GLOBAL REPORT ON ORGAN DONATION AND TRANSPLANTATION 2020

Activity and legislative & organizational issues

GODT
Global Observatory on Donation and Transplantation

World Health Organization
WHO Collaborating Centre on Donation and Transplantation

ONT
ORGANIZACIÓN NACIONAL DE TRASPLANTES

GLOBAL REPORT ON ORGAN DONATION AND TRANSPLANTATION 2020

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GLOBAL REPORT ON ORGAN DONATION AND TRANSPLANTATION 2020

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ABBREVIATIONS

AFR: African region

AMR: American Region

DBD: Donor after brain death

DCD: Donor after circulatory death

DD: Deceased donor

EMR: Eastern Mediterranean Region

EUR: European Region

GODT: Global Observatory on Donation and Transplantation

HDI: Human development index

ONT: Organización Nacional de Trasplantes

pmp: Per million population

SEAR: South East Asia Region

WHO: World Health Organization

WL: Waiting list

WPR: Western Pacific Region

FOREWORD

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Transplantation of organs, tissues or cells is an established form of treatment that is nowadays acknowledged as the best and very often the only life-saving therapy for several serious and life-threatening diseases or conditions. A sharp rise in chronic diseases such as diabetes, hypertension and cardiovascular disease that are mainly linked to aging populations and unhealthy lifestyles is becoming a worldwide crisis. The steady rise of end-stage disease and the need for therapeutic transplantation are far outpacing organ availability.

The foundation of donation of human origin substances lies in the traditional and longstanding values of solidarity and altruism. Social attitude and awareness play indeed a major role but we must accept the fact that this is a health service and as such, certain systems need to be in place (legislation, financing, organization, regulation, technical capacity, professional training).

Transplantation services should be integrated into the national health strategies and through universal health coverage we can do our best to ensure that everyone has access to such lifesaving therapies. Alternative replacement therapies such as dialysis must also be made available but with a balanced approach due to the cost-effectiveness and higher quality of transplantation.

Monitoring health trends is a core function of the World Health Organization (WHO) and is key to supporting countries in generating evidence-based policies and strategic plans. I am therefore, very pleased to introduce the 2020 Report of the Global Observatory on Donation and Transplantation which is the result of the longstanding collaboration of WHO with the Organización Nacional de Trasplantes of Spain. I believe that this report provides valuable information for policymakers, health professionals and the public for understanding the current trends in organ transplantation and identifying the areas for improvement.

This report reviews global progress in transplantation over the past years and is based on contributions from 104 WHO Member States. It clearly shows that more and more countries are recognizing the role of transplantation in their national health systems but unfortunately, transplant programs fall far short of meeting the increasing demand as in many countries deceased organ donation is virtually non-existent. The low development of transplantation services, combined with the shortage of organ donors, is the root cause of transplant tourism and may lead people to obtain a transplant through illegal and unethical pathways.

The World Health Assembly in 2010 endorsed a set of Guiding Principles on ethical, quality and safety aspects of transplantation and it is our task to assist Member States in transposing those principles into their national frameworks but also to guide them on how to implement them. We recognize the fact that resources are limited and especially for the low- and middle-income countries, thus no significant investments are made in that area.

Our current focus is to develop norms, standards and technical documents based on reliable information and data, to support Member States in providing safe, qualified and effective transplantation services and their appropriate integration into health systems for achieving universal health coverage and the Sustainable Development Goals.

There is a need for increased international collaboration at the highest political level and with the involvement of health professionals and other stakeholders in order to promote and safeguard organ, tissue and cell donation and transplantation. I would like to extend our gratitude to the government of Spain that has supported technically and financially, WHO's transplantation programme for many years and I take the opportunity for inviting other countries to also collaborate with us in making this plan effective.

1. INTRODUCTION

The Global Observatory on Donation and Transplantation (GODT)[1] is the result of a collaborative effort between the World Health Organization (WHO) and the Spanish Organización Nacional de Trasplantes (ONT). The GODT was created in 2006 in response to World Health Assembly Resolution 57.18,[2] requesting the Director General of the WHO to collect global data on the practices, safety, quality, efficacy, epidemiology and ethical issues of allogeneic transplantation. This request was further emphasized in Resolution 63.22,[3] that also urged Member States to collaborate in the collection of such data. The GODT compiles global activity data on organ donation and transplantation, as well as country descriptions of legislations and regulatory oversights in place.

The Council of Europe Newsletter Transplant database and other international data collections, such as that performed by countries of the Iberoamerican Council/Network of Donation and Transplantation (RCIDT), are connected with the GODT to avoid duplication of efforts.

The aim of this report is to provide an overview of the current legislative and organizational situation of donation and transplantation in the world, as well as of organ donation and transplantation activities in the year 2020, a year marked by the COVID-19 pandemic.

2. MATERIAL AND METHODS

A standardized questionnaire (http://www.transplant-observatory.org/download/questionnaire-2020/) was created through a consultation process driven by the WHO, to collect country specific information on legislation and organization of donation and transplantation programs and annual organ activities (donation, transplantation and waiting list) as aggregated data. The definitions applied for its completion are derived from the WHO Global Glossary on Donation and Transplantation.[4] Some selected definitions are as follows:

- Actual deceased donor (=deceased donor): Deceased person from whom at least one organ has been recovered for the purpose of transplantation.
- Utilized deceased donor: An actual donor from whom at least one organ has been transplanted.
- Donor declared dead by neurological criteria (=donor after brain death): A deceased organ donor in whom death has been determined by neurological criteria.
- Donor declared dead by circulatory criteria (=donor after circulatory death): A deceased organ donor in whom death has been determined by circulatory and respiratory criteria.
- Organ transplant: The transfer (engraftment) of human organs from a donor to a recipient with the aim of restoring function(s) in the body.
- Domino transplant: A procedure in which an organ is removed from one transplant candidate and immediately transplanted into a second patient, with the first patient receiving a new organ from a deceased donor.
- Paediatric donor/recipient: Donor/recipient aged less than 18 years.

The questionnaire is completed on an annual basis by individuals officially designated by the corresponding Ministries of Health or by identified health authorities in WHO Member States.

The State of World Population reports, from the United Nations Population Fund (UNFPA), are used as the source to estimate the population size for countries participating in the GODT. Information on the Human Development Index (HDI),that combines three basic dimensions of human development (a long and healthy life, knowledge and a decent standard of living)[5] is obtained from the United Nations Development Programme (UNDP). A HDI ≤ 0.546 represents a

[1] Global Observatory on Donation and Transplantation. Available at: http://www.transplant-observatory.org/. Access: July 2022.

[2] WHA Resolution 57.18 on Human organ and tissue transplantation. Available at: https://apps.who.int/gb/ebwha/pdf_files/WHA57/A57_R18-en.pdf. Access: July 2022

[3] WHA Resolution 63.22 on Human organ and tissue transplantation. Available at: https://apps.who.int/gb/ebwha/pdf_files/WHA63/A63_R22-en.pdf. Access: July 2022

[4] Global Glossary of Terms and Definitions on Donation and Transplantation. Available at: http://www.transplant-observatory.org/download/global-glossary/. Access: July 2022

[5] Human Development Report. United Nations Development Programme. Available at: https://hdr.undp.org/data-center/human-development-index#/indicies/HDI. Access: July 2022

low human development, a HDI of 0.697-0.554 represents a medium human development, a HDI of 0.796-0.703 represents a high human development and a HDI of 0.957-0.804 represents a very high human development.

