



ORGAN DONATION & TRANSPLANTATION: THE SPANISH MODEL

Beatriz Domínguez-Gil

Director General, Organización Nacional de Trasplantes, Spain

GÖG COLLOQUIUM

21/10/2025



GOBIERNO
DE ESPAÑA

MINISTERIO
DE SANIDAD



ORGANIZACIÓN NACIONAL
DE TRASPLANTES

GLOBAL DONATION AND TRANSPLANTATION DATA 2024

Kidney	Liver	Heart	Lung	Pancreas	Small bowel
110 190	42 495	10 287	8 236	2 066	174

≈ 173 448 solid organ transplants

≈ 2% increase vs 2023

≤ 10% global needs

37% kidney transplants from live donors

23% liver transplants from live donors

47 181 deceased donors (33 815 DBD & 13 366 DCD)

Information from 92 Member States (06 October 2025)

Source: Newsletter Transplant 2025; Global Observatory on Donation and Transplantation (GODT: <https://www.transplant-observatory.org/>)

TOWARDS GLOBAL CONVERGENCE IN TRANSPLANTATION: SUFFICIENCY, TRANSPARENCY AND OVERSIGHT



Participants in the Global Convergence in Transplantation Summit urge governments to “(...) make progress towards sufficiency in transplantation by (...) **developing and expanding deceased donation to its maximum therapeutic potential, including donation after both the neurological and the circulatory determination of death**”



Participants to the Global Summit in Transplantation (Santander, Spain, November 2023). Transplantation: Sufficiency, Transparency, and Oversight. Transplantation. 2025 Jan 1;109(1):7-9. doi: 10.1097/TP.0000000000005286.

INCREASING AVAILABILITY, ETHICAL ACCESS AND OVERSIGHT OF TRANSPLANTATION OF HUMAN CELLS, TISSUES AND ORGANS

77 WORLD HEALTH ASSEMBLY

MAY 2024. RESOLUTION 77.4



URGES MEMBER STATES TO

“integrate donation, transplantation and transplant follow-up activities into health care systems. so deceased donation is routinely considered as an option at the end of life and transplantation is incorporated in the continuum of care of patients (...)”

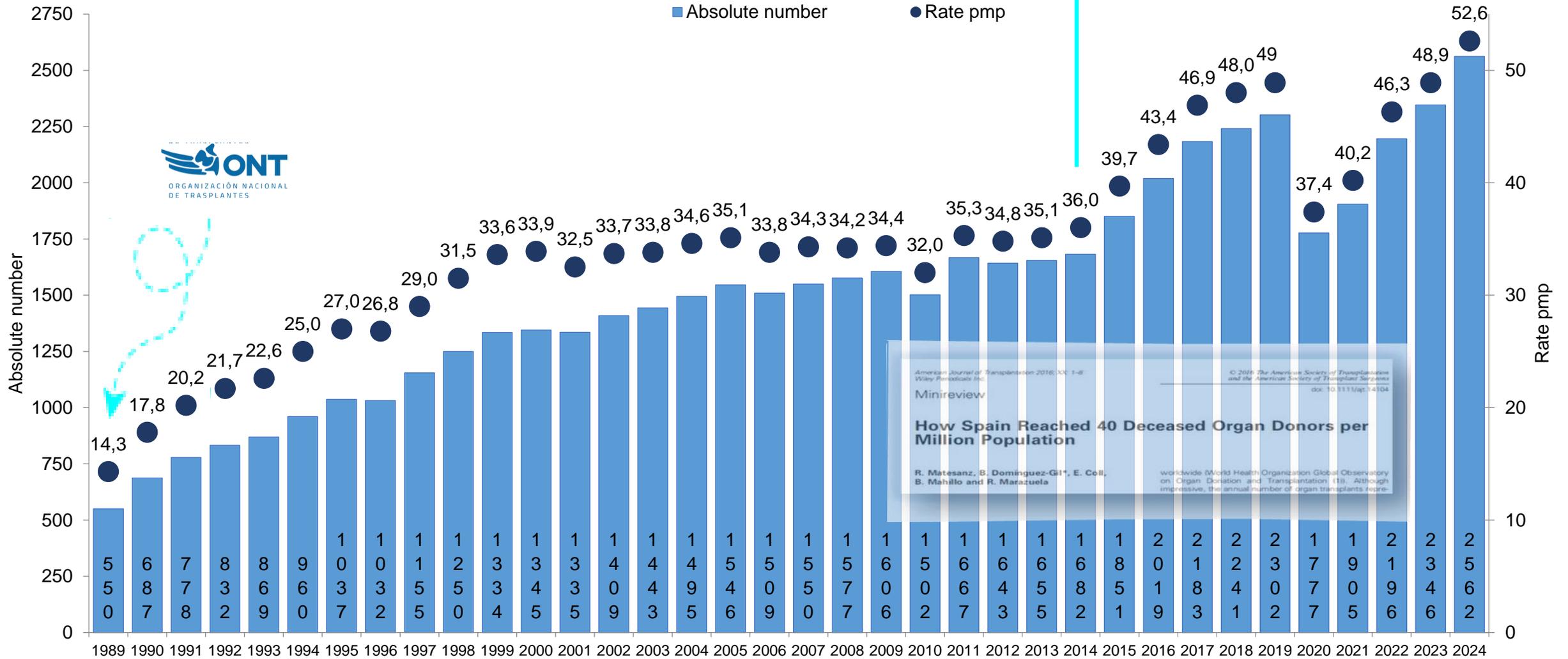
“protect living donors (...)”

“increase the availability of human cells, tissues and organs for transplantation with special attention to developing deceased donation to its maximum therapeutic potential, including donation after the neurological determination of death and. where appropriate. donation after the circulatory determination of death (...)”



<http://www.who.int/transplantation/en/>

DECEASED ORGAN DONATION IN SPAIN



American Journal of Transplantation 2016; 16: 1-8
Wiley Periodicals Inc.

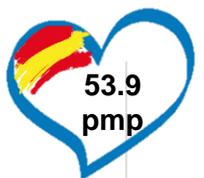
Minireview

How Spain Reached 40 Deceased Organ Donors per Million Population

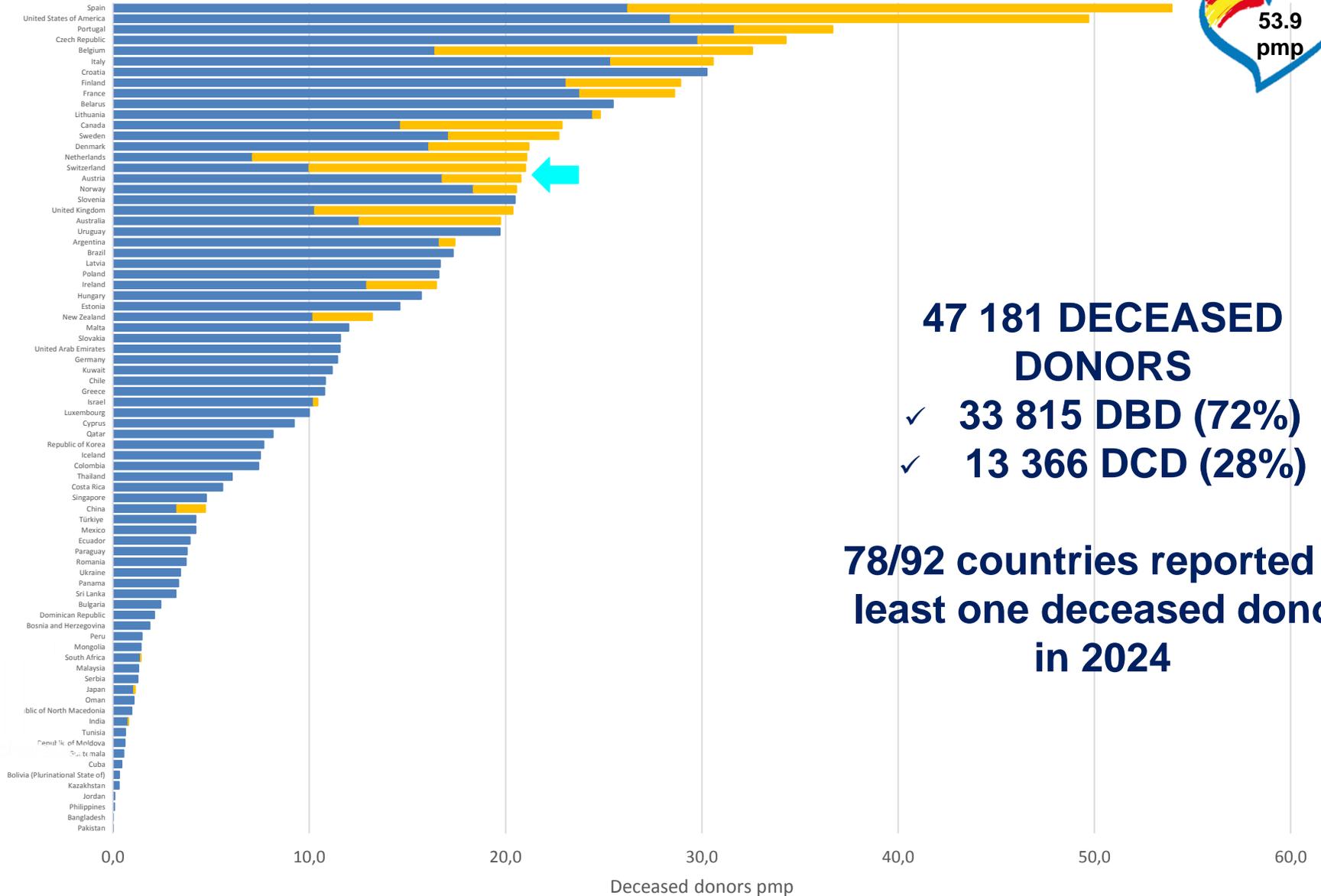
R. Matesanz, B. Domínguez-Gil*, E. Coll, B. Mahillo and R. Marazuela

© 2016 The American Society of Transplantation and the American Society of Transplant Surgeons
doi: 10.1111/ajt.14104

worldwide (World Health Organization Global Observatory on Organ Donation and Transplantation [1]). Although impressive, the annual number of organ transplants repre-



**DECEASED
DONATION IN THE
WORLD
(PMP)
YEAR 2024**

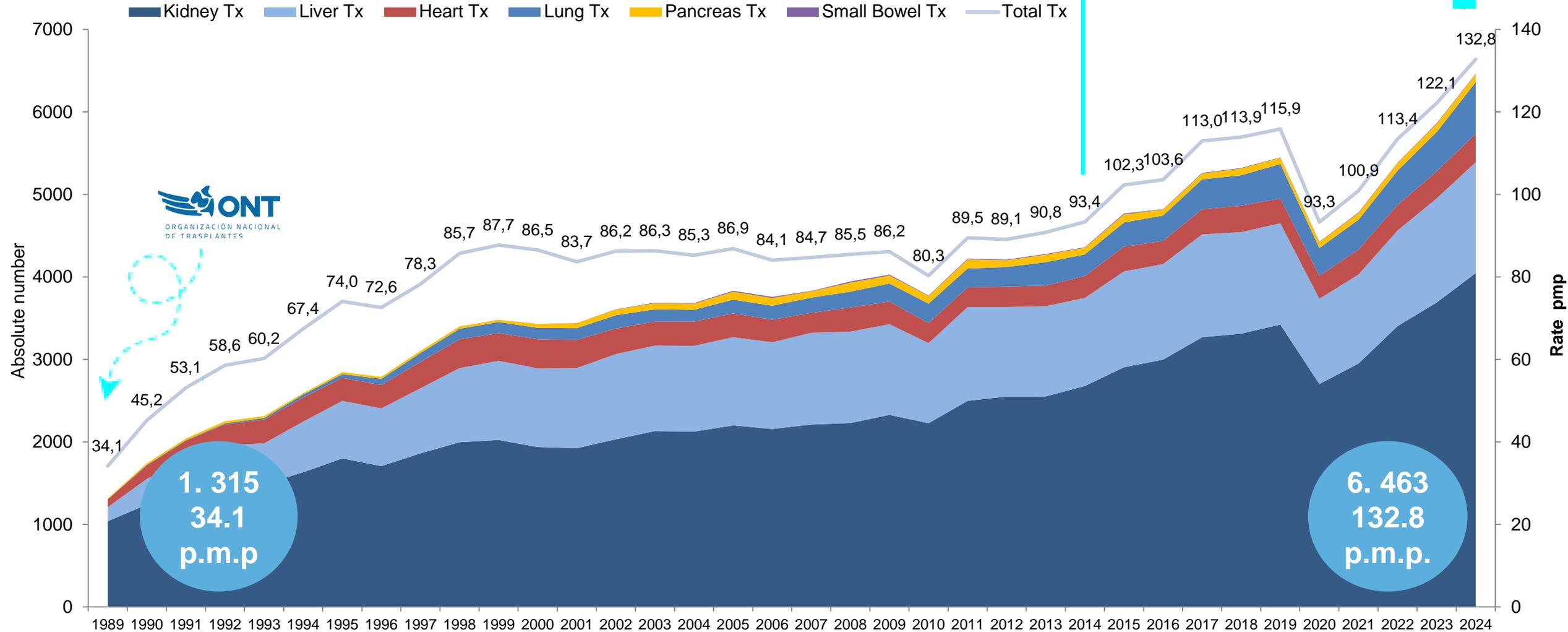
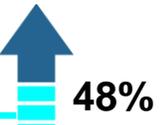


47 181 DECEASED DONORS
 ✓ **33 815 DBD (72%)**
 ✓ **13 366 DCD (28%)**

78/92 countries reported at least one deceased donor in 2024

Source: Global Observatory on Donation and Transplantation (GODT: <https://www.transplant-observatory.org/>)

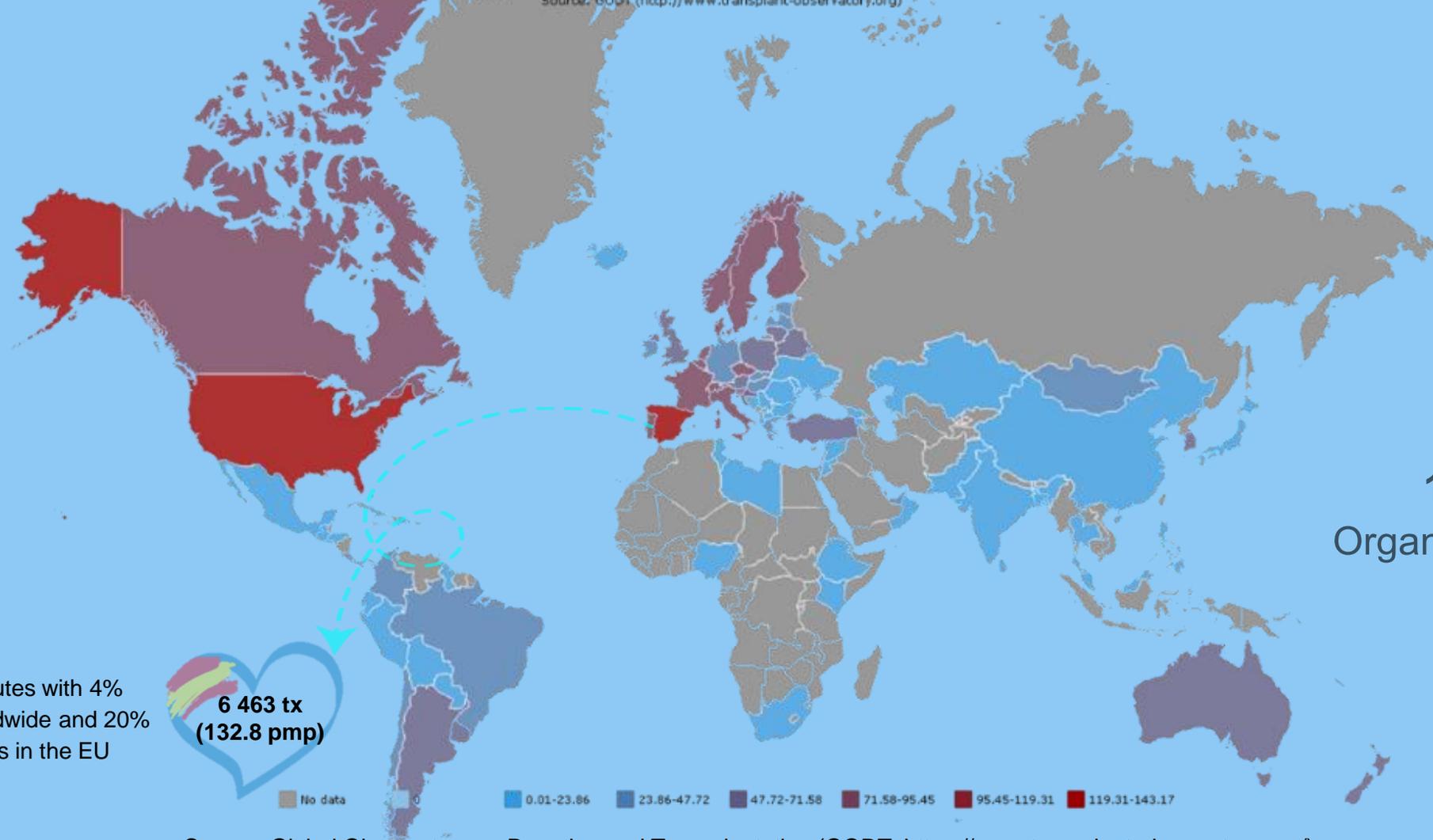
ORGAN TRANSPLANTATION IN SPAIN



Source: Organización Nacional de Trasplantes

TRANSPLANTS P.M.P IN THE WORLD 2024

Total Rate (pmp) Transplant sum: KIDNEY+HEART+LUNG+LIVER+PANCREAS+SMALL BOWEL (Global.2024)
 Source: GODT (<http://www.transplant-observatory.org>)



173 448
Organ Transplants

Spain contributes with 4% transplants worldwide and 20% of transplants in the EU



Source: Global Observatory on Donation and Transplantation (GODT: <https://www.transplant-observatory.org/>)

