

# Organ Donation and Transplantation: The Spanish Model

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**Director General**  
**Organización Nacional de Trasplantes**  
**Spain**

*The National Academies of*  
**SCIENCES • ENGINEERING • MEDICINE**

HEALTH AND MEDICINE DIVISION  
Board on Health Sciences Policy  
Board on Health Care Services

**The Committee on A Fairer and More Equitable,  
Cost-Effective, and Transparent System of Donor  
Organ Procurement, Allocation, and Distribution**

**16 April 2021**



# The Madrid Conference

## The Madrid Resolution on Organ Donation & Transplantation

National Responsibility in Meeting the Needs of Patients  
Guided by the WHO Principles

Every country, in light of its own level of economic and health system development, should progress towards the global goal of meeting patients' needs on the basis of resources obtained within the country, for that country's population, and through regulated and ethical regional or international cooperation when needed.

Donation from deceased persons, as a consequence of death determined by neurologic criteria (brain death) or by circulatory criteria (circulatory death), was affirmed as the priority source of organs and as having a fundamental role in maximizing the therapeutic potential of transplantation.



World Health  
Organization

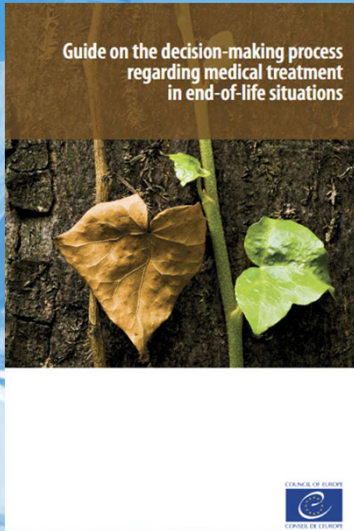


on Organ Donation and Transplantation



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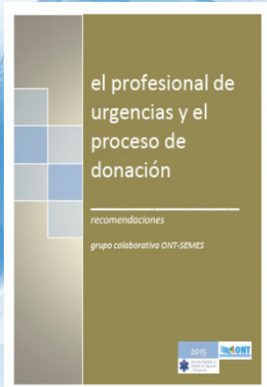
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Guide on the decision-making process regarding medical treatment in end-of-life situations



Decision-making at the end of life should not only take into account medical aspects, but also moral, societal, and welfare considerations



el profesional de urgencias y el proceso de donación

recomendaciones

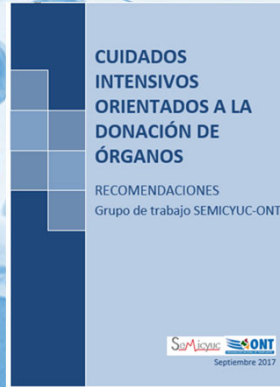
grupo colaborativo ONT-SEMES



### 5 RECOMENDACIONES DE INTERÉS ELEVADO de los Grupos de Trabajo de la SEMICYUC

GRUPO DE TRABAJO DE TRASPLANTES

- 1) Ofrece la opción de la donación de órganos y tejidos como parte integral de los cuidados al final de la vida.
- 2) Garantiza la posibilidad de donación de órganos y tejidos de todos aquellos pacientes que fallecen en muerte encefálica.
- 3) Valora la posibilidad de la donación en asistencia controlada en los pacientes en los que se decida la limitación del tratamiento de soporte vital.
- 4) Entrevista a familiares de pacientes con daño cerebral catastrófico sin opción de tratamiento, previamente a muerte encefálica, para ofrecer ingreso en cuidados intensivos.
- 5) En la información médica a las familias de aquellos pacientes que fallecen en tu UCI, si la patología lo permite, incorpora la posibilidad de donación de tejidos.



CUIDADOS INTENSIVOS ORIENTADOS A LA DONACIÓN DE ÓRGANOS

RECOMENDACIONES Grupo de trabajo SEMICYUC-ONT



Septiembre 2017

Donation should be a routine component in end-of-life care



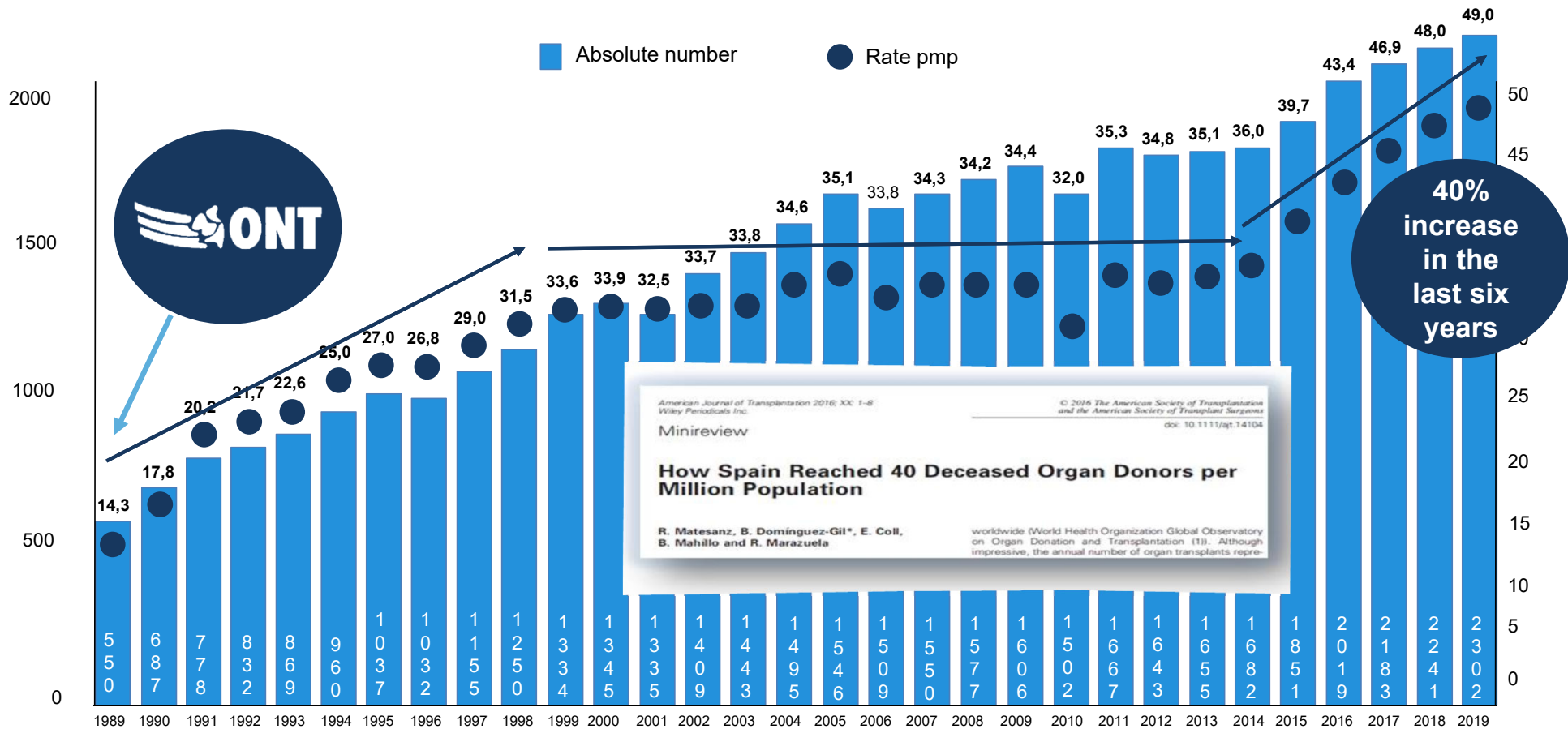
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550

