



# International Examples of Organ Procurement Allocation & Distribution

Lessons from Eurotransplant

The National Academies of Science · Engineering · Medicine

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Koordinierungsstelle Organspende

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I have nothing to disclose

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## Eurotransplant International Foundation

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- Oldest international organ exchange organization
- Founded by Prof. Dr. J.J. van Rood in 1967
- Eight member countries
  - Austria
  - Belgium
  - Croatia
  - Germany
  - Hungary
  - Luxembourg
  - Slovenia
  - The Netherlands

# European diversity – Organ Exchange Organizations



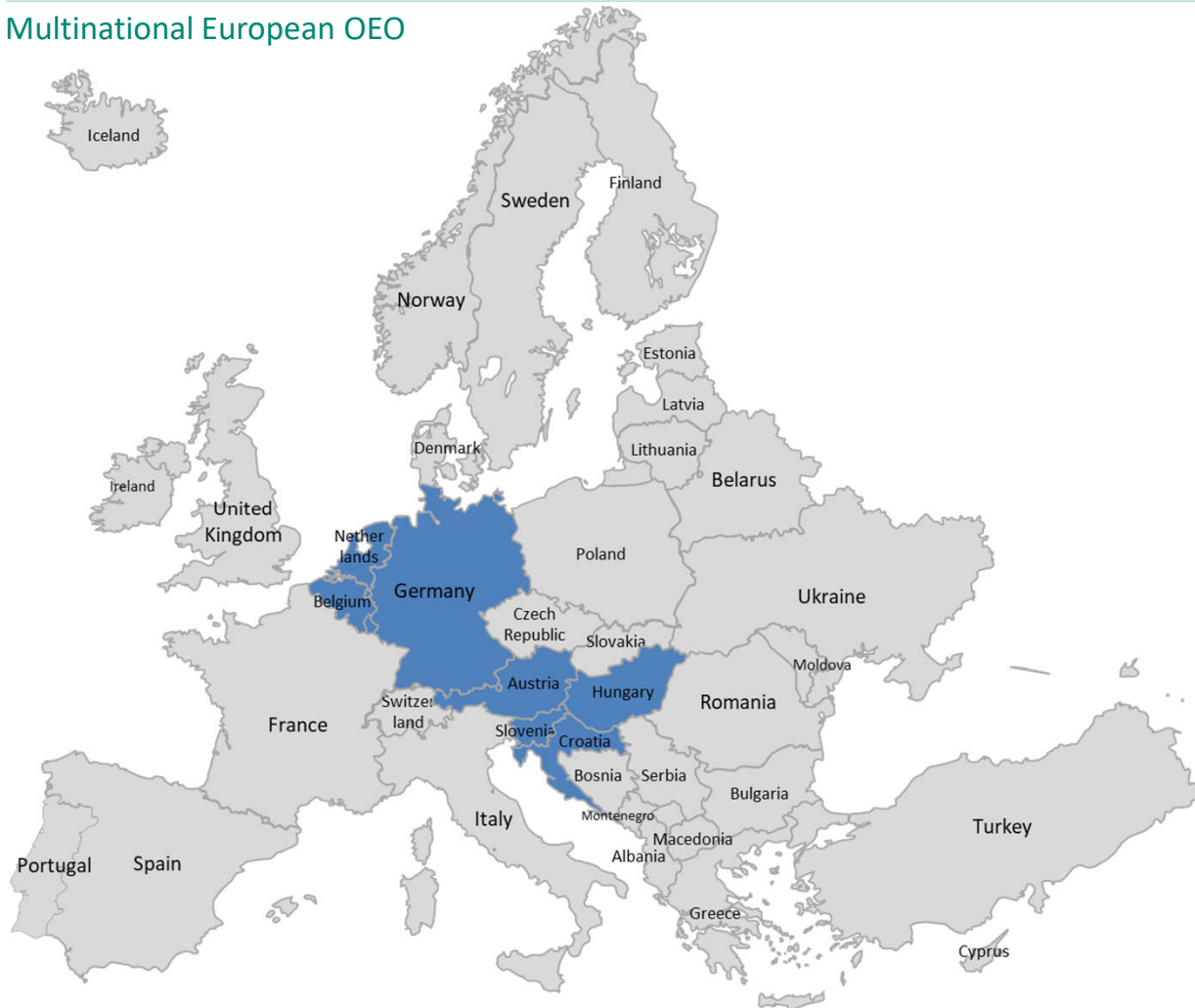
## Multinational European OEO



# European diversity – Organ Exchange Organizations



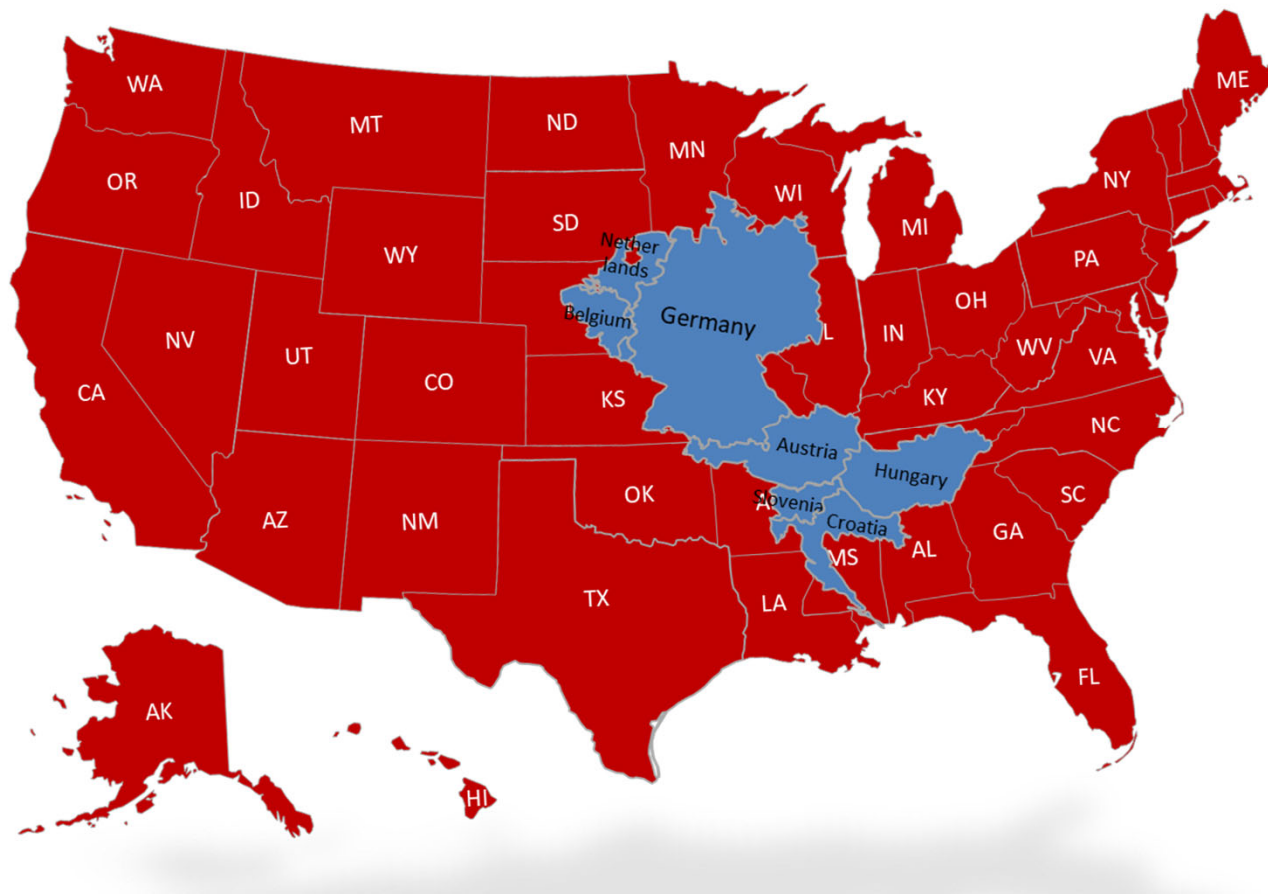
## Multinational European OEO



Eurotransplant

# Eurotransplant vs. US

Transport - logistical challenges



## Aims of international cooperation in organ allocation

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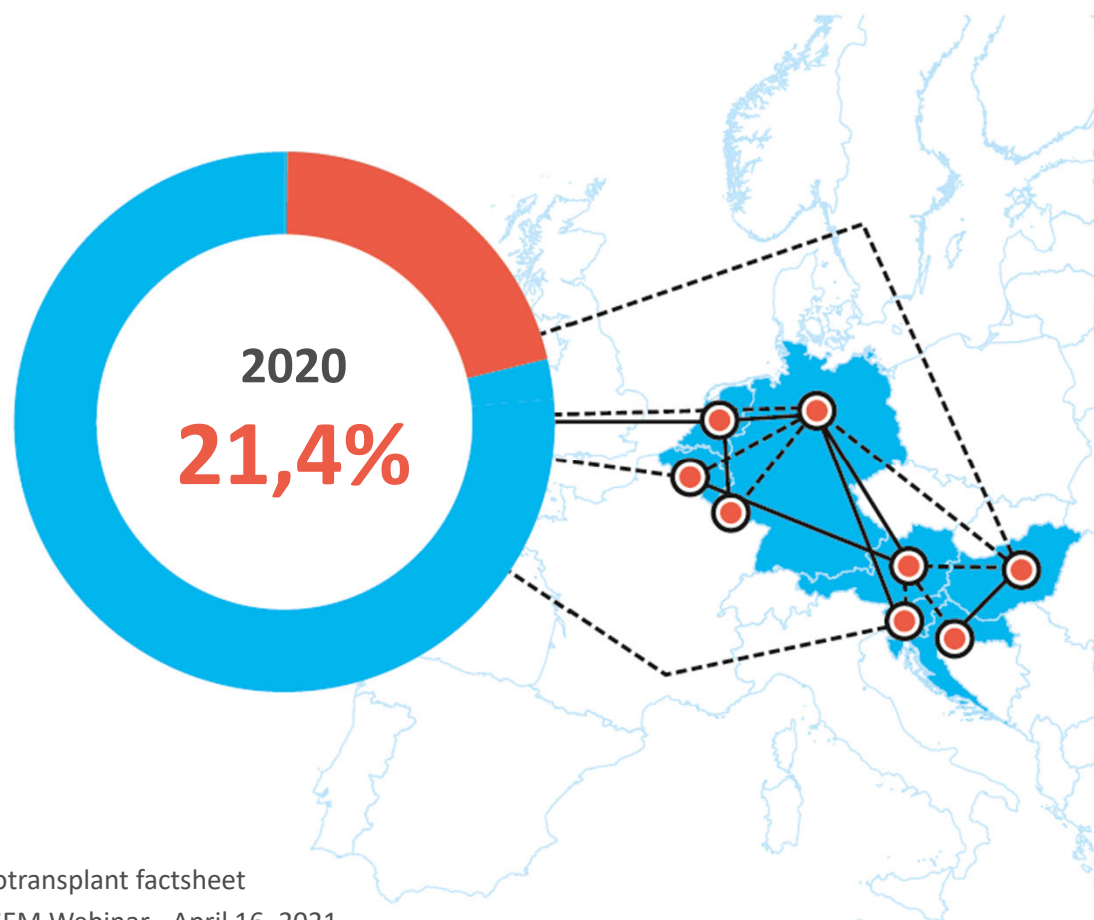


