

3rdGCC Organ Transplantation & Nephrology Congress

DCD Possibilities in the Middle East & Gulf Area

Kuwait – January 20th, 2017

Martí Manyalich, MD, PhD

Assesor on Transplantation-Hospital Clínic de Barcelona

Associated Professor- Universitat de Barcelona

President TPM-DTI Foundation

President ISODP-TTS

World actual population (2014)

- 7.175 million population
- 57 millions deaths/year
- 30,000 cadaveric donors/year
 - 3,000 controlled DCD 10%
 - 300 Uncontrolled DCD 1%
- 0.053 % donors/deaths
- 81.104 Cadaveric transplants
- 37.023 living K and L

FUTURE

SELF-SUFFICIENCY 0.5% donors/deaths

300.000 deceased Donors Year

30.000 Controlled

3,000 uncontrolled

“We need 1 million of transplants”

810,000 Tx Cadaveric

1.181.700 Total Transplants

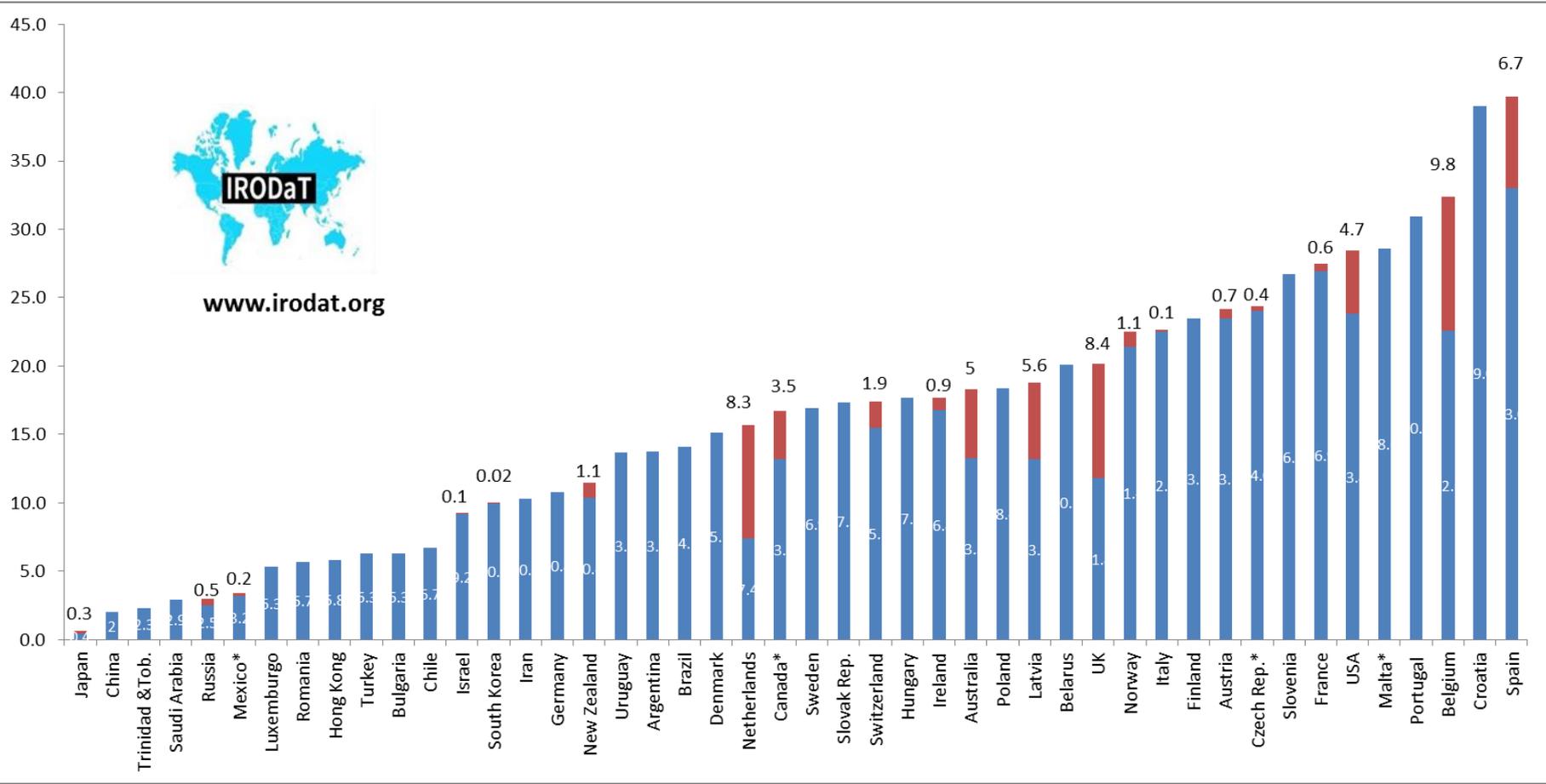


Save 1 million lives... DTI

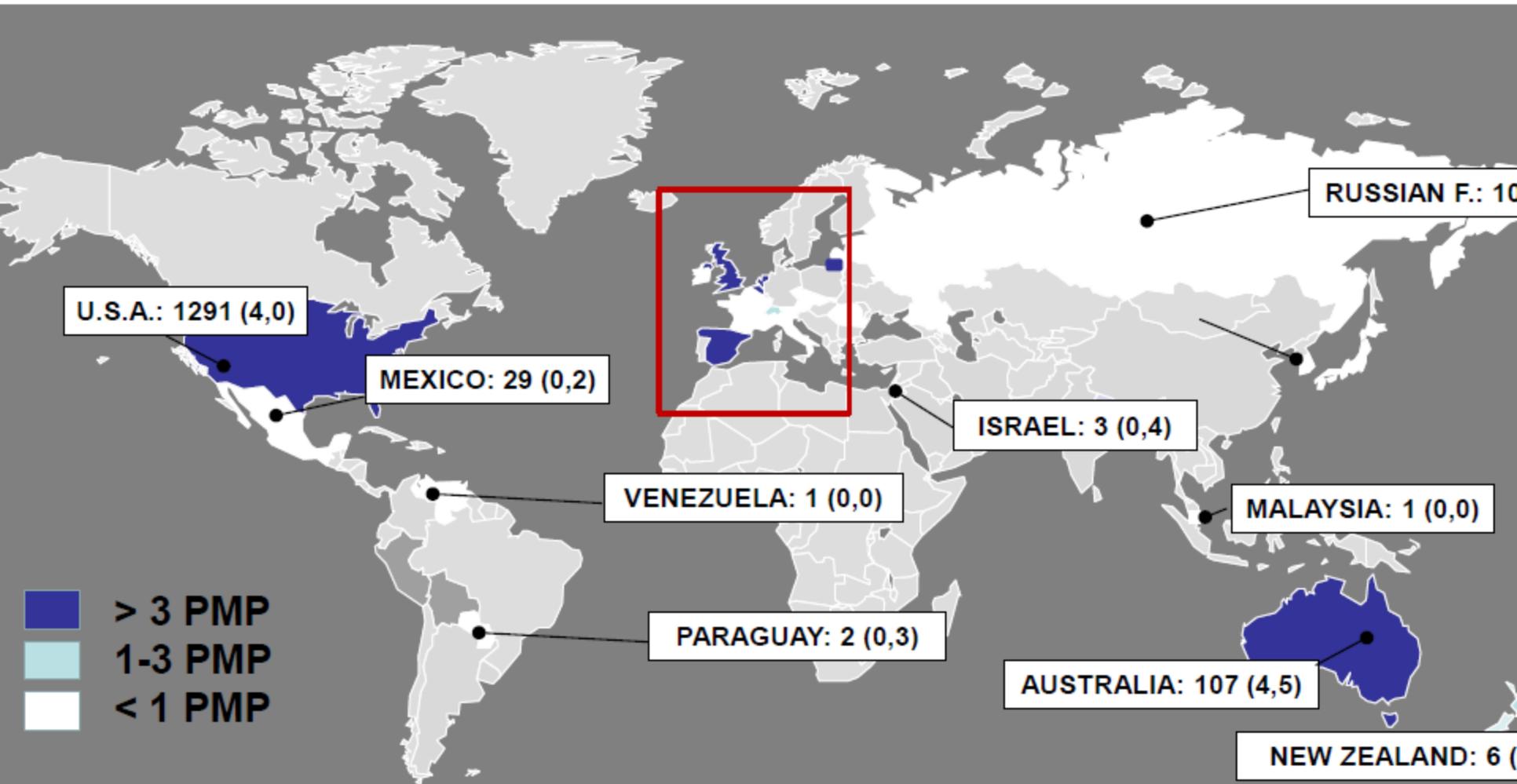
Worldwide DBD and DCD deceased organ donors (pmp) 2015



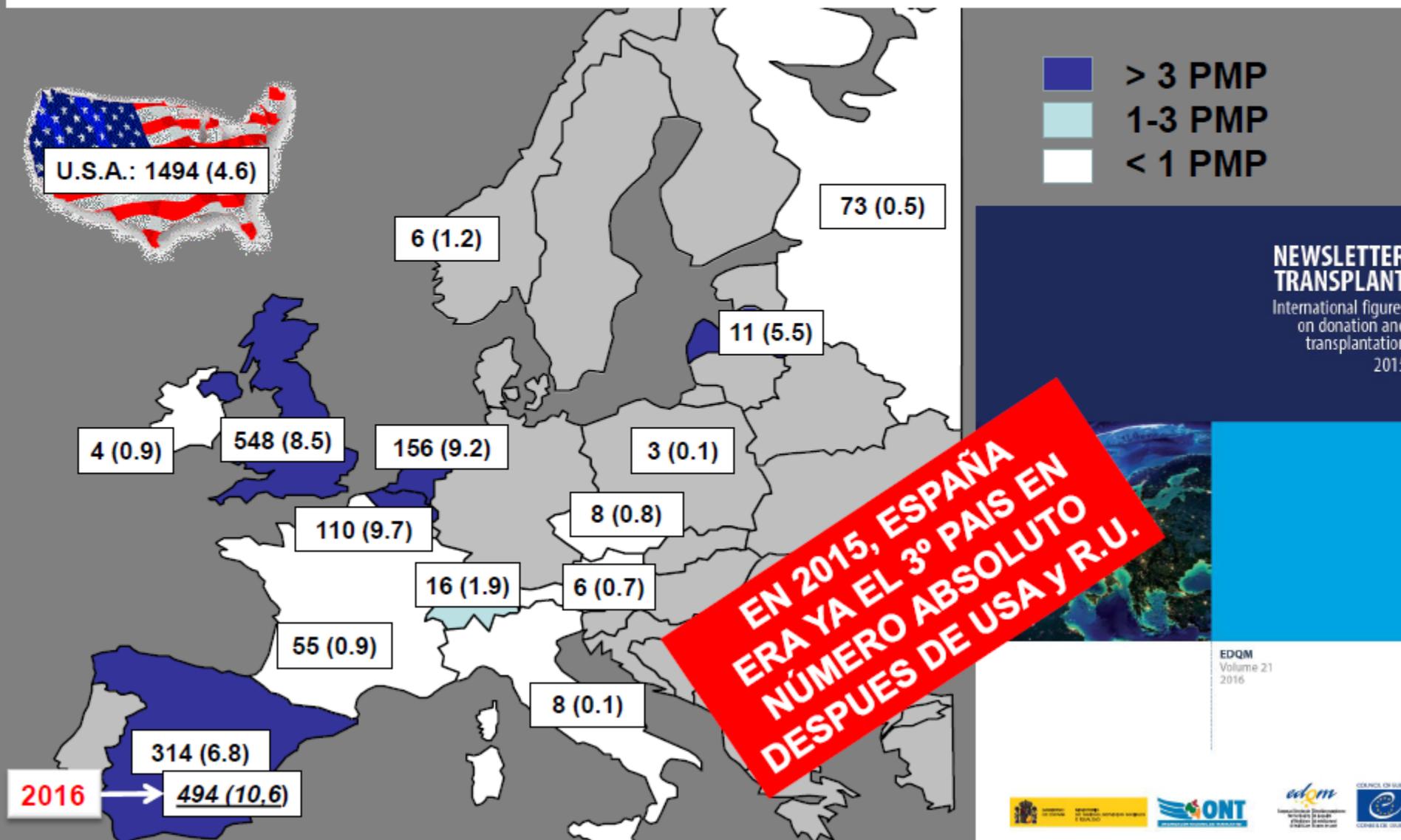
www.irodat.org



Actual donors after circulatory death -DCD- Absolute Number (PMP). 2014



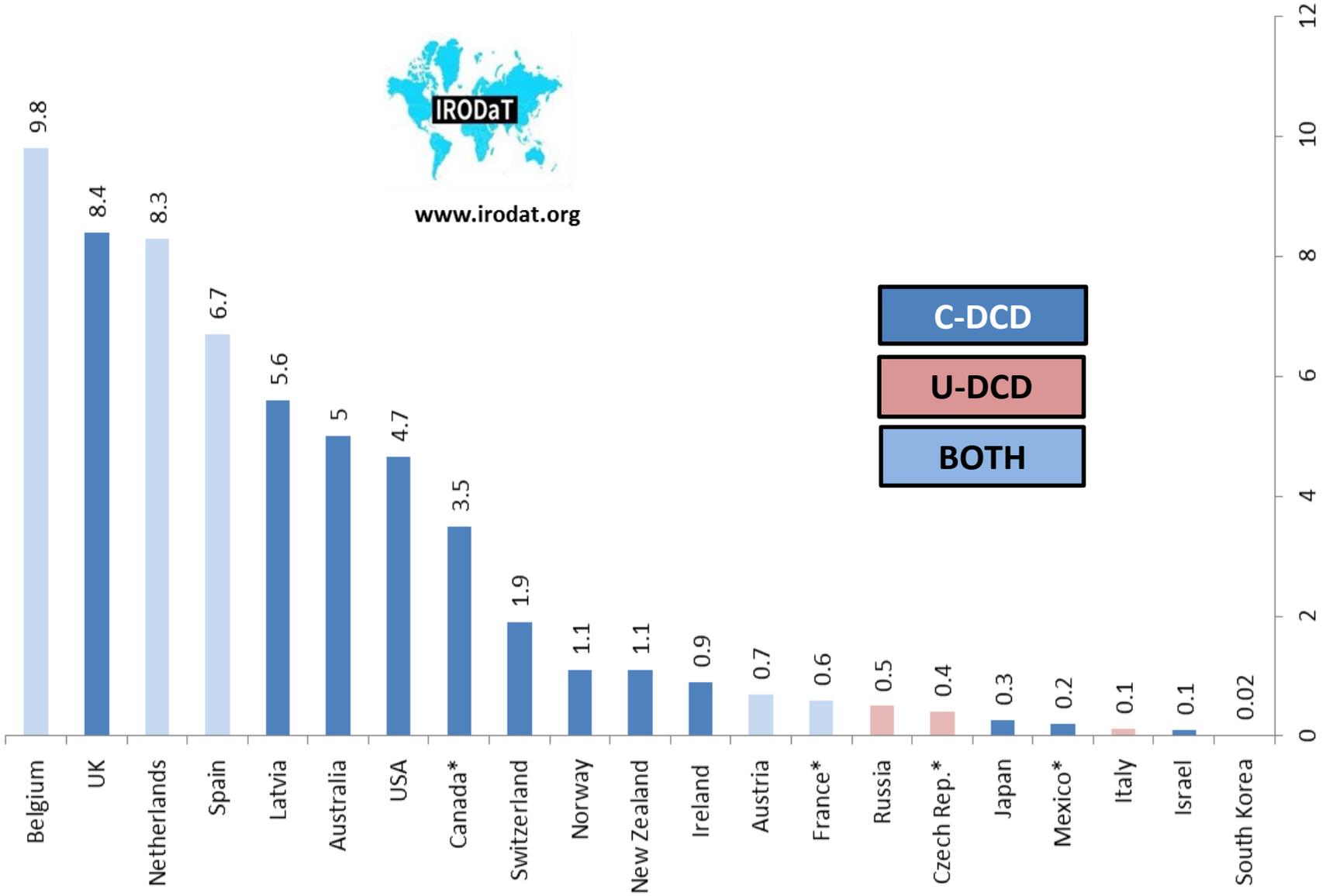
ORGAN DONORS IN ASISTOLIA (DCD) Número absoluto (pmp). 2015



WORLDWIDE DCD DONORS 2015 (PMP)

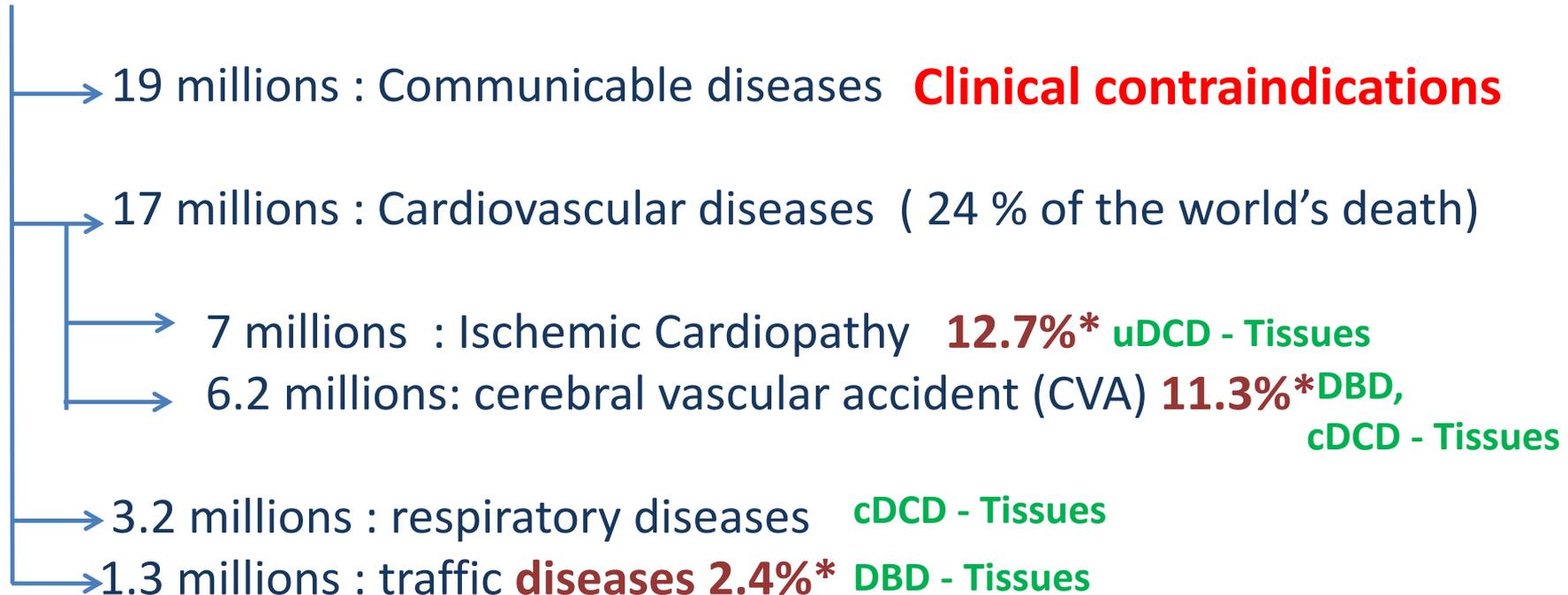


www.irodat.org



Causes of death in the world 2012

55 millions of deaths /year



***of the world's deaths**

CPR in Europe

- 350.000 cases/year
- 1000 cases/day
- Recuperated 40%
- Hospital survival 15%
- One year survival 12%

Bernd Böttiger, Colonia-Germany

European resuscitation council (ERC)

1st Pan-hellenic congress on Emergency Prehospital Care.