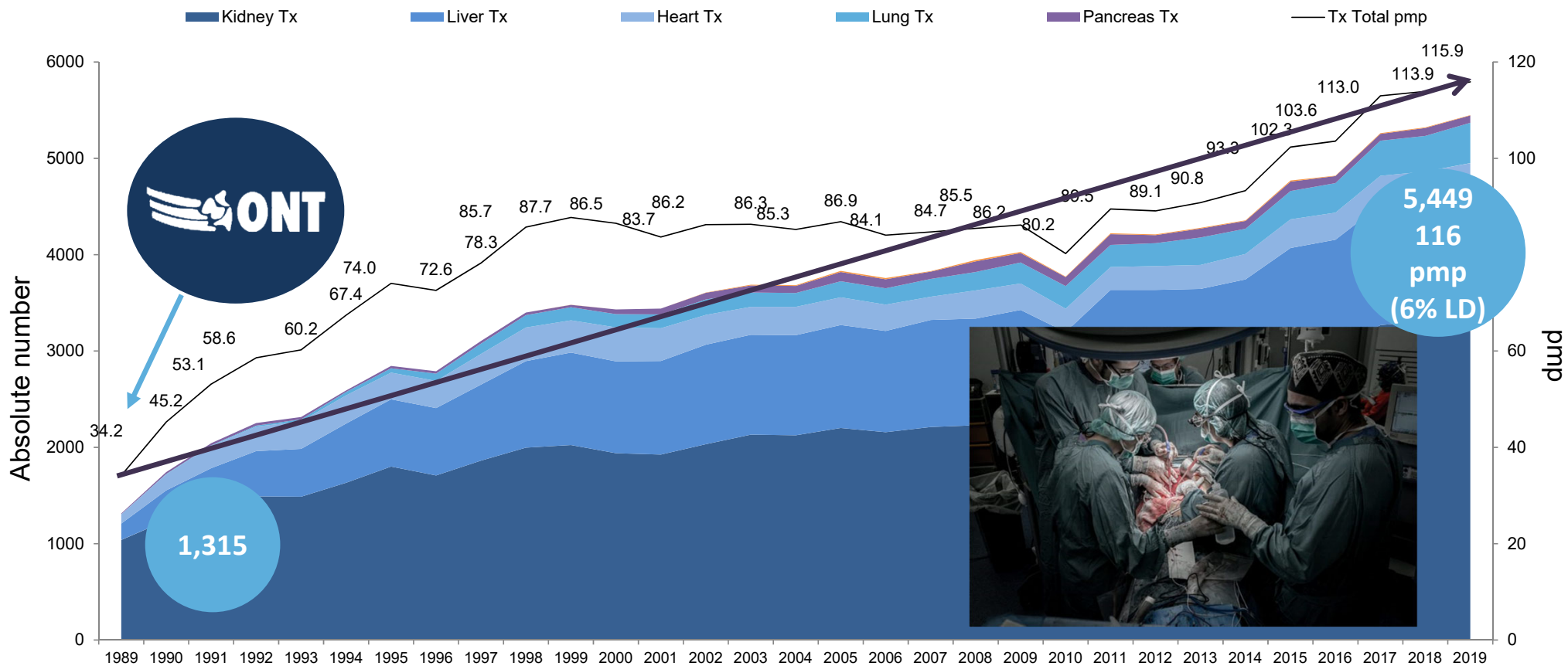
DECEASED DONATION IN SPAIN

2302



Source: Organización Nacional de Trasplantes

# SOLID ORGAN TRANSPLANTS IN SPAIN



Source: Organización Nacional de Trasplantes

# The Spanish Opt-Out System: Policy and Practice

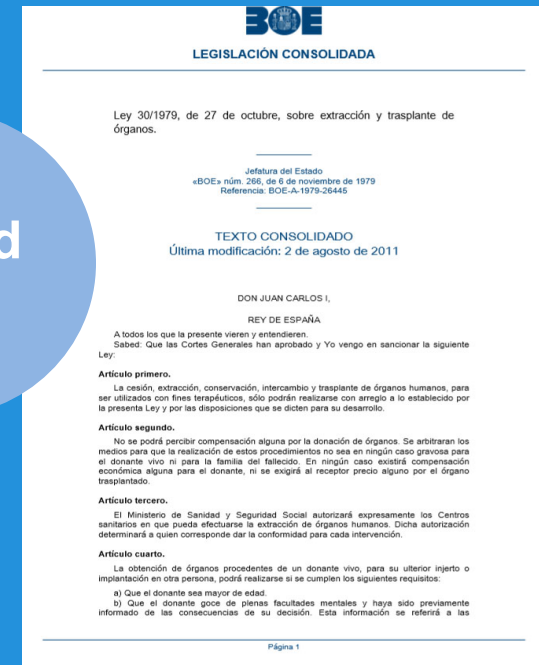


+ Donate seems the “normal” option

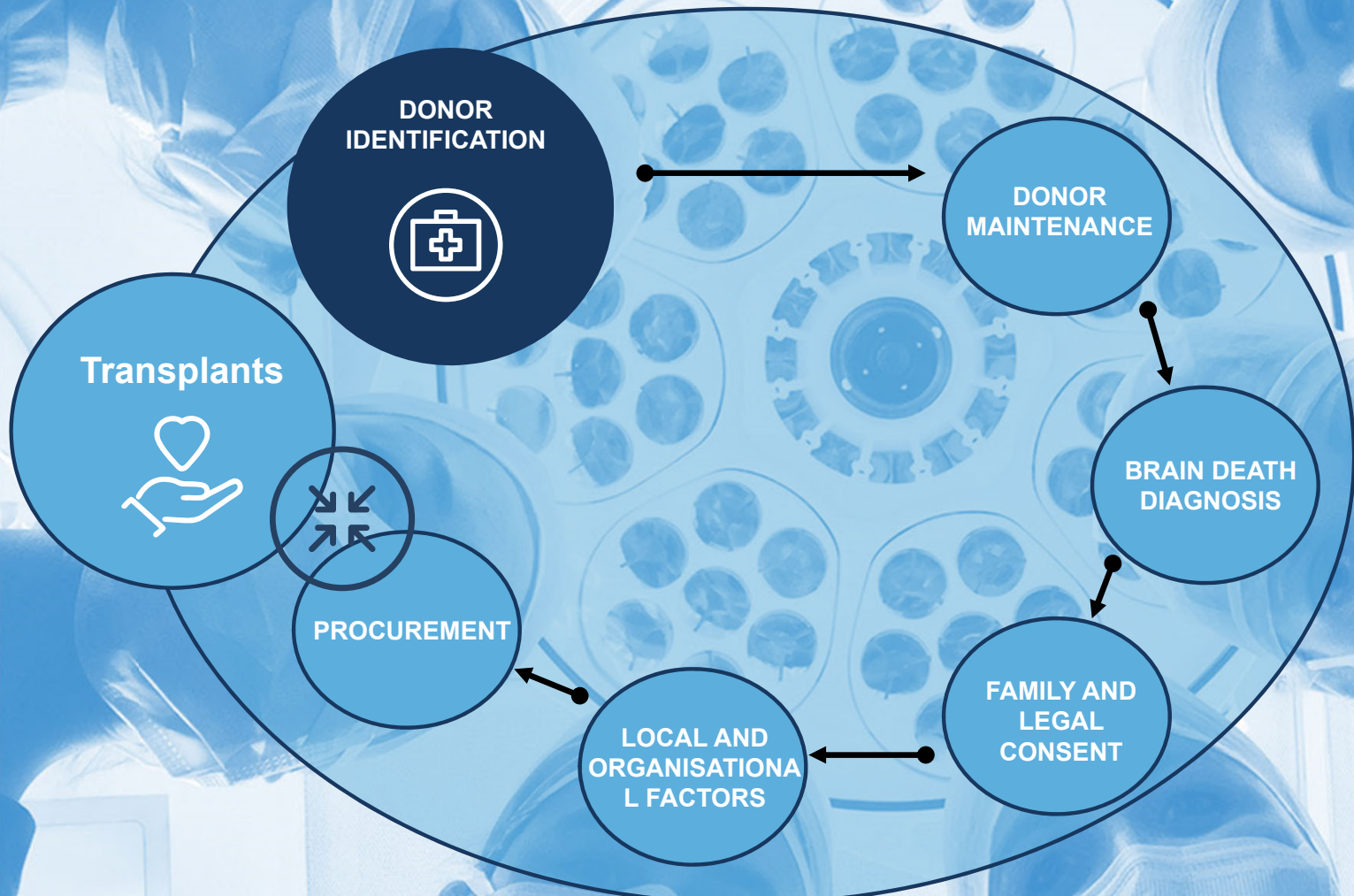
- The State as the “owner” of organs

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

Issued  
1979



# THE PROCESS OF DONATION AFTER THE NEUROLOGIC DETERMINATION OF DEATH



Improvements in organ donation



Improvements in organization



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## BASIC PRINCIPLES OF THE SPANISH MODEL

**All these  
points  
together**

- 01 Adequate legal & technical background
- 02 Donor coordination network
- 03 Special profile of donor coordinator
- 04 Donor coordinators inside the hospitals
- 05 Central Office (ONT) as a support agency
- 06 Continuous potential donor audit
- 07 Great effort in professional training
- 08 Hospital reimbursement
- 09 Continuous attention to the mass media

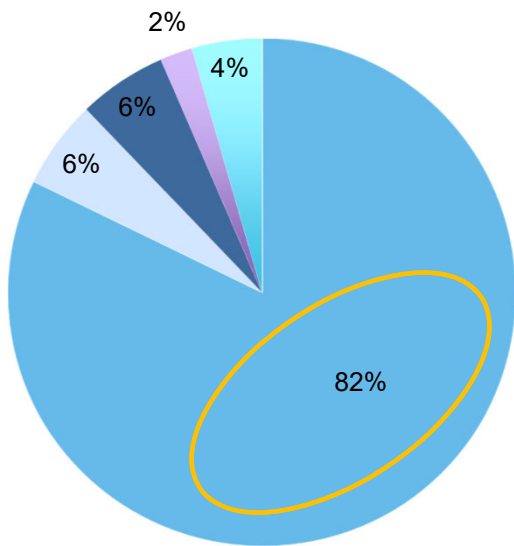




**KEEP  
CALM**  
The  
**Intensivist  
Is Here**

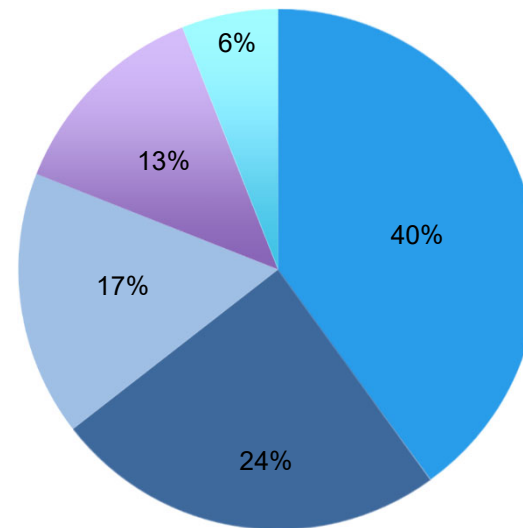
Spain 2020 (N =185)

■ INTENSIVE CARE ■ EMERGENCY CARE ■ ANESTHESIA ■ NEPHROLOGY ■ OTHER



**PHYSICIANS (337; 63%)**  
Full time dedication: 5%  
Part time dedication: 95%

■ INTENSIVE CARE ■ COORDINATION ■ ANESTHESIA/SURGERY ■ MANAGEMENT ■ OTROS



**NURSES (200; 37%)**  
Full time dedication: 29%  
Part time dedication: 71%

Source: Organización Nacional de Trasplantes



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# DONOR COORDINATION NETWORK

