

Ampliando indicaciones en el trasplante renal de donante vivo: trasplante renal en donante y receptor añoso

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KIDNEY TRANSPLANTATION FROM OLD DONORS IS BETTER THAN REMAINING ON DIALYSIS FOR ELDERLY RECIPIENTS

- Despite poorer results, the use of old kidneys targeted to a selected population may provide better survival than remaining on dialysis. Old donors constitute an enormous potential source of useful kidneys, but their use in a vast majority of countries is limited. Strategies and policies should be fostered to solve it (review)

Montero N et al. Transplantation 2017

- Despite KT from octogenarian deceased donors being associated with reduced graft survival, recipients had lower mortality rates than those remaining on dialysis, even if the kidney came from an extremely aged donor. (RMRC data)

Arcos E et al. Transplantation 2020

- Compared with remaining on dialysis, elderly KTRs (>70 years) incur an increased risk of early posttransplant mortality but thereafter may anticipate progressively superior survival rates. (ANZ registry)

Shi B et al. AM J Transplant 2023

CAUTION TO USE OF HIGHLY EXPANDED DONORS

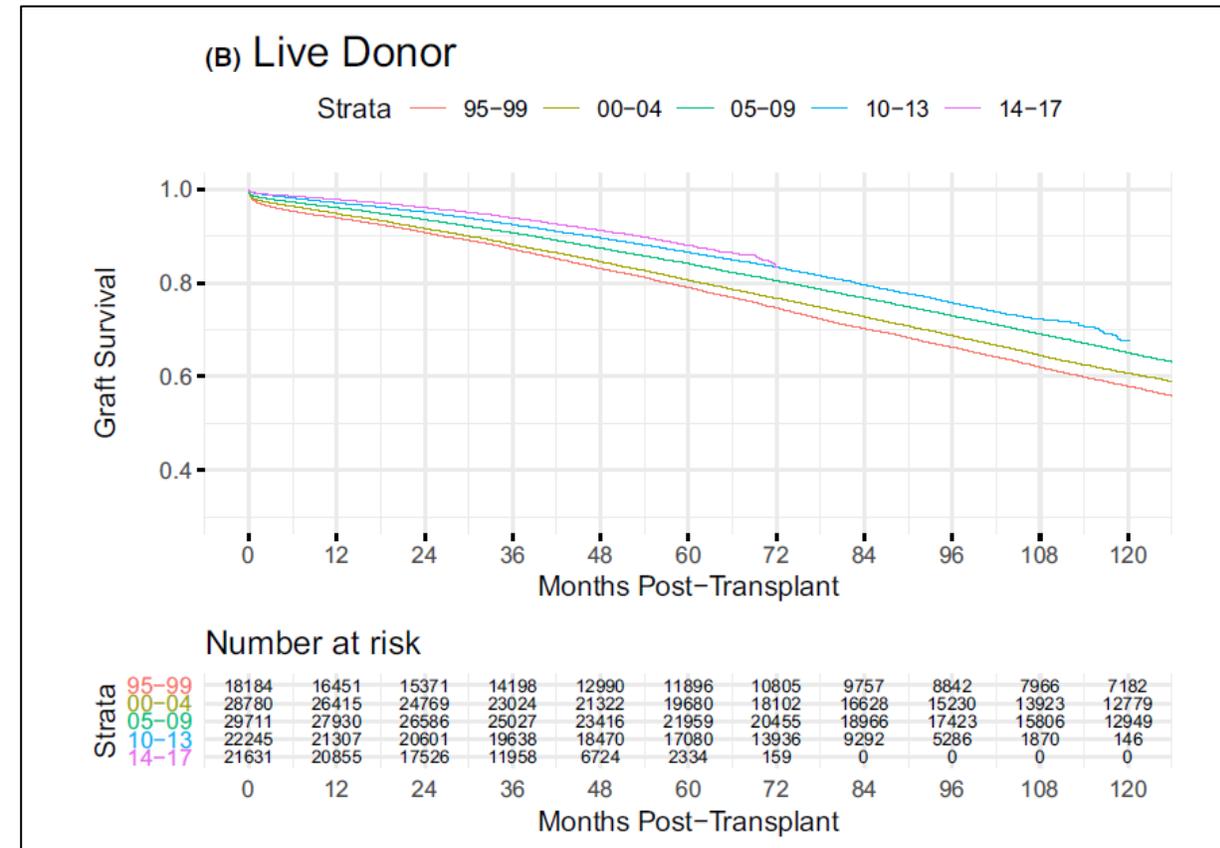
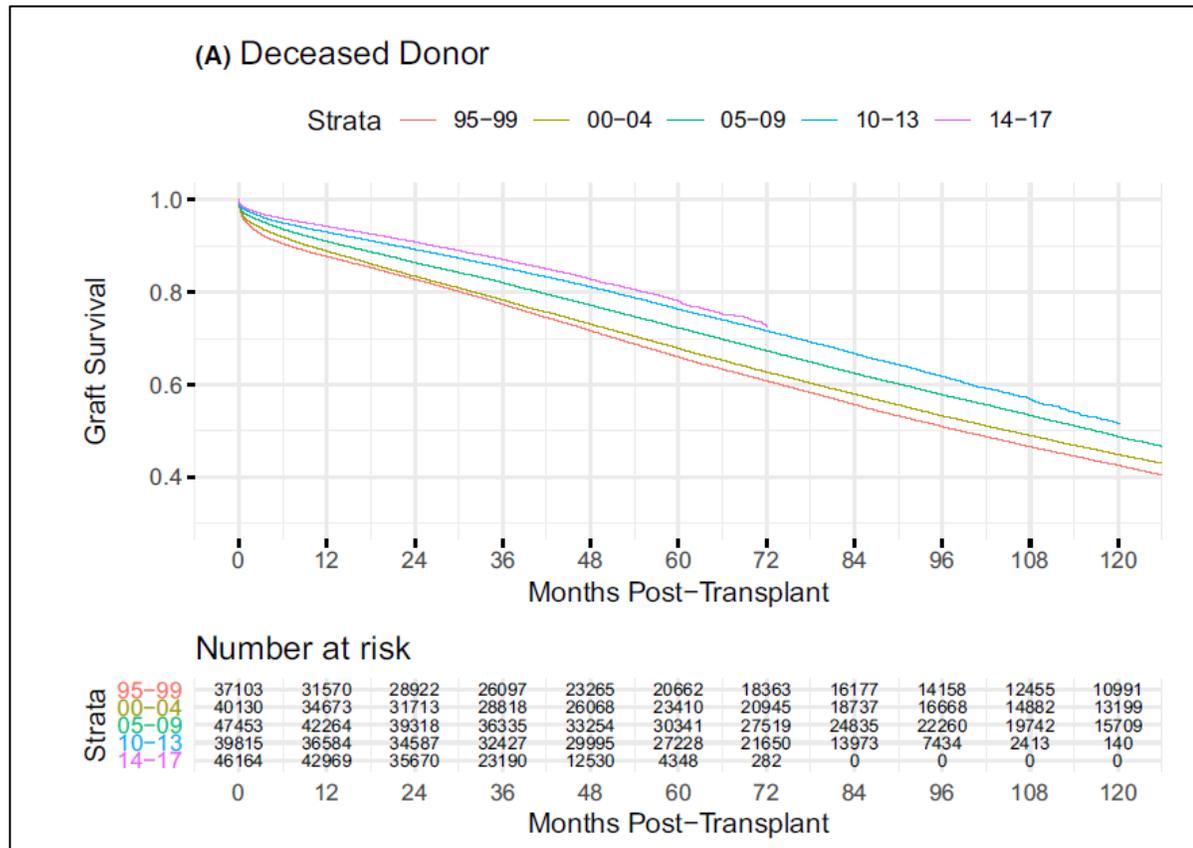
- Elderly recipients of elderly kidneys obtained from DCD had a 5-year mortality rate comparable to that of waitlisted elderly patients who remained on dialysis. Thus, improving donor selection and preservation is warranted if the allocation of elderly DCD grafts to elderly recipients is to be expanded. (Ducht registry)

Peter-Sengers H et al. J Am Soc Nephrol 2017

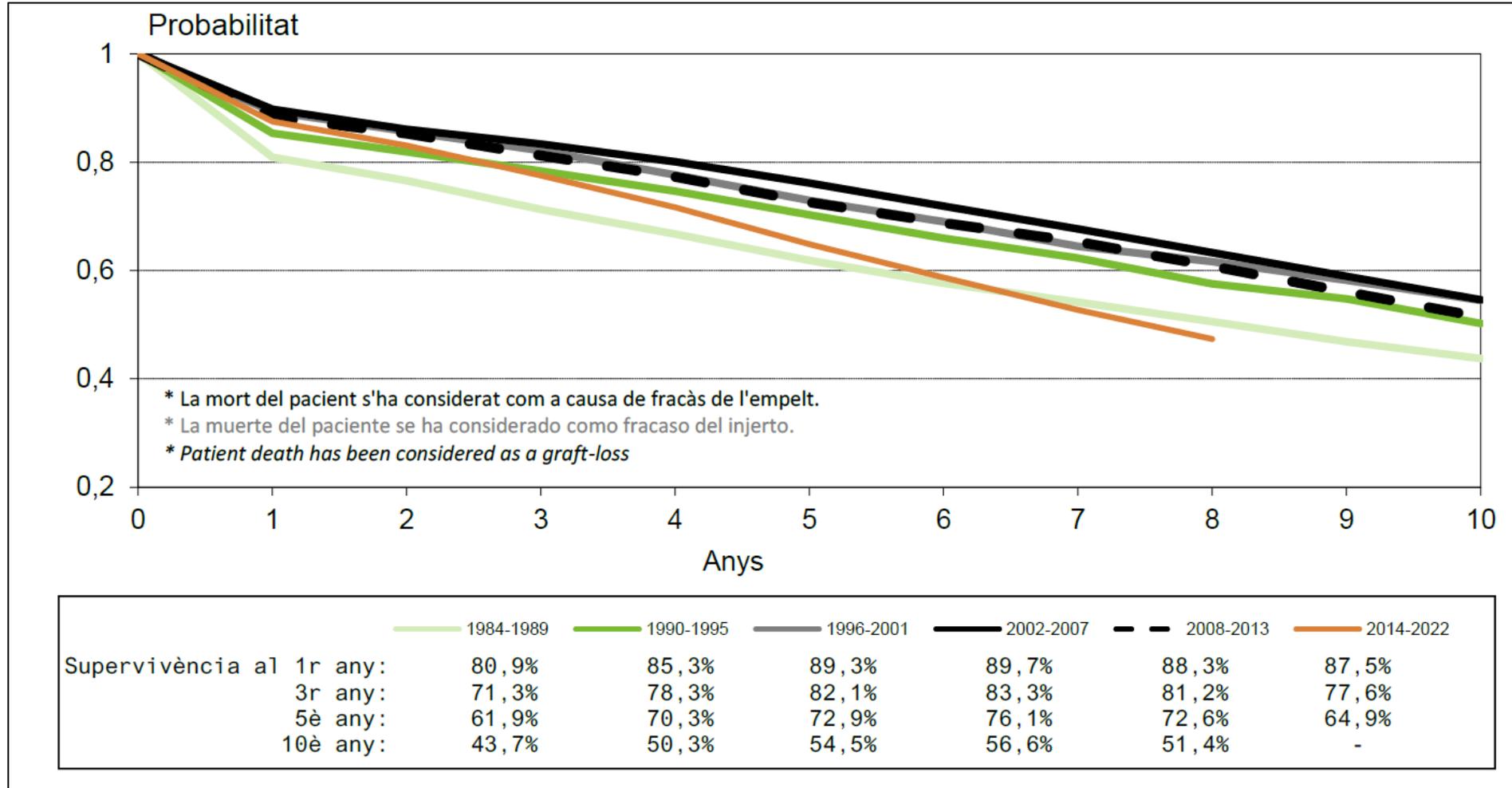
- Strategies to increase the donor pool, including cDCD transplants with highly expanded donor and recipient candidates should be performed with caution. (RMRC and EKITE validation)

