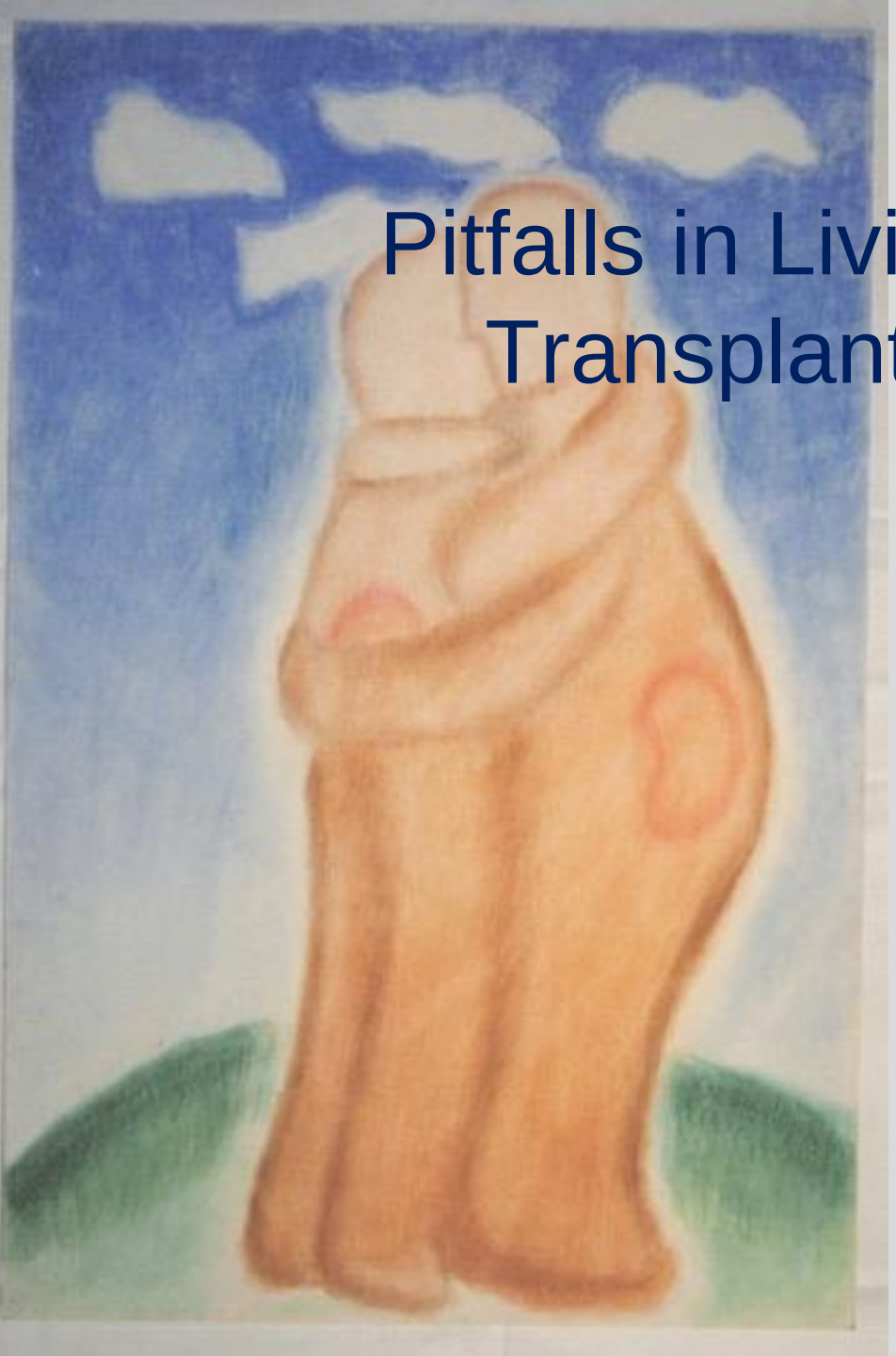


Pitfalls in Living Donor Renal Transplantation (LDRT)

Ferdinand Mühlbacher

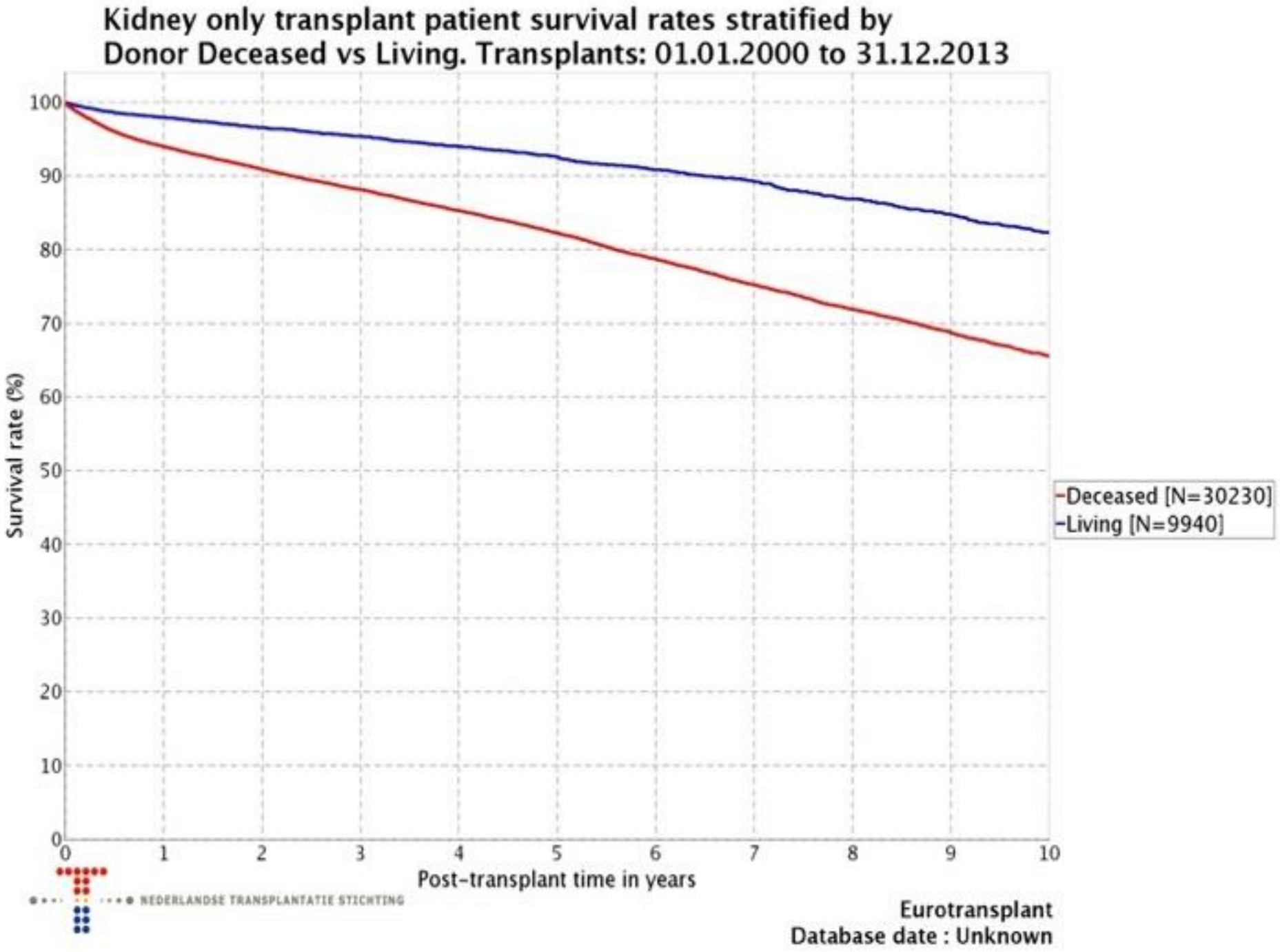
V. Nephrology Congress in Bosnia and Herzegovina