## Coordinating coordinators



**HAWTHORNE EFFECT:**  
*Everyone who feels observed,  
 automatically changes their behavior*

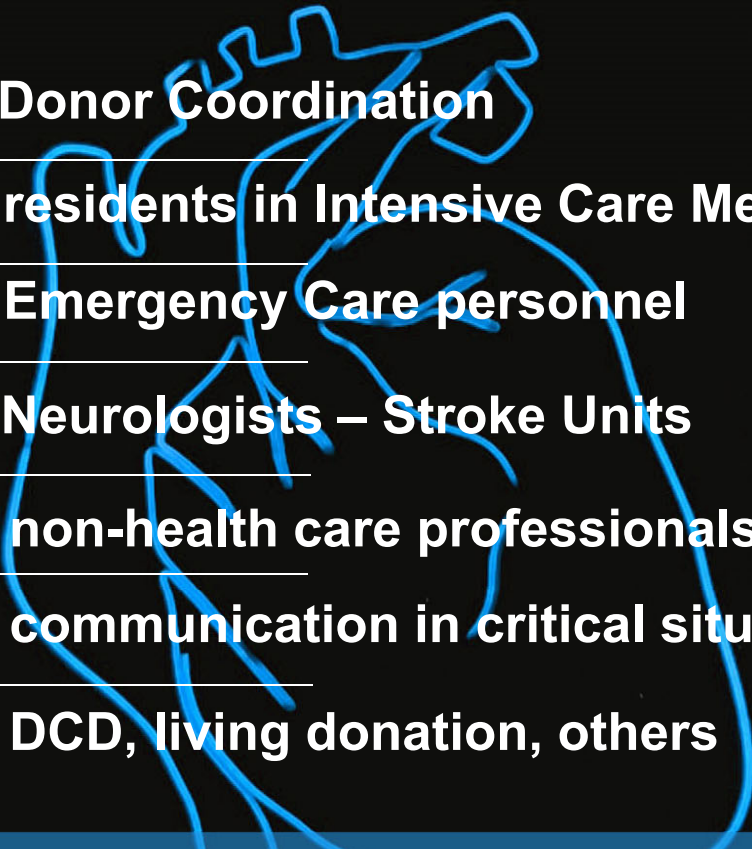
### Irish Medical Times

State 'must play a central role' in organ donation challenge

October 15, 2014 by Gary Culliton



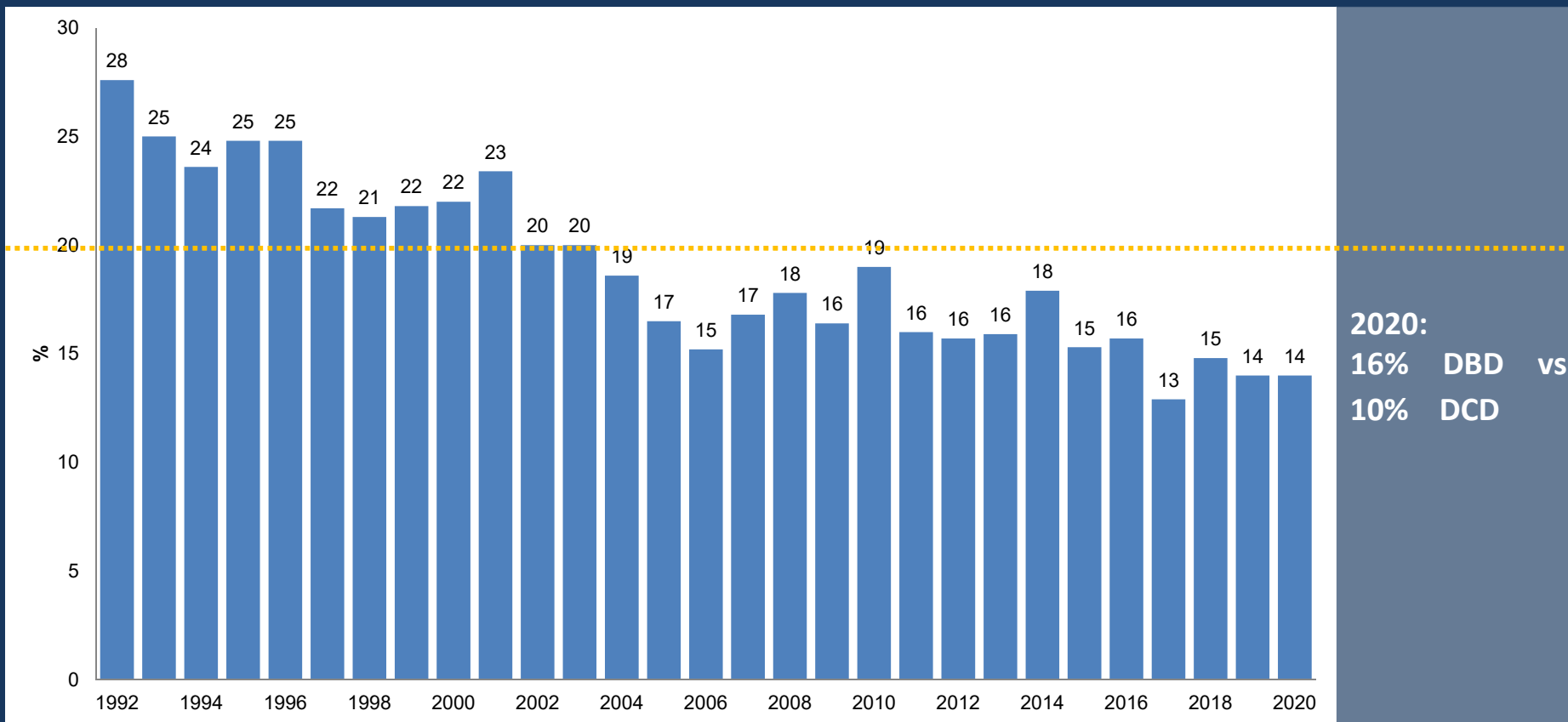
Matesanz R. Transplant Int 2011; 24: 333