Country aggregated data are analysed using descriptive statistics. Data are presented as absolute numbers, percentages and rates per million population (pmp) in the form of figures, tables and maps. Counts for combined or double organ transplants are made as follows:

I. a double kidney transplant is considered as one transplant;

II. a combined heart-lung transplant is counted as one lung transplant and one heart transplant.;

III. a double lung transplant is considered as one transplant;

IV. a combined kidney-pancreas transplant is counted as one kidney transplant and one pancreas transplant.

Countries occasionally provide incomplete data. This circumstance has been indicated along the report, where appropriate. For some selected indicators, data have been displayed exclusively for those countries that have reported this type of information, whenever the figures were > 0. Where relevant, data are displayed for the different WHO regions: African region (AFR), American Region (AMR), Eastern Mediterranean Region (EMR), European Region (EUR), South East Asia Region (SEAR) and Western Pacific Region (WPR).

Statistical analyses have been performed with the SPSS software (version 25.0).

3. RESULTS

3.1 LEGISLATION AND ORGANIZATION OF DONATION AND TRANSPLANTION PROGRAMS

In total, 104 out of the 194 Member States have provided the GODT with information on the regulatory framework and the organization of donation and transplantation activities in their jurisdiction (**Annex 1**). The description provided in this section is based on the latest available description of such issues by participating Member States.

3.1.1 LEGISLATION

Ninety-five out of the 104 responding Member States reported having any legal requirement that covers aspects of organ donation and /or transplantation (**Annex 2-Global map 1**).

3.1.2. CONSENT

> **"Cells, tissues and organs may be removed from the bodies of deceased persons for the purpose of transplantation if: (a) any consent required by law is obtained, and (b) there is no reason to believe that the deceased person objected to such removal."**
>
> *WHO Guiding Principle 1 on Human Cell, Tissue and Organ Transplantation*

Eighty-seven countries have provided information on the consent policy in place to proceed with deceased donation. Of those, 45 (52%) have an opt-in system and 33 (38%) an opt-out system in place, while 9 (10%) have described a mixed or an undefined policy (**Annex 2-Global map 2**).

3.1.3 ORGANIZATION

> **"Member States are urged to strengthen national and multinational authorities and/or capacities to provide oversight, organization and coordination of donation and transplantation activities, with special attention to maximizing donation from deceased donors and to protecting the health and welfare of living donors with appropriate health care services and long term follow up"**
>
> *WHA Resolution 63.22 on Human Organ and Tissue Transplantation*

Ninety-three countries have informed of a governmental authority and/or specific organization, institution or agency, overseeing organ donation and /or transplantation. (**Annex 2-Global map 3**). Most of these agencies (86%) are publically funded, 3% have exclusively private funds, 8% receive both, public-private funds, while 3 % have not specified the type of funding of their national agency.

Table 1 shows the number of transplant centers available per type of organ and WHO region. It also includes the mean population covered by transplant center, with profound disparities across regions.

3.1.4 REGISTRIES, SURVEILLANCE SYSTEMS AND GUIDELINES

> **"High-quality, safe and efficacious procedures are essential for donors and recipients alike. The long-term outcomes of cell, tissue and organ donation and transplantation should be assessed for the living donor as well as the recipient in order to document benefit and harm. The level of safety, efficacy and quality of human cells, tissues and organs for transplantation, as health products of an exceptional nature, must be maintained and optimized on an ongoing basis. This requires implementation of quality systems including traceability and vigilance, with adverse events and reactions reported, both nationally and for exported human products."**
>
> *WHO Guiding Principle 10 on Human Cell, Tissue and Organ Transplantation*

Table 2 shows the countries with registries on socio-demographic, clinical and/or epidemiological data of the donors, living or deceased. It also displays information on existing follow-up registries of transplant recipients and living donors, per type of organ.

Table 3 describes surveillance systems in Member States, based on the reporting of adverse events and adverse reactions in living organ donors and transplant recipients. It also presents those countries with a mechanism to ensure traceability of organs.

In terms of education, 22 responding Member States (21%) have developed a systematic public educational program on donation and transplantation at school level. Regarding the training of health professionals, 62 responding Member States (60%) have training programs within the country intended to harmonize practices for staff involved in organ donation/recovery, and 58 (56%) have such programs in organ transplantation.

Table 4 shows Member States that have any protocols/standards/guidelines for donor identification, criteria for donor selection and screening for transmissible diseases of deceased donors and standard guidelines for the evaluation of living donors.

Sixty-six (63%) countries have transparent systems based on specific criteria for the inclusion of patients on the transplant waiting list and the same number of countries have developed criteria for the allocation of organs obtained from deceased persons.

Table 1. Distribution of transplant centers among the WHO regions in 2020.

Transplant centres (millions inhabitants / centre)*	AFR	AMR	EMR	EUR	SEAR	WPR
Kidney	32 (15.0)	885 (1.1)	75 (6.3)	453 (1.9)	623 (2.6)	338 (5.3)
Liver	3 (159.5)	401 (2.5)	23 (20.4)	239 (3.5)	201 (8.1)	148 (12.2)
Heart	0 (0.0)	334 (2.9)	9 (52.3)	174 (4.9)	157 (10.4)	75 (24.1)
Lungs	0 (0.0)	118 (8.3)	3 (156.8)	91 (9.3)	83 (19.7)	81 (29.6)
Pancreas	0 (0.0)	225 (4.4)	5 (94.1)	121 (7.0)	54 (30.3)	68 (26.6)
Small Bowel	0 (0.0)	39 (25.2)	1 (470.3)	46 (18.4)	19 (86.1)	55 (32.8)

*Million inhabitants per transplant centre are calculated by applying the population of the responding countries.

Table 2. Availability of different types of donor and transplant registries.

	Donors' Registries		Recipients Follow up / outcomes registries					Living Donors Follow up registries		
Countries	DD registries	LD registries	Kidney	Liver	Heart	Lung	Pancreas	Kidney LD	Liver LD	Lung LD
Albania			Yes					Yes		
Algeria			Yes					Yes		
Argentina	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Armenia		Yes	Yes					Yes		
Australia	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Austria			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Azerbaijan		Yes	Yes	Yes				Yes	Yes	
Belarus	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	
Belgium	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bhutan										
Bosnia & Herzegovina			Yes	Yes				Yes	Yes	
Brazil	Yes	Yes	Yes	Yes	Yes	Yes	Yes			
Bulgaria	Yes		Yes	Yes	Yes					
Cameroon										
Canada	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Chile	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
China	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Colombia	Yes	Yes	Yes	Yes	Yes			Yes	Yes	
Costa Rica	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Croatia	Yes		Yes	Yes	Yes		Yes	Yes	Yes	
Cuba	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cyprus	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Czech Rep	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dominican Rep	Yes	Yes	Yes	Yes	Yes			Yes	Yes	
Ecuador	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	
Estonia	Yes	Yes	Yes	Yes		Yes		Yes		
Ethiopia		Yes	Yes					Yes		
Fiji										
Finland	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
France	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Georgia		Yes								
Germany	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ghana			Yes					Yes		
Hungary	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		

Table 2. Availability of different types of donor and transplant registries. *(continue)*