Montero N et al. Transplant Int 2021

LONG-TERM GRAFT OUTCOMES ARE STEADILY IMPROVING LIVING DONORS OFFER BETTER RESULTS THAN DECEASED DONORS



CAUTION: UNADJUSTED DATA FROM RMRC SHOWED THAT WE ARE NOT IMPROVING

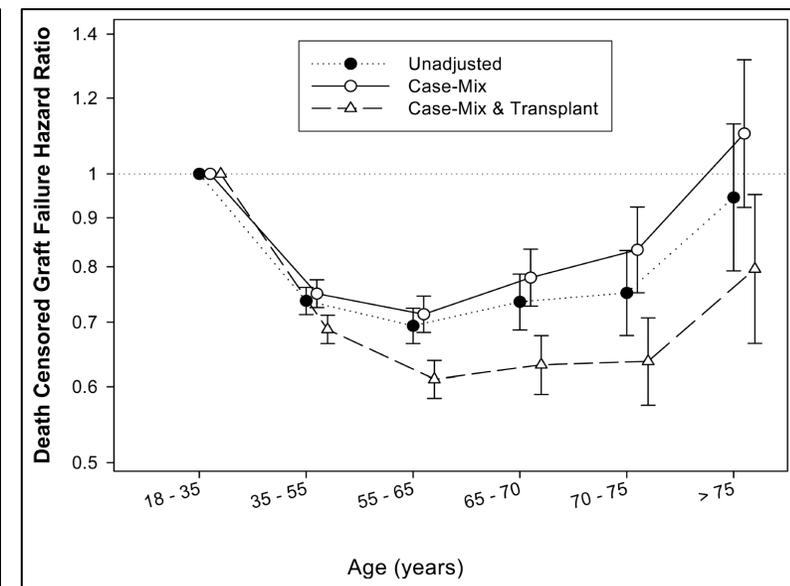
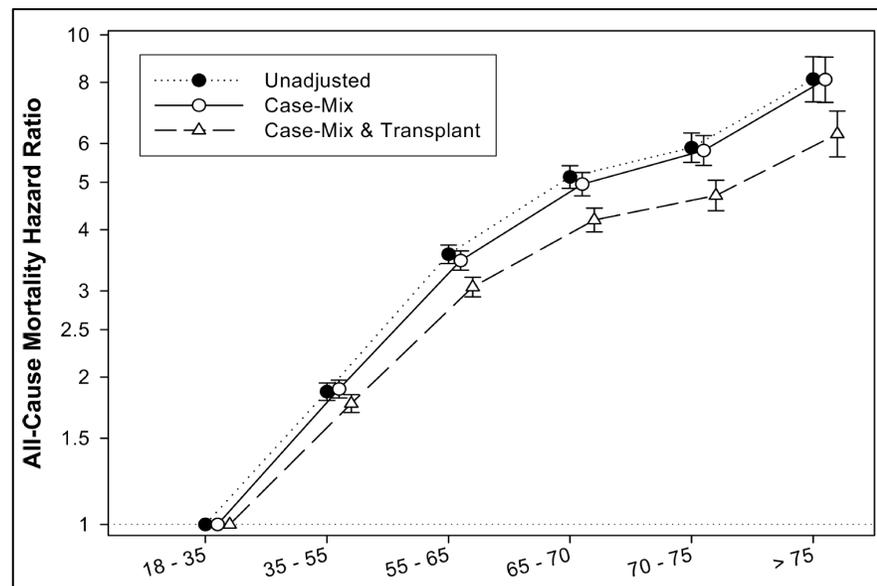
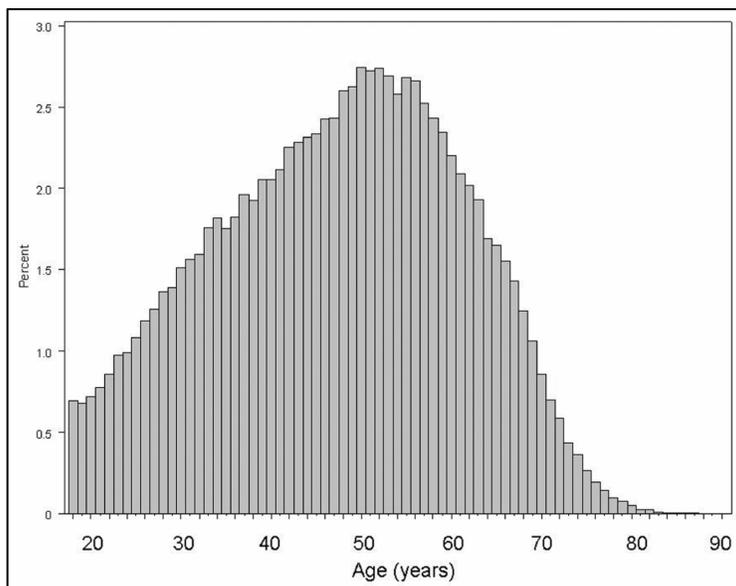


LIVING DONOR vs. DECEASED DONOR FOR ELDERLY RECIPIENTS



Age and the Associations of Living Donor and Expanded Criteria Donor Kidney With Kidney Transplant Outcomes

(N=145,170 KT in USA listed in SRTR up to 2006)



Age and the Associations of Living Donor and Expanded Criteria Donor Kidney With Kidney Transplant Outcomes

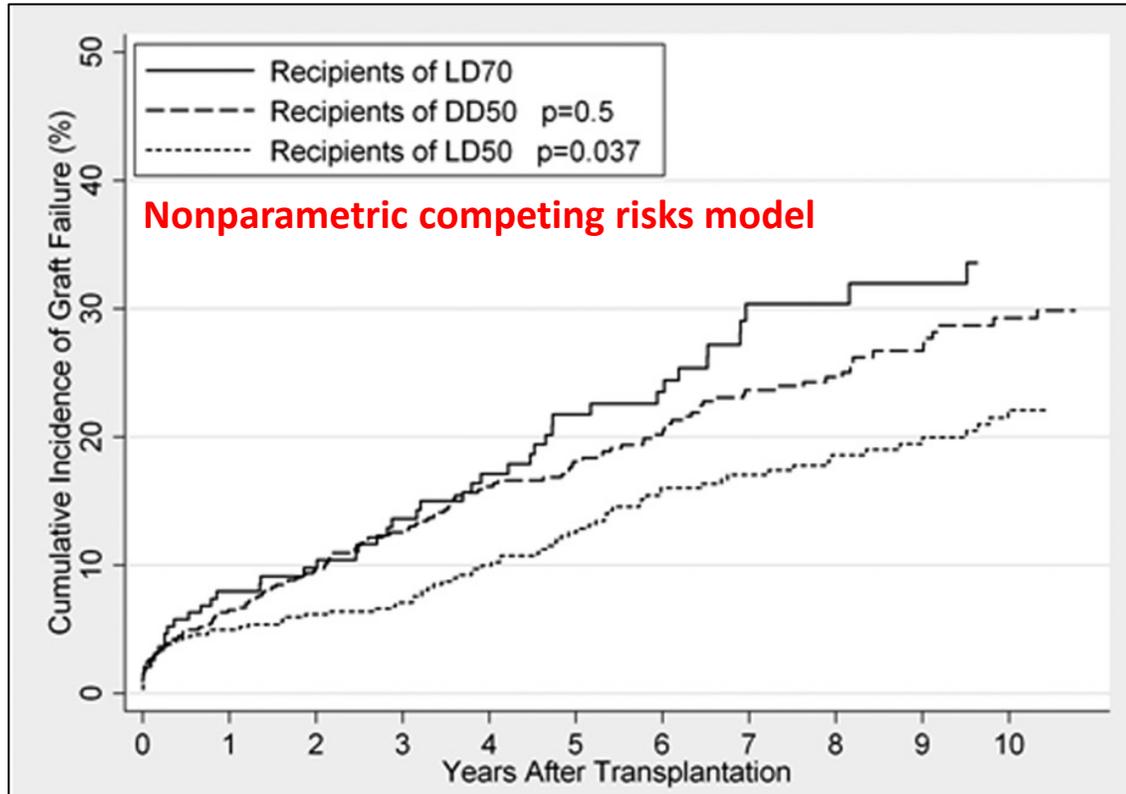
(N=145,170 KT in USA listed in SRTR up to 2006)

Type of Donor Kidney		<i>Non-elderly</i>			<i>Elderly</i>		
All cause mortality		<i>18-<35 y</i>	<i>35-<55 y</i>	<i>55-<65 y</i>	<i>65-<70 y</i>	<i>70-<75 y</i>	<i>≥75 y</i>
<i>ECD vs. non-ECD kidney</i>							
Unadjusted Case-mix model Fully adjusted	Type of Donor Kidney	<i>Non-elderly</i>			<i>Elderly</i>		
	Death-censored graft failure	<i>18-<35y</i>	<i>35-<55 y</i>	<i>55-<65 years</i>	<i>65-<70 years</i>	<i>70-<75 years</i>	<i>≥75 years</i>
Living vs. deceased donor	<i>ECD vs. non-ECD kidney</i>						
Unadjusted Case-mix model Fully adjusted	Unadjusted	1.72 (1.51– 1.96)	1.72 (1.60– 1.84)	2.12 (1.95– 2.30)	2.00 (1.72– 2.31)	2.04 (1.64– 2.54)	1.81 (1.21– 2.70)
	Case-mix model *	1.57 (1.41– 1.75)	1.56 (1.44– 1.69)	2.02 (1.84– 2.21)	2.00 (1.72– 2.32)	2.11 (1.69– 2.64)	1.94 (1.29– 2.93)
	Fully adjusted model **	1.40 (1.25– 1.58)	1.31(1.22– 1.40)	1.38 (1.24– 1.53)	1.36 (1.09– 1.71)	1.32 (0.96– 1.82)	1.45 (0.67– 3.15)
Living vs. non-ECD deceased kidney	Living vs. deceased donor						
Unadjusted Case-mix model Fully adjusted	Unadjusted	0.61 (0.58– 0.65)	0.52 (0.49– 0.54)	0.49 (0.45– 0.53)	0.45 (0.38– 0.53)	0.42 (0.32– 0.56)	0.46 (0.28– 0.78)
	Case-mix model *	0.68 (0.64– 0.73)	0.60 (0.57– 0.63)	0.53 (0.49– 0.58)	0.46 (0.39– 0.55)	0.43 (0.32– 0.57)	0.49 (0.29– 0.83)
	Fully adjusted model **	0.78 (0.70– 0.87)	0.71 (0.66– 0.77)	0.68 (0.61– 0.77)	0.51 (0.41– 0.64)	0.71 (0.48– 1.04)	1.17 (0.61– 2.25)
Unadjusted Case-mix model Fully adjusted	Living vs. non-ECD deceased kidney						
	Unadjusted	0.64 (0.60– 0.69)	0.56 (0.53– 0.59)	0.59 (0.54– 0.65)	0.56 (0.47– 0.67)	0.56 (0.41– 0.75)	0.55 (0.31– 0.97)
	Case-mix model *	0.68 (0.63– 0.72)	0.62 (0.59– 0.66)	0.63 (0.57– 0.69)	0.57 (0.47– 0.68)	0.55 (0.41– 0.75)	0.56 (0.31– 1.01)
	Fully adjusted model **	0.80 (0.72– 0.88)	0.74 (0.68– 0.80)	0.72 (0.63– 0.82)	0.53 (0.40– 0.70)	0.70 (0.44– 1.12)	1.13 (0.52– 2.48)

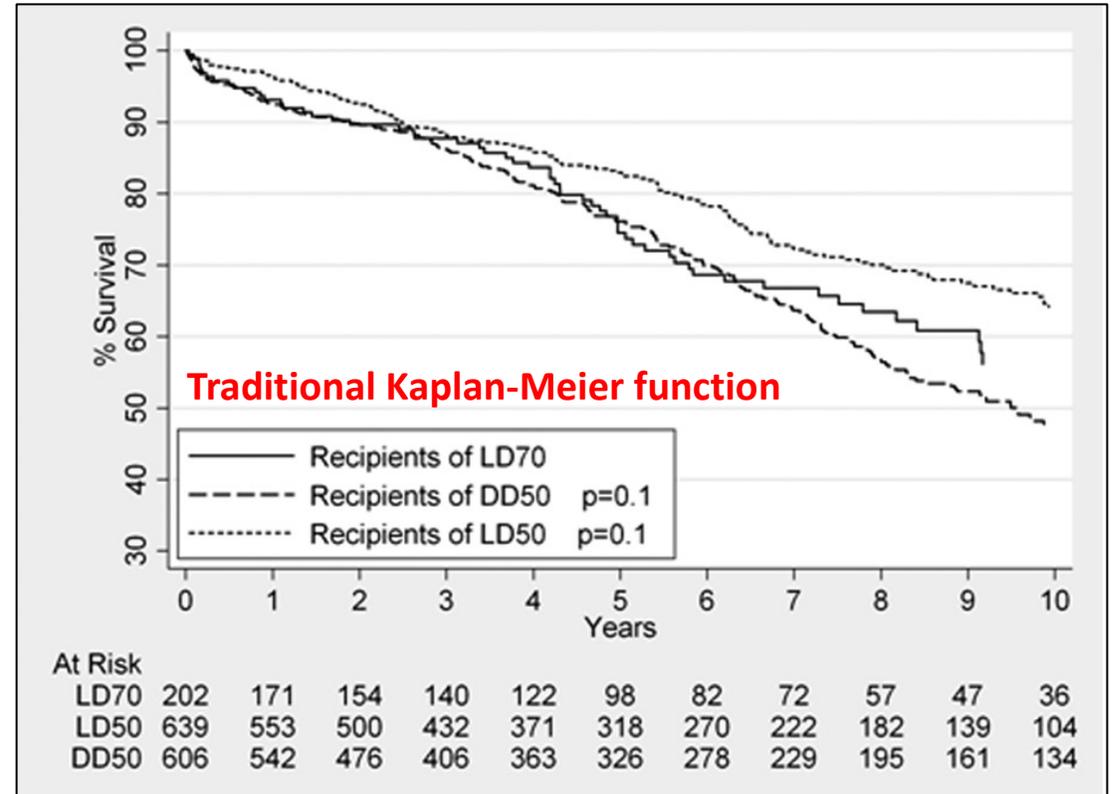
Living Kidney Donors Ages 70 and Older: Recipient and Donor Outcomes

1990-2008 LKT in USA with donors older than 70 years n=219

Matched cohorts by history of HTA, age, ethnicity, years of dialysis, insurance status, PRA, and year of transplantation from LKT with donors 50-60 and with non-ECD 50-60 years.



