Donors after circulatory death or Non-heart-beating Asystolic or donors after cardiac death

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Objects

Introduction

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- Types of organ donors
- Introduction
- The process of controlled DCD
- Definitions of terms in the process of controlled DCD
- Pathway for the offering of DD kidneys in the UK
- Early Graft Dysfunction in Controlled DCD
- Unadjusted death-censored graft survival for DD kidney transplantation in the UK
- Factors Associated with Transplant Outcome in Recipients of DCD Kidneys
- Some Statistics from MESOT 2025

Types of Organ Donors

- DECEASED DONORS
  - **Donation after Brain Death**
    - Most donors (>70%)
  - **Donation After Circulatory Death**
    - < 30% of donors

…But this is changing. In 2024 65% of the livers at MCF have been from DCD donors

- LIVING DONORS
  - Possibility of donor morbidity/mortality
  - Not all people are candidates

References

Review Article

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Organ donation after controlled circulatory death (Maastricht classification III) following the withdrawal of life-sustaining treatment in Korea: a suggested guideline

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Definitions

Criteria	Determination of death
Neurologic	Diagnosis & confirmation of death based on the irreversible cessation of functioning in the entire brain, including the brainstem
Circulatory	Diagnosis & confirmation of death based on the irreversible cessation of circulation followed by cardiac arrest, cardiocirculatory arrest, & respiratory arrest

Introduction

- The US & European countries, including Spain & the UK, have been implementing DCD since **1980–2000**.
- According to a report published in 2019, DCD is being implemented in **18 of 37** European countries.
- In 2018, the proportion of DCD against overall donors increased by 28%, 19.9%, & 38.8% in Spain, the US, & the UK, respectively.

References

GUEST EDITORIAL

J Nepal Med Assoc 2024;62(270):62-3

OPEN ACCESS

doi: 10.31729/jnma.8437

Circulatory Death and Organ Donation

Badri Man Shrestha[1]

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To address the global shortage of organs for transplantation, donors after circulatory death (DCD) are being increasingly utilised as an invaluable source of organs such as kidney, liver, heart, lungs and pancreas. DCDs are critically ill hospitalised patients, who do not fulfil the brain-stem death criteria and withdrawal of life-sustaining treatment (WLST) is considered because of expected futile outcomes of continued treatment.[1] The diagnosis of circulatory death is confirmed by the permanent absence of in the operation theatre and awaiting circulatory arrest (asystole) to occur. Before death is confirmed, five minutes of observation is carried out after the asystole to confirm irreversible cardio-respiratory arrest, which is confirmed by the isoelectric line in the electrocardiogram tracing and the absence of blood pressure in the arterial line. The time allowed from WLST to asystole is accepted as 2 hours for the kidney and 1 hour for the liver and pancreas. This is extended to a further 2 hours for the kidney, and 30 minutes for

Introduction

- The concept of DCD was introduced by Kootstra et al. in **Maastricht**, Netherlands. These donors are classified as:
  - **Uncontrolled donors**:
    - Category 1: brought in dead
    - Category 2: unsuccessful resuscitation
    - Category 5: cardiac arrest in a hospitalized patient
  - **Controlled donors**:
    - Category 3: awaiting cardiac arrest
    - Category 4: cardiac arrest after brain-stem death

Shrestha BM. J Neph Med Assoc.2024

References

http://www.kidney-international.org review

Kidney donation after circulatory death (DCD): state of the art

Dominic M. Summers[1,2], Christopher J.E. Watson[1], Gavin J. Pettigrew[1], Rachel J. Johnson[2], David Collett[2], James M. Neuberger[2] and J. Andrew Bradley[1,3]

[1]Department of Surgery, School of Clinical Medicine, University of Cambridge, Cambridge, UK; [2]Organ Donation and Transplantation, NHS Blood and Transplant, Bristol, UK and [3]NIHR Cambridge Biomedical Research Centre, Addenbrooke's Hospital, Cambridge, UK

The use of kidneys from controlled donation after circulatory death (DCD) donors has the potential to markedly increase kidney transplants performed. However, this potential is not being realized because of concerns that DCD kidneys are inferior to those from donation after brain-death (DBD) donors. The United Kingdom has developed a large and successful controlled DCD kidney transplant program that has allowed for a substantial increase in kidney transplant

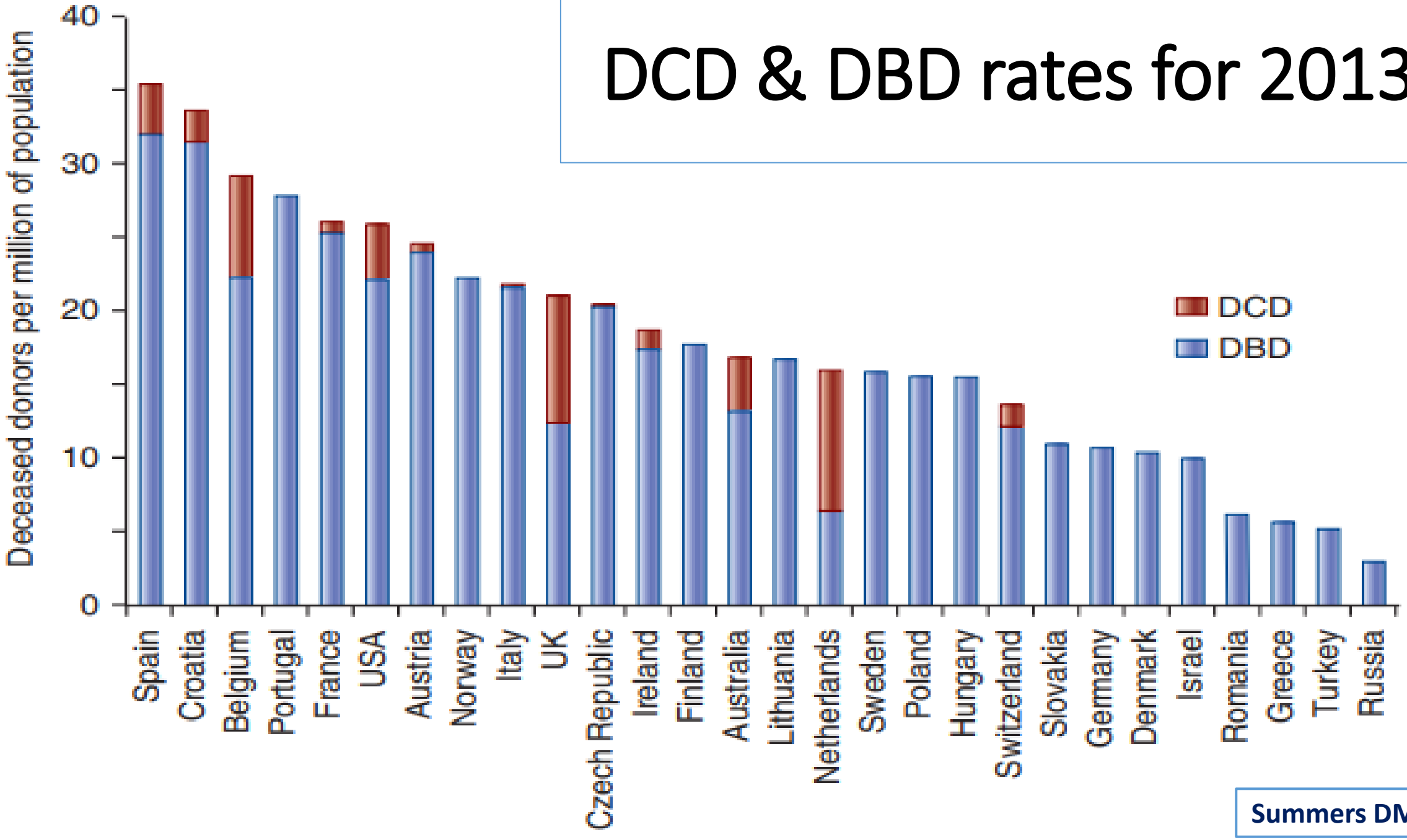
Kidney transplantation is the optimal treatment for selected patients with end-stage kidney failure, but the severe shortage of deceased donor kidneys for transplantation means that patients often have a long and uncertain wait for transplantation.[1,2] In the United Kingdom, the average waiting time for a deceased donor kidney transplant is over 3 years, and 12% of listed patients die or are removed from the waiting list owing to ill health within 3 years of listing.[3]