April 2012. Thessaloniki, Greece.

Potential uDCD in Europe

- 1000 cpr/day
- 600 no recuperated. Potential uDCD
- 400 recuperated
- 250 death in hospital. Potential cDCD
- 150 alive in hospital

Bernd Böttiger, Colonia-Germany

European resucitation council (ERC)

*1st Pan-hellenic congress on Emergency Prehospital Care. April 2012.
Thessaloniki, Greece.*

Adapted by M. Manyalich analisys

Cardiac arrest and resuscitation USA

Table 2. Number of Research Projects Funded by the National Heart, Lung, and Blood Institute From 1985 to 2009²⁵

Terms Searched	Funded Studies, n	Deaths per Year, n	Funded Studies per 10 000 Deaths per Year, n
Myocardial infarction	6886	157 000	439
Stroke	4403	150 000	294
Heart failure	9919	284 000	349
Heart arrest and resuscitation	257	310 000	8

Ornato et al. *Circulation* 2010. 122:1876-1879

DCD Potentiality

- 310.000 heart arrest and resuscitation
- 5% heart arrest potentials DCD
- 15.500 Total DCD Potentials
- Conversion rate 65%
- 10.075 Utilized Donors

What to DO ???

1.- No legal, No possible

NO

2.- Very Difficult, but...

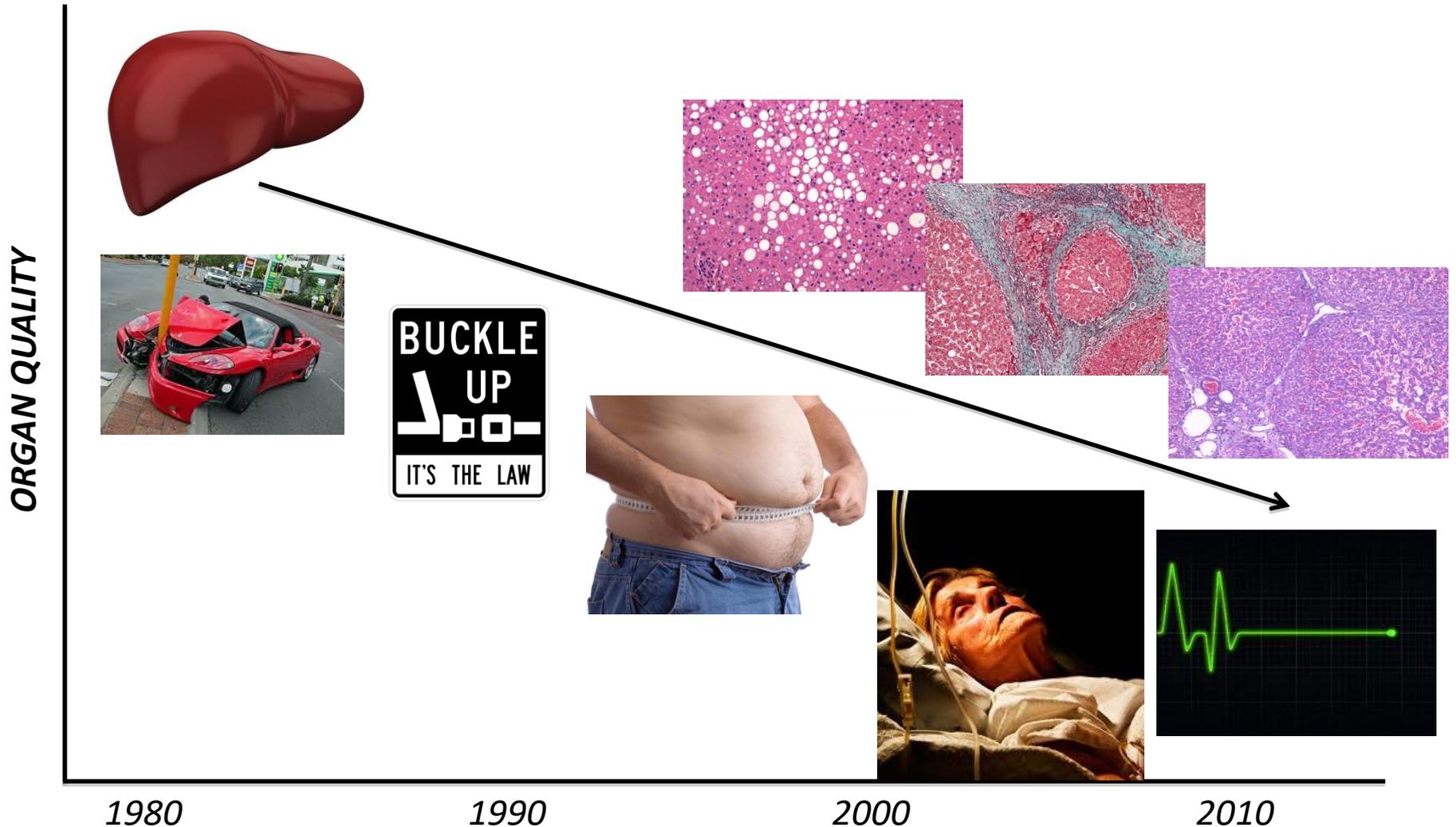
TRY

3.- Start pilot protocols

GO



Fewer and fewer "ideal" organs...



DCD

Donor after Circulatory Death...

Person who has suffered an

irreversible cardiac arrest

but with a *warm ischemia time*

*short enough to maintain the viability of the
organs for transplantation*

Critical pathways for organ donation*

POSSIBLE DECEASED ORGAN DONOR

A patient with a devastating brain injury or lesion OR a patient with circulatory failure
AND apparently medically suitable for organ donation

Donation after Circulatory Death (DCD)

POTENTIAL DCD DONOR

A.A person whose circulatory and respiratory functions have ceased and resuscitative measures are not to be attempted or continued.

or

B.A person in whom the cessation of circulatory and respiratory functions is anticipated to occur within a time frame that will enable organ recovery.

ELIGIBLE DCD DONOR

A **medically suitable** person who has been **declared dead** based on the irreversible absence of circulatory and respiratory functions as stipulated by the law of the relevant jurisdiction, within a time frame that enables organ recovery.

ACTUAL DCD DONOR

A consented eligible donor:

A. In whom an **operative incision** was made with the intent of organ recovery for the purpose of transplantation.

and/or

B. From whom at least **one organ was recovered** for the purpose of transplantation.

UTILIZED DCD DONOR

An actual donor from whom **at least one organ was transplanted**.

Treating physician
to identify/refer a potential donor

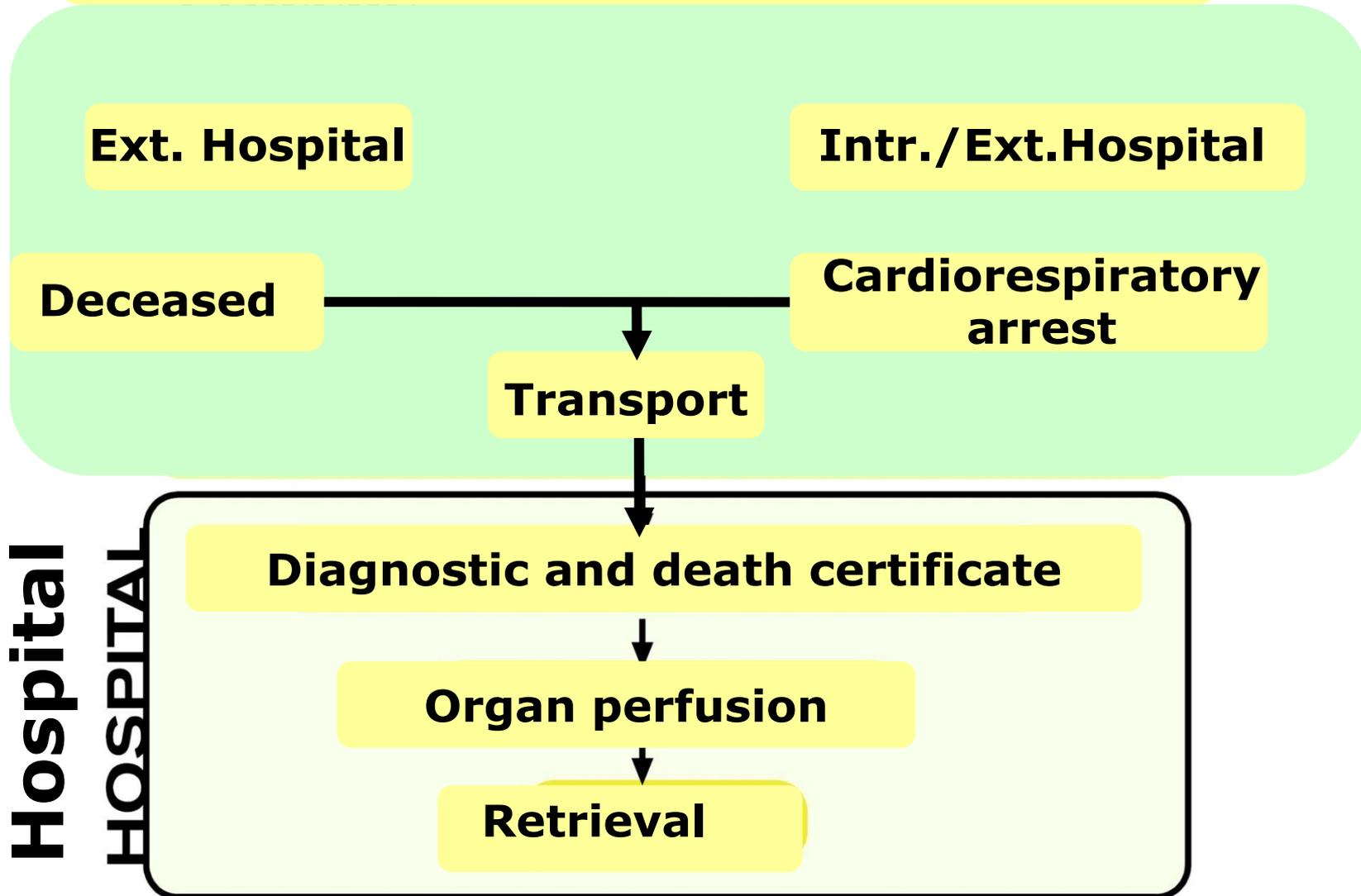
Donation after BrainDeath (DBD)

TPM



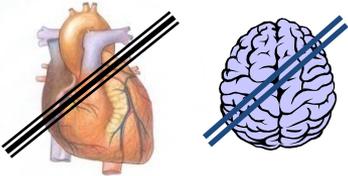
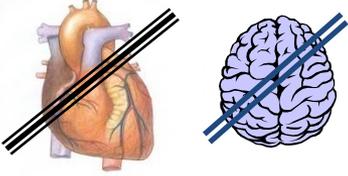
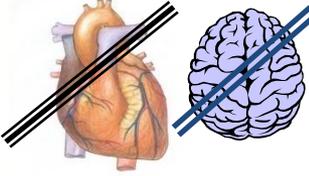
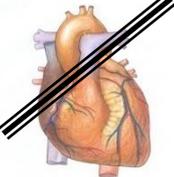
*The "dead donor rule" must be respected. That is, patients may only become donors after death, and the recovery of organs must not cause a donor's death.

DCD Procedure



Classification & Consideration

DCD - Donors after Cardiac Death

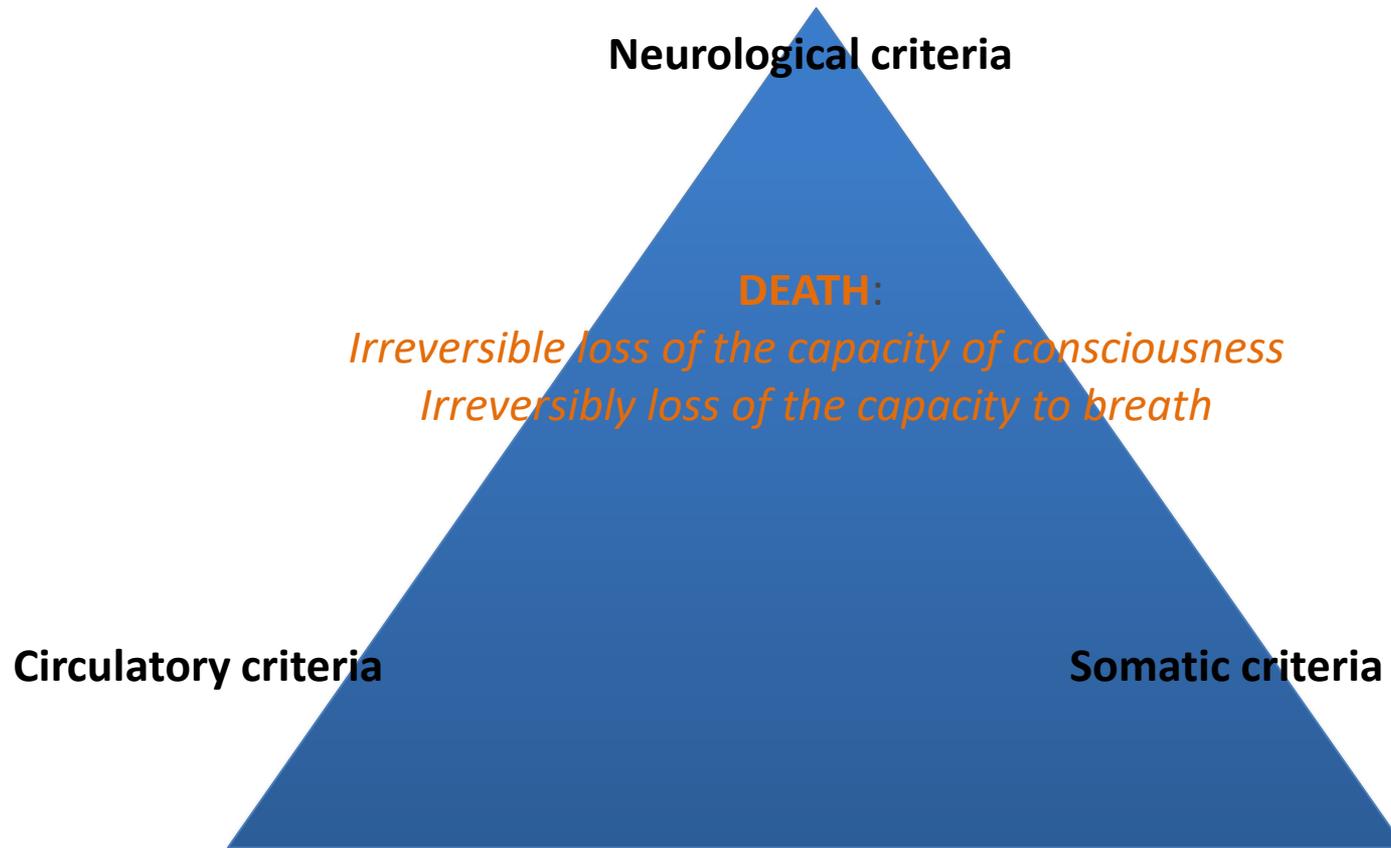
Unexpected Uncontrolled	I	Pre-Hosp.		Perfusion	Family Consent
	II	Emergency		Perfusion	Family consent
Expected Controlled	III	ICU	Family consent		Perfusion
	IV	ICU		Family consent	

Legal Aspects

1. Diagnosis of death
2. Family consent
3. “no-touch period” of 5 minutes
4. Organs Perfusion .Start preservation
5. Organ retrieval