- Finding a suitable donor organ for all patients on the waiting list (including special patient groups) in time
- Optimizing the match between donor and recipient to improve long term outcome of transplantation
- Preventing organ loss



# Eurotransplant – cross-border organ exchange

Percentage of organs exchanged cross-border - 2020



Eurotransplant factsheet  
NASEM Webinar - April 16, 2021



## NUMBER OF DECEASED DONOR ORGANS TRANSPLANTED IN 2020



Kidney  
**2,851**



Liver  
**1,470**



Heart  
**587**



Lung  
**1,279**



Pancreas  
**169**

**6,356 organs donated**  
**≈ 1400 exchanged cross-border**



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## Policy making – Organ allocation

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# Development of allocation rules – General aspects



## Stepwise approach

- Agreement on allocation principles
  - Examples:
    - Urgency, outcome ...
- Definition of surrogate parameters for the allocation principles
  - Examples:
    - Urgency:
      - Mortality on the waiting list, deterioration of function of other organs...
    - Outcome:
      - Patient survival after transplantation (1, 3 and/or 5 year survival), graft survival, quality of life...
- Models to (adequately) predict the surrogate parameters
  - Examples:
    - Scores like MELD or LAS...

Broad discussion/  
„Society“

Respective  
expert groups

Registries  
(Bio-)Statisticians

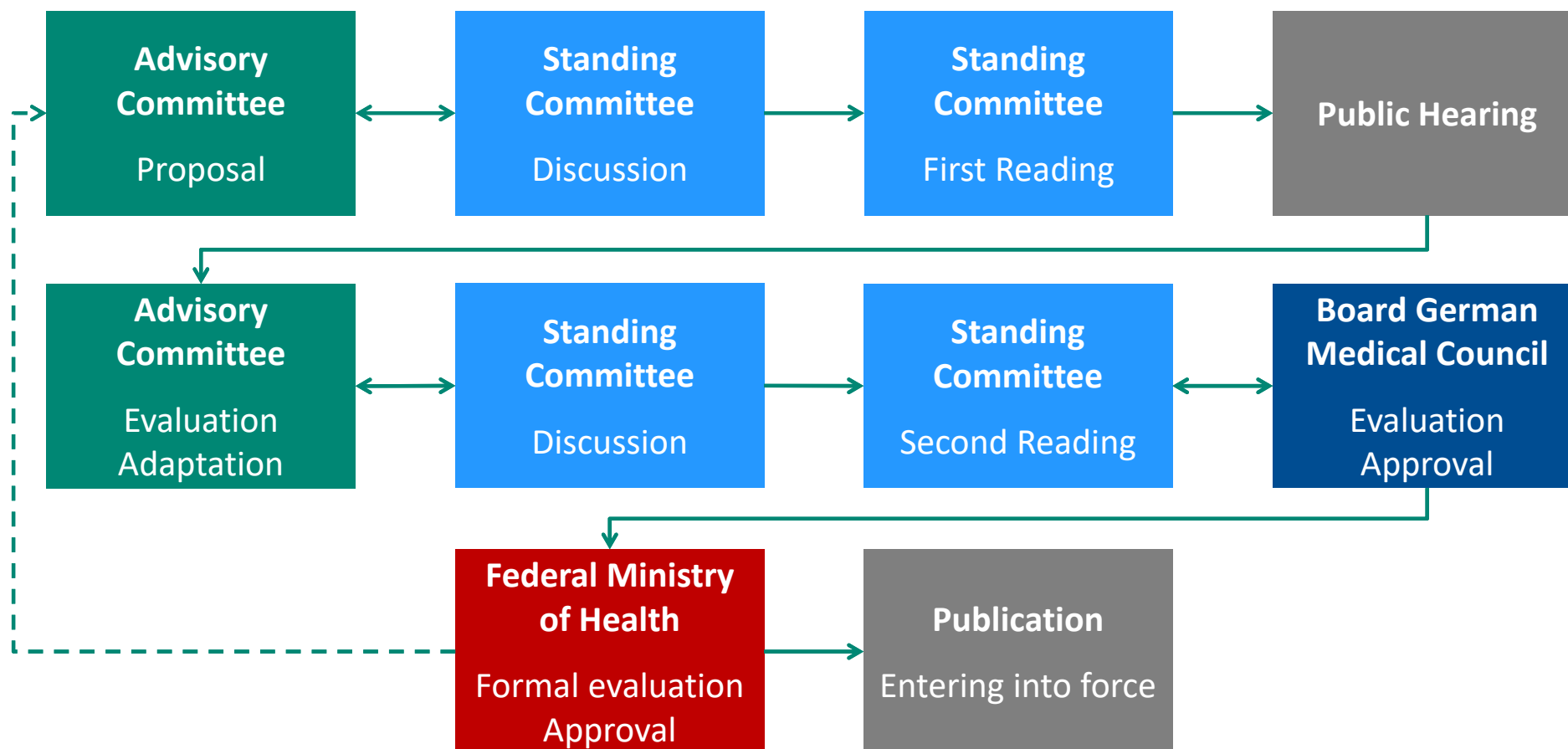
## Development of new allocation rules – Example Germany

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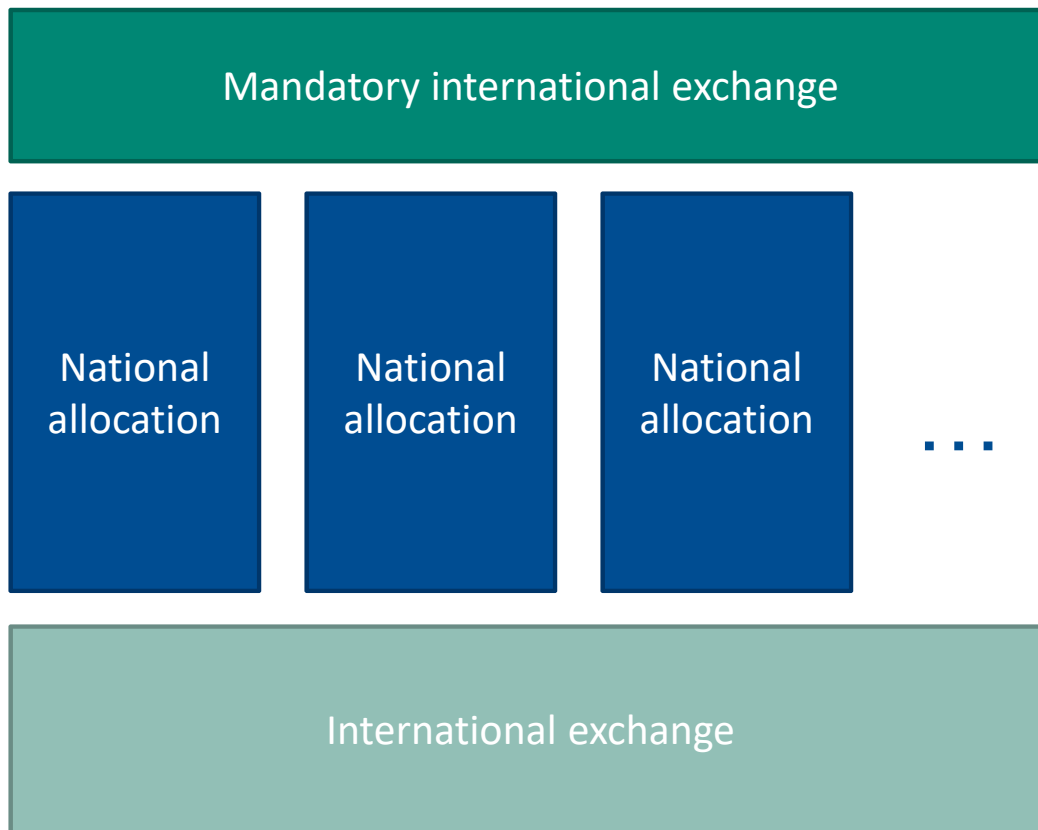


- Allocation rules vary from country to country
- German Transplant Law
  - Allocation rules have to correspond to the **current state of the art in medical science**
  - Allocation rules shall especially take into consideration **urgency and outcome** of transplantation
  - Waiting lists of all transplant centers have to be treated as a **unified waiting list**
- Development of the allocation rules by the German Medical Council
  - “Standing Committee on Organ Transplantation” with several Organ Advisory Committees
  - Members of the Standing Committee are representatives of:
    - German Transplant Society, Intensive Care Society, Ministries of Health, German Medical Council, German Hospital Federation, National Association of Statutory Health Insurance Funds, ethicists, legal experts, patient representatives, donor family representatives