Graft failure was less frequent with LD 50-60 y than with LD > 70 y
 Graft failure was not different with LD > 70 y than with DD non-ECD

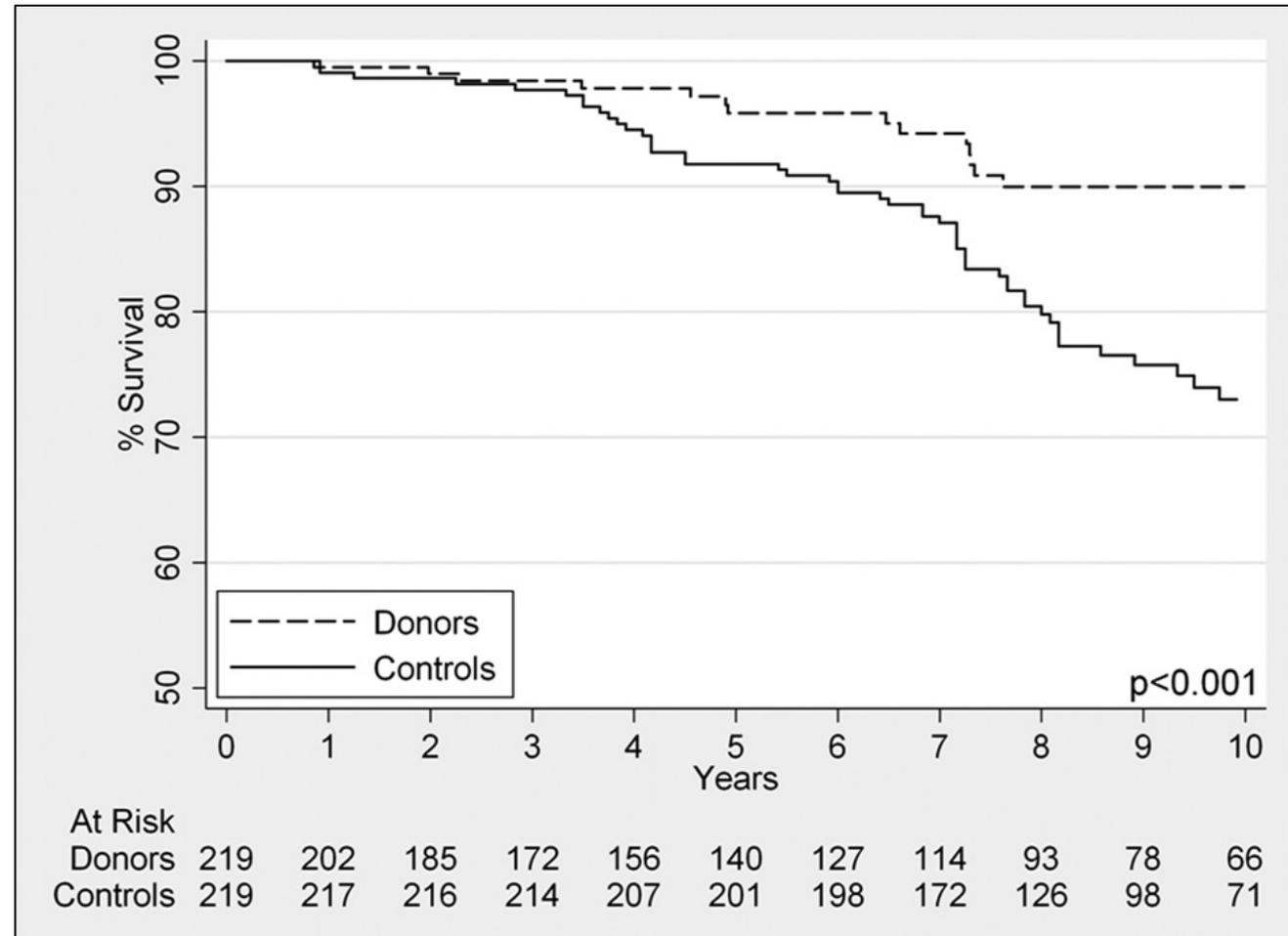


Patient survival was not different among these 3 groups

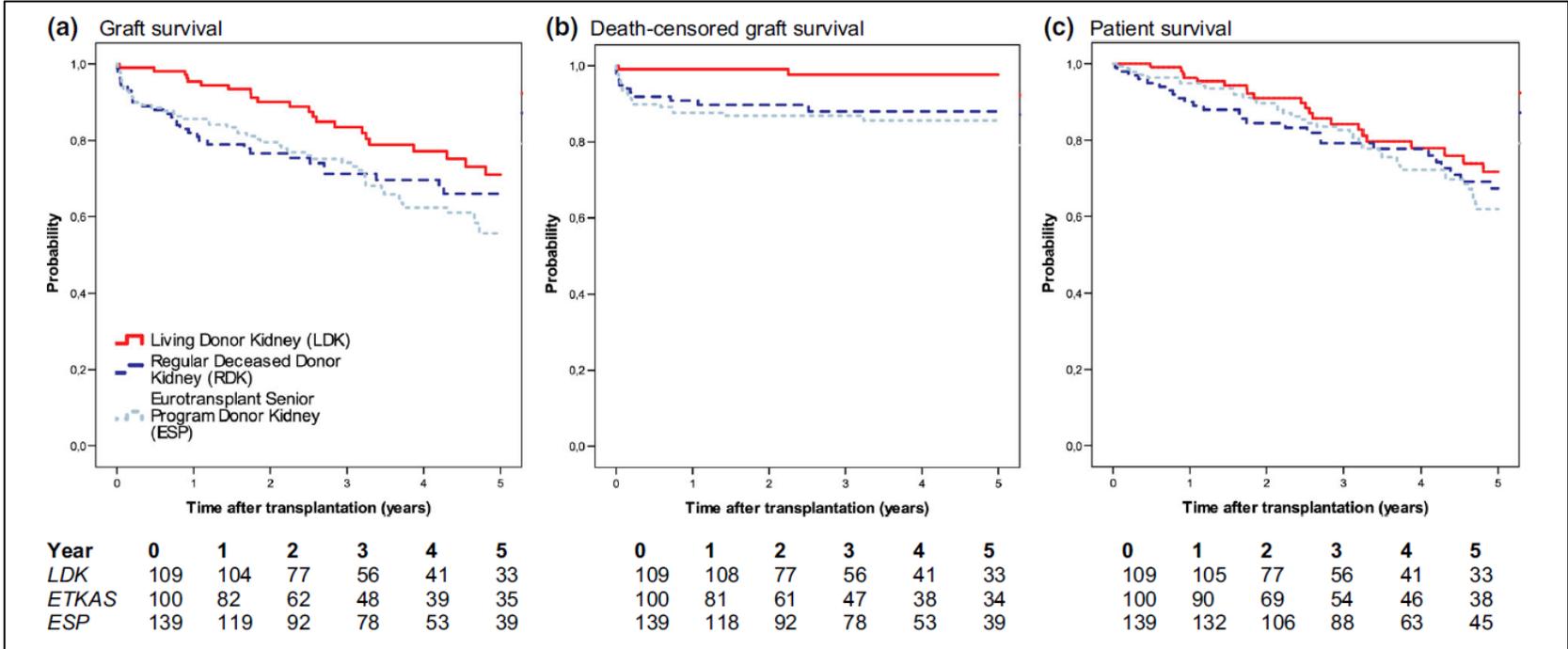
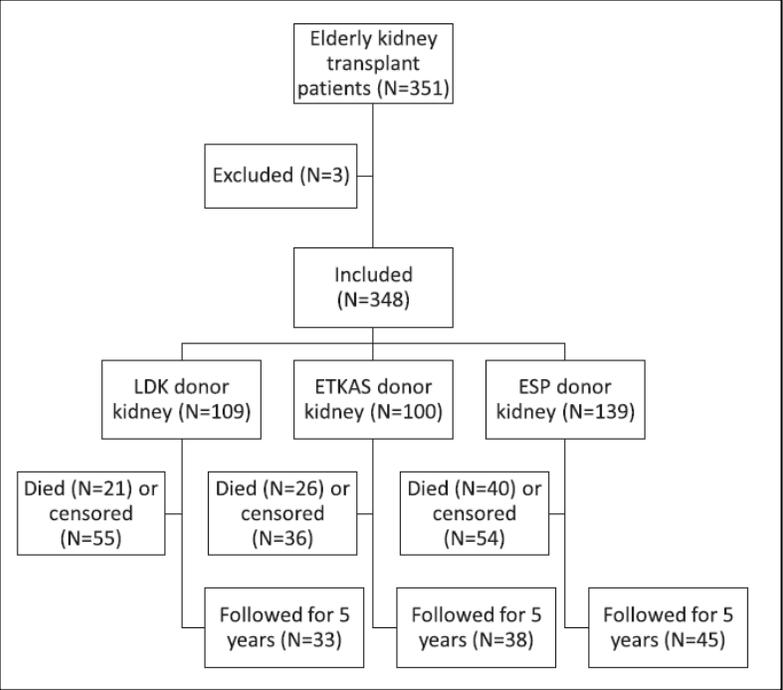
Living Kidney Donors Ages 70 and Older: Recipient and Donor Outcomes

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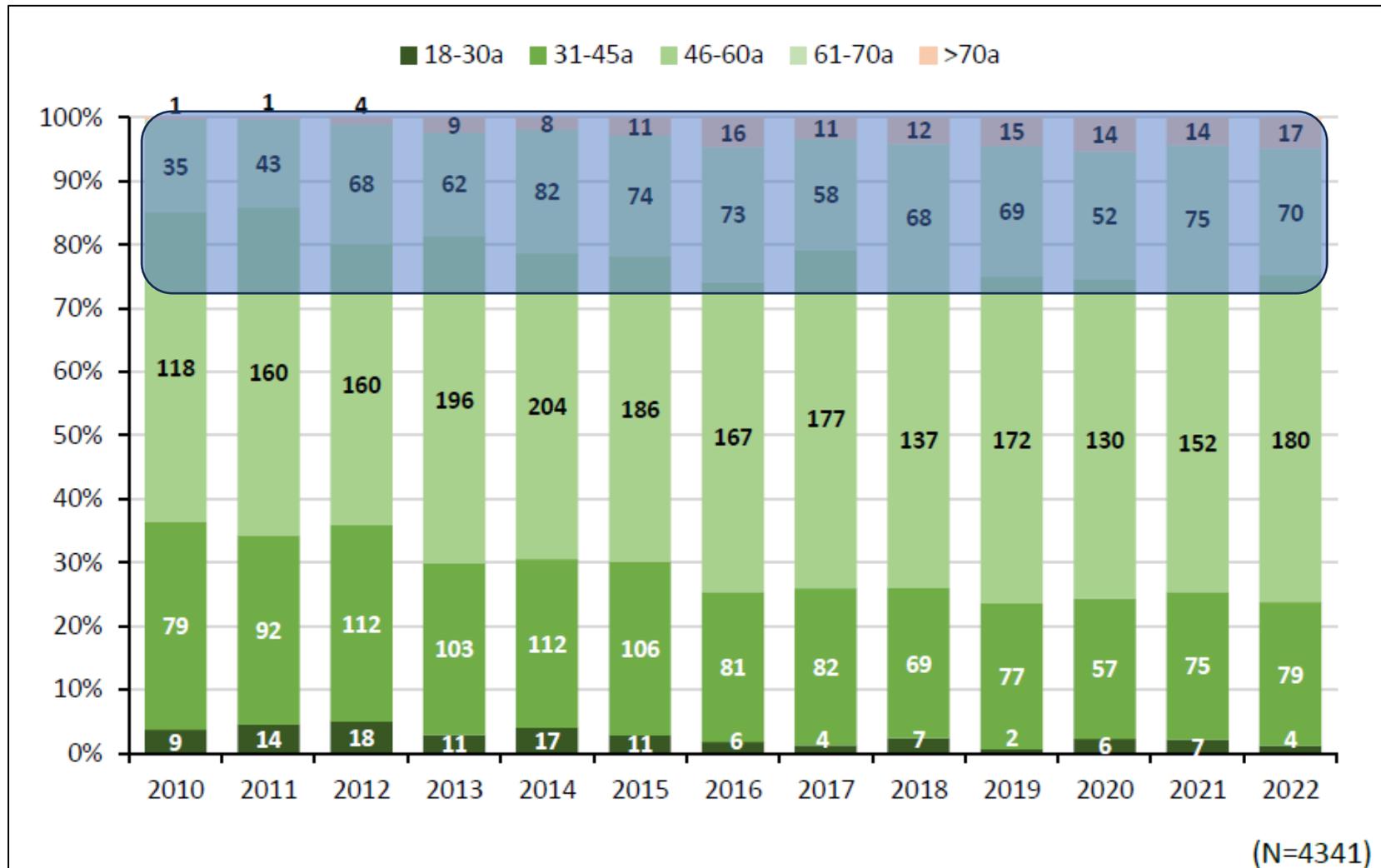
Matched cohort healthy controls drawn from the National Health and Nutrition Examination Survey (NHANES) cohort



Comparative survival of elderly renal transplant recipients with a living donor versus a deceased donor: A retrospective single center observational study (Groningen, The Netherlands)