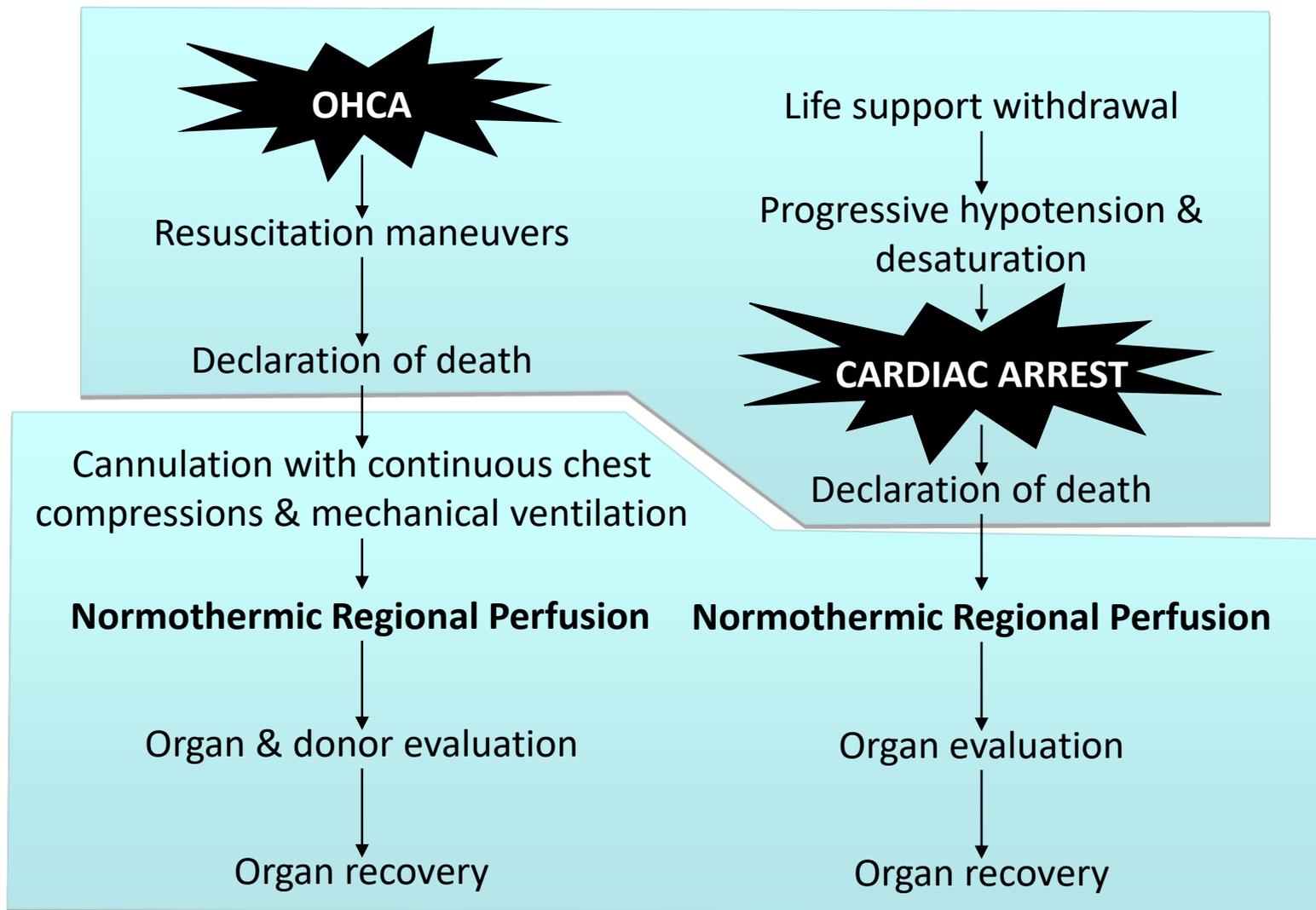
No difference between Brain Death and Cardiac Death



UNCONTROLLED DCD

CONTROLLED DCD

ISCHEMIA
Reconditioning



Organ Perfusion Methods

- Rapid organs cooling:

Reduce metabolic paths

- In situ perfusion (Dobel Balon Tripel Lumen)
- Total body cooling (*cardiopulmonary bypass*)
- *Quick Retrieval (Operation Room)*

- Normothermic recirculation

Recover metabolic energetic status

- Mechanical chest compression (Emergency, ICU)
- Normothermic recirculation (*NRP*)



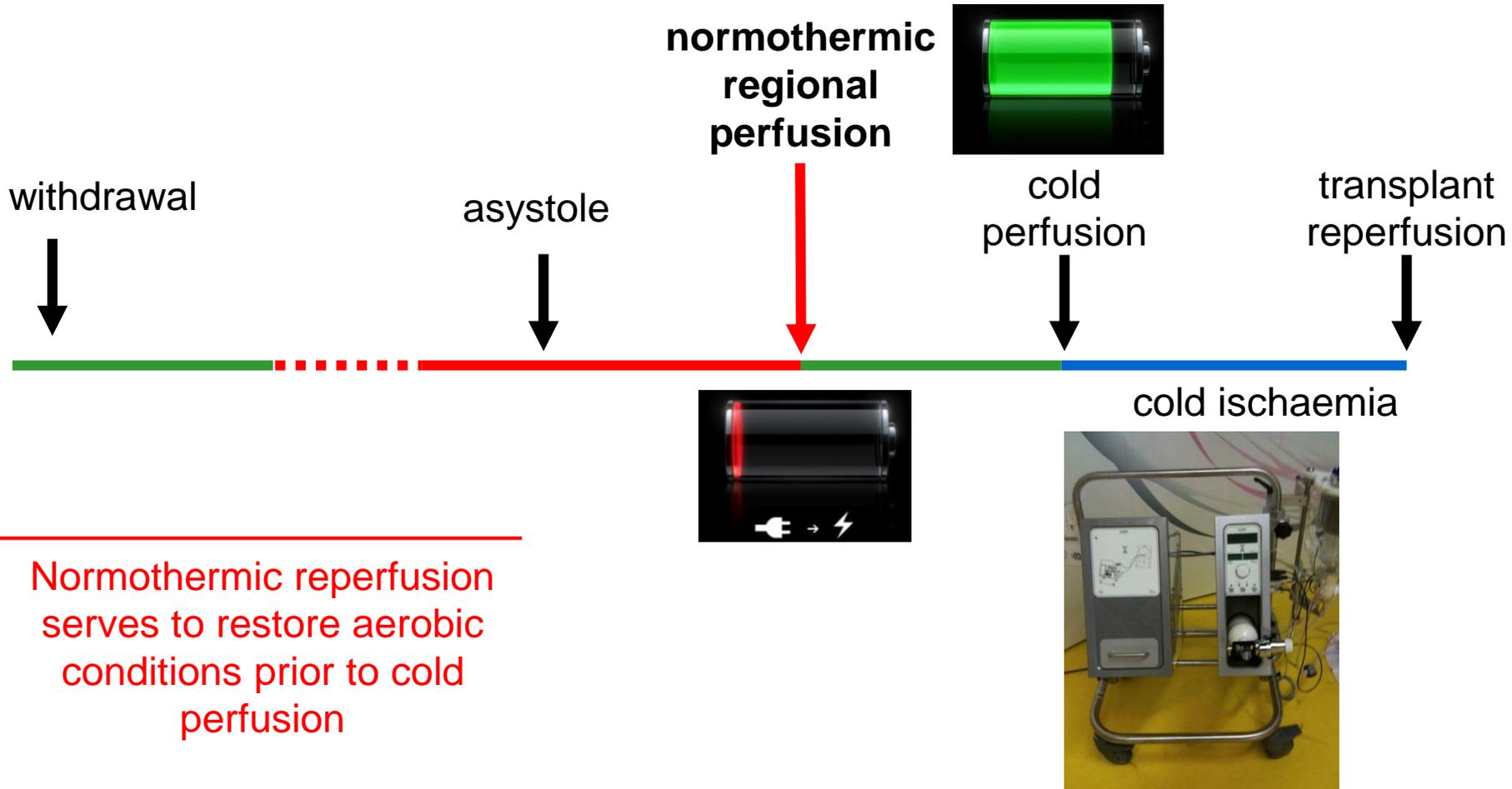
Ricard Valero, MD, PhD

Doctorate Thesis Contents

- Normothermic Recirculation Reduces Primary Graft Dysfunction of Kidneys Obtained from Non-Heart-Beating Donors.***
 Valero R, Cabrer C, Oppenheimer F, Trias E, Sánchez-Ibañez J, De Cabo FM, Navarro A, Paredes D, Alcaraz A, Gutiérrez R, **Manyalich M.**
Transplant International 2000;13:303-310
- Hepatic blood flow and oxygen extraction ratio during normothermic recirculation and total body cooling as viability predictors in non-heart-beating donor pigs.***
 Valero R, Garcia-Valdecasas JC, Tabet J, Taurà P, Rull R, Beltran J, Cifuentes A, García F, González X, López-Boado MA, Cabrer C, Visa J.
Transplantation 1998;66:170-6
- L-arginine reduces liver and biliary tract damage after liver transplantation from non-heart-beating donor pigs.*** Valero R, Garcia-Valdecasas JC, Net M, Beltran J, Ordi J, González FX, López-Boado MA, Almenara R, Taurà P, Elena M, Capdevila LI, **Manyalich M**, Visa J.
Transplantation 2000;70:730-737

Solutions to ischaemic injury

Normothermic regional perfusion



Method of Preservation

Cardiopulmonary Support

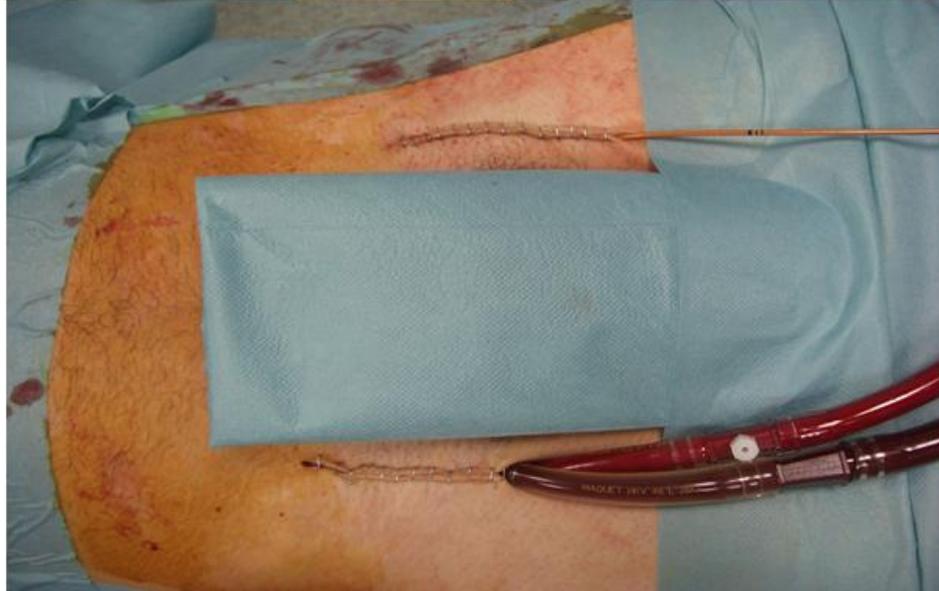
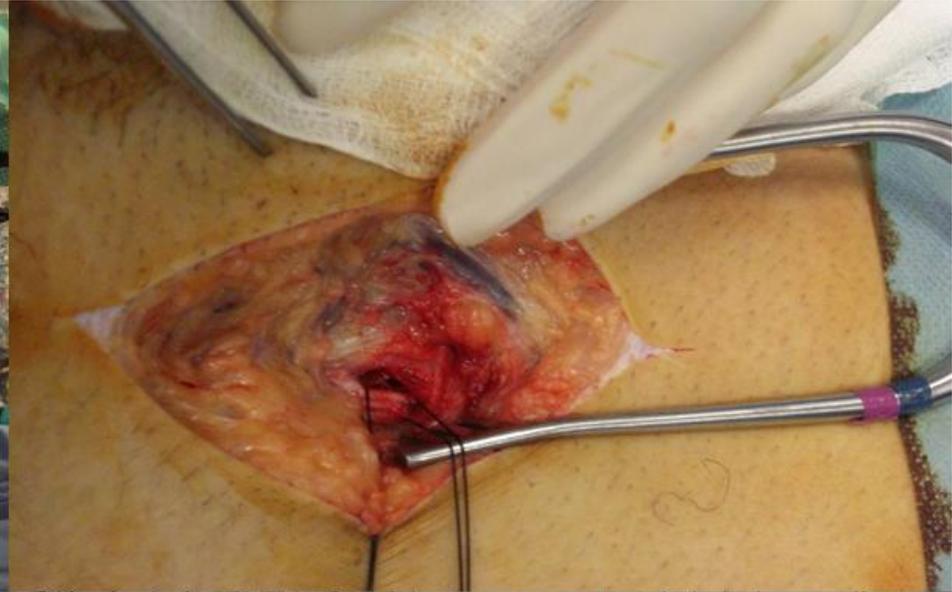


Manoeuvres of CPR with the simultaneous application of chest (mechanical) and abdominal (manual) compression

Monitoring of blood pressure through femoral artery

**Targets: BP ≥ 70 mm Hg; $P_aO_2 \geq 100$ mm Hg with 100%O₂ ;
pH > 7.10 with Na bicarbonate replacement**

Uncontrolled DCD. Emergency Area. Surgical



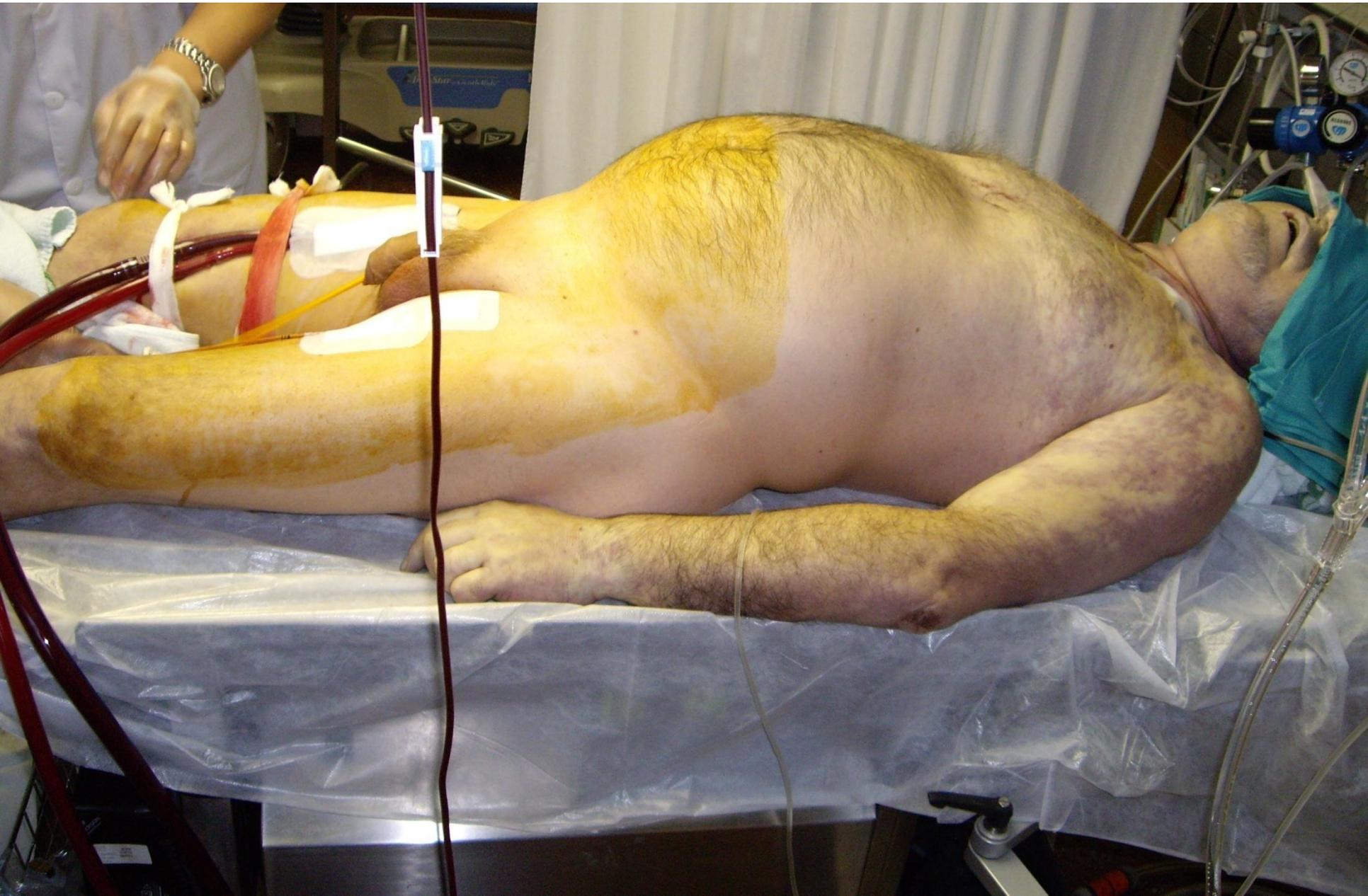
Normothermic Regional Perfusion (NRP)



