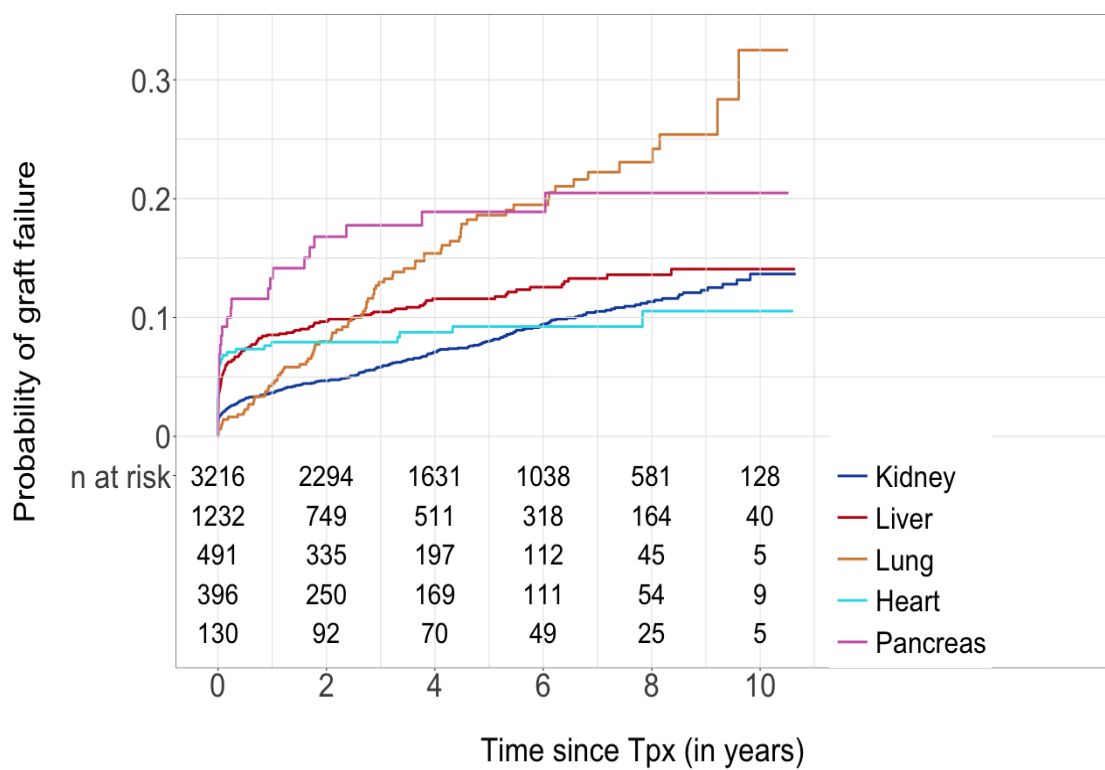


Figure 31: Cumulative incidence of graft failure for single Kidney Tpx by donor type

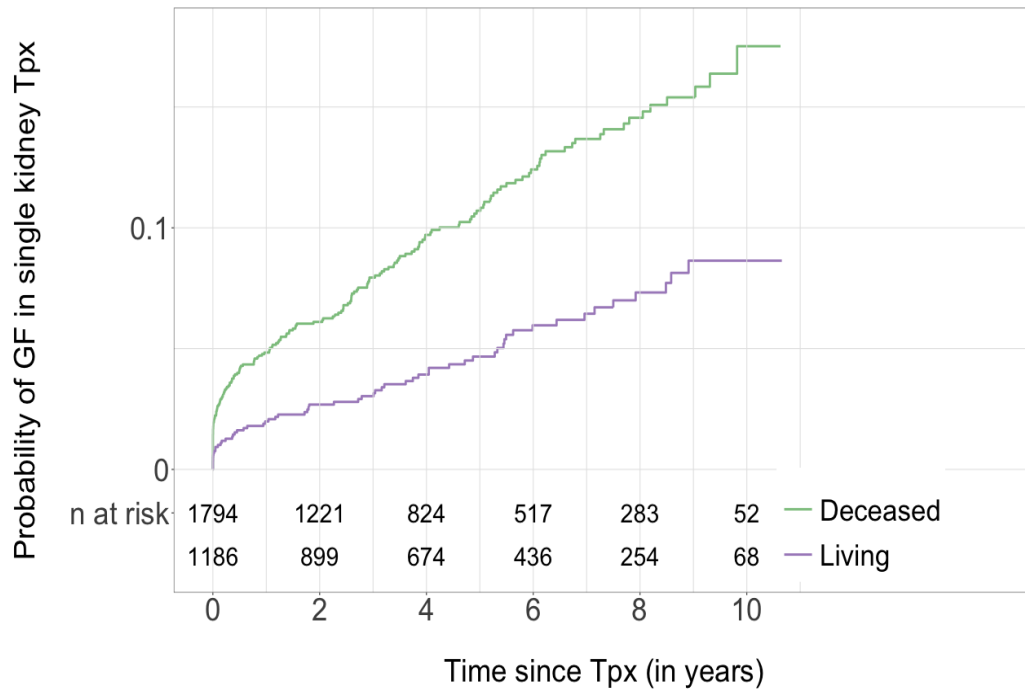


Figure 32: Cumulative incidence of graft failure for kidneys in single Tpx stratified by ABO compatibility