Introduction

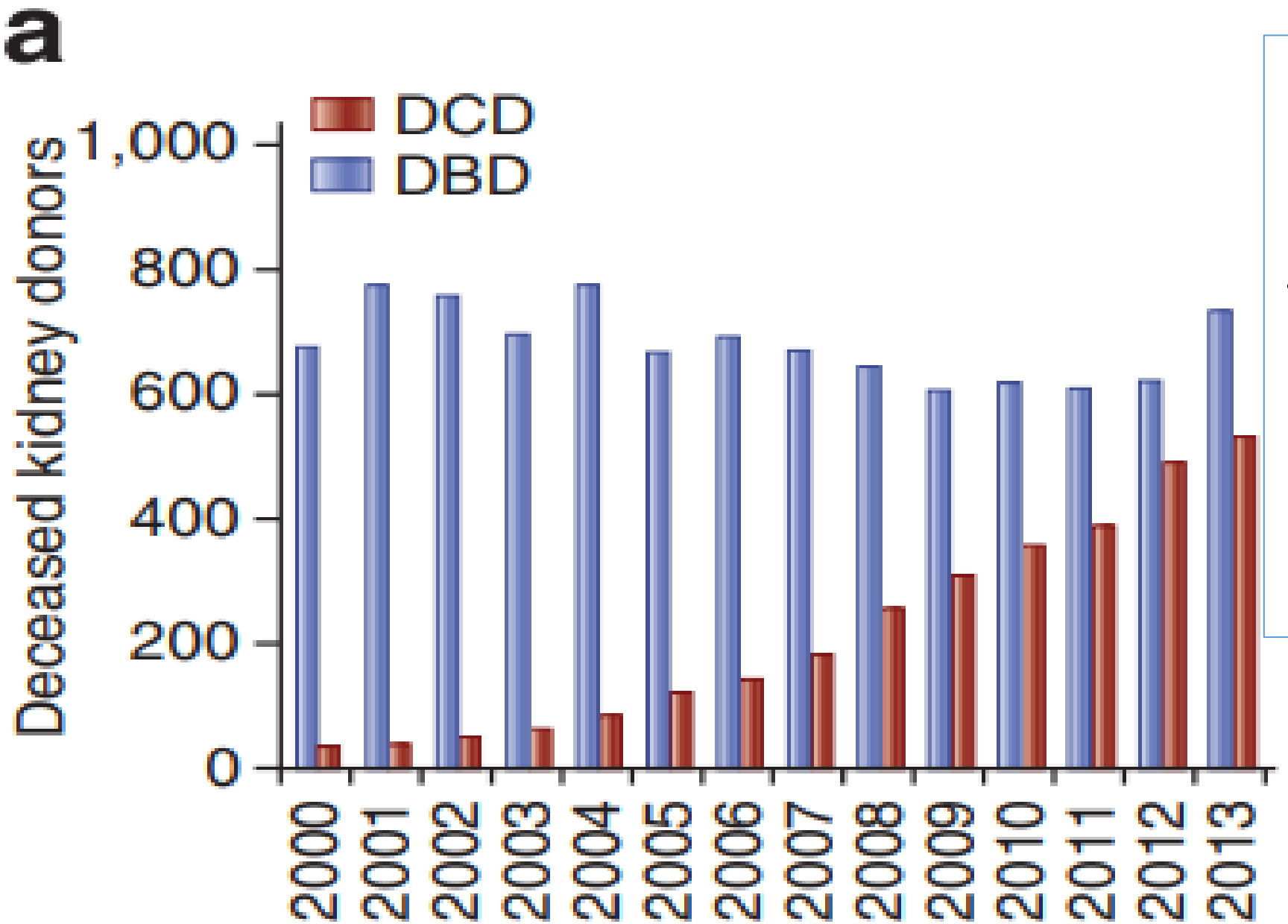
- In the UK, the average waiting time for a deceased donor KT is **over 3 years.**
- **12%** of listed patients die or are removed from the waiting list owing to ill health within 3 years of listing.

Summers DM. KI.2015

DCD & DBD rates for 2013

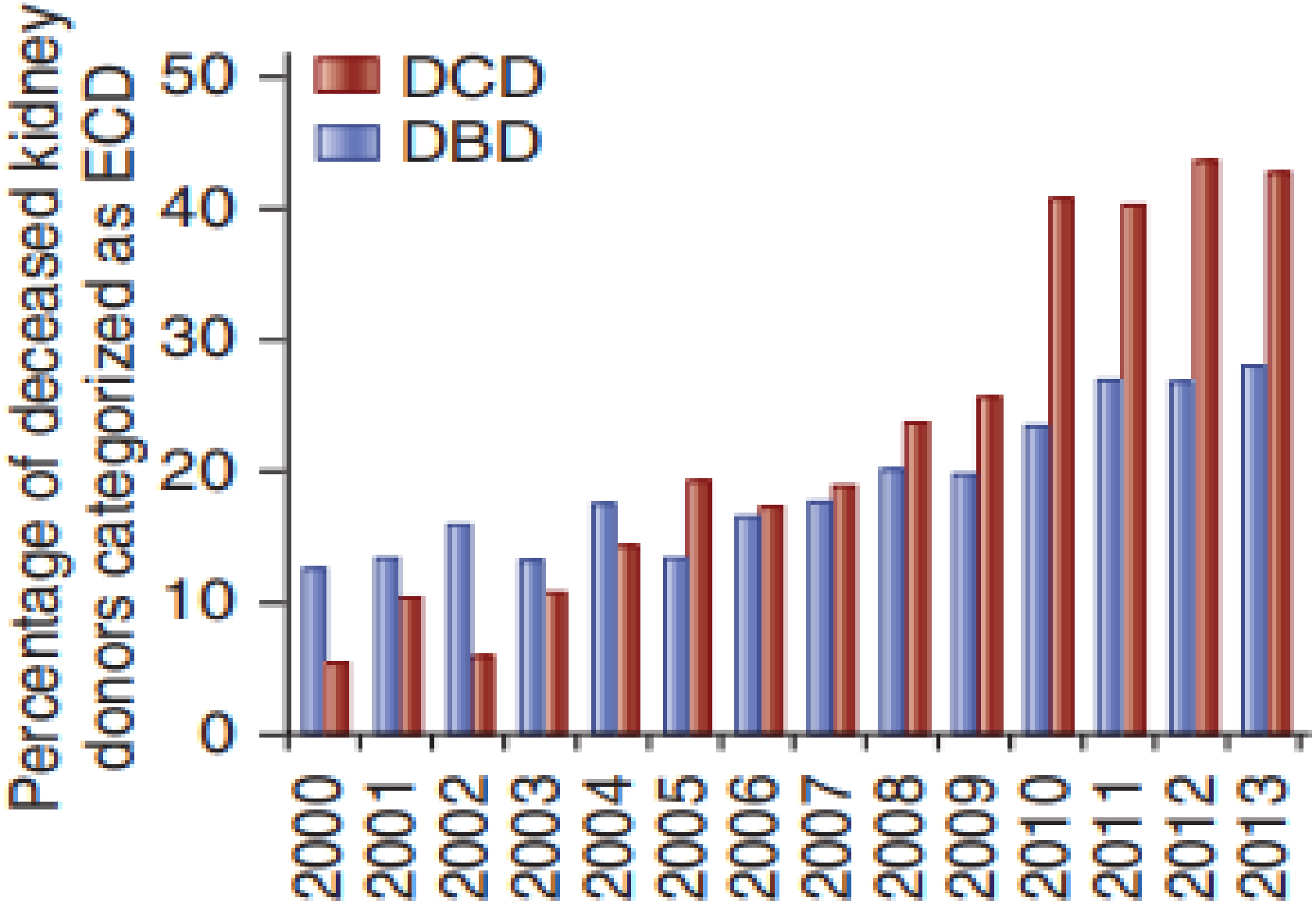


Summers DM. KI.2015



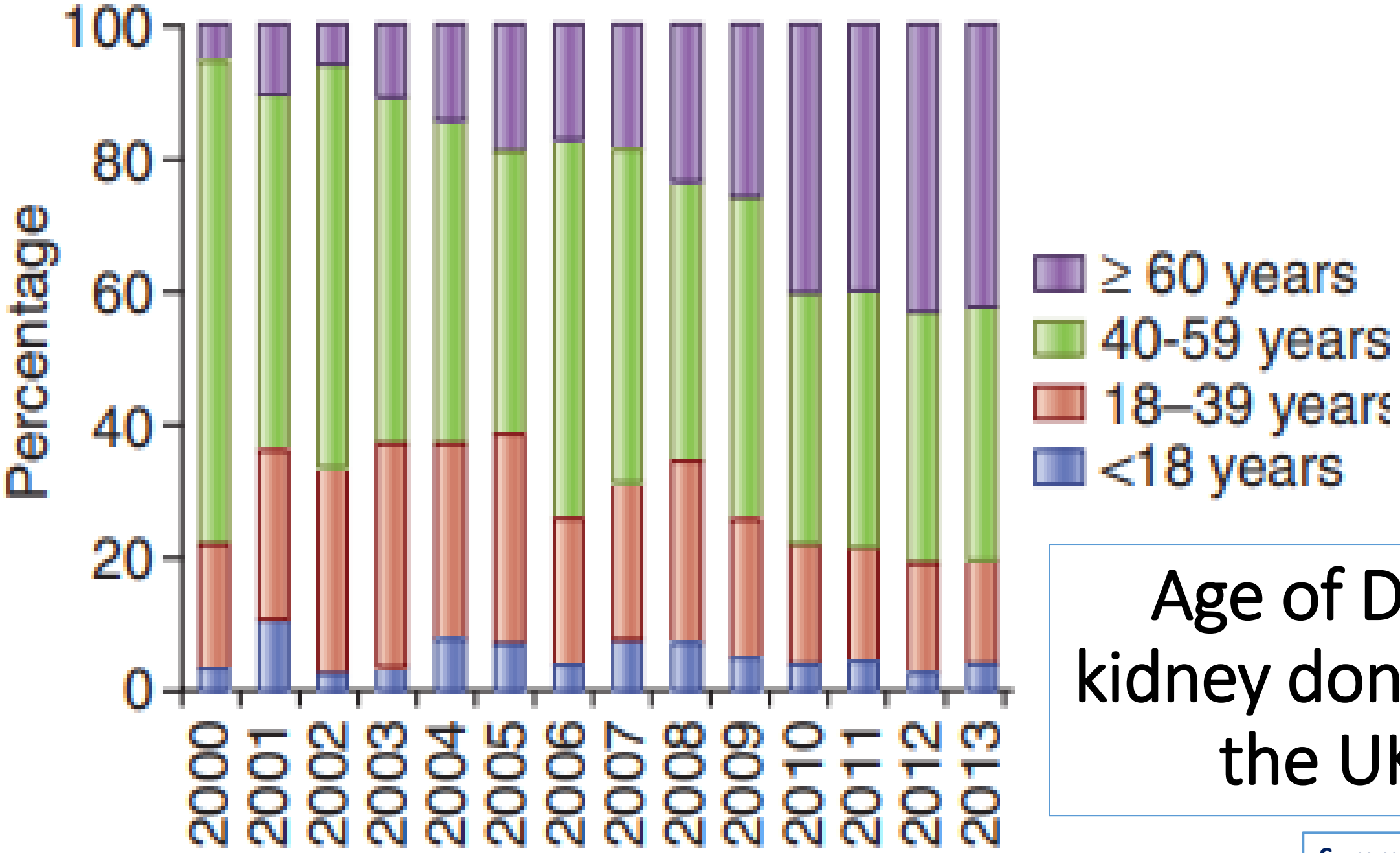
Annual number of deceased kidney donors in the UK from 2000 to 2013, highlighting the progressive increase in DCD numbers