	Donors' Registries		Recipients Follow up / outcomes registries					Living Donors Follow up registries		
Countries	DD registries	LD registries	Kidney	Liver	Heart	Lung	Pancreas	Kidney LD	Liver LD	Lung LD
Iceland	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
India	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Iran	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ireland			Yes	Yes	Yes	Yes	Yes	Yes		
Israel	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Italy	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Japan	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Jordan	Yes	Yes	Yes	Yes				Yes	Yes	
Kazakhstan	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Kenya										
Kuwait			Yes				Yes	Yes		
Kyrgyzstan		Yes						Yes		
Latvia	Yes	Yes	Yes		Yes			Yes		
Lebanon	Yes		Yes	Yes	Yes	Yes				
Libya		Yes	Yes	Yes				Yes	Yes	
Lithuania	Yes	Yes								
Malaysia	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Maldives										
Mali		Yes	Yes					Yes		
Malta	Yes	Yes								
Mexico	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Monaco										
Mongolia	Yes	Yes	Yes	Yes				Yes	Yes	
Montenegro	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	
Morocco										
Netherlands	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Nicaragua			Yes					Yes		
Nigeria			Yes					Yes		
Norway	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Oman		Yes	Yes	Yes				Yes		
Pakistan			Yes	Yes				Yes		
Panama	Yes	Yes	Yes	Yes				Yes		
Paraguay	Yes	Yes	Yes	Yes	Yes		Yes	Yes		
Peru	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Philippines	Yes	Yes	Yes	Yes				Yes	Yes	
Poland	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Portugal	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 2. Availability of different types of donor and transplant registries. *(continue)*

	Donors' Registries		Recipients Follow up / outcomes registries					Living Donors Follow up registries		
Countries	DD registries	LD registries	Kidney	Liver	Heart	Lung	Pancreas	Kidney LD	Liver LD	Lung LD
Qatar	Yes	Yes	Yes	Yes				Yes	Yes	
Rep of Korea			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Rep of Moldova	Yes	Yes	Yes	Yes				Yes	Yes	
North Macedonia			Yes					Yes		
Romania	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Russia			Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Saudi Arabia	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Senegal										
Serbia			Yes	Yes	Yes			Yes		
Singapore	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Slovakia	Yes	Yes	Yes	Yes	Yes			Yes		
Slovenia	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
South Africa										
Spain	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Sri Lanka	Yes		Yes	Yes	Yes	Yes	Yes			
Sudan		Yes	Yes					Yes		
Switzerland			Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Syria										
Tajikistan	Yes	Yes	Yes	Yes				Yes	Yes	
Thailand	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Trinidad & Tobago	Yes	Yes	Yes					Yes		
Tunisia			Yes	Yes	Yes			Yes	Yes	
Turkey	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Ukraine			Yes	Yes	Yes			Yes	Yes	
U.Arab Emir.		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UK	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Tanzania		Yes	Yes					Yes		
USA	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Uruguay	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Uzbekistan			Yes					Yes		
Venezuela	Yes	Yes	Yes					Yes		
Viet Nam										
Total N. (%)	64 (61%)	68 (65%)	89 (85%)	73 (70%)	61 (58%)	48 (46%)	48 (46%)	85 (81%)	54 (51%)	25 (24%)

DD registries: Deceased Donors´ registries; LD registries: Living Donors´ registries; Kidney LD: Kidney Living Donor; Liver LD: Liver Living Donor; Lung LD: Lung Living Donor; Blank fields: Not available information/not applicable or not registries in place

Table 3. Availability of systems for the reporting and management of adverse events and reactions and to ensure traceability of organs.

Countries	Adverse events	Adverse reactions in tx recipients	Adverse reactions in LD	Mechanisms to ensure traceability
Albania		Yes		
Algeria				Yes
Argentina	Yes	Yes		Yes
Armenia	Yes	Yes		
Australia	Yes	Yes		Yes
Austria	Yes	Yes		Yes
Azerbaijan	Yes	Yes	Yes	Yes
Belarus	Yes	Yes	Yes	Yes
Belgium	Yes	Yes	Yes	Yes
Bhutan				
Bosnia & Herzegovina	Yes	Yes	Yes	Yes
Brazil	Yes			Yes
Bulgaria	Yes	Yes	Yes	Yes
Cameroon				
Canada	Yes	Yes		Yes
Chile				
China	Yes	Yes	Yes	Yes
Colombia	Yes	Yes	Yes	Yes
Costa Rica	Yes	Yes	Yes	
Croatia	Yes	Yes	Yes	Yes
Cuba	Yes	Yes	Yes	Yes
Cyprus	Yes	Yes	Yes	Yes
Czech Rep	Yes	Yes	Yes	Yes
Dominican Rep	Yes	Yes		Yes
Ecuador	Yes	Yes		Yes
Estonia	Yes	Yes	Yes	Yes
Ethiopia	Yes		Yes	Yes
Fiji				
Finland	Yes	Yes	Yes	Yes
France	Yes	Yes	Yes	Yes
Georgia				
Germany	Yes	Yes	Yes	Yes

Table 3. Availability of systems for the reporting and management of adverse events and reactions and to ensure traceability of organs. *(continue)*

Countries	Adverse events	Adverse reactions in tx recipients	Adverse reactions in LD	Mechanisms to ensure traceability
Ghana		Yes	Yes	
Greece	Yes			Yes
Hungary	Yes	Yes		Yes
Iceland				Yes
India				Yes
Iran	Yes	Yes	Yes	Yes
Ireland	Yes	Yes	Yes	Yes
Israel	Yes	Yes		Yes
Italy	Yes	Yes	Yes	Yes
Japan	Yes	Yes	Yes	Yes
Jordan				Yes
Kazakhstan	Yes	Yes	Yes	Yes
Kenya				
Kuwait				Yes
Kyrgyzstan			Yes	
Latvia	Yes	Yes	Yes	Yes
Lebanon				Yes
Libya	Yes	Yes	Yes	Yes
Lithuania	Yes	Yes	Yes	Yes
Malaysia	Yes	Yes	Yes	Yes
Maldives				
Mali			Yes	Yes
Malta	Yes	Yes	Yes	Yes
Mexico				Yes
Monaco				
Mongolia	Yes	Yes	Yes	
Montenegro	Yes	Yes	Yes	Yes
Morocco				
Netherlands	Yes	Yes	Yes	Yes
Nicaragua				
Nigeria	Yes	Yes	Yes	Yes
Norway				

Table 3. Availability of systems for the reporting and management of adverse events and reactions and to ensure traceability of organs. *(continue)*

Countries	Adverse events	Adverse reactions in tx recipients	Adverse reactions in LD	Mechanisms to ensure traceability
Oman	Yes	Yes	Yes	Yes
Pakistan	Yes	Yes	Yes	
Panama	Yes	Yes	Yes	Yes
Paraguay	Yes		Yes	
Peru	Yes	Yes	Yes	
Philippines				Yes
Poland	Yes	Yes	Yes	Yes
Portugal	Yes	Yes	Yes	Yes
Qatar	Yes	Yes	Yes	Yes
Rep of Korea	Yes	Yes	Yes	Yes
Rep of Moldova	Yes	Yes	Yes	Yes
North Macedonia				Yes
Romania	Yes	Yes	Yes	Yes
Russia	Yes	Yes	Yes	Yes
Saudi Arabia	Yes	Yes	Yes	Yes
Senegal				
Serbia	Yes	Yes		Yes
Singapore	Yes	Yes	Yes	Yes
Slovakia	Yes	Yes		Yes
Slovenia	Yes	Yes	Yes	Yes
South Africa				
Spain	Yes	Yes	Yes	Yes
Sri Lanka	Yes			Yes
Sudan	Yes	Yes	Yes	Yes
Switzerland			Yes	Yes
Syria				
Tajikistan	Yes	Yes	Yes	
Thailand	Yes	Yes	Yes	Yes
Trinidad&Tobago	Yes	Yes	Yes	Yes
Tunisia	Yes	Yes	Yes	Yes
Turkey				Yes
Ukraine	Yes	Yes	Yes	

Table 3. Availability of systems for the reporting and management of adverse events and reactions and to ensure traceability of organs. *(continue)*

Countries	Adverse events	Adverse reactions in tx recipients	Adverse reactions in LD	Mechanisms to ensure traceability
U.A.Emirates	Yes	Yes	Yes	Yes
UK	Yes	Yes	Yes	Yes
Tanzania				Yes
USA	Yes	Yes	Yes	Yes
Uruguay	Yes	Yes	Yes	Yes
Uzbekistan				
Venezuela	Yes	Yes	Yes	
Viet Nam				
Total N. (%)	**72 (69%)**	**69 (66%)**	**62 (59%)**	**76 (73%)**

Blank fields: Not available information/not applicable or not in place

Table 4. Availability of protocols, standards or guidelines in deceased donation and living donation.