## Development of new allocation rules – Example Germany



## Allocation sequence



High urgency- / Highly immunized- /  
Multi-organ-transplant- recipients  
Kidney: zero-mismatch transplantation

International balancing

Addressing specific national  
needs/preferences

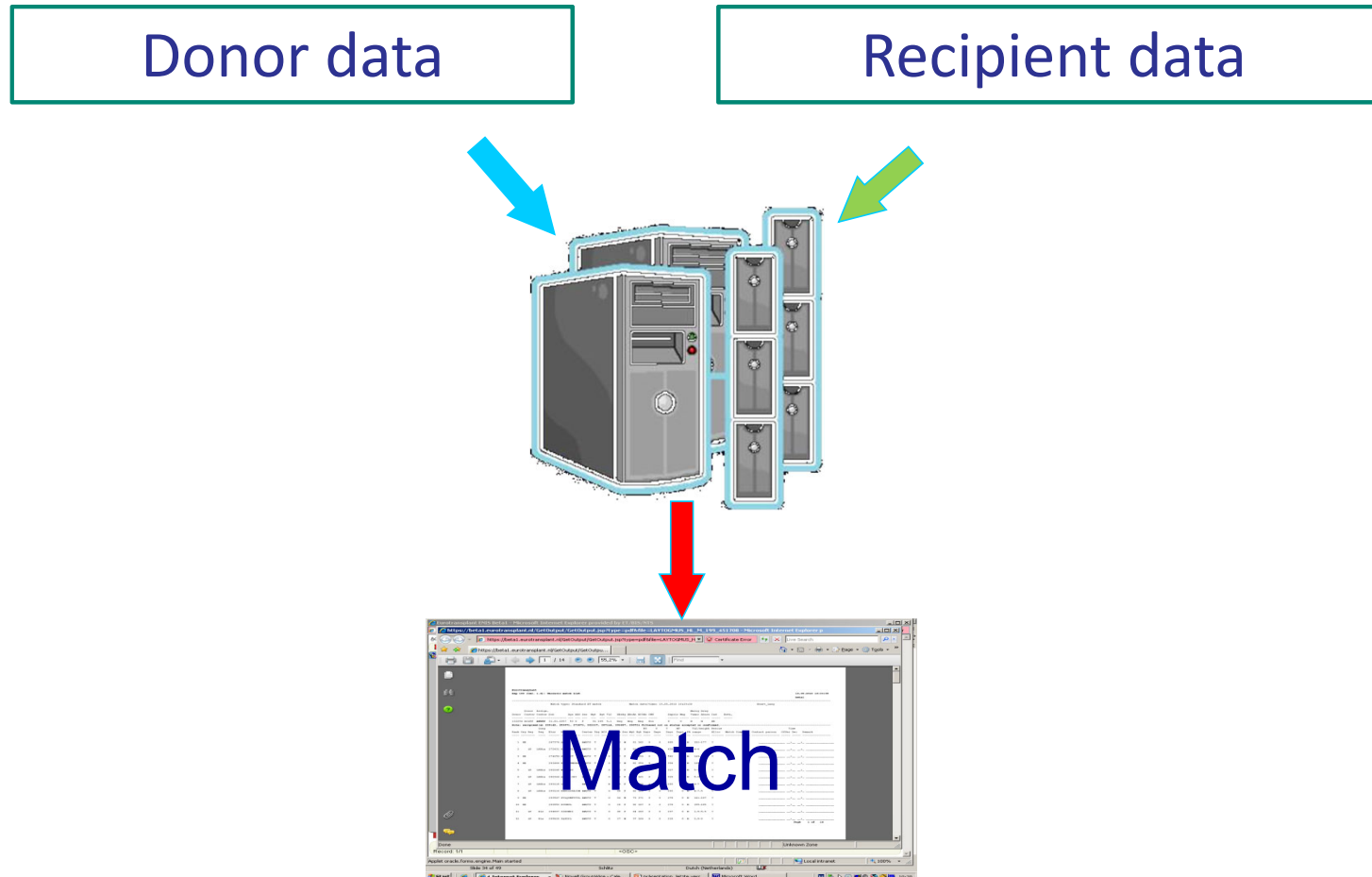
Preventing organ loss

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## Standard allocation

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## Matching process – Standard allocation





## Matchlist → Allocation



120087

V G ULJUOW G IEFUNNUR BETA1

B

Pos

NLBTP

29.05.1966

Save

Modify List

Jump/Add

Reports

Close

Sort by

☒ Rank

☐ Decision

RECIPIENT

COMPLETE LIVER LIST

Rank	Crit.	ETnr	Name	Cent.	Req.	Decn.	Org.	Decn.-date	Comment
1	NAT	246891	TEURUJOWM	NRDTP	LIV	OF			
2	NAT	267734	SOILSAOH	NGRTP	LIV	OF			
3	NAT	257630	OLEPOTLENE	NRDTP	LIV				
4	LOC	249293	FOIM	NLBTP	LIV				
5	NAT	268078	KAOKK	NRDTP	LIV				
6	NAT	256336	EHNIMO	NRDTP	LIV				
7	NAT	246558	FOURHNI	NGRTP	LIV				
8	LOC	258017	HIUH	NLBTP	LIV				
9	NAT	158145	WAMV	NGRTP	LIV				
10	NAT	268816	MANUAL	NGRTP	LIV				
11	INT	268652	XOUHRIADOEKLEJDO	GESTP	LIV				
12	INT	260344	NILESM	GJETP	LIV				
13	INT	268468	IOPRUOKMUL	AWGTP	LIV				
14	INT	199824	SEUVUR	GLPTP	LIV				
15	INT	221566	FAPUHSUON	GMZTP	LIV				

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## Modified allocation

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## Modified allocation

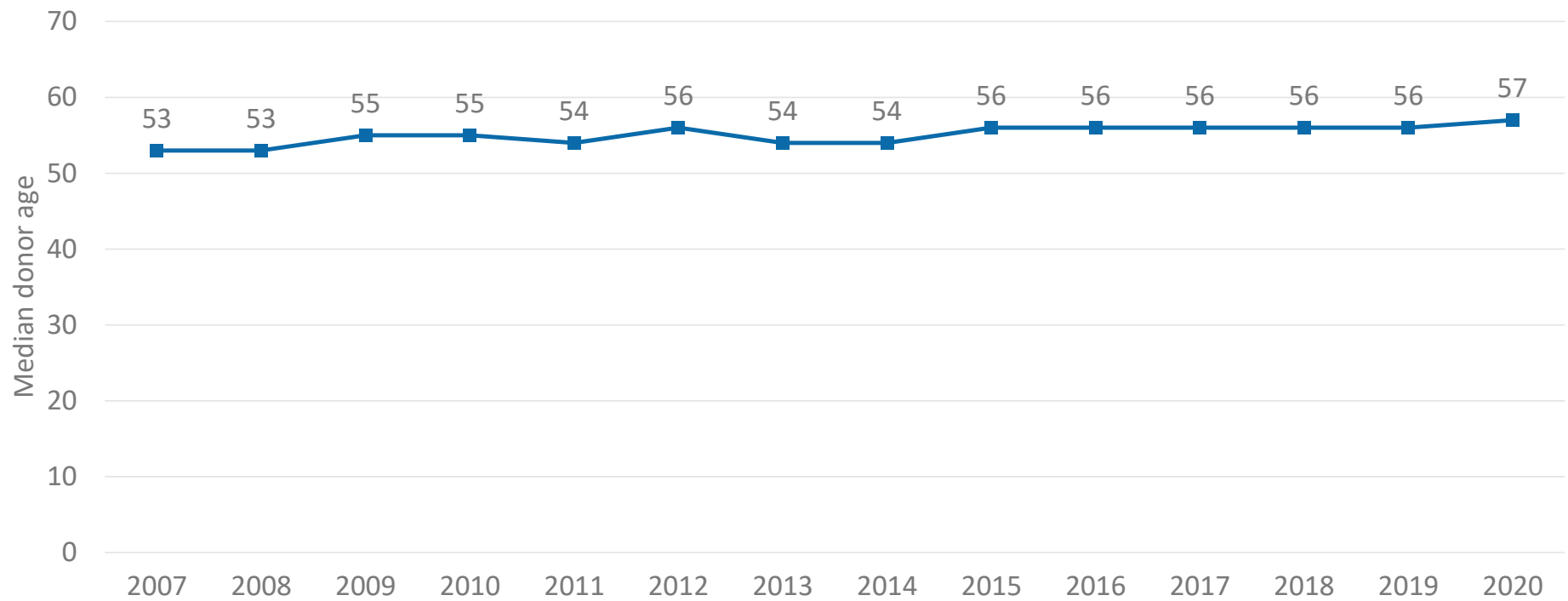
Eurotransplant Senior Program – Kidney allocation