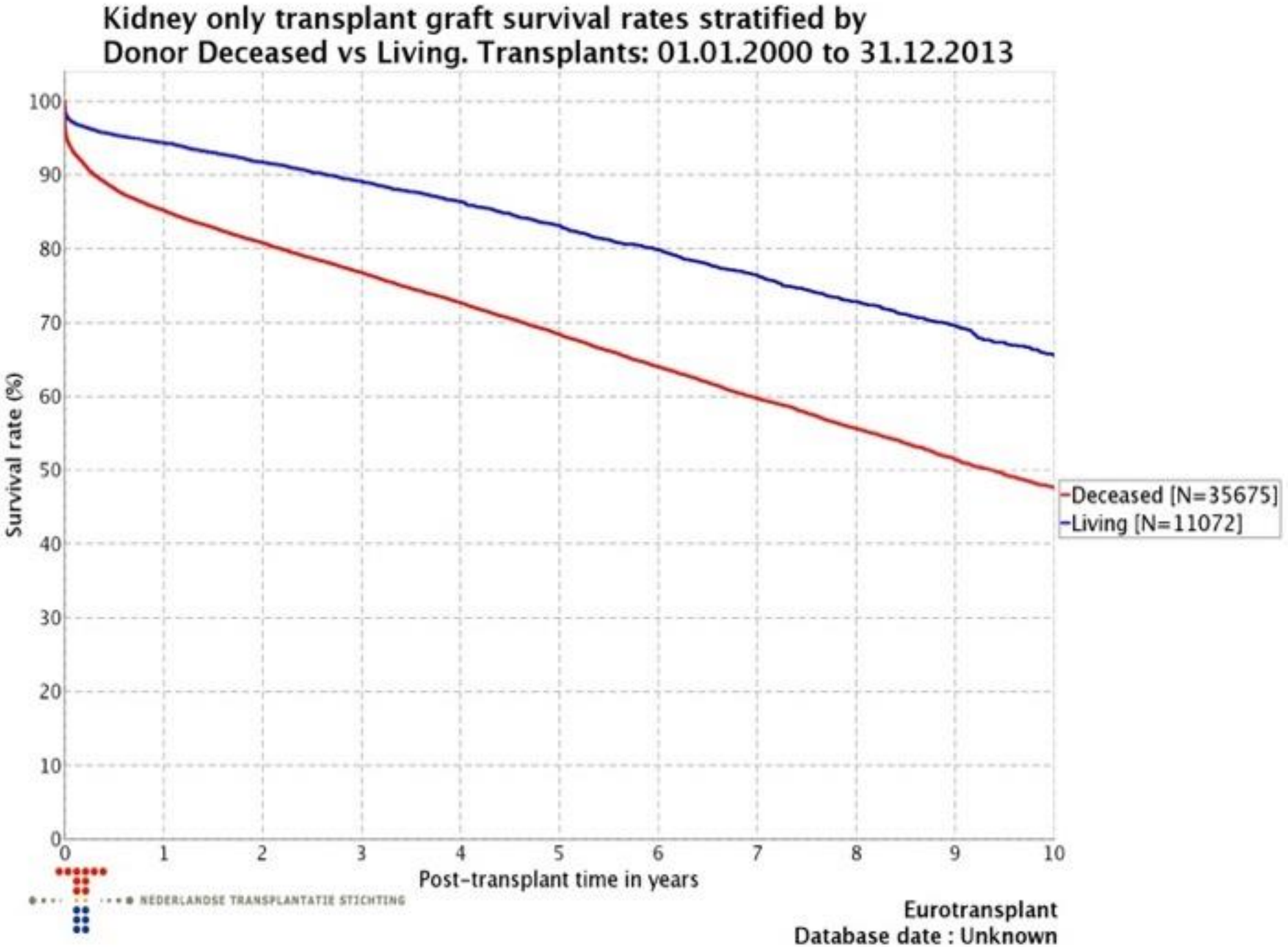
Tuzla, 17 – 20. October 2019

Life Kidney Donation

Many advantages

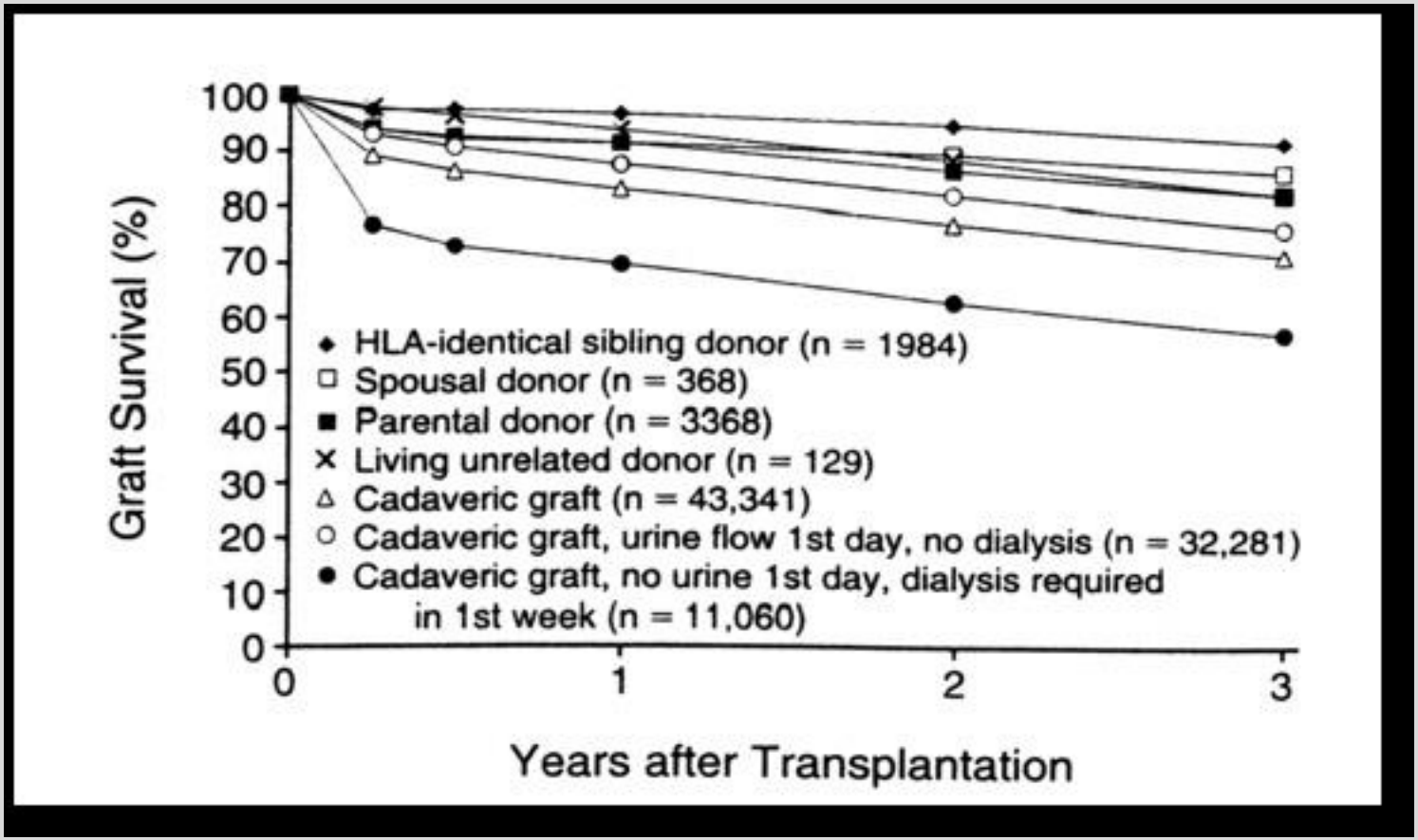
- Short waiting time for patients - Perfect timing
- Scheduled daytime procedure - Best available team
- HLA irrelevant (negative Crossmatch)
- Organ Quality known in advance
- Possible against ABO barrier
- Paired Donation Possible
- Exceptional cases possible (i.e. identical twins)
- Superior results compared to deceased donation


Kidney only transplant patient survival rates stratified by
Donor Deceased vs Living. Transplants: 01.01.2000 to 31.12.2013
Survival rate (%)
100
90
80
70
60
50
40
30
20
10
0
0
1
2
3
4
5
6
7
8
9
10
Post-transplant time in years
Deceased [N=30230]
Living [N=9940]
NEDERLANDSE TRANSPLANTATIE STICHTING
Eurotransplant
Database date : Unknown


Kidney only transplant graft survival rates stratified by
Donor Deceased vs Living. Transplants: 01.01.2000 to 31.12.2013
Survival rate (%)
100
90
80
70
60
50
40
30
20
10
0
0
1
2
3
4
5
6
7
8
9
10
Post-transplant time in years
Deceased [N=35675]
Living [N=11072]
NEDERLANDSE TRANSPLANTATIE STICHTING
Eurotransplant
Database date : Unknown

HLA irrelevant in LRD

LRD vs. LURD vs. DDD



Terasaki P. et. al.: NEJM 333:6, 1995

Benefits in Life Donation

Donor

- Biological Benefit: 0
  - Only Risk
- Psychological Benefit:

Recipient

- Outcomes: Patient and Graft survival much better compared to DDRT

Pitfalls, Downsides in LDRT

Pitfalls

- Donor risk
  - Perioperative Mortality
  - Life time expectancy
  - Risk of ESRD
- Interdependance of Donor to Recipient:
  - Act of love ..... court case

LDRT as an exclusive Organ source

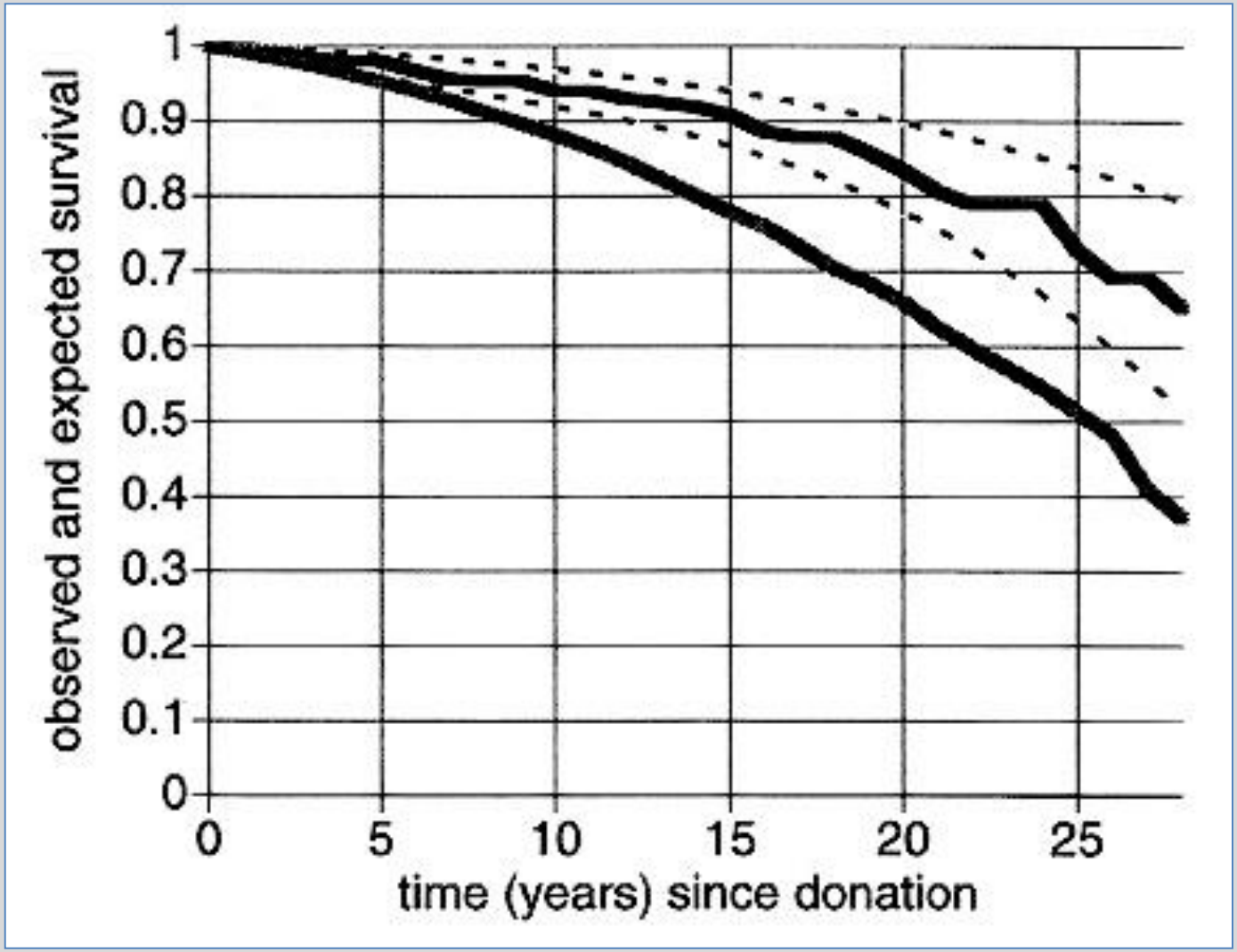
- Insufficient Organ availability
- Unability of
  - repeated RT,
  - VCA and other Organs

Just One Negative Example

Donor Risk Information

- We, and many others explained to the potential donor:
  - Minimal mortality risk
  - No reduction in life expectancy
  - No increases risk of ESRD

Life Donors Live Longer



Fehrman-Ekholm I Transplantation1997, 64, 976-78

90 Days Mortality

Author		Donors	FU	Mortality 90 days	Complications Clavien ≥3
Fehrman-Ekholm I. et.al.	Transplantation 1997, 64:976-8	1112	20	0	
Segev D.L et. al	JAMA, March 10, 2010—Vol 303, No. 10 959	80347	6,3	25= 0,003%	
Mjøen G. et. al	Kidney International (2014) 86, 162–167	1901	15,1	0	
Burkhalter F. et. al	Swiss Medical Weekly, 2017; 147 w 14497	1649		0	34 (2,1%)
Vienna	unpublished	1477	13,5	0	

Selection Bias !

- Fehrman-Ekholm compared Kidney Donors with the "General Population"
- Kidney Donors are a healthy selection of the population.

- Kidney Donors have to be matched with a population of the same risk factors:

Mortality Risk LD vs HND

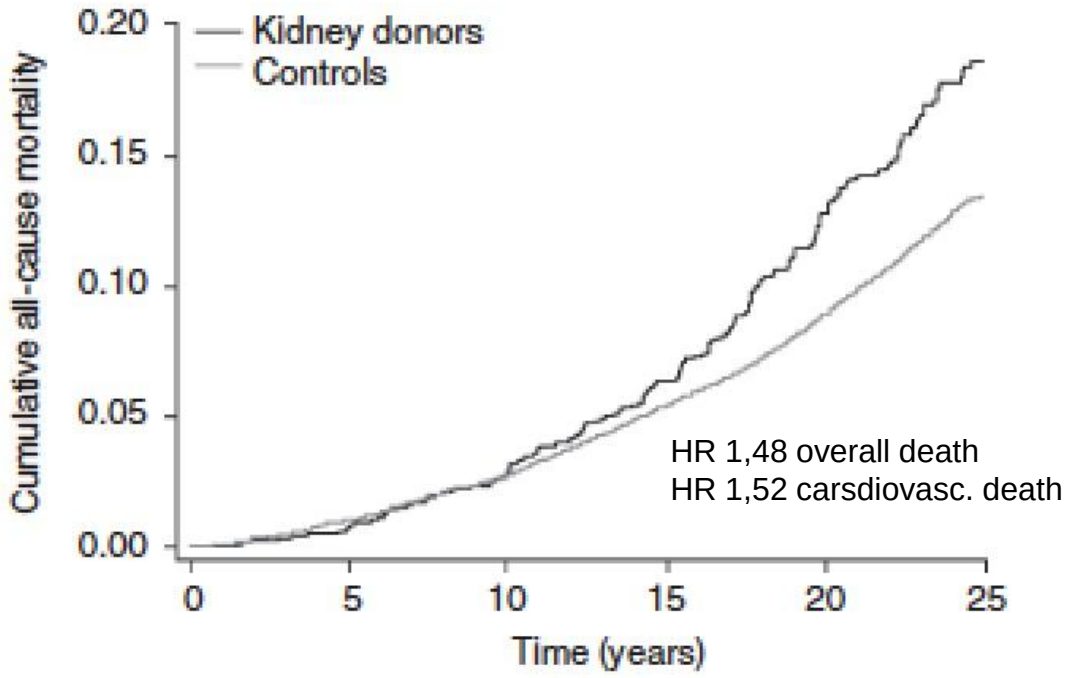
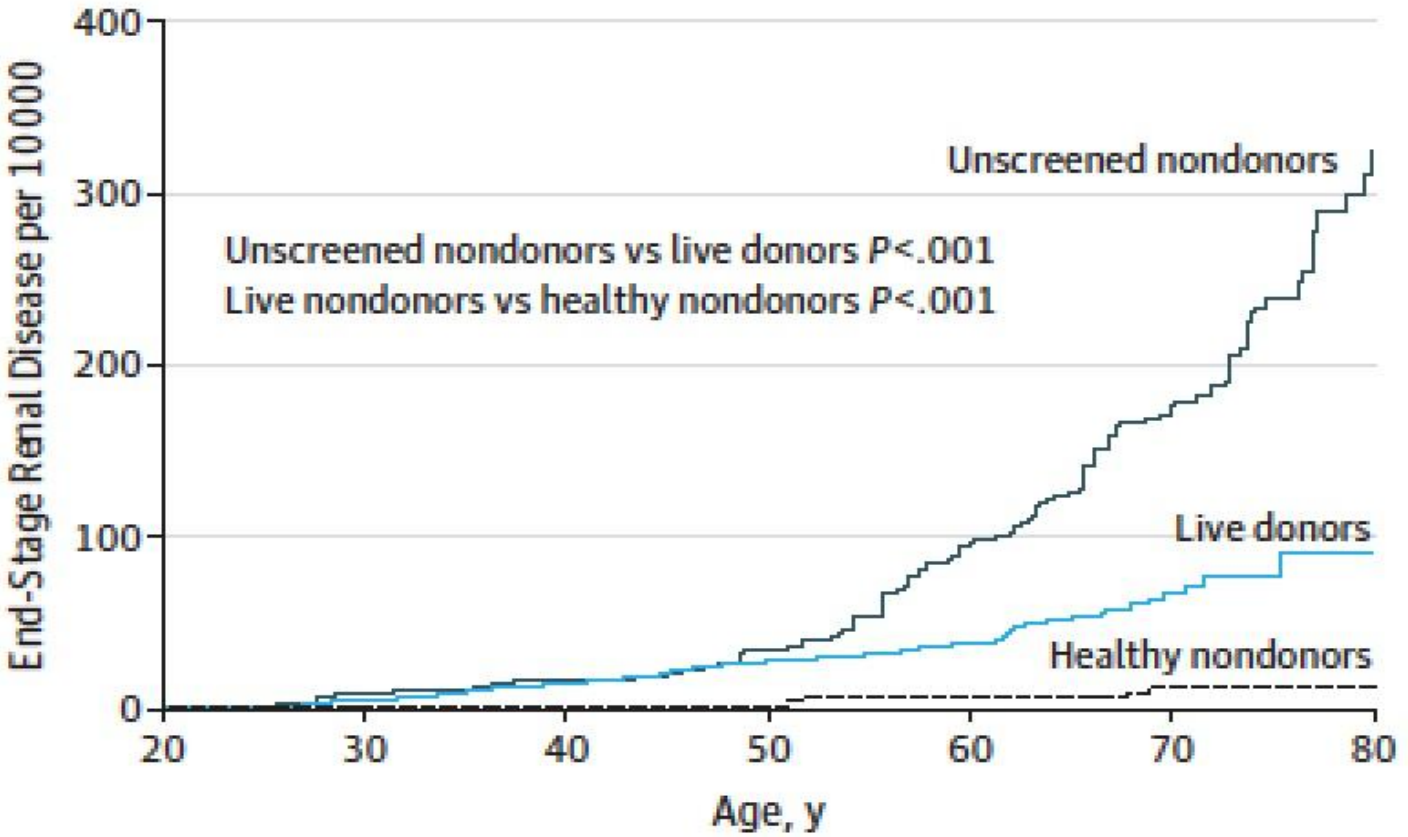


Figure 2 | Cumulative mortality risk in kidney donors and controls, adjusted for year of donation. Controls are matched to donors for age, sex, systolic blood pressure, body mass index, and smoking status.

Mjøen G..Kidney International (2014) 86, 162–167

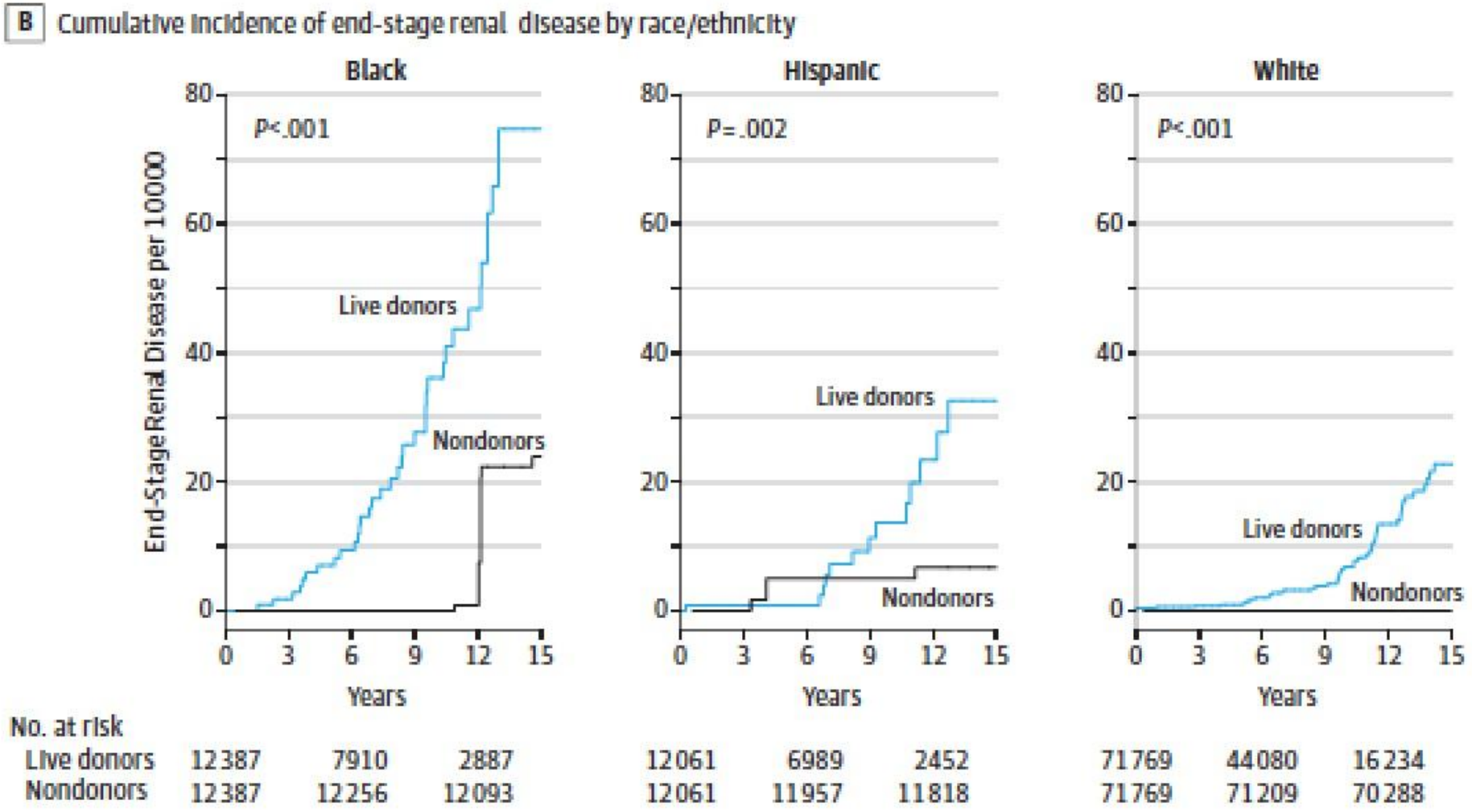
Risk of ESRD, LD vs.HND vs.USND

Muzaale JAMA 2014, 311:579-86

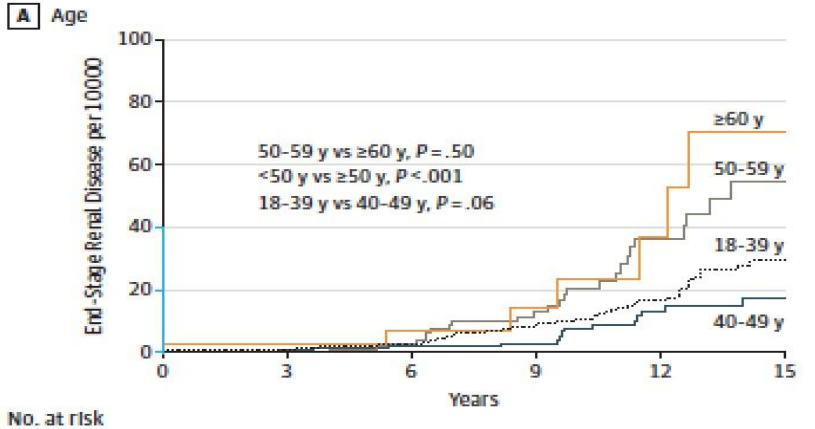


No. at risk							
Unscreened nondonor	1296	18436	36272	40863	26982	7990	647
Live donor	1143	13144	22647	22944	12151	2575	218
Healthy nondonor	1306	18487	36397	40961	28358	9011	870

ESDR Risk by Race/Ethnicity

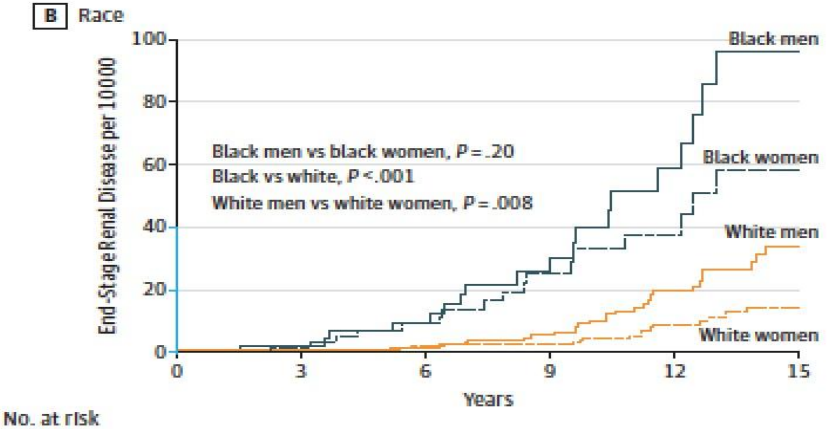


ESRD Risk by Age, Gender, Relationship, Period,



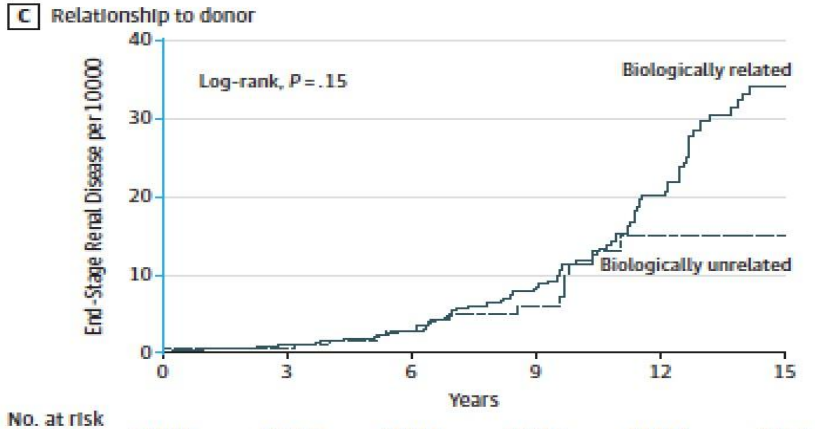
No. at risk

Age, y						
≥60	4039	2858	1967	1223	656	244
50-59	16840	12881	9241	5887	3015	1101
40-49	28994	23621	17929	11728	6261	2549
18-39	46344	38227	29842	20393	11641	4887