Family Consent

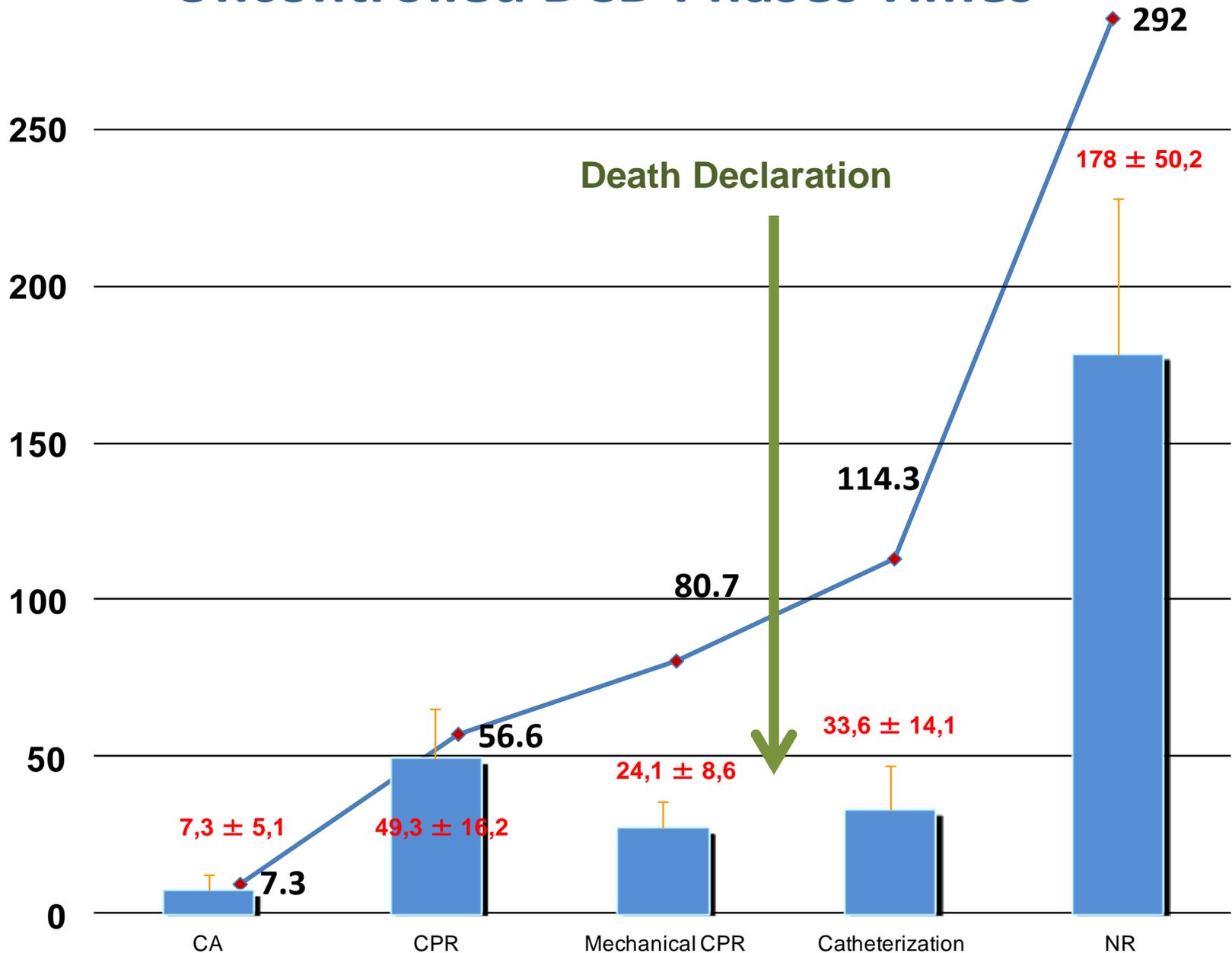


Donor & Organ Viability



Uncontrolled DCD Phases Times

Min.



Controlled DCD. ICU Selinger Access



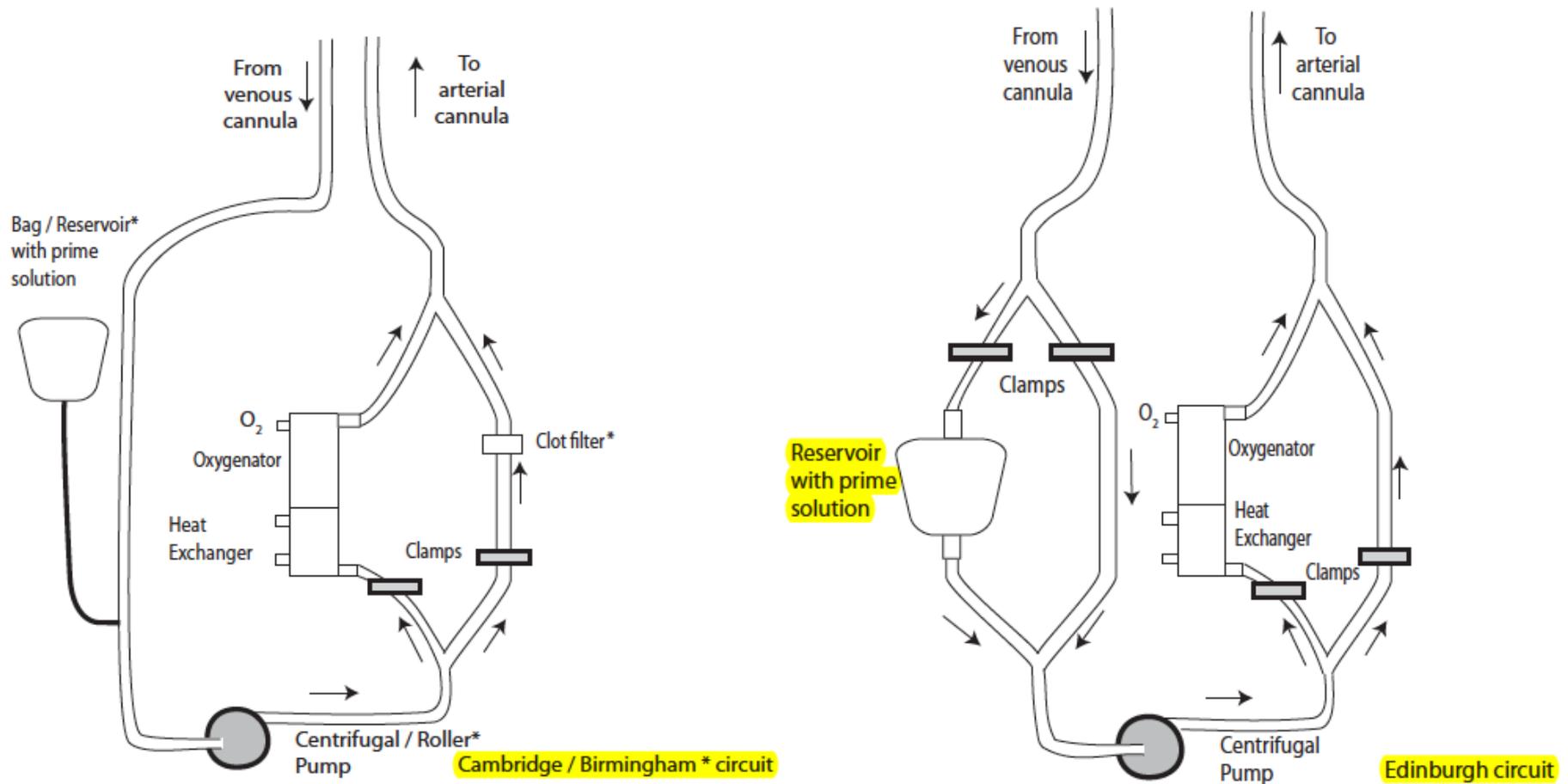
CANNULATION

Start 15:40 End 15:50

Controlled DCD



In Situ Normothermic Regional Perfusion for Controlled Donation After Circulatory Death—The United Kingdom Experience





How France launched its donation after cardiac death program^{☆☆☆}

Interactions avec le prélèvement d'organes : la question du M3, position de l'Agence de la biomédecine

C. Antoine^{a,*}, F. Mourey^b, E. Prada-Bordenave^c Steering committee on DCD program

^a Agence de la biomédecine, direction générale médicale et scientifique, direction prélèvement greffe organes-tissus, pôle stratégie prélèvement greffe, 1, avenue du Stade-de-France, 93212 Saint-Denis-la-Plaine cedex, France

^b Agence de la biomédecine, direction générale médicale et scientifique, direction prélèvement greffe organes-tissus, SRA Sud-Est/Océan Indien, bâtiment B, 162, avenue Lacassagne, 69424 Lyon cedex 03, France

^c Directrice générale, Agence de la biomédecine, 1, avenue du Stade-de-France, 93212 Saint-Denis-la-Plaine cedex, France

[Annales Françaises d'Anesthésie et de Réanimation 33 \(2014\) 138–143](#)

Controlled DCD started in December 2014

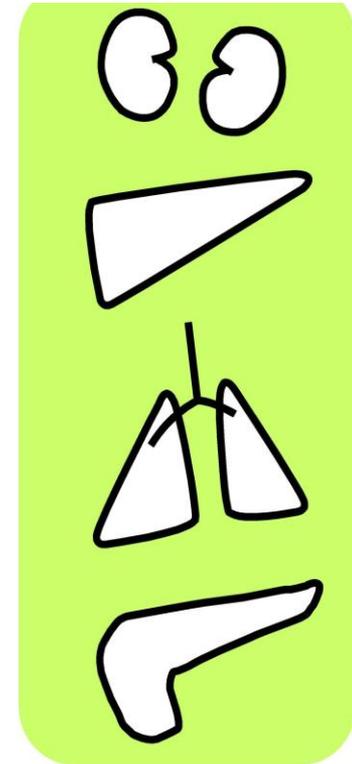
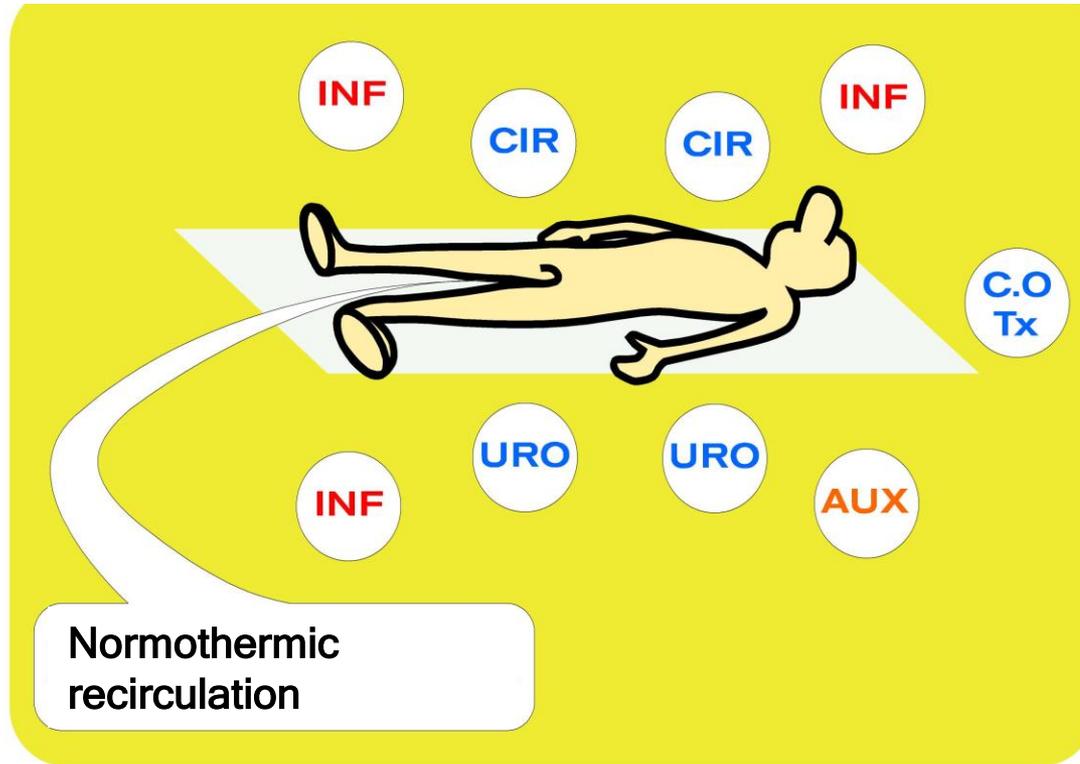
Initial french experience (3 Hospitals, 5 donors, 3 livers transplanted)

NRP mandatory (after CA, pre-catheterisation femoral vessels)

(Data courtesy of Corinne Antoine)

Operating Room

Retrieval



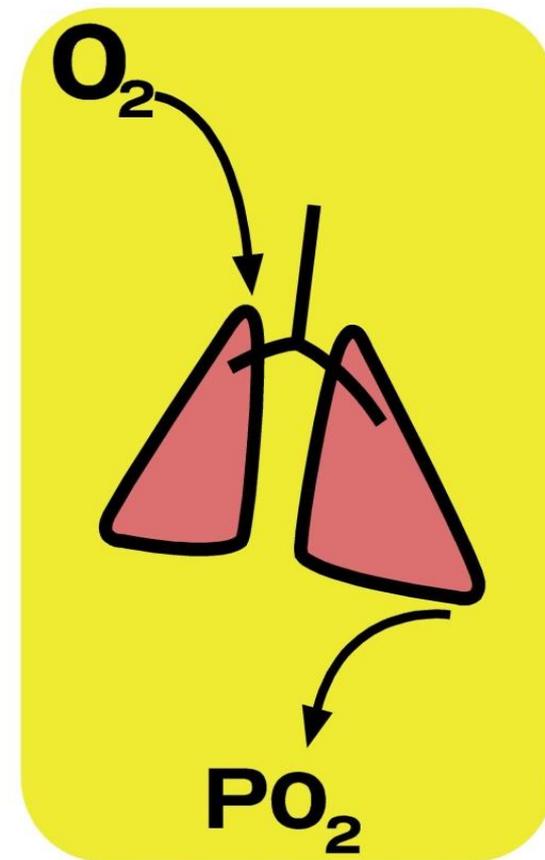
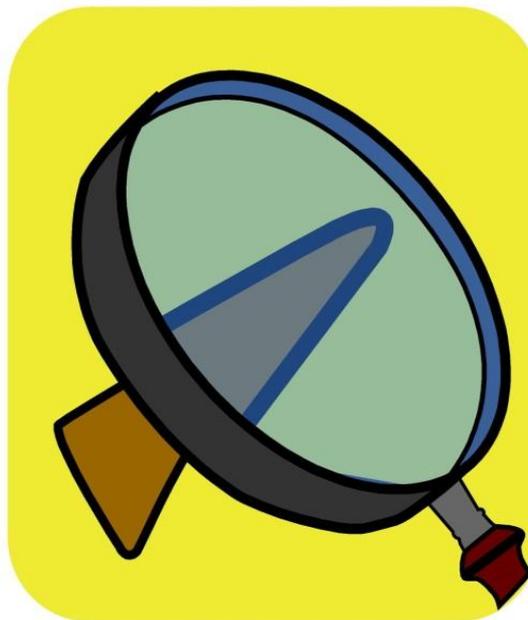
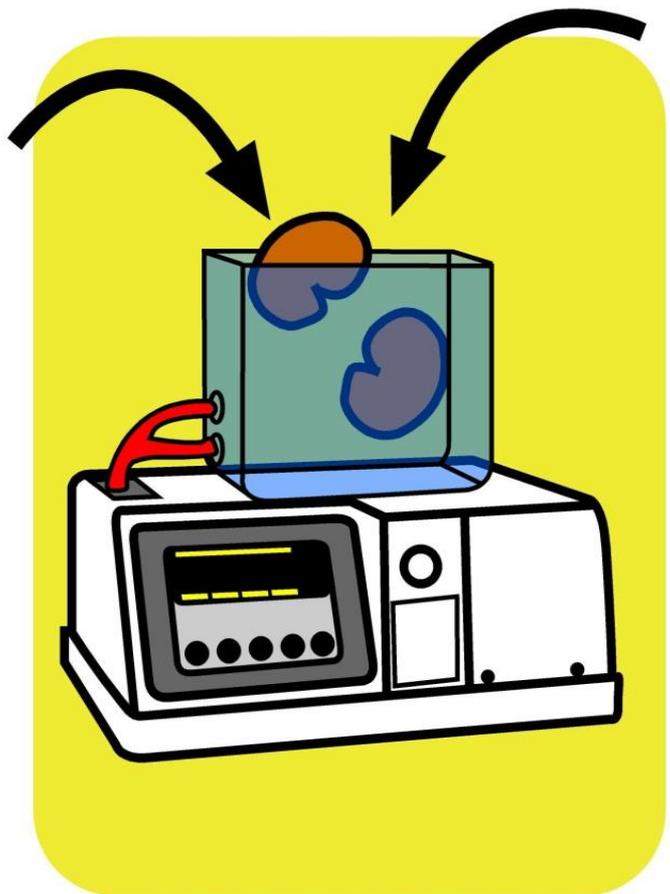
before < 4 hours of NRP