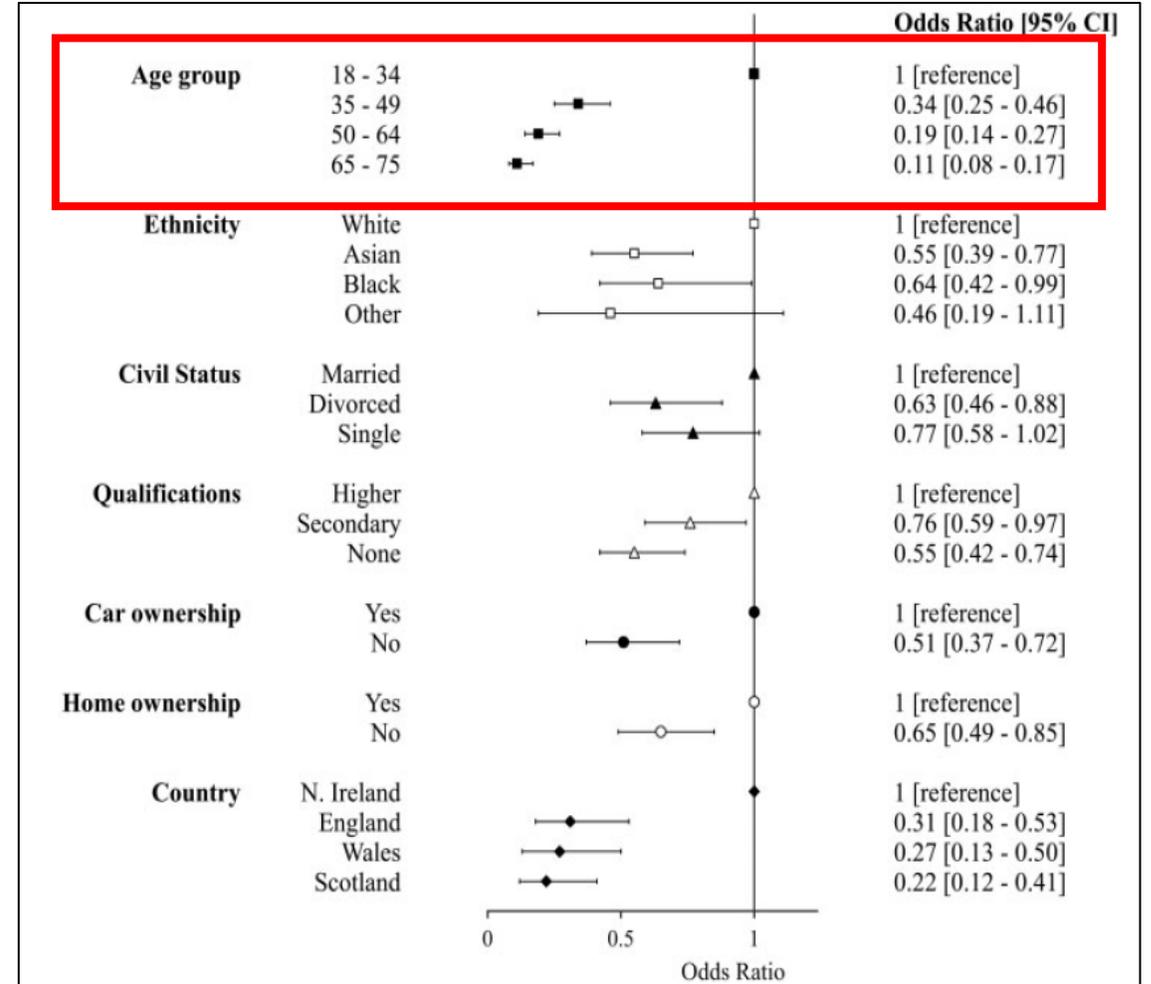
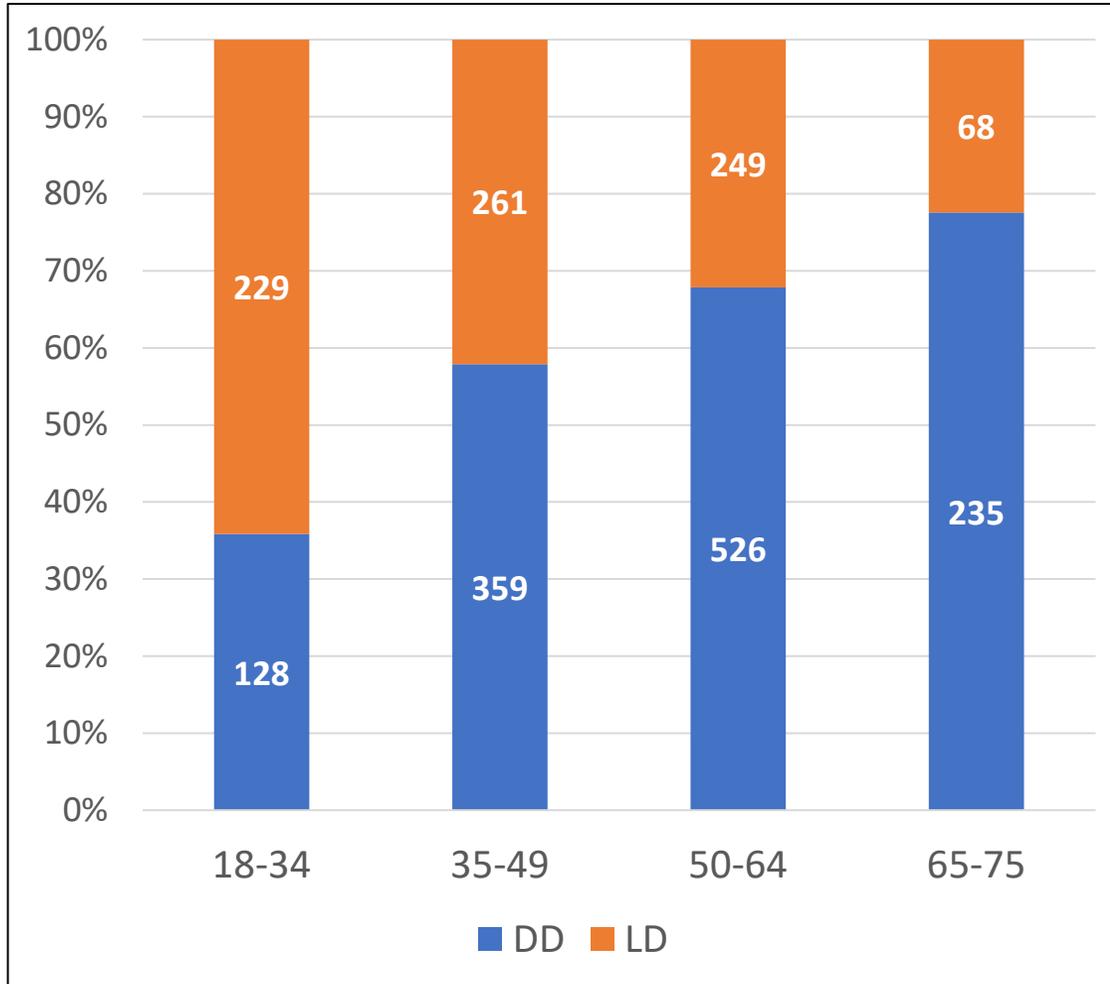


LESS THAN 30% OF LIVING DONORS ARE OLDER THAN 60 YEARS IN SPAIN

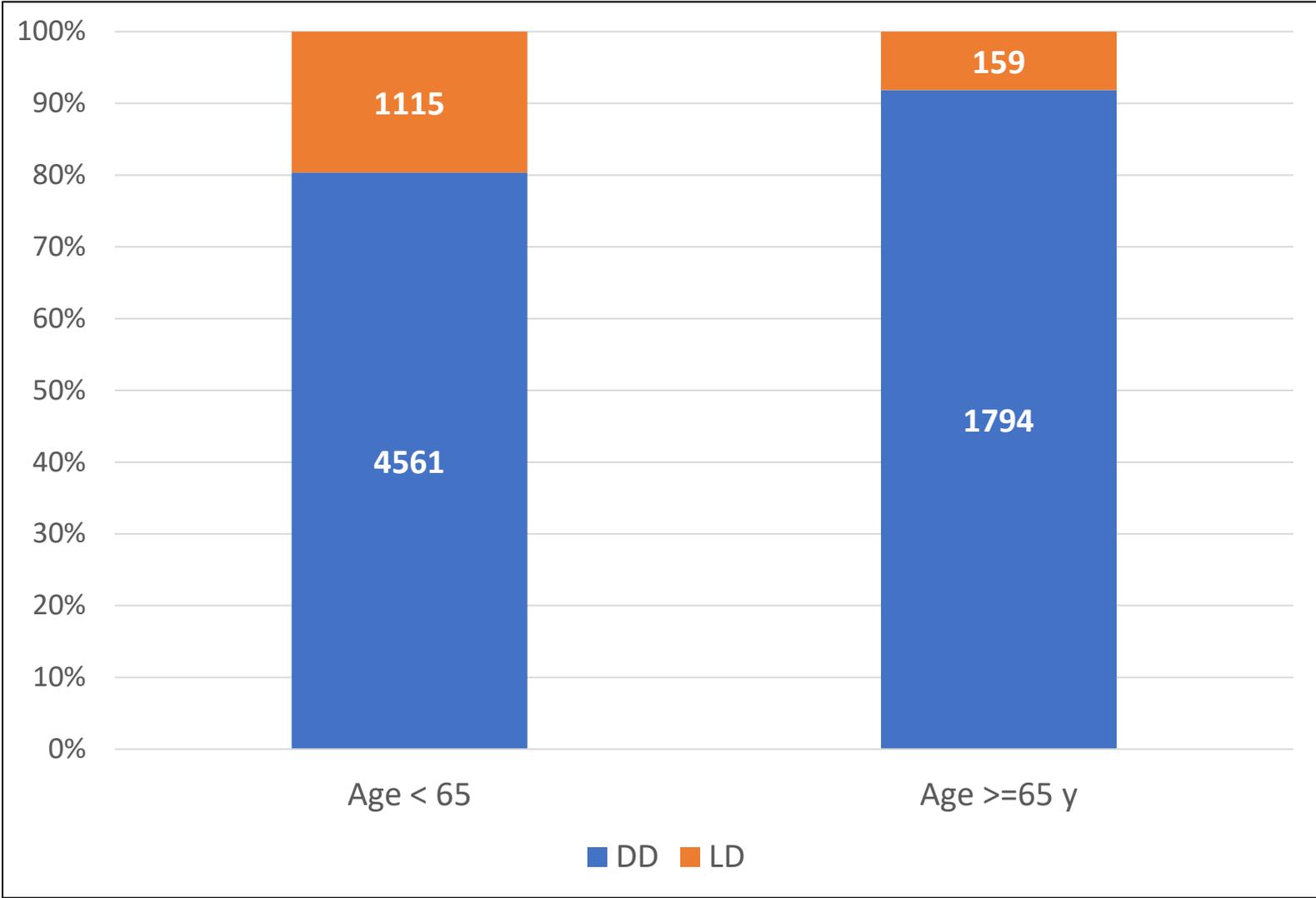


Barriers to living donor kidney transplantation in the United Kingdom: a national observational study