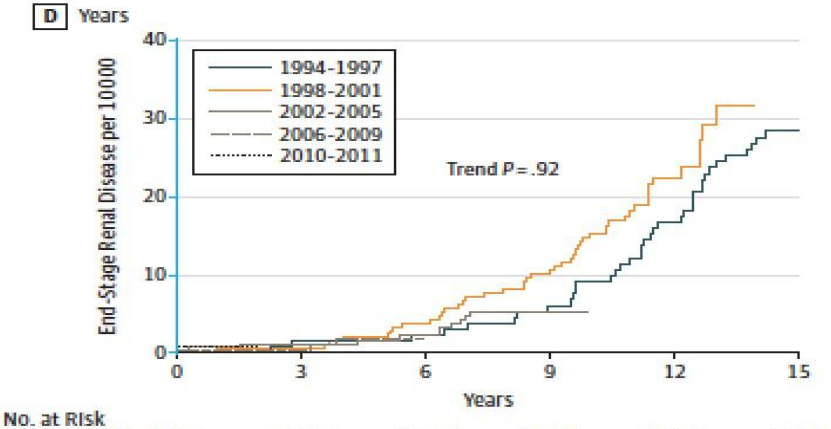
No. at risk

Black						
Men	5330	4409	3449	2247	1238	470
Women	7057	5773	4461	2968	1649	680
White						
Men	28941	23689	18120	12206	6744	2784
Women	42828	34266	25960	17278	9490	3886



No. at risk

Related	64897	54772	43454	30461	17764	7635
Unrelated	31081	22639	15351	8598	3643	1101



No. at Risk

1994-1997	13290	13263	13220	13135	13020	8781
1998-2001	20667	20620	20539	20426	8550	0
2002-2005	25924	25870	25220	5670	0	0
2006-2009	24827	17834	0	0	0	0
2010-2011	11509					

Author		Donors	FU	ESRD observed	ESRD expected	HR	Control group
Fehrman-Ekholm I. et.al.	Transplantation 1997, 64:976-8 2006, 82:1646-48	1112	20	6 =0,54%	2		
Segev D.L et. al	JAMA, March 10, 2010—Vol 303, No. 10 959	80347	6,3	No difference to controls			9364
Mjøen G. et. al	Kidney International (2014) 86, 162–167	1901	15,1	9 =0,47%	3	11,42	32621
Muzaale AD et.al.	JAMA 2014 311:579-86	96217	7,6	99	36		20024
Vienna unpublished	unpublished	1477	13,5	4 =,27%	2		

Balance of Risk and Benefit

- There is a very small risk of mortaliy
- There is a very small risk of decreasing life expectancy
- There is a very small risk of ESRD

These Risks have to be explained and balanced to the psychological benefit !

Vienna RT Experience

1.1.1965 – 14.10.2019

All Transpalnts	LDRT	
6777	754*)	11,12%

*) 4 out of 1425 (=0,28%) donors turned into uremia and requiered RRT

Gender Distribution in LDRT in A

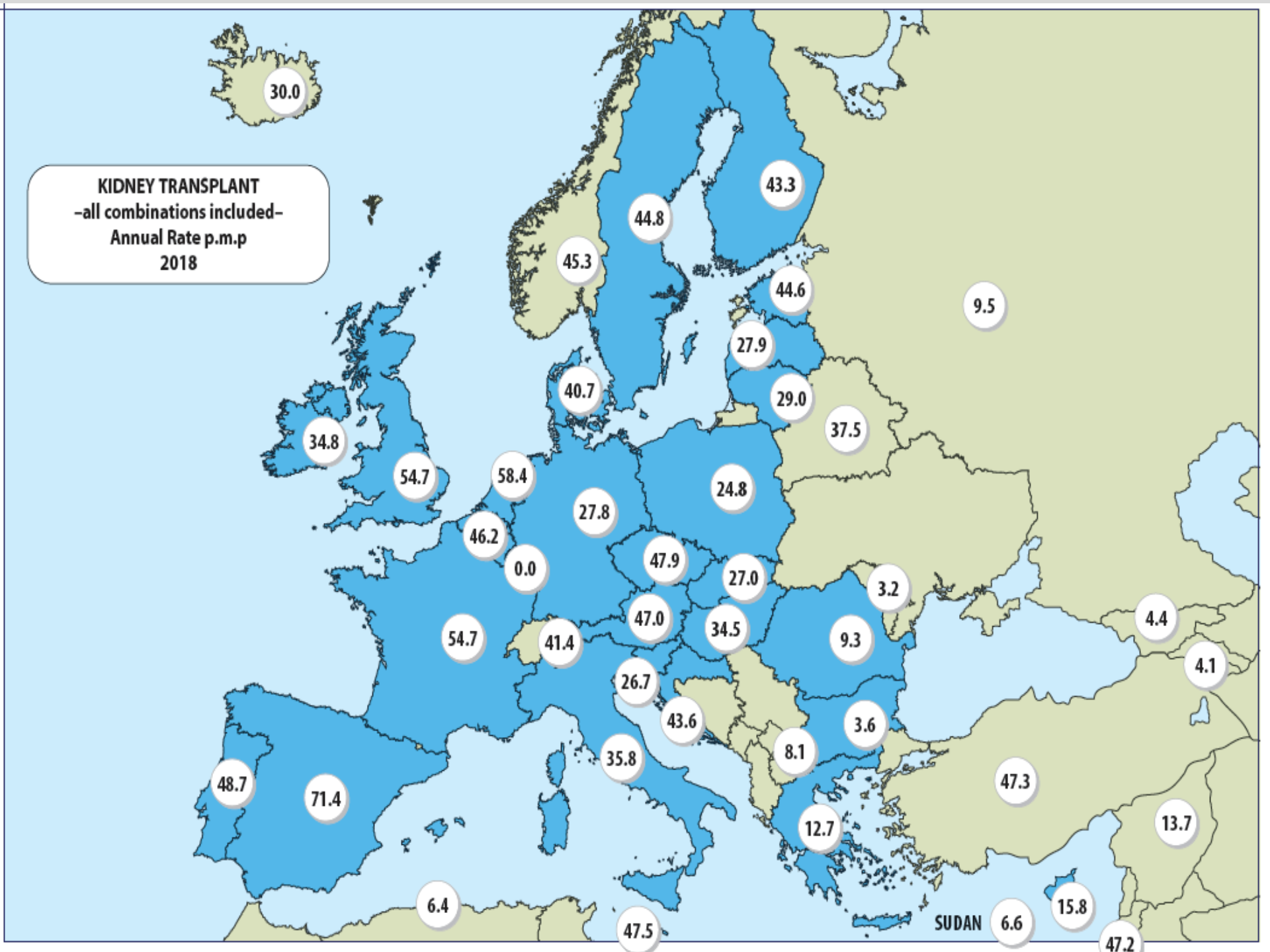
1973 – Aug.2018

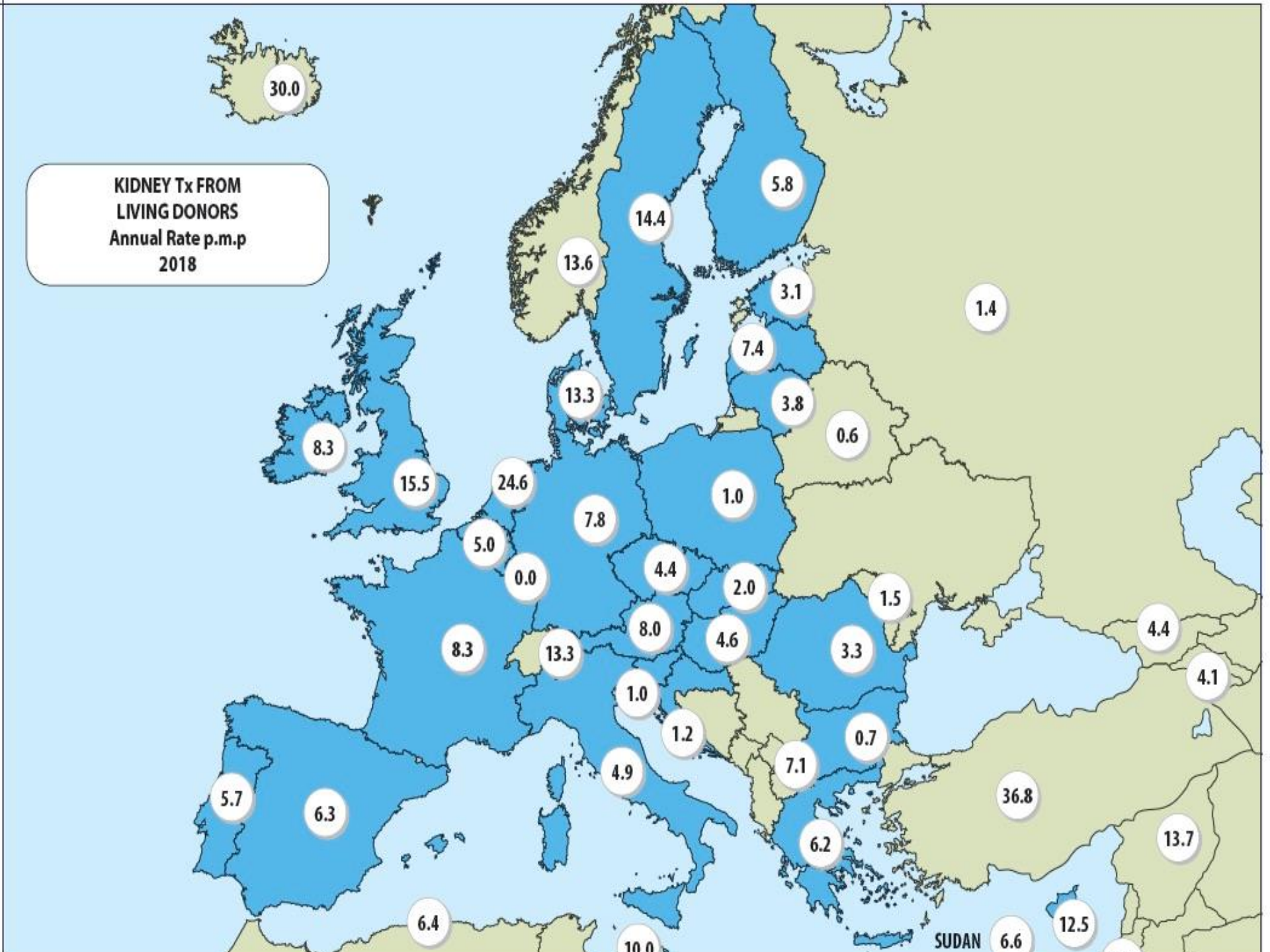
Donor	ET Data:	Recipient	ÖDTR:	
F	861	F	480	
M	527	M	945	
Total	1388	Total	1425	
F/M in %	62/38		34/66	

Vienna RT Experience

1.1.1965 – 30.11.2018

Transplant	#	male	female	Median age
1.	5462	3443	2019	49
2.	902	539	363	43
3.	216	133	83	42
4.	61	38	23	41
5.	15	12	3	44
6.	3	2	1	44
Summary	6659	4167	2492	
		63%	37%	


KIDNEY TRANSPLANT
–all combinations included–
Annual Rate p.m.p
2018
30.0
43.3
44.8
45.3
44.6
9.5
27.9
40.7
29.0
37.5
34.8
54.7
58.4
24.8
27.8
46.2
0.0
47.9
27.0
3.2
47.0
34.5
4.4
54.7
41.4
9.3
4.1
26.7
43.6
3.6
8.1
35.8
48.7
71.4
47.3
12.7
13.7
6.4
47.5
SUDAN
6.6
15.8
47.2