Time **enough to setup Transplantation**

“Slow” Organ Retrieval



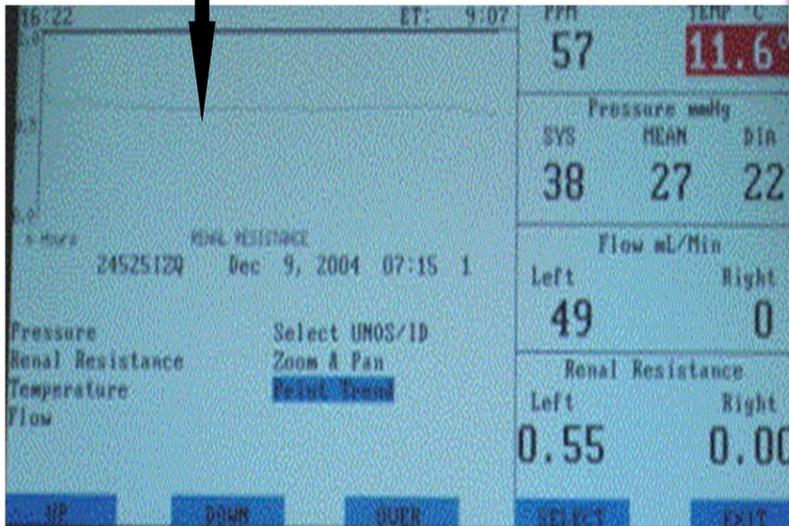
Viability



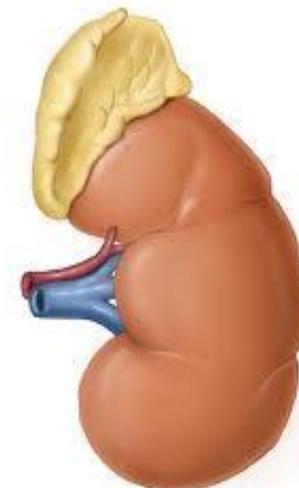
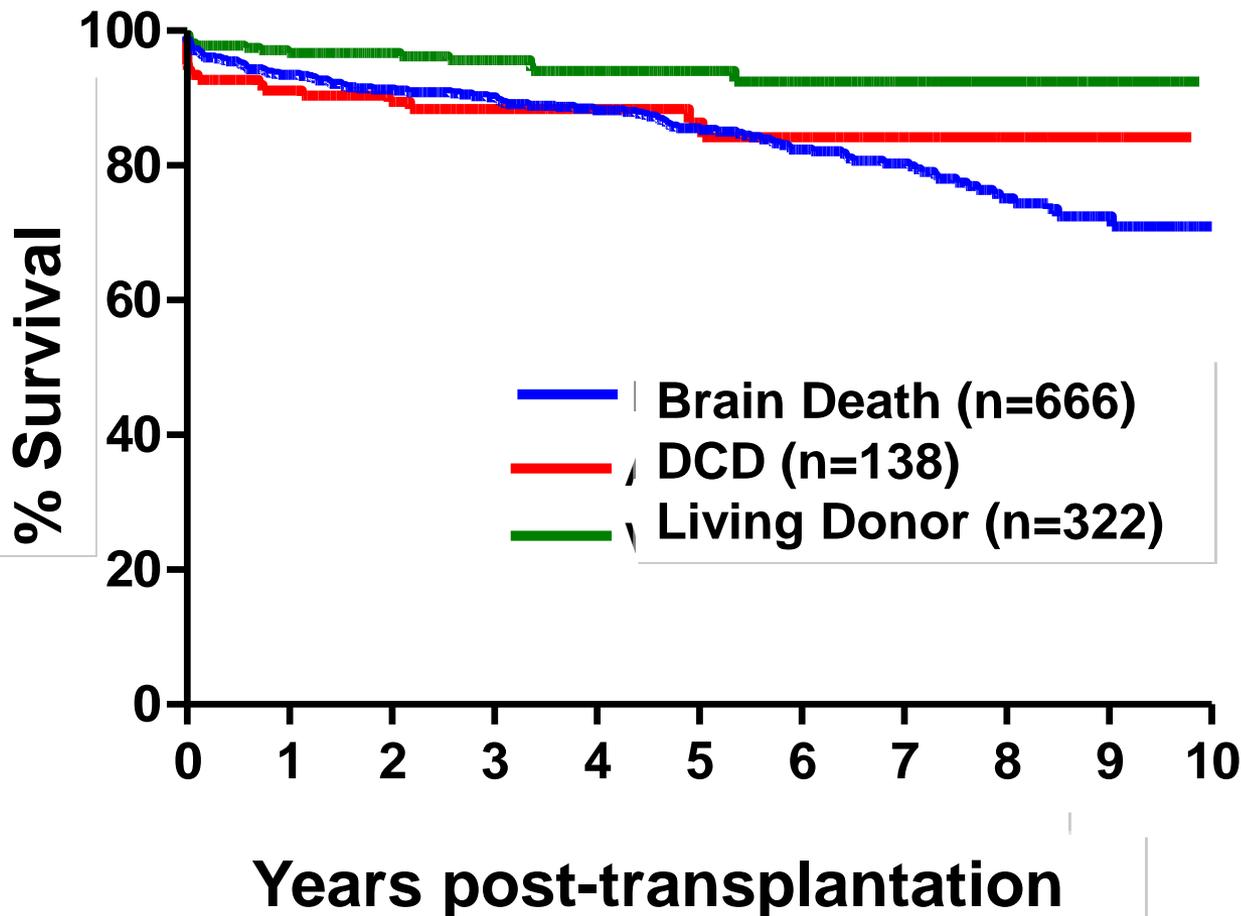
Organ validation – Allocation

Logistics – Recipients – Ischemia time

Kidney Machine Perfusion



Actual Survival of Graft (2002 – 2011)



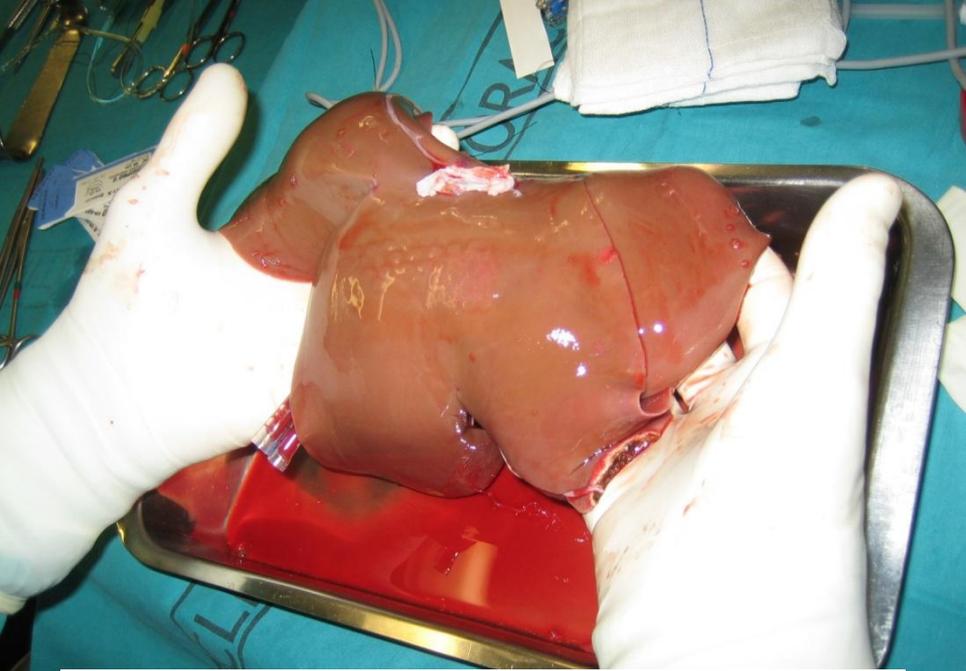
F. Oppenheimer



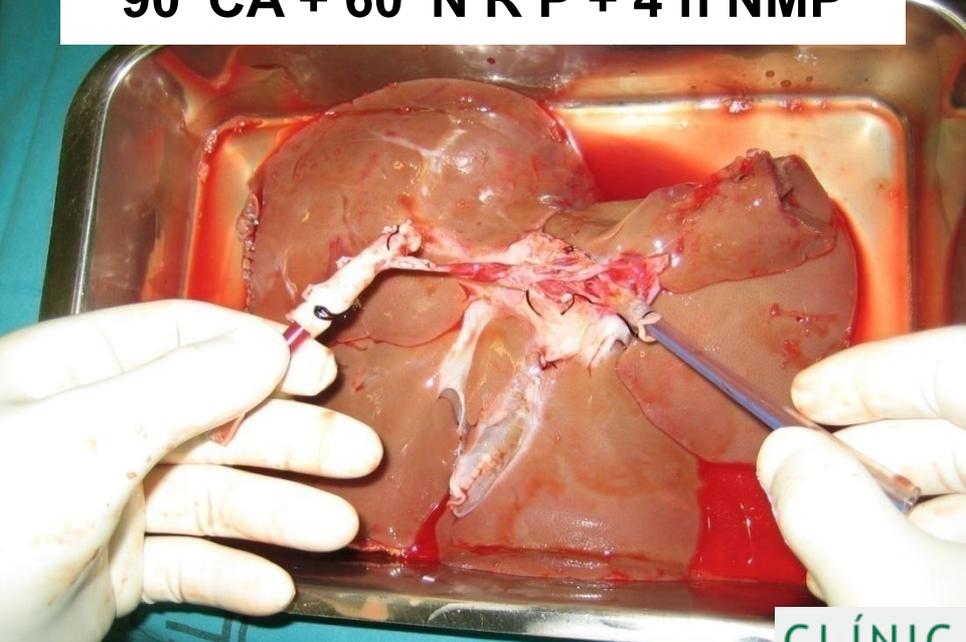
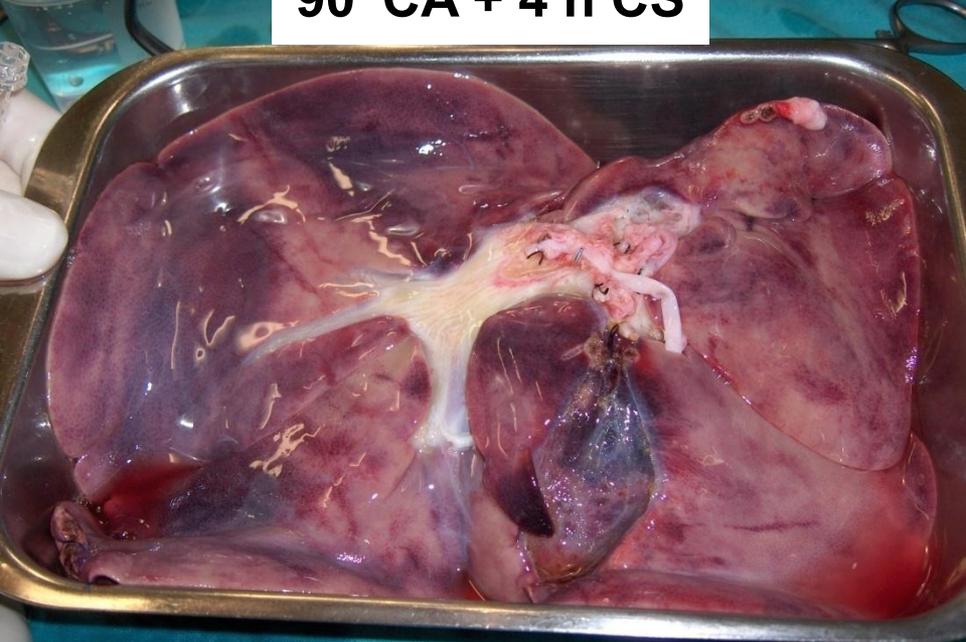
Courtesy of C.Fondevila



90' CA + 4 h CS



90' CA + 60' N R P + 4 h NMP



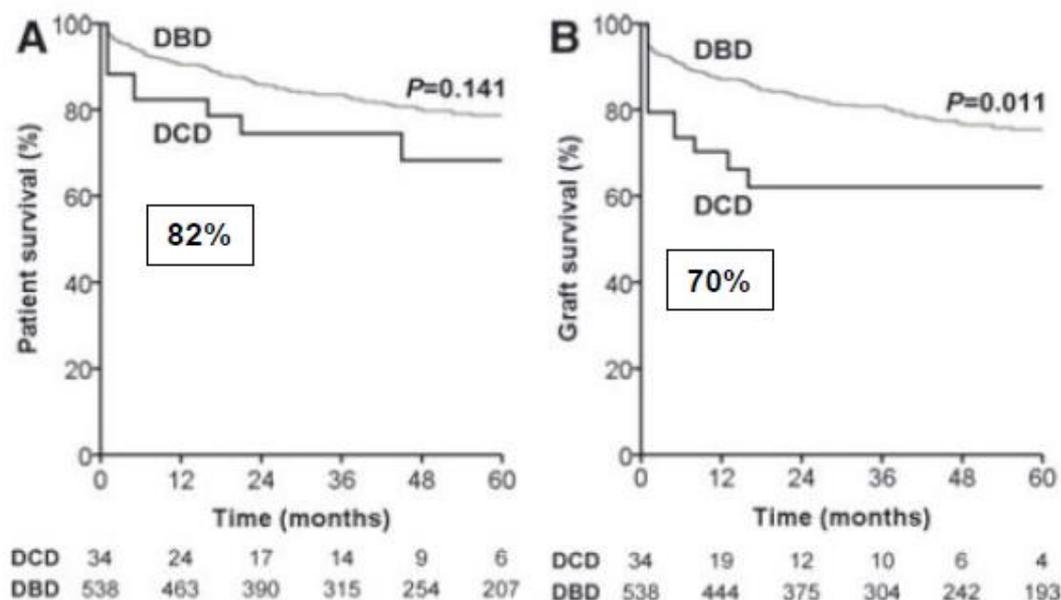
Courtesy of C.Fondevila

RESULTATS TRASPLANTAMENT HEPÀTIC

Applicability and Results of Maastricht Type 2 Donation After Cardiac Death Liver Transplantation

C. Fondevila^{a,*}, A. J. Hessheimer^a, E. Flores^a,
 A. Ruiz^b, N. Mestres^a, D. Calatayud^a, D. Paredes^b,
 C. Rodriguez^b, J. Fuster^a, M. Navasa^c,
 A. Rimola^c, P. Taurà^d and J. C. Garcia-Valdecasas^a

American Journal of Transplantation 2012; 12: 162–170



Mitjana seguiment: 24 mesos (r= 0-111)

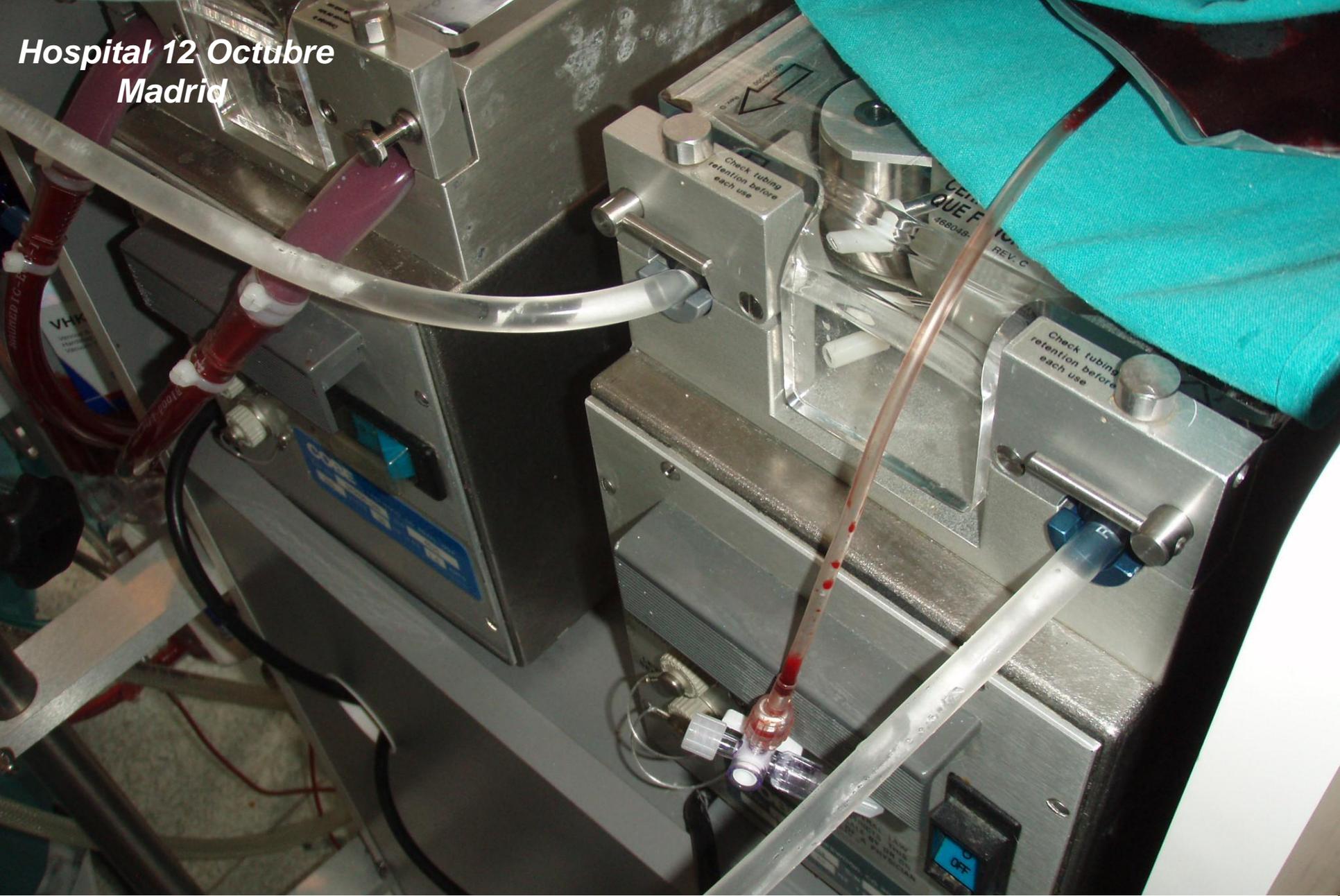
(Match de variables: sexo, edad, MELD score, IMC)