	Protocols, standards, guidelines for DD			Protocols, standards, guidelines for LD
	Donor identification	Donor selection	TD Screening	Donor evaluation
Albania				Yes
Algeria	Yes	Yes	Yes	Yes
Argentina	Yes	Yes	Yes	
Armenia				Yes
Australia	Yes	Yes	Yes	Yes
Austria	Yes	Yes		
Azerbaijan				
Belarus	Yes	Yes	Yes	Yes
Belgium	Yes	Yes	Yes	Yes
Bhutan				Yes
Bosnia & Herzegovina	Yes	Yes	Yes	Yes
Brazil	Yes	Yes	Yes	Yes
Bulgaria	Yes	Yes	Yes	Yes
Cameroon				
Canada	Yes	Yes	Yes	Yes

Table 4. Availability of protocols, standards or guidelines in deceased donation and living donation. *(continue)*

	Protocols, standards, guidelines for DD			Protocols, standards, guidelines for LD
	Donor identification	Donor selection	TD Screening	Donor evaluation
Chile	Yes	Yes	Yes	Yes
China	Yes	Yes	Yes	Yes
Colombia	Yes	Yes	Yes	
Costa Rica	Yes	Yes	Yes	Yes
Croatia	Yes	Yes	Yes	Yes
Cuba	Yes	Yes	Yes	Yes
Cyprus	Yes	Yes	Yes	Yes
Czech Republic	Yes	Yes	Yes	Yes
Dominican Rep	Yes	Yes	Yes	Yes
Ecuador	Yes	Yes	Yes	Yes
Estonia	Yes	Yes	Yes	Yes
Ethiopia				Yes
Fiji				
Finland	Yes	Yes	Yes	Yes
France	Yes	Yes	Yes	Yes
Georgia				Yes
Germany	Yes	Yes	Yes	Yes
Ghana				Yes
Greece	Yes	Yes	Yes	
Hungary	Yes	Yes	Yes	Yes
Iceland	Yes	Yes	Yes	Yes
India	Yes	Yes	Yes	Yes
Iran	Yes	Yes	Yes	Yes
Ireland				Yes
Israel	Yes	Yes	Yes	Yes
Italy	Yes	Yes	Yes	Yes
Japan	Yes	Yes	Yes	Yes
Jordan	Yes	Yes	Yes	Yes
Kazakhstan	Yes	Yes	Yes	Yes
Kenya				Yes
Kuwait	Yes	Yes	Yes	Yes

Table 4. Availability of protocols, standards or guidelines in deceased donation and living donation. *(continue)*

	Protocols, standards, guidelines for DD			Protocols, standards, guidelines for LD
	Donor identification	Donor selection	TD Screening	Donor evaluation
Kyrgyzstan				
Latvia	Yes	Yes	Yes	Yes
Lebanon	Yes	Yes	Yes	Yes
Libya				Yes
Lithuania	Yes	Yes	Yes	Yes
Malaysia	Yes	Yes	Yes	Yes
Maldives				
Mali				Yes
Malta	Yes	Yes	Yes	Yes
Mexico				
Monaco				
Mongolia	Yes	Yes	Yes	Yes
Montenegro	Yes	Yes	Yes	Yes
Morocco	Yes	Yes	Yes	Yes
Netherlands	Yes	Yes	Yes	Yes
Nicaragua				Yes
Nigeria				Yes
Norway	Yes	Yes	Yes	Yes
Oman				Yes
Pakistan	Yes	Yes	Yes	Yes
Panama	Yes	Yes	Yes	Yes
Paraguay	Yes	Yes	Yes	Yes
Peru	Yes	Yes	Yes	Yes
Philippines	Yes	Yes	Yes	Yes
Poland	Yes	Yes	Yes	Yes
Portugal	Yes	Yes	Yes	Yes
Qatar	Yes	Yes	Yes	Yes
Rep of Korea	Yes	Yes	Yes	Yes
Rep of Moldova	Yes	Yes	Yes	Yes
North Macedonia	Yes	Yes	Yes	Yes
Romania	Yes	Yes	Yes	

Table 4. Availability of protocols, standards or guidelines in deceased donation and living donation. *(continue)*

	Protocols, standards, guidelines for DD			Protocols, standards, guidelines for LD
	Donor identification	Donor selection	TD Screening	Donor evaluation
Russia	Yes	Yes	Yes	Yes
Saudi Arabia	Yes	Yes	Yes	Yes
Senegal				
Serbia	Yes	Yes	Yes	Yes
Singapore	Yes	Yes	Yes	Yes
Slovakia	Yes	Yes	Yes	
Slovenia	Yes	Yes	Yes	Yes
South Africa	Yes	Yes	Yes	Yes
Spain	Yes	Yes	Yes	Yes
Sri Lanka	Yes	Yes	Yes	
Sudan				Yes
Switzerland	Yes	Yes	Yes	Yes
Syria				Yes
Tajikistan	Yes	Yes	Yes	Yes
Thailand	Yes	Yes	Yes	Yes
Trinidad Tobago	Yes	Yes	Yes	Yes
Tunisia	Yes	Yes	Yes	Yes
Turkey	Yes	Yes	Yes	
Ukraine	Yes	Yes	Yes	Yes
U. Arab Emirates	Yes	Yes	Yes	Yes
UK	Yes	Yes	Yes	Yes
Tanzania				Yes
USA	Yes	Yes	Yes	Yes
Uruguay	Yes	Yes	Yes	Yes
Uzbekistan				
Venezuela	Yes	Yes	Yes	Yes
Viet Nam				
Total N. (%)	**78 (75%)**	**78 (75%)**	**77 (74%)**	**86 (83%)**

DD: Deceased Donors; LD: Living Donors; TD: Transmissible Diseases

Blank fields: Not available information/not applicable or not protocols, standards, guidelines in place

3.2 GLOBAL ACTIVITY DATA 2020

Of the 194 WHO Member States, 93 (**Annex 3**) provided information to the GODT on the 2020 donation and transplantation activities that was available at the moment of preparing this report. These 93 countries represented 80% of the global population. Globally, a steady increase in transplantation activities had been observed over the years. However, as a result of the COVID-19 pandemic, the number of organ transplants performed globally decreased by 18% in 2020 compared with 2019.

In total, 129 681 solid organs were reported to be transplanted during 2020: 80 926 kidney transplants (32% from living donors), 32 586 liver transplants (20% from living donors), 8 101 heart transplants, 5 940 lung transplants, 1 970 pancreas transplants and 158 small bowel transplants. The percentages for each organ transplant are shown in **Figure 1**, kidney and liver transplants representing 87% of organ transplantation procedures worldwide.