- 
- ✓ **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**



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

# ONT CONSENT DECLINED TO ORGAN DONATION IN SPAIN (%)

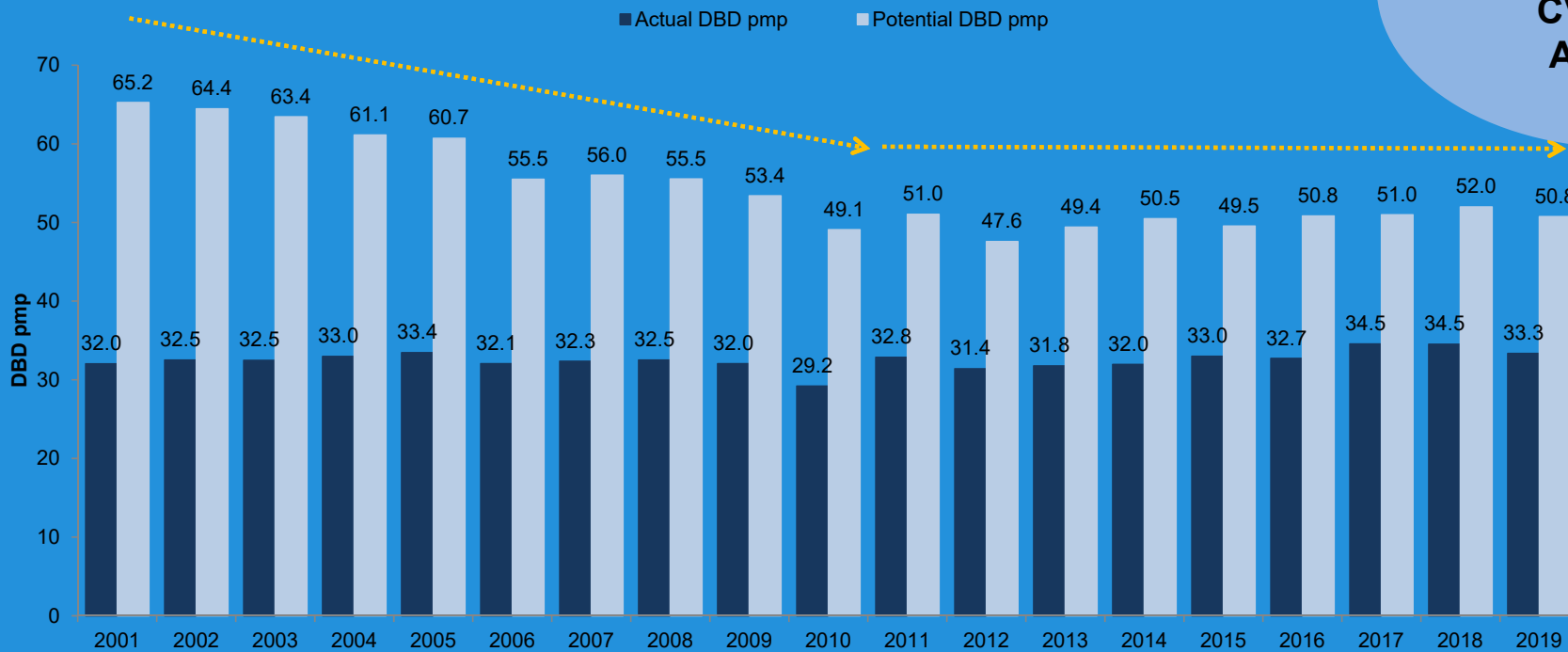


Source: Organización Nacional de Trasplantes

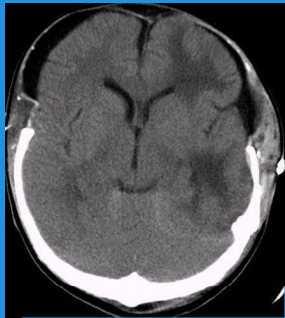


**WHAT'S  
NEXT?**

# PROGRESSIVE DECLINE IN THE INCIDENCE OF BRAIN DEATH IN SPAIN



**Median age 63  
(IQR: 51-73) years  
CVA: 58%  
AE: 23%**



End of life care



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## NEW STRATEGY 2018-2022

<http://www.ont.es/infesp/Paginas/plan-estrategico-2018-2022.aspx>

Incorporation of private health care to deceased donation

Intensive care to facilitate organ donation

Expanded criteria and non-standard risk donors

**50 x 22**  
50 donantes por millón de habitantes para el año 2022

Paediatric deceased donation

Donation after the Circulatory Determination of Death

Living Kidney Donation



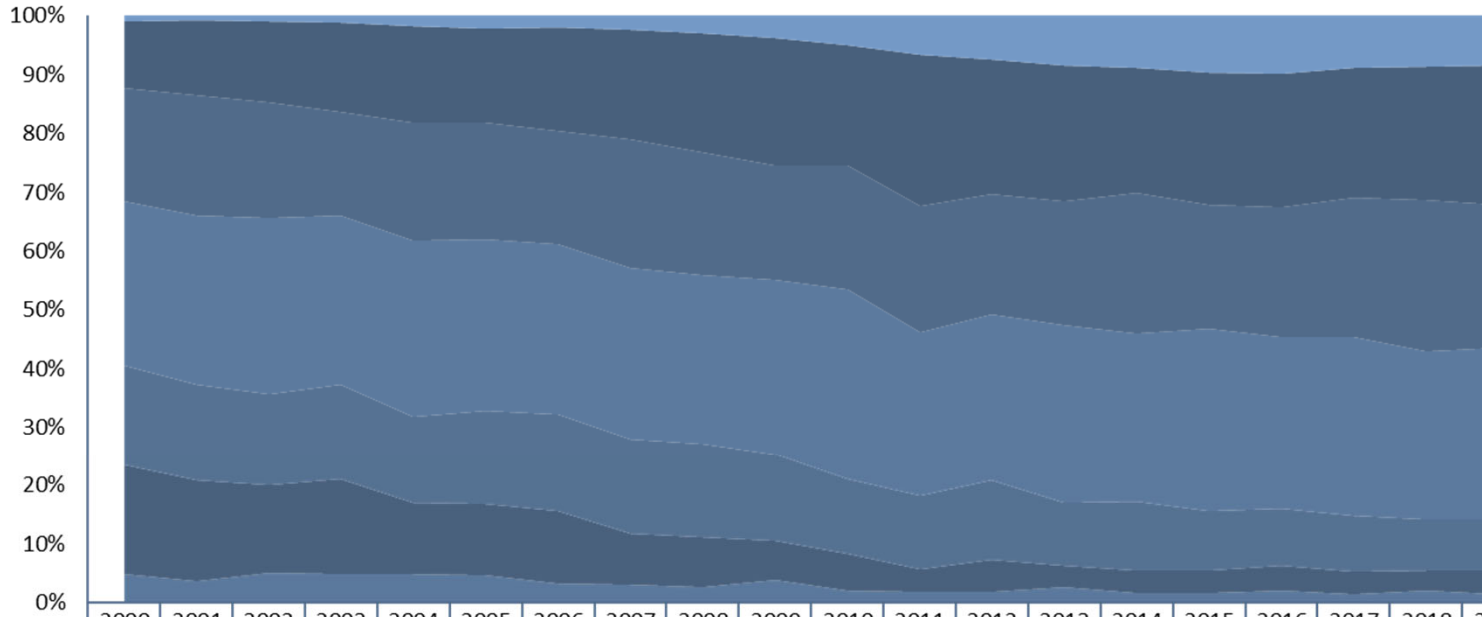


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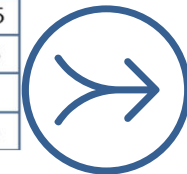


# AGE OF DECEASED DONORS IN SPAIN



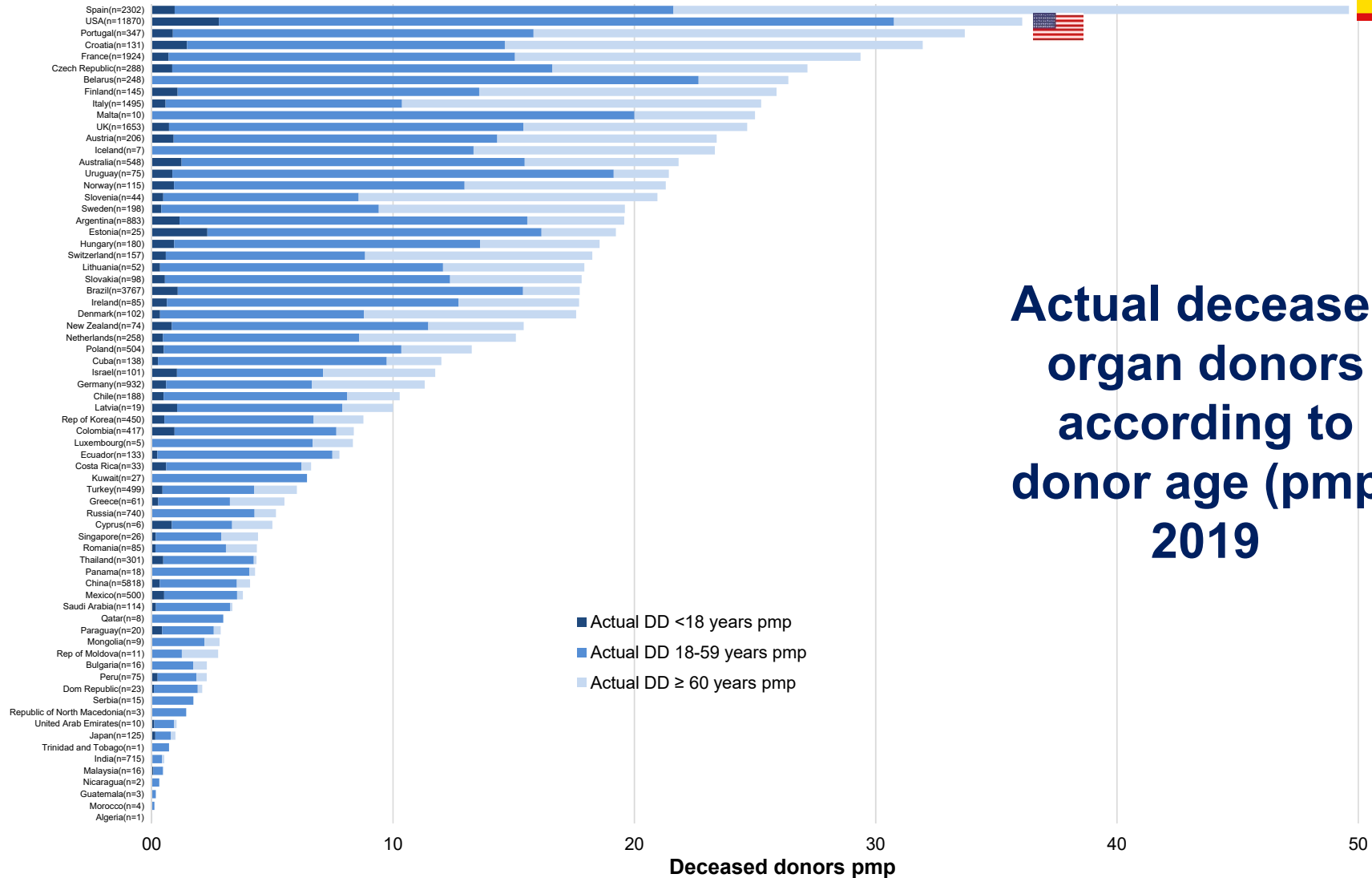
**MORE THAN  
50% DONORS  
AGED > 60  
YEARS,  
30% > 70 YEARS  
AND 9% > 80  
YEARS**

|           | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
|-----------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| ■ ≥ 80 y  | 0,9  | 0,7  | 1    | 1,2  | 1,7  | 2,1  | 2    | 2,4  | 3    | 3,7  | 4,9  | 6,7  | 7,5  | 8,4  | 8,9  | 9,7  | 9,9  | 8,9  | 8,7  | 8,5  |
| ■ 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 |
| ■ 60-69 y | 19,2 | 20,4 | 19,7 | 17,5 | 19,9 | 19,8 | 19,2 | 21,9 | 20,9 | 19,5 | 21,1 | 21,4 | 20,5 | 20,9 | 23,8 | 21   | 22,1 | 23,7 | 25,8 | 24,3 |
| ■ 45-59 y | 28,1 | 28,8 | 30   | 28,7 | 30   | 29,2 | 29   | 29,1 | 28,7 | 29,8 | 32,4 | 28   | 28,4 | 30,4 | 28,7 | 31,1 | 29,3 | 30,7 | 28,8 | 29,5 |
| ■ 30-44 y | 17   | 16,3 | 15,5 | 16,2 | 14,7 | 16   | 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  |
| ■ 16-29 y | 18,6 | 17,2 | 15   | 16,2 | 12,3 | 12,2 | 12,3 | 8,8  | 8,6  | 6,7  | 6,3  | 3,7  | 5,5  | 3,6  | 3,9  | 3,8  | 4,3  | 3,9  | 3,4  | 4    |
| ■ < 16 y  | 4,8  | 3,7  | 5,1  | 4,9  | 4,8  | 4,7  | 3,3  | 3    | 2,6  | 3,9  | 2    | 1,9  | 1,9  | 2,7  | 1,6  | 1,6  | 2    | 1,4  | 2,1  | 1,5  |