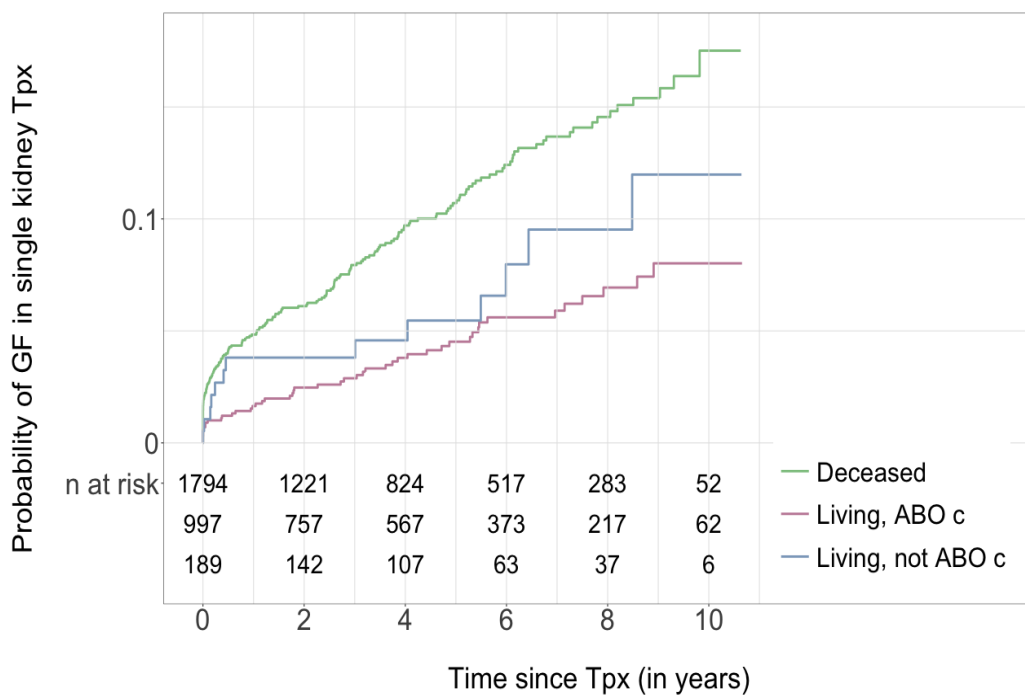


Table 20: Graft failure by organ

Organ	Time	CumInc (%)	95% CI	No at risk	Cum. GF	Cum. deaths
Kidney	Baseline	-	-	3216	0	0
-	1 month	2	(1.6,2.5)	3119	64	7
-	6 months	3.1	(2.6,3.8)	2933	100	29
-	1 year	3.7	(3.1,4.4)	2703	116	56
-	2 year(s)	4.7	(4,5.5)	2294	143	92
-	4 year(s)	7.1	(6.2,8.1)	1631	195	138
-	6 year(s)	9.5	(8.3,10.7)	1038	231	190
-	8 year(s)	11.3	(9.9,12.8)	581	250	221
-	10 year(s)	13.7	(11.6,15.9)	128	260	235
-	Overall	13.7	(11.6,15.9)	0	260	236
Liver	Baseline	-	-	1232	0	0
-	1 month	5.2	(4.1,6.5)	1140	64	19
-	6 months	7.4	(6,8.9)	1022	90	49
-	1 year	8.5	(7,10.2)	919	103	69
-	2 year(s)	9.7	(8,11.4)	749	114	100
-	4 year(s)	11.6	(9.7,13.6)	511	129	125
-	6 year(s)	12.6	(10.6,14.7)	318	134	145
-	8 year(s)	13.6	(11.4,16)	164	138	156
-	10 year(s)	14.1	(11.7,16.6)	40	139	158
-	Overall	14.1	(11.7,16.6)	0	139	158
Lung	Baseline	-	-	491	0	0
-	1 month	1.2	(0.5,2.5)	471	6	13
-	6 months	2.3	(1.2,3.9)	429	11	29
-	1 year	4.5	(2.8,6.6)	393	21	35
-	2 year(s)	8	(5.7,10.7)	335	36	48
-	4 year(s)	15.4	(12,19.1)	197	63	78
-	6 year(s)	19.5	(15.5,23.8)	112	74	92
-	8 year(s)	23.1	(18.4,28.1)	45	80	96
-	10 year(s)	32.5	(22,43.5)	5	84	99
-	Overall	32.5	(22,43.5)	0	84	99
Heart	Baseline	-	-	396	0	0
-	1 month	6.6	(4.4,9.3)	353	26	13
-	6 months	7.3	(5,10.2)	321	29	21
-	1 year	7.9	(5.5,10.9)	288	31	27
-	2 year(s)	7.9	(5.5,10.9)	250	31	30
-	4 year(s)	8.8	(6.1,11.9)	169	33	41
-	6 year(s)	9.2	(6.5,12.6)	111	34	44
-	8 year(s)	10.5	(7,14.9)	54	35	44
-	10 year(s)	10.5	(7,14.9)	9	35	45
-	Overall	10.5	(7,14.9)	0	35	45
Pancreas	Baseline	-	-	130	0	0
-	1 month	9.2	(5,15)	116	12	1
-	6 months	11.6	(6.8,17.8)	111	15	1
-	1 year	13.3	(8.1,19.8)	100	17	1
-	2 year(s)	16.8	(10.8,23.9)	92	21	1

Organ	Time	CumInc (%)	95% CI	No at risk	Cum. GF	Cum. deaths
-	4 year(s)	18.9	(12.4,26.4)	70	23	2
-	6 year(s)	18.9	(12.4,26.4)	49	23	3
-	8 year(s)	20.5	(13.5,28.5)	25	24	3
-	10 year(s)	20.5	(13.5,28.5)	5	24	4
-	Overall	20.5	(13.5,28.5)	0	24	4

Table 21: Graft failure by organ and centre

Organ - Centre	Time	CumInc (%)	95% CI	No at risk	Cum. GF	Cum. deaths
Kidney-USZ	Baseline	0.0	-	952	0	0
-	1 month	2.3	(1.5,3.4)	918	22	2
-	6 months	3.8	(2.7,5.2)	859	36	9
-	1 year	4.2	(3,5.6)	802	39	15
-	2 year(s)	5.1	(3.8,6.6)	684	46	28
-	4 year(s)	6.8	(5.2,8.7)	495	57	45
-	6 year(s)	8.7	(6.8,11)	324	66	61
-	8 year(s)	10.0	(7.7,12.6)	165	70	72
-	10 year(s)	11.9	(8.5,15.9)	35	72	75
-	Overall	11.9	(8.5,15.9)	0	72	75
Kidney-USB	Baseline	0.0	-	746	0	0
-	1 month	1.2	(0.6,2.2)	729	9	2
-	6 months	1.9	(1.1,3.1)	685	14	9
-	1 year	2.2	(1.3,3.5)	627	16	16
-	2 year(s)	3.3	(2.2,4.9)	540	23	22
-	4 year(s)	5.8	(4.1,7.9)	376	35	34
-	6 year(s)	9.0	(6.6,11.9)	226	46	49
-	8 year(s)	10.4	(7.6,13.7)	141	49	59
-	10 year(s)	13.8	(9.2,19.2)	36	52	65
-	Overall	13.8	(9.2,19.2)	0	52	66
Kidney-CHUV	Baseline	0.0	-	519	0	0
-	1 month	2.3	(1.3,3.9)	503	12	1
-	6 months	2.7	(1.5,4.4)	484	14	3
-	1 year	3.1	(1.9,4.9)	451	16	6
-	2 year(s)	3.6	(2.2,5.5)	384	18	12
-	4 year(s)	7.0	(4.8,9.7)	270	30	15
-	6 year(s)	10.7	(7.6,14.3)	175	39	19
-	8 year(s)	13.1	(9.4,17.4)	100	43	22
-	10 year(s)	16.7	(11.5,22.8)	19	46	25
-	Overall	16.7	(11.5,22.8)	0	46	25
Kidney-BE	Baseline	0.0	-	435	0	0
-	1 month	1.8	(0.9,3.5)	419	8	2
-	6 months	4.5	(2.8,6.8)	379	19	6
-	1 year	5.8	(3.8,8.3)	337	24	12
-	2 year(s)	7.5	(5.2,10.4)	273	30	20
-	4 year(s)	11.2	(8.1,14.8)	197	40	23
-	6 year(s)	13.1	(9.6,17.2)	120	44	28
-	8 year(s)	16.3	(11.8,21.4)	73	48	29
-	10 year(s)	17.4	(12.5,22.9)	14	49	29
-	Overall	17.4	(12.5,22.9)	0	49	29
Kidney-HUG	Baseline	0.0	-	354	0	0
-	1 month	3.1	(1.6,5.3)	342	11	0
-	6 months	4.3	(2.5,6.7)	325	15	2
-	1 year	4.6	(2.7,7.1)	297	16	4
-	2 year(s)	5.2	(3.2,7.9)	256	18	6

Organ - Centre	Time	CumInc (%)	95% CI	No at risk	Cum. GF	Cum. deaths
-	4 year(s)	6.0	(3.8,9)	183	20	14
-	6 year(s)	6.6	(4.2,9.8)	122	21	23
-	8 year(s)	9.1	(5.7,13.5)	68	24	28
-	10 year(s)	9.1	(5.7,13.5)	17	24	29
-	Overall	9.1	(5.7,13.5)	0	24	29
Kidney-SG	Baseline	0.0	-	210	0	0
-	1 month	1.0	(0.2,3.1)	208	2	0
-	6 months	1.0	(0.2,3.1)	201	2	0
-	1 year	2.5	(0.9,5.3)	189	5	3
-	2 year(s)	4.0	(1.9,7.4)	157	8	4
-	4 year(s)	7.4	(4.1,12)	110	13	7
-	6 year(s)	9.3	(5.3,14.6)	71	15	10
-	8 year(s)	10.5	(6,16.3)	34	16	11
-	10 year(s)	13.3	(7,21.7)	7	17	12
-	Overall	13.3	(7,21.7)	0	17	12
Liver-USZ	Baseline	0.0	-	517	0	0
-	1 month	7.4	(5.3,9.8)	465	38	13
-	6 months	10.3	(7.9,13.1)	409	53	33
-	1 year	12.4	(9.7,15.4)	365	63	43
-	2 year(s)	13.8	(11,17)	286	69	63
-	4 year(s)	16.4	(13.1,19.9)	180	77	77
-	6 year(s)	18.3	(14.6,22.3)	110	81	87
-	8 year(s)	19.5	(15.6,23.8)	51	83	92
-	10 year(s)	19.5	(15.6,23.8)	10	83	94
-	Overall	19.5	(15.6,23.8)	0	83	94
Liver-BE	Baseline	0.0	-	266	0	0
-	1 month	6.0	(3.6,9.3)	246	16	2
-	6 months	7.2	(4.5,10.7)	219	19	8
-	1 year	7.2	(4.5,10.7)	192	19	14
-	2 year(s)	7.2	(4.5,10.7)	160	19	19
-	4 year(s)	9.5	(6.2,13.8)	115	23	26
-	6 year(s)	9.5	(6.2,13.8)	70	23	32
-	8 year(s)	11.1	(6.9,16.4)	31	24	36
-	10 year(s)	11.1	(6.9,16.4)	7	24	36
-	Overall	11.1	(6.9,16.4)	0	24	36
Liver-HUG	Baseline	0.0	-	449	0	0
-	1 month	2.2	(1.1,3.9)	429	10	4
-	6 months	4.1	(2.5,6.2)	394	18	8
-	1 year	4.8	(3.1,7.1)	362	21	12
-	2 year(s)	6.2	(4.2,8.8)	303	26	18
-	4 year(s)	7.2	(4.9,10.1)	216	29	22
-	6 year(s)	7.8	(5.3,10.8)	138	30	26
-	8 year(s)	8.4	(5.7,11.8)	82	31	28
-	10 year(s)	9.6	(6.2,13.8)	23	32	28
-	Overall	9.6	(6.2,13.8)	0	32	28
Lung-USZ	Baseline	0.0	-	280	0	0
-	1 month	1.8	(0.7,3.9)	266	5	8