Of the 93 countries participating in this report, 90 reported at least one organ transplant, with a large variability in the number of transplants pmp between countries (**Figure 2** and **Global map 4** in **Annex 2**). Only three countries (Luxembourg, Monaco and Oman) reported not having performed any transplant procedure in 2020. These countries may have established official cooperation agreements with other countries to ensure the access of their patient population to solid organ transplantation.

3.3 ORGAN DONATION ACTIVITY 2020

> **"Donation from deceased persons should be developed to its maximum therapeutic potential"**
>
> *WHO Guiding Principle 3 on Human Cell, Tissue and Organ Transplantation*

3.3.1 DECEASED DONATION ACTIVITY 2020

In 2020, 36 100 deceased donors (DD) were reported to the GODT. This number represents a 13% decrease compared with 2019. This DD activity was notified by 75 of the 93 countries participating in this report. Countries with no DD activity were Albania, Algeria, Armenia, Bangladesh, Bolivia, El Salvador, Ethiopia, Georgia, Guatemala, Kenya, Monaco, Nigeria, Oman, Pakistan, Sudan, Syria, Tanzania and Venezuela.

DD rates pmp for all Member States that reported data to the GODT in 2020 are displayed in **Figure 3** and **Global map 5** in **Annex 2**, showing profound disparities. **Figure 3** also represents the number of transplants performed with organs derived from DD by country. This figure may help to estimate the effectiveness of deceased donation by country. However, it must be interpreted with caution. Of note, some of these transplants may have been performed with organs obtained in a different Member State on the basis of agreements for international organ exchange. Differences in the number of transplants performed from local DDs are also determined by the local availability of transplant programs (e.g. DD lungs obtained in countries with no lung transplant program may be used for transplantation in neighbour countries) and by the profile of DDs, extremely variable across countries, among others. This same observation needs to be taken into account when interpreting **Figure 4**, which represents the rate of actual and utilized DDs by country. Globally, the utilization rate (percentage of actual donors that transition to utilized donors) was 93% in 2020, ranging from 50% to 100%.

Figure 5 represents the correlation between the HDI and DD rates pmp, displaying that there is a minimum level of development required for DD programs to be possible in a given jurisdiction. At the same time, it makes evident important variations in DD rates between countries with a similar HDI, including those that belong to the group of countries with a very high level of human development.

Figure 1. Percentages of transplanted organs in 2020.

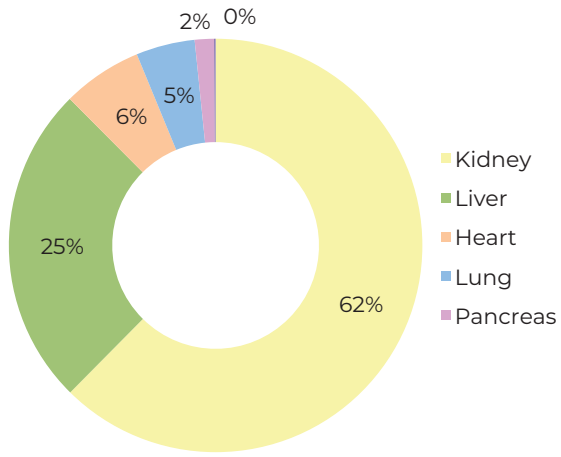


Figure 2. Solid organ transplant activity. Absolute numbers of transplant (in brackets) and rates pmp. N= 90 countries. Year 2020.

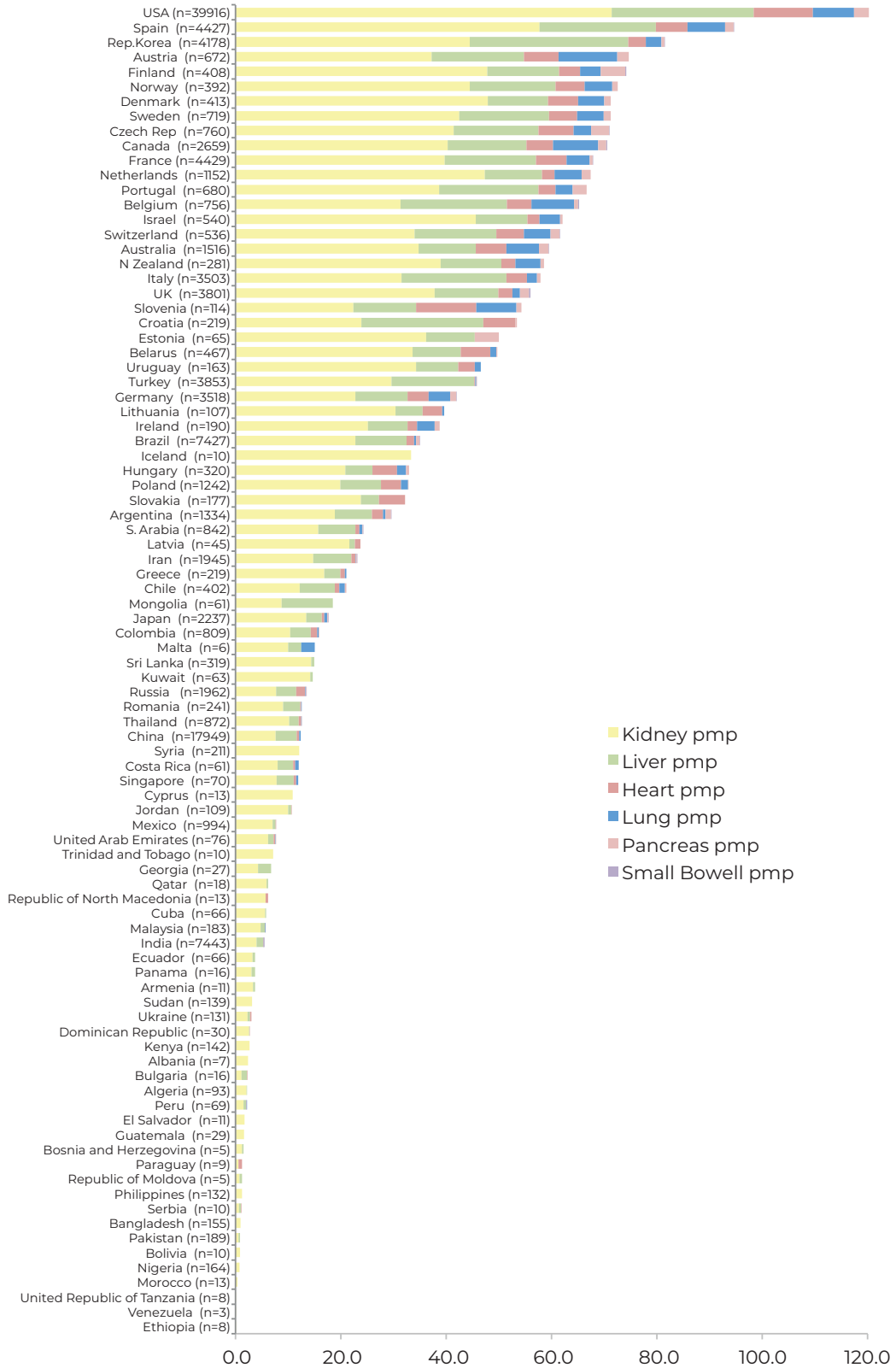


Figure 3. Rate of actual deceased organ donors per million population (pmp) and transplants from deceased donors pmp per type of organ. N=75 countries. Year 2020.