KIDNEY Tx FROM
LIVING DONORS
Annual Rate p.m.p
2018
30.0
14.4
5.8
13.6
3.1
1.4
7.4
13.3
3.8
0.6
8.3
15.5
24.6
7.8
1.0
5.0
0.0
4.4
2.0
1.5
8.0
4.6
3.3
4.4
8.3
13.3
4.1
1.0
1.2
0.7
7.1
4.9
5.7
6.3
36.8
13.7
6.2
6.4
12.5
SUDAN
6.6
10.0

Efficacy of LDRT

2018 (pmp)	A	B	HR	G	H	NL	SLO	F	E	GB	N	BiH 2017
NT	47,0	46,2	43,6	27,8	34,5	58,4	26,7	54,7	71,4	54,7	45,3	4,9
LDRT	8,0	5,0	1,2	6,2	4,6	29,8	1,0	8,3	6,3	15,5	13,6	3,7
%	17,0	10,8	2,8	22,3	13,3	51,0	3,7	15,2	8,8	28,3	30,0	75,5

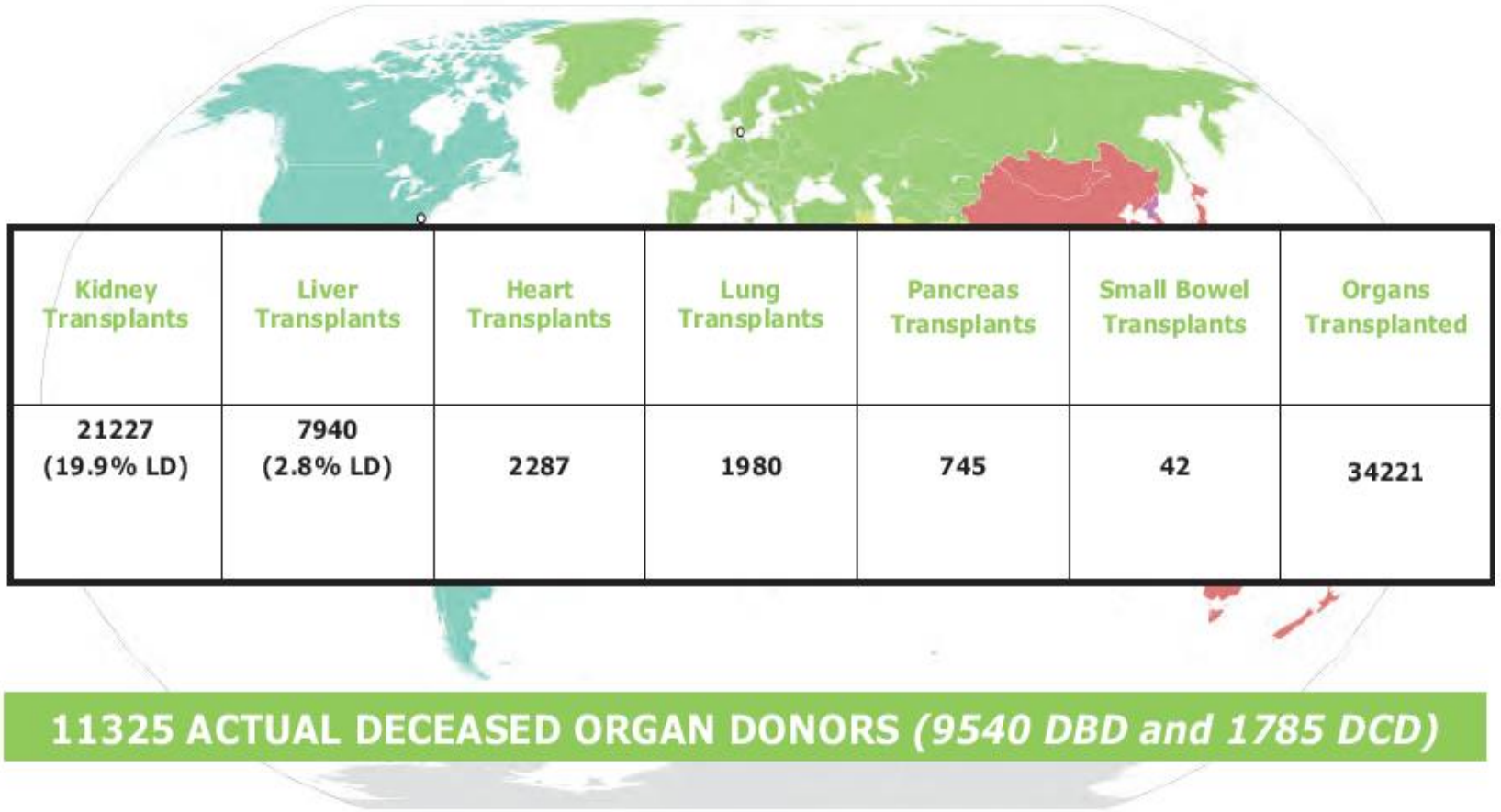
How many kidney transplants are needed?

GODT
Global Observatory on Donation and Transplantation

WHO Collaborating Centre on donation and Transplantation

GOBIERNO DE ESPAÑA · MINISTERIO DE SANIDAD, CONSUMO Y BIENESTAR SOCIAL · ONT

EUROPEAN UNION DATA



Kidney Transplants	Liver Transplants	Heart Transplants	Lung Transplants	Pancreas Transplants	Small Bowel Transplants	Organs Transplanted
21227 (19.9% LD)	7940 (2.8% LD)	2287	1980	745	42	34221

11325 ACTUAL DECEASED ORGAN DONORS *(9540 DBD and 1785 DCD)*

2018 data

N= 28 COUNTRIES (509.7 million inhabitants)

Conclusion

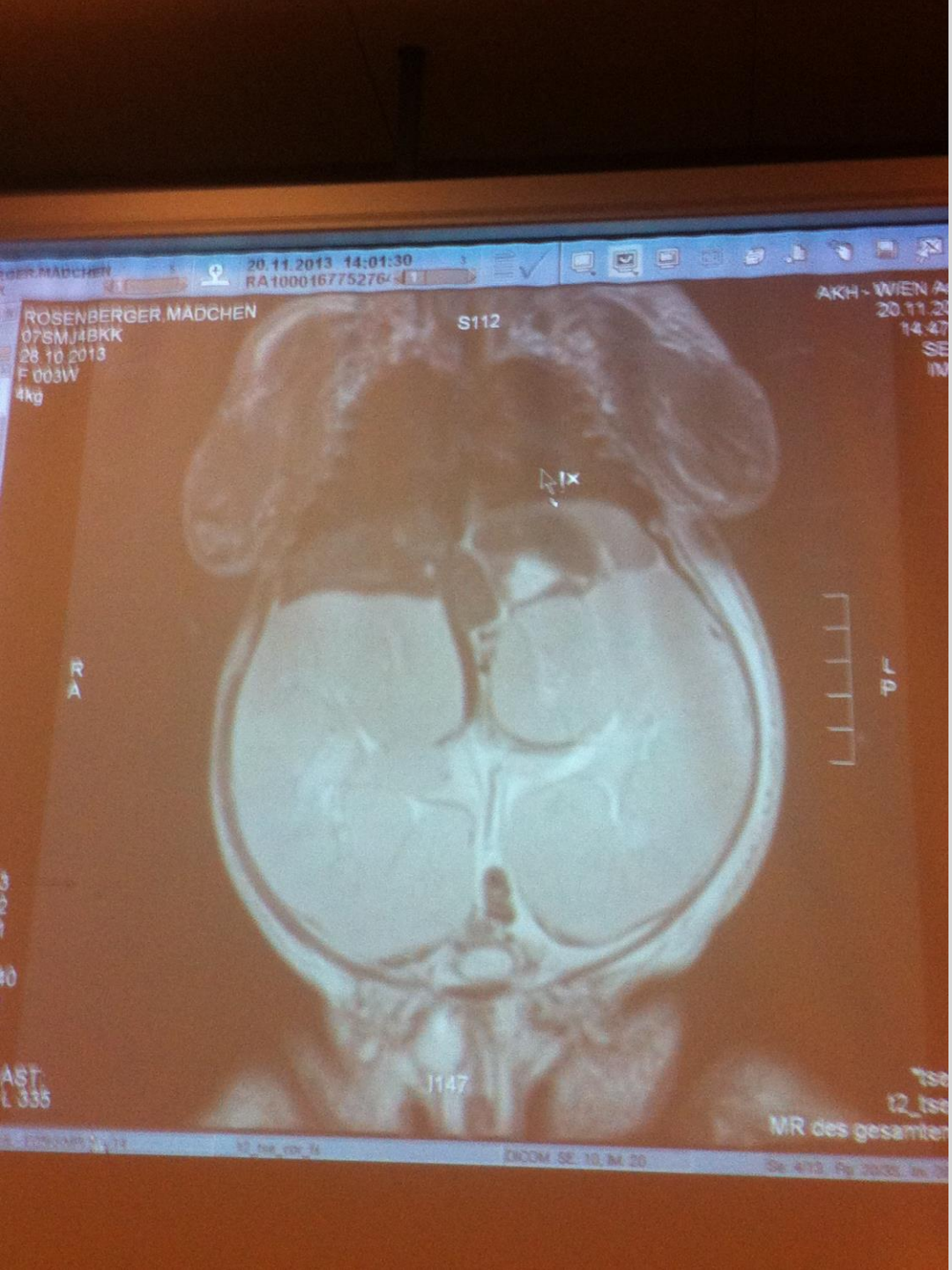
- LDRT still is the best Therapy for ESRD

However

- LDRT has inherent Donor Risk and has a -limited efficacy

Therefore

- Deceased Organ Donation has to be forced to give a chance not only to Kidney patients but also to Heart- Liver- Lung- and VCA Patients in the future.