THE SPANISH OPT-OUT SYSTEM: POLICY AND PRACTICE

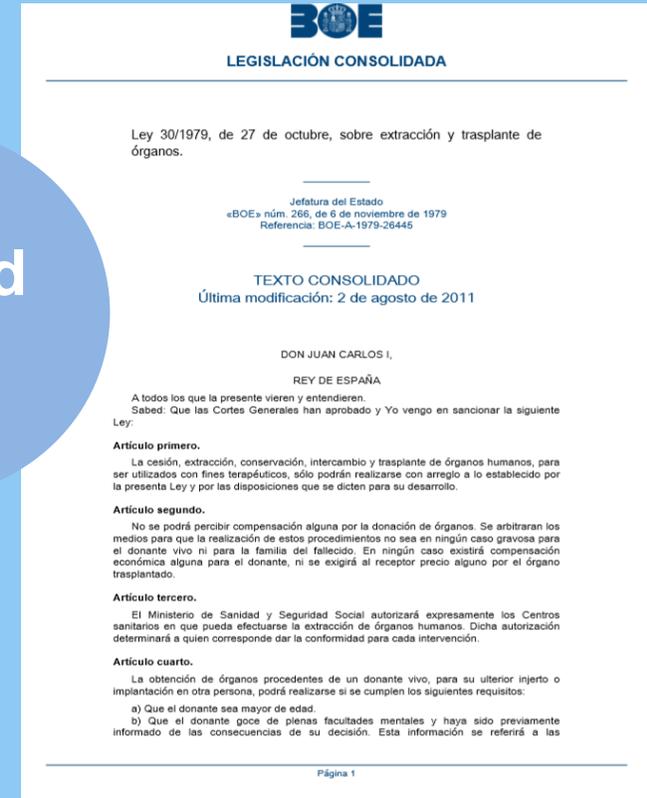


+ Donate seems the “normal” option

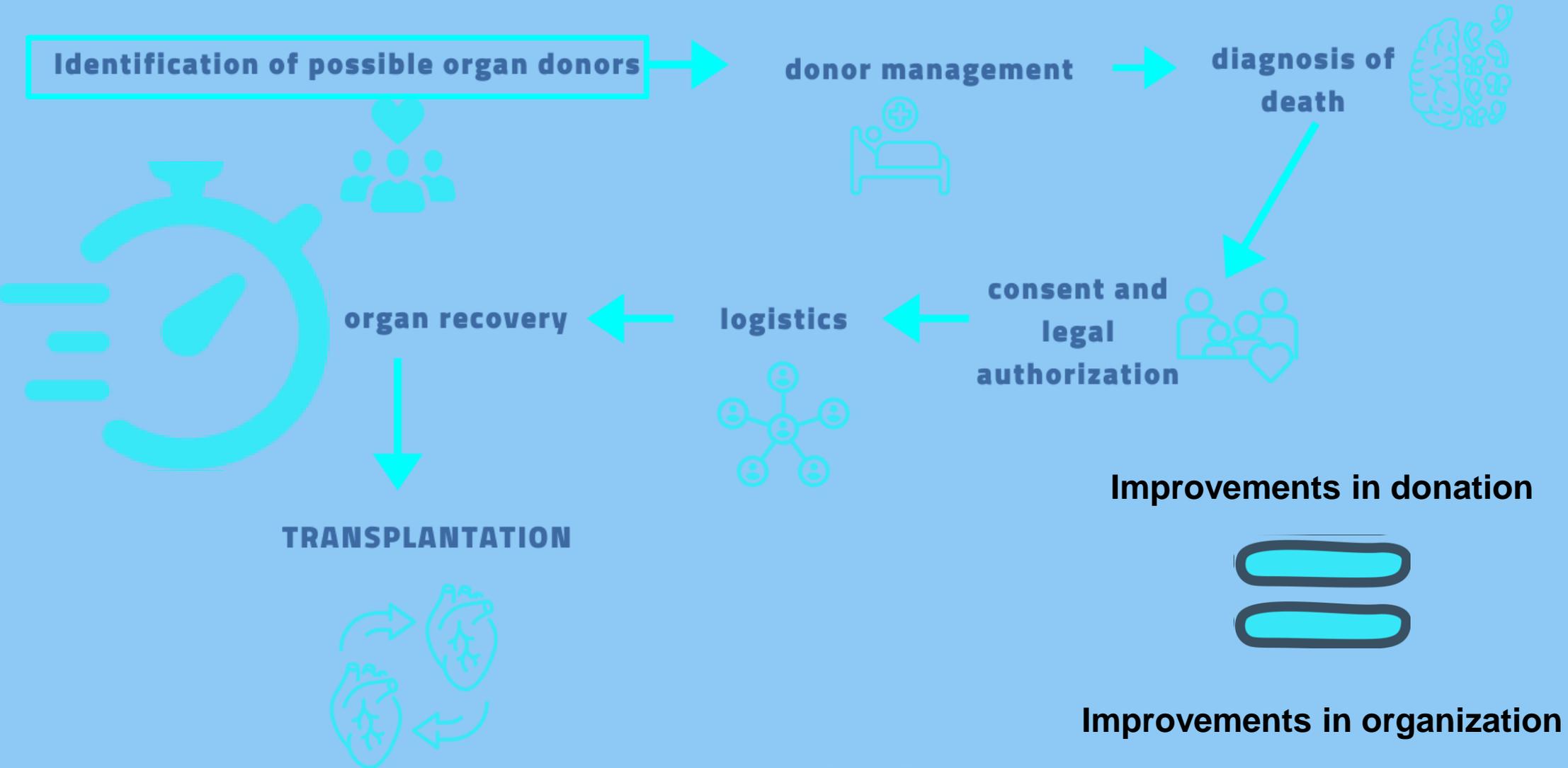
— The State as the “owner” of organs

- ✓ DETAILED IN SECONDARY LEGISLATION (RD 1723/2012)
- ✓ ADVANCED DIRECTIVES REGISTRY
- ✓ RELATIVES ALWAYS APPROACHED
- ✓ THEY ALWAYS HAVE THE FINAL VETO

Issued
1979



THE PROCESS OF DECEASED ORGAN DONATION



Matesanz R. et al. Transpl Int 2011; 24: 333-43

BASIC PRINCIPLES OF THE SPANISH MODEL

- 
- 1 Appropriate legal and technical framework
 - 2 Donor coordination network
 - 3 Special profile of donor coordinators
 - 4 Donor coordinators inside the hospital
 - 5 Central office (ONT) in support of the system
 - 6 Quality assurance program in organ donation
 - 7 Great effort in professional training
 - 8 Hospital reimbursement
 - 9 Continuous attention to the media

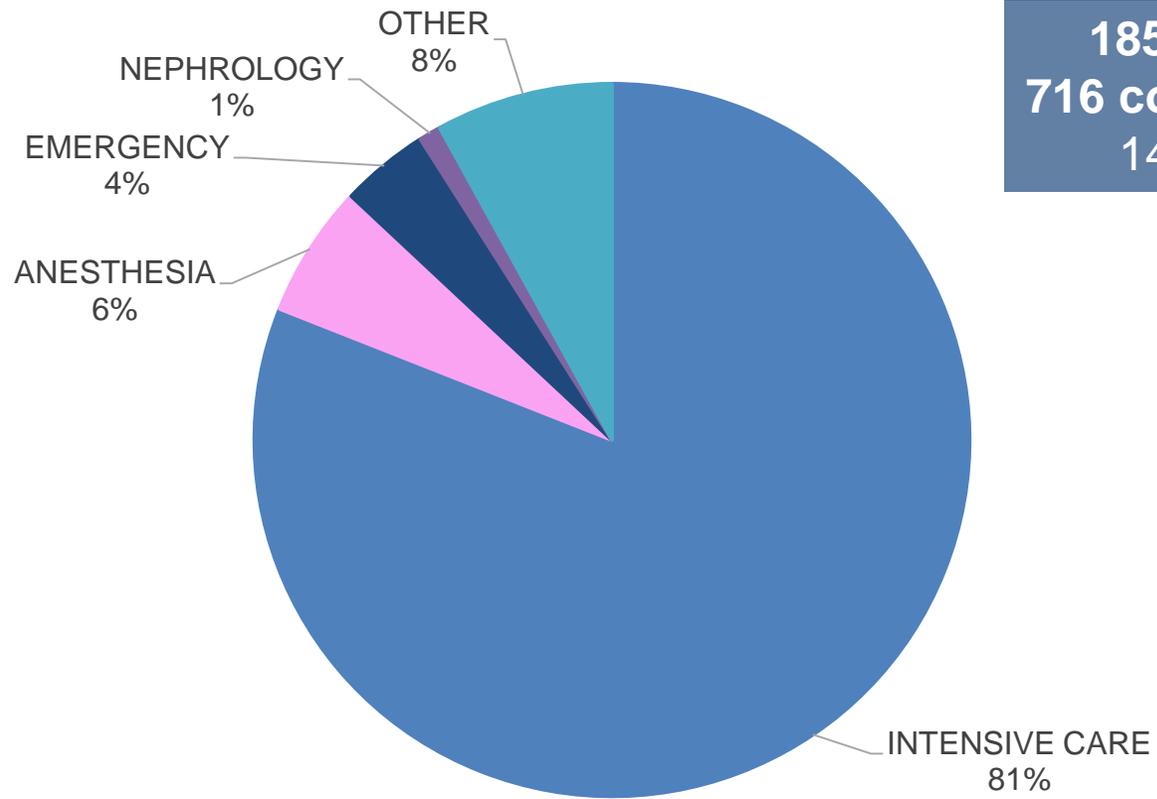
Matesanz R. et al. *Transpl Int* 2011; 24: 333-43



**KEEP
CALM**

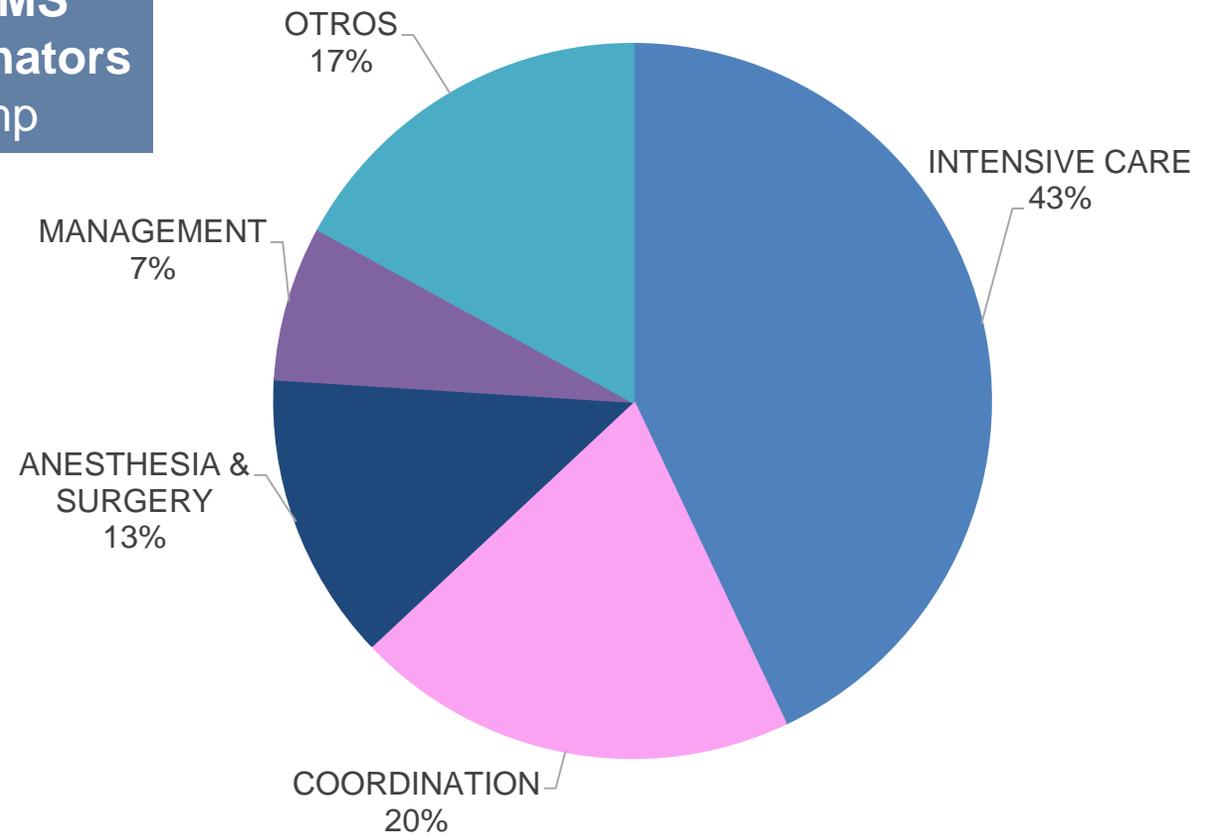
The
**Intensivist
Is Here**

DONOR COORDINATION HOSPITAL UNITS. SPAIN 2025



PHYSICIANS (453; 63%)
Full-time: 4%
Part-time: 96%

185 TEAMS
716 coordinators
14.7 pmp



NURSES (263; 37%)
Full-time: 24%
Part-time: 76%

Source: Organización Nacional de Trasplantes



**RECOMMENDATIONS ON THE
DEFINITION, STRUCTURE AND
FUNCTIONS OF DONOR TRANSPLANT
COORDINATION TEAMS
IN SPAIN**

Adopted by the Transplant Commission of the
Interterritorial Council of the National Healthcare System

21 May 2025

RECOMMENDATIONS

DEFINITION OF THE DTC TEAM

STRUCTURE OF DTC TEAM

FUNCTIONS OF DTC TEAM



A SYSTEM THAT COORDINATES COORDINATORS

Transplant Committee of the
National Healthcare System

REGIONAL

HOSPITAL



“Hawthorne effect: everyone who feels observed automatically changes their behaviour”

ONT: CENTRAL AGENCY IN SUPPORT OF THE SYSTEM

Not only an
organ
sharing
office

- 1 Management of waiting lists
- 2 Organ allocation
- 3 Logistic support to the process of donation
- 4 Quality assurance program in organ donation
- 5 Promotion and education
- 6 Training programs
- 7 Relationship with the media
- 8 National registries
- 9 Legislation
- 10 International cooperation

The logo for the Organización Nacional de Trasplantes (ONT) features the letters 'ONT' in a large, bold, blue font. The 'O' is a solid circle, while the 'N' and 'T' are outlined. The letters are slightly shadowed to give a 3D effect.

POTENTIAL DONOR AUDIT SPAIN SINCE 1999



POSSIBLE DONORS (2023 DATA)					
DBD		Global*		DCD	
2, 000 (42%)		4, 780		2, 483* (52%)	
Medically unsuitability					
359	17.9%	1, 608	33.6%	1, 045	42.1%
Failure to identify and refer					
8	0.4%	64	1.3%	0	2.0%
Problems in donor management					
29	1.5%	91	1.9%	40	1.6%
Logistical problems					
4	0.2%	18	0.4%	11	0.4%
No suitable recipient					
20	1.0%	43	0.9%	22	0.9%
Consent declined					
295	14.8%	561	11.7%	240	9.7%
Coroner refusal					
16	0.8%	20	0.4%	3	0.1%
Other					
19	0.9%	117	2.4%	64	2.6%
BD diagnosis not completed			Out of protocol		
0			6		
ACTUAL DONORS					
DBD		Global		DCD	
1, 250 62.5%		2, 258 47.2%		1, 008 40.6%	

*195 no DBI

>200 EXTERNAL AUDITS

Possibility of improvement ~ 22% !

<https://www.ont.es/wp-content/uploads/2024/10/MEMORIA-ANUAL-PROG.-GARANTIA-CALIDAD-2023.pdf>

GREAT EFFORT IN PROFESSIONAL TRAINING

General courses on Donor Coordination

Courses targeted to residents in Intensive Care Medicine

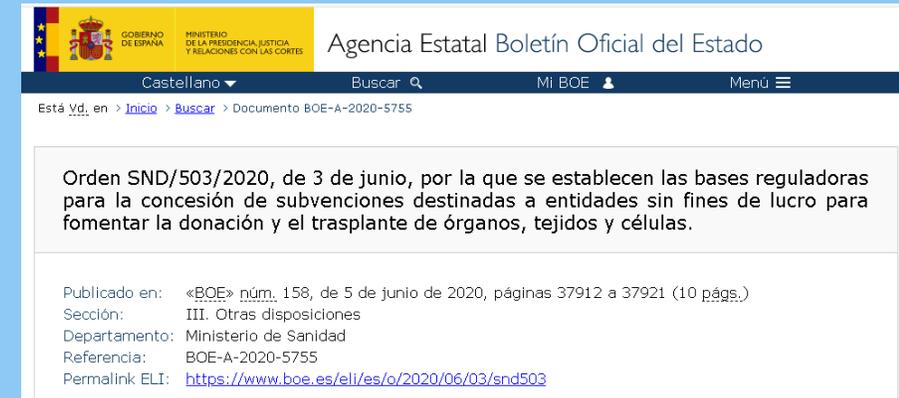
Courses targeted to Emergency Care personnel

Courses targeted to Neurologists – Stroke Units

Courses targeted to non-health care professionals

Specific courses on communication in critical situations

Specific courses on DCD, living donation, others



Agencia Estatal Boletín Oficial del Estado

Castellano | Buscar | Mi BOE | Menú

Está Ud. en > Inicio > Buscar > Documento BOE-A-2020-5755

Orden SND/503/2020, de 3 de junio, por la que se establecen las bases reguladoras para la concesión de subvenciones destinadas a entidades sin fines de lucro para fomentar la donación y el trasplante de órganos, tejidos y células.

Publicado en: «BOE» núm. 158, de 5 de junio de 2020, páginas 37912 a 37921 (10 págs.)
Sección: III. Otras disposiciones
Departamento: Ministerio de Sanidad
Referencia: BOE-A-2020-5755
Permalink ELI: <https://www.boe.es/eli/es/o/2020/06/03/snd503>