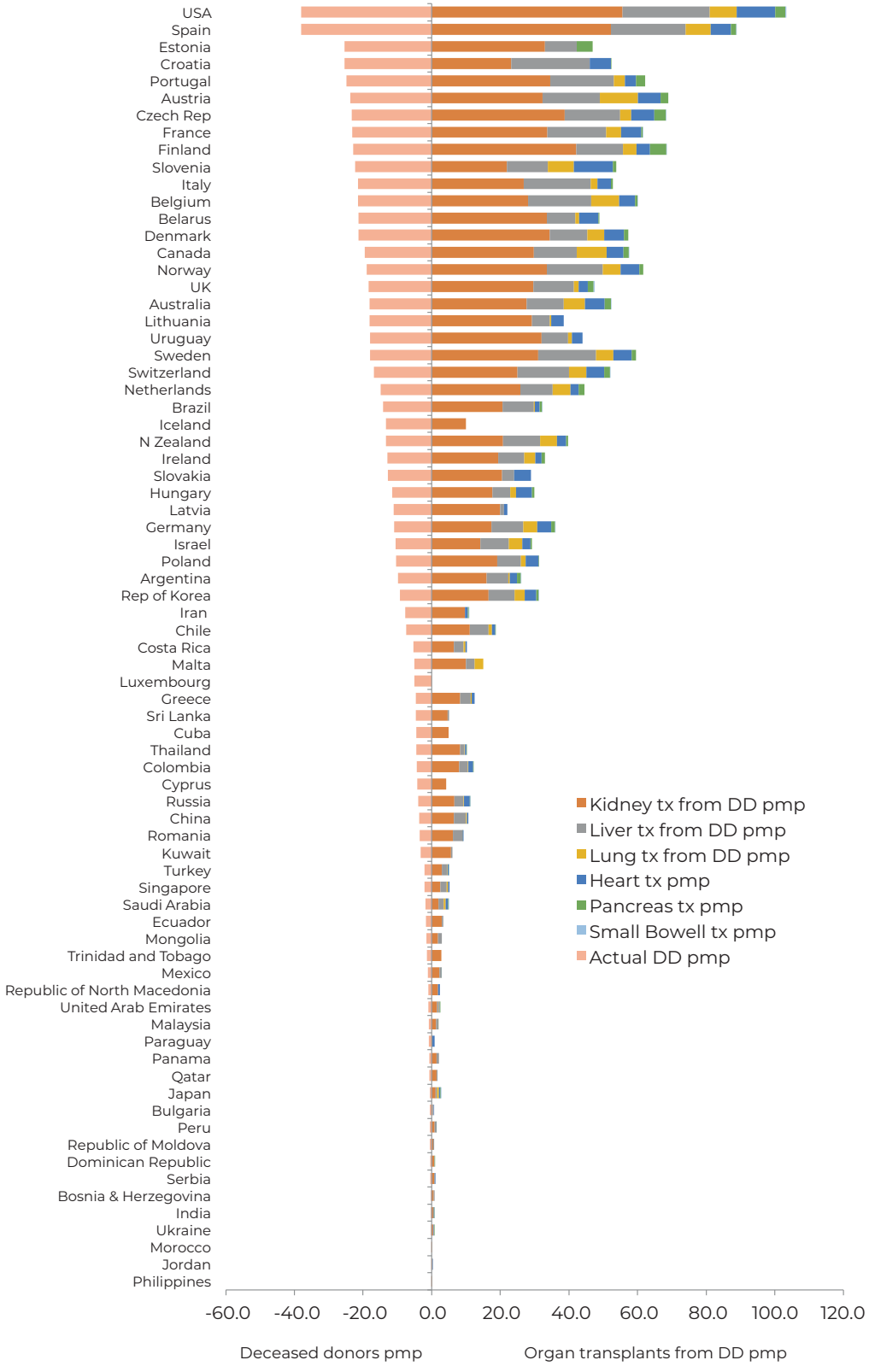


Figure 4. Donation from deceased persons. Absolute numbers and rates per million population (pmp). Actual and utilized deceased donors. N= 73 countries (with ADD and UDD available data). Year 2020.

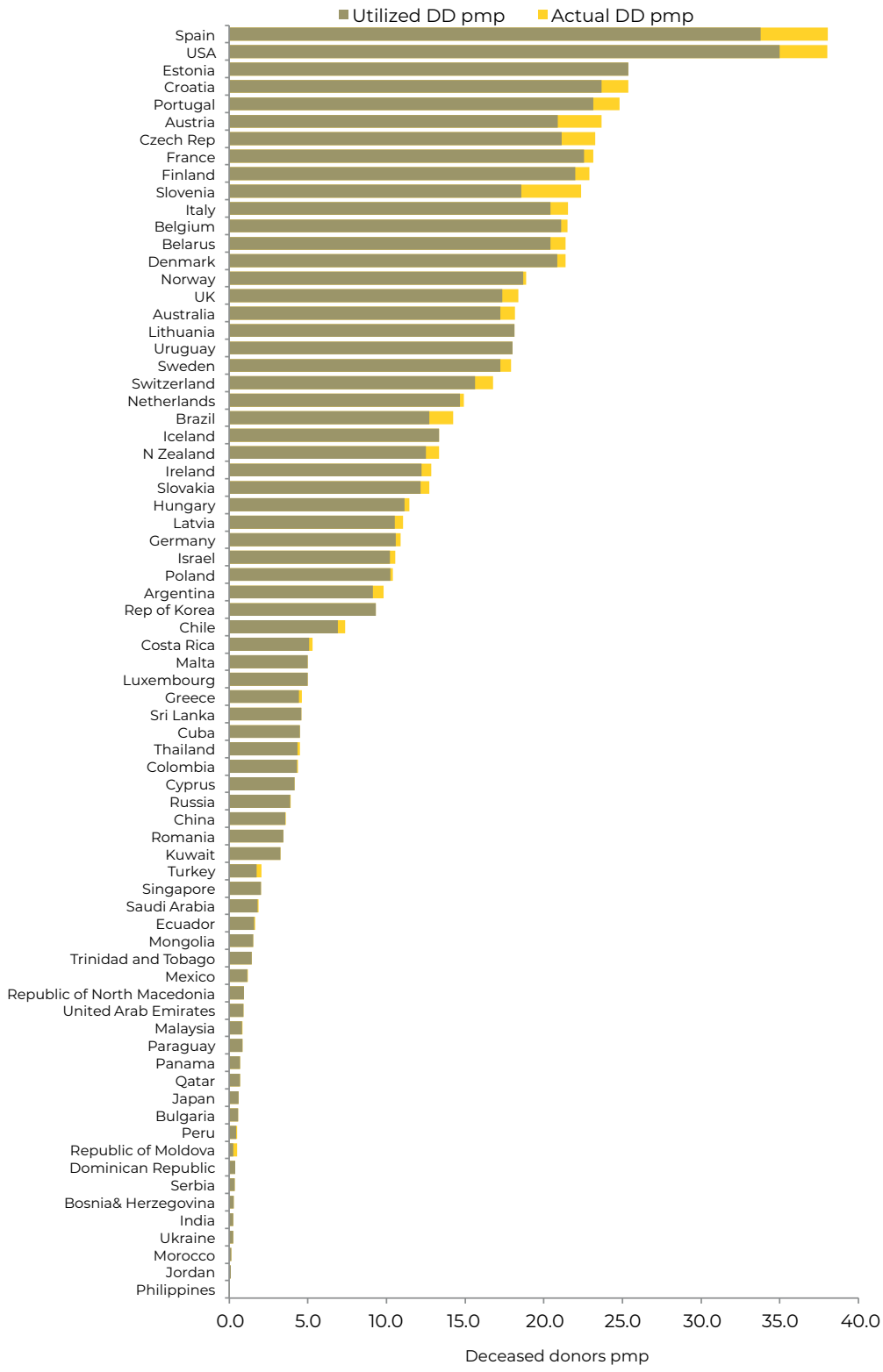
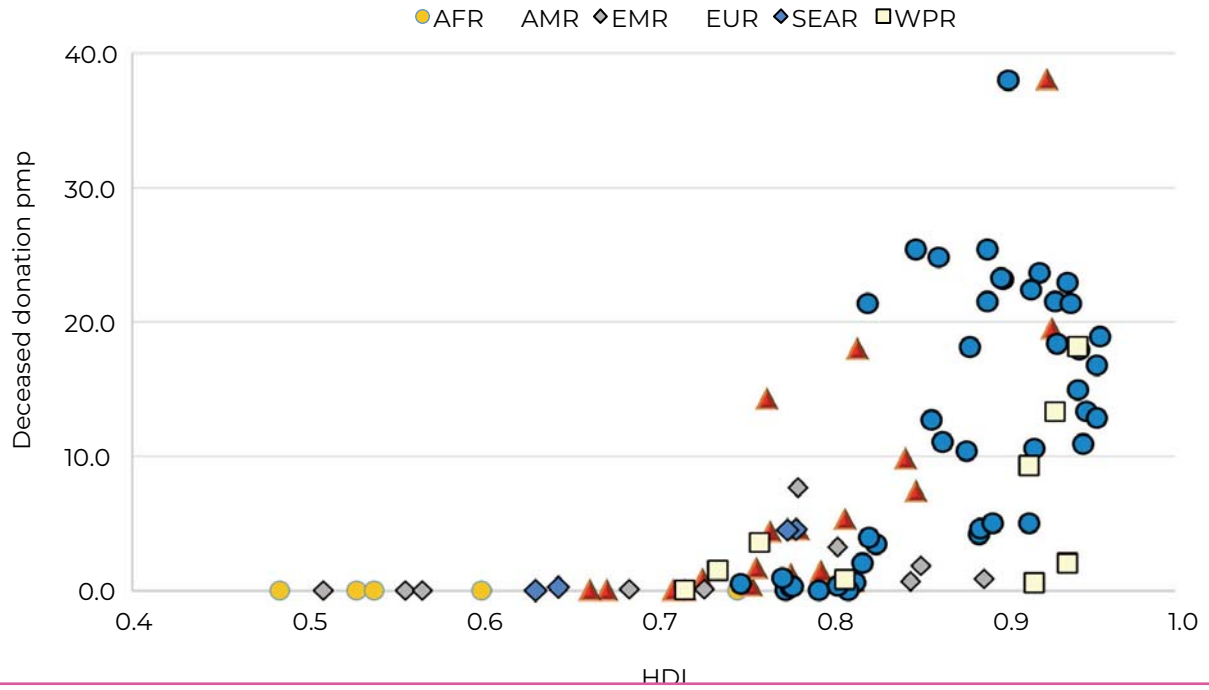