„Old-for-old“-program

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## Median donor age

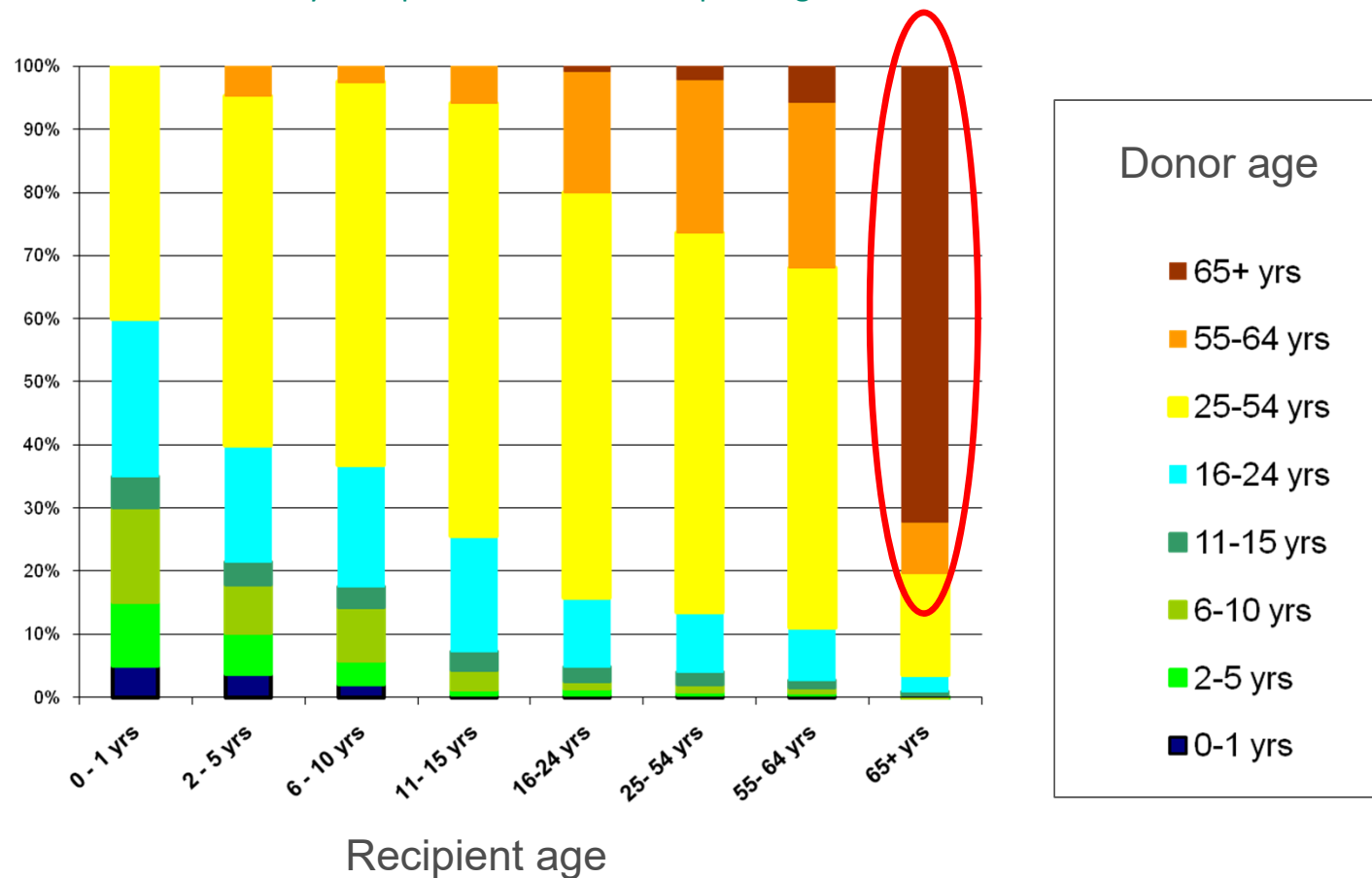
Germany, 2007-2020



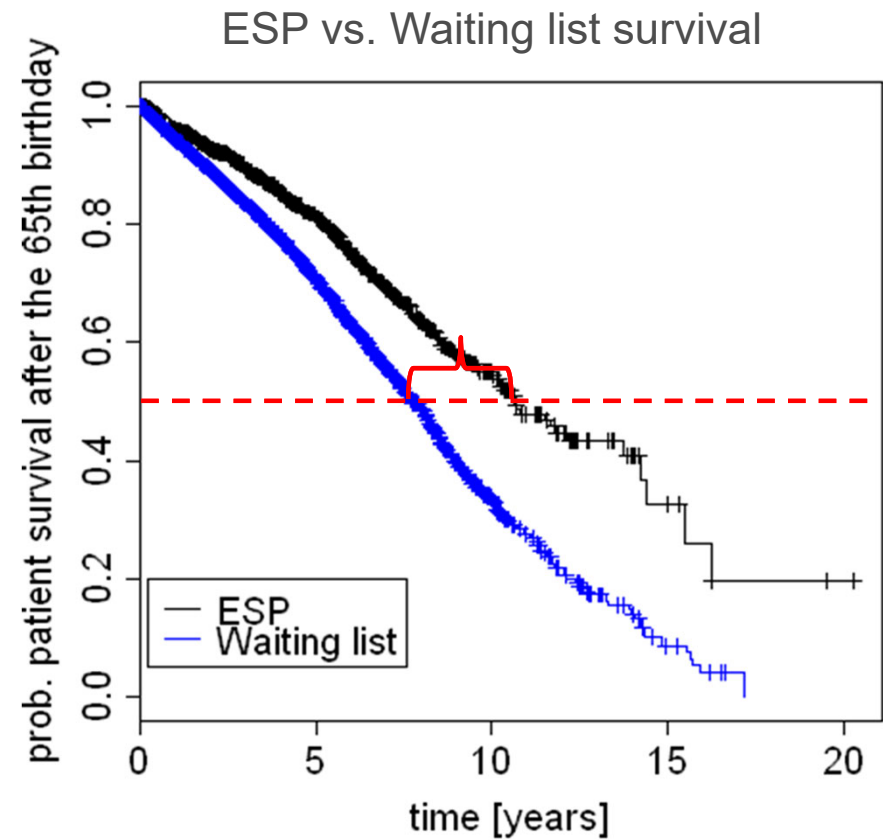
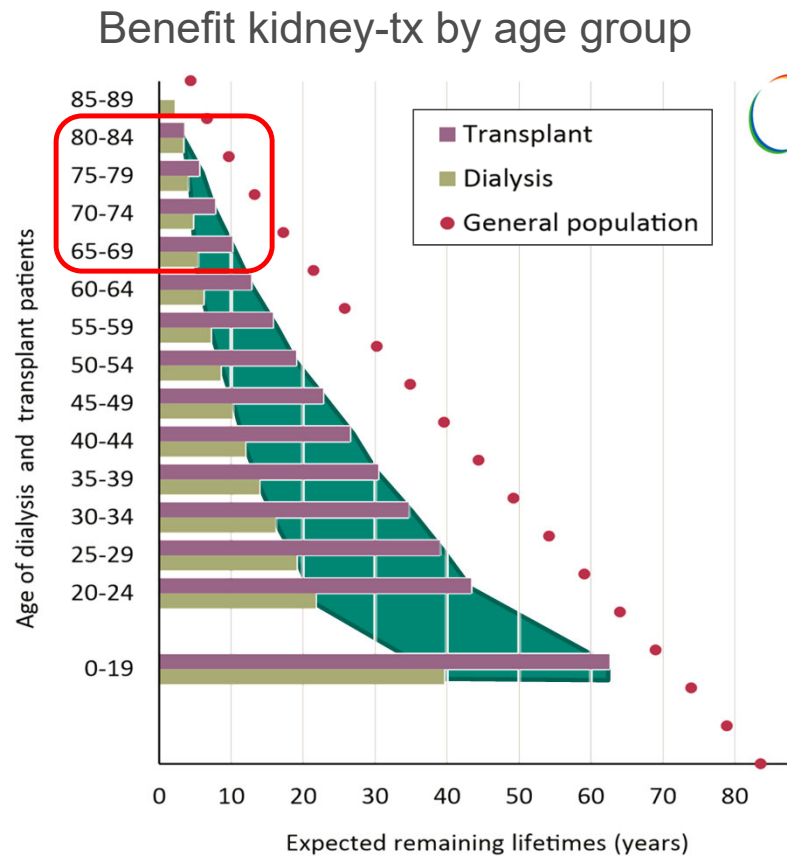
# Eurotransplant Senior Program (ESP) – „Old for old“-program



Deceased donor kidney transplants - donor vs. recipient age



## Kidney allocation – Eurotransplant Senior Program (ESP) – Outcome



Frei et al., AJT 2007

NASEM Webinar - April 16, 2021

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## Modified allocation

Expedited allocation - “Rescue” allocation

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## Expedited allocation - „Rescue“ allocation

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Shift from „standard“ to „expedited“ allocation takes place; when

- No suitable recipient can be found using standard allocation prior to the start of explantation (for thoracic organs: plus travel time for the thoracic explant team)
- (Abdominal) organ has been explanted and shipped but is turned down for the selected recipient and ischemic time does not allow restart of standard allocation
- -> Often extended criteria donors (ECD)

Goal

- Preventing organ loss („rescue“ of a precious organ)



## Recipient-Oriented Expedited Allocation (REAL)

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- All transplant centers that can be reached with the donor organ in time (taking acceptable ischemic time into account) are contacted
- Each center can identify up to two patients from its waiting list that could be transplanted with this donor organ
  - Taking donor and recipient characteristics and consent of the recipient into account
- These suitable recipients are reported back to Eurotransplant within 30 min after the offer
- Eurotransplant creates a match list of these suitable recipients based on the organ-specific allocation criteria and offers the donor organ in the sequence of this “Mini-Match”

# Recipient-oriented expedited allocation (REAL)



Rank	ET-number	Name
1	911866	xxxxxx xxxxxxxx
2	481844	xxxxxx xxxxxxxx
3	95383	xxxxxx xxxxxxxx
4	713120	xxxxxx xxxxxxxx
5	315402	xxxxxx xxxxxxxx
6	365392	xxxxxx xxxxxxxx
7	154275	xxxxxx xxxxxxxx
8	211370	xxxxxx xxxxxxxx
9	224889	xxxxxx xxxxxxxx
10	944251	xxxxxx xxxxxxxx
11	236459	xxxxxx xxxxxxxx
12	734391	xxxxxx xxxxxxxx
13	741706	xxxxxx xxxxxxxx
14	17870	xxxxxx xxxxxxxx
15	948339	xxxxxx xxxxxxxx
16	63200	xxxxxx xxxxxxxx
17	565684	xxxxxx xxxxxxxx
18	805966	xxxxxx xxxxxxxx
19	459106	xxxxxx xxxxxxxx
20	422810	xxxxxx xxxxxxxx
21	2726	xxxxxx xxxxxxxx
22	816131	xxxxxx xxxxxxxx
23	984541	xxxxxx xxxxxxxx
24	957569	xxxxxx xxxxxxxx
25	658807	xxxxxx xxxxxxxx
26	899606	xxxxxx xxxxxxxx
27	959612	xxxxxx xxxxxxxx
28	721421	xxxxxx xxxxxxxx
29	591297	xxxxxx xxxxxxxx
30	431398	xxxxxx xxxxxxxx
31	388916	xxxxxx xxxxxxxx
32	448791	xxxxxx xxxxxxxx
33	374639	xxxxxx xxxxxxxx
34	811682	xxxxxx xxxxxxxx
35	275724	xxxxxx xxxxxxxx
36	537873	xxxxxx xxxxxxxx
37	42698	xxxxxx xxxxxxxx
38	937302	xxxxxx xxxxxxxx
39	865791	xxxxxx xxxxxxxx
40	665731	xxxxxx xxxxxxxx
41	633264	xxxxxx xxxxxxxx
42	409280	xxxxxx xxxxxxxx
43	680280	xxxxxx xxxxxxxx
44	291446	xxxxxx xxxxxxxx
45	717307	xxxxxx xxxxxxxx
46	147734	xxxxxx xxxxxxxx
47	572102	xxxxxx xxxxxxxx
48	619994	xxxxxx xxxxxxxx
49	163741	xxxxxx xxxxxxxx
50	336247	xxxxxx xxxxxxxx
....		