Summers DM. KI.2015



Proportion of deceased kidney donors (DBD & DCD) that fulfill the criteria for extended criteria donors (ECD)

Summers DM. KI.2015



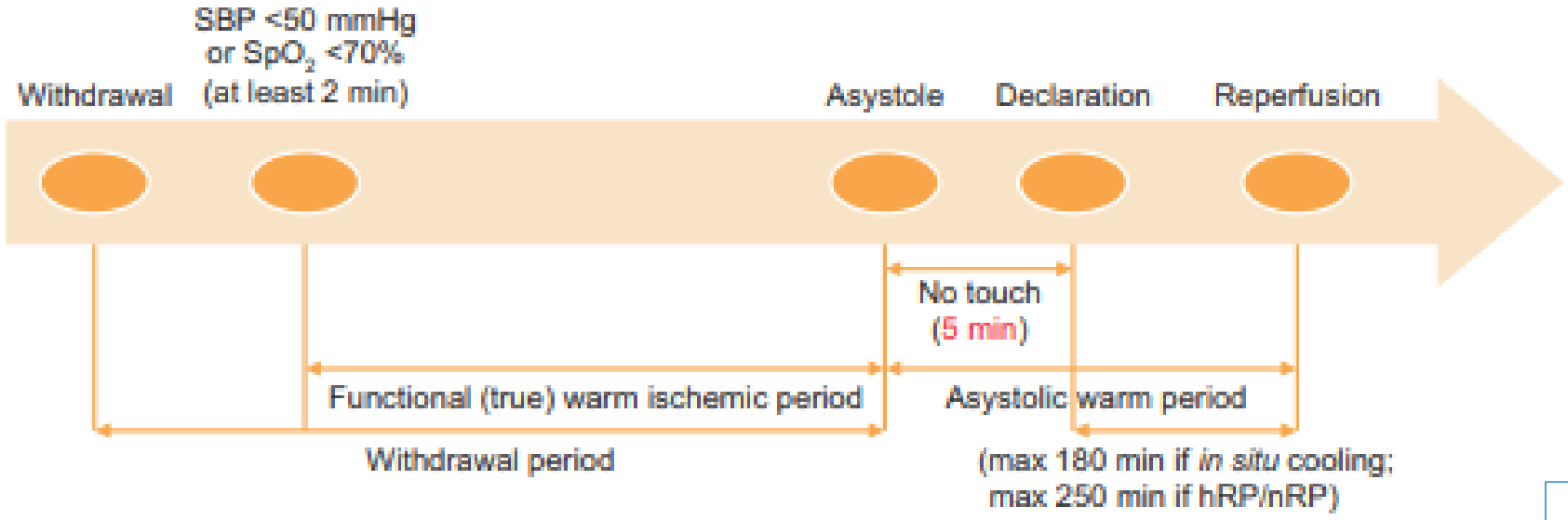
Age of DCD kidney donors in the UK

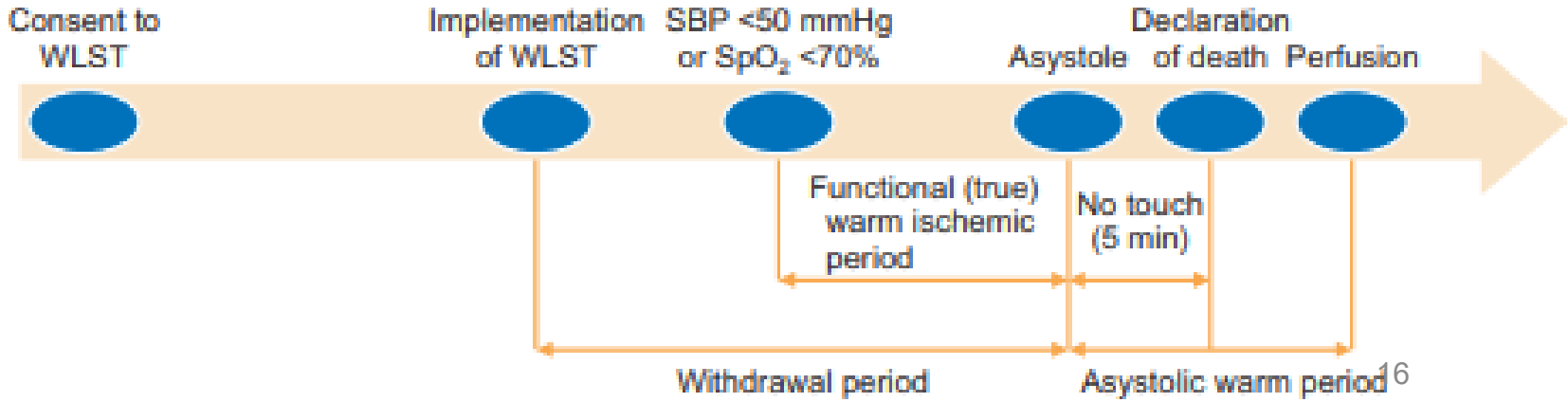
Summers DM. KI.2015

Introduction

- Countries like the UK & Australia focus principally on controlled DCD
- France, Spain & the Netherlands utilize both uncontrolled & controlled DCD donors.

Shrestha BM. J Neph Med Assoc.2024





The process of controlled DCD

Park H. KJT.2021

Definitions of terms in the process of controlled DCD

1. **No flow time**: time from cardiac arrest to start of CPR
2. **Total warm ischemic time**
   - **Uncontrolled**: from the time of the cardiac arrest to the start of preservation for sustaining organ function. Within a maximum of 150 min
   - **Controlled**: from the time of WLST to the start of perfusion (withdrawal period+asystolic warm period)
3. **Withdrawal period**, agonal period : from the time of WLST to asystole

Park H. KJT.2021

Definitions of terms in the process of controlled DCD

4. **Functional (true) warm ischemic period**: after the implementation of WLST, from the time that one of the 2 conditions below is met to asystole.

(1) Systolic BP <50

(2) Peripheral oxygen saturation < 70%

5. **Asystole** : under invasive arterial BP monitoring, the time that the pulse wave was lost. If invasive arterial BP monitoring is unavailable, the first time that the heart rate shows “zero” on an ECG can be used.

Definitions of terms in the process of controlled DCD

6. **No touch time**: from asystole, the time to observe self-resuscitation of the heart without any treatment for 5 min

7. **Asystolic warm period**, primary warm ischemic time: time from asystole to the start of perfusion

8. **Declaration of death** : take 5 min of no touch time after asystole. Then, a declaration of death can be made.

9. **Preservation time** : from the time when preservation was started to sustain organ function until organ procurement.

Park H. KJT.2021

WLSTs for Organ Donation

- WLST can be implemented in an ICU or **OR**.
- Before implementation, the operative field must be sterilized & draped.
- For **anticoagulation**, 20,000–30,000 IU (400 IU/kg) IV heparin.
- After WLST implementation, the patients' clinical status should be checked, including HR, BP, RR, & O2 saturation per min.

Park H. KJT.2021

WLSTs for Organ Donation

- If cardiac arrest does not occur within **90 min** of WLST implementation, the donation process is halted, & the patient is transferred to the ICU.

- The functional warm ischemic time at which organic transplantation is possible:
  - **Liver: within 30 minutes**
  - **Pancreas: within 30 minutes**
  - **Lung: within 60 minutes**
  - **Kidney: within 60 minutes (120 min in UK)**

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The Donation Process

- The time period deemed necessary from cessation of circulation to the start of organ procurement: **2 - 20 min**.

- In contrast to the USA, it is not permissible in the UK to heparinize the potential donor or to cannulate the femoral vessels before death.

Summers DM. KI.2015

The Donation Process

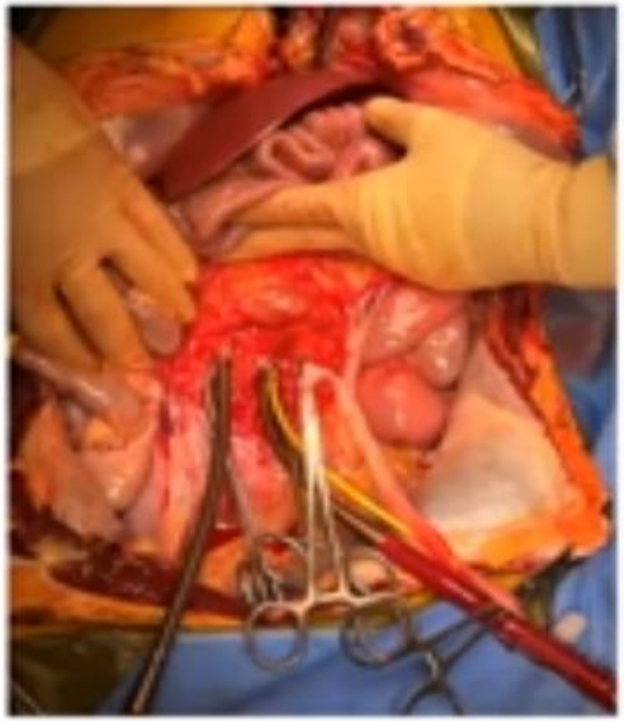
- After procurement, the majority (around **75%**) of DCD kidneys in the UK are subjected to **simple SCS**, & the remainder undergo cold pulsatile machine perfusion.