PCKD

Nephrectomy 2M

PD failed

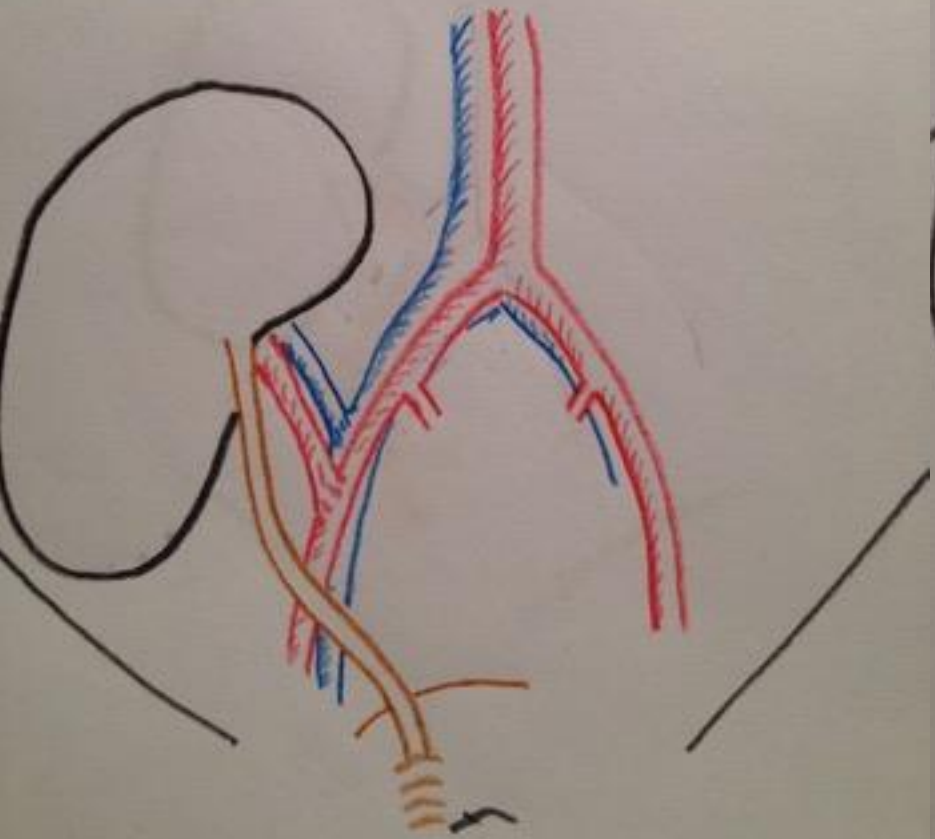
Hemodialysis

At 6 M

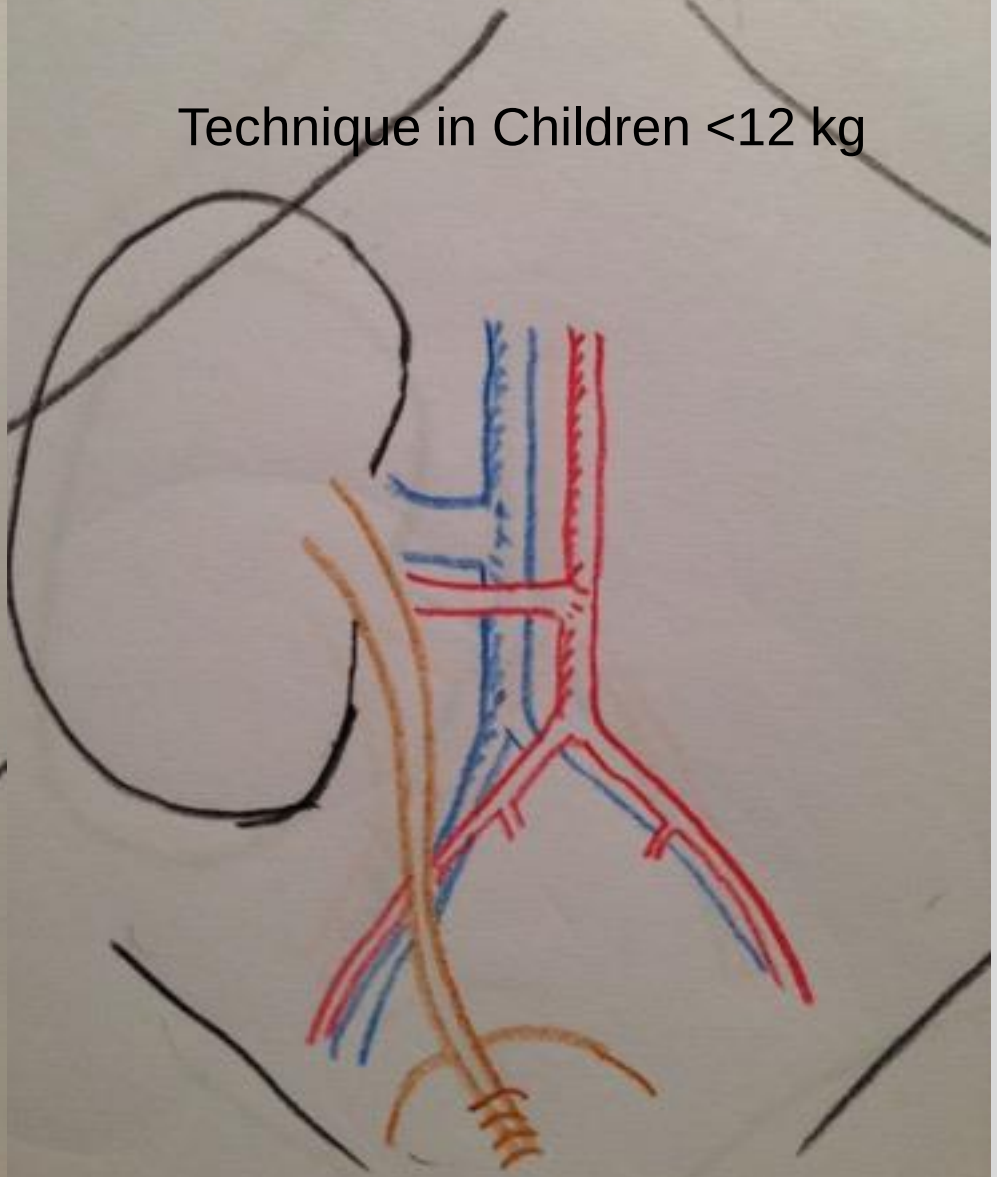
5 kg

LDRT

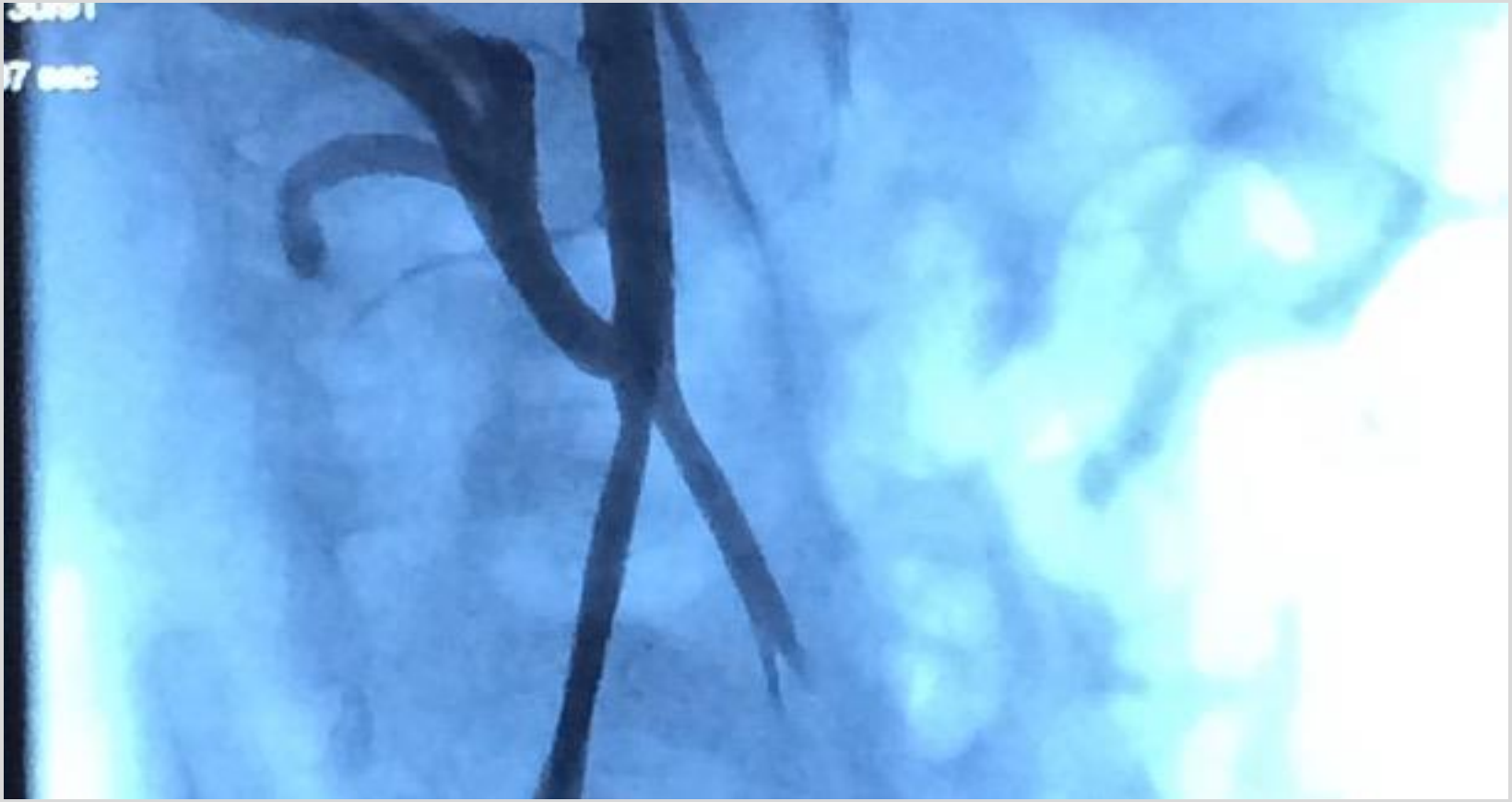
Technique in Adults



Technique in Children <12 kg



Angiography



....7 years later

The Family

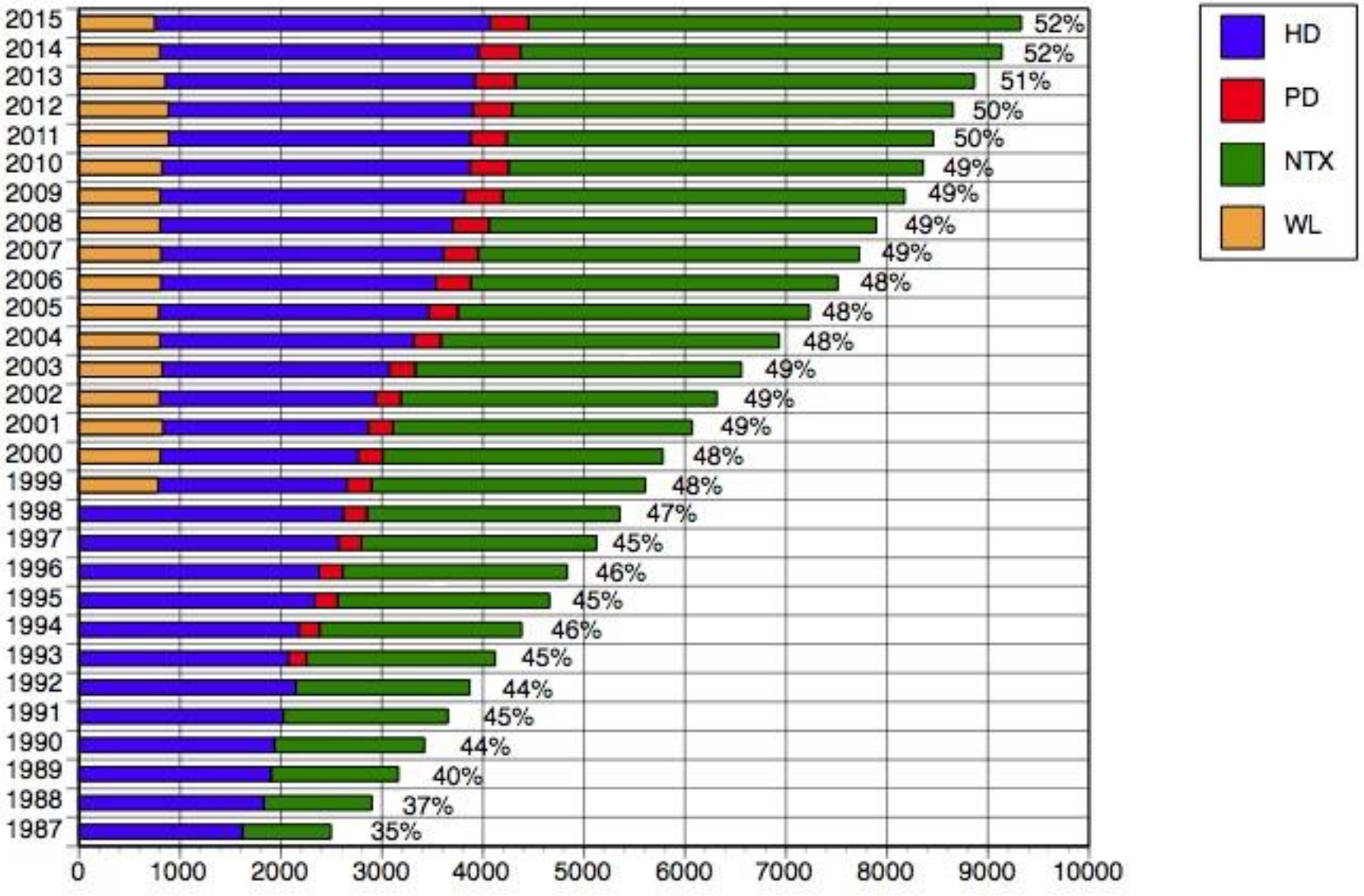
Mono-ovarian Twins

Bilder mit freundlicher Genehmigung der Familie


HEUTE:
EIER
SCHAUKE

Update 2019 Monoovarian Twins

Versorgungswirksamkeit der NT



Waitlist 31.12.2017

	A	B	HR	G	H	NL	SLO
Heart	69	103	35	724	61	107	42
Lung	105	143	-	391	-	178	-
Liver	68	201	107	1086	101	133	18
Kidney	528	849	206	7924	872	673	53
Pancr.	8	26	-	261	29	19	2