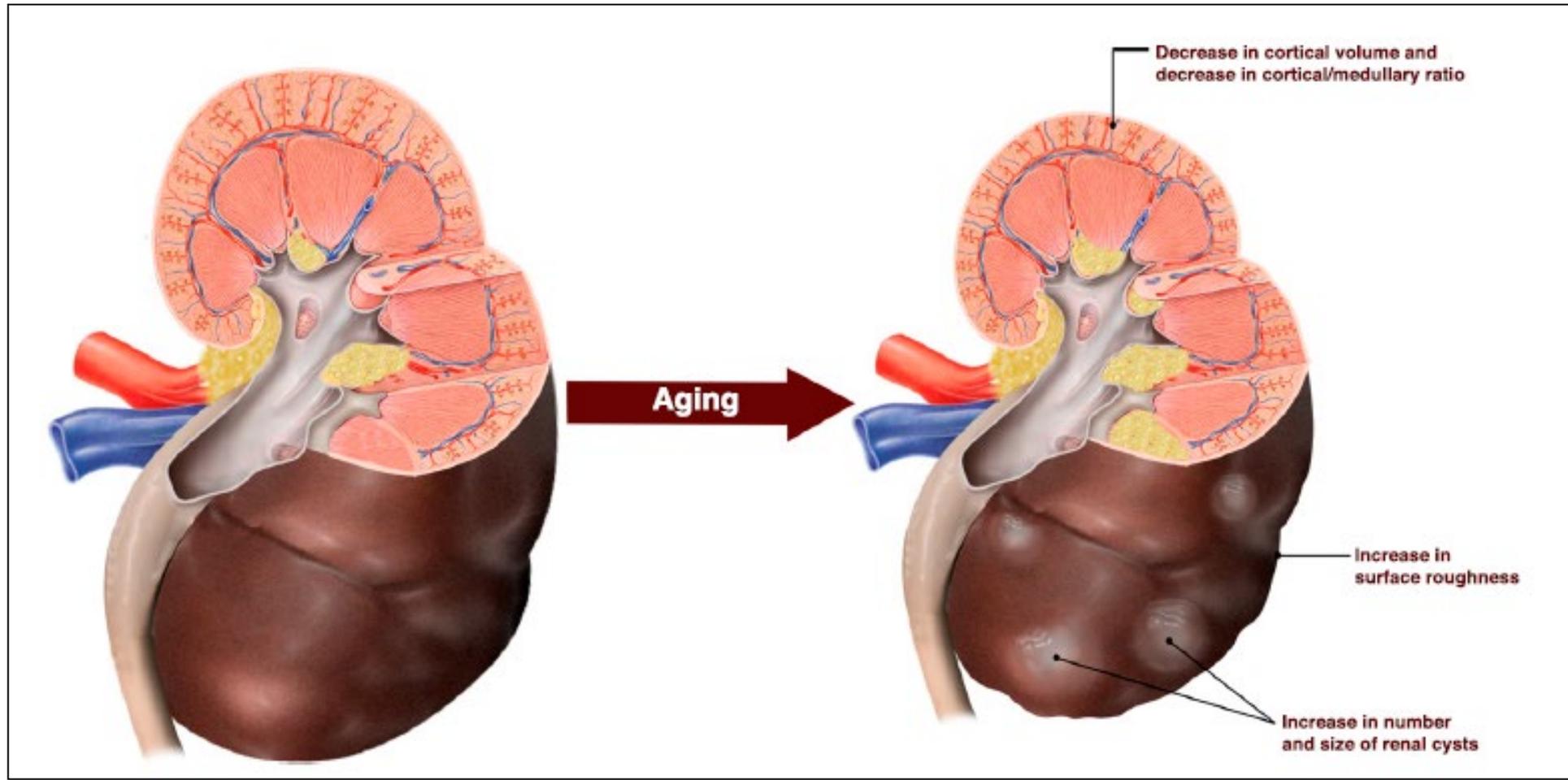
ATTOM study. 11/2011 to 03/2013. n=2055 (1248 DD and 807 LD)



AGE INEQUITY IN ACCESS TO LIVING DONOR KIDNEY TRANSPLANTATION RMRC. 2013-2021



Structural and Functional Changes in Human Kidneys with Healthy Aging



Structural and Functional Changes in Human Kidneys with Healthy Aging

	Young	Elderly	P
N	10	11	
Age (years)	30 ± 1.7	67 ± 2.1	
GFR (mL/min/1.73 m ²)	127 ± 5.9	79 ± 4.1	<0.001
RPF (mL/min/1.73 m ²)	618 ± 34	361 ± 29	<0.001
RVR (mm Hg/mL/min)	0.09 ± 0.004	0.19 ± 0.002	<0.001
N	15	11	
Arteriosclerosis	0.45 ± 0.08	0.89 ± 0.15	<0.05
Arteriolar hyalinosis	0.27 ± 0.04	0.33 ± 0.10	Ns
Glomerulosclerosis (%)	0.56 ± 0.13	1 ± 0.19	Ns
Mononuclear infiltration	0	0.18 ± 0.12	Not comp
Interst fib/tubular atr	0.53 ± 0.13	1.18 ± 0.13	<0.02
Chronicity index	2.13 ± 0.42	4.10 ± 0.56	<0.02

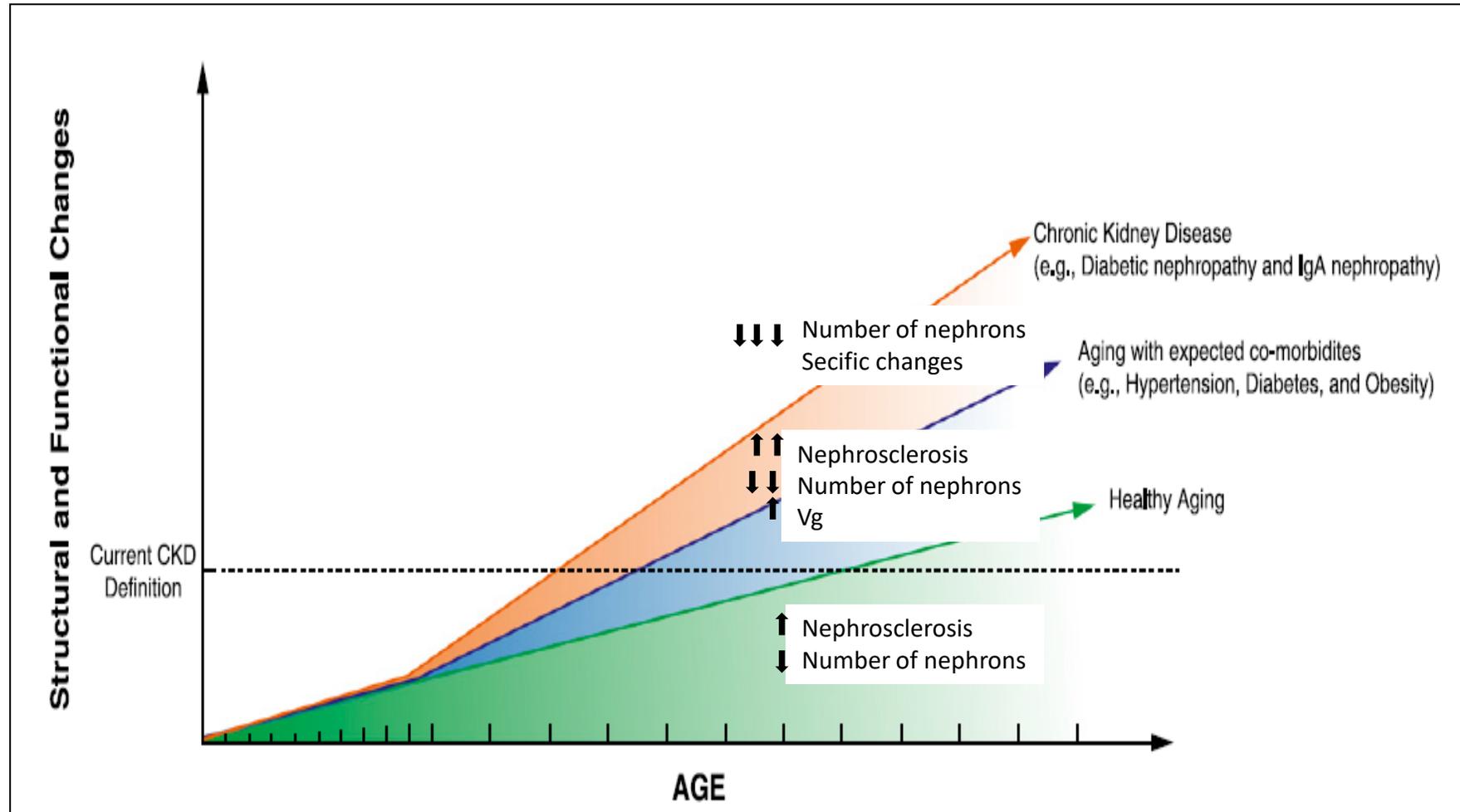
Structural and Functional Changes in Human Kidneys with Healthy Aging

Table 2. Upper reference limit (95th percentile) for the number of globally sclerotic glomeruli

Age, yr	Total No. of Glomeruli Seen on Biopsy							
	1	2	3–4	5–8	9–16	17–32	33–48	49–64
18–29	0.5	0.5	0.5	0.5	1	1	1	1
30–34	0.5	0.5	0.5	0.5	1	1	1	1.5
35–39	0.5	0.5	0.5	0.5	1	1.5	2	2
40–44	0.5	0.5	0.5	1	1	2	2.5	3
45–49	0.5	0.5	1	1	1.5	2	3	4
50–54	1	1	1	1.5	2	3	5	5
55–59	1	1	1.5	1.5	2	3.5	4.5	6
60–64	1	1.5	1.5	2	2.5	4	5.5	7
65–69	1	2	2	2.5	3	4.5	6.5	8
70–74	1	2	2.5	3	4	5.5	7.5	9
75–77	1	2	2.5	3	4	6	8	9.5

Reference limits were developed using kidney biopsies at time of kidney transplant for 1847 carefully screened normotensive kidney donors.⁹

Structural and Functional Changes in Human Kidneys with Healthy Aging



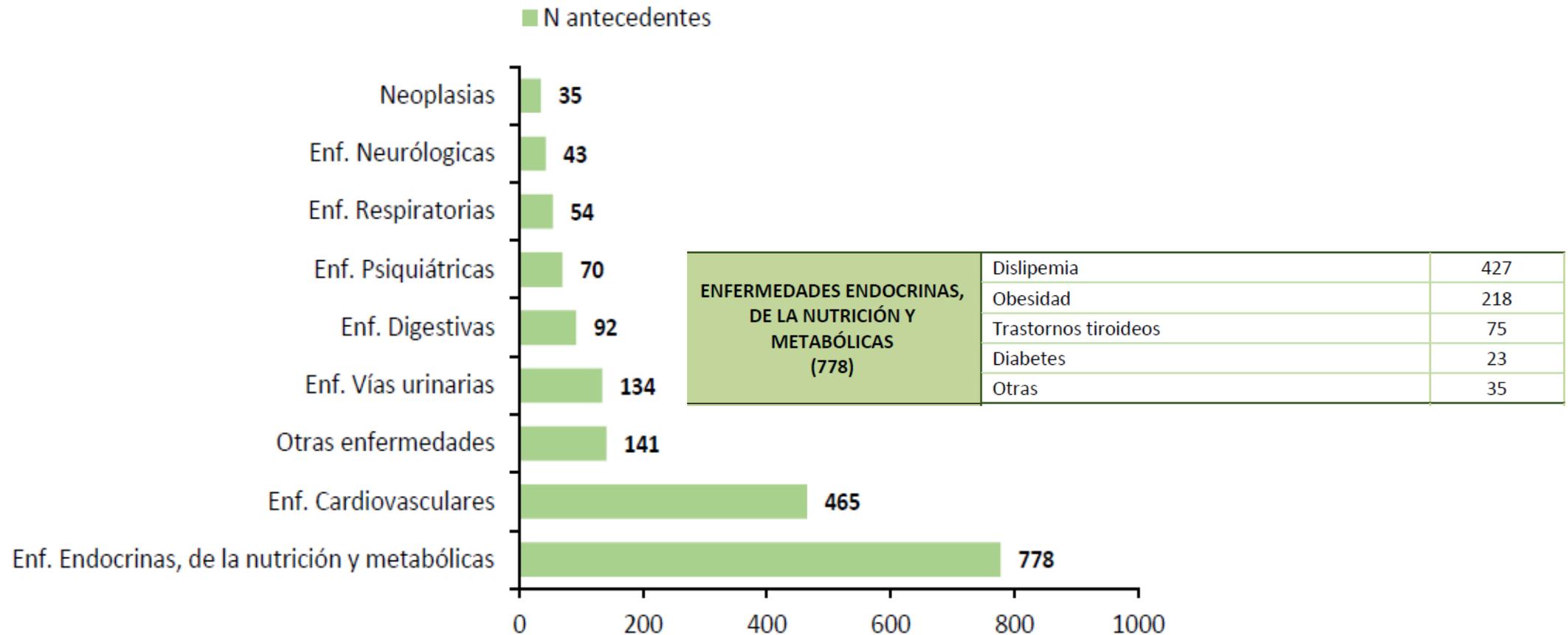
FUNCIÓN RENAL EN LOS DONANTES VIVOS EN ESPAÑA

Tabla 7. Filtrado glomerular (CKD EPI) basal según grupo de edad y sexo de los donantes renales vivos. España 2010-2022.