Summers DM. KI.2015

NRP Approaches for the procurement of abdominal organs

A-NRP

Intra-abdominal Cannulation



Pro:
Can do in most OPOs
Familiarity with anatomy

Con:
Bleeding
Speed is important
Harder in Obese patients

A-NRP

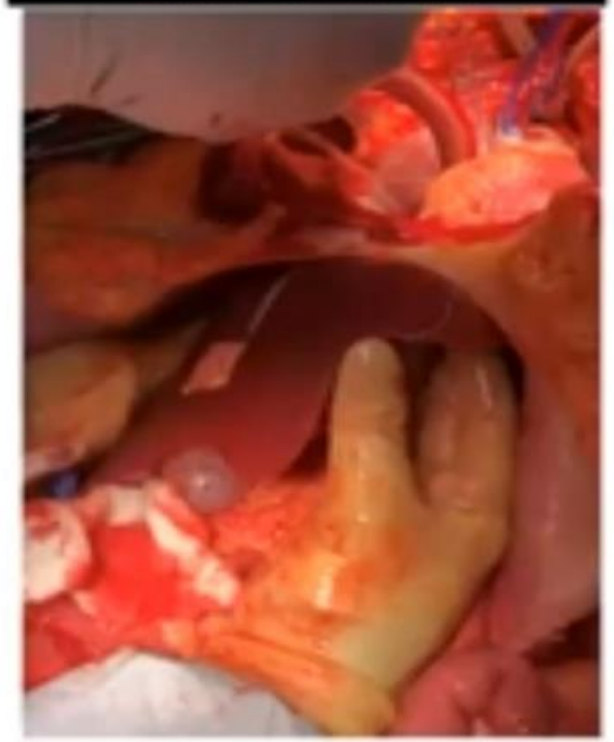
Peripheral Pre-Cannulation

Pro:
Quick to go on pump
No bleeding
Less stress

Con:
Most OPOs don't allow it
Takes more time up front

TA-NRP

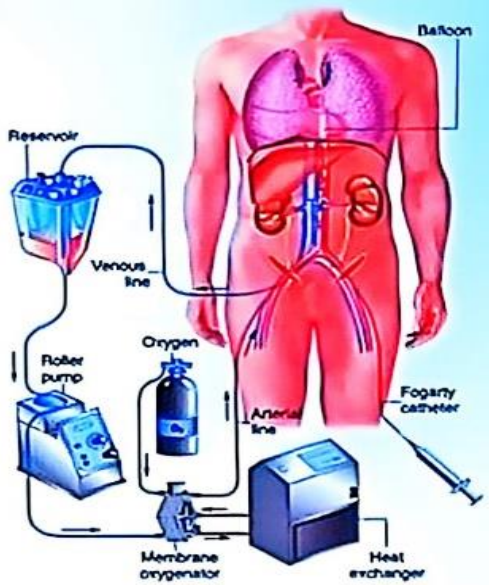
Central Cannulation



Pro:
Good for obese patients
Good for adhesion patients

Con:
Some OPOs don't allow it
Thoracic surgery?

NMP in Spain



+

In situ NRP

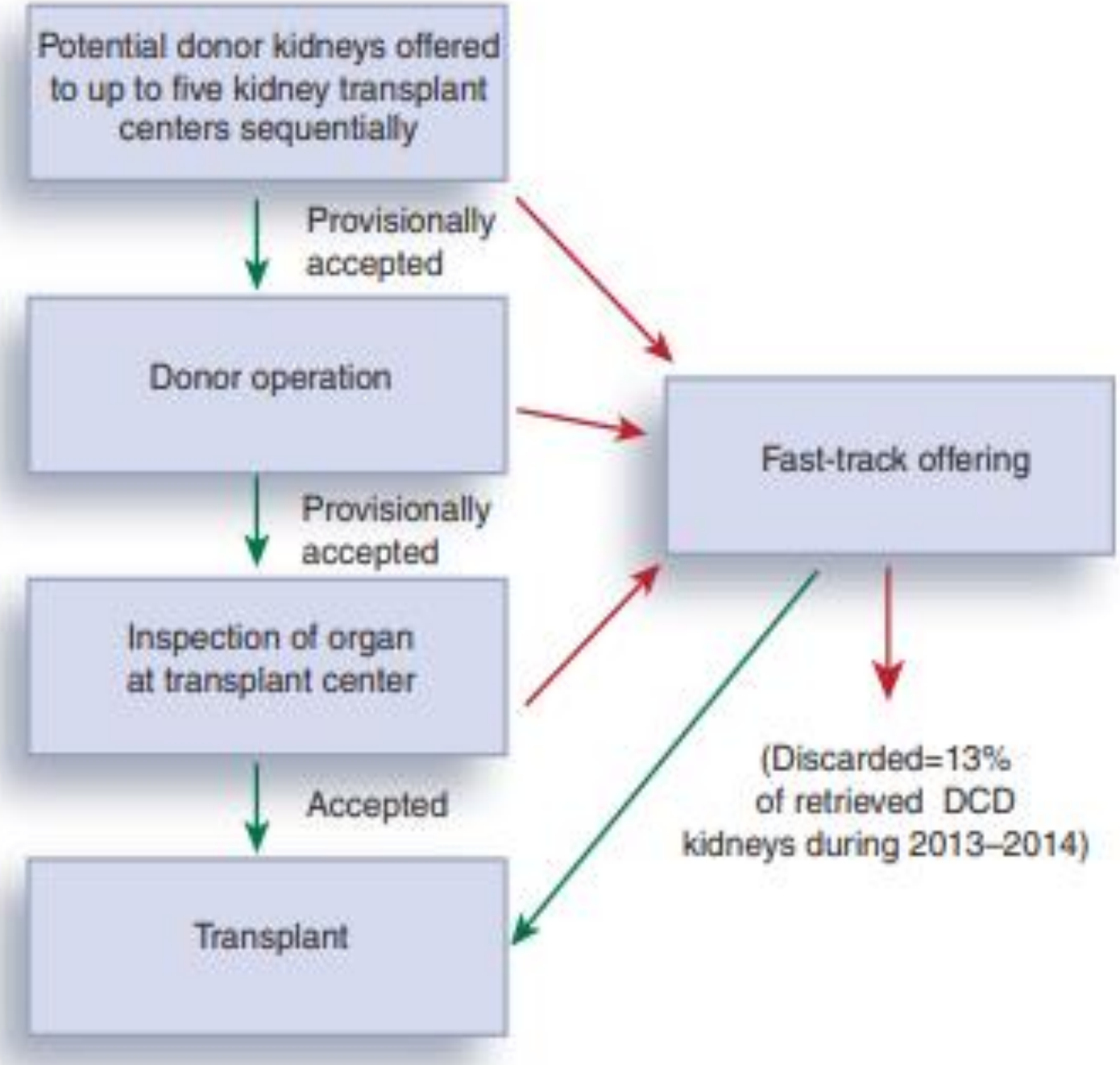
Ex situ NMP

Initial experience/single center

NRP and NMP in high-risk DCD donors,

A-NRP Equipment Setup

Pathway for the offering of deceased donor kidneys in the UK



Summers DM. KI.2015

Allocation scheme for DCD kidneys

- One donor kidney is retained for local use & the paired kidney is shared within one of four UK regions.
- Shared kidneys are allocated according to an algorithm that takes into account:
  - **Recipient waiting time**
  - **Sensitization**
  - **HLA match**
  - **Donor–recipient age match**.

Summers DM. KI.2015

Allocation scheme for DCD kidneys

- Currently only kidneys from DCD donors under the age of 50 ys are shared & one kidney from all DCD donors is retained for local allocation.

Summers DM. KI.2015

Early Graft Dysfunction in Controlled DCD

- Recipients of kidneys from controlled DCD have **twice** the risk of developing DGF compared with recipients of kidneys from DBD donors.
- In the UK is 49%, which is comparable to that reported in other countries.