Center response:

**Center A:**

ET-number: 224889 – rank 9

ET-number: 721421 – rank 28

**Center B:**

ET-number: 154275 – rank 7

ET-number: 336247 – rank 50

**Center C:**

ET-number: 734391 – rank 12

ET-number: 948339 – rank 15

Mini-Match:

1. ET-number: 154275 – rank 7

2. ET-number: 224889 – rank 9

3. ET-number: 734391 – rank 12

4. ET-number: 948339 – rank 15

5. ET-number: 721421 – rank 28

6. ET-number: 336247 – rank 50

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## International cooperation and modified allocation

### Benefits and challenges

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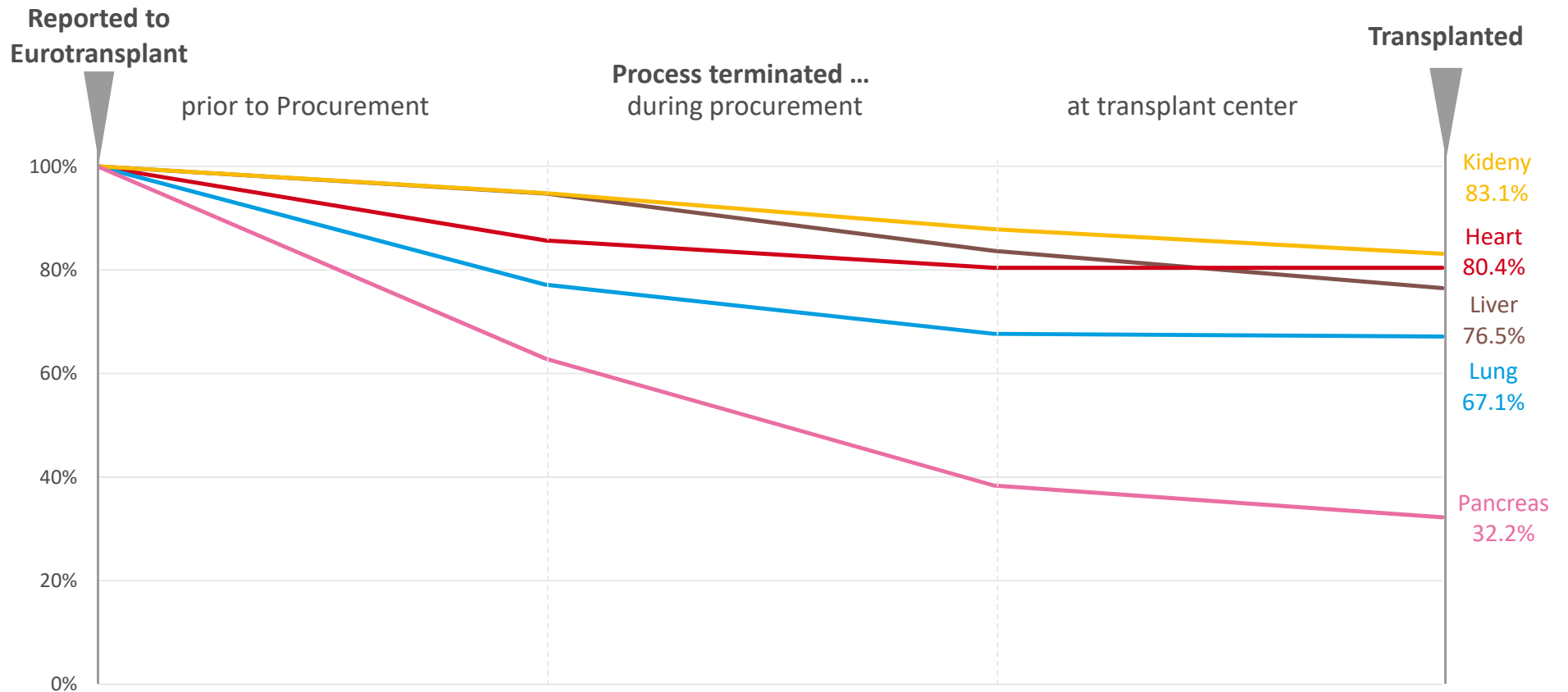
## Utilization

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# Organ utilization – from organ reporting to transplantation