Organ - Centre	Time	CumInc (%)	95% CI	No at risk	Cum. GF	Cum. deaths
-	6 months	2.1	(0.9,4.4)	245	6	21
-	1 year	4.4	(2.4,7.4)	223	12	27
-	2 year(s)	8.8	(5.8,12.6)	188	23	37
-	4 year(s)	18.4	(13.8,23.7)	103	44	60
-	6 year(s)	23.4	(17.9,29.3)	55	52	71
-	8 year(s)	26.5	(20.2,33.2)	21	55	75
-	10 year(s)	34.6	(23.5,45.9)	4	58	77
-	Overall	34.6	(23.5,45.9)	0	58	77
Lung-CHUV	Baseline	0.0	-	203	0	0
-	1 month	0.5	(0,2.5)	198	1	4
-	6 months	2.0	(0.7,4.8)	178	4	7
-	1 year	4.2	(2,7.8)	164	8	7
-	2 year(s)	6.6	(3.6,10.8)	142	12	10
-	4 year(s)	10.6	(6.5,15.9)	91	18	17
-	6 year(s)	13.5	(8.5,19.6)	55	21	20
-	8 year(s)	17.9	(11.4,25.7)	22	24	20
-	10 year(s)	26.0	(11.1,43.7)	1	25	21
-	Overall	26.0	(11.1,43.7)	0	25	21
Lung-HUG	Baseline	0.0	-	8	0	0
-	1 month	0.0	-	7	0	1
-	6 months	12.5	(0.5,44.8)	6	1	1
-	1 year	12.5	(0.5,44.8)	6	1	1
-	2 year(s)	12.5	(0.5,44.8)	5	1	1
-	4 year(s)	12.5	(0.5,44.8)	3	1	1
-	6 year(s)	12.5	(0.5,44.8)	2	1	1
-	8 year(s)	12.5	(0.5,44.8)	2	1	1
-	10 year(s)	-	-	0	1	1
-	Overall	12.5	(0.5,44.8)	0	1	1
Heart-USZ	Baseline	0.0	-	134	0	0
-	1 month	3.7	(1.4,8)	125	5	3
-	6 months	6.0	(2.8,10.9)	108	8	9
-	1 year	6.9	(3.4,12.1)	97	9	12
-	2 year(s)	6.9	(3.4,12.1)	82	9	13
-	4 year(s)	6.9	(3.4,12.1)	57	9	16
-	6 year(s)	6.9	(3.4,12.1)	37	9	18
-	8 year(s)	10.9	(4,21.5)	16	10	18
-	10 year(s)	10.9	(4,21.5)	1	10	18
-	Overall	10.9	(4,21.5)	0	10	18
Heart-CHUV	Baseline	0.0	-	133	0	0
-	1 month	7.5	(3.8,12.8)	119	10	3
-	6 months	7.5	(3.8,12.8)	108	10	4
-	1 year	8.4	(4.5,14.1)	93	11	7
-	2 year(s)	8.4	(4.5,14.1)	80	11	9
-	4 year(s)	8.4	(4.5,14.1)	56	11	12
-	6 year(s)	10.0	(5.3,16.4)	35	12	12
-	8 year(s)	10.0	(5.3,16.4)	14	12	12
-	10 year(s)	10.0	(5.3,16.4)	3	12	12

Organ - Centre	Time	CumInc (%)	95% CI	No at risk	Cum. GF	Cum. deaths
-	Overall	10.0	(5.3,16.4)	0	12	12
Heart-BE	Baseline	0.0	-	129	0	0
-	1 month	8.5	(4.5,14.2)	109	11	7
-	6 months	8.5	(4.5,14.2)	105	11	8
-	1 year	8.5	(4.5,14.2)	98	11	8
-	2 year(s)	8.5	(4.5,14.2)	88	11	8
-	4 year(s)	10.9	(6,17.5)	56	13	13
-	6 year(s)	10.9	(6,17.5)	39	13	14
-	8 year(s)	10.9	(6,17.5)	24	13	14
-	10 year(s)	10.9	(6,17.5)	5	13	15
-	Overall	10.9	(6,17.5)	0	13	15
Pancreas-USZ	Baseline	0.0	-	85	0	0
-	1 month	8.2	(3.6,15.3)	76	7	1
-	6 months	11.8	(6,19.8)	72	10	1
-	1 year	13.1	(6.9,21.3)	67	11	1
-	2 year(s)	15.7	(8.8,24.5)	62	13	1
-	4 year(s)	18.7	(11,28)	51	15	2
-	6 year(s)	18.7	(11,28)	35	15	3
-	8 year(s)	20.9	(12.3,30.9)	16	16	3
-	10 year(s)	20.9	(12.3,30.9)	4	16	3
-	Overall	20.9	(12.3,30.9)	0	16	3
Pancreas-HUG	Baseline	0.0	-	45	0	0
-	1 month	11.1	(4,22.3)	40	5	0
-	6 months	11.1	(4,22.3)	39	5	0
-	1 year	13.7	(5.5,25.7)	33	6	0
-	2 year(s)	19.0	(8.8,32.3)	30	8	0
-	4 year(s)	19.0	(8.8,32.3)	19	8	0
-	6 year(s)	19.0	(8.8,32.3)	14	8	0
-	8 year(s)	19.0	(8.8,32.3)	9	8	0
-	10 year(s)	19.0	(8.8,32.3)	1	8	1
-	Overall	19.0	(8.8,32.3)	0	8	1