>20,000 HEALTH CARE PROFESSIONALS TRAINED THROUGH ONT COURSES SINCE 1991

Matesanz R. Transplant Int 2011; 24: 333

HOSPITAL REIMBURSEMENT

Donation is another clinical activity at the hospital & is appropriately funded



CONTINUOUS ATTENTION TO THE MEDIA

**Telephone/web
contact 24/7 available
to the public,
professionals and the
media**



**Connection with the
media**

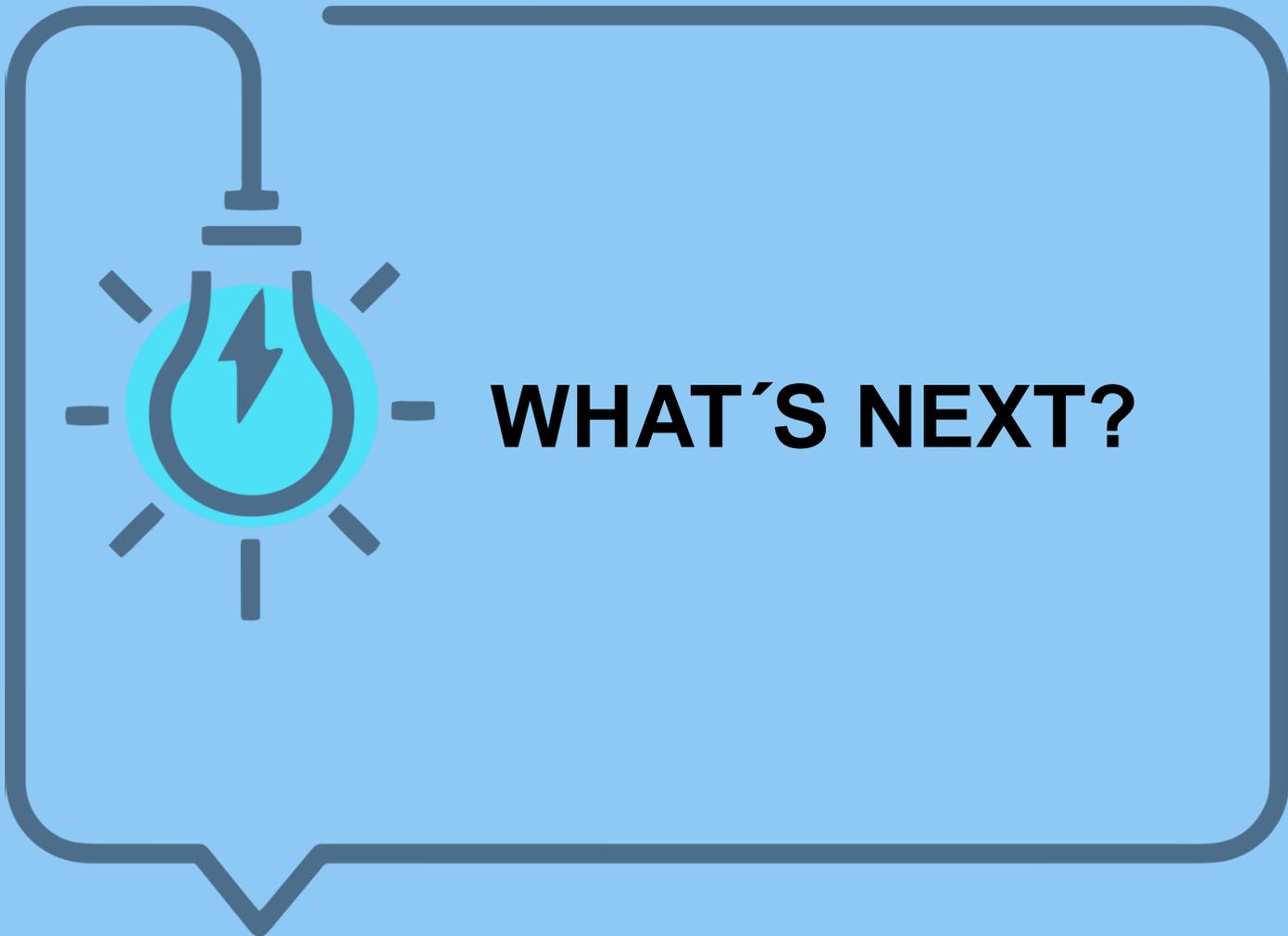


**Control of
information without
intermediaries**

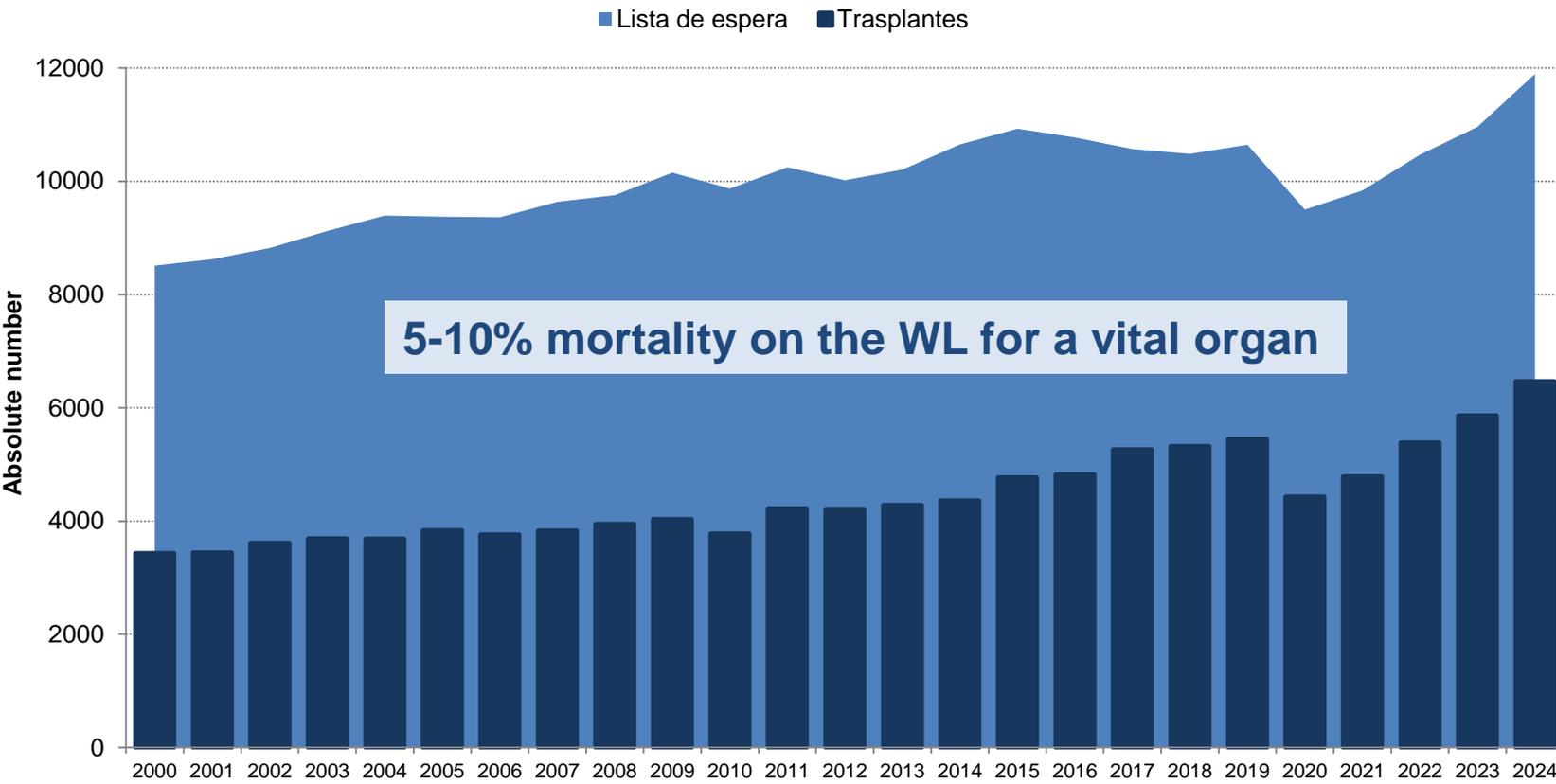


**Permanent and
immediate accessibility
to the media (local,
national, international)**

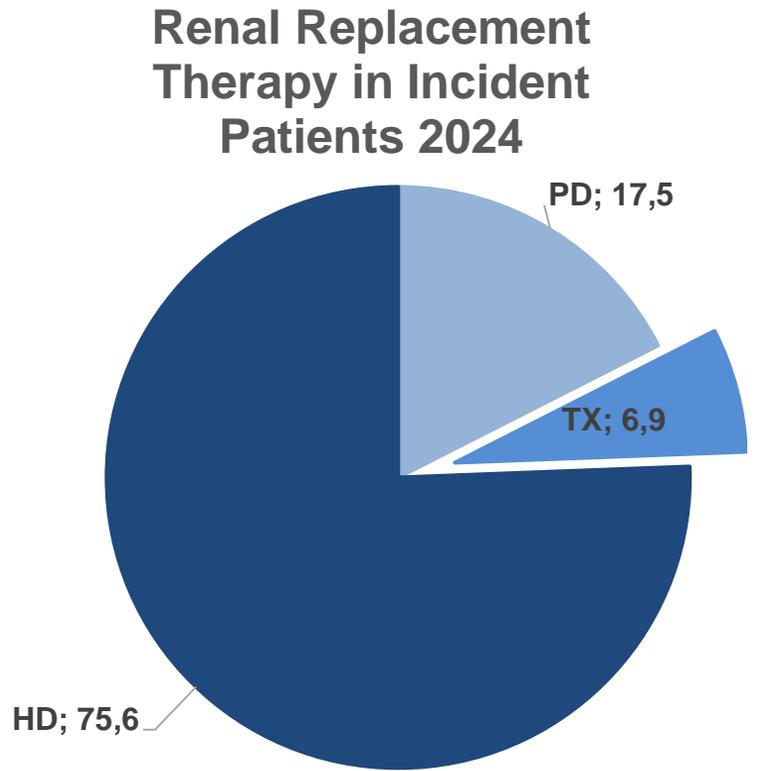




STILL FAR FROM SELF-SUFFICIENCY IN TRANSPLANTATION



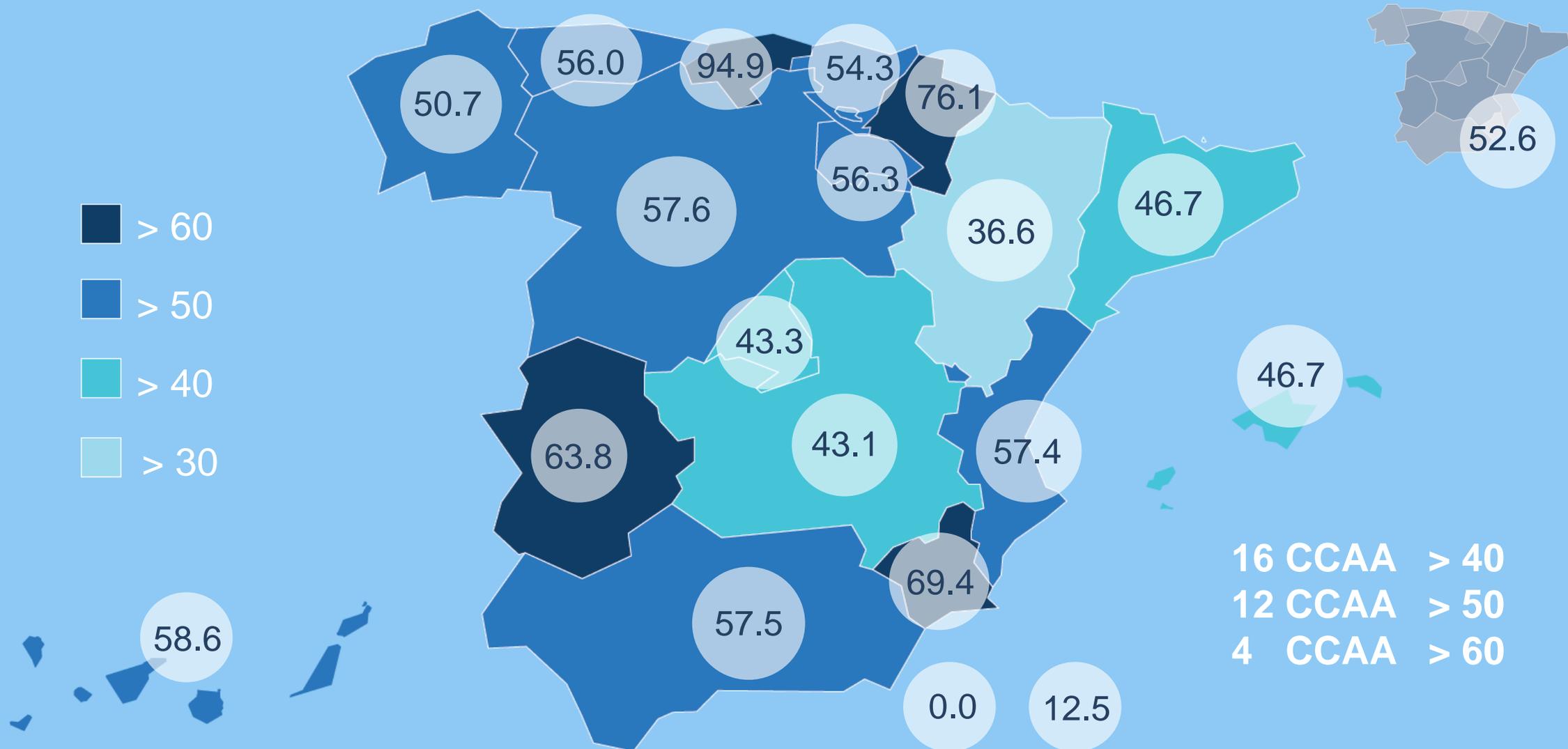
Waiting list *versus* transplants in Spain



PREEMPTIVE KIDNEY TRANSPLANTATION EXCEPTIONAL

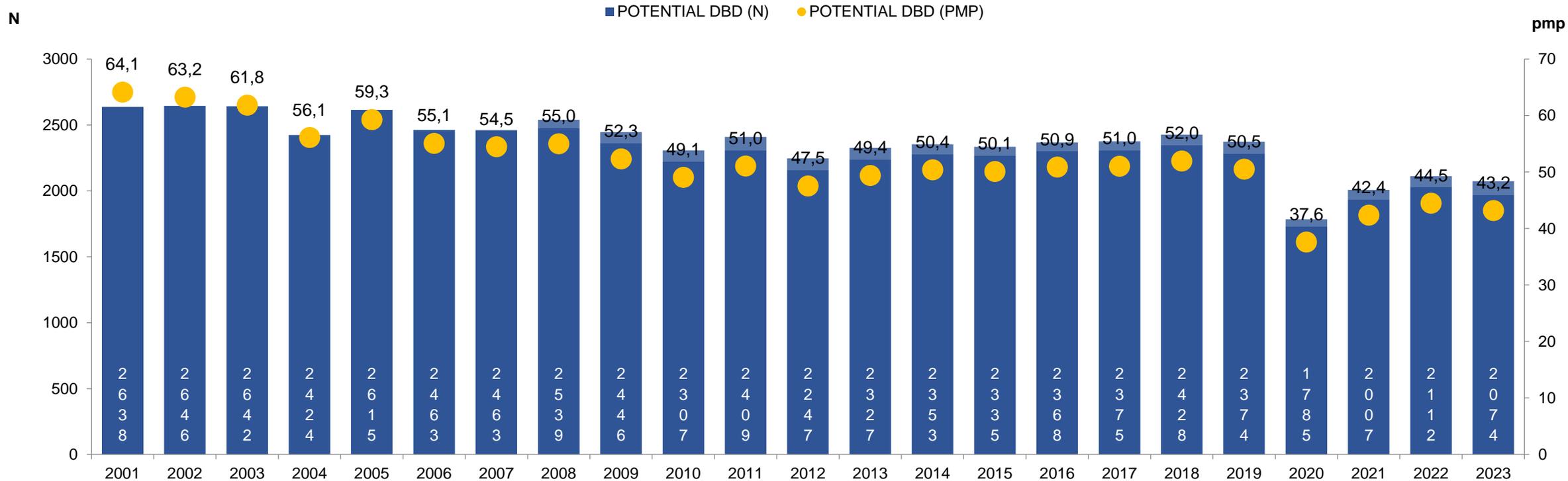
Source: Organización Nacional de Trasplantes

DECEASED DONATION IN SPAIN 2024



Source: Organización Nacional de Trasplantes

DECREASE IN THE INCIDENCE OF BRAIN DEATH IN SPAIN



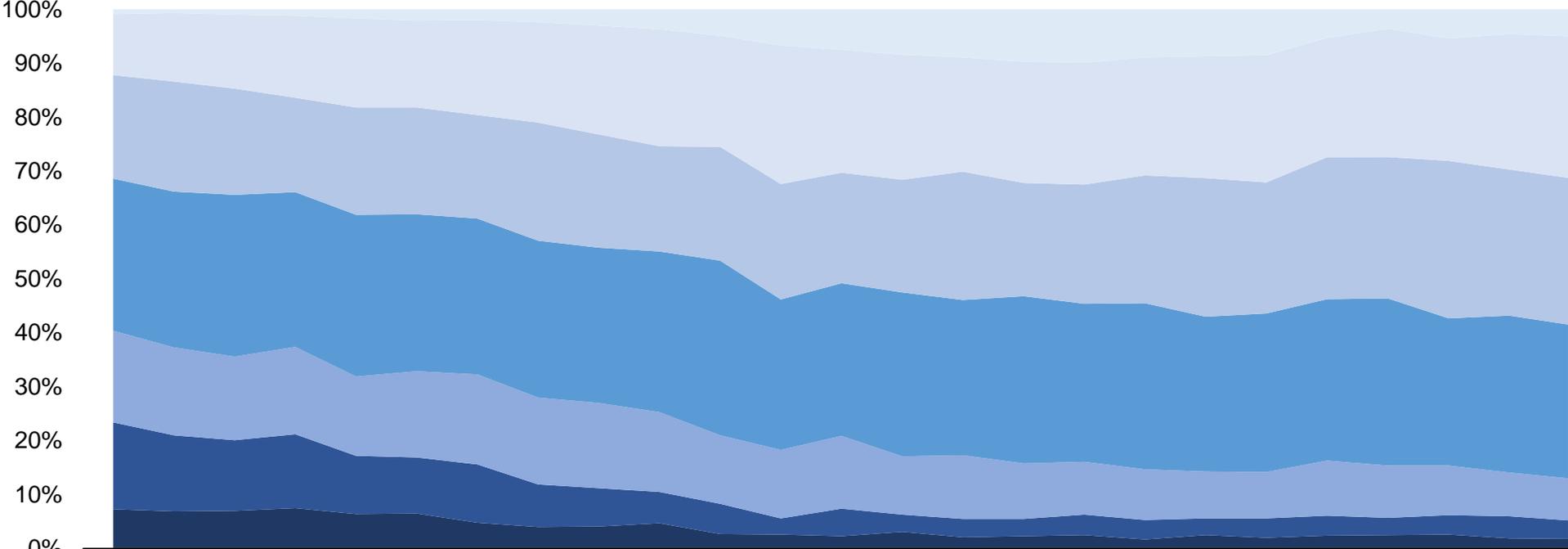
Source: Organización Nacional de Trasplantes

1

THE EXPANDED CRITERIA AND THE NON-STANDARD RISK DONOR

DECEASED DONOR AGE IN SPAIN

■ 0-17 y ■ 18-29 y ■ 30-44 y ■ 45-59 y ■ 60-69 y ■ 70-79 y ■ ≥ 80 y



59% DONORS ≥ 60 y
31% ≥ 70 y
5% ≥ 80 y

Mean age
61 years

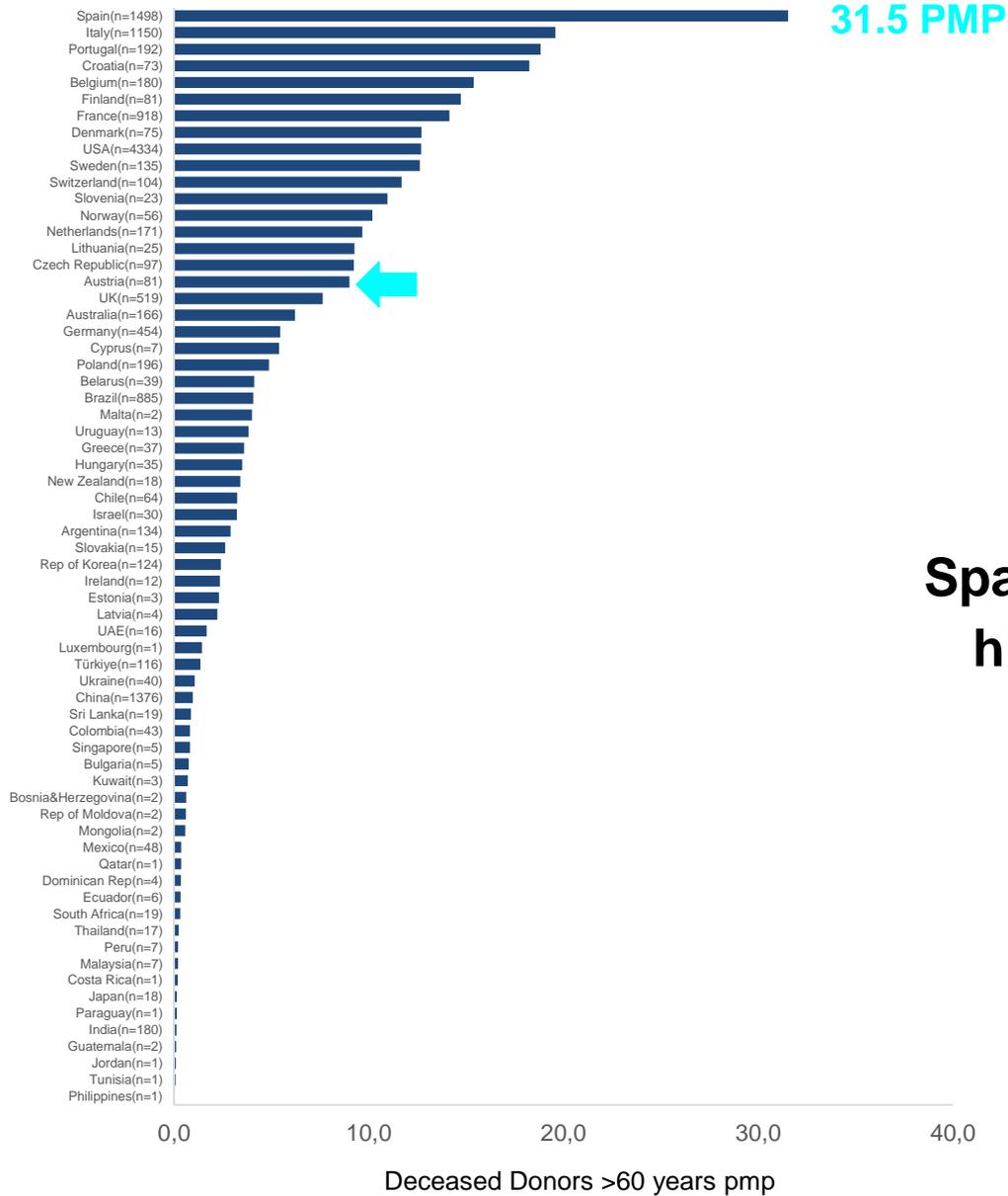
2024

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
≥ 80 y	0,9	0,7	1,0	1,2	1,7	2,1	2,0	2,4	3,0	3,7	4,9	6,7	7,5	8,4	8,9	9,7	9,9	8,9	8,7	8,5	5,3	3,6	5,4	4,6	5,0
70-79 y	11,3	12,7	13,7	15,2	16,5	16,1	17,6	18,6	20,2	21,7	20,6	25,7	22,8	23,2	21,2	22,5	22,6	21,9	22,6	23,6	22,1	23,8	22,7	25,1	26,3
60-69 y	19,2	20,4	19,7	17,5	19,9	19,8	19,2	21,9	21,0	19,5	21,1	21,4	20,5	20,9	23,8	21,0	22,1	23,7	25,7	24,3	26,3	26,2	29,2	27,1	27,2
45-59 y	28,2	28,9	30,0	28,7	30,0	29,1	28,9	29,1	28,8	29,8	32,4	27,9	28,3	30,4	28,8	31,0	29,3	30,8	28,7	29,4	29,9	31,0	27,3	29,1	28,5
30-44 y	17,0	16,3	15,5	16,2	14,7	16,0	16,7	16,1	15,8	14,8	12,7	12,7	13,5	10,8	11,8	10,3	9,8	9,4	8,7	8,6	10,2	9,7	9,2	8,1	7,8
18-29 y	16,1	14,1	13,1	13,7	10,8	10,4	10,8	7,9	7,1	5,8	5,6	3,0	5,1	3,2	3,4	3,2	3,8	3,6	3,1	3,6	3,7	3,2	3,6	4,1	3,4
0-17 y	7,3	6,9	7,0	7,5	6,4	6,5	4,8	4,0	4,1	4,7	2,7	2,6	2,3	3,1	2,1	2,3	2,5	1,7	2,5	2,0	2,4	2,5	2,6	1,9	1,8