Summers DM. KI.2015

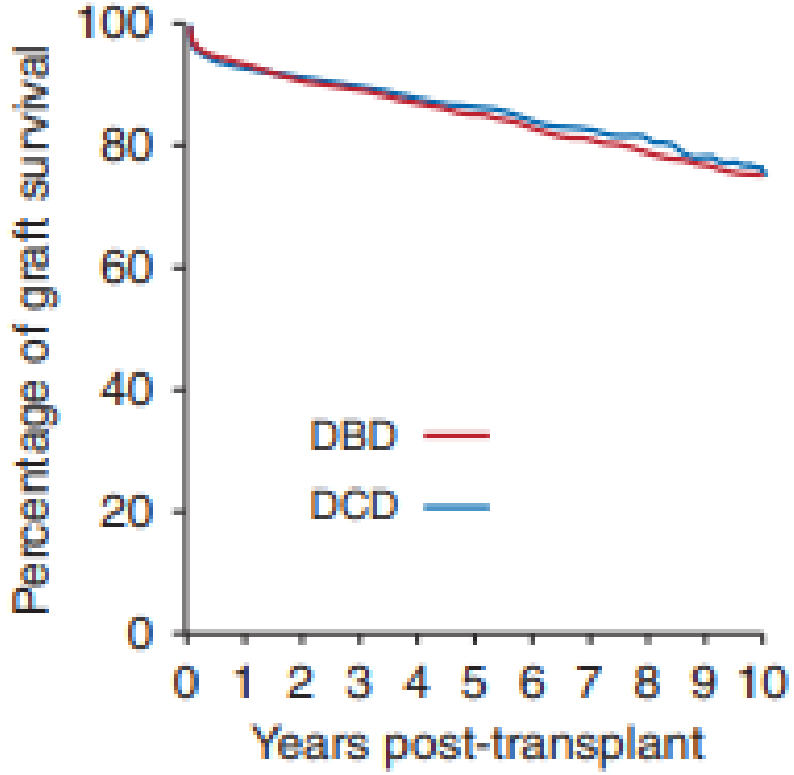
Early Graft Dysfunction in Controlled DCD

- RCTS of **machine perfusion** for DCD kidneys have produced conflicting results with respect to DGF, & **none** have shown a beneficial effect on graft survival.
- It may be most apparent in a particular subgroup of DCD donor kidneys:
  - Those kidneys from older donors
  - Prolonged cold ischemic time

Summers DM. KI.2015

Unadjusted death-censored graft survival for DD kidney transplantation in the UK

a



P=0.31	0	1	2	3	4	5	6	7	8	9	10
DBD	9,684	8,500	7,638	6,737	5,896	5,064	4,285	3,583	2,913	2,209	1,559
DCD	3,626	3,093	2,533	1,976	1,489	1,067	752	516	352	215	131

Summers DM. KI.2015

Unadjusted death-censored graft survival for DD kidney transplantation in the UK

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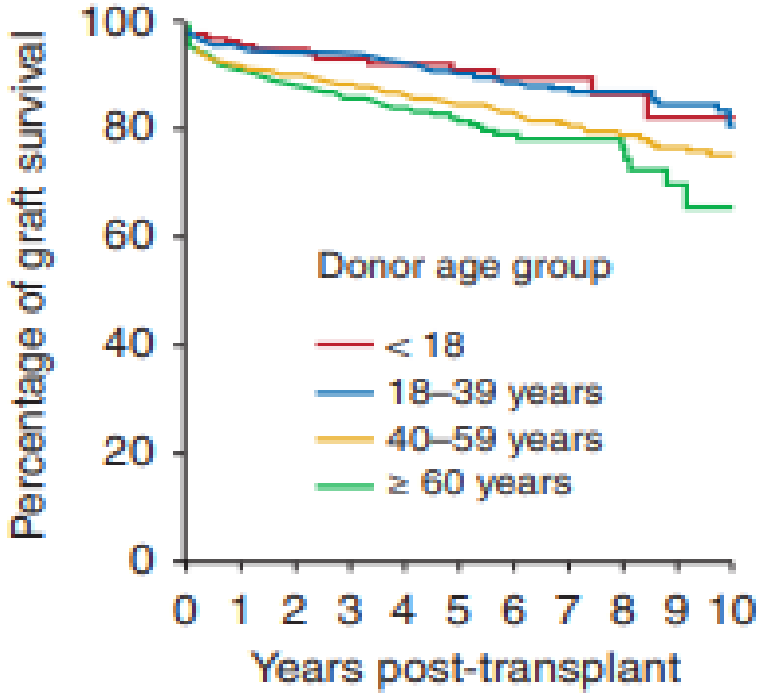

P<0.0001	0	1	2	3	4	5	6	7	8	9	10
< 18 years	140	128	120	105	86	66	49	34	23	11	9
18–39 years	839	760	654	544	443	325	236	162	128	82	45
40–59 years	1,634	1,383	1,170	940	714	522	372	259	162	104	68
≥ 60 years	1,013	822	589	387	246	154	95	61	38	18	9

Summers DM. KI.2015

Factors Associated with Transplant Outcome in Recipients of DCD Kidneys

- **Donor age** (most important)
- Prolonged cold ischemic time (CIT)
- Hx of HTN
- Donor premortem serum cr
- Increased recipient age
- Primary cause of renal failure
- Increased HLA-mismatch grade

Summers DM. KI.2015

Selection of DCD Donor Kidneys

The most common reason for a center declining a kidney is because the donor is too elderly

Summers DM. KI.2015

Some Statistics from MESOT 2025

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THE MIDDLE EAST SOCIETY FOR ORGAN TRANSPLANTATION

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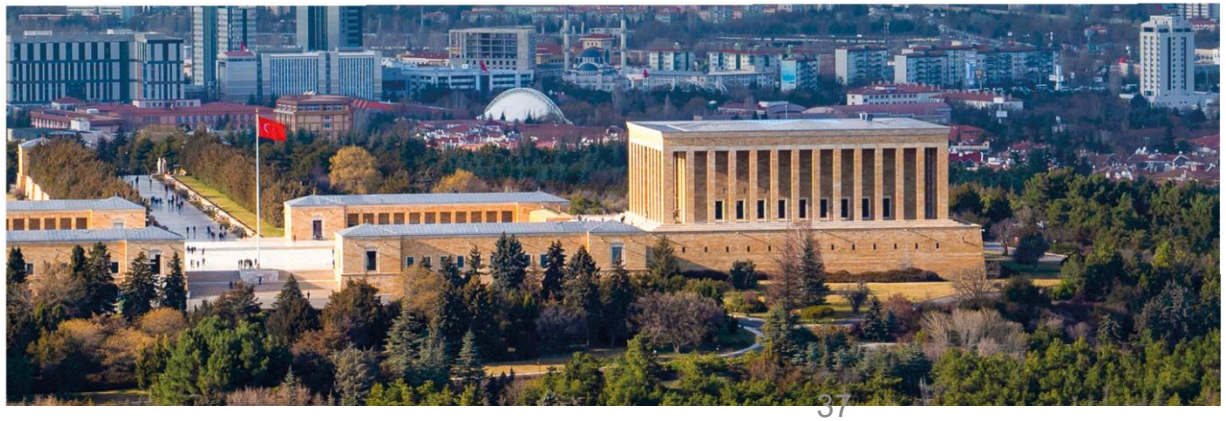
ANKARA TÜRKİYE NOVEMBER 4-5-6-7

3 NOVEMBER 1975-2025 50TH Anniversary OF ORGAN TRANSPLANTATION IN TÜRKİYE

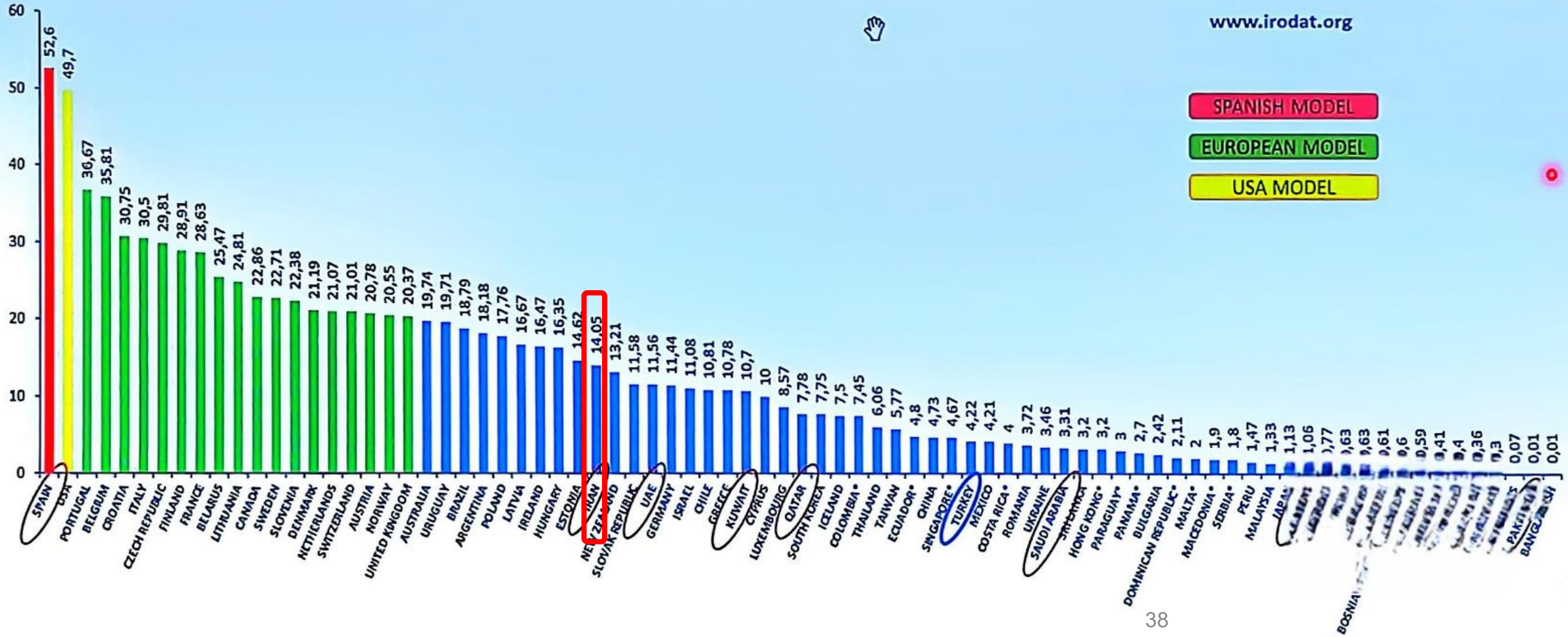


WORLDWIDE DECEASED ORGAN DONORS 2024
(PMP)

DONATION & TRANSPLANTATION INSTITUTE

IRODaT

www.irodat.org



WORLDWIDE KIDNEY TRANSPLANT FROM LIVING DONOR 2024 (PMP)