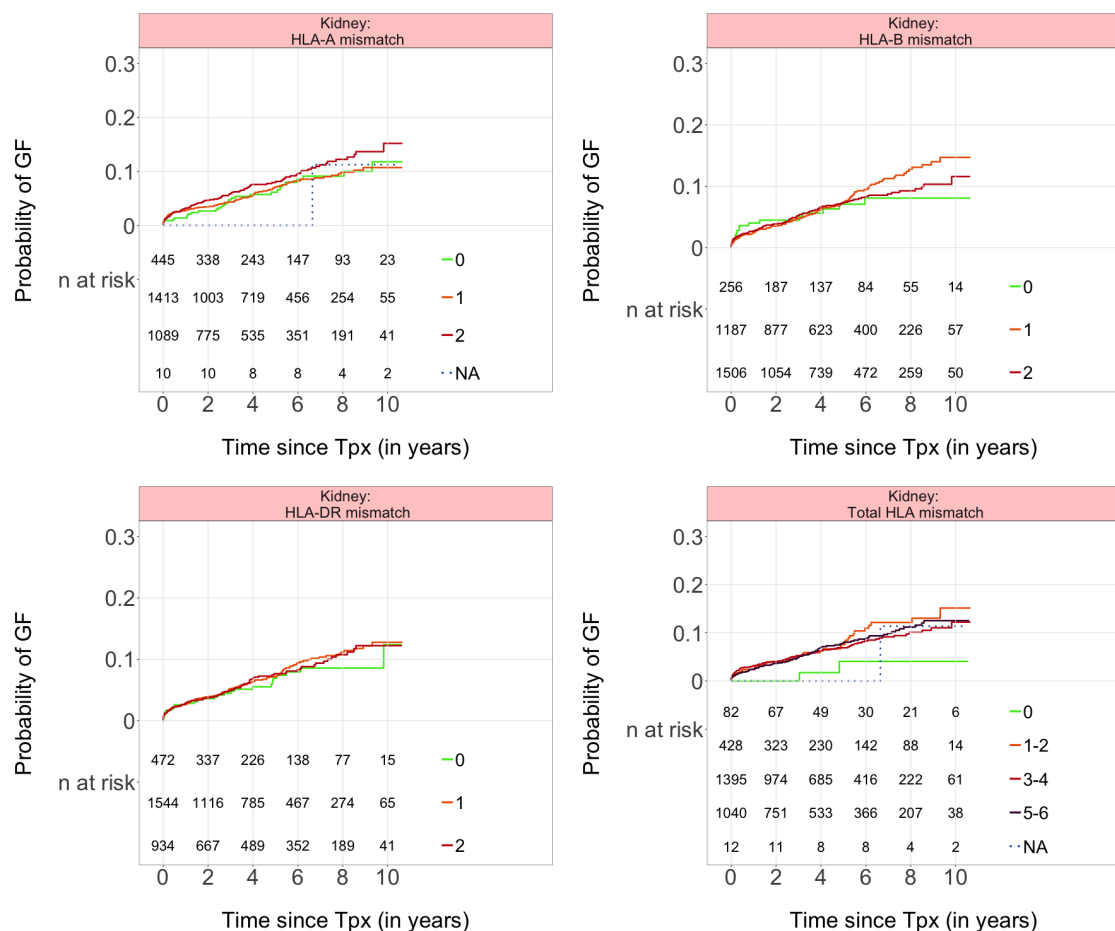
Table 22: Graft failure of kidneys (in first STCS single Tpx) by donor type

Donor type	Time	CumInc (%)	95% CI	No at risk	Cum. GF	Cum. deaths
Deceased	Baseline	-	-	1794	0	0
-	1 month	2.6	(1.9,3.4)	1732	46	3
-	6 months	4.1	(3.3,5.1)	1613	73	18
-	1 year	4.8	(3.9,5.9)	1463	85	43
-	2 year(s)	6.1	(5,7.3)	1221	104	66
-	4 year(s)	9.7	(8.2,11.3)	824	146	100
-	6 year(s)	12.4	(10.6,14.3)	517	168	134
-	8 year(s)	14.6	(12.4,16.8)	283	180	151
-	10 year(s)	17.5	(14.2,21.1)	52	186	159
-	Overall	17.5	(14.2,21.1)	0	186	159
Living	Baseline	-	-	1186	0	0
-	1 month	0.9	(0.5,1.6)	1165	11	0
-	6 months	1.6	(1,2.5)	1108	19	5
-	1 year	2	(1.3,2.9)	1043	23	7
-	2 year(s)	2.7	(1.8,3.8)	899	30	18
-	4 year(s)	3.9	(2.8,5.3)	674	40	25
-	6 year(s)	6	(4.5,7.8)	436	52	39
-	8 year(s)	7.3	(5.5,9.5)	254	57	52
-	10 year(s)	8.6	(6.4,11.3)	68	60	58
-	Overall	8.6	(6.4,11.3)	0	60	59

9.4 Graft failure and number of HLA mismatches

Figures 33-36 show the cumulative incidence functions for graft failures separated by (major) transplantation and the number of HLA mismatches¹ between donor and recipient at STCS enrolment. It is distinguished between mismatches for HLA-A, HLA-B and HLA-DR and the total number of HLA mismatches.

Figure 33: Cumulative incidence of graft failure in Kidney or Kidney-Kidney Tpx recipients by HLA mismatches



¹The number of mismatches refers the number of HLA antigens of the donor that are not expressed in the recipient. If the donor is homozygous for a certain HLA locus, only one mismatch was counted. Groups with less than 10 patients at time of tpx are not shown. NA stands for missing HLA information. The number of patients at risk for some tpx is lower compared to the number of tpx due to missing HLA information.

Figure 34: Cumulative incidence of graft failure in Liver Tpx recipients by HLA mismatches

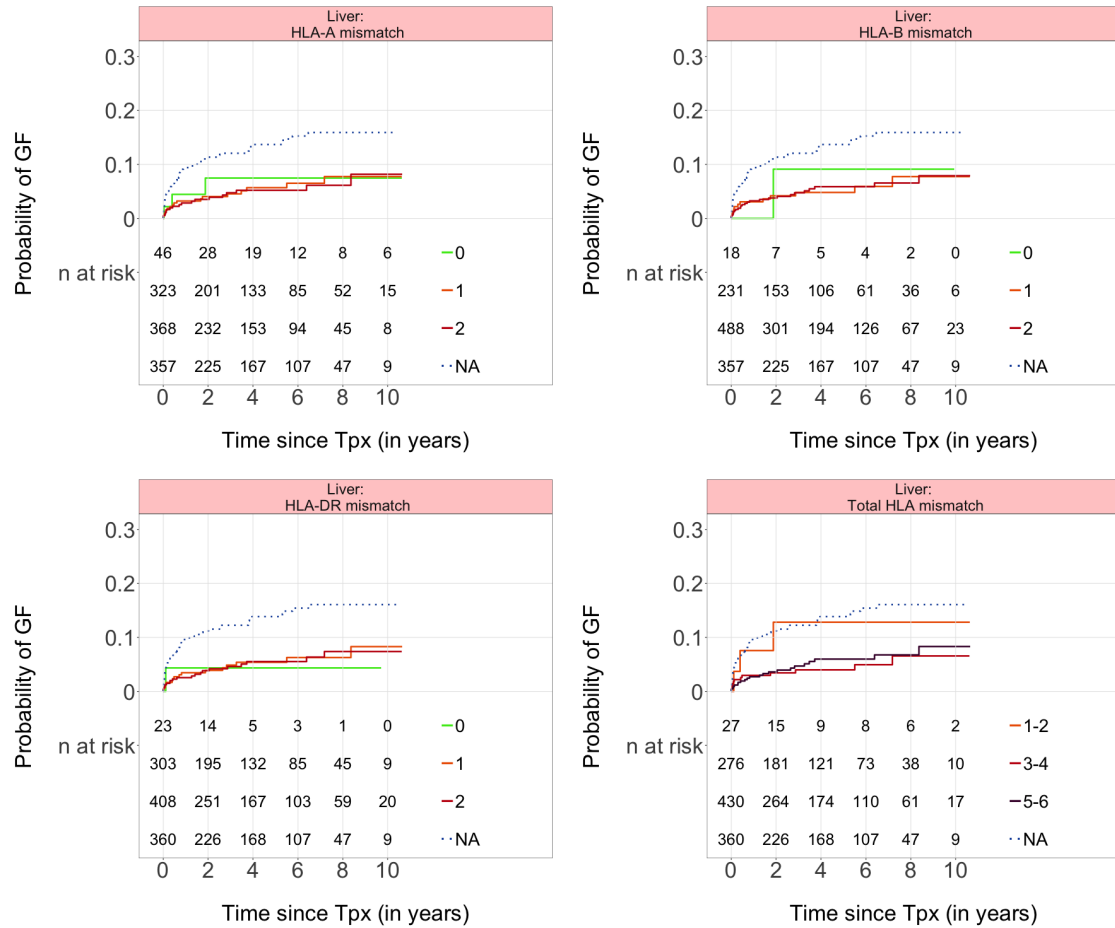


Figure 35: Cumulative incidence of graft failure in Lung Tpx recipients by HLA mismatches