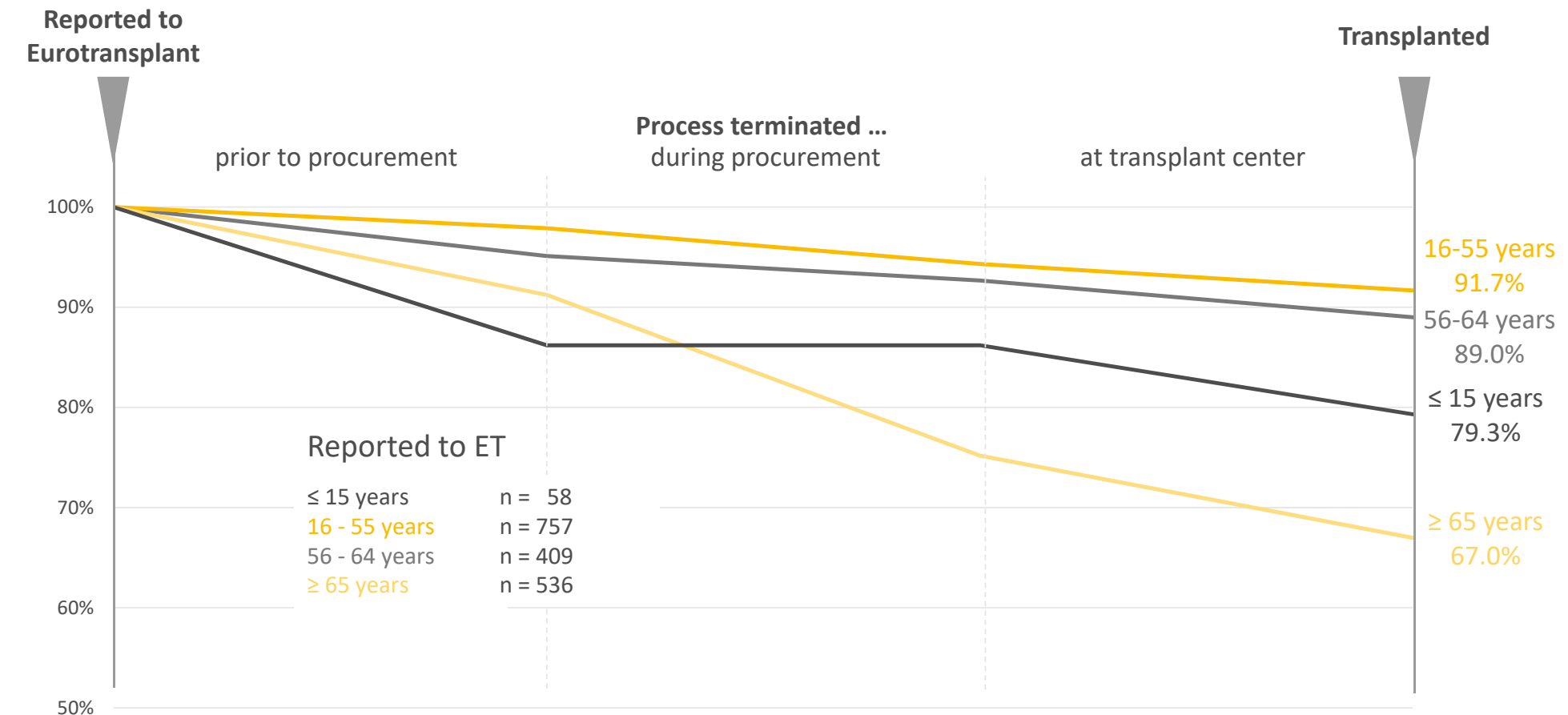
Germany 2020



# Kidney utilization – from organ reporting to transplantation



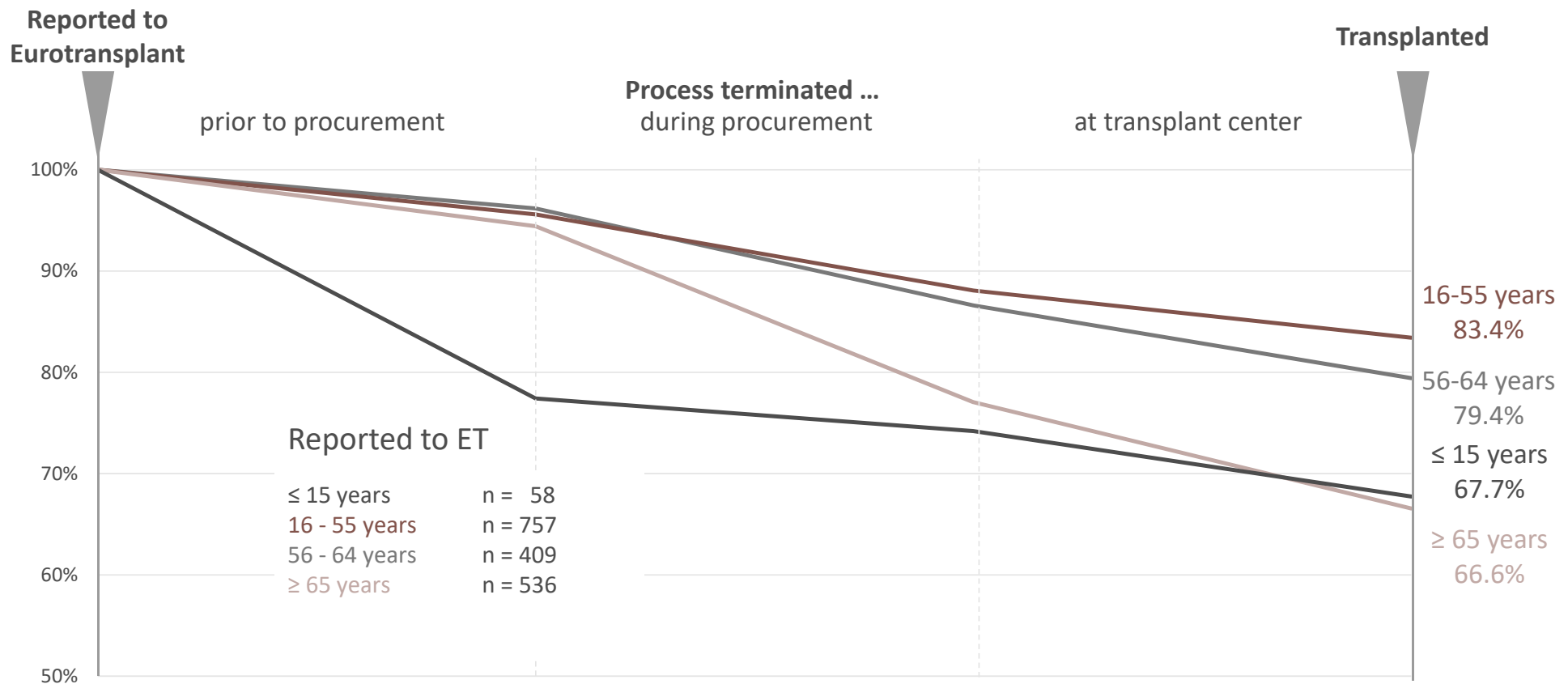
By donor age – Germany 2020



# Liver utilization – from organ reporting to transplantation

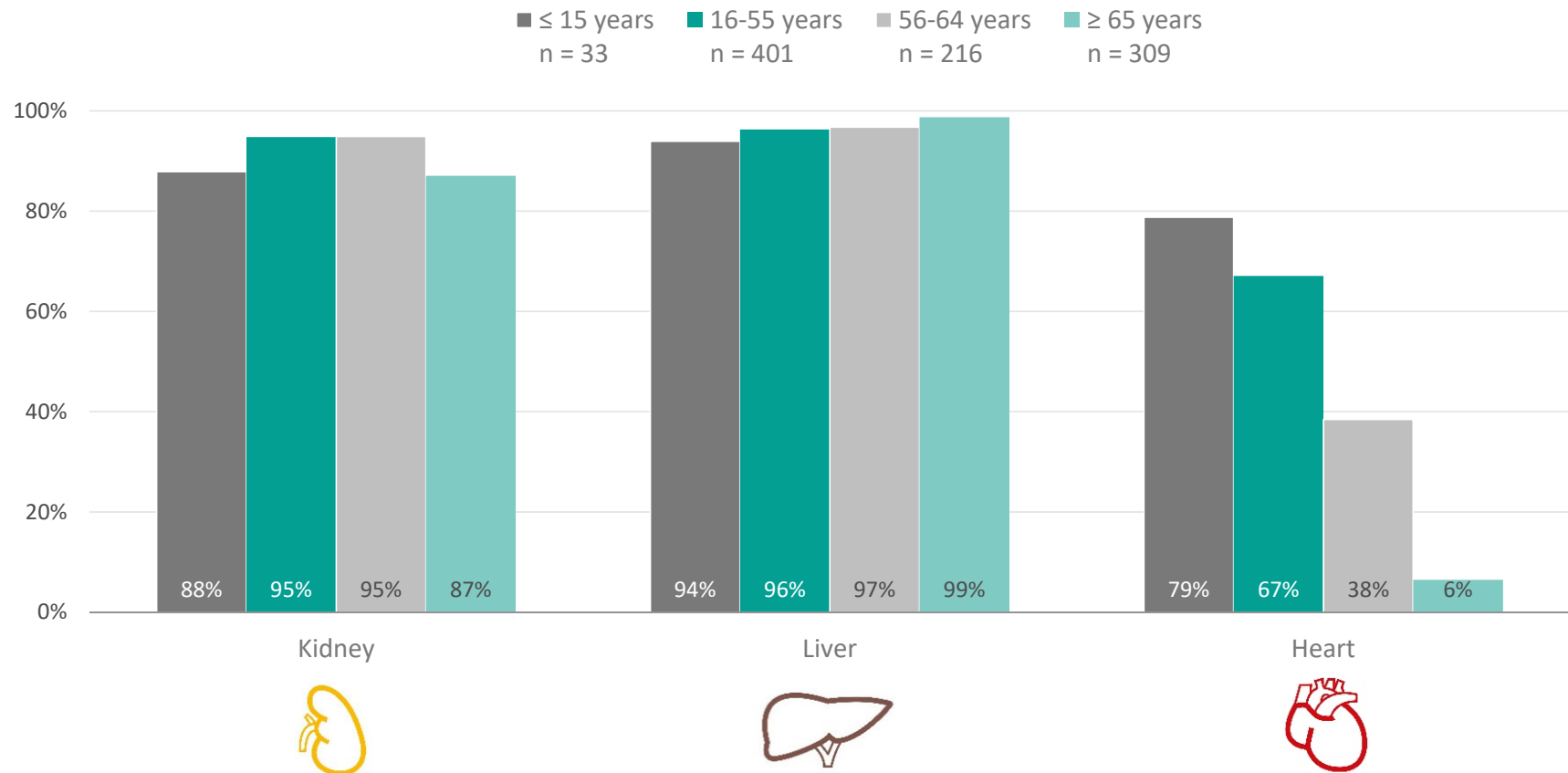


By donor age – Germany 2020



# Organs offered per age group (of all donors reported to Eurotransplant)

Germany 2020





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## Recipient benefits

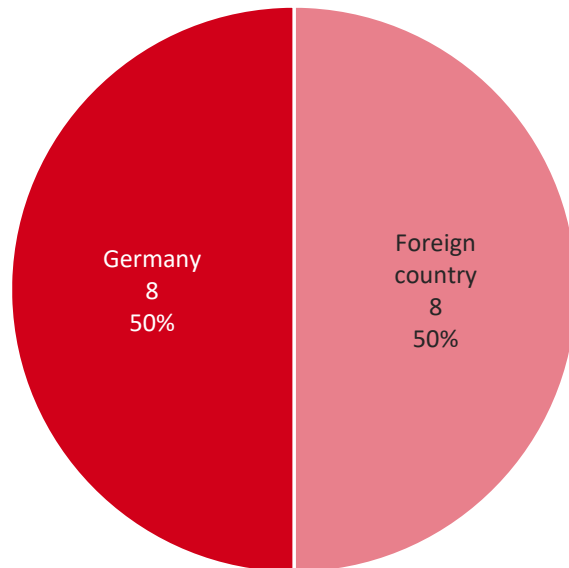
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# Origin of donor organs | Pediatric heart-transplants