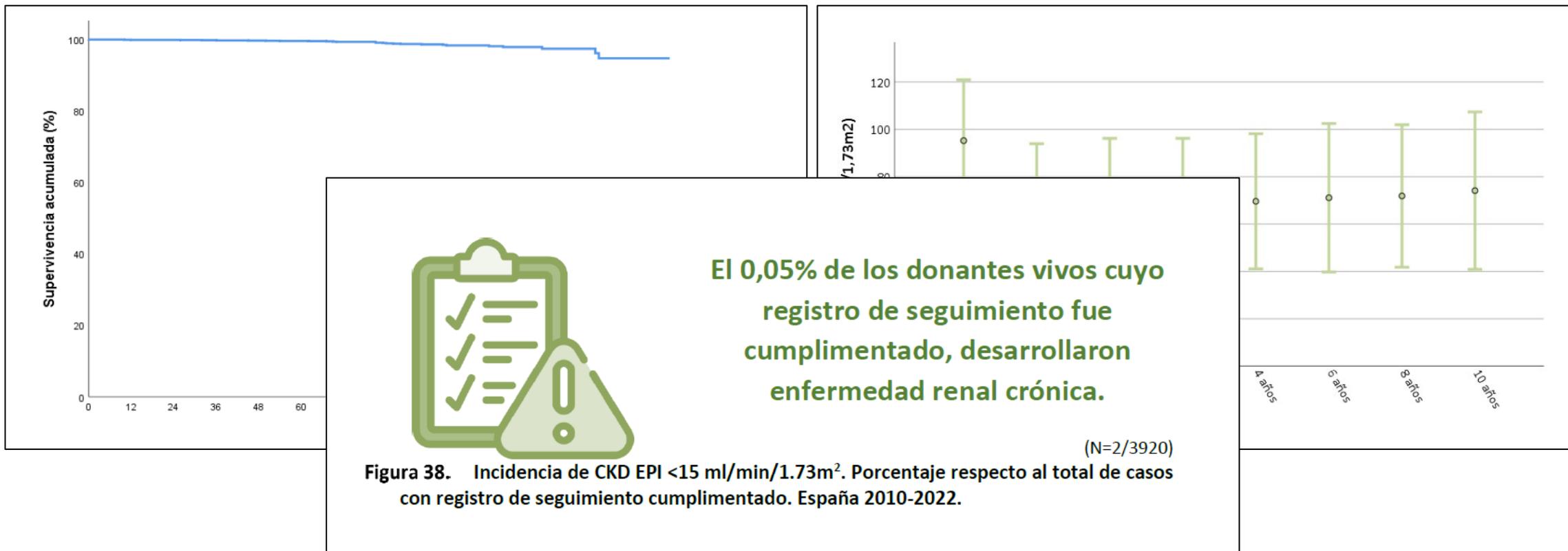
GRUPO DE EDAD	SEXO	N	MEDIA (DE) *	MEDIANA (RIC)
18-30 años	Hombre	48	108,5 (15,3)	107,7 (100,6 – 119,7)
	Mujer	58	111,9 (15,5)	117,9 (103,3 – 124,0)
31-45 años	Hombre	402	101,2 (15,3)	104,7 (92,6 – 111,6)
	Mujer	604	102,4 (15,0)	107,3 (93,9 – 112,3)
46-60 años	Hombre	653	92,4 (13,7)	95,2 (85,0– 101,4)
	Mujer	1305	92,2 (14,1)	96,7 (83,6 – 102,7)
61-70 años	Hombre	239	84,8 (12,3)	88,9 (77,3 – 92,5)
	Mujer	517	84,5 (13,4)	88,6 (77,4 – 94,3)
>70 años	Hombre	53	77,2 (15,7)	79,2 (74,9 – 87,5)
	Mujer	68	81,5 (12,6)	85,4 (78,1 – 89,6)

* La fórmula de cálculo de CKD EPI no incluye corrección por raza. CKD EPI medido en ml/min/1.73m².

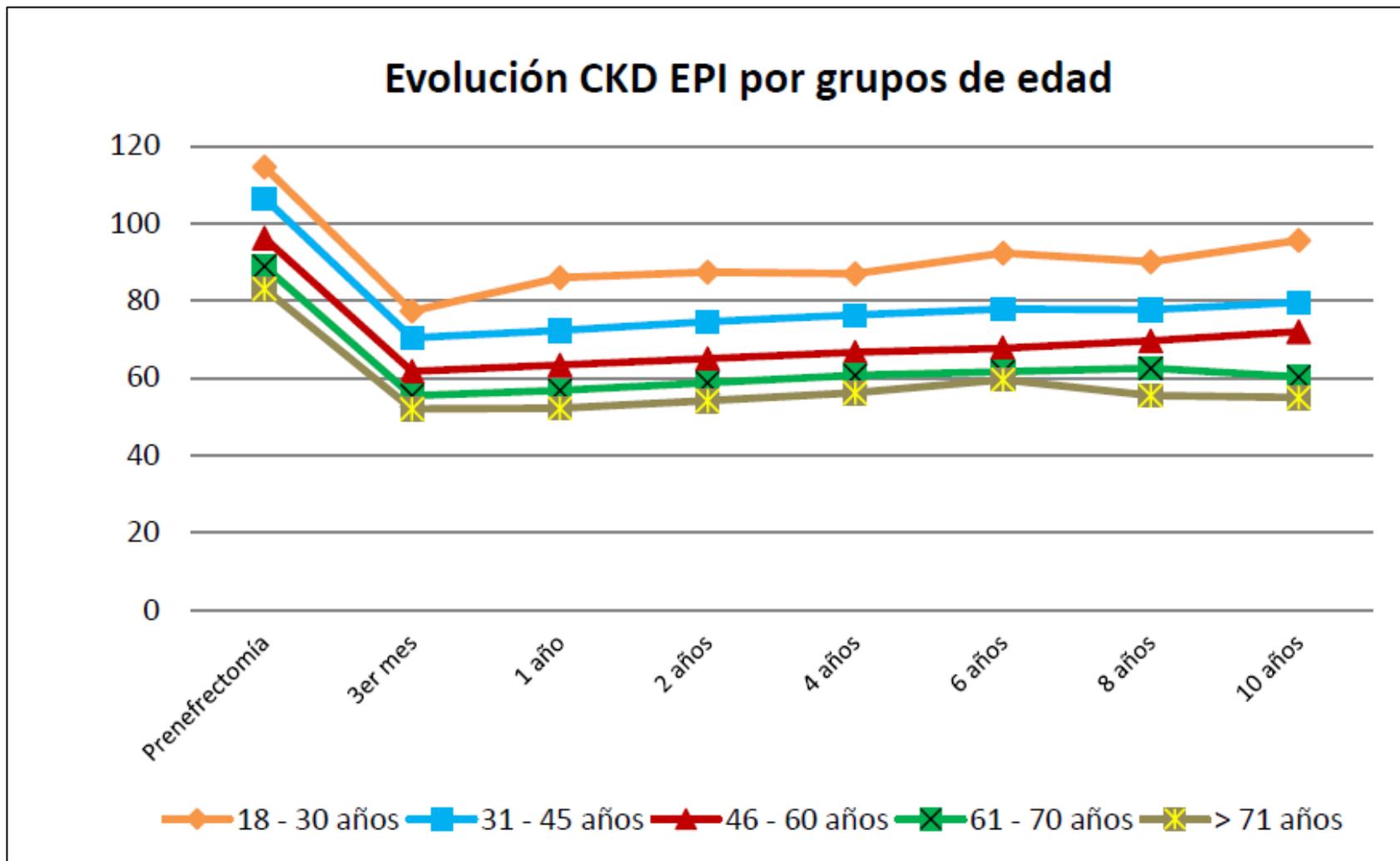
PATOLOGÍA ASOCIADA EN LOS DONANTES VIVOS EN ESPAÑA



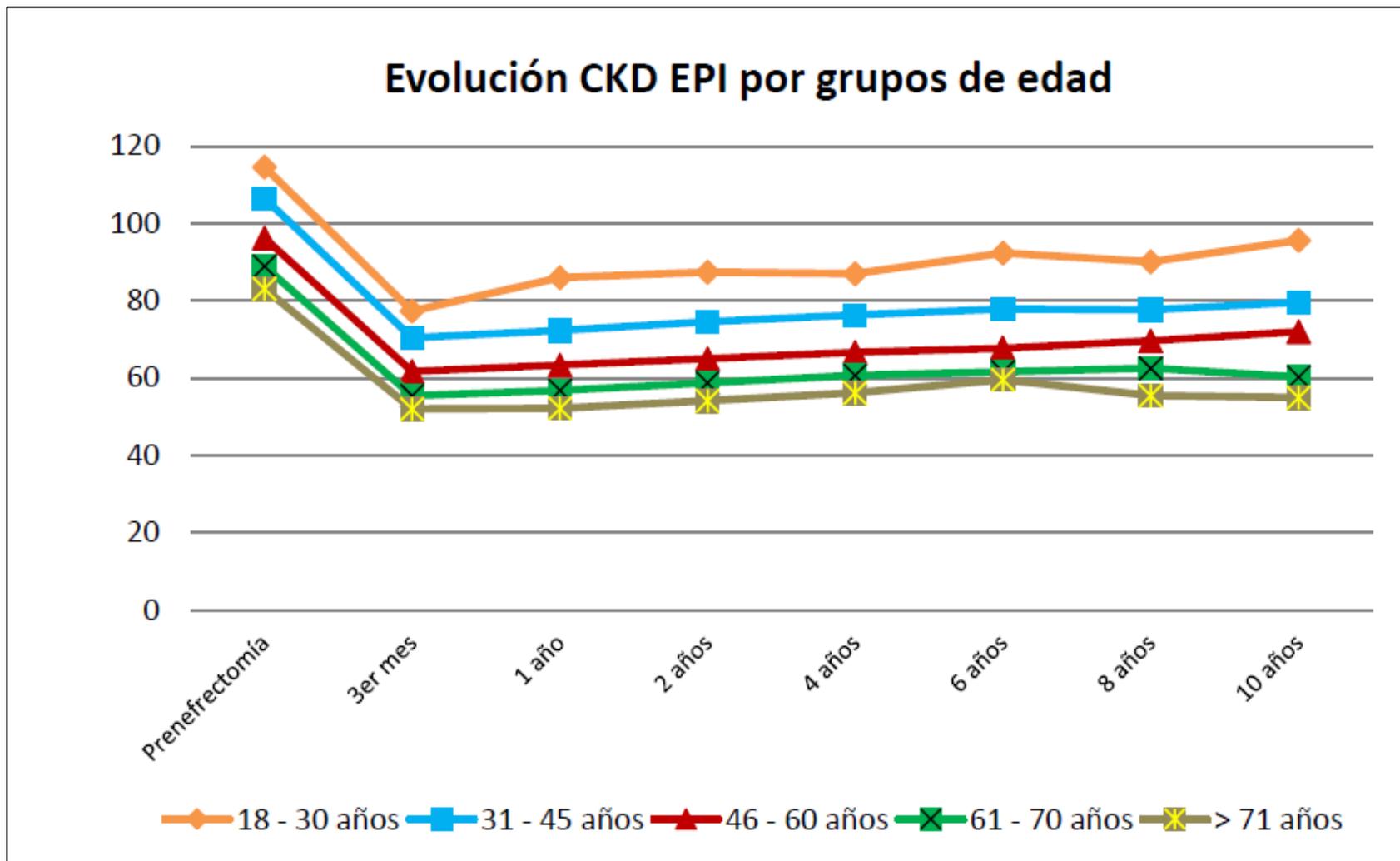
SUPERVIVENCIA Y FUNCIÓN RENAL EN EL DONANTE VIVO



EVOLUCIÓN FUNCIÓN RENAL SEGÚN EDAD DEL DONANTE VIVO



EVOLUCIÓN FUNCIÓN RENAL SEGÚN EDAD DEL DONANTE VIVO



PROTEINURIA EN EL DONANTE VIVO

Tabla 20. Prevalencia de proteinuria por periodo de seguimiento de los donantes renales vivos. España 2010-2022.

SEGUIMIENTO	PROTEINURIA		
	N TOTAL	Positiva*	
		N	%
3 meses	2450	257	10,5
1 año	2445	253	10,3
2 años	1995	190	9,5
4 años	1763	140	7,9
6 años	1249	95	7,6
8 años	753	80	10,6
10 años	523	41	7,8

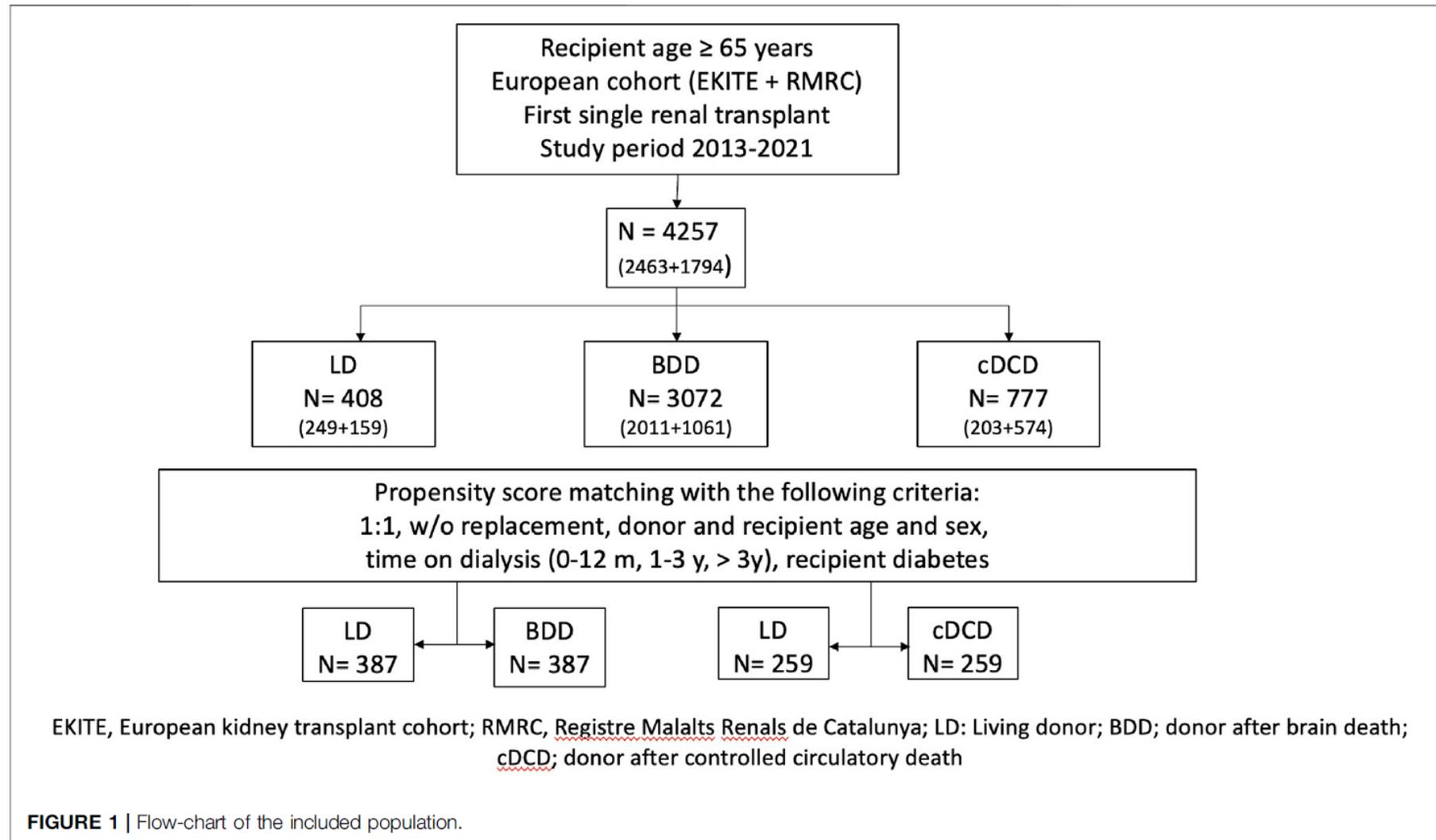
* Se considera proteinuria valores por encima de 150mg/día o 150mg/g (en caso de utilizar cociente proteinuria/creatinina).