**14%**

Source: Organización Nacional de Trasplantes



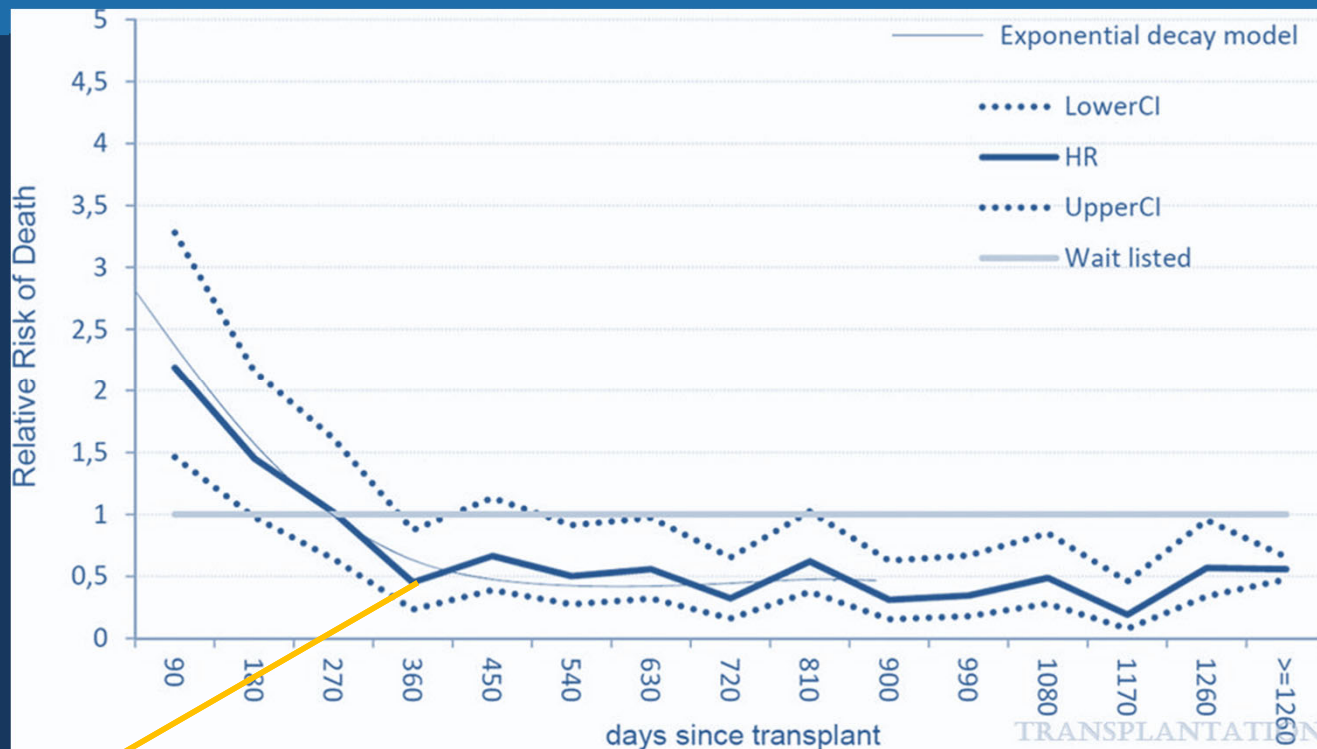


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At 12 months, the RR of death among recipients  $\geq 60$  years with a first kidney transplant from a donor  $\geq 60$  years was significantly lower than patients who remained in dialysis waitlisted



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

|        | Adjusted HR mortality risk from donor 60–79 y <sup>a</sup> ; (n = 1084) | P      | Adjusted HR mortality risk from donor $\geq 80$ y <sup>a</sup> ; (n = 128) | P     |
|--------|---|--------|--|-------|
| Global | 0.50 (0.44–0.58)  | <0.001 | 0.54 (0.38–0.77)   | 0.001 |



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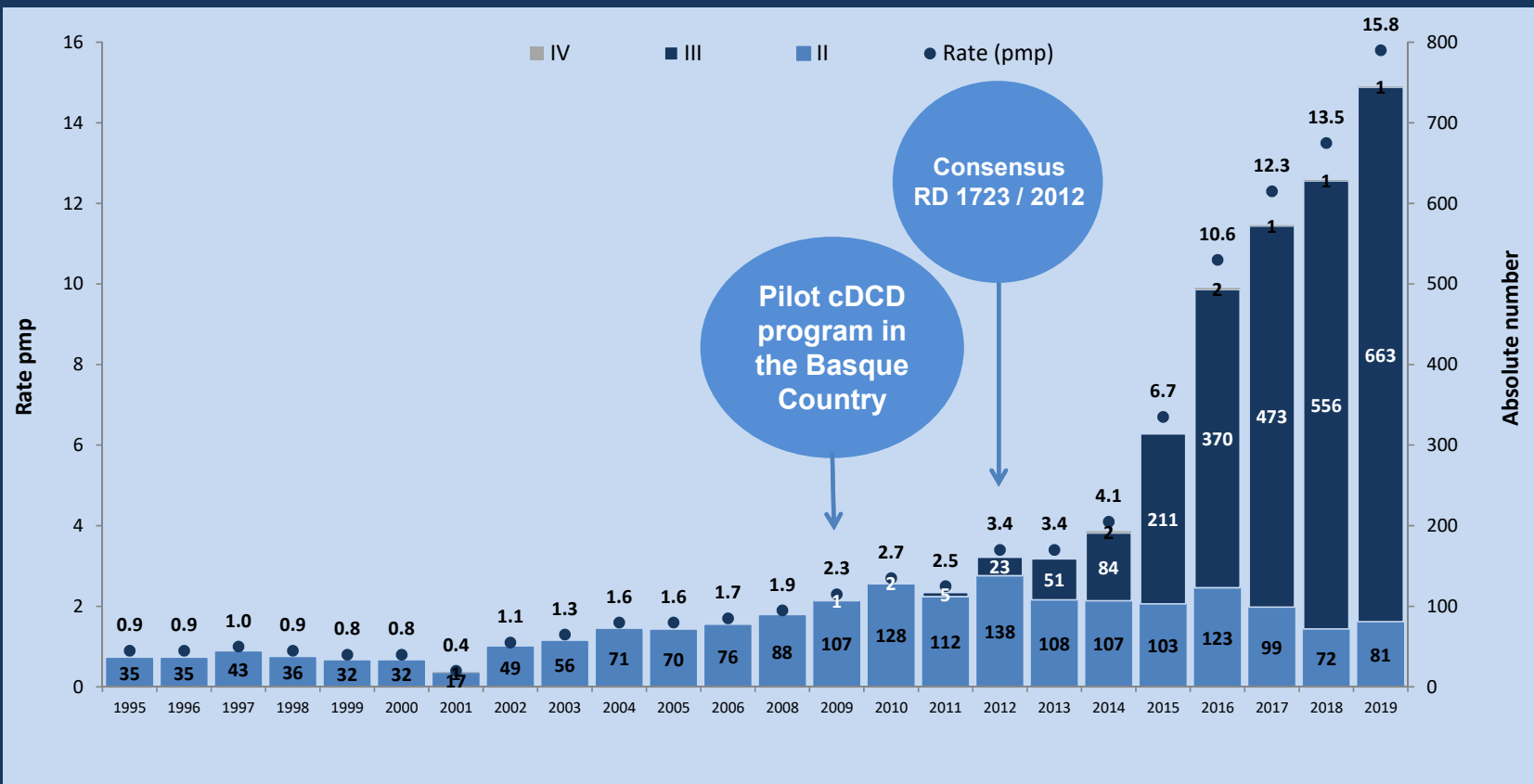
**50 x 22**  
50 donantes por millón de habitantes para el año 2022