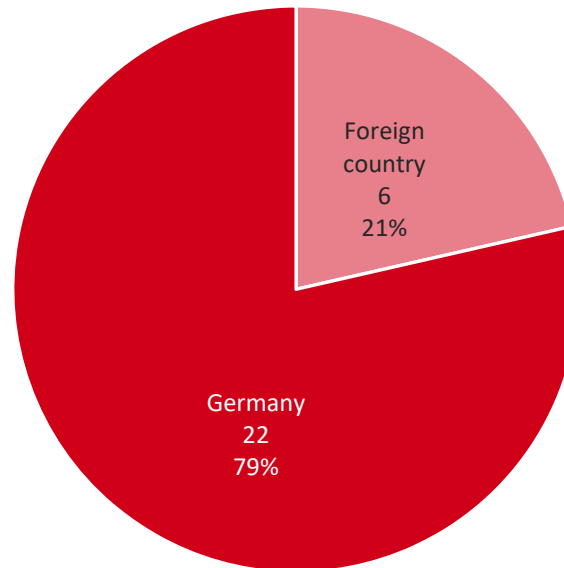


By recipient age | Germany 2019

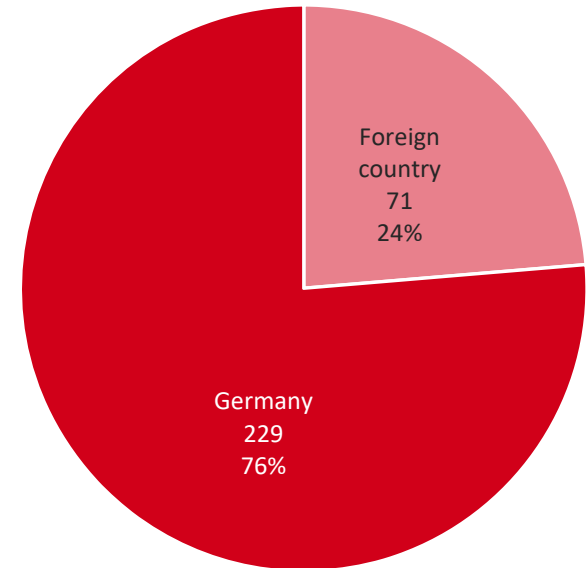
0 - 3 years



4 - 15 years



≥ 16 Jahre

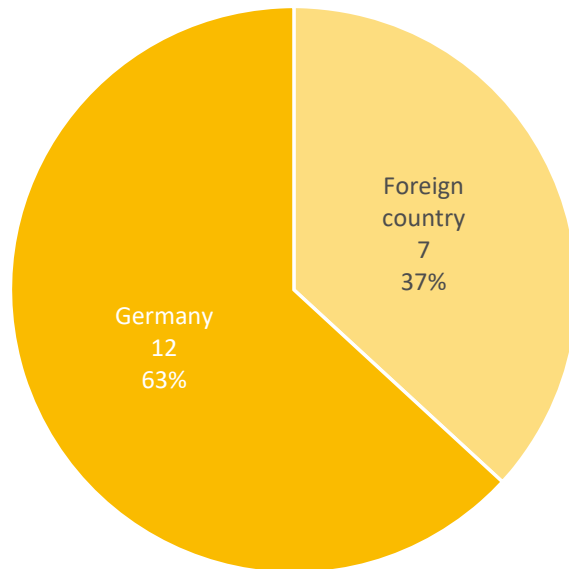


# Origin of donor organs | Pediatric kidney-transplants

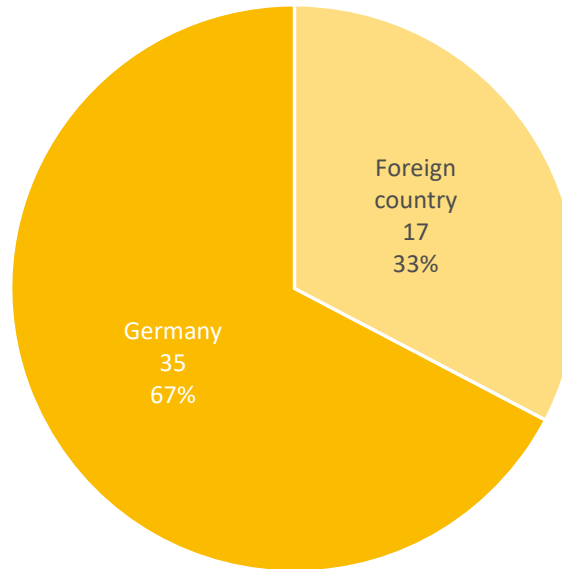


By recipient age | Germany 2019

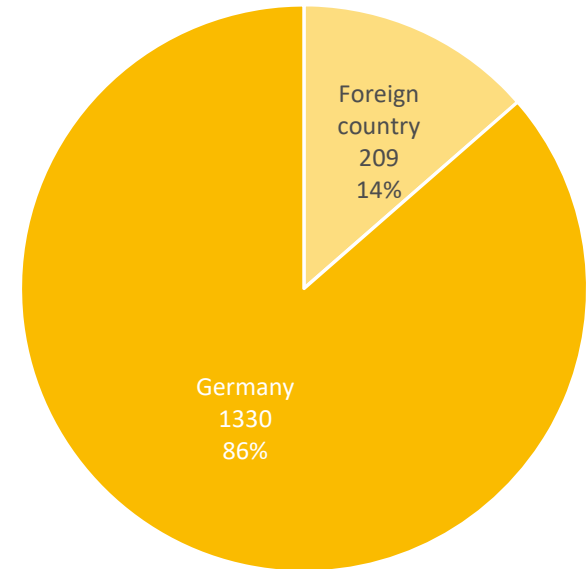
0 - 3 years



4 - 15 years



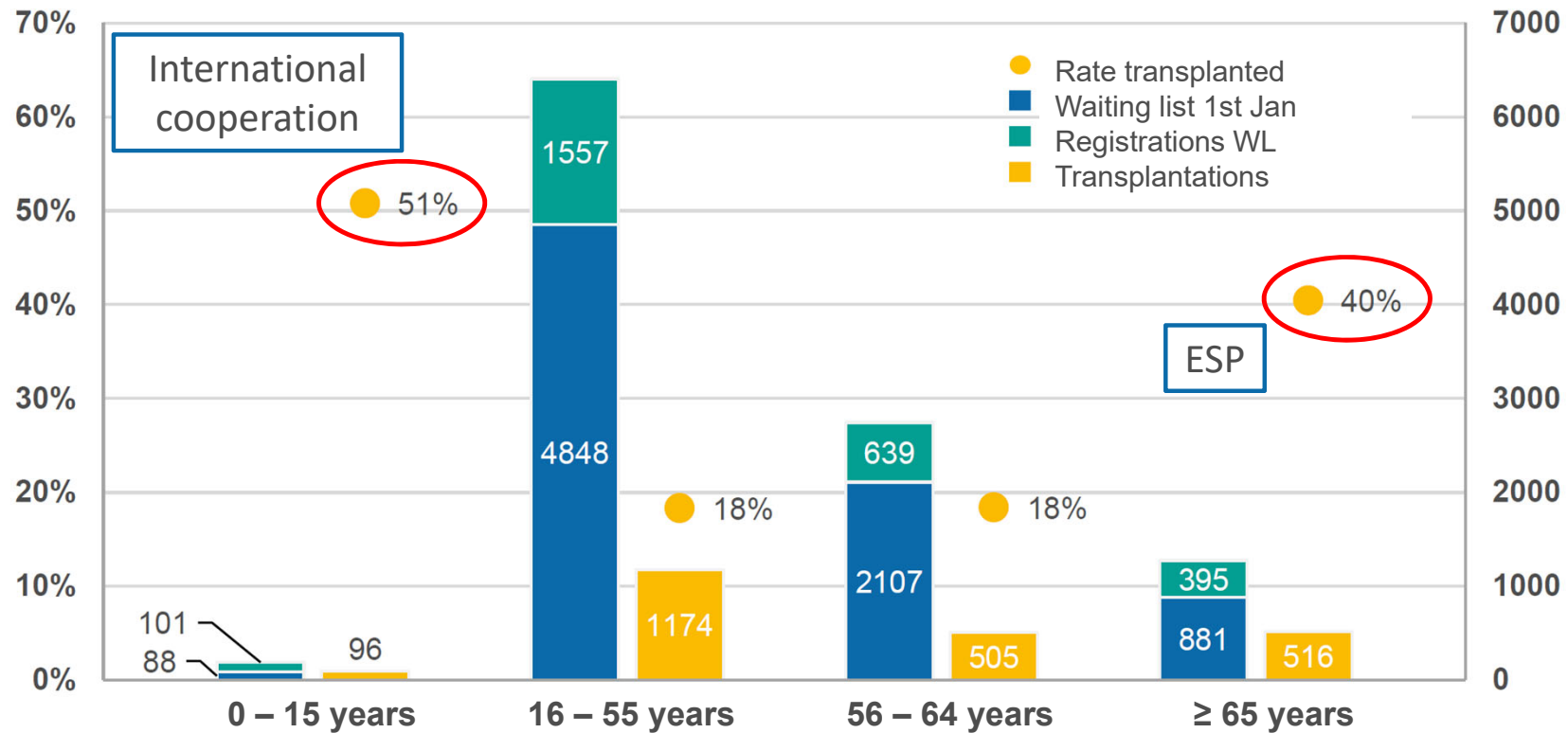
≥ 16 years



# Waiting list (WL) + WL registrations, transplants and WL dynamics



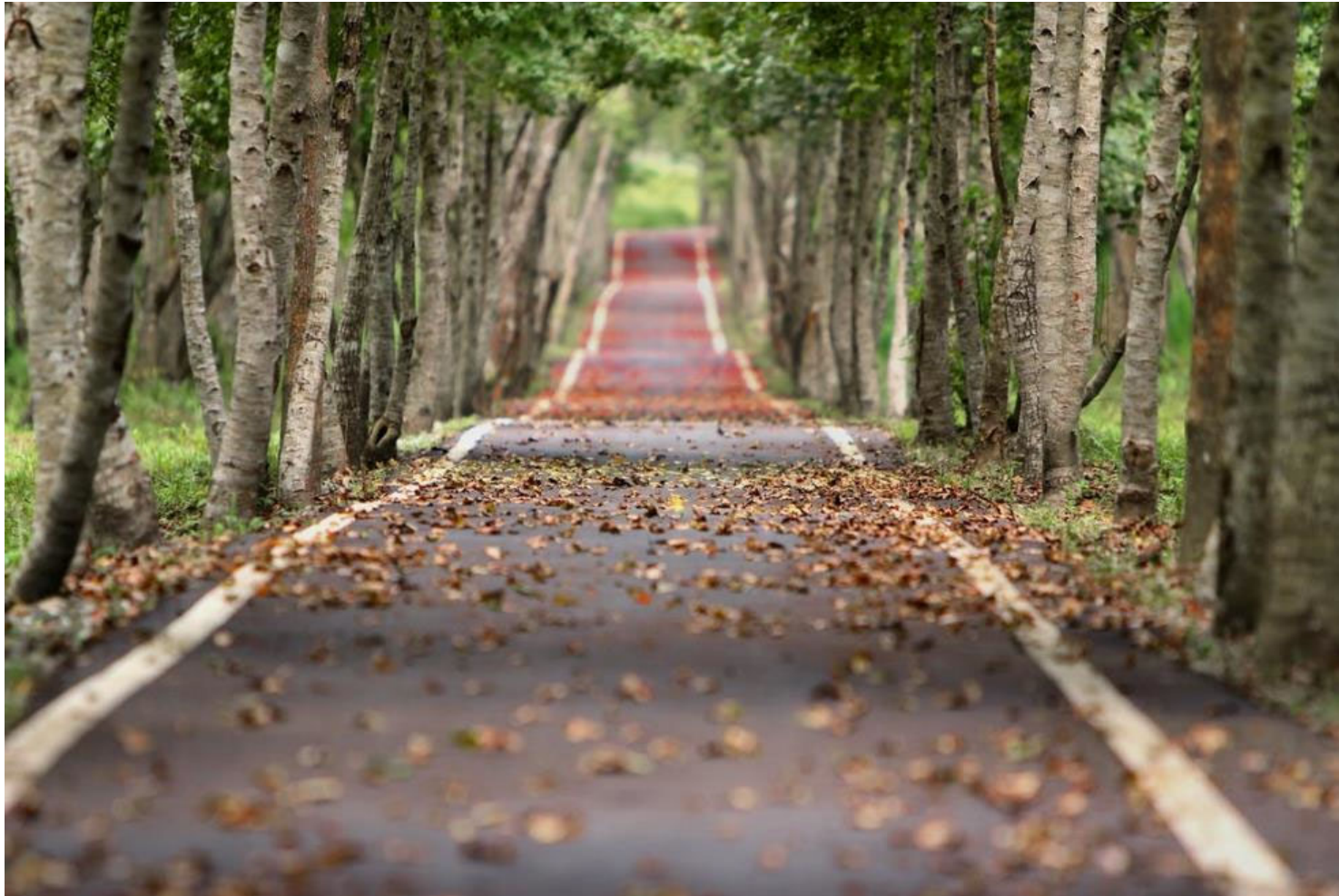
Germany 2018



- Development of allocation rules has to follow a transparent, stepwise approach
  - Clear definition / prioritization of goals / allocation principles well knowing that they are not always corresponding / can be contradicting
  - External monitoring / evaluation / formal approval of new allocation rules can help structuring the process of developing new allocation rules