DTI
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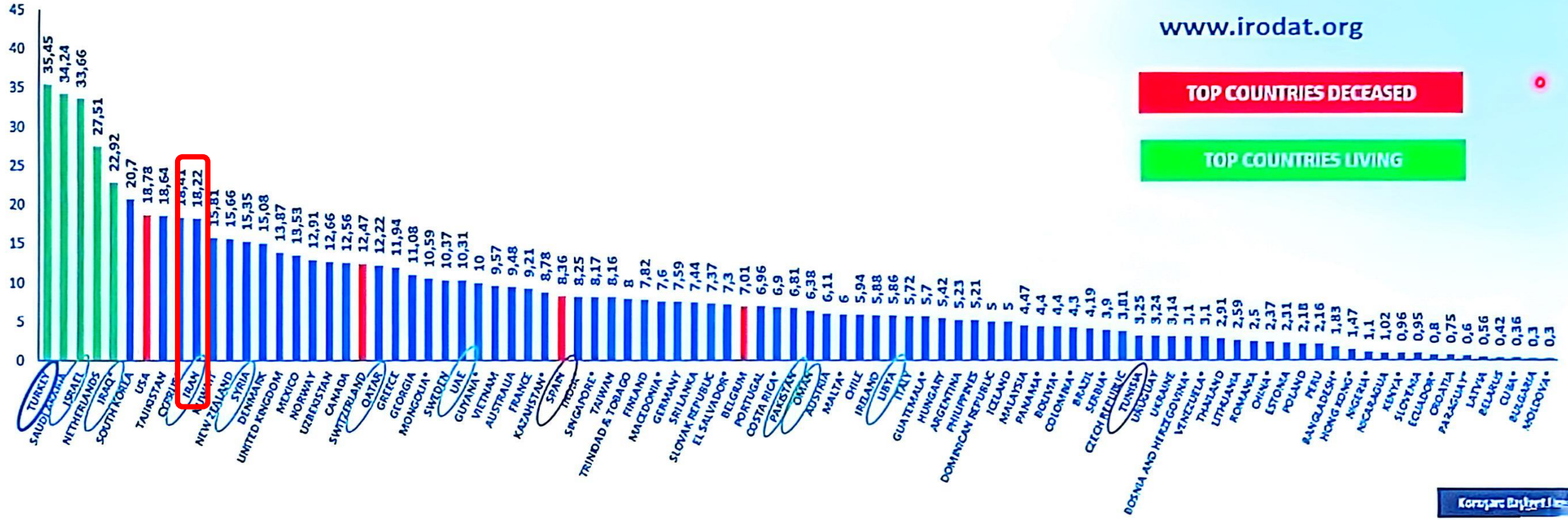


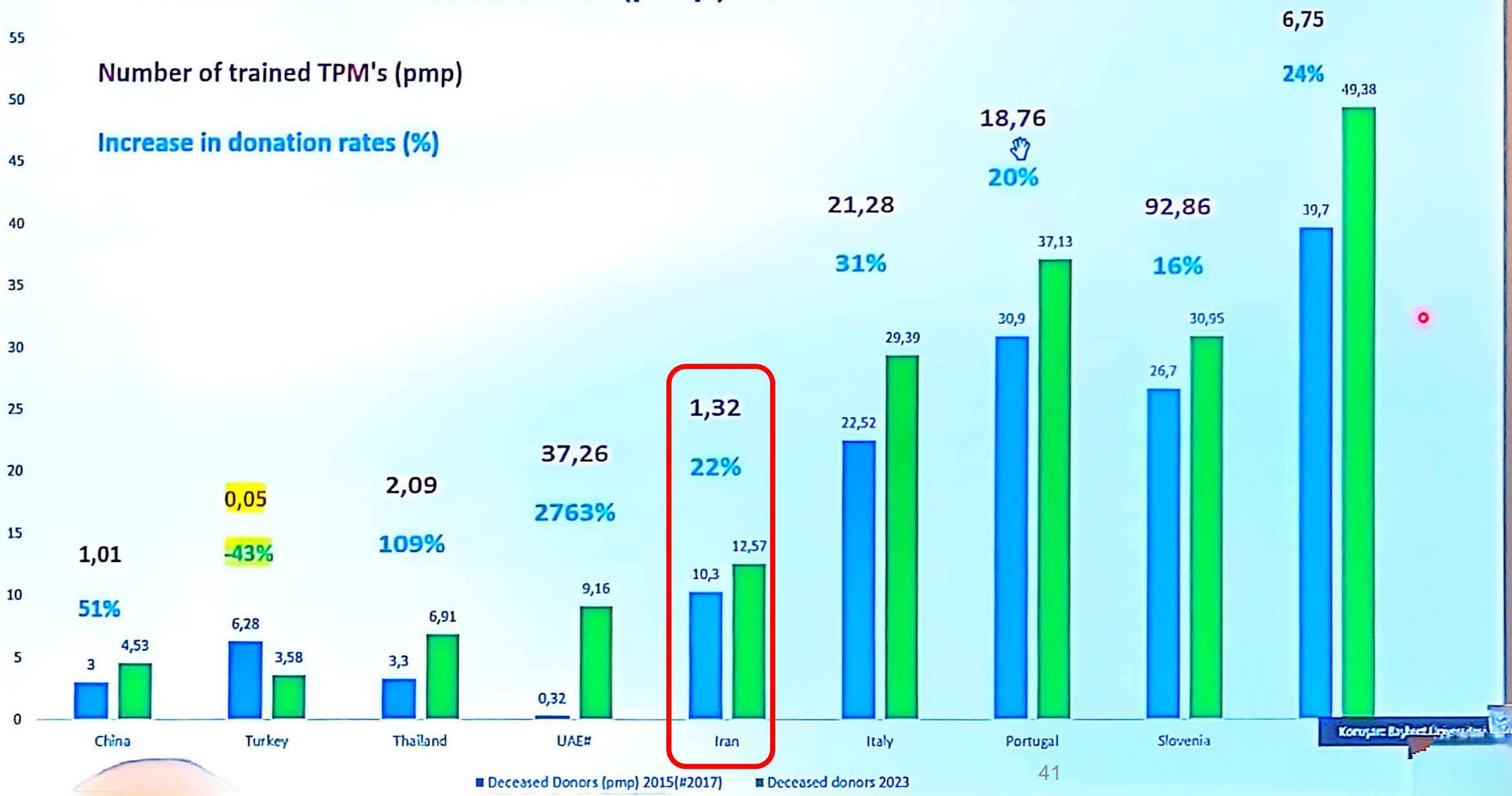
AREU
Sistema Socio Sanitario
Regione Lombardia

DTI
DONATION & TRANSPLANTATION INSTITUTE

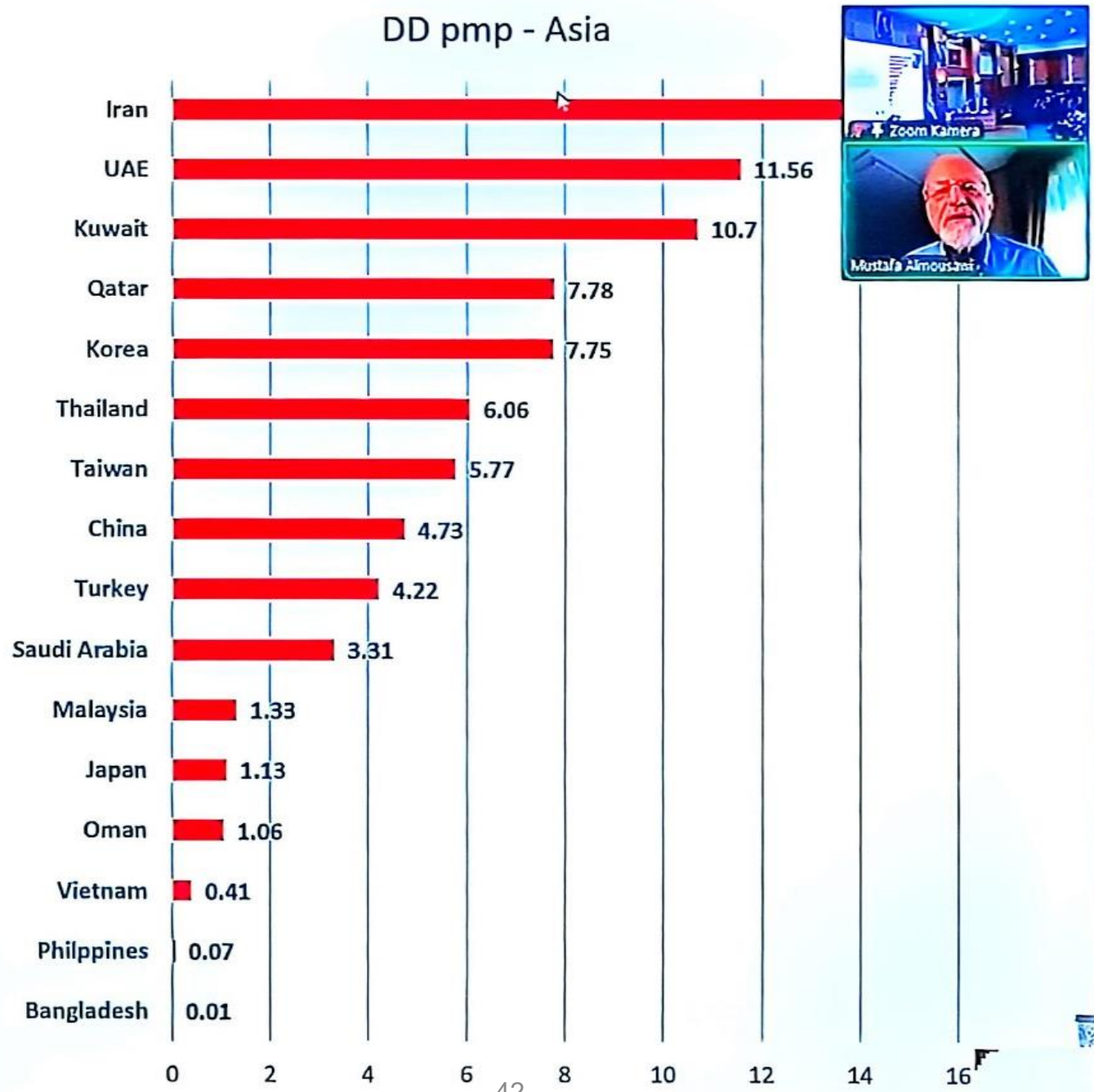
IRODaT
www.irodat.org

WORLDWIDE ACTUAL DONORS AFTER CIRCULATORY DEATH RATE 2024 (PMP)