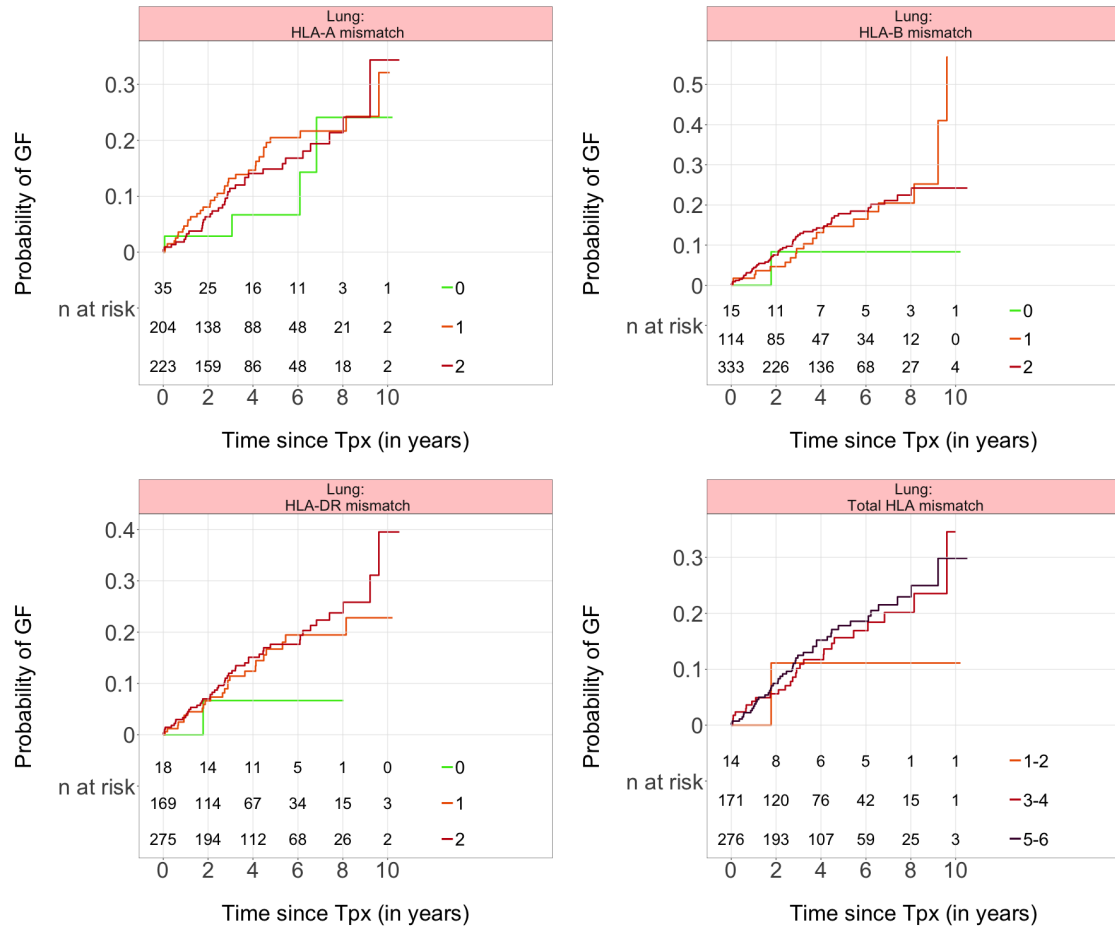
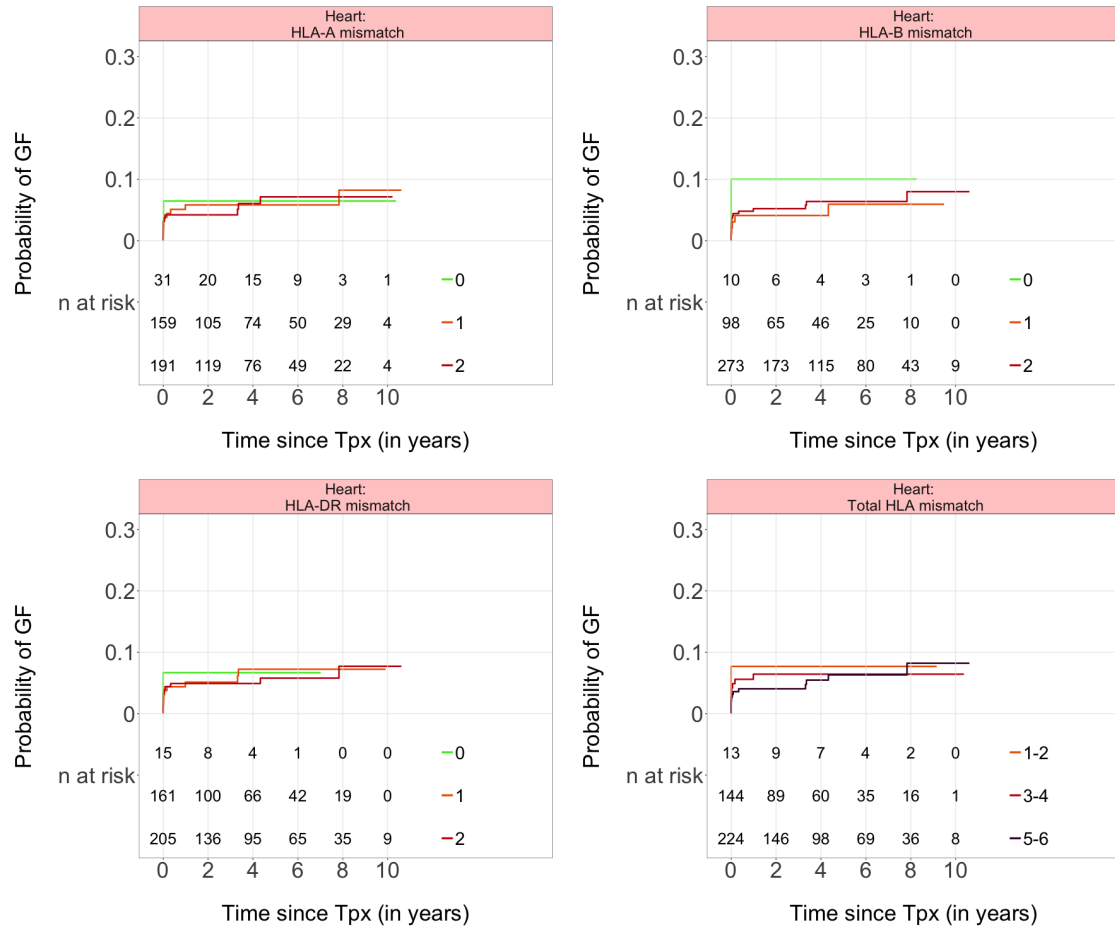


Figure 36: Cumulative incidence of graft failure in Heart Tpx recipients by HLA mismatches



10 Cancer

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

10.1 Cancer other than skin

Table 23: Overview of patients with incident cancer

	N	%
Total number of patients	5137	
Patients with incident cancer (other than skin)	421	8.2
- single record (% of line 2)	280	66.5
- multiple records (% of line 2)	141	33.5

Table 24: Patients with incident cancer

	Patients	Episodes	Median time (in yrs)*
Total	421	697	2.87
Kidney	219	332	3.25
Liver	142	273	2.64
Lung	41	61	2.66
Heart	14	25	2.73
Pancreas	1	1	0.00
Islets	3	3	1.22
Small bowel	1	2	0.24

* Median time (in years) from first STCS transplantation to diagnosis of cancer

Remark: Patients are listed regarding the organ implanted in the first STCS transplantation.