13%

Source: Organización Nacional de Trasplantes

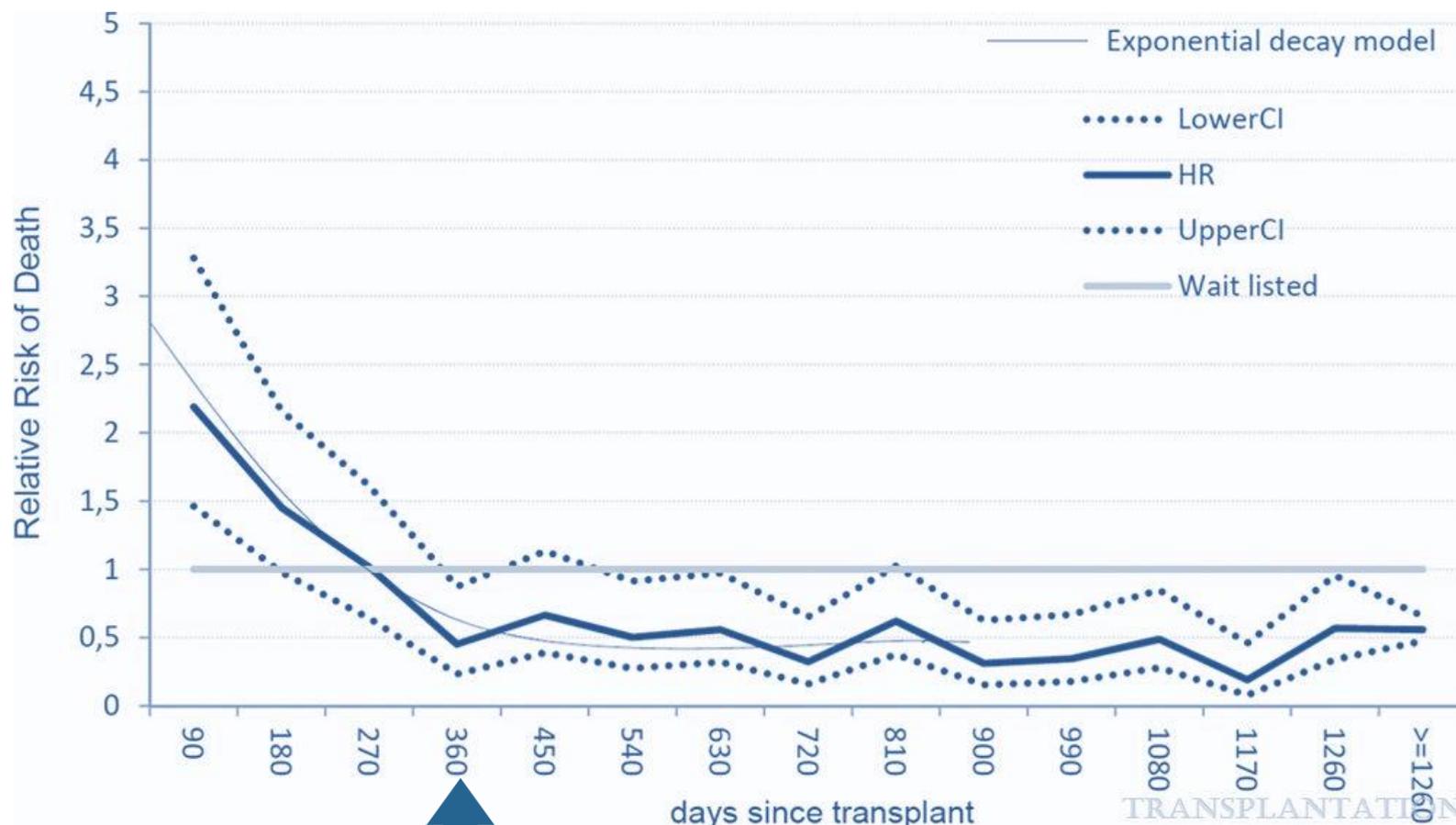
**DECEASED
DONORS
> 60 YEARS
PMP
IN 2024**



Spain is the country with the highest rate of deceased donors > 60 years

Source: Global Observatory on Organ Donation and Transplantation (<https://www.transplant-observatory.org/>)

At 12 months, the RR of death among recipients ≥ 60 years with a first kidney transplant from a donor ≥ 60 years was significantly lower than patients who remained in dialysis waitlisted



Relative risk of death at 12 mo after kidney transplantation in 2 donor age groups (60–79 y and ≥ 80 y), compared to remaining on dialysis on the waiting list

	Adjusted HR mortality risk from donor 60–79 y ^a ; (n = 1084)	P	Adjusted HR mortality risk from donor ≥ 80 y ^a ; (n = 128)	P
Global	0.50 (0.44–0.58)	<0.001	0.54 (0.38–0.77)	0.001

Arcos E, et al. Transplantation 2020; 104(1):176-183

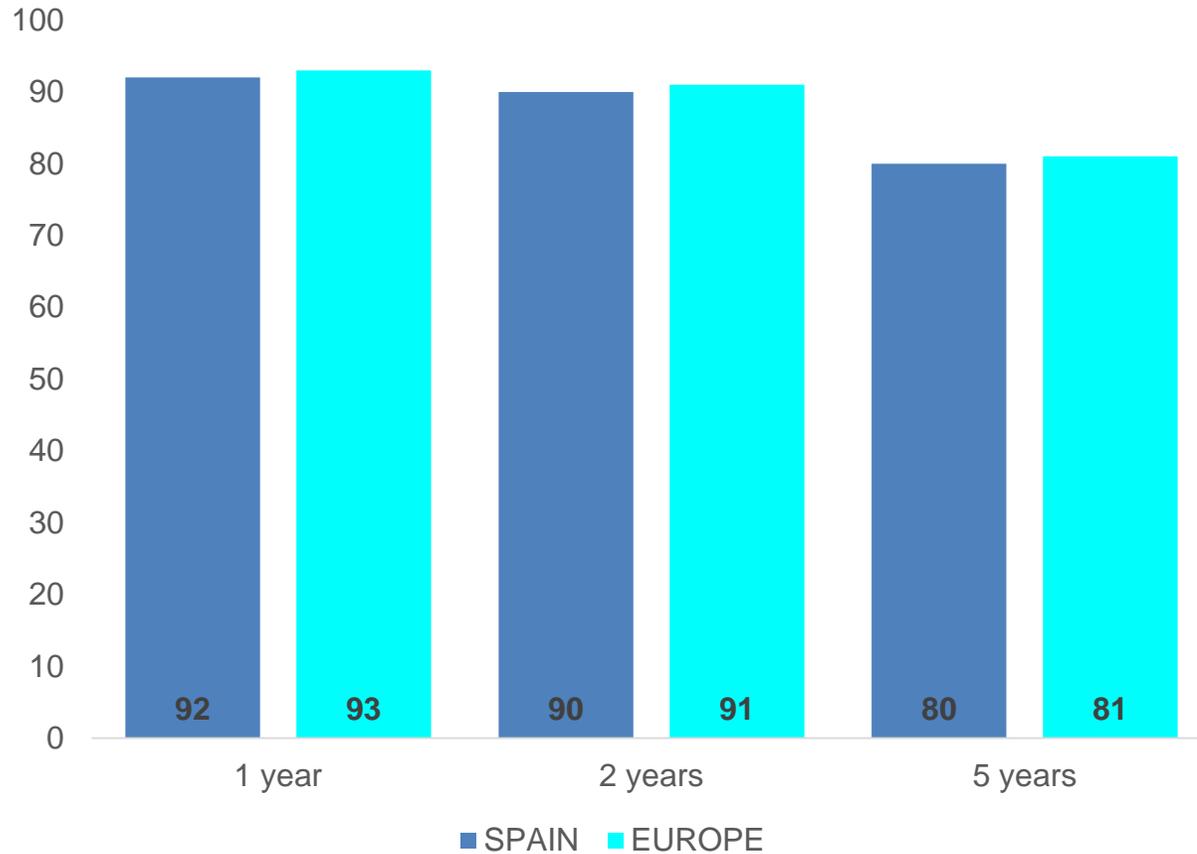


GRAFT SURVIVAL AFTER KIDNEY TRANSPLANT SPAIN VS EUROPE

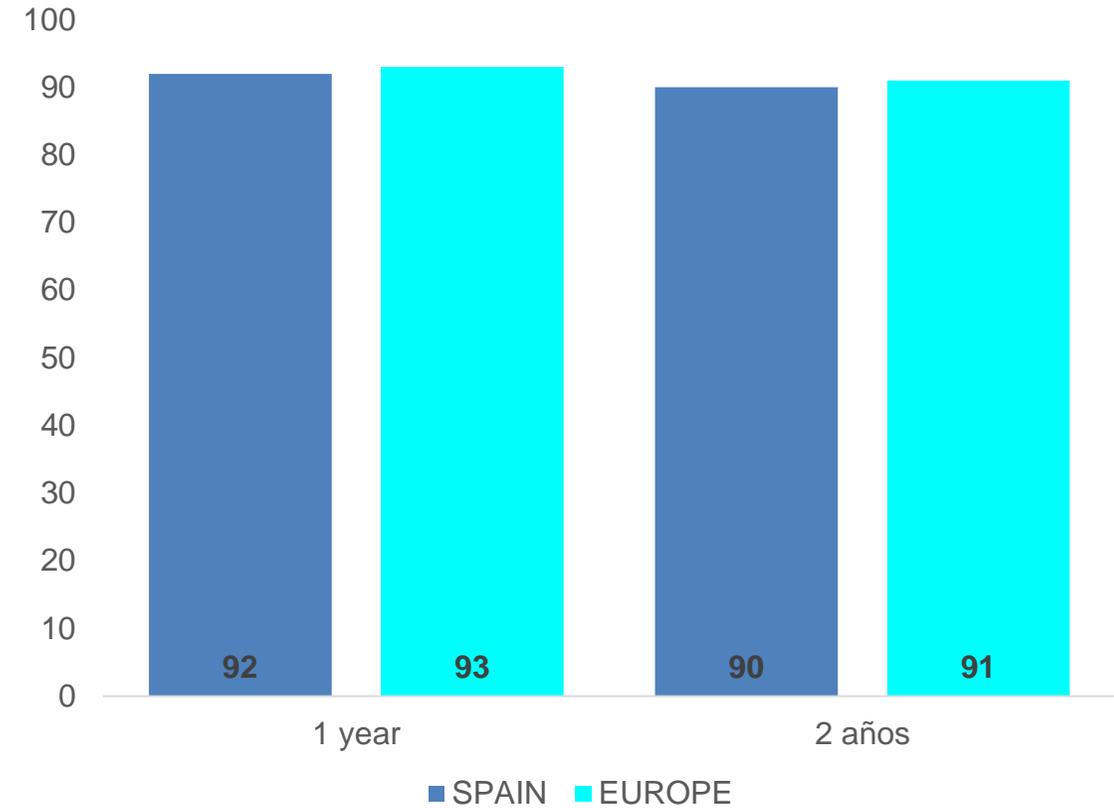
First graft (deceased donor) from day of transplant, adjusted*



2012-2018



2017-2021



*Recipient age and sex and primary renal disease

Source: 2022 ERA-EDTA Annual Report: https://www.ont.es/wp-content/uploads/2024/10/eraregistry_survival_report_2022__ES.pdf



“ We perceive greater risk in acts of commission than in acts of omission: if a patient dies during or after transplantation, it’s the doctor’s responsibility; if the patient dies from organ failure while awaiting a transplant, we can blame the indifference of the Universe.”

Getting Comfortable with Risk
Dr. Robert A. Montgomery
New Engl J Med 2019; 381 (17)

SPECTRUM OF RISK ATTITUDES APPLIED TO TRANSPLANTATION

Attribute	Risk avoiding	Risk averse	Risk neutral	Risk tolerant	Risk seeking
Focus	Focus mainly on negative risk and avoiding loss at all costs	Focus on managing or avoiding negative risk drives most decisions	Focus on managing risk balance between negative and positive	Focus is on positive risk, but negative risk is also considered	Focus on positive risk and maximising gain— <i>all-or-nothing</i> philosophy
Attitude	Risk is very bad and to be avoided at all costs	Risk is bad but acceptable in some circumstances	Risk is seen as both bad and good to be managed equally	Risk is good but unacceptable in some circumstances	Risk is very good and to be embraced at all costs
Transplant example	Declining all organ offers as ' <i>no organ is ever risk-free</i> '	Declining most organ offers as ' <i>no organ is risk-free</i> '	Accepting some organ offers but declining some as ' <i>not every organ offer is better than no offer</i> '	Accepting most organ offers as ' <i>any organ is better than no organ</i> ' in majority of cases	Accepting all organ offers as ' <i>any organ is better than no organ</i> '
Risk versus benefit scale	Risk >>> Benefit	Risk > Benefit	Risk = Benefit	Risk < Benefit	Risk <<< Benefit
Optimal attitude ^a	Problematic	Questionable	Good	Ideal	Problematic

^aAuthor opinion.

Sharif A. Risk Aversion, Organ Utilization and Changing Behavior. *Transpl Int* 2022; 35:10339. doi: 10.3389/ti.2022.10339.

SUPPORT TO THE SAFE USE OF NON-STANDARD RISK DONORS

2019

documento de consenso para la valoración de donantes con serología positiva para el virus de la hepatitis c

ONT · AEEH · GESITRA · SEC · SEN · SEPAR · SET · SETH

la valoración antes virus C
Abril 2019

SYSTEM FOR SECOND OPINION

NSRD PROGRAM/ BIOVIGILANCE

MINISTERIO DE SANIDAD

Organización Nacional de Trasplantes O.A.

DOCUMENTO DE CONSENSO SOBRE LA EVALUACIÓN DEL DONANTE DE ÓRGANOS PARA PREVENIR LA TRANSMISIÓN DE ENFERMEDADES TUMORALES

Este documento representa la traducción al castellano del Capítulo 9 de la Guía del Consejo de Europa sobre la Calidad y la Seguridad de los Órganos Humanos destinados a Trasplante en su 8ª Edición (<https://www.edqm.eu/en/organs-tissues-and-cells-technical-guides>), relativo al riesgo de transmisión de enfermedades tumorales a través de los órganos trasplantados. Este documento se refiere a la valoración y selección de donantes de órganos con serología positiva para el virus de la hepatitis C en el contexto de la evaluación de la calidad y la seguridad de los trasplantes de órganos humanos.

Este documento sustituye a la versión previa adoptada en septiembre de 2019.

A pie de página, se incluyen aclaraciones para la interpretación del documento en su aplicación a la realidad española.

La coordinación de la traducción, revisión y adaptación del documento ha sido liderada por la Organización Nacional de Trasplantes, por las doctoras Mahillo B., Albalade M., y Domínguez-Gil B., con el apoyo de la Subcomisión Nacional para la Seguridad del trasplante de órganos, tejidos y células, en concreto, por los doctores Casanova D., Fondevila C., García Cosío D., Hernández D., Navarro A., Pérez Redondo M., Salvatierra A., Sánchez J.

En julio de 2023, la Comisión de Trasplantes del Consejo Interterritorial del Sistema Nacional de Salud adopta este documento como guía de referencia oficial para la evaluación del donante de órganos con respecto a la transmisión de enfermedades tumorales en España.

Edqm

Europa Directorate for the Quality of Medicines & Healthcare

Direction européenne de la qualité des médicaments & soins de santé

CONSEIL DE L'EUROPE

Julio de 2023

Gesitra-IC

seimc

ONT

Documento de Consenso del Grupo de Estudio de la Infección en el Trasplante (GESITRA) perteneciente a la Sociedad Española de Enfermedades Infecciosas y Microbiología Clínica (SEIMC) y la Organización Nacional de Trasplantes (ONT) sobre los Criterios de Selección del Donante de Órganos Sólidos en relación a las Enfermedades Infecciosas

2019

Source: Organización Nacional de Trasplantes

SUPPORT TO THE SAFE USE OF NON-STANDARD RISK DONORS

NON-STANDARD RISK DONORS (KNOWN BEFORE TX)

BIOVIGILANCE (KNOWN AFTER TX)



- ✓ Prospective follow-up of recipients
- ✓ Minimum data set
- ✓ Frequency depending on the conditions in the donor
- ✓ Coordinators/transplant teams
- ✓ Mobile devices/PC

- ✓ Alert
- ✓ Investigate
- ✓ Manage
- ✓ Prospective follow-up of recipients

MINISTERIO DE SANIDAD, CONSUMO Y BIENESTAR SOCIAL

ANEXO I. FICHA DE NOTIFICACIÓN DE EVENTO ADVERSO

CENTRO QUE DECLARA:	
COMUNIDAD AUTÓNOMA:	
FECHA DE NOTIFICACIÓN (dd/mm/aaaa):	

3. Datos que servirán y disposición de Biovigilancia de eventos

A. Datos para recepción que recibir		B. Datos para el seguimiento de Biovigilancia de eventos (BAC)	
Identidad de la persona que notifica	Nombre:	Identidad de la BAC	Nombre:
Apellido:	Apellido:		
Edad:	Edad:		
Cargo:	Cargo:		
Datos de contacto:		Datos de contacto:	
Teléfono:	Teléfono:	Fax:	Fax:
E-mail:	E-mail:	Correo postal:	Correo postal:
Observación general:	Observación general:	El sistema de referencia:	El sistema de referencia:
		<input type="checkbox"/> Notificación inicial	<input type="checkbox"/> Notificación de seguimiento (especificar número):

PAIS: -000. NAL: de NOTIFICACION Y GESTION DE REACCIONES Y EVENTOS ADVERSOS EN DONES Y DE ORGANOS - BIOVIGILANCIA DE ORGANOS. Pág. 23 de 42

MINISTERIO DE SANIDAD, CONSUMO Y BIENESTAR SOCIAL

ANEXO III. INFORME DE CASO DE BIOVIGILANCIA

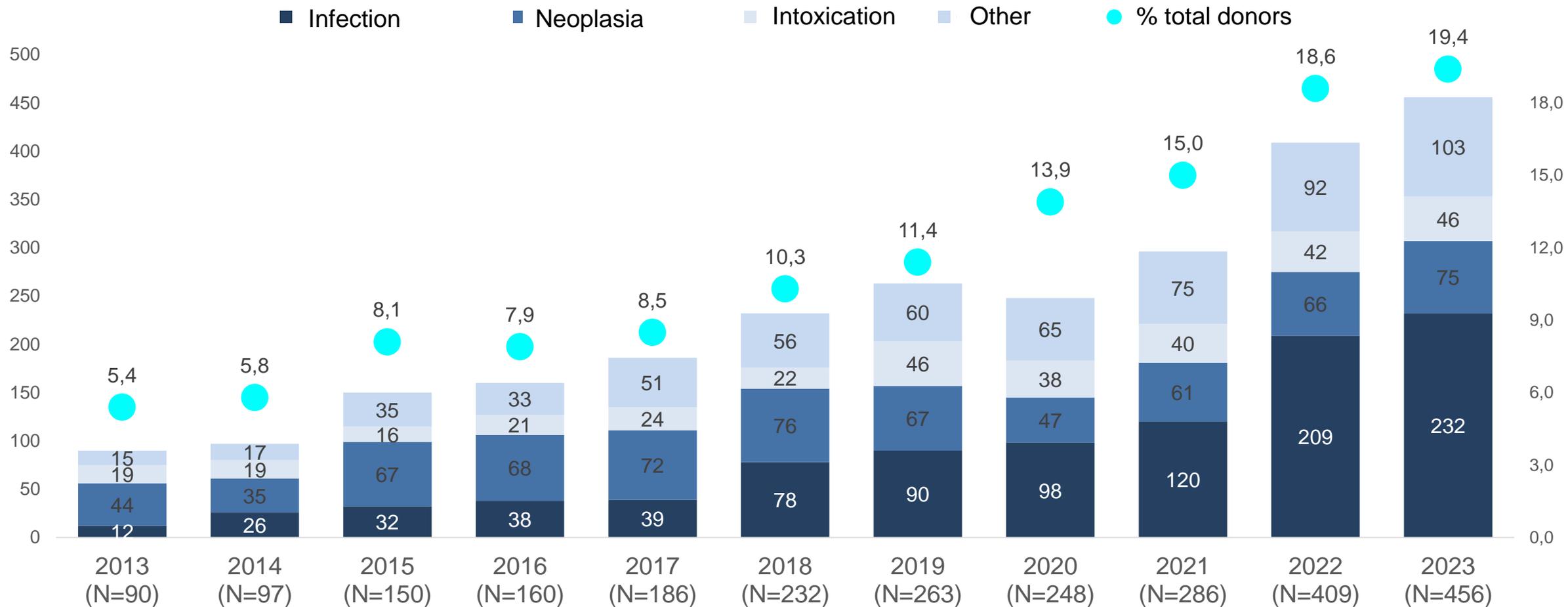
REFERENCIA: (CASO) DE BIOVIGILANCIA: (CASO)	
LOCALIDAD:	
TIPO DE REACCIÓN DE INTERÉS:	
DESCRIPTORIO DEL TIPO DE REACCIÓN:	
- Centro de recepción de órganos:	
- Centro de trasplante de órganos:	
- Coordinación Asistencia de Trasplante:	
- Autoridades: Comités de ética: Estado:	
- Identificación de la BAC:	
FORMACIÓN SOBRE EL CASO QUE NOTIFICA:	
DESCRIPCIÓN, RESUMEN DE REACCIÓN Y TRANSPLANTACIÓN (Países donante (origen) (donante) (país receptor) (destino) (receptor))	
DESCRIPCIÓN DEL CASO:	
RESULTADO DE LA INVESTIGACIÓN:	
RIESGOS: FARMACOLÓGICOS, QUÍMICOS Y FÍSICOQUÍMICOS:	
ADAPTACIONES:	
CONCLUSIONES DEL CASO Y SEGUIMIENTO DE CASO NECESARIO:	
FECHA DE RESPUESTA/ACTUALIZACIÓN DEL INFORME:	

El responsable de la persona que recibe esta información es el centro de biovigilancia adjunto a los órganos de trasplante, entendiendo que el caso notificado es el resultado de la investigación. No se debe garantizar la recepción de datos (información) por parte de los responsables notificados de cada uno de los países implicados. El responsable de la información de trasplante debe ser un responsable de trasplante de un hospital acreditado por el país de origen (donante) o el país receptor (receptor) o el país de destino (receptor) o el país de origen (donante) o el país receptor (receptor).