Paediatric deceased donation

Donation after the Circulatory Determination of Death

Living Kidney Donation

**DCD ALREADY REPRESENTS 32% OF THE OVERALL DECEASED DONATION ACTIVITY IN SPAIN**



• Source: Organización Nacional de Trasplantes

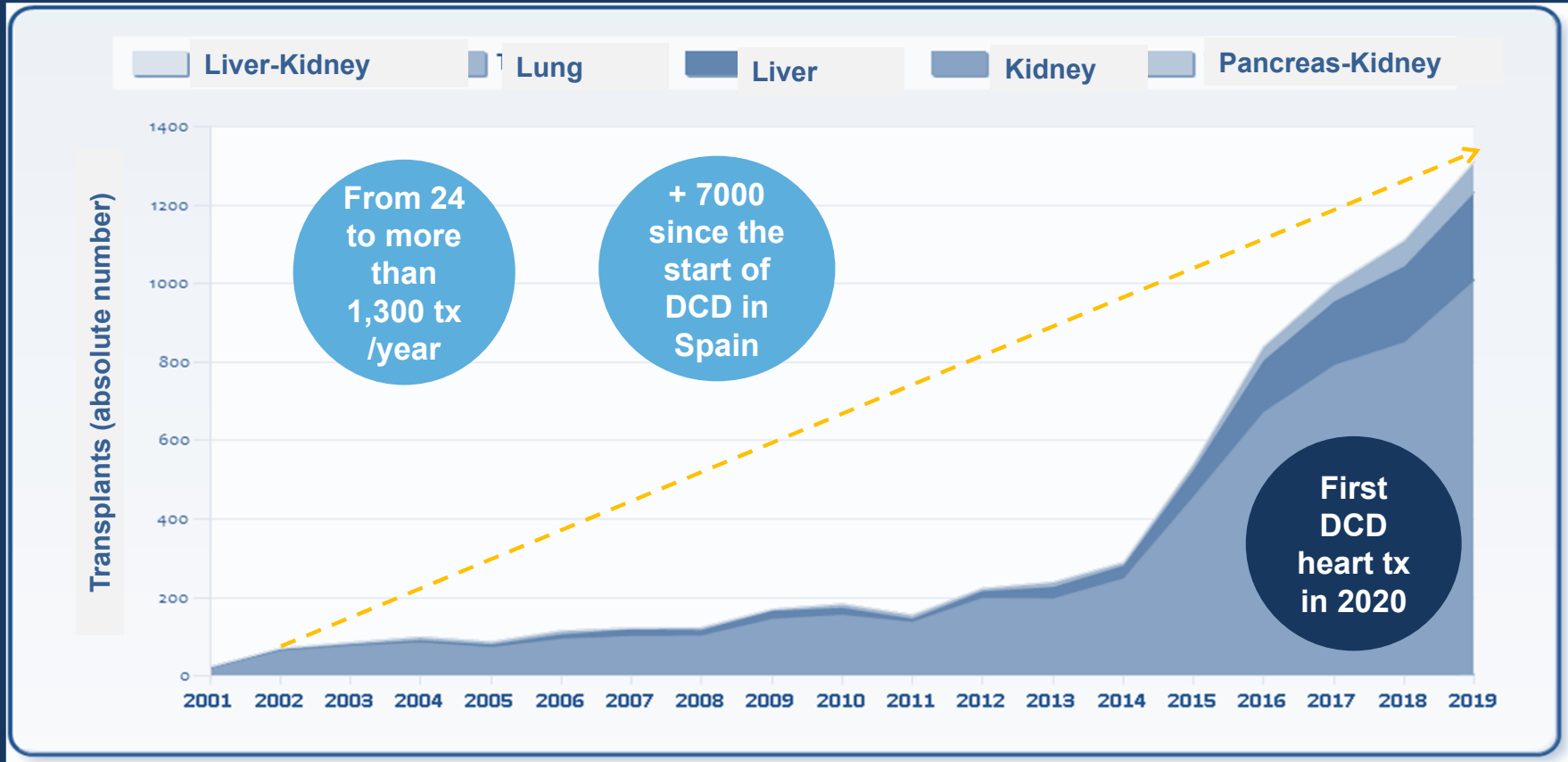


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# DCD TRANSPLANTS IN SPAIN



Source: Organización Nacional de Trasplantes



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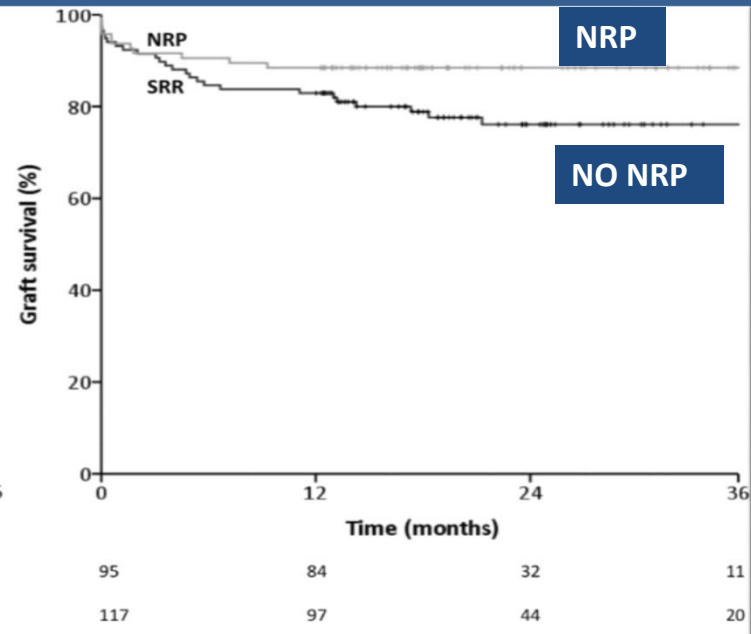
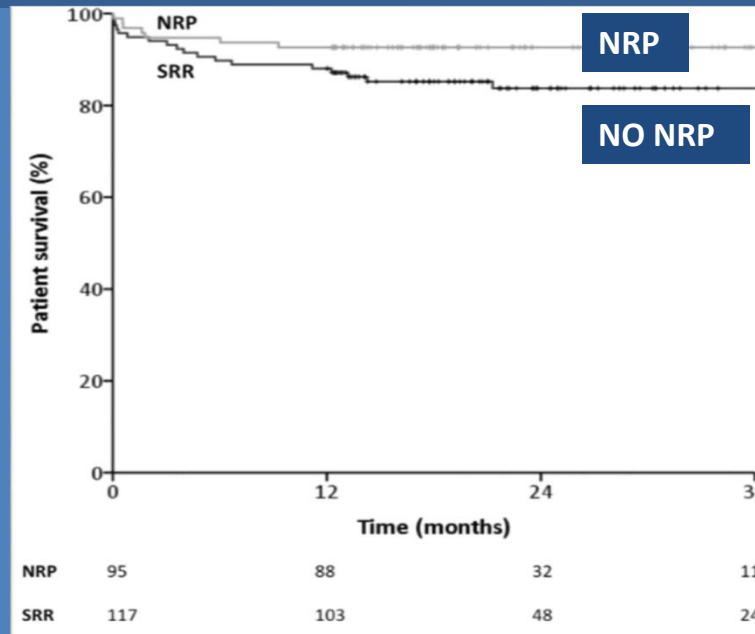
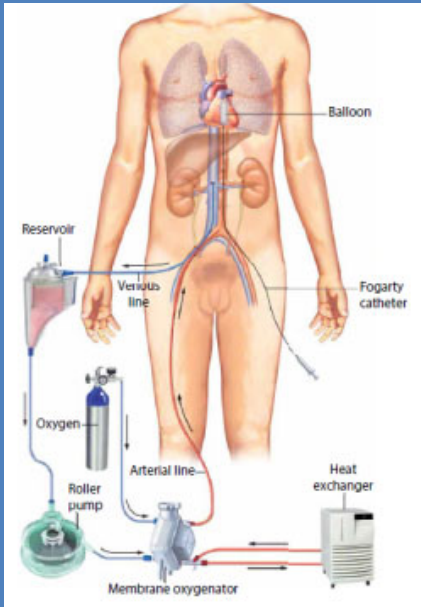


## INTRAHEPATIC ABSCESSES AFTER DCD LIVER TRANSPLANTATION



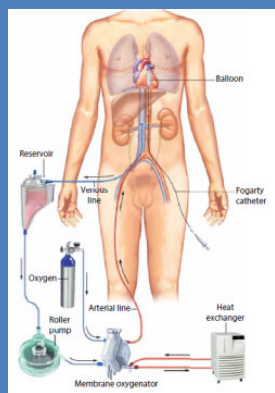
Source: Lens S, et al. Med Clin (Barc) 2012

# cDCD LIVER TRANSPLANTATION. SPAIN 2012-2016

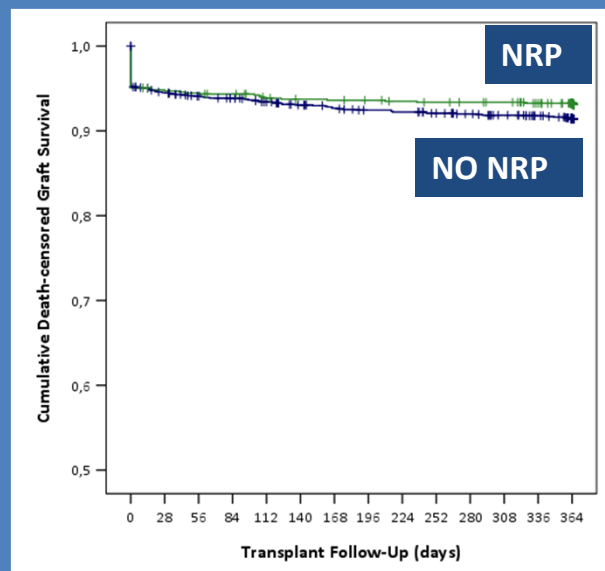
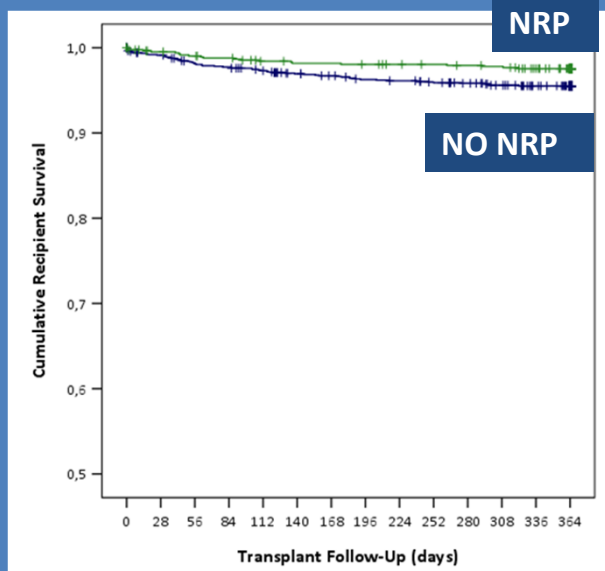