- All suitable donors organs should be used to increase the benefit for the transplant population and to respect the precious gift of the donor
  - Allocation rules should take this into account
- Broad organ sharing has substantial benefits, in particular for special patient groups and helps to prevent organ loss

## Development of a roadmap needed

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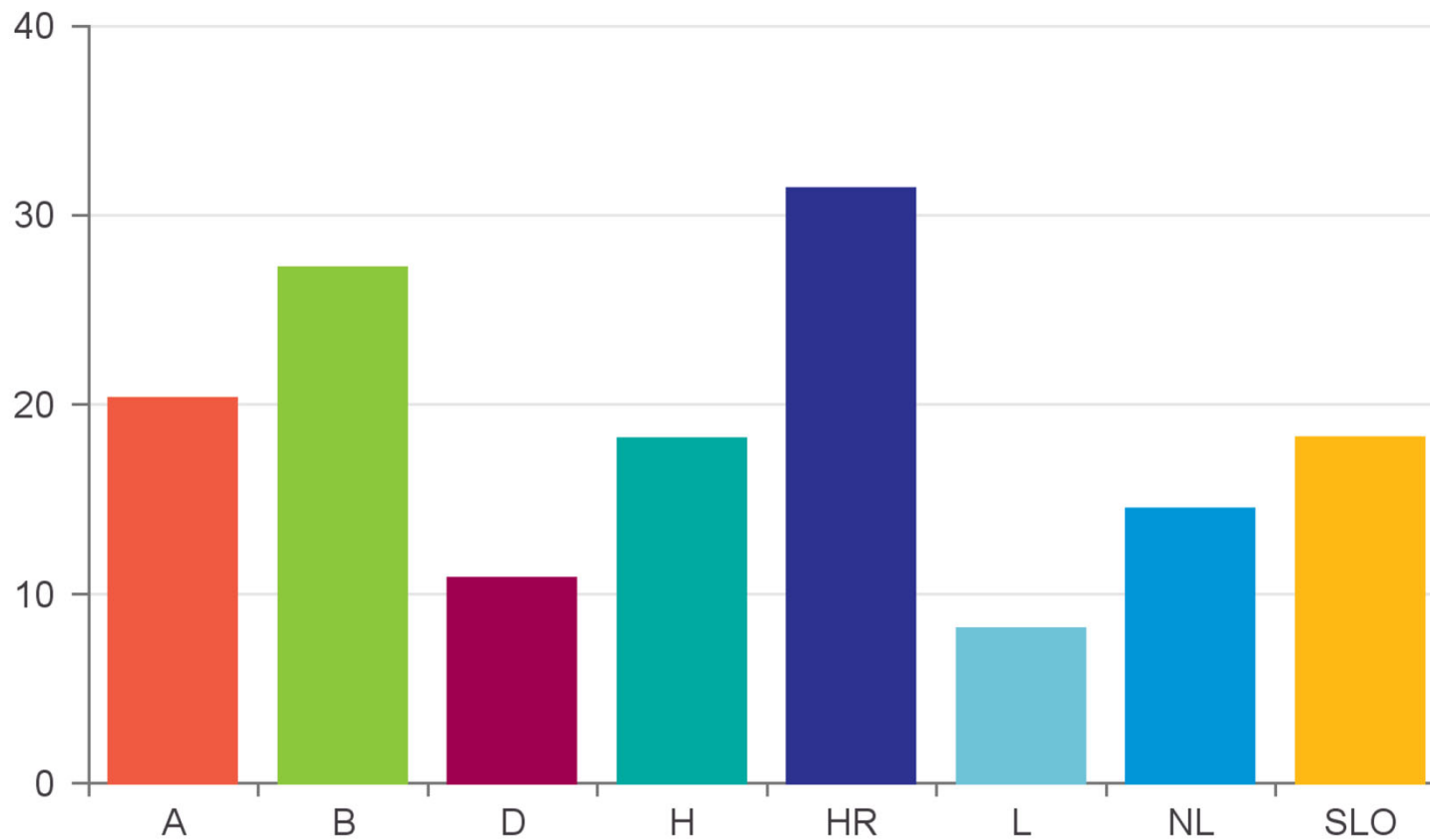
Reserve

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## Deceased donors – Eurotransplant countries



Per million population – Eurotransplant 2019

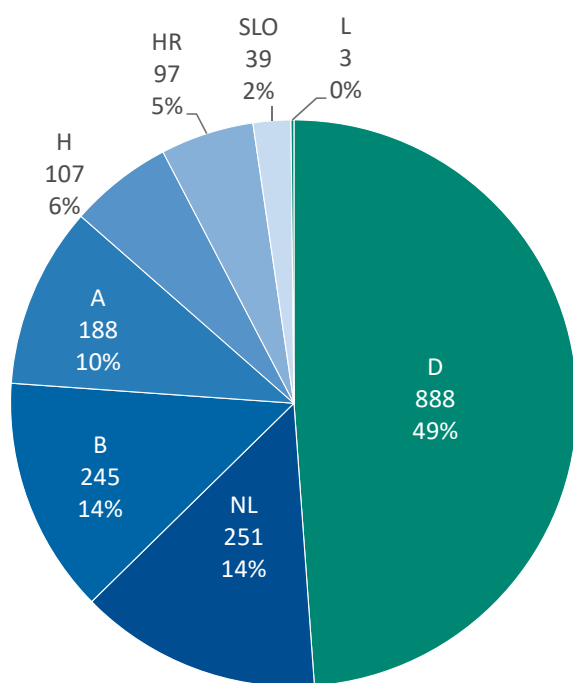




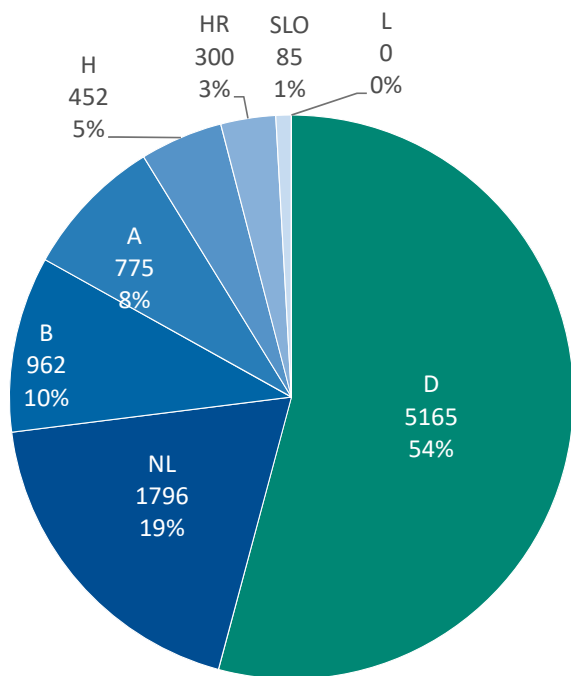
# Comparison Eurotransplant-countries 2020



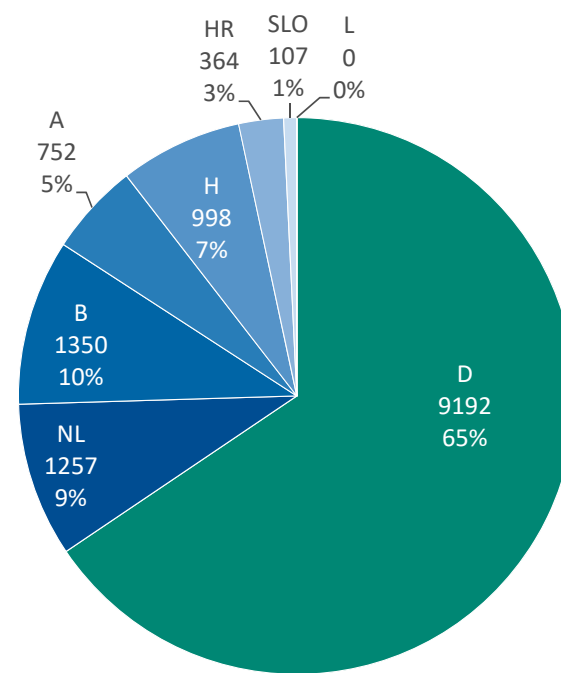
Deceased donor used | Waiting list registration | Waiting list by year end



Deceased donors used  
n = 1.818



Waiting list registration  
n = 9.534



Patients on waiting list (31.12.)  
n = 14.020

# Organ exchange via Eurotransplant – Allocation categories



Import/Export German perspective 2020