HIPERTENSIÓN ARTERIAL EN EL DONANTE VIVO

Tabla 22. Prevalencia de HTA por periodo de seguimiento de los donantes renales vivos. España 2010-2022.

SEGUIMIENTO	HTA		
	N TOTAL	Sí	
		N	%
3 meses	3222	215	6,7
1 año	3145	266	8,5
2 años	2575	277	10,8
4 años	2284	313	13,7
6 años	1609	229	14,2
8 años	984	149	15,1
10 años	585	91	15,6

Benefits of Living Over Deceased Donor Kidney Transplantation in Elderly Recipients. A Propensity Score Matched Analysis of a Large European Registry Cohort



LIVING DONATION is associated with PREEMPTIVE kidney transplantation and better SURVIVAL

TABLE 1 | Donor and recipient characteristics of renal transplants from the BDD, cDCD, and LD cohorts.

Variables	BDD (n = 3,072)	cDCD (n = 777)	LD (n = 408)	P
Age of donors, years	71.5 ± 9.8	67.2 ± 11.1	59.2 ± 11.2	<0.001
Age of recipient, years	71.4 ± 4.4	70.6 ± 4.4	69.4 ± 3.3	<0.001
Male sex, %	66.2	67.4	77.9	<0.001
Time on dialysis, Pre-emptive/0–12 mo./1–3 y/>3 y, %	10.8/12.5/39.3/37.2	7.4/14.5/45.3/32.6	51.7/20.3/21.5/6.3	<0.001
Blood group A/B/AB/O, %	45.2/10.3/4.7/39.7	44.7/8.1/2.9/44.1	50.1/9.6/2.7/37.4	0.016
Blood group A and time of dialysis 0–12 mo./1–3 y/>3y	32.8/45.2/21.9	31.7/49.4/18.8	78.2/17.3/4.4	<0.001
Blood group B and time of dialysis 0–12 mo./1–3 y/>3y	26.0/33.3/40.6	24.5/44.2/31.1	69.2/25.6/5.1	<0.001
Blood group AB and time of dialysis 0–12 mo./1–3 y/>3y	42.1/39.8/18.0	45.4/31.8/22.7	81.8/9.09/9.09	0.144
Blood group O and time of dialysis 0–12 mo./1–3 y/>3y	13.2/37.6/49.1	11.5/42.4/46.0	62.9/27.8/9.2	<0.001
Diabetes, %	42.9	44.2	41.4	0.635
Cardiovascular disease, %	57.8	59.7	44.3	<0.001

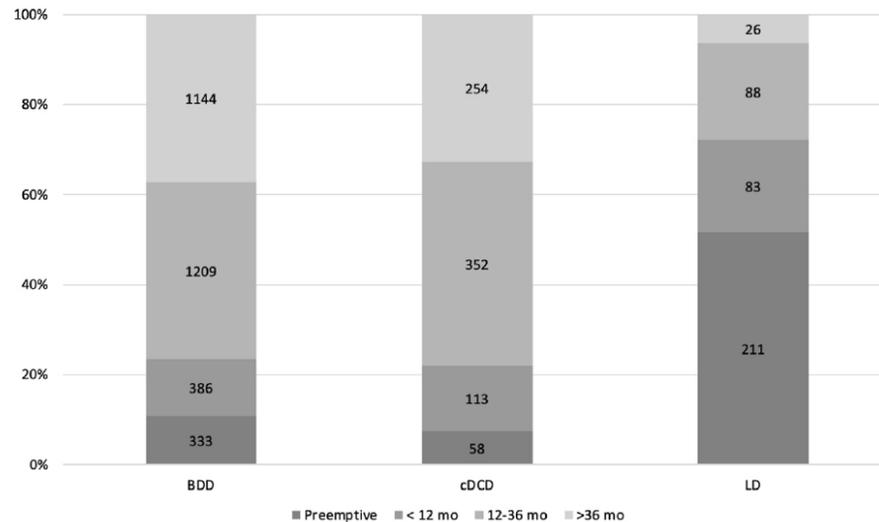
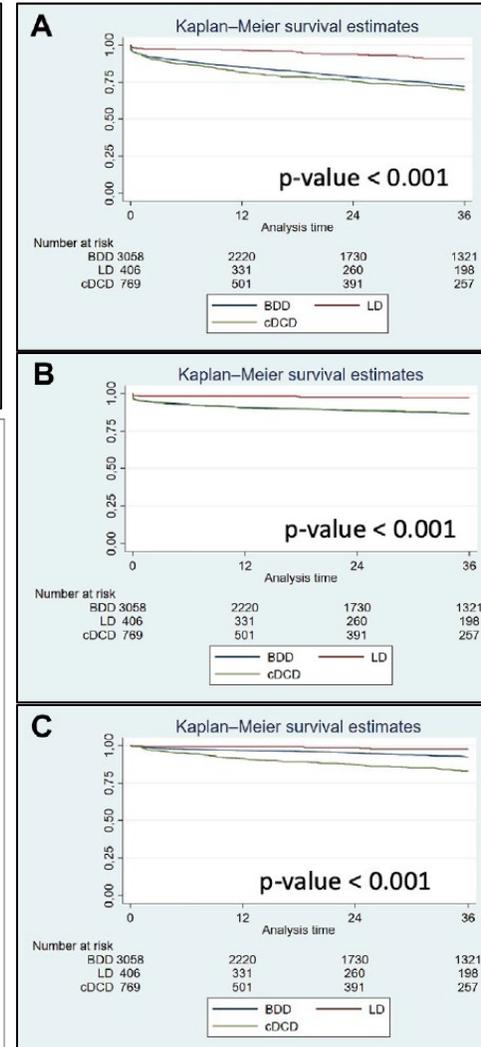


FIGURE 2 | Distribution of time on dialysis across the different donor sources. LD, living donor; DBD, donors after brain death; cDCD, donor after controlled circulatory death.



Living donation is associated with PREEMPTIVE kidney transplantation and better SURVIVAL

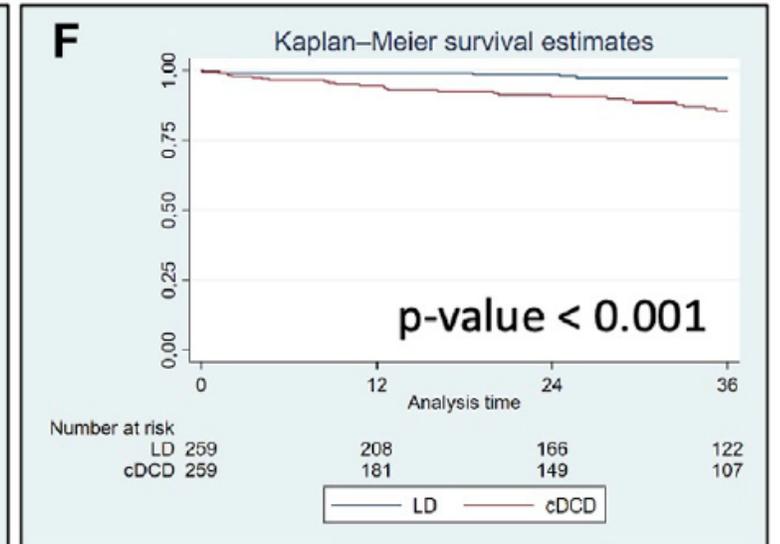
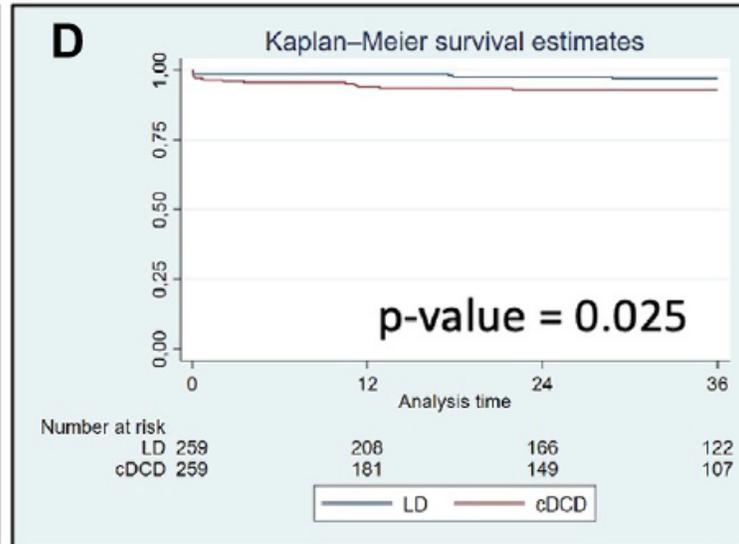
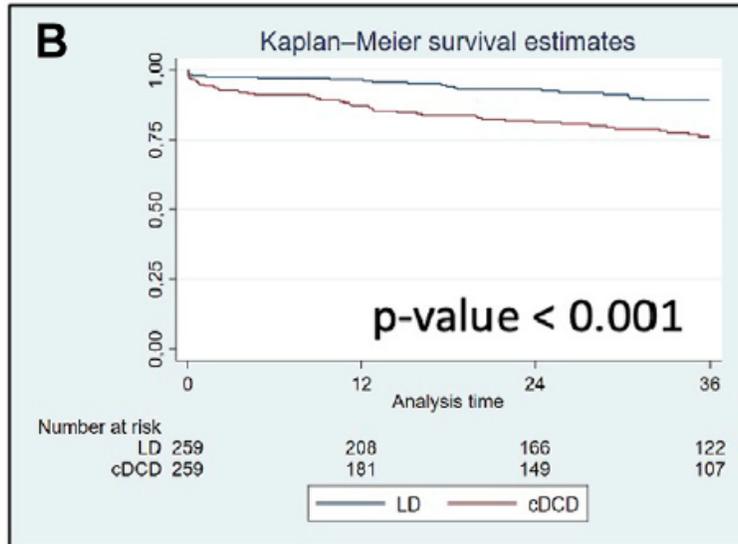
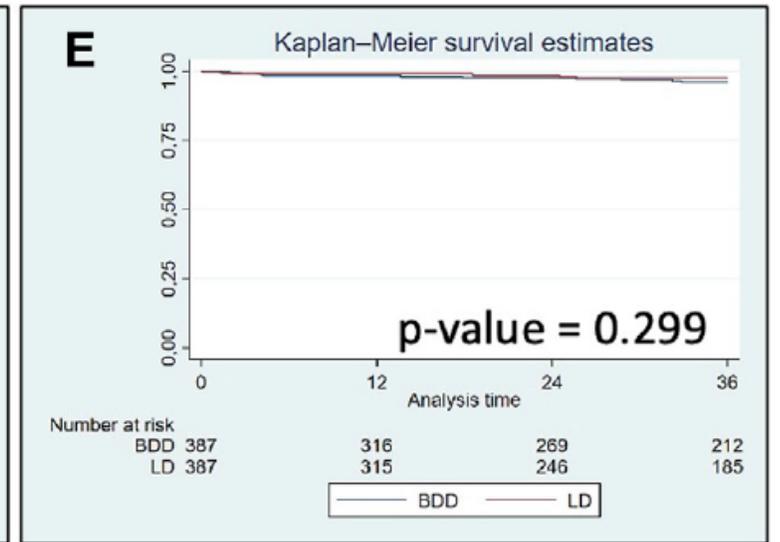
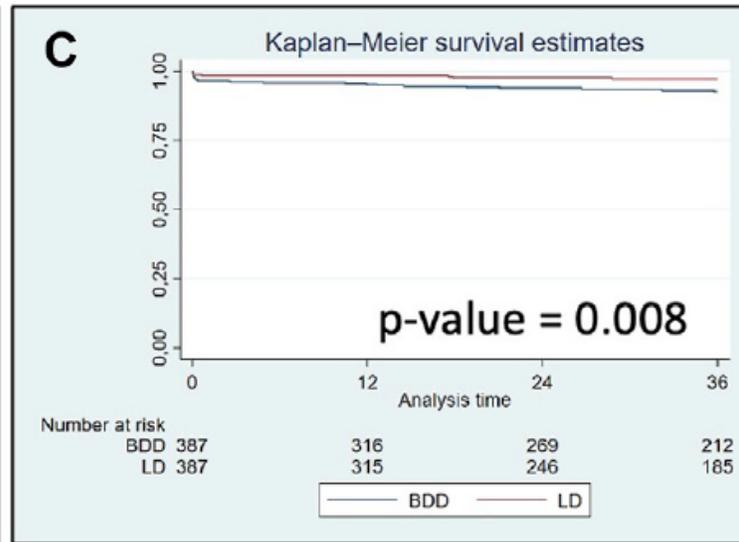
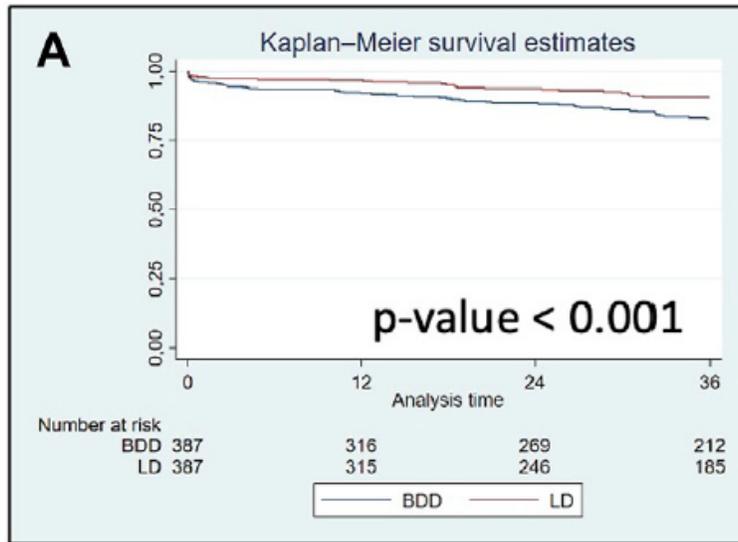
TABLE 2 | Univariate and multivariate Cox's regression analysis comparing outcomes in living donor (LD) and donor after brain death (DBD) kidney transplantation.