PAIS: -000. NAL: de NOTIFICACION Y GESTION DE REACCIONES Y EVENTOS ADVERSOS EN DONES Y DE ORGANOS - BIOVIGILANCIA DE ORGANOS. Pág. 24 de 42

Mahillo B, et al. Transplantation. 2022 Apr 1. doi: 10.1097/TP.0000000000004117.

NON-STANDARD RISK DONORS IN SPAIN



12% of deceased donors were NSRD with > 5,500 transplants during 2013-2023

Source: Organización Nacional de Trasplantes

TRANSPLANTS FROM DONORS WITH CANCER. SPAIN 2013-2018

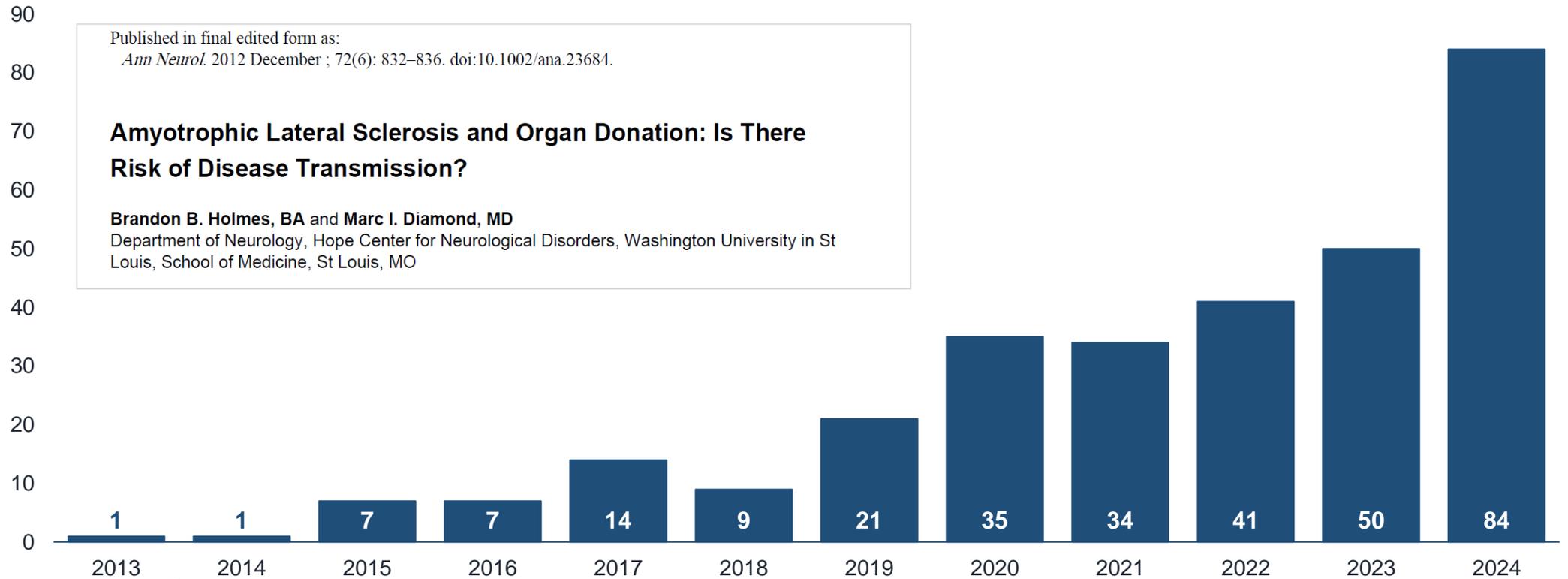
TUMOR (location in the donor)	DONORS WITH CANCER	RECIPIENTS AT RISK	RECIPIENTS WITH CONFIRMED DTC*	GRAFT LOSS RELATED TO DONOR CANCER**	RECIPIENT DEATH RELATED TO DONOR CANCER
ADENOCARCINOMA OMENTUM	1	2	0	1	0
BREAST	9	28	0	0	0
CHOLANGIOCARCINOMA	1	3	1	0	0
CNS (WHO I-IV)	104	279	0	0	0
COLO-RECTAL	10	18	0	0	0
DUODENAL	1	2	2	0	2
ESOPHAGEAL	1	4	0	0	0
GALLBLADDER	1	3	0	1	0
GASTRIC	3	9	0	0	0
GIST	6	12	0	0	0
HEAD AND NECK	14	25	0	0	0
HEMATOPOIETIC	16	31	0	0	0
LIVER	3	5	0	0	0
LUNG	8	21	9 (43%)	10	7
NEUROENDOCRINE	4	10	0	0	0
OVARIAN	1	2	0	0	0
PROSTATE	41	91	1	0	0
RCC	71	116	2	2	0
SUPRA-RENAL	6	18	0	0	0
TESTICULAR	2	5	0	0	0
THYROID	4	13	0	0	0
UROTHELIAL	18	39	0	0	0
UTERINE CERVIX	8	24	0	0	0
UTERUS	7	16	0	0	0
UNDIFFERENCIATED	1	1	1	1	0
OTHER	7	19	0	0	0
TOTAL	349	802	16 (2%)	15 (2%)	9 (1%)

DTC IN 6 / 10,000 TRANSPLANTS (ALL UNKNOWN IN THE DONOR)

*Donor-origin classified as possible, probable or definite/certain.
**Includes 5 prophylactic transplantectomies.

Mahillo B, et al. Transplantation. 2022 Apr 1. doi: 10.1097/TP.0000000000004117.

ORGAN DONORS WITH ALS IN SPAIN



Published in final edited form as:

Ann Neurol. 2012 December ; 72(6): 832–836. doi:10.1002/ana.23684.

Amyotrophic Lateral Sclerosis and Organ Donation: Is There Risk of Disease Transmission?

Brandon B. Holmes, BA and Marc I. Diamond, MD

Department of Neurology, Hope Center for Neurological Disorders, Washington University in St Louis, School of Medicine, St Louis, MO

➤ **304** actual donors (8 DBD & 296 DCD)

➤ **826 tx** (469 kidney, 212 liver, 3 liver-kidney, 100 lung, 26 heart & 16 pancreas-kidney)

➤ **NO SERIOUS ADVERSE REACTION RELATED TO THE DONOR'S CONDITION**

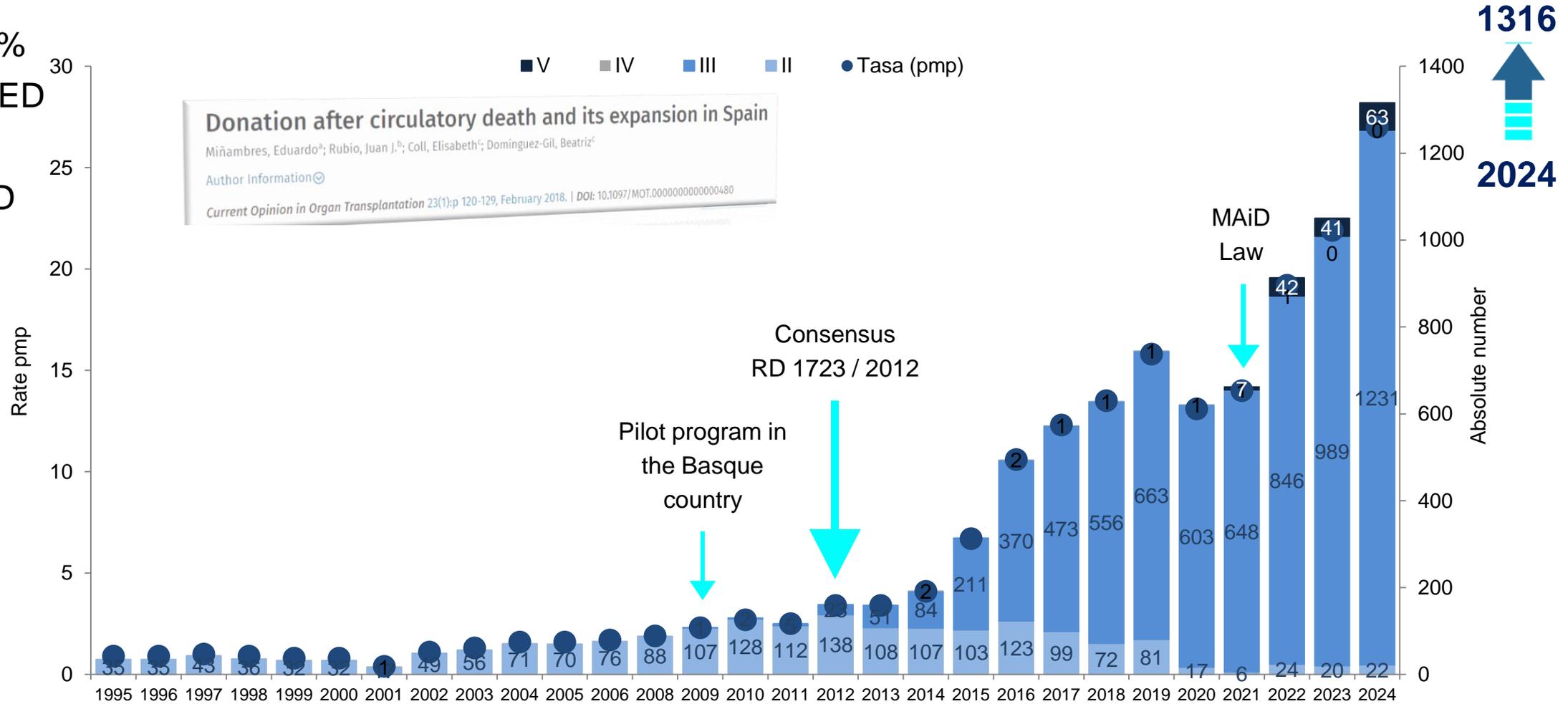
Source: Organización Nacional de Trasplantes

2

DONATION AFTER THE CIRCULATORY DETERMINATION OF DEATH

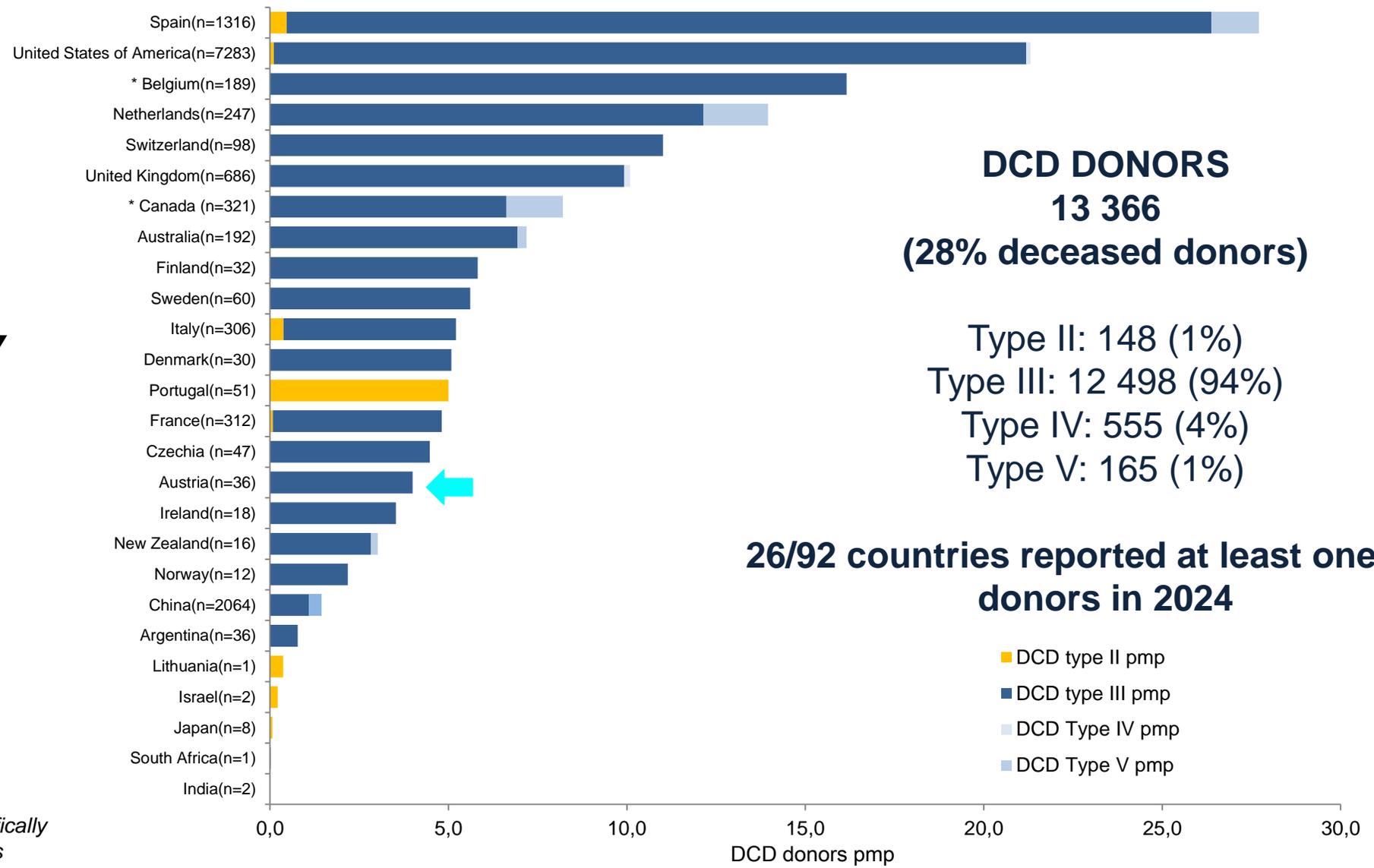
DONATION AFTER THE CIRCULATORY DETERMINATION OF DEATH IN SPAIN

IN 2024, 51%
OF DECEASED
DONORS
WERE DCD
DONORS



Source: Organización Nacional de Trasplantes

**DCD DONORS BY
MAASTRICHT
TYPE
(PMP)
YEAR 2024**

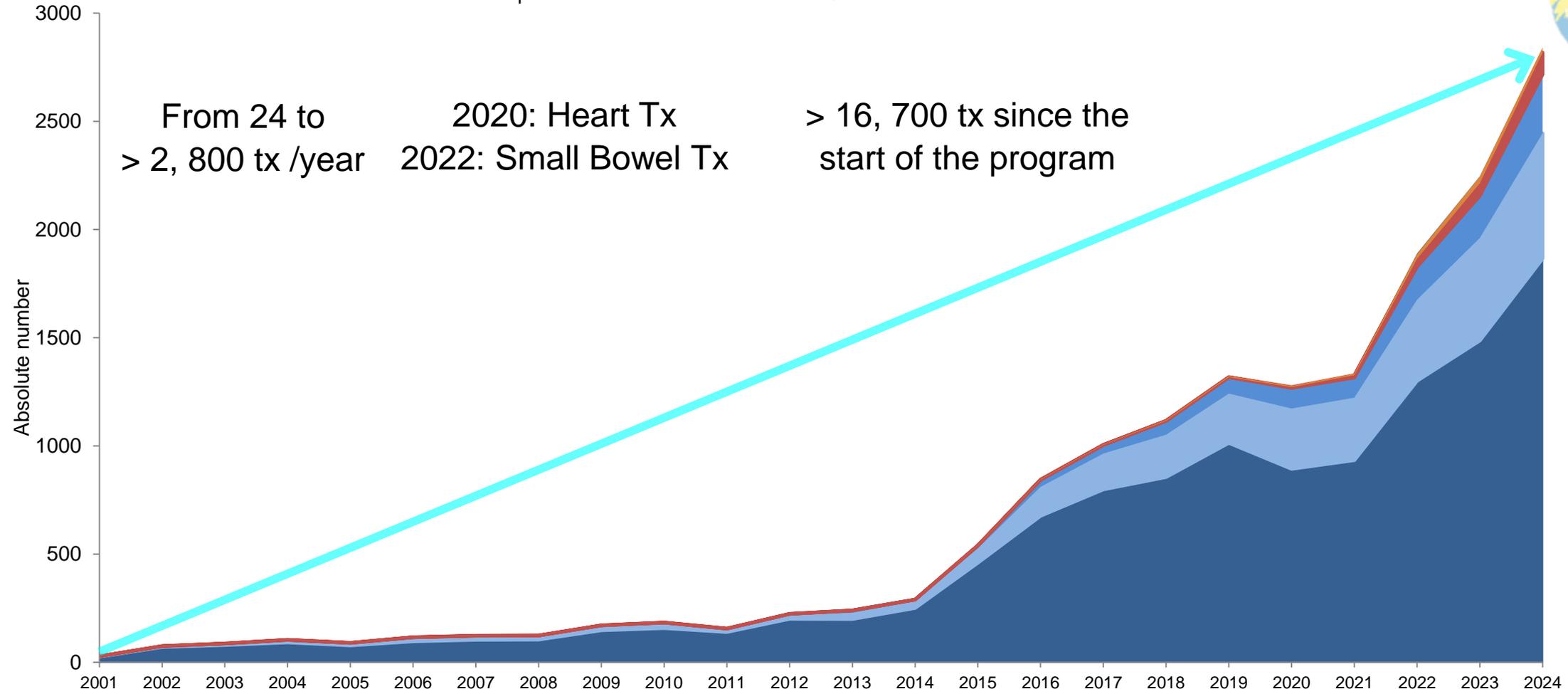


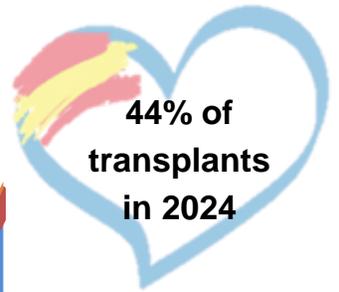
* Data on type III DCD donors not specifically reported, but inferred from other sources

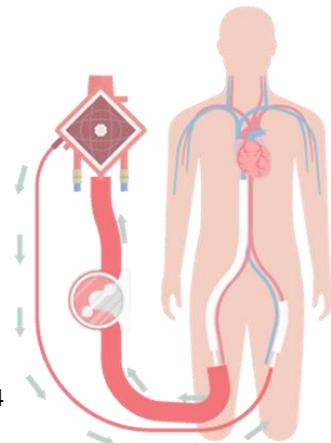
Source: Global Observatory on Donation and Transplantation (GODT: <https://www.transplant-observatory.org/>)

TRANSPLANTS FROM DCD DONORS IN SPAIN

■ Tx Renal
 ■ Tx Hepático
 ■ Tx Pulmonar
 ■ Tx Cardíaco
 ■ Tx Pancreático
 ■ Tx Intestinal