Table 25: Overview of incident cancer occurrence

	N	%
Total	697	100
Brain	13	2
Breast	28	4
Cervix_Uterus_Adnex	6	1
Colon	24	3
CUP	3	0
Kaposi	7	1
Kidney	27	4
Leukemia	11	2
Liver	87	12
Lung	67	10
MDS	10	1
MM	5	1
Neuroendocrine	8	1
Prostate	54	8
PTLD	65	9
Sarkoma	8	1
Testicular cancer	5	1
Thyroid	9	1
Uro_bladder	41	6
Other	219	31

10.2 Skin cancer

Table 26: Overview of patients with incident skin cancer

	N	%
Total number of patients	5137	
Patients with incident skin cancer	618	12
- single record (% of line 2)	314	50.8
- multiple records (% of line 2)	304	49.2

Table 27: Patients with incident skin cancer

	Patients	Episodes	Median time (in yrs)*
Total	618	1670	3.34
Kidney	423	1191	3.28
Liver	78	166	3.18
Lung	62	183	3.22
Heart	41	93	4.63
Pancreas	6	26	4.17
Islets	8	11	2.33

* Median time (in years) from first STCS transplantation to diagnosis of skin cancer

Remark: Patients are listed regarding the organ implanted in the first STCS transplantation.

Table 28: Overview of incident skin cancer occurrence

	N	%
Total	1670	100
Basalioma	516	31
Melanoma	50	3
Spinalioma	735	44
Other	369	22

11 Specific Population

11.1 DCD Donor Recipients

Table 29: Kidney patients' characteristics by donor type

	Total	Brain dead (DBD)	NHBD (DCD)	Living
Total no. patients	2957	1606	176	1175
Age (yrs), median	54.4	56.4	57.4	51.1
- IQR	(42.6,63.1)	(45.1,64.5)	(47.4,63.9)	(38.2,60.4)
Male gender, n (%)	1880 (63.6%)	1002 (62.4%)	103 (58.5%)	775 (66%)
Donor age (yrs), median	54	54	56	54
- IQR	(44,63)	(41,65)	(44,63)	(46,62)
Cold ischemia time (yrs), median	6.4	9.3	8.6	1.5
- IQR	(1.7,10)	(7.2,12.3)	(6.8,10.8)	(1.3,2.1)
Pediatric, n (%)	119 (4%)	76 (4.7%)	3 (1.7%)	40 (3.4%)
Observation time (yrs), median	4.5	4.4	2.0	4.8
- IQR	(1.9,7.3)	(2,7.4)	(1,4.2)	(2.2,7.8)
No. DGF, n (%)	370 (12.5%)	257 (16%)	93 (52.8%)	20 (1.7%)
No. deaths, n (%)	288 (9.7%)	202 (12.6%)	12 (6.8%)	74 (6.3%)
No. patients with at least one GF, n (%)	241 (8.2%)	170 (10.6%)	11 (6.2%)	60 (5.1%)
- with GF, alive	170 (5.7%)	117 (7.3%)	8 (4.5%)	45 (3.8%)
- with GF -> death	63 (2.1%)	48 (3%)	3 (1.7%)	12 (1%)
- with GF - related death	8 (0.3%)	5 (0.3%)	0 (0%)	3 (0.3%)
Death without GF	217 (7.3%)	149 (9.3%)	9 (5.1%)	59 (5%)

Figure 37: Cumulative patient enrolment

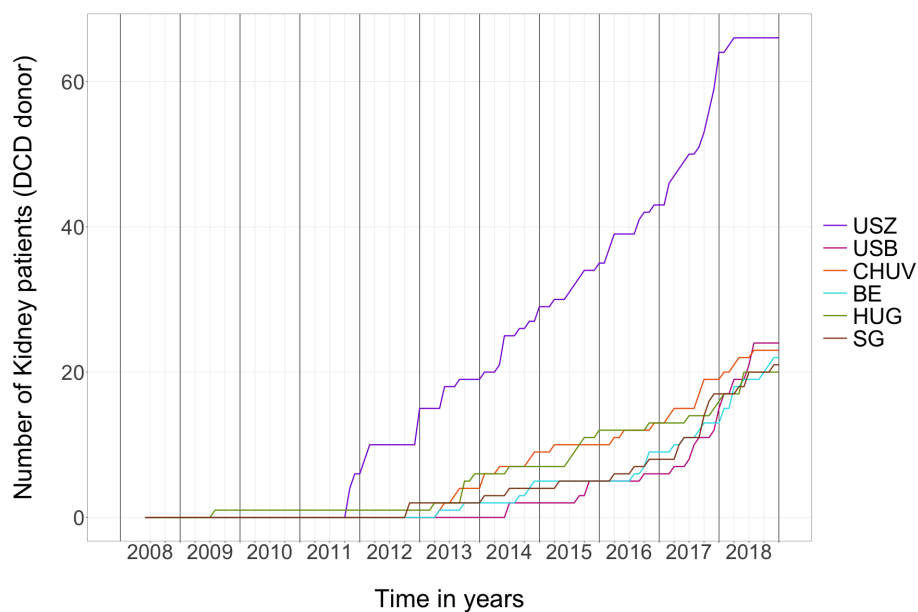


Figure 38: Graft failure free survival in patients with first STCS Kidney (and Kidney-Kidney) Tpx by donor type

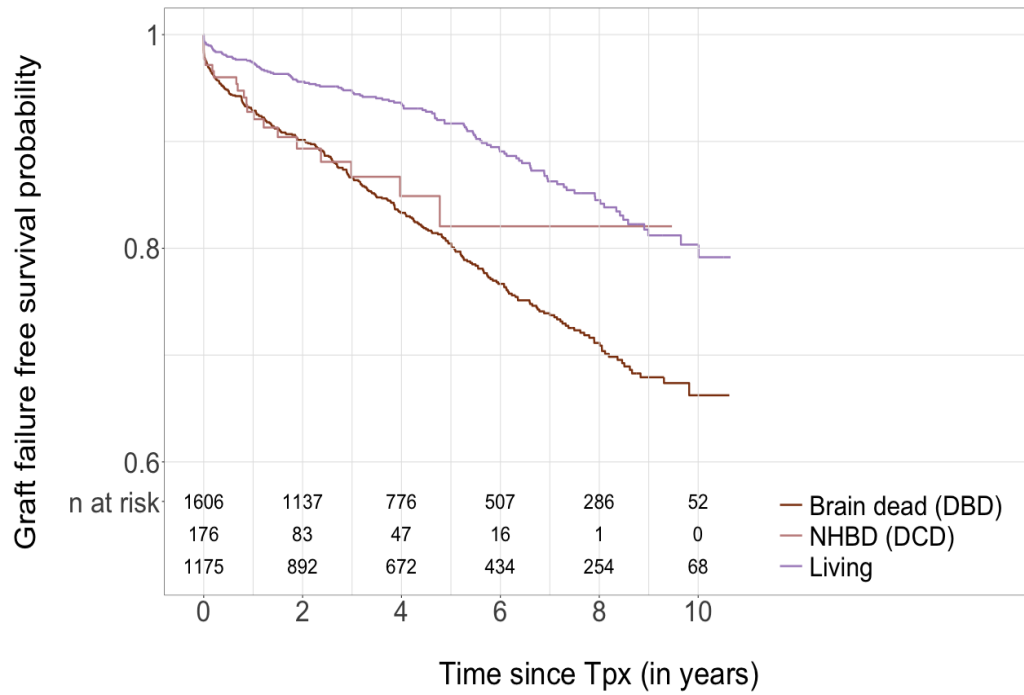
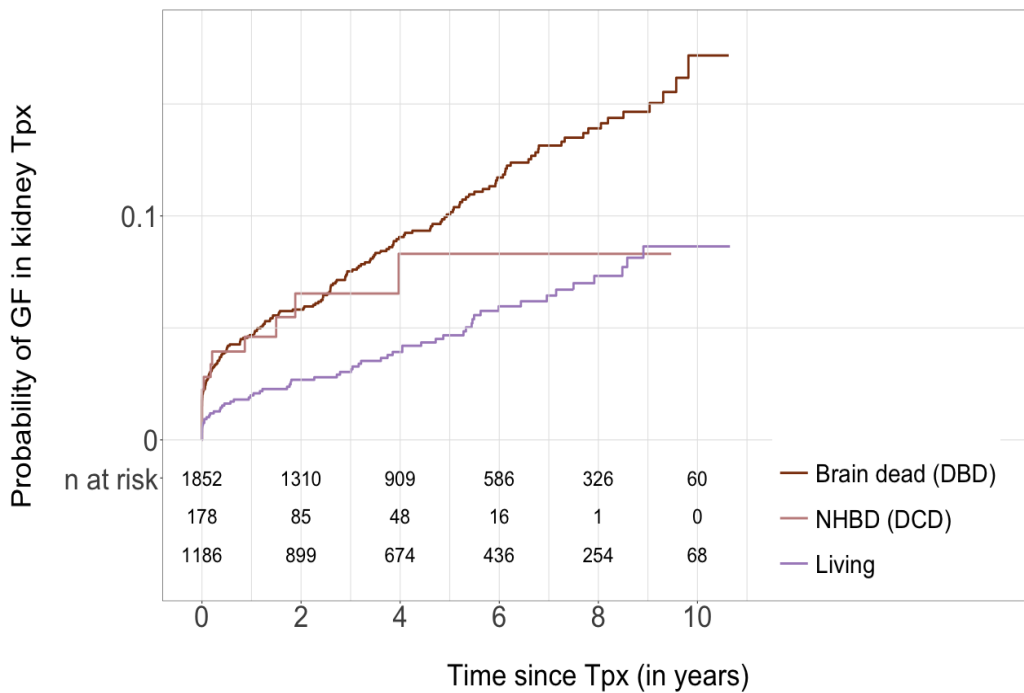