Figure 5. Correlation between deceased donation rates per million population (pmp) and the Human Development Index (HDI). Countries are identified by WHO region. Year 2020.



3.3.2 PROFILE OF DECEASED DONORS 2020

When analysing DDs by donor age categories, the group between 18 and 59 years was the most frequent (72%) in 2020, followed by donors aged 60 years or older (22%) and paediatric (<18 years) donors (6%). **Figure 6** and **Figure 7** illustrate the distribution of donors by age for the 71 countries that provided these data. The important variations in the rate of DDs within the older group reveals important room for improvement. Similarly, paediatric donation shows a limited development in a majority of countries.

With regards to the distribution of DDs by sex, information was provided by 69 countries, revealing that 63% of DDs were male versus 37% female globally. Corresponding data by country are displayed in **Figure 8**.

3.3.3 DONATION AFTER THE DETERMINATION OF DEATH BY CIRCULATORY CRITERIA

Of the global number of DDs, 27 934 (77%) had been declared dead by neurological criteria, i.e. donors after brain death (DBD), while 8 166 (23%) had been declared dead by circulatory criteria (DCD donors). **Figure 9** displays the rate of DBD and DCD donors by country.

Although DCD has become an important source of organs for transplantation, only 23 countries reported any DCD activity in 2020. In absolute numbers, the most relevant activities were described in the United States of America (n=3 224), followed by China (n=2 907) and Spain (n=621). The highest DCD rates were registered in Spain (13.3 pmp) and USA (9.7 pmp). DCD represents more than half of DD activities in the Netherlands (61%) and China (56%).

With regards to the type of DCD program in place, **Figure 10** shows countries with controlled and uncontrolled DCD donor programs. Notably, of the 2 907 DCD donors reported by China for that year, 857 had been defined as donors after brain death followed by cardiac death.

A total of 18 291 transplants (13 015 kidneys, 4 486 livers, 158 hearts, 556 lungs, 76 pancreas) were performed with organs from DCD donors during 2020. **Table 5** and **Figure 11** summarize the DCD transplant activity per country.

3.3.4 REFUSALS TO ORGAN DONATION

Fifty-three Member States provided information on the number of interviews to present the option of posthumous donation and the number of refusals. **Figure 12** displays the percentage of refusals to organ donation in each country that provided the said information. Differences in policies to assess the wishes and values of the deceased towards organ donation and in the role of surrogates in decision-making should be taken into account when interpreting these data.

3.3.5 LIVING DONATION

> **"Principle number 3 stresses the importance of protecting the health of living donors during the process of selection, donation, and necessary aftercare to ensure that the potential untoward consequences of the donation are unlikely to disadvantage the remainder of the donor's life"**
>
> *WHO Guiding Principle 3 (explanatory report) on Human Cell, Tissue and Organ Transplantation*

A total of 87 countries reported at least one living organ donation procedure during 2020. Globally, 25 668 living kidney donors, 6 663 living liver donors and 28 living lung donors were reported. Also, 32 domino liver donors were registered in 11 countries (Brazil, China, France, India, Italy, Japan, Portugal, Sweden, Switzerland, Turkey and United States of America). **Figure 13** shows the total number of living donors (kidney, liver, domino and lung) reported by 42 countries, with rates ranging from 3.7 pmp in Armenia to 50.3 pmp in Republic of Korea. The remaining 45 countries that reported living donation activities registered less than 3.5 living donors pmp and are not included in the said figure.

Distribution of living donors by sex is represented in **Figure 14** (kidney) and **Figure 15** (liver). Information was provided by 74 of the 88 countries with kidney living donation activities and 41 of the 49 in the case of countries with liver living donation activities. Globally, 61% of kidney living donors were female and 39% male; for liver living donors, 51% were female and 49% male. The predominance of female living donors is in contrast with what observed for DDs.

Figure 6. Donation from deceased persons by donor age. Absolute numbers of deceased donors (in brackets) and rates per million population (pmp) by donor age group. N= 71 countries. Year 2020.