DBD vs. LD	Univariate Cox's regression		Multivariate Cox's regression	
	HR (95% CI)	p-value	HR (95% CI)	p-value
Graft survival	3.53 (2.43–5.11)	<0.001	2.64 (1.64–4.50)	<0.001
Death-censored graft survival	4.87 (2.60–9.13)	<0.001	2.59 (1.19–5.67)	0.017
Patient survival	3.33 (1.56–7.10)	0.002	3.03 (0.93–9.84)	0.066

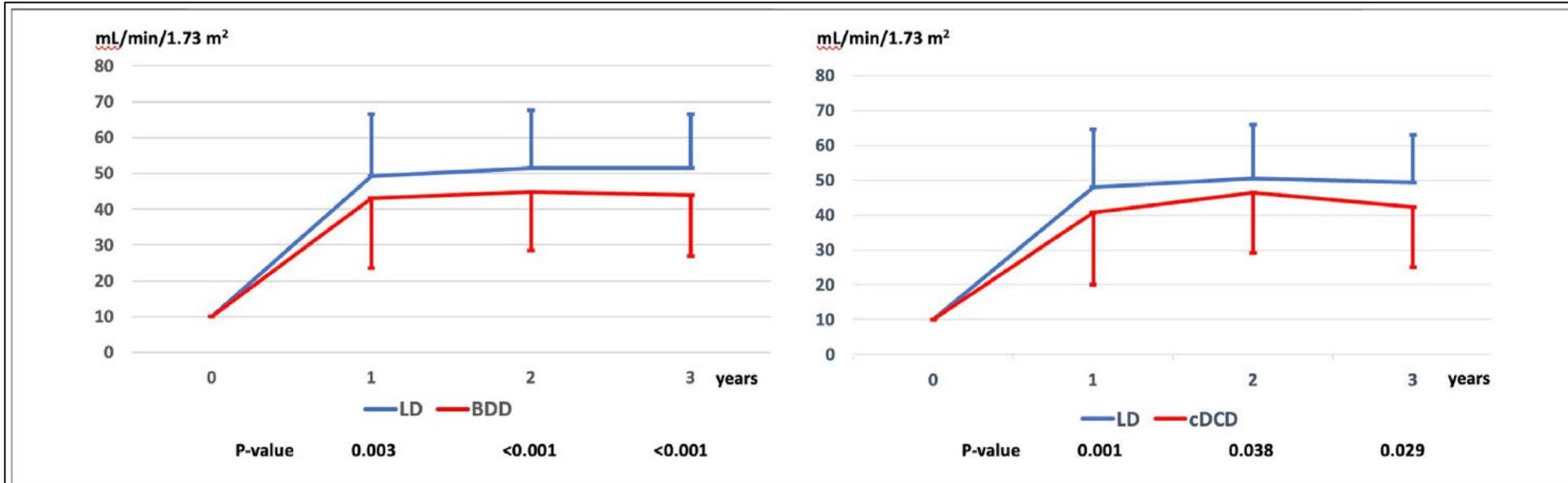
TABLE 3 | Univariate and multivariate Cox's regression analysis comparing outcomes in living donor (LD) and donor after controlled circulatory death (cDCD) kidney transplantation.

cDCD vs. LD	Univariate Cox's regression		Multivariate Cox's regression	
	HR (95% CI)	p-value	HR (95% CI)	p-value
Graft survival	3.97 (2.69–5.67)	<0.001	3.90 (2.15–7.06)	<0.001
Death-censored graft survival	4.90 (2.54–9.44)	<0.001	3.06 (1.27–7.39)	0.013
Patient survival	8.16 (3.78–17.60)	<0.001	11.35 (3.37–38.21)	<0.001

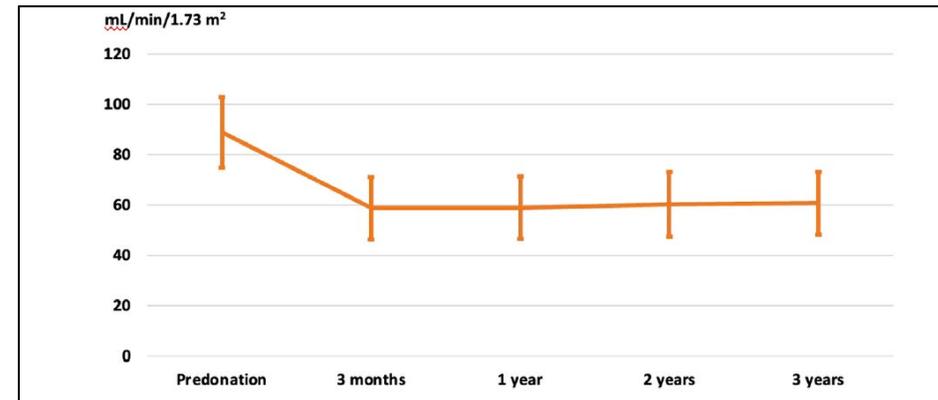
Living donation is associated with better SURVIVAL adjusting for time on dialysis



LIVING DONATION is associated with better RENAL FUNCTION for RECIPIENTS



LIVING DONATION is SAFE for DONORS



Benefits of Living Over Deceased Donor Kidney Transplantation in Elderly Recipients. A Propensity Score Matched Analysis of a Large European Registry Cohort

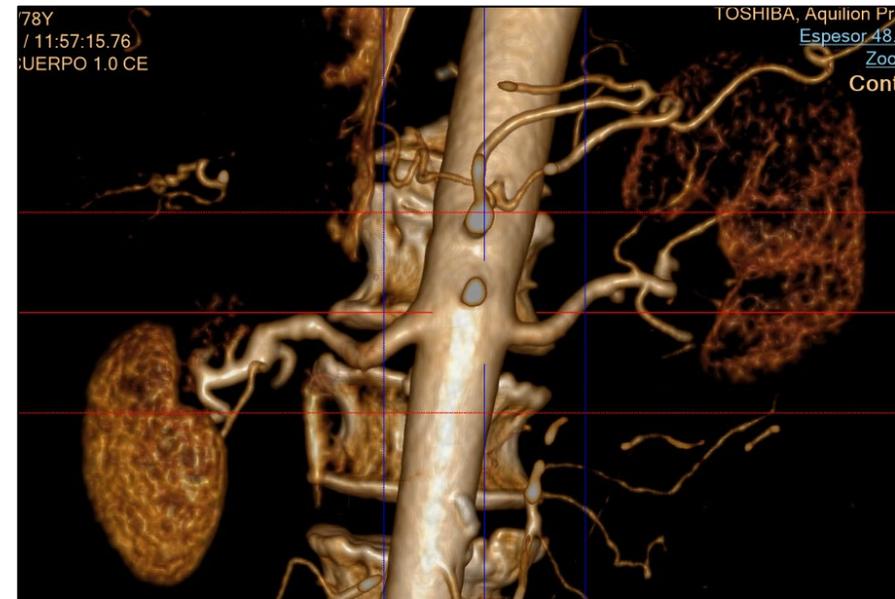
This study strongly supports that LD transplantation offers significant advantages for elderly transplant recipients in terms of elective surgery, timely transplantation, graft survival and mid-term graft function. Thus, transplant teams should offer this treatment to elderly kidney transplant candidates to avoid the age-based inequity in access to transplantation.

R.P.N. Dona. 75 anys. DM2 amb nefropatia classe IV.
07/2023. IAMCEST + BAV. DTP + stent a CD. Marcapàs
Claudicació intermitent 300-400 m.

Creatinina pre-TR 4.52 mg/dL
FGRe 10 mL/min/1.73 m²

Grup sanguini A / A
cPRA 20%. No DSA
HLA mm 112

L.A.M. Home. 78 anys. Fractura costal múltiple accident
Fa bicicleta habitualment (Montseny)
Creatinina pre-TR 0.86 mg/dL
FGR mesurat 78 mL/min/1.73 m²



1R TIEMPO CIRUGIA VASCULAR:
ver nota adjunta

2o TIEMPO CIRUGIA DE BANCO:

riñon izquierdo con pedículo vascular único, ureter único. Se realiza exeresis de grasa perirenal sin detectar lesiones macroscópicas. Arteria y vena integras.

3r TIEMPO CIRUGIA DE TRANSPLANTE:

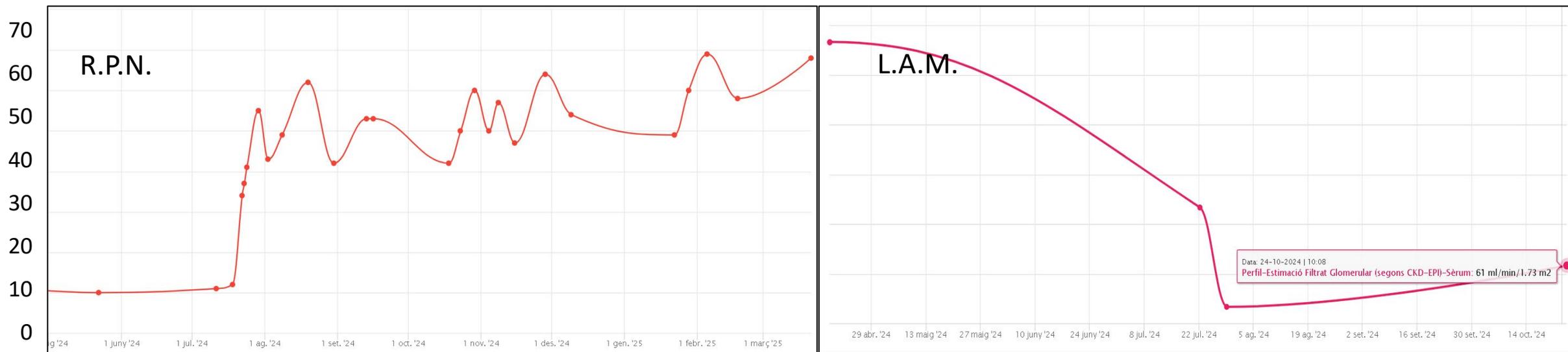
Campo preparado por cirugía vascular, con prótesis de goretex T-L a arteria iliaca externa.

Clampaje de vena iliaca externa, venotomía y confección de sutura T-L con vena renal con 2 hemicontinuas de prolene 6/0. CLampaje con bulldog de vena renal y desclampaje de vena iliaca sin objetivar sangrado a nivel de la sutura.

Sección de arteria renal y espatulación de la misma, realizando una anastomosis T-T con continua de goretex 6/0 a la prótesis de goretex. Retirada de clamp a nivel de prótesis, purgado de la misma y anudado, con correcto flujo arterial. Punto de refuerzo a nivel de anastomosis, sin sangrado activo.

Retirada de ambos bulldogs con correcta reperusión del injerto. Hemostasia sobre puntos sangrantes a nivel de capsula renal.

Dissección de cara posterior y cúpula vesical. Cistotomía y confección de reimplante ureteral según técnica de Gregoire con 2 hemicontinuas de monocryl 4/0 tras colocar doble J. puntos sueltos de vicryl 2/0 como antireflujo.



Gracias