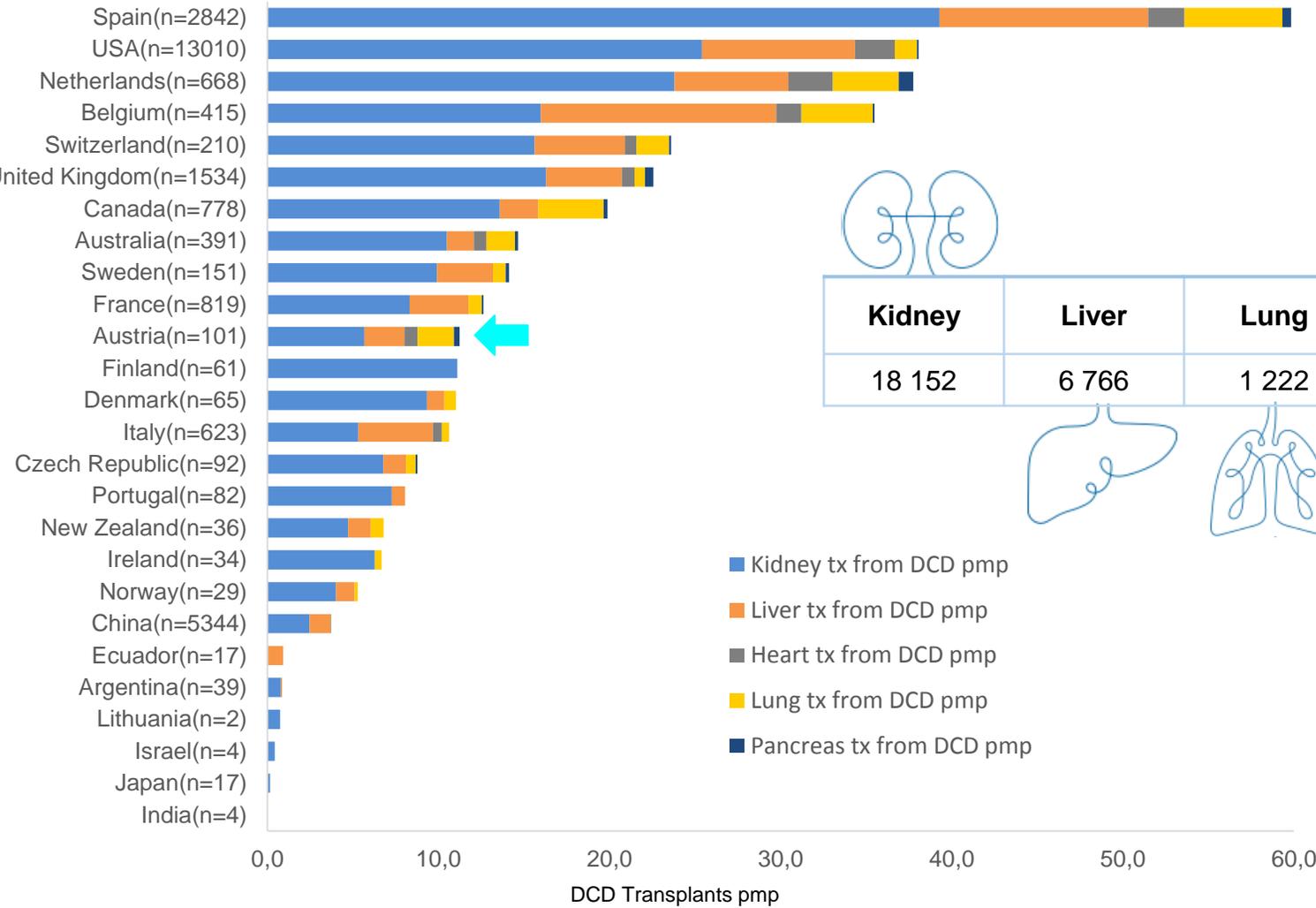



44% of transplants in 2024



Source: Organización Nacional de Trasplantes

TRANSPLANTS FROM DCD DONORS BY ORGAN TYPE (PMP). YEAR 2024

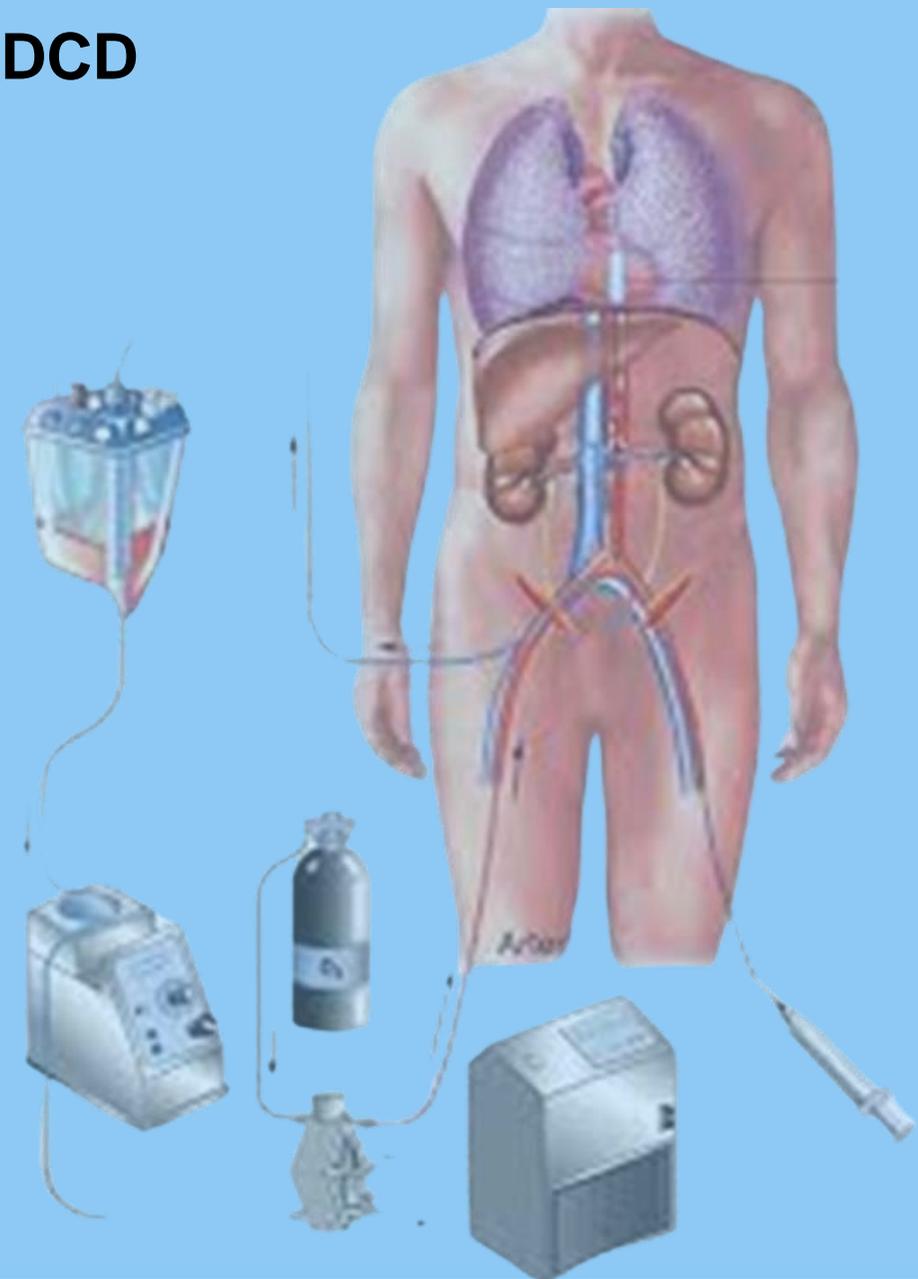


Kidney	Liver	Lung	Heart	Pancreas	Small bowel	Total
18 152	6 766	1 222	1 073	154	1	27 368

- Kidney tx from DCD pmp
- Liver tx from DCD pmp
- Heart tx from DCD pmp
- Lung tx from DCD pmp
- Pancreas tx from DCD pmp

Source: Global Observatory on Donation and Transplantation (GODT: <https://www.transplant-observatory.org/>)

THE REVOLUTION OF NRP IN DCD



The use of the ECMO technology for the *in situ* perfusion of organs was conceived in Spain during the 90s for the practice of uDCD

Review



Normothermic Regional Perfusion in Controlled Donation After the Circulatory Determination of Death: Understanding Where the Benefit Lies

Mario Royo-Villanova, MD, PhD,¹ Eduardo Miñambres, MD, PhD,² Elisabeth Coll, MD, PhD,³ and Beatriz Domínguez-Gil, MD, PhD³

Abstract. Controlled donation after the circulatory determination of death (cDCDD) has emerged as a strategy to increase the availability of organs for clinical use. Traditionally, organs from cDCDD donors have been subject to standard rapid recovery (SRR) with poor posttransplant outcomes of abdominal organs, particularly the liver, and limited organ utilization. Normothermic regional perfusion (NRP), based on the use of extracorporeal membrane oxygenation devices, consists of the *in situ* perfusion of organs that will be subject to transplantation with oxygenated blood under normothermic conditions after the declaration of death and before organ recovery. NRP is a potential solution to address the limitations of traditional recovery methods. It has become normal practice in several European countries and has been recently introduced in the United States. The increased use of NRP in cDCDD has occurred as a result of a growing body of evidence on its association with improved posttransplant outcomes and organ utilization compared with SRR. However, the expansion of NRP is precluded by obstacles of an organizational, legal, and ethical nature. This article details the technique of both abdominal and thoracoabdominal NRP. Based on the available evidence, it describes its benefits in terms of posttransplant outcomes of abdominal and thoracic organs and organ utilization. It addresses cost-effectiveness aspects of NRP, as well as logistical and ethical obstacles that limit the implementation of this innovative preservation strategy.

(Transplantation 2024;00: 00-00).

INTRODUCTION

Organ transplantation has transformed the lives of countless individuals diagnosed with end-stage organ failure, offering them the opportunity of living a longer and healthier life. However, the demand of organs far exceeds the available supply, leading to significant challenges in meeting the transplant needs of patients.¹ Donation after the circulatory determination of death (DCDD) has become a valuable approach

to increase the supply of organs for clinical use.² In 2022, 71 countries reported 41 793 deceased organ donors to the Global Observatory on Organ Donation and Transplantation, of which 9544 (23%) were DCDD donors. DCDD programs were described in 23 Member States of the World Health Organization, in some of which DCDD contributed to >40% of the overall deceased donation activity (Figure 1). Most DCDD donors notified to the Global Observatory on Organ Donation and Transplantation (n = 8798) were controlled DCDD (cDCDD) donors—donors who had been declared dead by circulatory criteria after the withdrawal of life-sustaining therapies (WLSs) that were no longer deemed beneficial (Figure 2).³ In recent years, cDCDD has also been possible after conscious and competent persons diagnosed with a variety of diseases and conditions request the WLST or, where legally allowed, medical assistance in dying.^{4,5}

Traditionally, cDCDD has been based on a standard rapid recovery (SRR) of organs followed by static cold storage (SCS).^{6,7} However, this approach has been associated with suboptimal posttransplant outcomes of abdominal organs, particularly the liver, and with limited organ utilization.⁸ Normothermic regional perfusion (NRP), based on the use of extracorporeal membrane oxygenation (ECMO), has emerged as an alternative promising technology to be applied in cDCDD procedures. It consists of the *in situ* perfusion of organs that will be subject to transplantation with oxygenated blood under normothermic conditions after the declaration of death and before organ recovery. NRP may be limited to the

Received 11 March 2024. Revision received 28 April 2024.

Accepted 17 May 2024.

¹ Transplant Coordination Unit and Service of Intensive Care, Hospital Clínico Universitario Virgen de la Arrixaca, Murcia, Spain.

² Transplant Coordination Unit and Service of Intensive Care, University Hospital Marqués de Valdecilla-ICVALE, School of Medicine, Universidad de Cantabria, Santander, Spain.

³ Organización Nacional de Trasplantes, Madrid, Spain.

All authors equally contributed to the design and the writing of the article and approved the last version of the article.

The authors declare no funding or conflicts of interest.

Supplemental visual abstract: <http://links.lww.com/TP/D112>.

Correspondence: Mario Royo-Villanova, MD, PhD, Transplant Coordination Unit and Service of Intensive Care, Hospital Clínico Universitario Virgen de la Arrixaca, Ctra. Madrid-Cartagena, s/n, 30120 El Palmar, Murcia, Spain. (marroyo@ontr.org).

Copyright © 2024 Wolters Kluwer Health, Inc. All rights reserved.

ISSN: 0041-1221/2024/0000-00

DOI: 10.1097/TP.00000000000026143

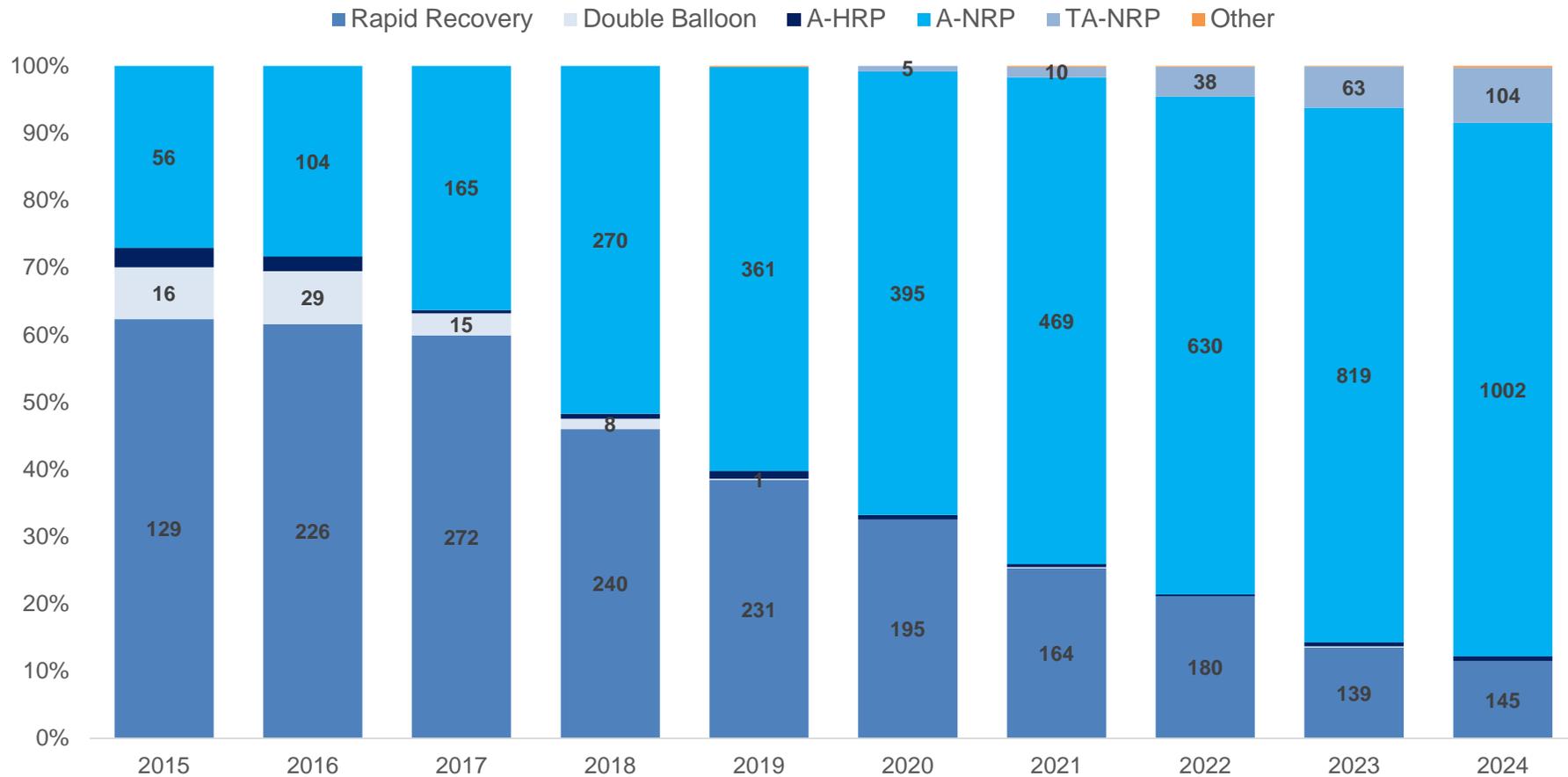
Transplantation ■ xxx 2024 ■ Volume 00 ■ Number 00

www.transplantjournal.com

1

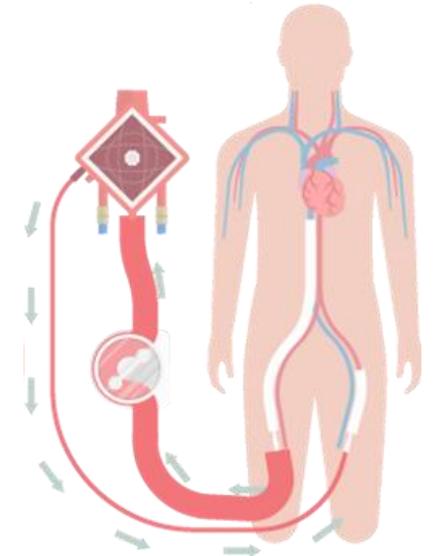
Copyright © 2024 Wolters Kluwer Health, Inc. Unauthorized reproduction of this article is prohibited.

IN SITU PRESERVATION AND RECOVERY OF cDCD ORGANS IN SPAIN



IN 2024, ≈ 90% OF cDCD PROCEDURES WERE PERFORMED WITH A-NRP OR TA-NRP

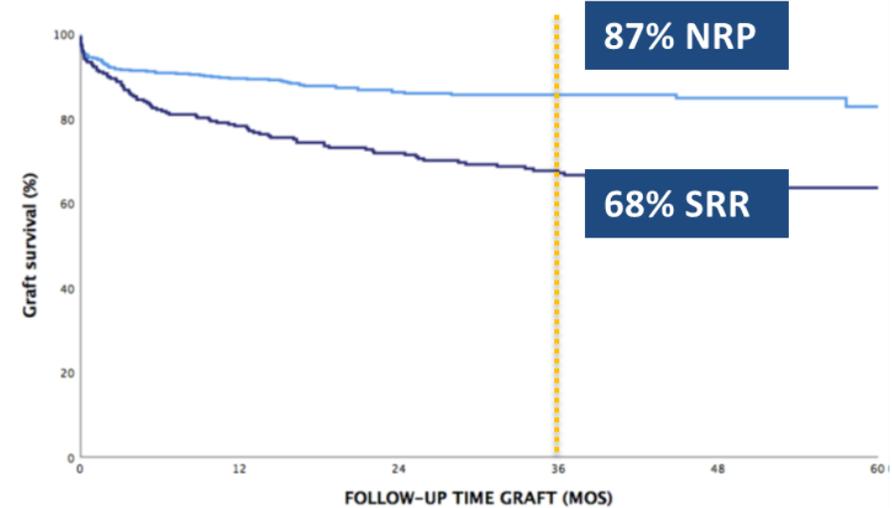
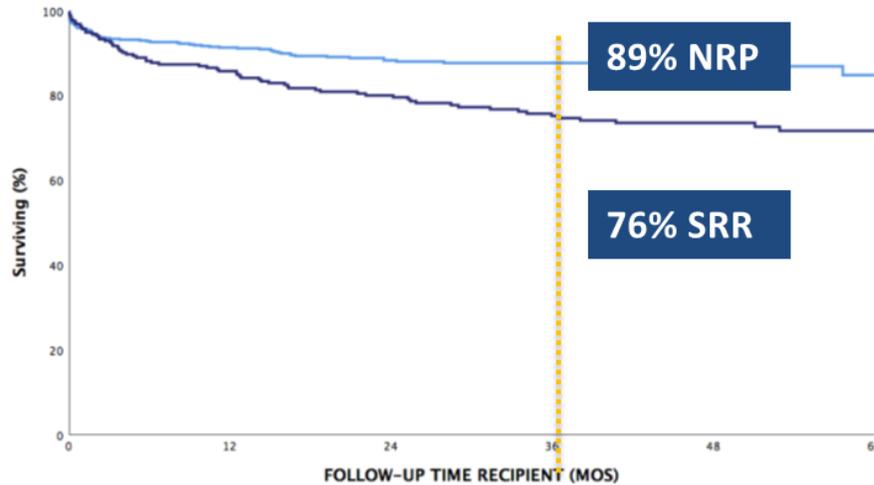
≈4 300 A-NRP & 220 TA-NRP PROCEDURES IN A DECADE



Source: Organización Nacional de Trasplantes

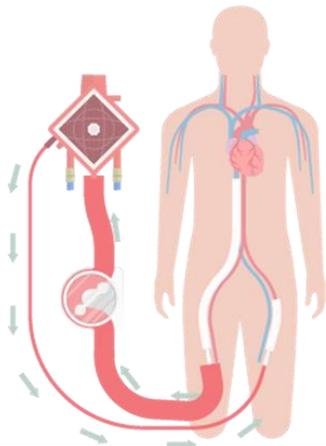
cDCD LIVER TRANSPLANTATION. SPAIN 2012-2019