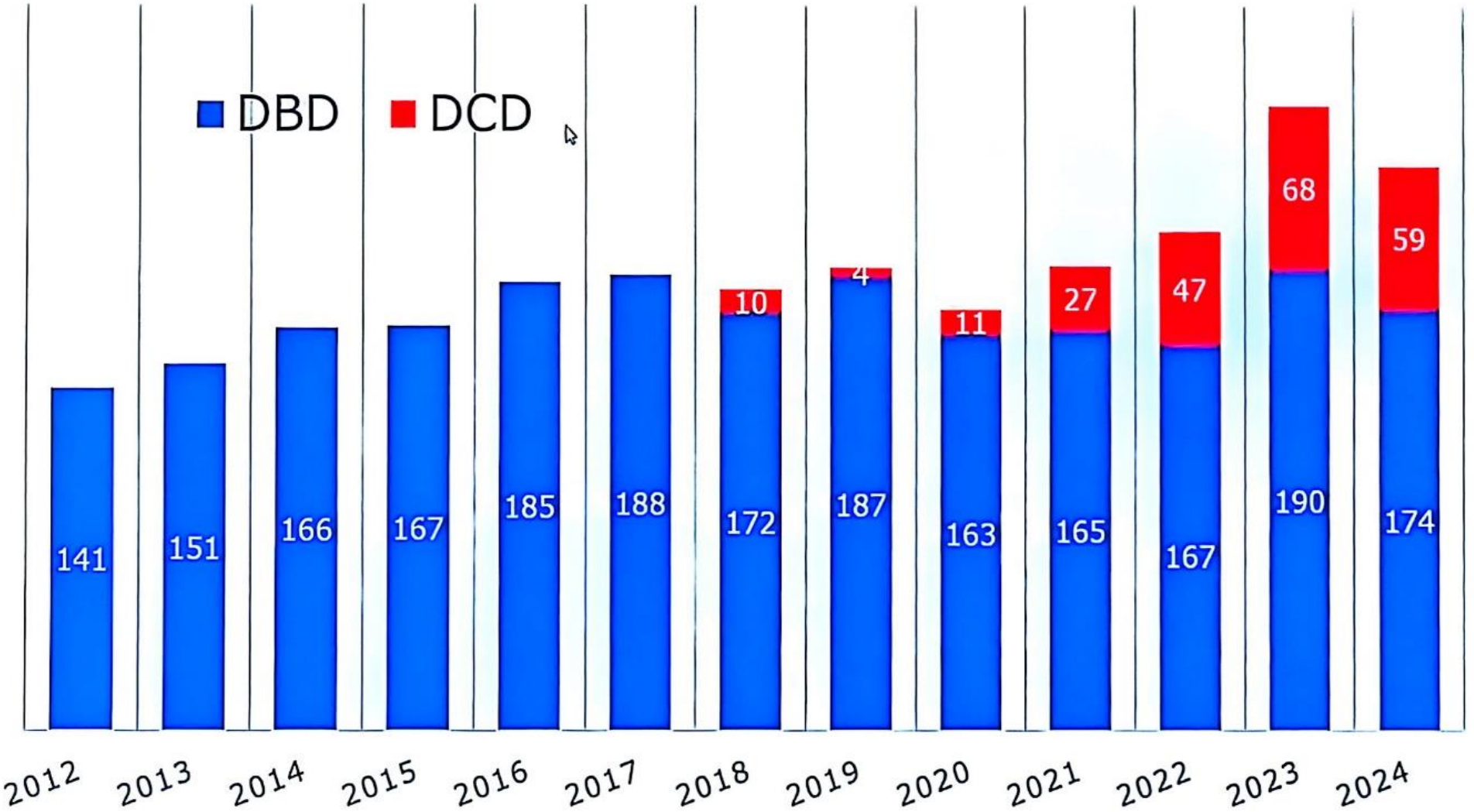
Actual deceased donors (pmp) from 2015 to 2023