Hospital 12 Octubre
Madrid



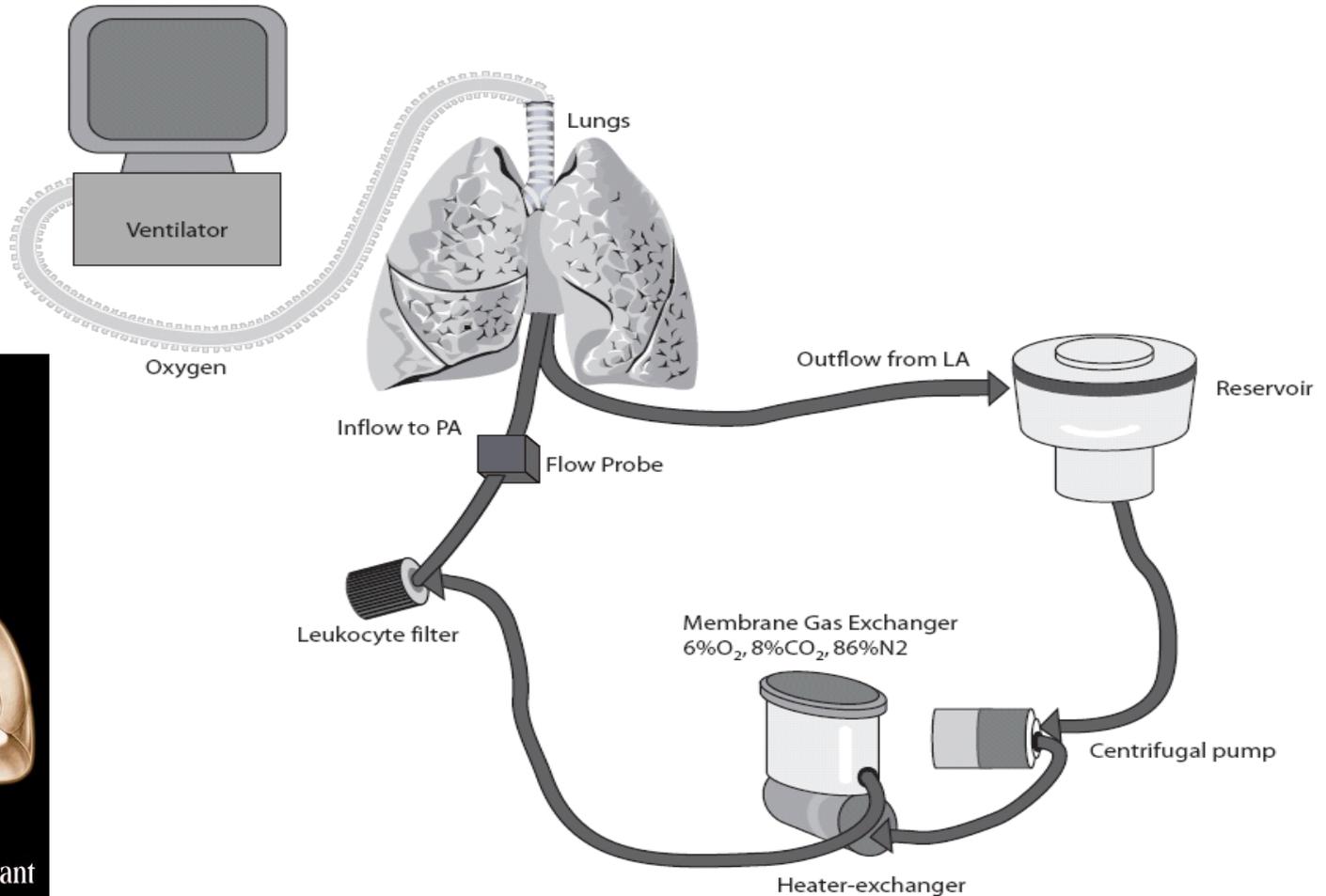
DCD Lung Preservation

Hospital 12 Octubre
Madrid



Dual Preservation

Normothermic Ex Vivo Lung Perfusion (EVLP)



Lancet. 2015 Jun 27;385(9987):2585-91.
Epub 2015 Apr 14



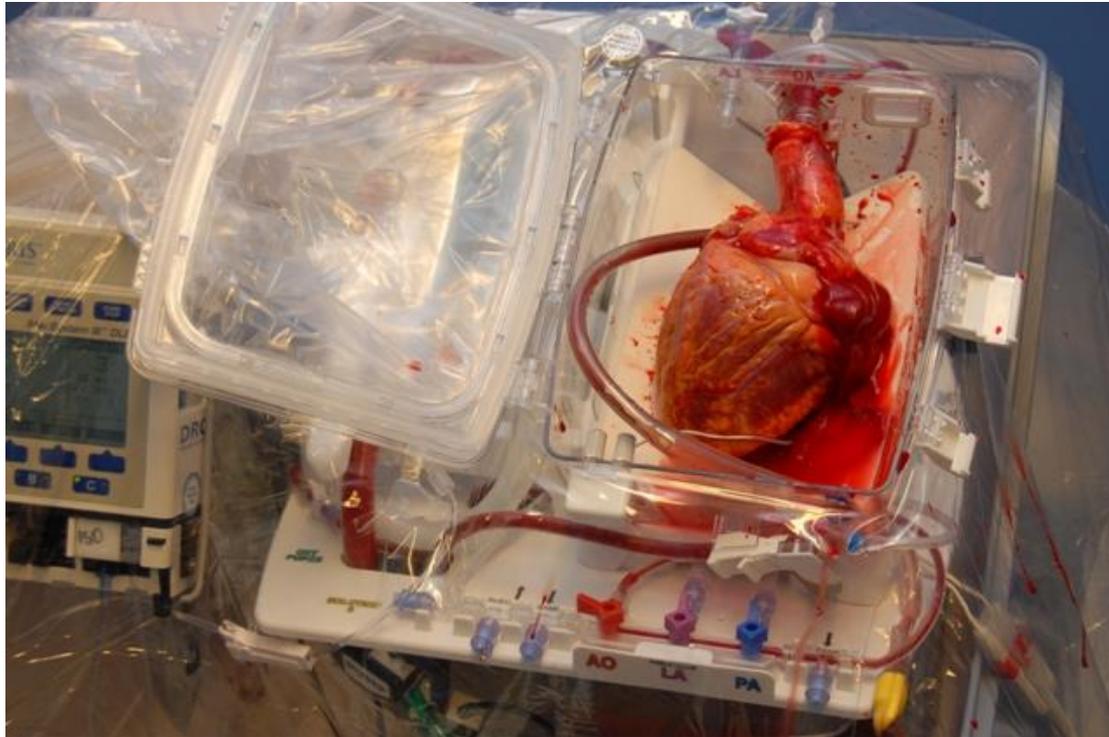
Articles

Adult heart transplantation with distant procurement and ex-vivo preservation of donor hearts after circulatory death: a case series

Kumud K Dhital, FRCS-CTh  , Arjun Iyer, MBBS, Mark Connellan, FC Cardio (SA), Hong C Chew, MS, Ling Gao, PhD, Aoife Doyle, MEngSc, Mark Hicks, PhD, Gayathri Kumarasinghe, FRACP, Claude Soto, MSc, Andrew Dinale, BAppSc, Bruce Cartwright, MBBS, Priya Nair, FCICM, Emily Granger, MBBS, Paul Jansz, PhD, Andrew Jabbour, PhD, Eugene Kotlyar, MD, Prof Anne Keogh, MBBS, Prof Christopher Hayward, MD, Prof Robert Graham, MD, Phillip Spratt, FRACS, Prof Peter Macdonald, MD

Published Online: 14 April 2015

Heart Perfusion Machines



Increase Tolerance of DCD Hearts Warm Ischemia Time
 Normothermic Perfusion vs Static storage and cardioplegia
 Ex vivo viability assessment
 Transportation
 Expand Criteria for Marginal hearts

-----Mensaje original-----

De: Peter Macdonald [mailto:Peter.Macdonald@svha.org.au]

Enviado el: lunes, 29 de febrero de 2016 21:47

Para: Martí Manyalich

Asunto: RE: Peter Macdonald - possible Sabbatical in Barcelona Sep-Nov 2016

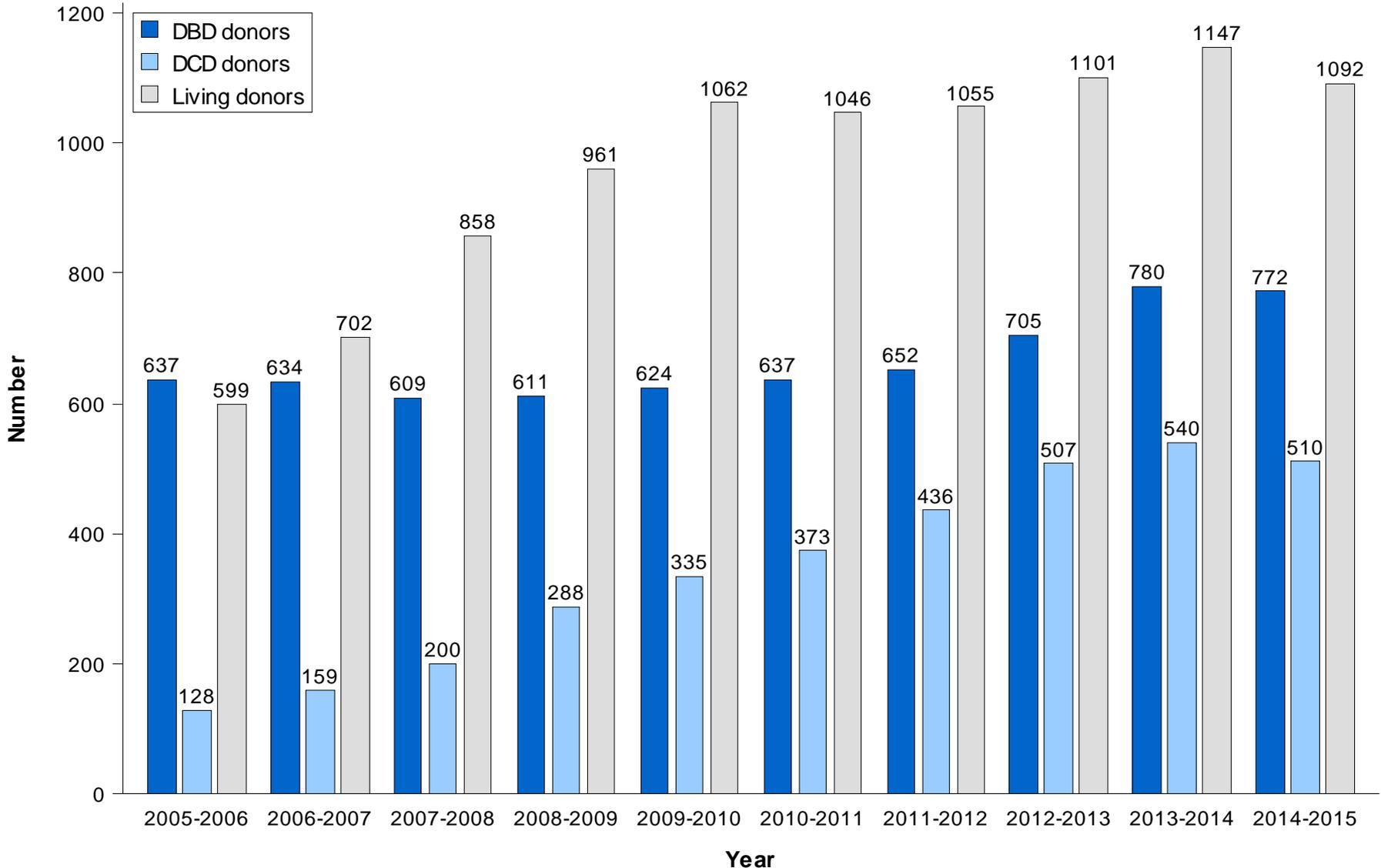
Hi Marti,

We have now completed 8 DCD heart transplants so far with good results. Our most recent DCD Tx involved a retrieval from Darwin more than 3000 km from Sydney and 4 hours of air travel time. The total transport time was about 7 hours with 6 hours on the Transmedics. The heart worked well immediately with no need for early support.

Regards

Peter

Number of deceased and living donors in the UK, 1 April 2005 - 31 March 2015



1,961 Consenting organ donors in the uk

Brain death



804 Proceeding after brain death

51 Median Age



2,721 Organs transplanted

Circulatory death



505 Proceeding after cardiac death

56 Median Age



1,104 Organs transplanted

U.S. Growth In Donation after Cardiac Death 1995 – 2015



In 2015, DCD donors provided 2,876 life-saving organ transplants

Source: Based on OPTN data through December 31, 2015. Data subject to change due to future data submission or correction.

14 OPOs Recovering > 35 DCDs: 2015

OPO	Deceased Donors	DCD Donors	% DCD
New England Organ Bank (CT, MA, ME, NH, RI, VT)	282	85	30%
Gift of Life Donor Program (DE, NJ, PA)	483	83	17%
Gift of Life Michigan (MI)	285	74	26%
Gift of Hope Organ & Tissue Donor Network (IL & IN)	379	73	19%
OneLegacy (CA)	460	60	13%
LifeCenter Northwest (AK, ID, MT, WA)	200	50	25%
Midwest Transplant Network (KS & MO)	200	47	24%
LifeGift Organ Donation Center (TX)	283	46	16%
LifeShare Transplant Donor Services of Oklahoma (OK)	174	42	24%
Donor Network of Arizona (AZ)	166	39	23%
LifeSource Upper Midwest (MN, ND, SD & WI)	154	39	25%
Carolina Donor Services (NC & VA)	159	36	23%
Pacific Northwest Transplant Bank (OR, ID & WA)	120	36	30%
Center for Organ Recovery and Education (NY, PA & WV)	207	36	17%

14 of 58 OPOs (24%) recovered 746 of the 1,494 DCDs (50%)

*Courtesy of H. Nathan
Gift of Life*

Hospital Clinic Barcelona

Idea and Development

- *Prof. Kootstra Visit 1985*
- *Program STARTS 1986*

Pioneers Hospital Clínic



Conseller Laporte. SCEM
S. Ferrandiz, M.Manyalich...



F. Oppenheimer
Kidney Transplant Unit

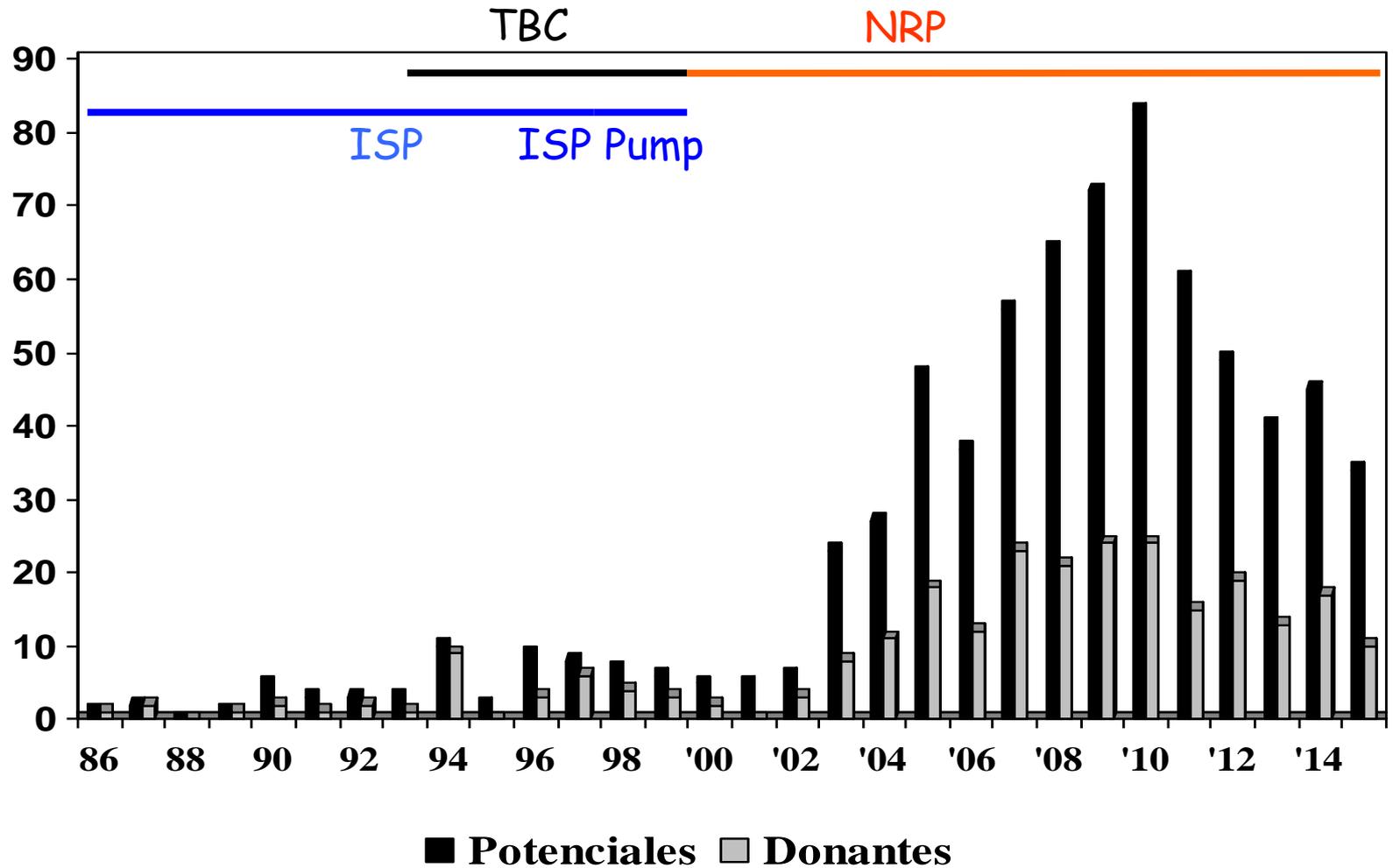


R.Gutierrez and A. Alcaraz
Urology Unit



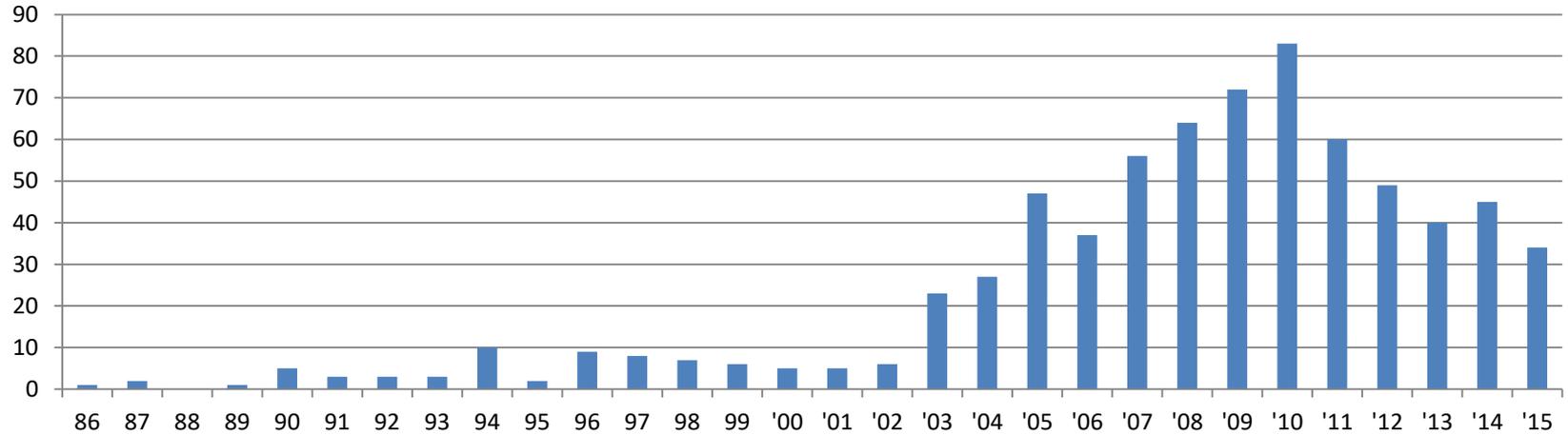
J.C. Garcia Valdecasas
Liver Transplant Unit