803 cDCDD LIVER
TX 2012-2019:
NRP: 545
SRR: 258



No. at risk	0	12	24	36	48	60
NRP	545	498	320	181	92	34
SRR	258	220	180	142	99	49

No. at risk	0	12	24	36	48	60
NRP	545	488	316	179	91	34
SRR	258	202	167	130	88	41



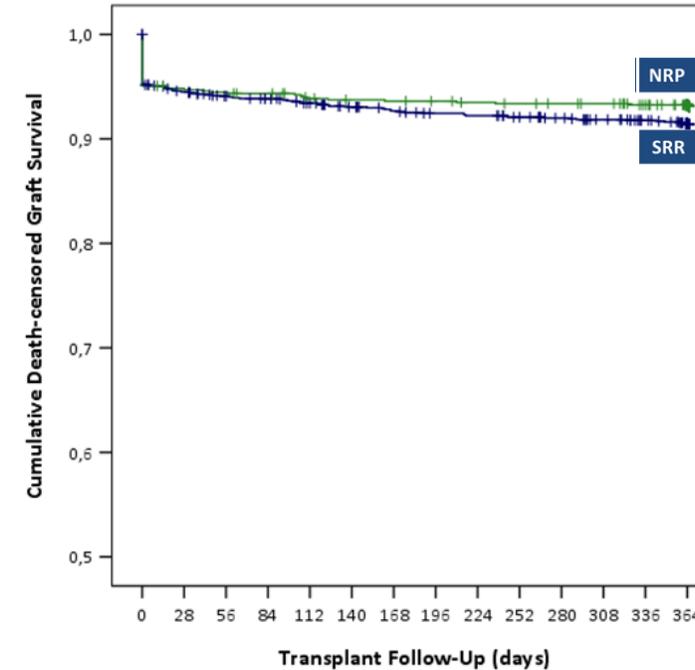
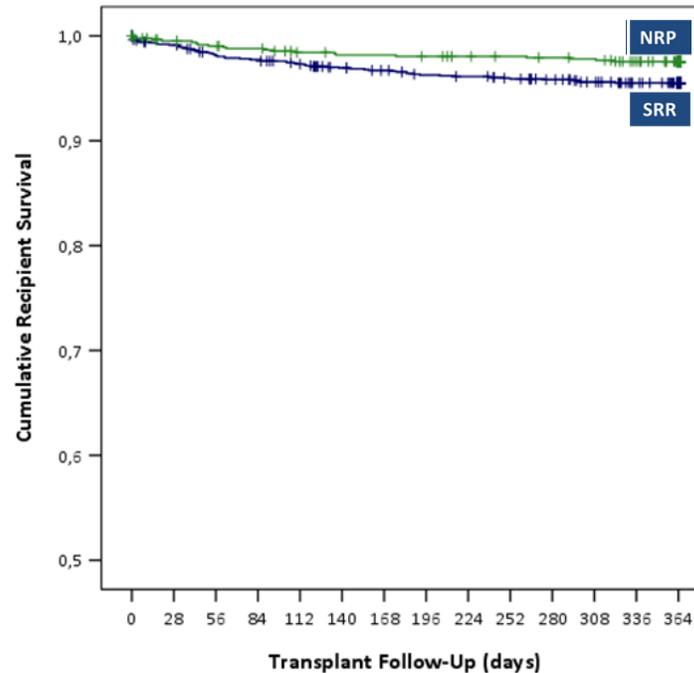
	NRP (N=545) SRR (N=258)		Unadjusted		Adjusted ¹	
			Risks estimate (95% CI) ²	P value	Risks estimate (95% CI) ²	P value
EAD (%)	81 (15)	60 (23)	0.576 (0.397-0.837)	0.004	0.562 (0.363-0.871)	0.010
PNF (%)	16 (3)	15 (6)	0.490 (0.238-1.007)	0.052	0.573 (0.252-1.303)	0.184
HAT (%)	22 (4)	19 (7)	0.529 (0.281-0.996)	0.049	0.452 (0.219-0.932)	0.032
All biliary complications (%) ³	63 (12)	75 (29)	0.319 (0.219-0.464)	<0.001	0.300 (0.197-0.459)	<0.001
ITBL (%)	6 (1)	24 (9)	0.109 (0.044-0.269)	<0.001	0.112 (0.042-0.299)	<0.001
Re-transplantation (%)	19 (3.5)	31 (12)	0.265 (0.146-0.478)	<0.001	0.279 (0.147-0.531)	<0.001
Graft loss (%)	77 (14)	88 (34)	0.422 (0.311-0.574)	<0.001	0.371 (0.267-0.516)	<0.001
Patient death (%)	65 (12)	66 (26)	0.494 (0.350-0.696)	<0.001	0.540 (0.373-0.781)	0.001

Hessheimer AJ. et al. Am J Transplant. 2021 Dec 2. doi: 10.1111/ajt.16899.

cDCD KIDNEY TRANSPLANTATION. SPAIN 2012-2018

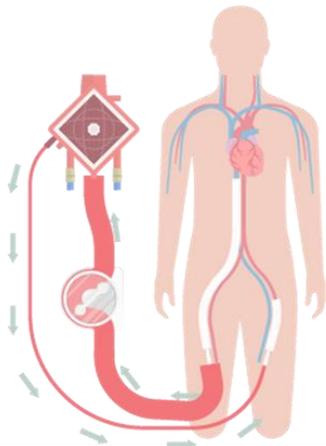


2.302 CDCD
KIDNEY TX 2012-
2018:
NRP: 865
SRR: 1, 437



	UNIVARIATE				ADJUSTED				PSM				
	P	OR	CI95%		P	OR	CI95%		ATT (%)	P	OR	CI95%	
Primary non function	0.637	0.91	0.6	1.36	0.426	1.26	0.71	2.22	(6.6 vs. 4.7)	0.261	1.44	0.73	2.91
Delayed graft function	<0.001	2.16	1.79	2.6	<0.001	2.1	1.6	2.78	(45.4 vs. 29.7)	<0.001	1.97	1.43	2.72
		HR				HR				OR			
1-year graft loss	0.165	1.25	0.91	1.72	0.051	1.49	1	2.28	(9.9 vs. 5.8)	0.034	1.77	1.01	3.17
1-year patient death	0.017	1.85	1.12	3.07	0.055	1.83	0.99	3.46	(4.3 vs. 2.3)	0.111	1.93	0.8	4.97

Padilla M. et al Am J Transplant 2021. Apr 23. doi: 10.1111/ajt.16622



Emma, una española de 13 meses, la primera en el mundo en recibir un trasplante de intestino en asistolia

11/10/2022

La niña fue dada de alta del Hospital madrileño de La Paz y se encuentra en perfecto estado de salud en su domicilio

ABC Salud

American Journal of Transplantation 23 (2023) 577–581

Contents lists available at ScienceDirect

American Journal of Transplantation

journal homepage: www.amjtransplant.org



ELSEVIER



Case Report

First case report of multivisceral transplant from a deceased cardiac death donor

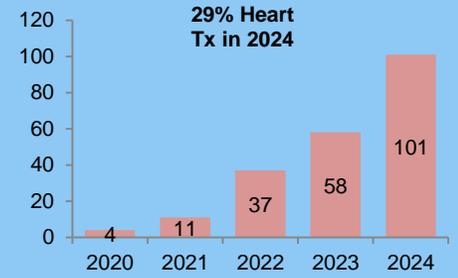


Ane M. Andres^{1,2,3,4,*}, Jose Luis Encinas¹, Alba Sánchez-Galán¹,
Javier Serradilla Rodríguez^{1,2}, Karla Estefanía¹, Rocio Gonzalez Sacristan⁵,
Alida Alcolea⁵, Pilar Serrano⁵, Belén Estébanez⁶, Iñigo Velasco Leon^{7,8}, Paula Burgos^{7,8},
Alvaro Gonzalez Rocafort⁹, Buntly Ramchandani⁹, Belén Calderón⁹, Cristina Verdú⁹,
Esperanza Jimenez¹⁰, Paloma Talayero¹¹, Pablo Stringa¹², Itziar de la Peña Navarro¹³,
Esther Ramos⁵, Francisco Hernandez Oliveros^{1,2,3}

cDCD HEART TRANSPLANTATION. SPAIN 2020-2024



211
(22 ped)



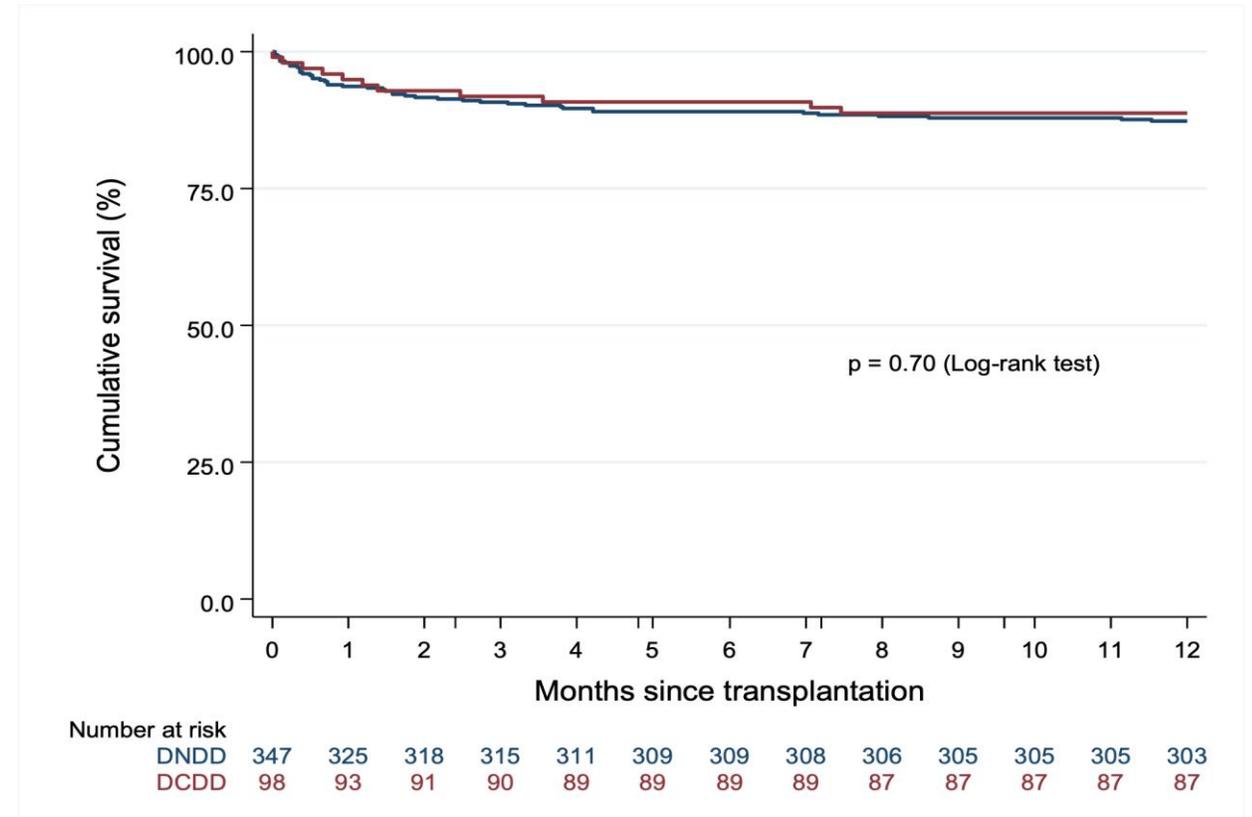
Source: Organización Nacional de Trasplantes

cDCD HEARTS RECOVERED VIA TA-NRP FOLLOWED BY SCS SHOW EQUIVALENT OUTCOMES vs DBD HEARTS



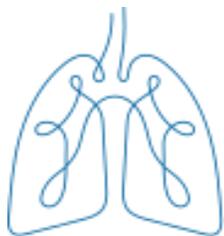
98 TA-NRP DCD vs
347 DBD HEART TX
11 centers in Spain
(adult cases, 2020-2023)

The primary outcome (composite of 1-year all-cause death or severe PGF) was met by 21 (21.4%) and 77 (22.2%) patients, respectively ($p=0.87$). Thirty-day and 1-year survival were 94.9% and 88.8% in the DCD vs 93.7% and 87.3% in the DBD group ($p=0.70$). Severe PGF was observed in 13 (13.3%) vs 52 (15.0%) patients ($p=0.67$). **By inverse probability weighting, the DCD heart was not associated with the primary outcome (HR 0.97;95%CI 0.58-1.62; $p=0.91$).**



Pérez-Blanco A, et al. Am J Transplant. 2025 Feb 22:S1600-6135(25)00082-6. doi: 10.1016/j.ajt.2025.02.006.

APPROPRIATE OUTCOMES OF LUNG TX WHEN A-NRP IS USED IN cDCD



SPAIN 2015-2020

170 cDCD A-NRP vs
1,579 DBD lung transplants

PGD GRADE 3 AT 72 HOURS

$P = 0.139$

cDCD

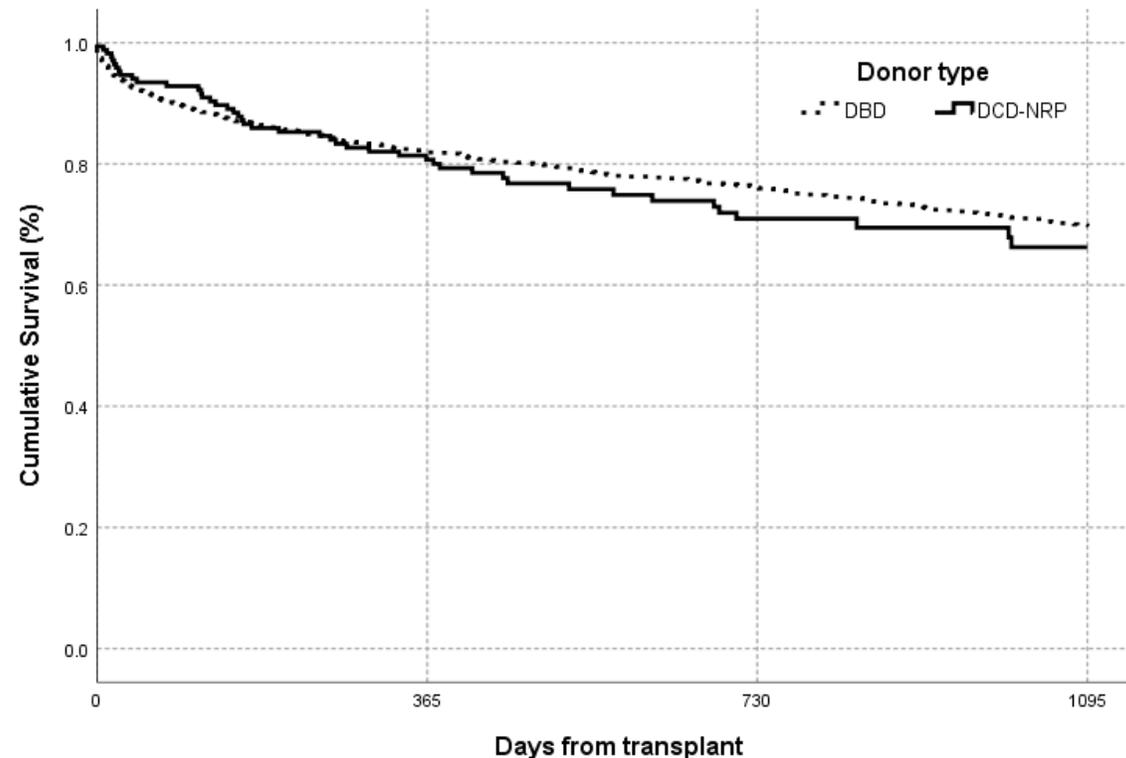
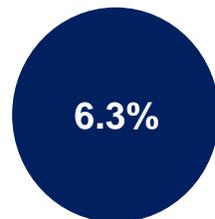
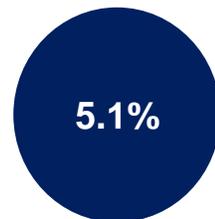


DBD



MORTALITY AT 30 DAYS

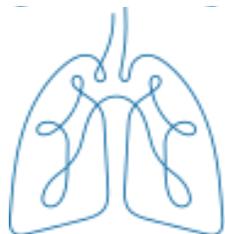
$P = 0.502$



	Survival probability (number at risk)		
	1 month	1 year	3 years
DBD (N=1579)	93.7 (N=1456)	81.9 (N=1221)	69.7 (N=696)
DCD-NRP (N=170)	94.7 (N=155)	80.7 (N=118)	66.2 (N=35)

Campo-Cañaveral de la Cruz JL, et al. Am J Transplant 2023;23(7):996-1008. doi: 10.1016/j.ajt.2023.04.016.

APPROPRIATE OUTCOMES OF LUNG TX WHEN TA-NRP IS USED IN cDCD

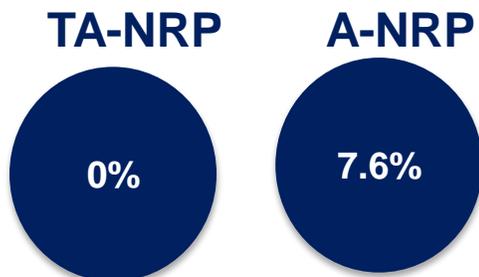


SPAIN 2021-2023

28 cDCD TA-NRP vs
255 cDCD A-NRP

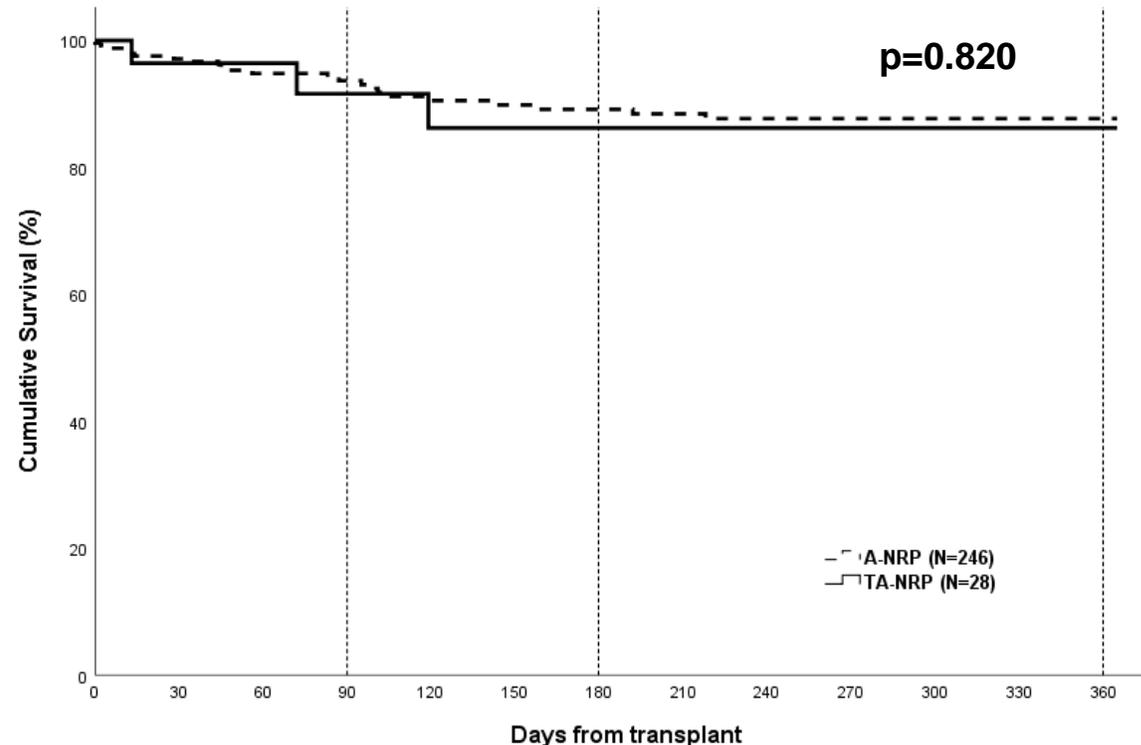
PGD GRADE 3 AT 72 HOURS

$P = 0.231$



MORTALITY AT 30 DAYS

$P = 0.529$



	3 months	6 months	1 year
A-NRP	93.7% (161)	89.2% (127)	87.7% (93)
TA-NRP	91.6% (17)	86.2% (15)	86.2% (11)

Minasyan A, et al. J Heart Lung Transplant. 2024 Sep 30:S1053-2498(24)01870-9. doi: 10.1016/j.healun.2024.09.018.

cDCD PROVIDES THE OPPORTUNITY TO DONATE TO PATIENTS OTHER THAN THOSE WITH A DEVASTATING BRAIN INJURY



Devastating brain injury

- Emergency care
- Neurology
- Neurosurgery
- Internal medicine
- Oncology, neurology, palliative care (CNS neoplasia)