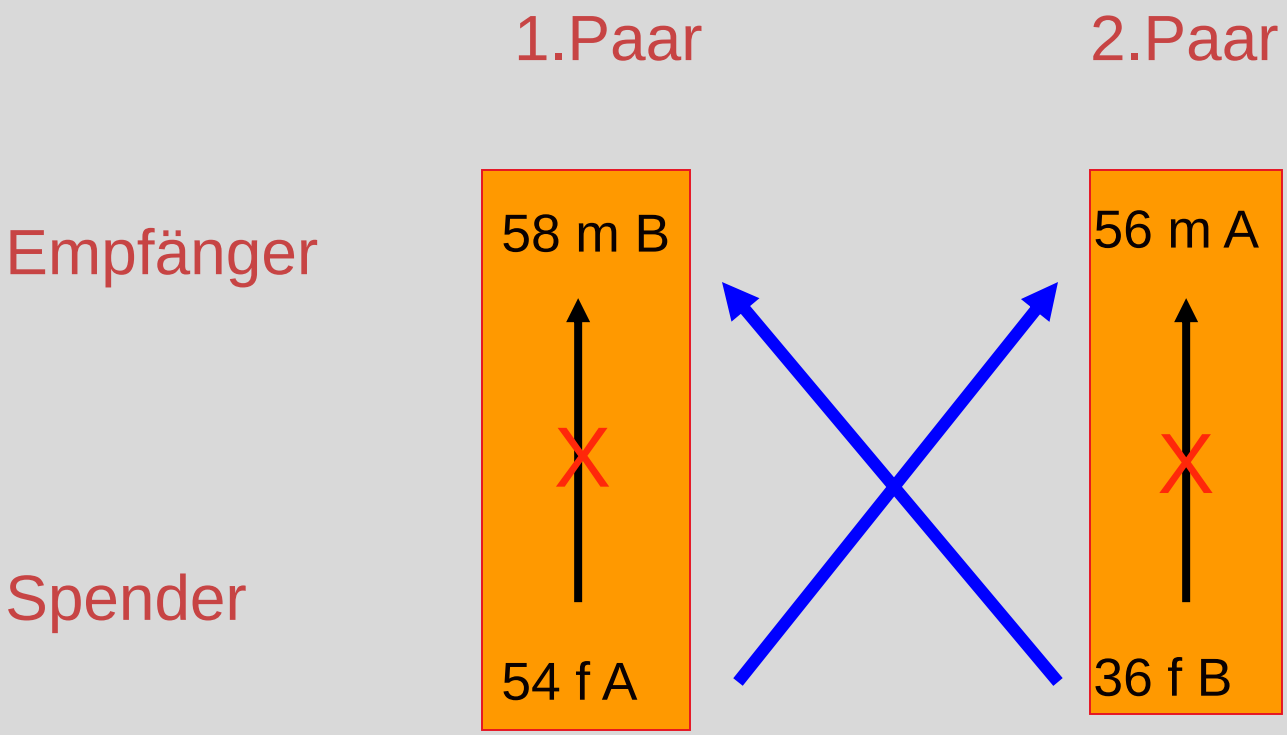
Eurotransplant On-line Data 3/2018

VCA (Vascularized Composite Allografts)

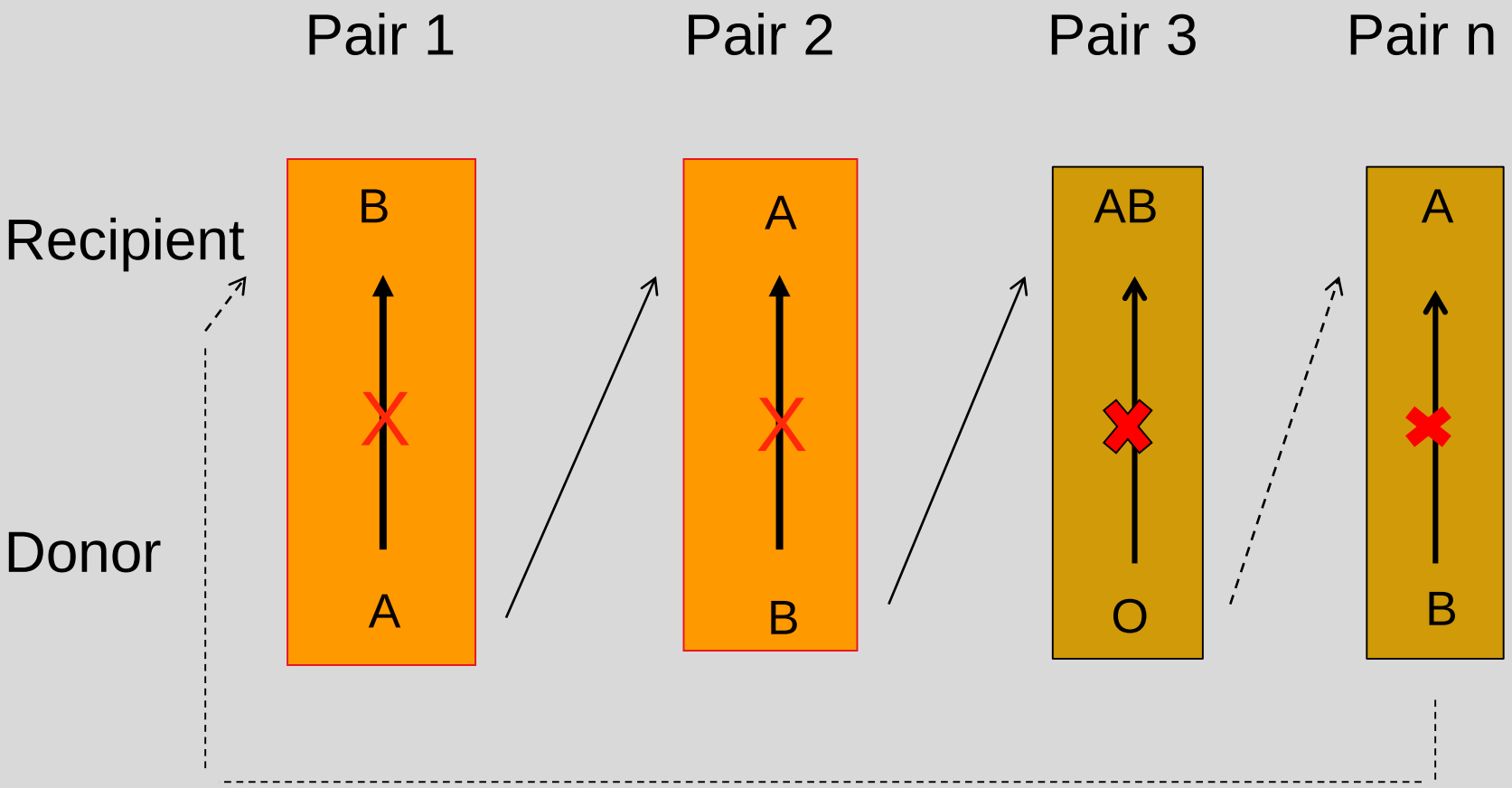
Theo Kelz
Doppelhand TX 7.3.2000

Isabel Denoir
Gesichtstransplantation 6.2.2006
† April 2016 (49a)

„Cross over“ Transplantation



„Paired Donation“ Transplantation



Hand/Arm Transplantation

	Double	Single/Arm/Hand	Summe	Graft survival
USA	8	13	21	>90%
Europe/Australia	17	13	30	>90%
China	3	9	12	5/12

Shores J....Brandacher G: J Mater.Sci:Mater.Med. 2017:May: 28(5), 28:72

Transplantationen in Ö

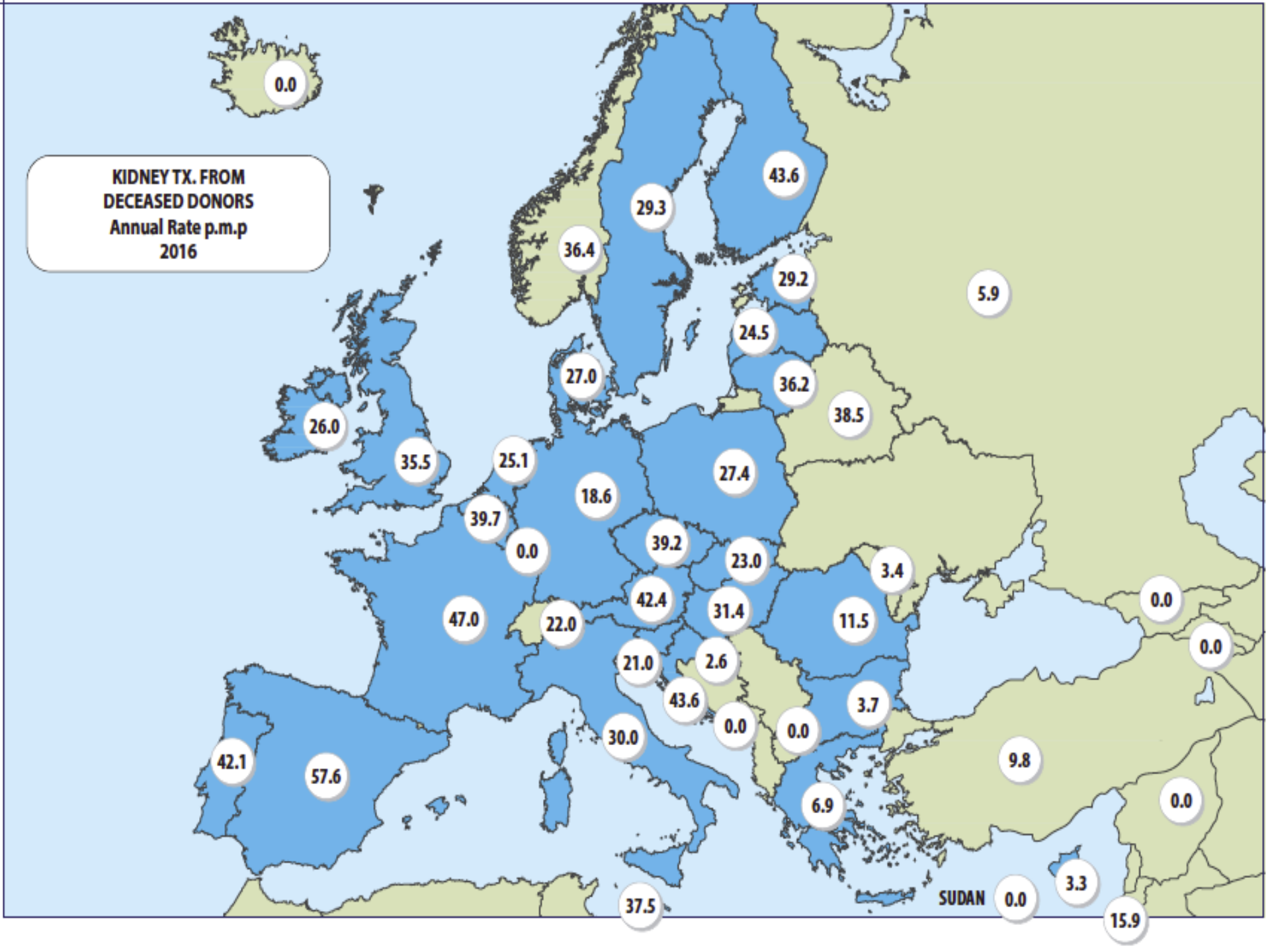
Häufigkeit

Organ/System	Häufigkeit in Ö / Jahr
Niere	400
Leber	150
Lunge	120
Herz	70
Pankreas	25
VCA	0-1
Spender	200