Asia
Actual Deceased Donors pmp 2024



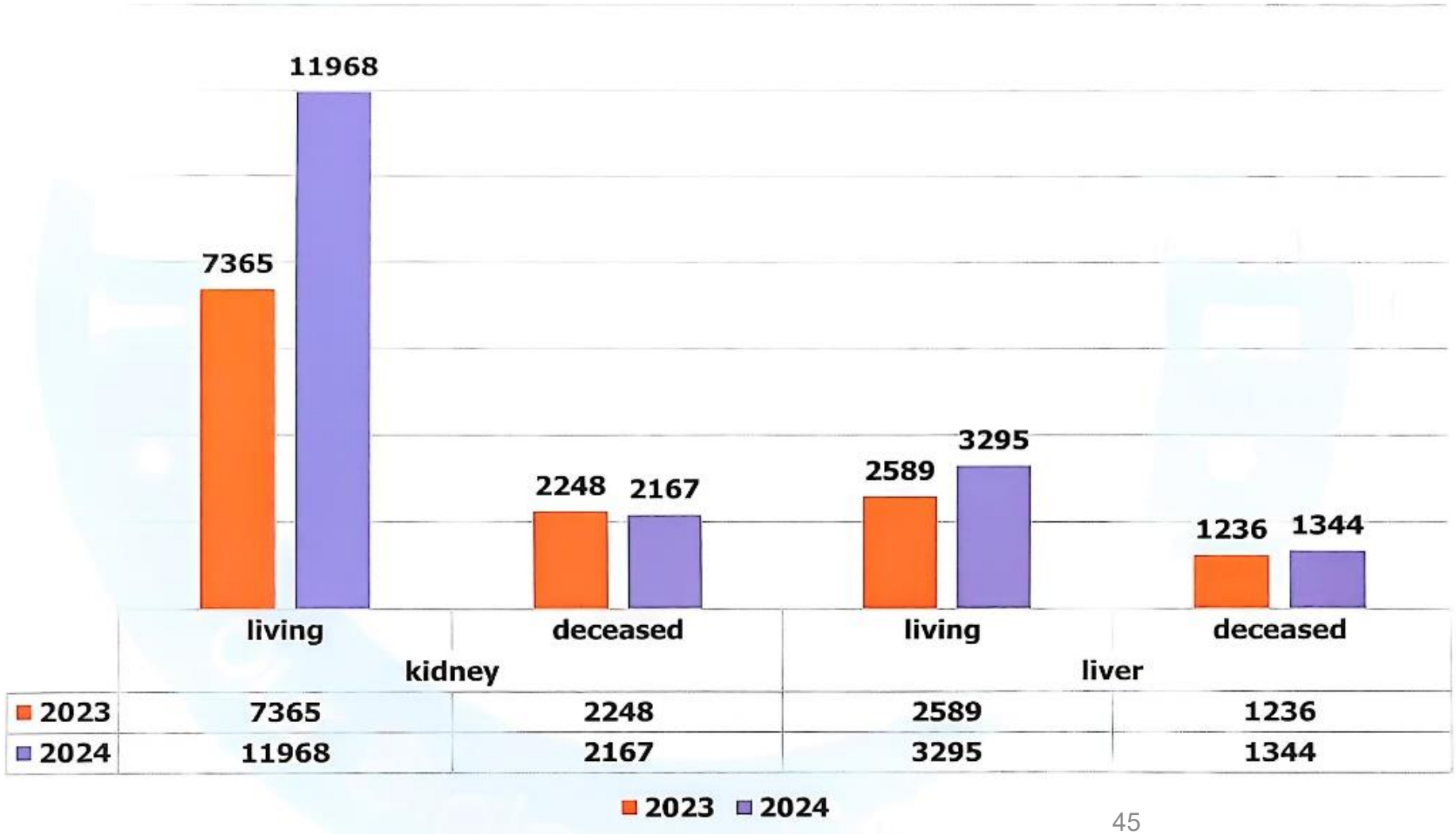
Deceased donors Sweden 2012-2024



Overall data MESOT 2024

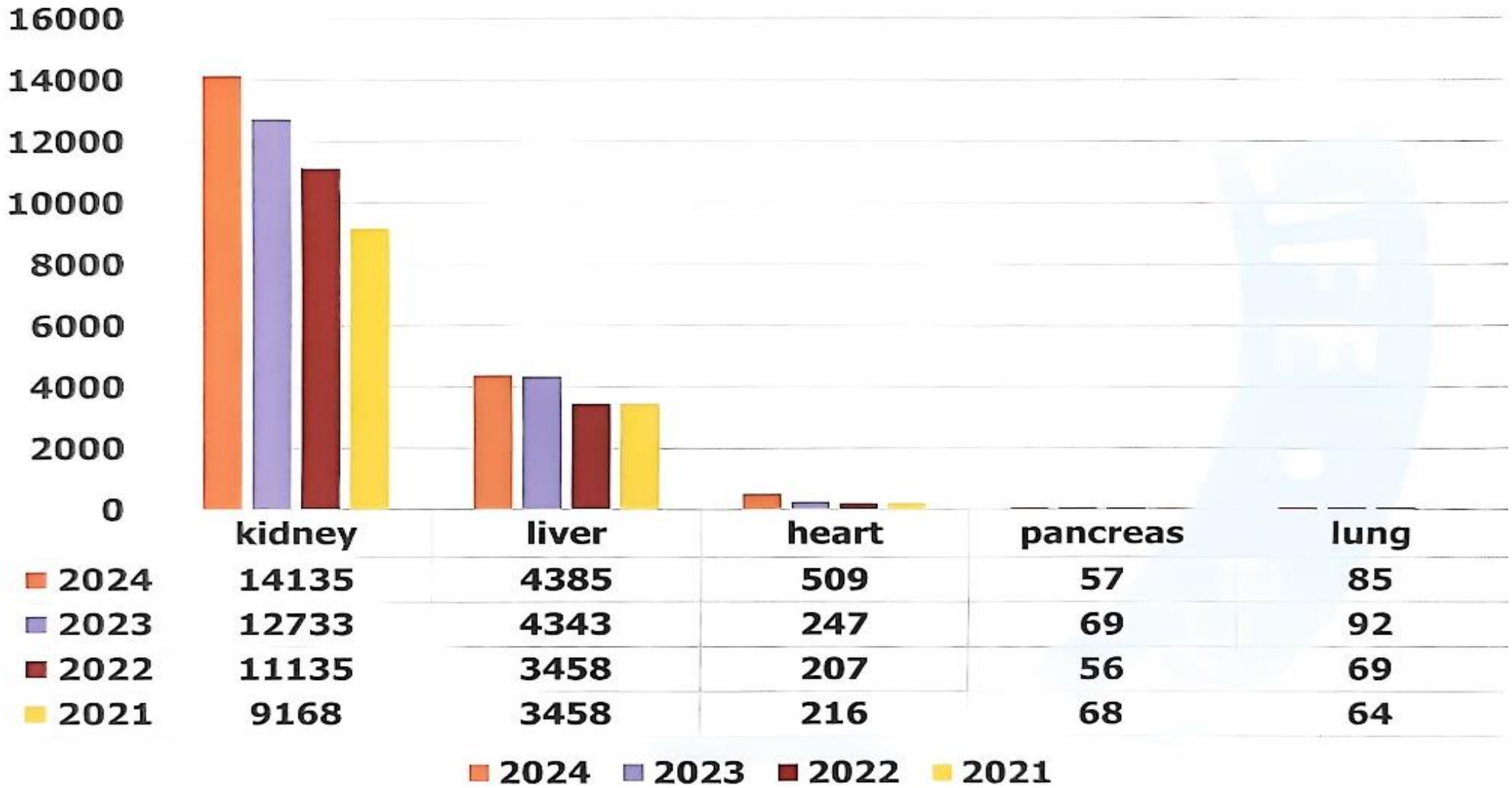
Country	Kidney		Liver		Pancreas	Heart	Lung
	Living	Deceased	Living	Deceased			
Algeria	166						
Egypt	1395	0	479	0			
Iran	1462	1636	86	898	39	111	8
Jordan	201	2		4			
Syria	373						
Kuwait	68	80				2	
Lebanon	60	3		1		1	
Libyia	41						
Oman	30	10	7	2			
Pakistan	1669		681				
KSA	1284	203	101	422	15	40	34
Qatar	33	29		12			1
UAE	99	190	3	131	2	7	22
Tunisia	41	14	2	4		5	
Turkey	3121	347	1543	188	1	43	18
Iraq	1500						
uzpakistan	452		72				

Living vs deceased



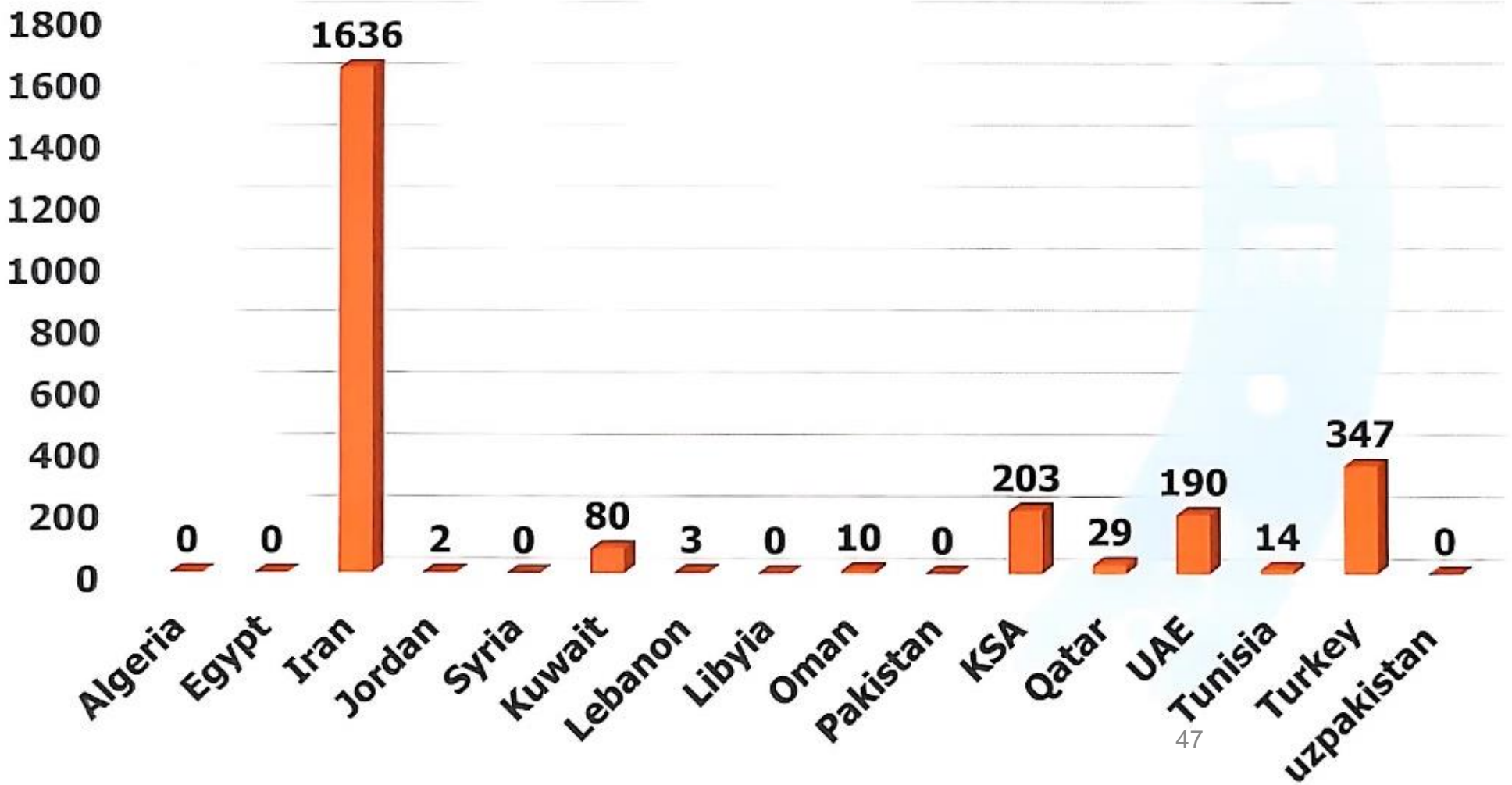
	kidney		liver	
	living	deceased	living	deceased
2023	7365	2248	2589	1236
2024	11968	2167	3295	1344

4 years data in MESOT



	kidney	liver	heart	pancreas	lung
2024	14135	4385	509	57	85
2023	12733	4343	247	69	92
2022	11135	3458	207	56	69
2021	9168	3458	216	68	64

Deceased Kidney Transplant in MESOT 2024




P08
BAŞKENT ÜNİVERSİTESİ
19th CONGRESS OF
MESOT2025
NOVEMBER 4-5-6-7
Kidney transplantation as pre-emptive or non pre-emptive; which has improved survival in recipients?
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Background:
Methods:
Results:
Conclusion:
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ANKARA TÜRKİYE NOVEMBER 4-5-6-7
KIZILCAHAMAM PALYA RESORT HOTEL
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MESOT 2025
ANKARA, TÜRKİYE
NOVEMBER 4-5-6-7

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19th MESOT 2025

KIZILCAHAMAM PATALYA THERMAL RESORT HOTEL ANKARA TÜRKİYE NOVEMBER 4-7

50th Anniversary of Organ Transplantation in Türkiye

575 PARTICIPANTS FROM 41 COUNTRIES

- ALBANIA
- ALGERIA
- ARGENTINA
- AUSTRALIA
- AZERBAIJAN
- BANGLADESH
- CANADA
- COSTA RICA
- EGYPT
- GERMANY
- GREECE
- INDIA
- IRAN
- IRAQ
- ITALY
- JORDAN
- KAZAKHSTAN
- KSA
- KUWAIT
- KYRGYZSTAN
- LEBANON
- LIBYA
- MEXICO
- NIGERIA
- OMAN
- PAKISTAN
- PALESTINE
- PHILIPPINES
- PORTUGAL
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- SPAIN
- SWEDEN
- SWITZERLAND
- SYRIA
- THE NETHERLANDS
- TUNISIA
- TÜRKİYE
- UAE
- UK
- USA
- UZBEKISTA