Uncontrolled DCD. Hospital Clinic . 1986 - 2015



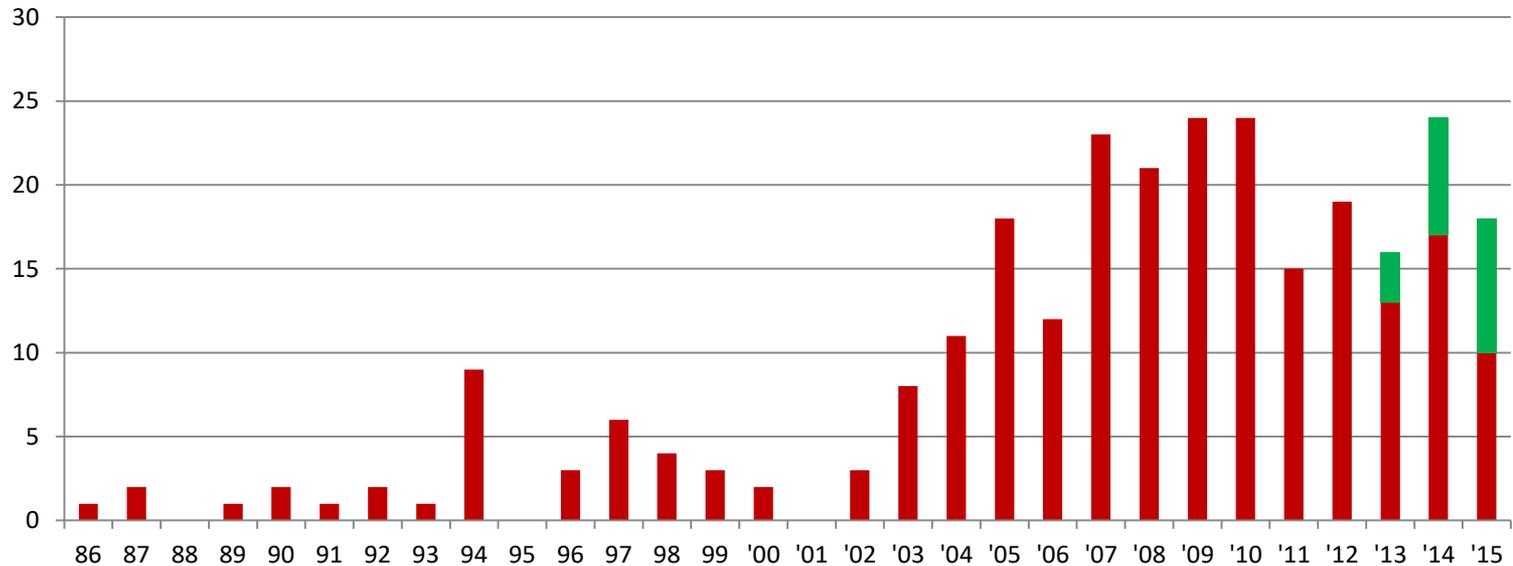
HOSPITAL CLINIC DCD ACTIVITY 1986- 2015

Potential DCD



Controlled DCD

Uncontrolled DCD



TPM participants: 13034 from 105 countries (1991-2016)

6795 **936**

- | | | | |
|------------|-----------|-------------|-------------|
| Albania | Estonia | Malta | Slovenia |
| Andorra | Finland | Moldova | Spain |
| Austria | France | Montenegro | Sweden |
| Belarus | Germany | Netherlands | Switzerland |
| Belgium | Greece | Norway | Ukraine |
| Bosnia | Hungary | Poland | UK |
| Bulgaria | Ireland | Portugal | |
| Croatia | Italy | Romania | |
| Cyprus | Latvia | Russia | |
| Czech. Rep | Lithuania | Slovak Rep. | |
| Denmark | Macedonia | Serbia | |

1877 **246**

- | | |
|-------------|----------|
| Bangladesh | Taiwan |
| Brunei | Thailand |
| China | Vietnam |
| Hong Kong | Yemen |
| India | |
| Japan | |
| Malaysia | |
| Myanmar | |
| Pakistan | |
| Philippines | |
| Singapore | |
| South Korea | |
| Sri Lanka | |

2032 **862**

- Canada
USA

- Costa Rica
Cuba
Dominican Rep.
El Salvador
Guatemala

- Honduras
Mexico
Panama
Puerto Rico
Nicaragua

185 **162**

- | | |
|--------------|----------|
| Algeria | Eritrea |
| Egypt | Ethiopia |
| Kenya | Sudan |
| La Reunion | |
| Libya | |
| Morocco | |
| South Africa | |
| Tunisia | |

- | | |
|---------|--------------|
| Bahrain | Palestine |
| Iran | Qatar |
| Israel | Saudi Arabia |
| Jordan | Syria |
| Kuwait | Turkey |
| Lebanon | UAE |
| Oman | |

- Argentina
Bolivia
Brazil
Chile
Colombia
Ecuador

- Paraguay
Peru
Trinidad & Tobago
Uruguay
Venezuela

100 **76**

- Australia
New Caledonia
New Zealand
Tahiti

10989 FACE-TO-FACE LEARNING MODALITY
2282 E-LEARNING/BLENDED MODALITY

TPM

DCD Training

**Advanced TPM Training
2000-2016**

**ESOT/EDTCO Congress
2013-2014**

**DCD Workshop Barcelona
(2013 , 2014 , 2016 x 2)**

**Workshops in Lebanon
(2015) and Cardiff,
Lithuania & Amman (2016)**



25
years
TPM
1991-2016

*Transplant
Procurement
Management*

TPM ICU Doctors Spain Training in Controlled DCD



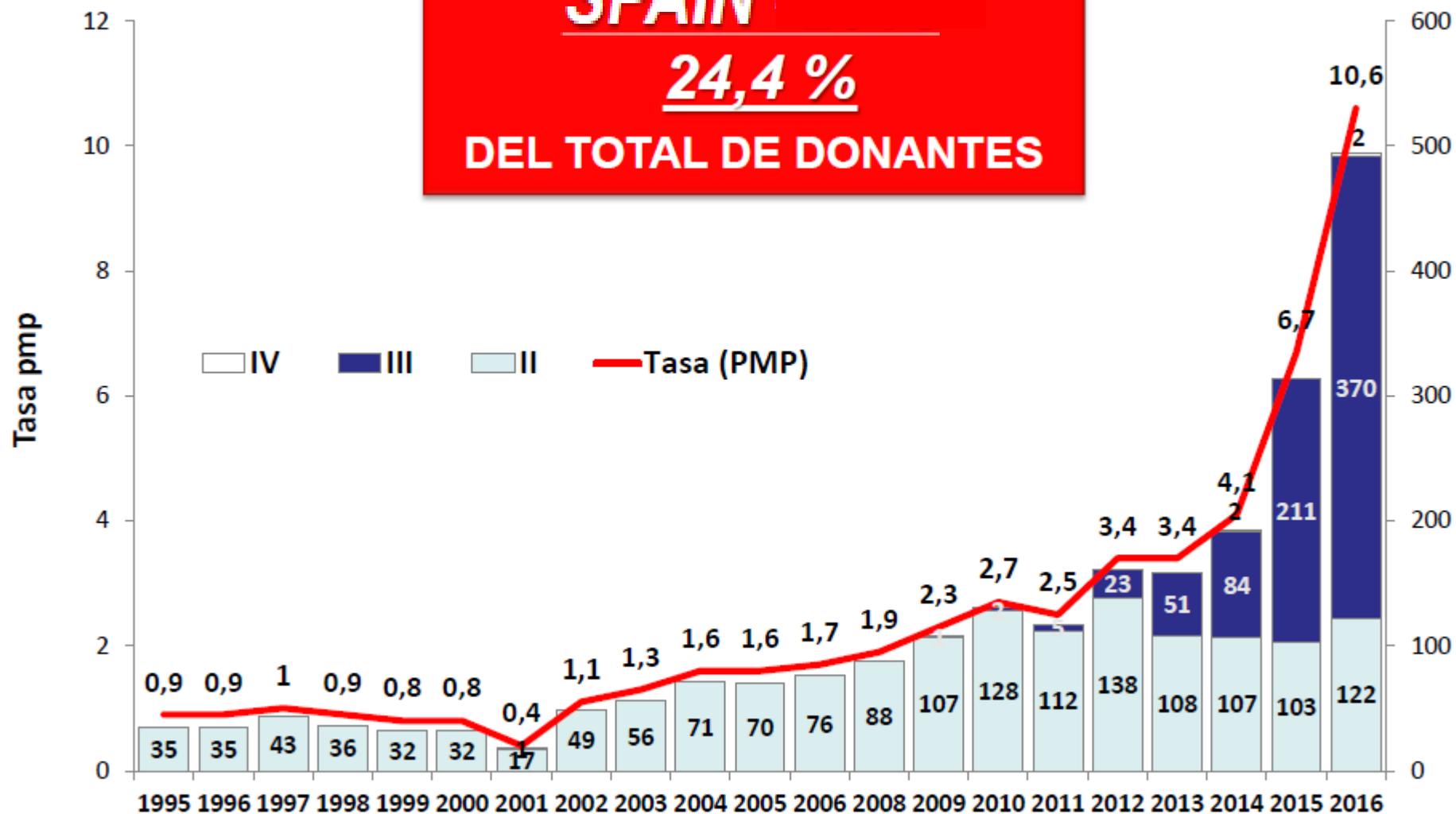
A Coruña 15-17 October 2013



DCD DONORS IN SPAIN

24,4 %

DEL TOTAL DE DONANTES



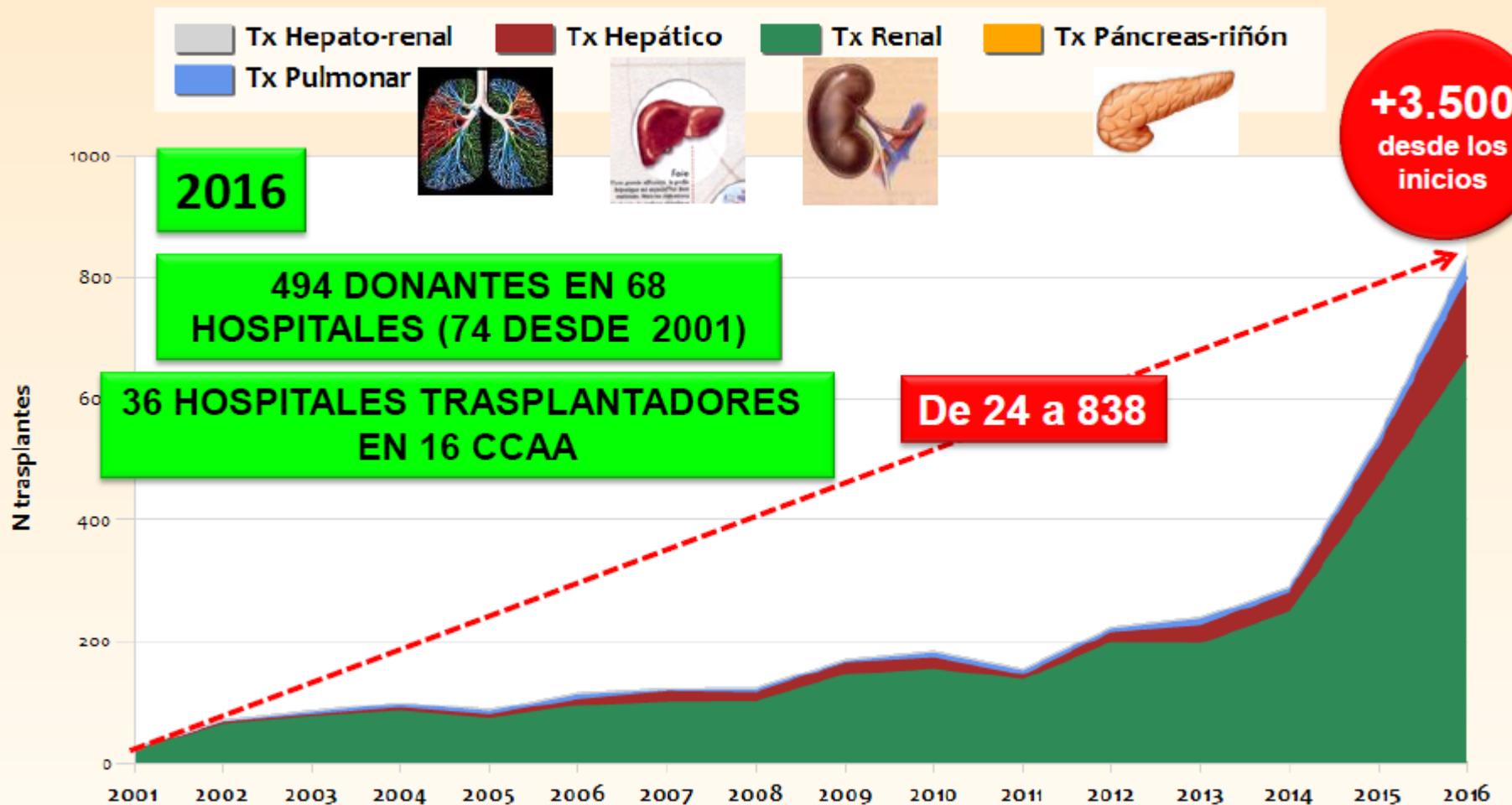


GOBIERNO DE ESPAÑA

MINISTERIO DE SANIDAD, SERVICIOS SOCIALES E IGUALDAD

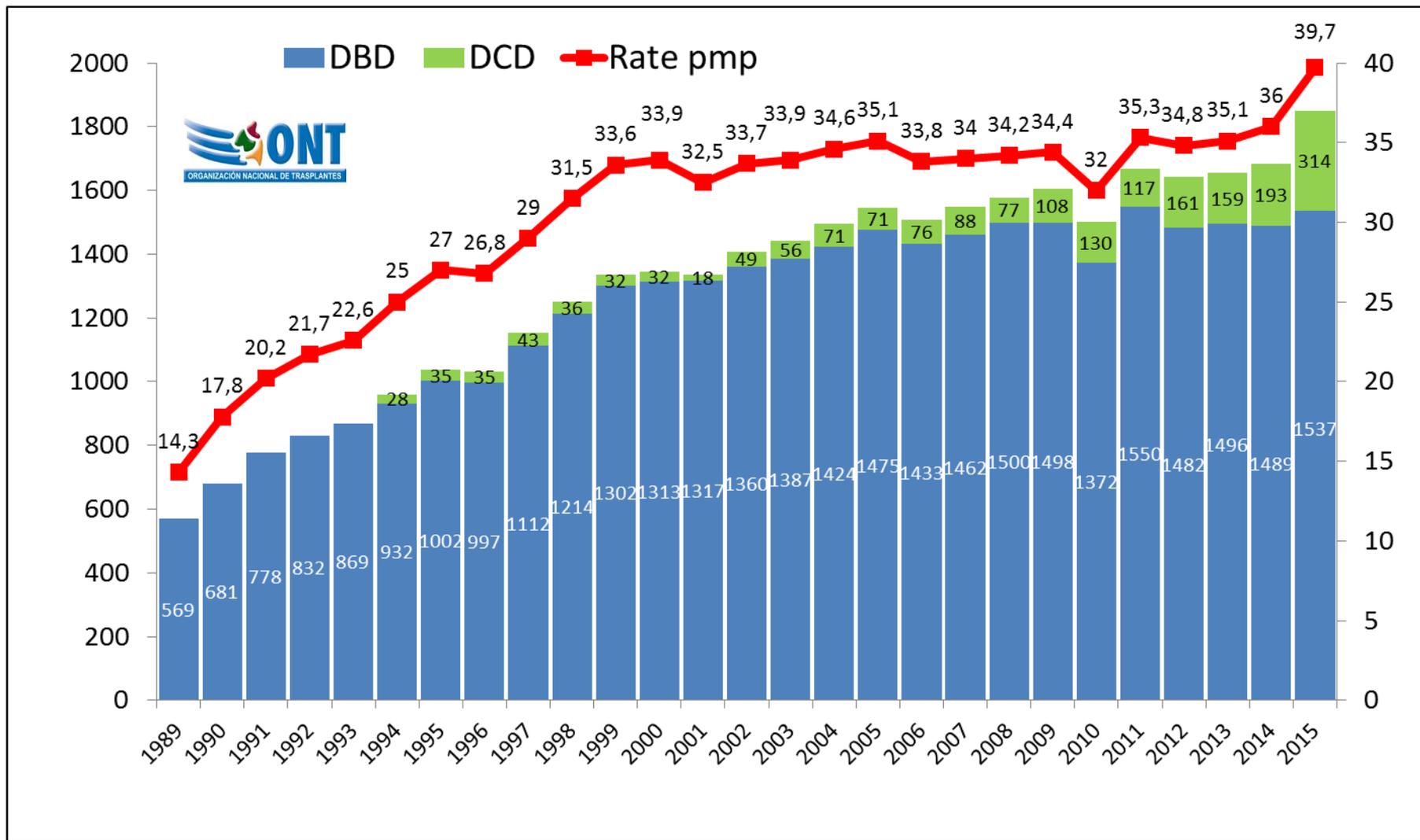


SOLID ORGAN TRANSPLANTS IN SPAIN FROM DCD DONORS: 2001-2016



Cadaveric organ donation according to the type of donor (DBD and DCD)