|                             | NRP (N=95) | SRR (N=117) | Raw Analysis                         |                  | IPTW Analysis                        |                  |
|-----------------------------|------------|-------------|--------------------------------------|------------------|--------------------------------------|------------------|
|                             |            |             | Risk Estimates [95% CI] <sup>5</sup> | P                | Risk Estimates [95% CI] <sup>5</sup> | P                |
| Early allograft dysfunction | 21 (22%)   | 32 (27%)    | 0.75 [0.40-1.42]                     | 0.381            | 0.97 [0.53-1.80]                     | 0.931            |
| Primary non-function        | 2 (2%)     | 3 (3%)      | 0.82 [0.13-4.99]                     | 0.827            | 0.24 [0.04-1.56]                     | 0.135            |
| Hepatic artery thrombosis   | 4 (4%)     | 3 (3%)      | 1.67 [0.36-7.65]                     | 0.509            | 0.79 [0.16-3.85]                     | 0.770            |
| All biliary complications   | 8 (8%)     | 36 (31%)    | <b>0.21 [0.09-0.47]</b>              | <b>&lt;0.001</b> | <b>0.14 [0.06-0.35]</b>              | <b>&lt;0.001</b> |
| ITBL                        | 2 (2%)     | 15 (13%)    | <b>0.15 [0.03-0.66]</b>              | <b>0.012</b>     | <b>0.11 [0.02-0.57]</b>              | <b>0.008</b>     |
| Retransplantation           | 5 (5%)     | 11 (9%)     | 0.54 [0.18-1.60]                     | 0.263            | <b>0.24 [0.07-0.78]</b>              | <b>0.018</b>     |
| Patient death               | 7 (7%)     | 20 (17%)    | 0.44 [0.19-1.05]                     | 0.064            | 0.53 [0.23-1.22]                     | 0.135            |
| Graft loss                  | 11 (12%)   | 28 (24%)    | <b>0.49 [0.24-0.98]</b>              | <b>0.043</b>     | <b>0.39 [0.20-0.78]</b>              | <b>0.008</b>     |



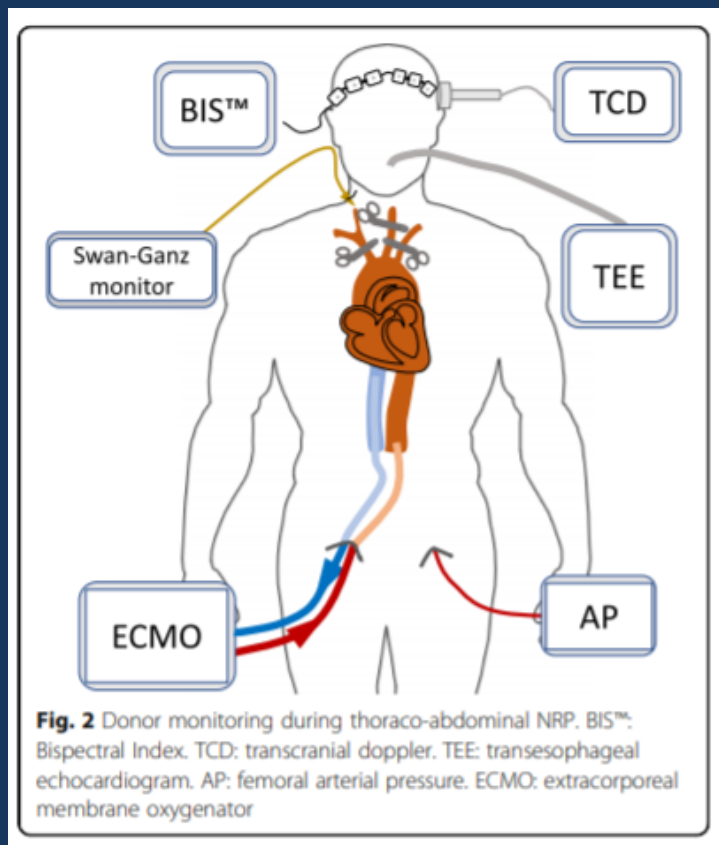


**2,302 cDCD KIDNEY TX 2012-2018:**  
**NRP: 865 (38%)**  
**RR: 1.437 (62%)**



|                        | UNIVARIATE |      |       |      | ADJUSTED |      |       |      | ATT (%)         | PSM    |      |       |      |
|------------------------|------------|------|-------|------|----------|------|-------|------|-----------------|--------|------|-------|------|
|                        | P          | OR   | CI95% |      | P        | OR   | CI95% |      |                 | 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 |

## DCD HEART TRANSPLANTATION IN SPAIN



American Journal of  
Transplantation

AST | AMERICAN SOCIETY OF  
TRANSPLANTATION

ASTS  
AMERICAN SOCIETY OF  
TRANSPLANT SURGEONS

BRIEF COMMUNICATION

### Spanish experience with heart transplants from controlled donation after the circulatory determination of death using thoraco-abdominal normothermic regional perfusion and cold storage

Eduardo Miñambres, Mario Royo-Villanova, Marina Pérez-Redondo, Elisabeth Coll, Susana Villar-García, Sergio J. Canovas, Juan Francisco Nistal, Iris P. Garrido, Manuel Gómez-Bueno, Manuel Cobo, Beatriz Dominguez-Gil ... [See fewer authors](#) ^





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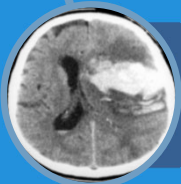
Donation after the Circulatory Determination of Death

Living Kidney Donation

# What I talk about when I talk about... Intensive Care to facilitate Organ Donation (ICOD)



the **initiation or continuation of intensive care measures** (e.g. admission to the ICU, respiratory support, haemodynamic support)



in patients with a **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 pathway**


# ICOD AND COOPERATION WITH INTENSIVE AND EMERGENCY CARE PROFESSIONALS



el profesional de urgencias y el proceso de donación

recomendaciones  
grupo colaborativo ONT-SEMES

**>8,700 emergency care professionals trained in 10 years (2009-2018)**





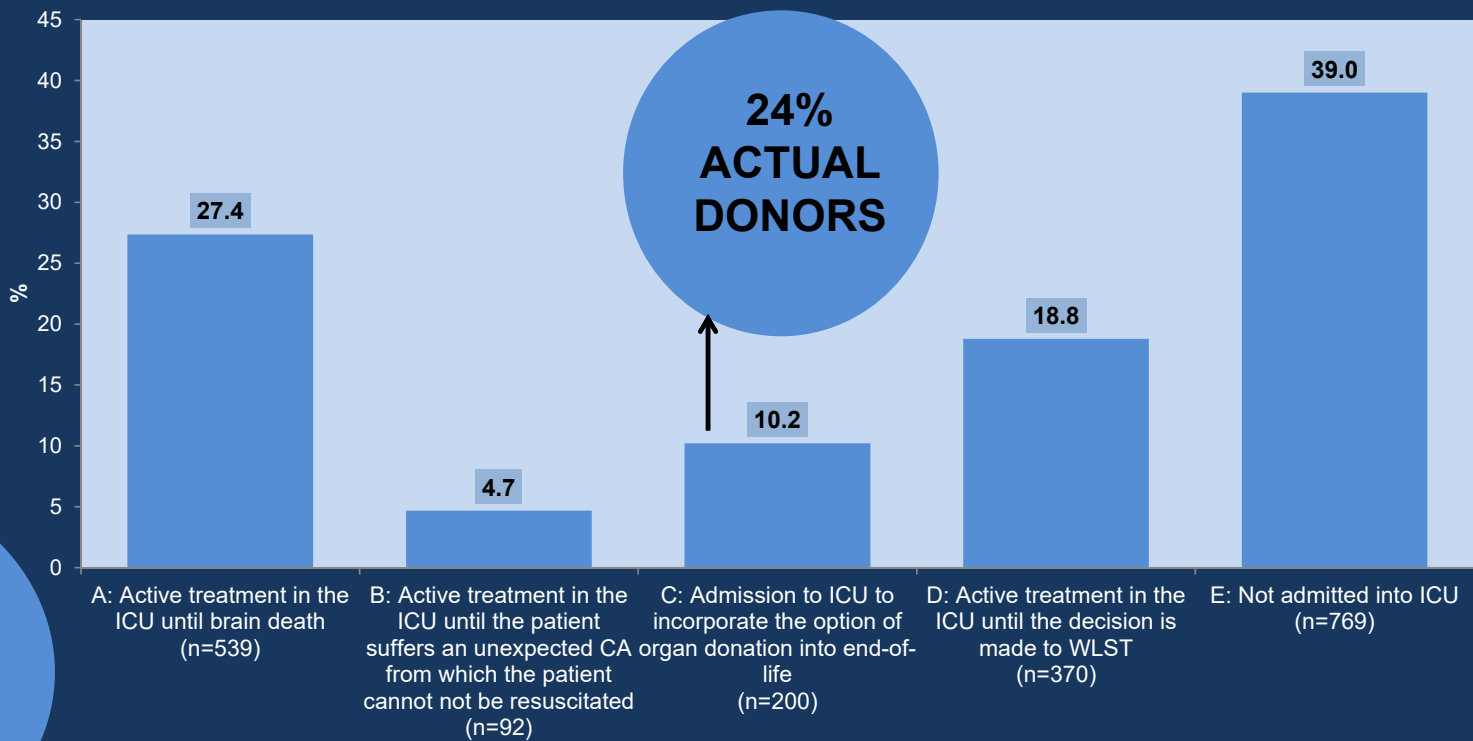
CUIDADOS INTENSIVOS ORIENTADOS A LA DONACIÓN DE ÓRGANOS