Lung disease

- Emergency care
- Pneumology
- Internal medicine

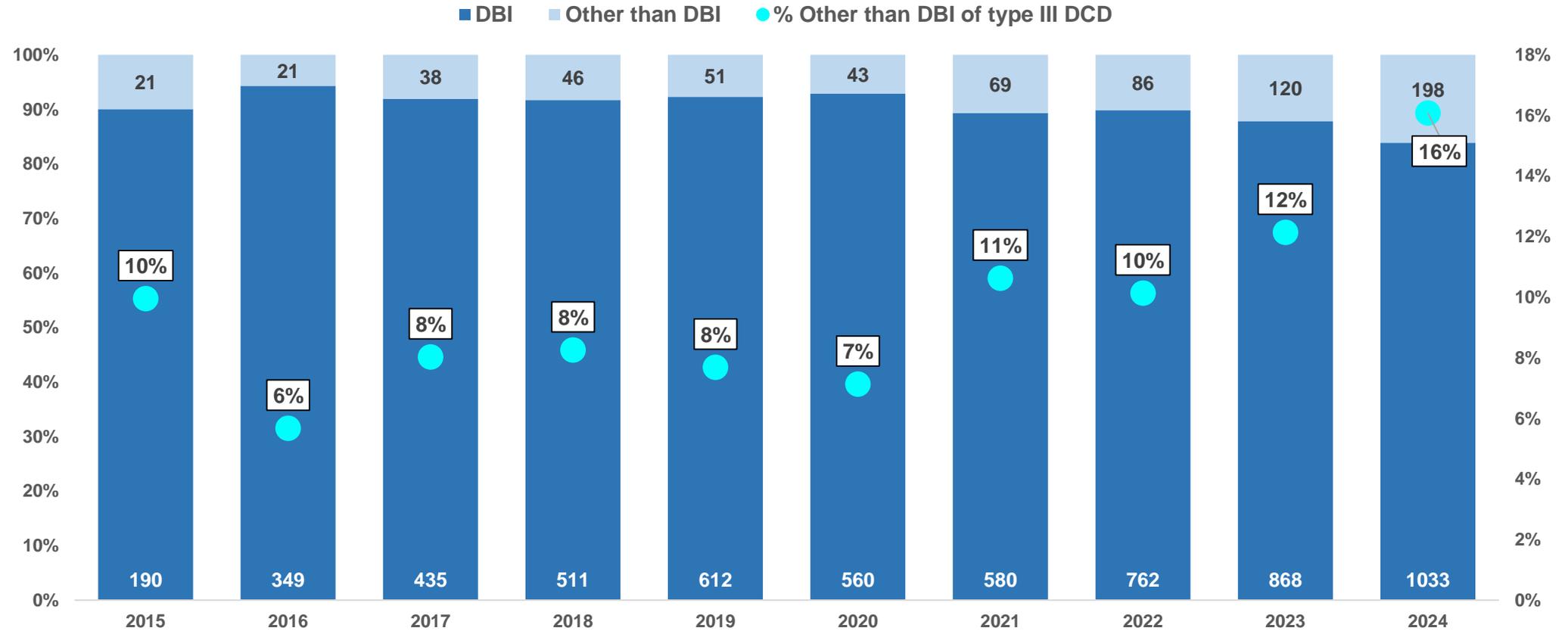
Heart disease

- Emergency care
- Cardiology
- Coronary unit
- Internal medicine

Neurodegenerative disease

- Neurology
- Pneumology
- Palliative care
- ALS units

TYPE III DCD DONORS DEAD AS A RESULT OF A DEVASTATING BRAIN INJURY vs OTHER CONDITIONS*. SPAIN 2015-2024



*Neurodegenerative, lung, heart and other diseases and conditions

Source: Organización Nacional de Trasplantes

3

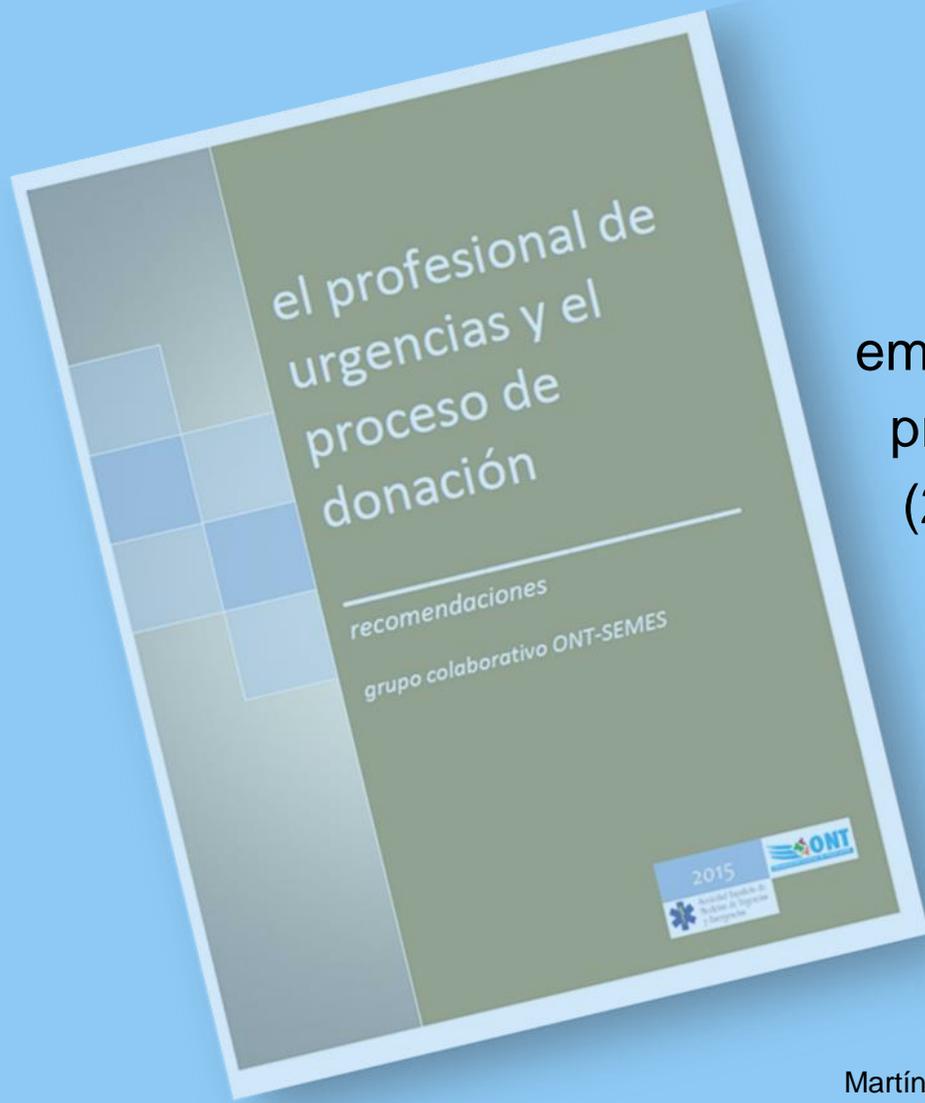
**INTENSIVE CARE TO
FACILITATE ORGAN
DONATION**

WHAT I TALK ABOUT WHEN I TALK ABOUT... INTENSIVE CARE TO FACILITATE ORGAN DONATION

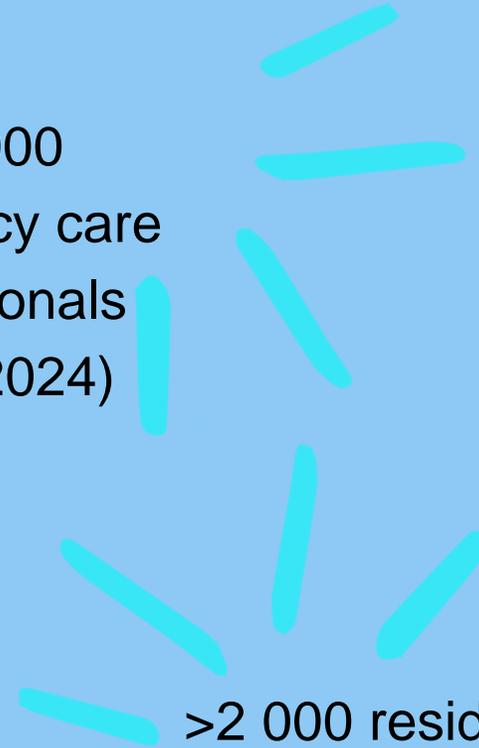
- ➡ the initiation or continuation of **intensive care measures** (e.g. admission to the ICU, respiratory support, hemodynamic support)
- ➡ in patients with **devastating brain injury** (imminent risk of death of a neurologic cause) in whom intensive care with a therapeutic purpose has been deemed futile
- ➡ who are **considered possible donors** (BD is likely to occur within a short period of time and there are no apparent medical contraindications to organ donation)
- ➡ in order to **incorporate the option of DBD into their end-of-life care plans**

Martín Delgado MC, et al. Am J Transplant 2019; 19(6):1782-1791

STANDARDS FOR THE PRACTICE OF ICOD



>11 000
emergency care
professionals
(2009-2024)

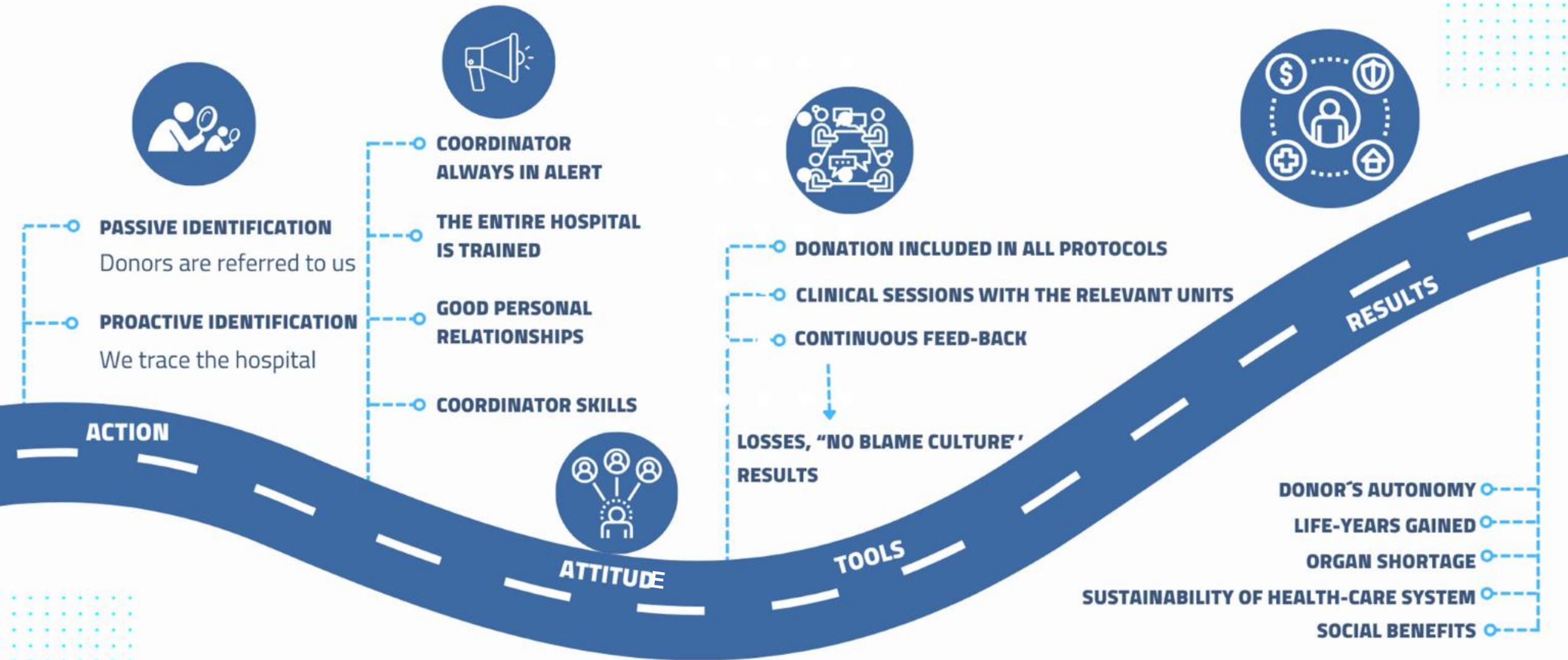


>2 000 residents in
intensive care
(2007-2024)



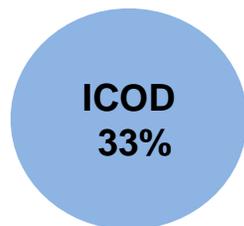
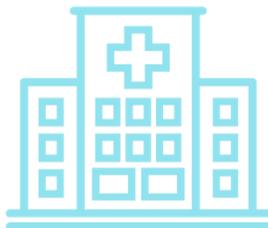
Martín Delgado MC, et al. Am J Transplant 2019; 19(6):1782-1791

HOW SHOULD THE DONOR COORDINATOR IDENTIFY POSSIBLE DONORS IN THE ENTIRE HOSPITAL?



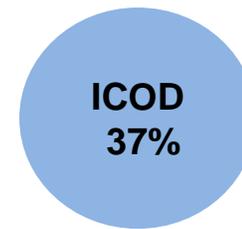
Courtesy: Dr. Mario Royo-Villanova. Hospital Universitario Virgen de la Arrixaca. Murcia (Spain)

POTENTIAL DONOR AUDIT SPAIN 2023 (125 HOSPITALS)



POSSIBLE DONORS (2023 DATA)					
DBD		Global*		DCD	
2,000 (42%)		4,780		2,483* (52%)	
Medically unsuitability					
359	17.9%	1,608	33.6%	1,045	42.1%
Failure to identify and refer					
8	0.4%	64	1.3%	0	2.0%
Problems in donor management					
29	1.5%	91	1.9%	40	1.6%
Logistical problems					
4	0.2%	18	0.4%	11	0.4%
No suitable recipient					
20	1.0%	43	0.9%	22	0.9%
Consent declined					
295	14.8%	561	11.7%	240	9.7%
Coroner refusal					
16	0.8%	20	0.4%	3	0.1%
Other					
19	0.9%	117	2.4%	64	2.6%
BD diagnosis not completed			Out of protocol		
0			6		
ACTUAL DONORS					
DBD		Global		DCD	
1,250 62.5%		2,258 47.2%		1,008 40.6%	

*195 no DBI



<https://www.ont.es/wp-content/uploads/2024/10/MEMORIA-ANUAL-PROG.-GARANTIA-CALIDAD-2023.pdf>

THE LANCET

Volume 404 · Number 10 459 · Pages 1171-1278 · September 28-October 4, 2024

www.thelancet.com

“The decision to donate organs raises deep questions...The Spanish model demonstrates the central importance of trust. When a well-designed and resourced system is in place, people respond with solidarity.”

See Editorial page 1171

Comment

Long-term ill health in sepsis survivors
See page 1173

World Report

“The final warning sign”: XDR typhoid
See page 1182

Articles

Global burden of bacterial antimicrobial resistance
See page 1199

Review

Lipoprotein(a) and cardiovascular disease
See page 1255

Review

Endovascular management of acute stroke
See page 1265

£5.00 Registered as a newspaper - ISSN 0140-6736
Founded 1823 · Published weekly

Organ donation: lessons from the Spanish model

Transplantation often represents the only life-saving treatment available for end-stage organ failure and can profoundly transform the lives of those dependent on burdensome technologies such as dialysis. However, there is a worldwide organ shortage. According to the Global Observatory on Donation and Transplantation, only 10% of global transplant demand is being met, with substantial disparities—transplantation rates exceed 130 per million population (pmp) in the USA and Spain, compared with 12 pmp in India. Data are unavailable in many countries (including most in Africa) and many countries lack established transplant programmes. This scarcity has led to an illegal market organ trafficking with criminal networks exploiting vulnerable individuals.

To tackle this problem, in May, 2024 a new resolution on increasing availability, ethical access and oversight of transplantation was approved at the World Health Assembly, initiated by Spain. Spain's involvement in this resolution is not coincidental, given the country's long-standing international leadership in organ transplantation, with the world's highest deceased donor rate in 2023 (49.4 pmp). The success of the Spanish transplantation system is built on three components: a solid legislative framework, strong clinical leadership, and a highly organised logistics network overseen by the National Transplant Organization (ONT), whose creation led to a doubling of deceased donation activity in less than a decade. Crucially, this success would not be possible without strong sociopolitical support. This model may offer valuable lessons for other nations.

Spain operates a soft opt-out system: everyone is an organ donor by default, but families of the deceased have the final say. Other countries have introduced opt-out systems, but this has not necessarily resulted in a more positive donation attitude (for example, while eight out of ten families in Spain consent to donate, the rate in the UK is six out of ten). A simplistic switch to the “opt-out” model is alone not sufficient to boost donation. Spain's organ transplant law from 1979 ensures transparency and equitable organ allocation across regions. This law is regularly updated under advice from Clinical Committees and the ONT, expanding criteria for donation to allow the use of organs from people older than 80 years and non-standard risk

donors. Donation after circulatory death—unavailable in many countries—is one of the principal avenues for the expansion of organ donation in Spain, representing 45% of all donation activities in the country.

Clinical leadership is vital for the smooth running of what can be a logistically fraught system. In Spain, this is exemplified by the hospital transplant coordinator, typically a doctor from the intensive care department. They know the patients, health-care professionals, and families, identifying possible donors, facilitating donations, and reducing wait times for transplants, with support from a regional coordinator, and with the ONT overseeing transplants nationally. Hospital transplant coordinators are also well-trained to psychologically support families and provide continuous training to staff involved in transplantation. Organ donation is a sensitive subject for many and often discussed at a difficult time for families, with many fears and misconceptions.

The ONT is also responsible for transparent communication and public education, creating an awareness of organ donation and helping to shape cultural and social attitudes. Concepts like organ donation or brain and circulatory death need careful explanation. People who have discussed organ donation with their families and friends are more likely to consent to donation. The ONT works with the media to raise awareness of donation through positive personal stories or reports on scientific advances. Patients' associations serve as vital advocates, helping to build trust and amplify the message of the ONT. Failure to maintain an ethical system for organ allocation and transplantation can have catastrophic consequences for faith in the system, as scandals around fabrication of transplantation data in Germany have shown.

WHO is now tasked with developing a global strategy on donation and transplantation. It might seem difficult to boost donation in a field such as organ transplantation, that ultimately relies on the altruism of others, particularly as the decision to donate organs raises deep cultural, ethical, religious, and personal questions for many. The Spanish model demonstrates the central importance of trust. When a well-designed and resourced system is in place, people respond with solidarity and contribute to the development of a cultural atmosphere in which donation is the norm, and the health of others benefits.

■ The Lancet

Editorial



PHOTO: GETTY IMAGES

For more on the Global Observatory on Donation and Transplantation see <https://www.who.int/news/item/20-05-2024-se-who-global-observatory-on-donation-and-transplantation>

For more on the World Health Assembly resolution see <https://www.who.int/news/item/20-05-2024-se-who-world-health-assembly-daily-update-30-may-2024>

For more on how Spain reached 49 deceased organ donors per million population see [https://www.thelancet.com/article/S0140-6736\(24\)00154-4](https://www.thelancet.com/article/S0140-6736(24)00154-4)

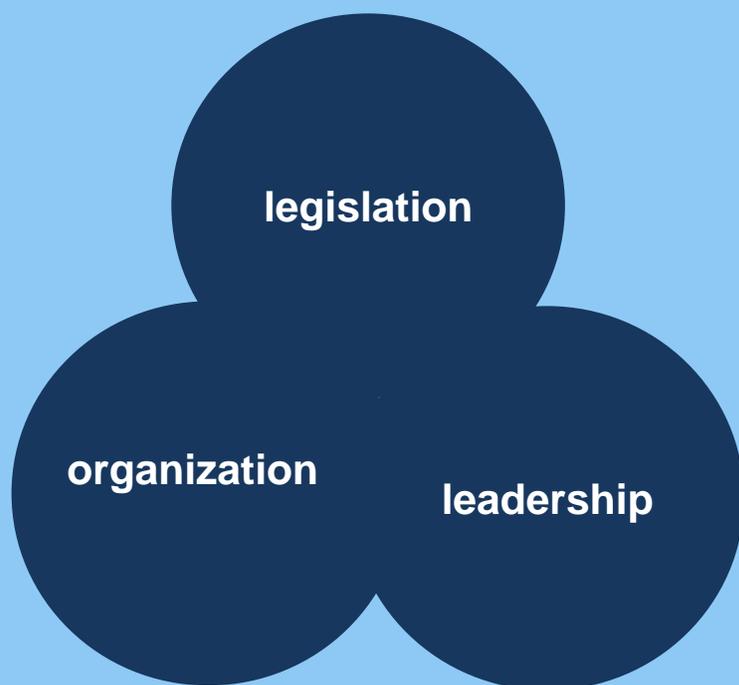
For more on expanded donation criteria see [https://www.thelancet.com/article/S0140-6736\(24\)00154-4](https://www.thelancet.com/article/S0140-6736(24)00154-4)

For more on the importance of discussions about organ donation see [https://www.thelancet.com/article/S0140-6736\(24\)00154-4](https://www.thelancet.com/article/S0140-6736(24)00154-4)

For more information on the ethics in Germany's transplantation system see [https://www.thelancet.com/article/S0140-6736\(24\)00154-4](https://www.thelancet.com/article/S0140-6736(24)00154-4)

www.thelancet.com Vol 404 September 28, 2024

1171



SPANISH MODEL DONATION & TRANSPLANTATION





THANK YOU

Beatriz Domínguez-Gil
Director General. Organización Nacional de Trasplantes
Spain



sdont@sanidad.gob.es



www.ont.es



[@ont_esp](https://twitter.com/ont_esp)



[@ont.esp](https://www.instagram.com/ont.esp)



[@ont_esp](https://www.youtube.com/ont_esp)



GOBIERNO
DE ESPAÑA

MINISTERIO
DE SANIDAD



ORGANIZACIÓN NACIONAL
DE TRASPLANTES