Let Us Plant
a Tree

as a
Gratitude

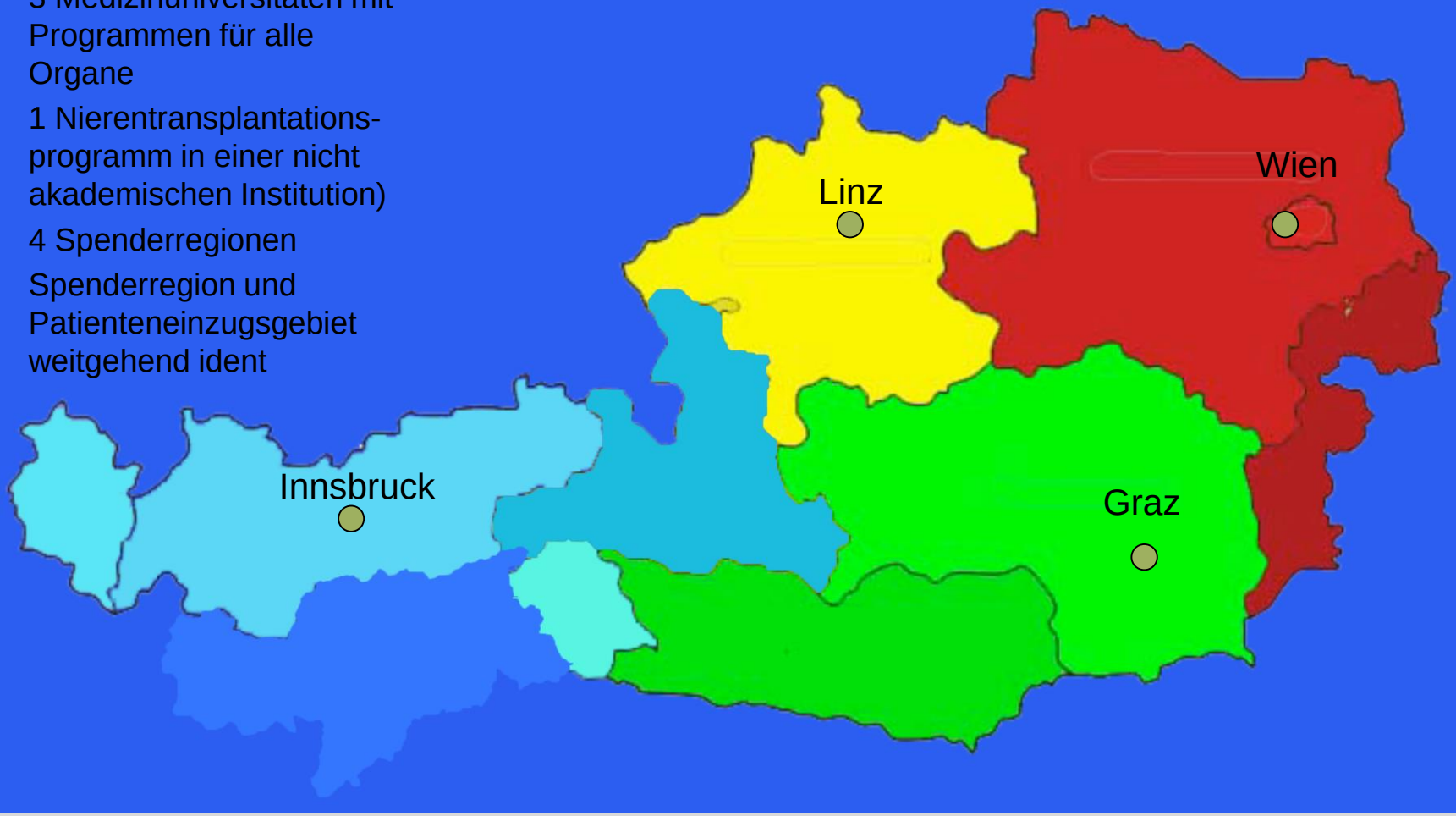
to Living and
Deceased
Organ
Donors


KIDNEY TX. FROM
DECEASED DONORS
Annual Rate p.m.p
2016
0.0
43.6
29.3
36.4
29.2
5.9
24.5
27.0
36.2
38.5
26.0
35.5
25.1
27.4
18.6
39.7
0.0
39.2
23.0
3.4
42.4
31.4
11.5
0.0
47.0
22.0
21.0
2.6
0.0
43.6
3.7
0.0
30.0
0.0
9.8
42.1
57.6
6.9
0.0
SUDAN
0.0
3.3
37.5
15.9

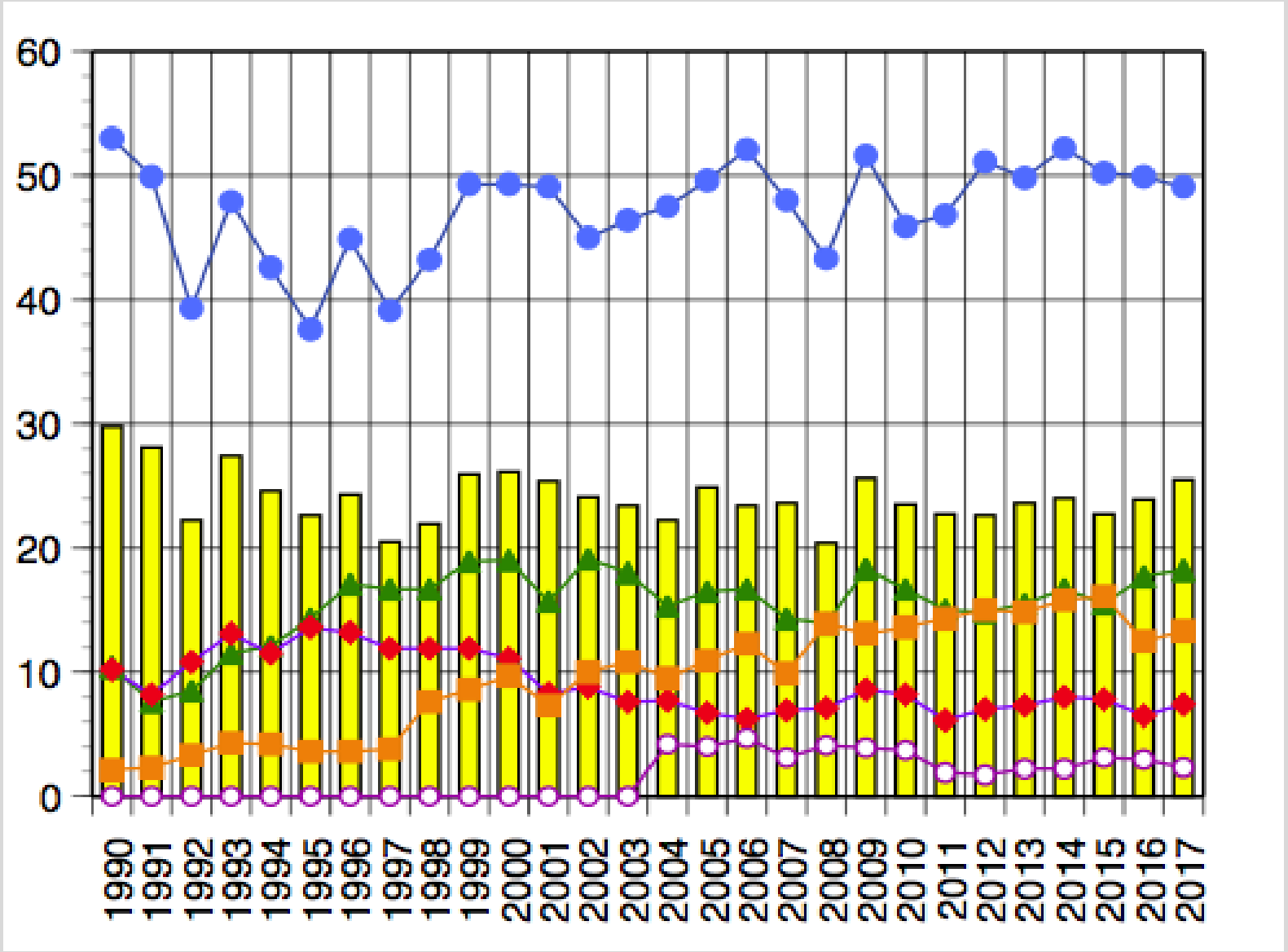
Struktur des Österreichischen Transplantationswesens

Zentrumbasiert, wenig regulatorischer Einfluss (Föderalismus)

- 3 Medizinuniversitäten mit Programmen für alle Organe
- 1 Nierentransplantations-programm in einer nicht akademischen Institution)
- 4 Spenderregionen
- Spenderregion und Patienteneinzugsgebiet weitgehend ident



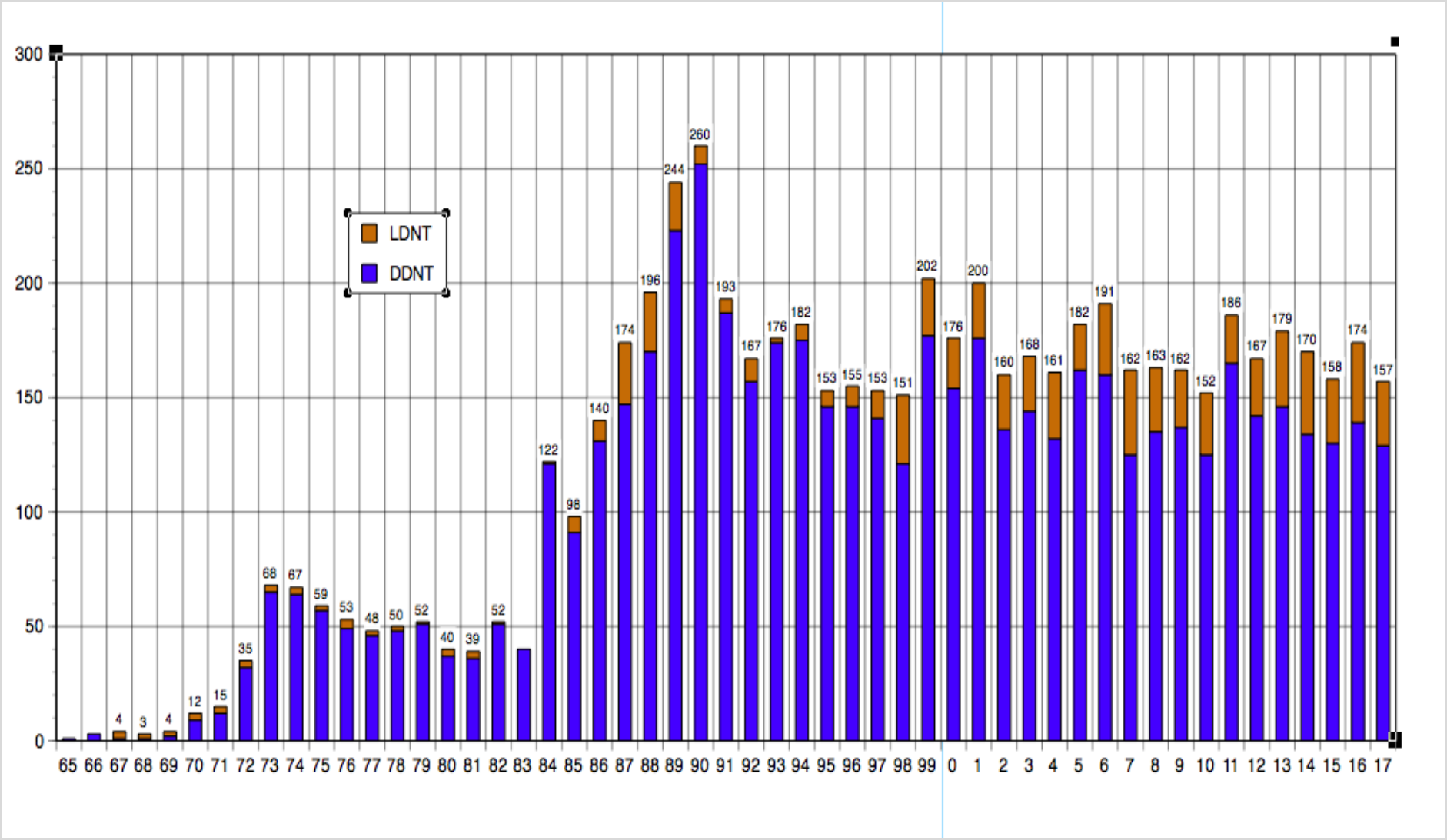
Donor- and Tx Frequencies in A



Themen

- Alterslimit
- GFR Limit
- Follow up Frequency
- Nephrektomieseite
- Open vs Laparoskopic

History of Renal TX in AKH Vienna



LDRT Graft Survival 1. Tx by Period