RECOMENDACIONES  
Grupo de trabajo SEMICYUC-ONT

**>1,500 residents in intensive care along 41 courses (2007-2018)**

   
Septiembre 2017

# 1 OUT OF 4 DONORS IN SPAIN HAVE BEEN ADMITTED TO THE ICU TO ENABLE ORGAN DONATION



**N=1,970 possible donors aged ≤85**  
**Nov 2014-Apr 2015**

**Organ donation as a hospital policy:  
THE FUTURE IS OUT THERE**





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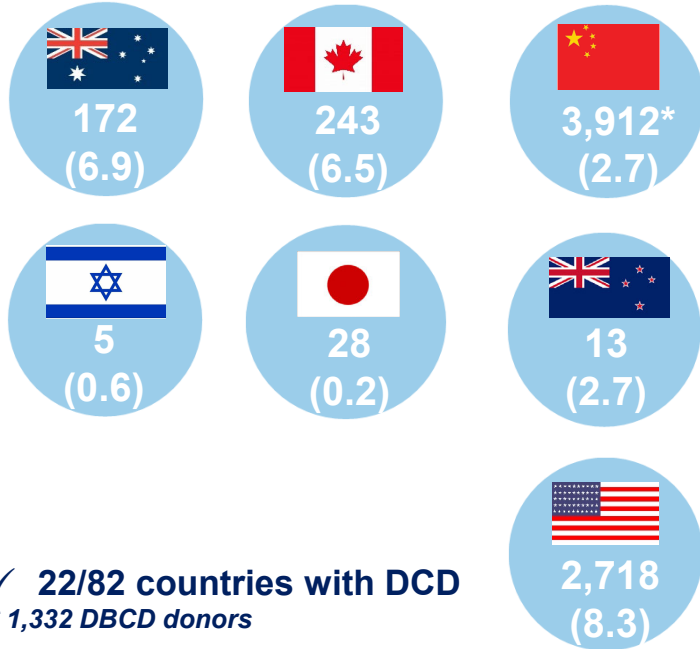
**Beatriz Domínguez-Gil, MD, PhD**  
**Director General**  
**Organización Nacional de Trasplantes, Spain**  
[bdominguez@sanidad.gob.es](mailto:bdominguez@sanidad.gob.es)  
[ont@sanidad.gob.es](mailto:ont@sanidad.gob.es)



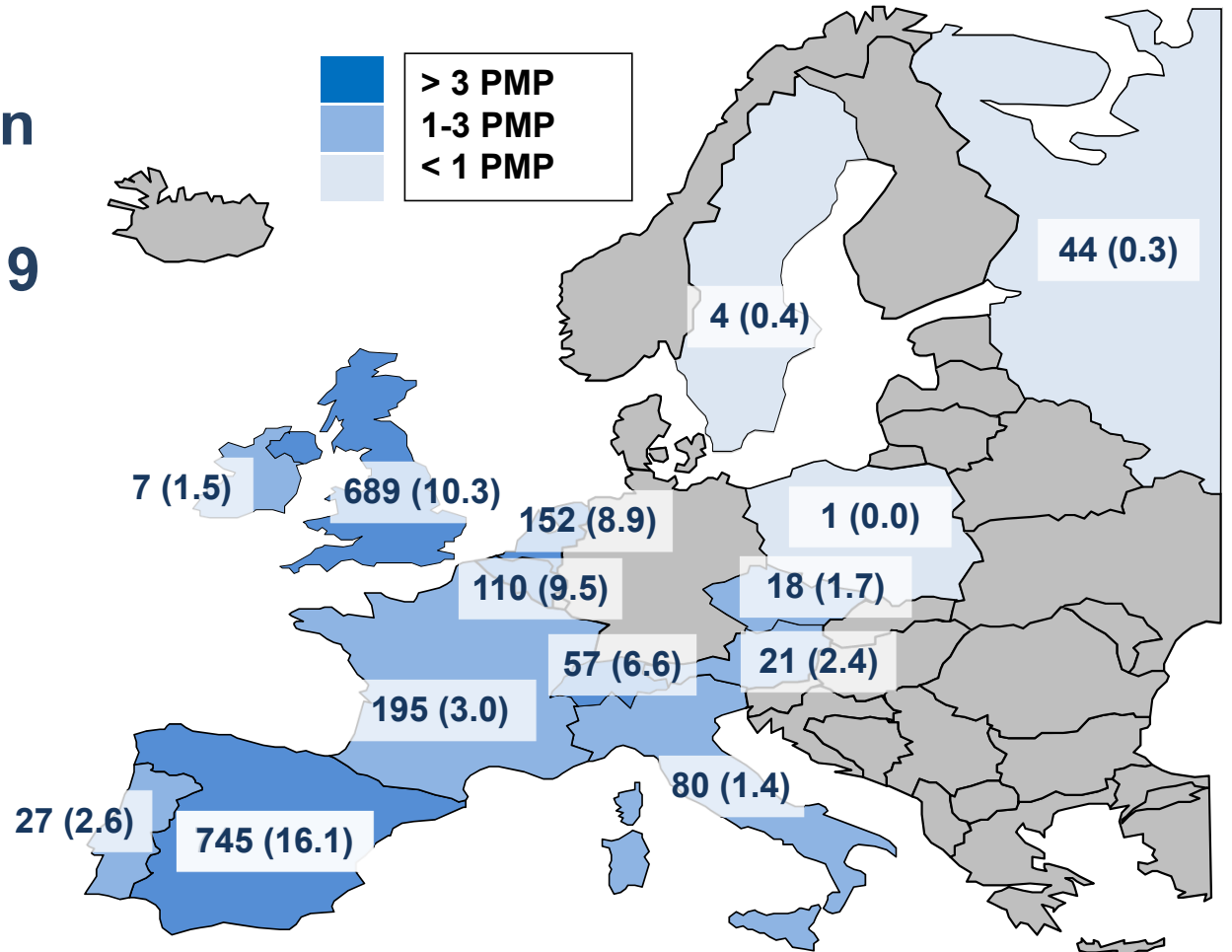


# Donation after the Circulatory Determination of Death in the world

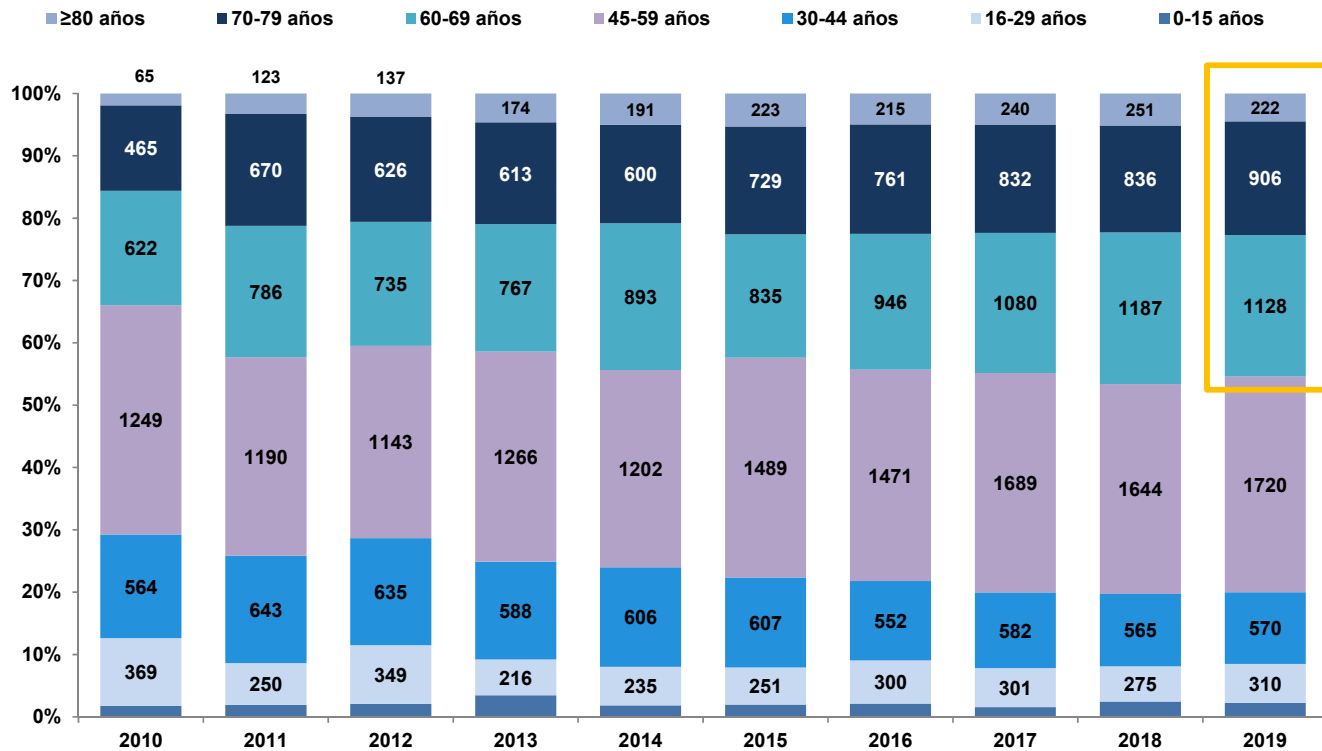
*Absolute number (pmp). 2019*



✓ 22/82 countries with DCD  
\* 1,332 DBCD donors



# TRASPLANTS BY DONOR AGE



Source: Organización Nacional de Trasplantes