Figure 39: Cumulative incidence of graft failure for Kidney and Kidney-Kidney Tpx by donor type



11.2 Pediatric patients

Table 30: Number of pediatric patients (under 18) by first Tpx type

	Total	USZ	%	USB	%	CHUV	%	BE	%	HUG	%	SG	%
Total	264	99	37.5	4	1.5	27	10.2	36	13.6	95	36.0	3	1.1
Kidney	117	64	54.7	4	3.4	15	12.8	26	22.2	5	4.3	3	2.6
Liver	89	3	3.4	0	0.0	0	0.0	1	1.1	85	95.5	0	0.0
Lung	16	14	87.5	0	0.0	1	6.2	0	0.0	1	6.2	0	0.0
Heart	36	16	44.4	0	0.0	11	30.6	9	25.0	0	0.0	0	0.0
Kidney - Kidney	2	2	100.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Kidney - Liver	3	0	0.0	0	0.0	0	0.0	0	0.0	3	100.0	0	0.0
Islets - Liver - Lung	1	0	0.0	0	0.0	0	0.0	0	0.0	1	100.0	0	0.0

Table 31: Number of Tpx in pediatric patients by organ and centre

	Total	USZ	%	USB	%	CHUV	%	BE	%	HUG	%	SG	%
Total	278	104	37.4	4	1.4	30	10.8	37	13.3	100	36.0	3	1.1
Kidney	121	66	54.5	4	3.3	17	14.0	26	21.5	5	4.1	3	2.5
Liver	94	4	4.3	0	0.0	0	0.0	1	1.1	89	94.7	0	0.0
Lung	19	16	84.2	0	0.0	2	10.5	0	0.0	1	5.3	0	0.0
Heart	37	16	43.2	0	0.0	11	29.7	10	27.0	0	0.0	0	0.0
Kidney - Kidney	2	2	100.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Kidney - Liver	4	0	0.0	0	0.0	0	0.0	0	0.0	4	100.0	0	0.0
Islets - Liver - Lung	1	0	0.0	0	0.0	0	0.0	0	0.0	1	100.0	0	0.0

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

A Cohort of all solid organ recipients transplanted since January 2008

The STCS officially started to enrol patients on 1 May 2008. By request from the Swiss Federal Office of Public Health, patients transplanted in the reporting period from 1 January 2008 until 30 April 2008 were retrospectively added to the STCS. The STCS authorities decided to capture and report only “mini-minimal” data for these patients. Therefore for the full reporting period (January 2008 to present) only data on the transplanted organ, overall mortality and failure-free survival can be presented.

A.1 Overview

The following table lists the number of patients enrolled and transplantations performed, it shows patients according to their first STCS transplantation in the period: January 2008 - April 2008.

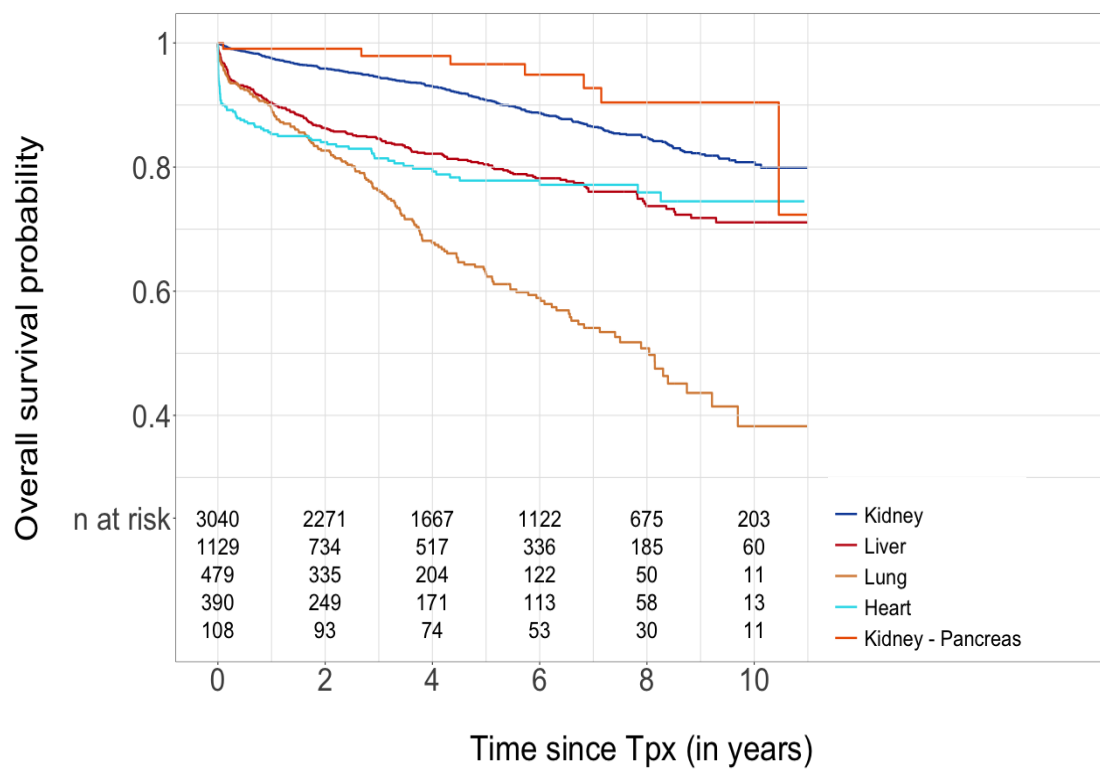
Table 32: Number of patients enrolled by Tpx type (January 2008 - April 2008)

	Total	First Tpx	(%)	Re Tpx	(%)	Second Tpx	(%)
Total	151	126	83.4	20	13.2	5	3.3
Kidney	83	62	74.7	17	20.5	4	4.8
Liver	35	34	97.1	1	2.9	0	0.0
Lung	16	15	93.8	1	6.2	0	0.0
Heart	8	8	100.0	0	0.0	0	0.0
Islets	2	0	0.0	1	50.0	1	50.0
Small bowel	1	1	100.0	0	0.0	0	0.0
Kidney - Pancreas	4	4	100.0	0	0.0	0	0.0
Kidney - Liver	1	1	100.0	0	0.0	0	0.0
Kidney - Heart	1	1	100.0	0	0.0	0	0.0

A.2 Mortality by transplantation

The following figure includes all the patients transplanted in the period: January 2008 - December 2018 and is analogous to Figure 23.