62

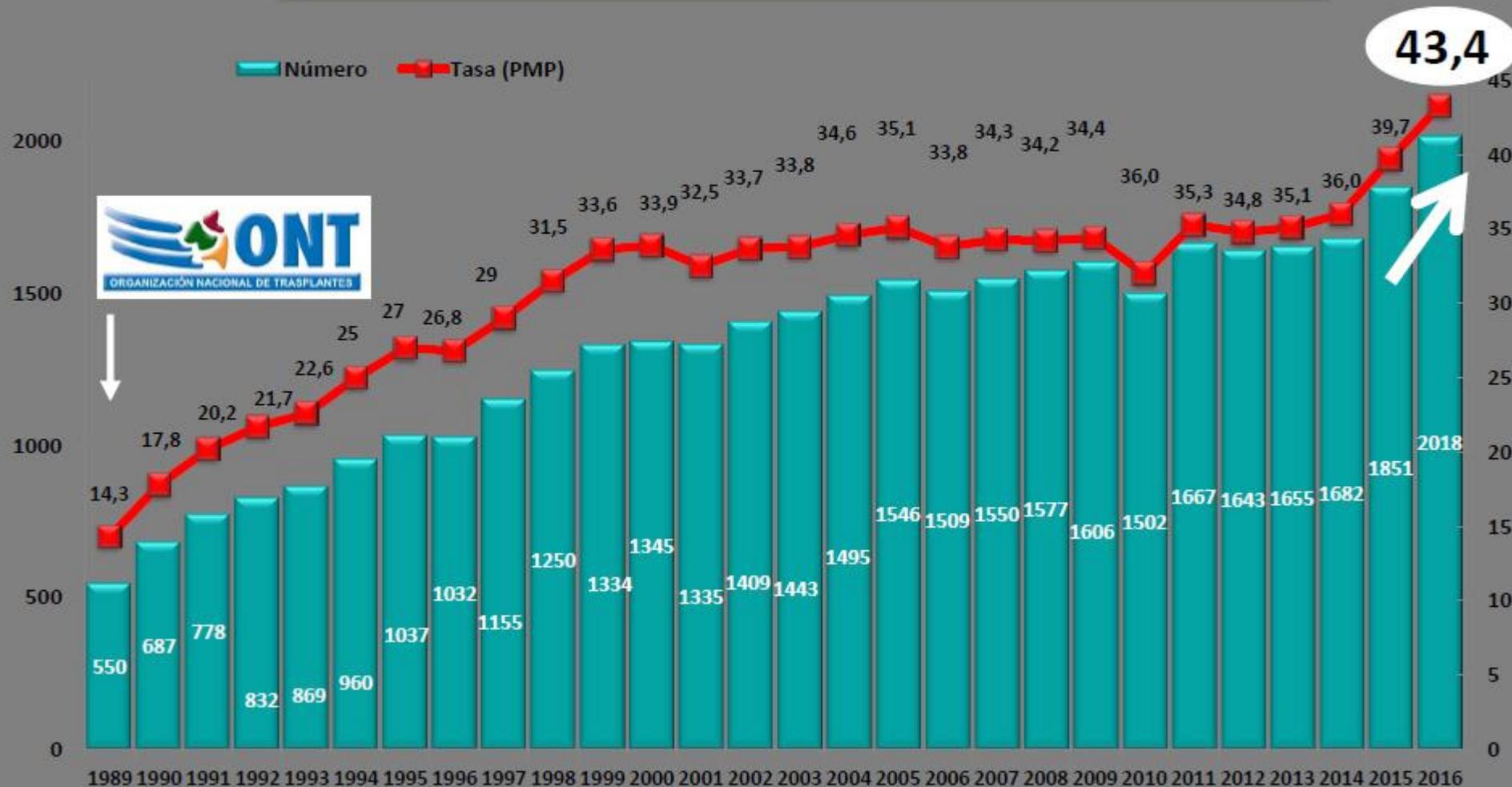




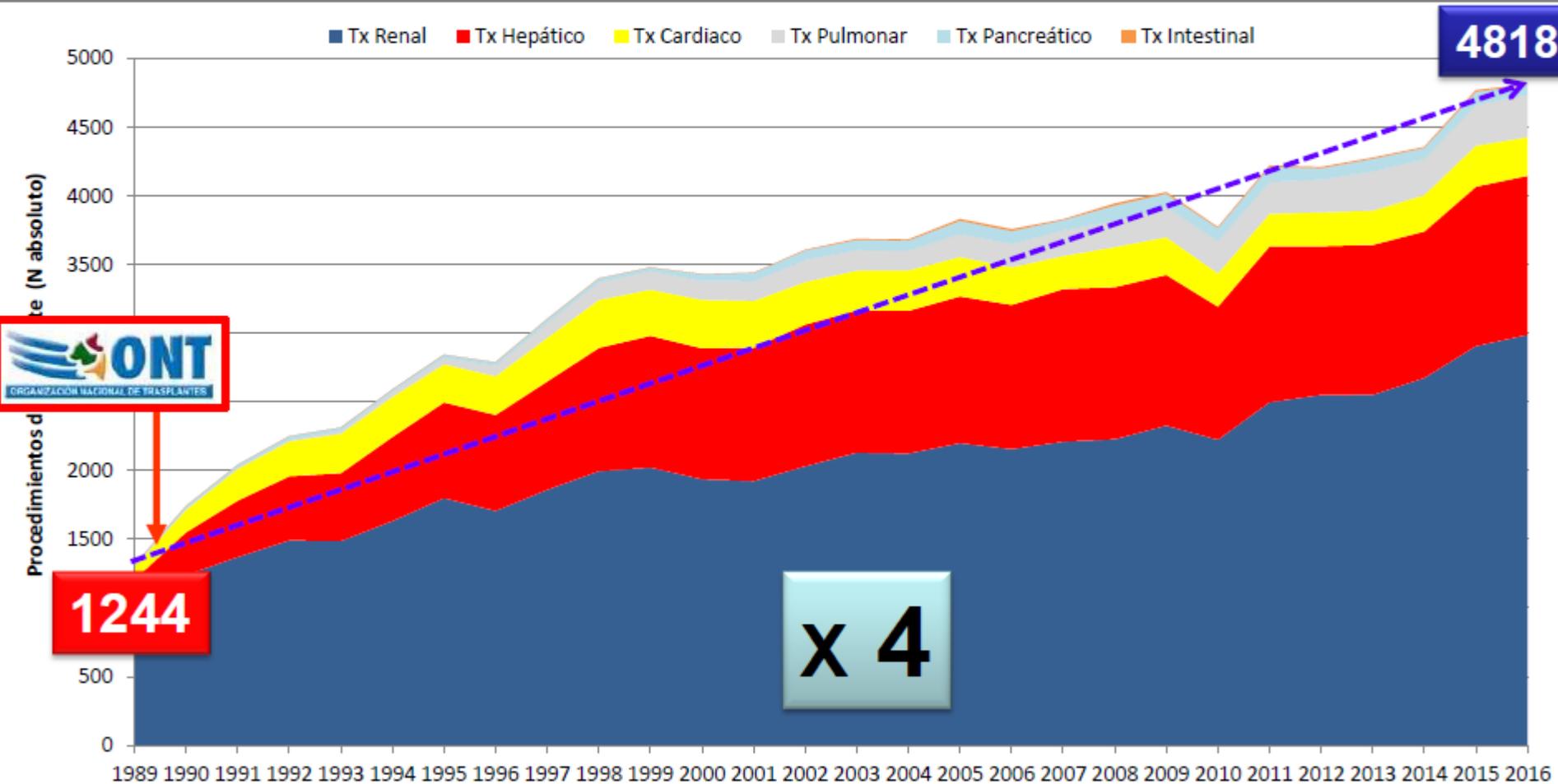
ORGAN DONORS IN SPAIN SINCE THE START OF O.N.T.

550

2018



ORGAN TRANSPLANTS IN SPAIN 1989-2016 (total number)



WAITING LIST EVOLUTION

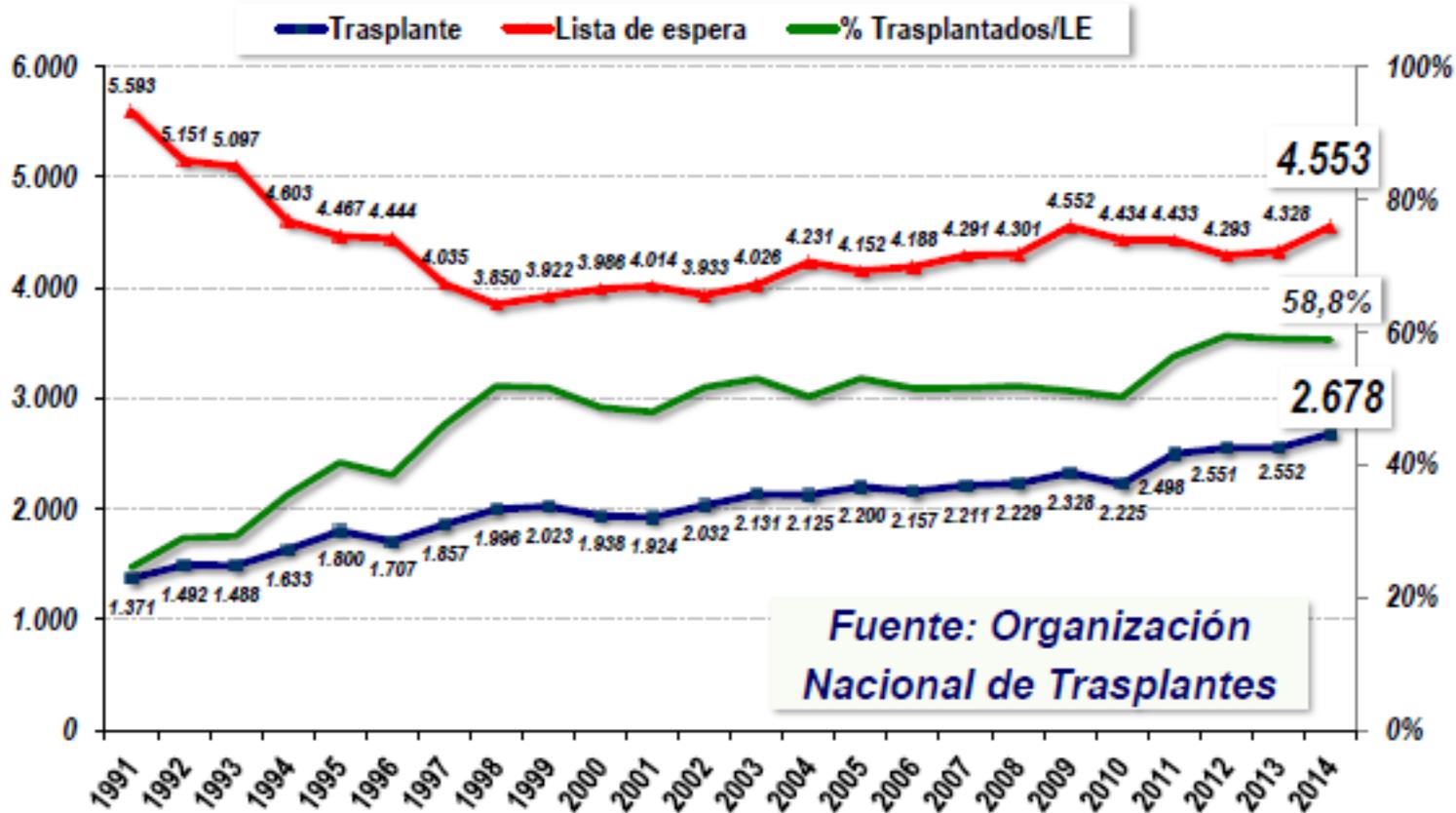
Incidencia

Prevalencia

Trasplante

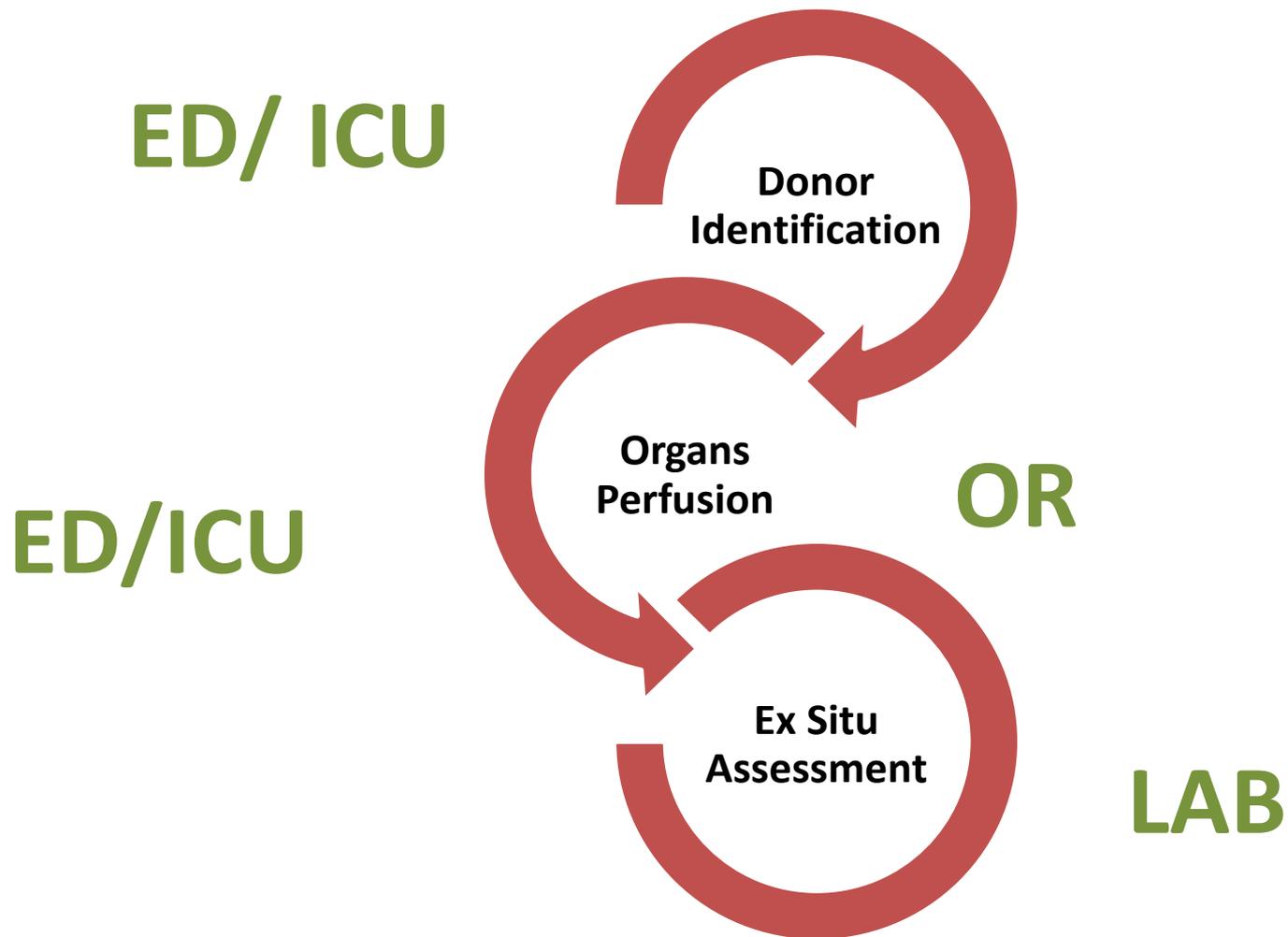
Mortalidad

Supervivencia



Fuente: Organización
Nacional de Trasplantes

DCD - PROCEDURES



Conclusions

- 1. Death potential in all the countries**
- 2. Social, Religious and Legal accepted death Diagnosis Practices**
- 3. System possible to implement in all countries**
- 4. Excellent results of kidney survival**
- 5. Cost/Benefice compared with dialysis**



Gràcies

Gracias

Thank You

謝謝

ありがとうございます

Hvala lijepa

Tack så mycket

Teseukur ederim

Merci

Bedankt

Danke

ευχαριστώ

Teseukur ederim



Geneva 6-9 September 2017



Geneva 2017

Organ Donation Congress

14th Congress of
The International Society for
Organ Donation and Procurement

September 6-9 | Geneva, Switzerland | www.isodp2017.org