Figure 40: Overall survival since January 2008 for frequent transplantation types

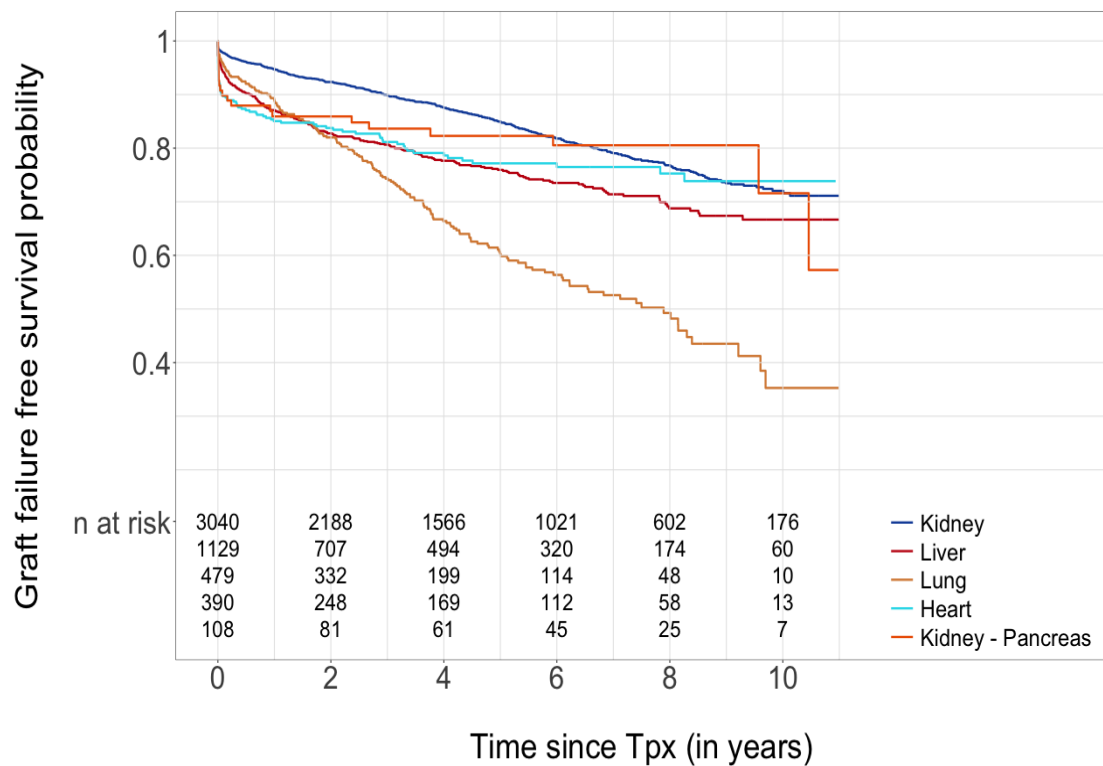


51 Kidney-Kidney Tpx are included in Kidney Tpx. 2 Kidney-Kidney-Pancreas Tpx are included in Kidney-Pancreas Tpx.

A.3 Graft failure free survival

The following figure includes all the patients transplanted in the period: January 2008 - December 2018 and is analogous to Figure 27. The rate estimates for graft failure free survival are not adjusted for potential risk factors. Only the first STCS transplantation of each patient is considered.

Figure 41: Graft failure free survival since January 2008 by major transplantation type



51 Kidney-Kidney Tpx are included in Kidney Tpx. 2 Kidney-Kidney-Pancreas Tpx are included in Kidney-Pancreas Tpx.

B Mortality in patients with rare Tpx scenarios

Kidney - Kidney transplantation and Kidney - Kidney - Pancreas transplantation are excluded from the following tables.

Table 33: Overall mortality by rare Tpx scenarios

Tpx	Time	Mortality (%)	95% CI	No at risk	Cum. deaths
Islets	Baseline	0.00	-	36	0
-	Overall	45.17	(18, 63.3)	-	11
Pancreas	Baseline	0.00	-	13	0
-	Overall	33.33	(0, 70)	-	1
Small bowel	Baseline	0.00	-	1	0
-	Overall	100.00	-	-	1
Kidney - Liver	Baseline	0.00	-	43	0
-	Overall	27.74	(9, 42.6)	-	9
Kidney - Islets	Baseline	0.00	-	21	0
-	Overall	16.67	(0, 41.7)	-	1
Kidney - Heart	Baseline	0.00	-	10	0
-	Overall	20.00	(0, 41.3)	-	2
Kidney - Lung	Baseline	0.00	-	2	0
-	Overall	0.00	-	-	0
Liver - Lung	Baseline	0.00	-	4	0
-	Overall	0.00	-	-	0
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	-	2	0
-	Overall	100.00	-	-	2
Kidney - Islets - Liver	Baseline	0.00	-	1	0
-	Overall	0.00	-	-	0
Islets - Liver - Lung	Baseline	0.00	-	1	0
-	Overall	0.00	-	-	0

Table 34: Overall mortality by rare Tpx scenarios and centre

Tpx - centre	Time	Mortality (%)	95% CI	No at risk	Cum. deaths
Islets - USZ	Baseline	0.0	-	21	0
-	Overall	66.9	(30.4, 84.2)	-	11
Islets - HUG	Baseline	0.0	-	15	0
-	Overall	0.0	-	-	0
Pancreas - USZ	Baseline	0.0	-	5	0
-	Overall	0.0	-	-	0
Pancreas - HUG	Baseline	0.0	-	8	0
-	Overall	33.3	(0, 70)	-	1
Small bowel - HUG	Baseline	0.0	-	1	0
-	Overall	100.0	-	-	1
Kidney - Liver - USZ	Baseline	0.0	-	16	0
-	Overall	19.8	(0, 37.6)	-	3
Kidney - Liver - BE	Baseline	0.0	-	10	0
-	Overall	35.7	(0, 66.2)	-	2
Kidney - Liver - HUG	Baseline	0.0	-	17	0
-	Overall	27.2	(0, 47.1)	-	4
Kidney - Islets - USZ	Baseline	0.0	-	13	0
-	Overall	25.0	(0, 57.4)	-	1
Kidney - Islets - HUG	Baseline	0.0	-	8	0
-	Overall	0.0	-	-	0
Kidney - Heart - USZ	Baseline	0.0	-	2	0
-	Overall	50.0	(0, 87.5)	-	1
Kidney - Heart - CHUV	Baseline	0.0	-	6	0
-	Overall	0.0	-	-	0
Kidney - Heart - BE	Baseline	0.0	-	2	0
-	Overall	50.0	(0, 87.5)	-	1
Kidney - Lung - CHUV	Baseline	0.0	-	2	0
-	Overall	0.0	-	-	0
Liver - Lung - HUG	Baseline	0.0	-	4	0
-	Overall	0.0	-	-	0
Liver - Pancreas - HUG	Baseline	0.0	-	1	0
-	Overall	0.0	-	-	0
Heart - Lung - USZ	Baseline	0.0	-	1	0
-	Overall	100.0	-	-	1
Islets - Liver - USZ	Baseline	0.0	-	1	0
-	Overall	0.0	-	-	0
Pancreas - Small bowel - USZ	Baseline	0.0	-	1	0
-	Overall	100.0	-	-	1
Pancreas - Small bowel - HUG	Baseline	0.0	-	1	0
-	Overall	100.0	-	-	1
Kidney - Islets - Liver - HUG	Baseline	0.0	-	1	0
-	Overall	0.0	-	-	0
Islets - Liver - Lung - HUG	Baseline	0.0	-	1	0
-	Overall	0.0	-	-	0

C Technical summary

All analyses were performed using the statistical software R - version 3.5.3 (2019-03-11). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL <https://www.R-project.org/>.