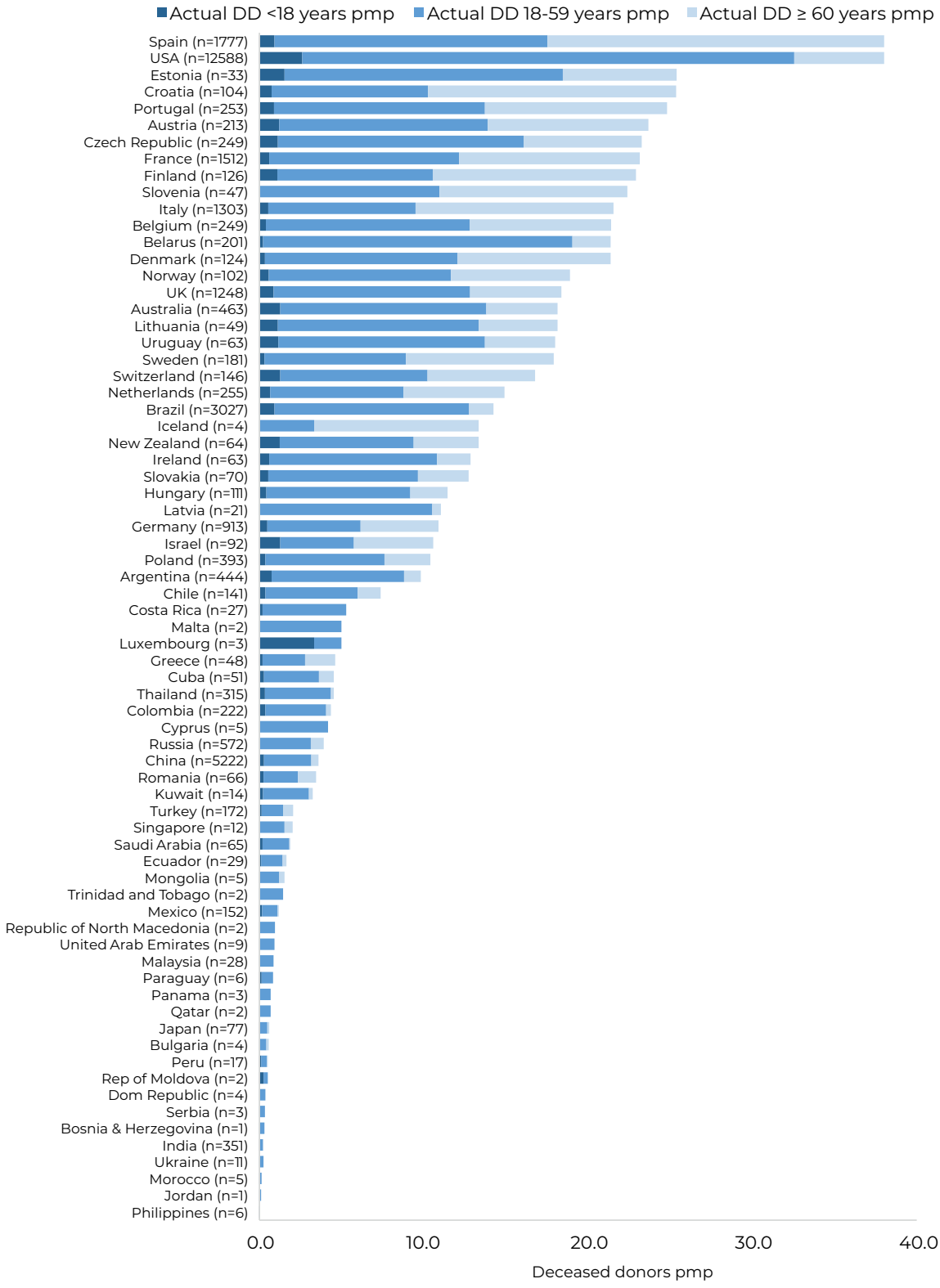


Figure 7. Donation from deceased persons by donor age. Absolute number of deceased donors (in brackets) and percentages by donor age group. N= 71 countries. Year 2020.

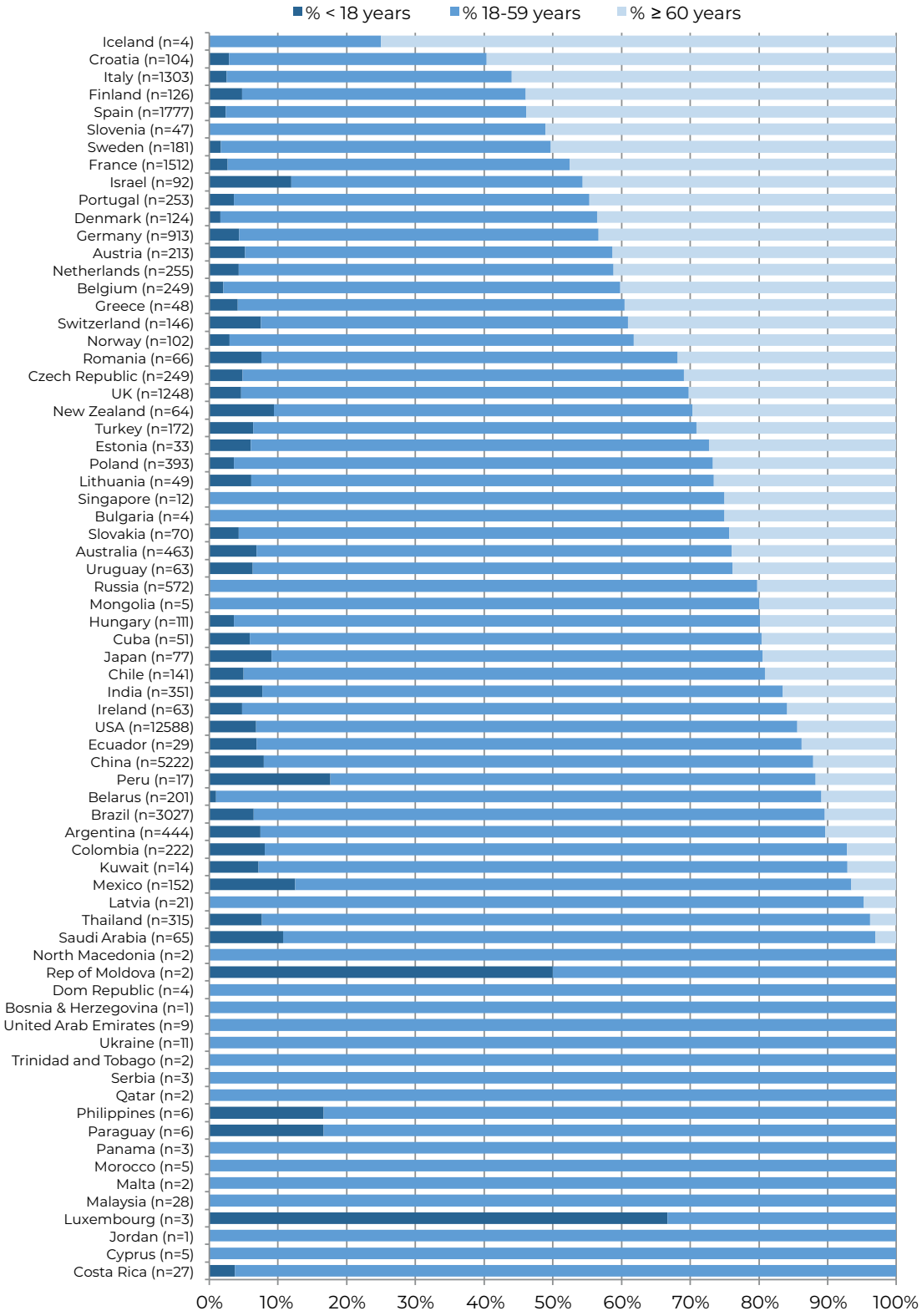


Figure 8. Donation from deceased persons by donor sex. Absolute number of donors (in brackets) and percentage by sex of deceased donors. N=69 countries. Year 2020.

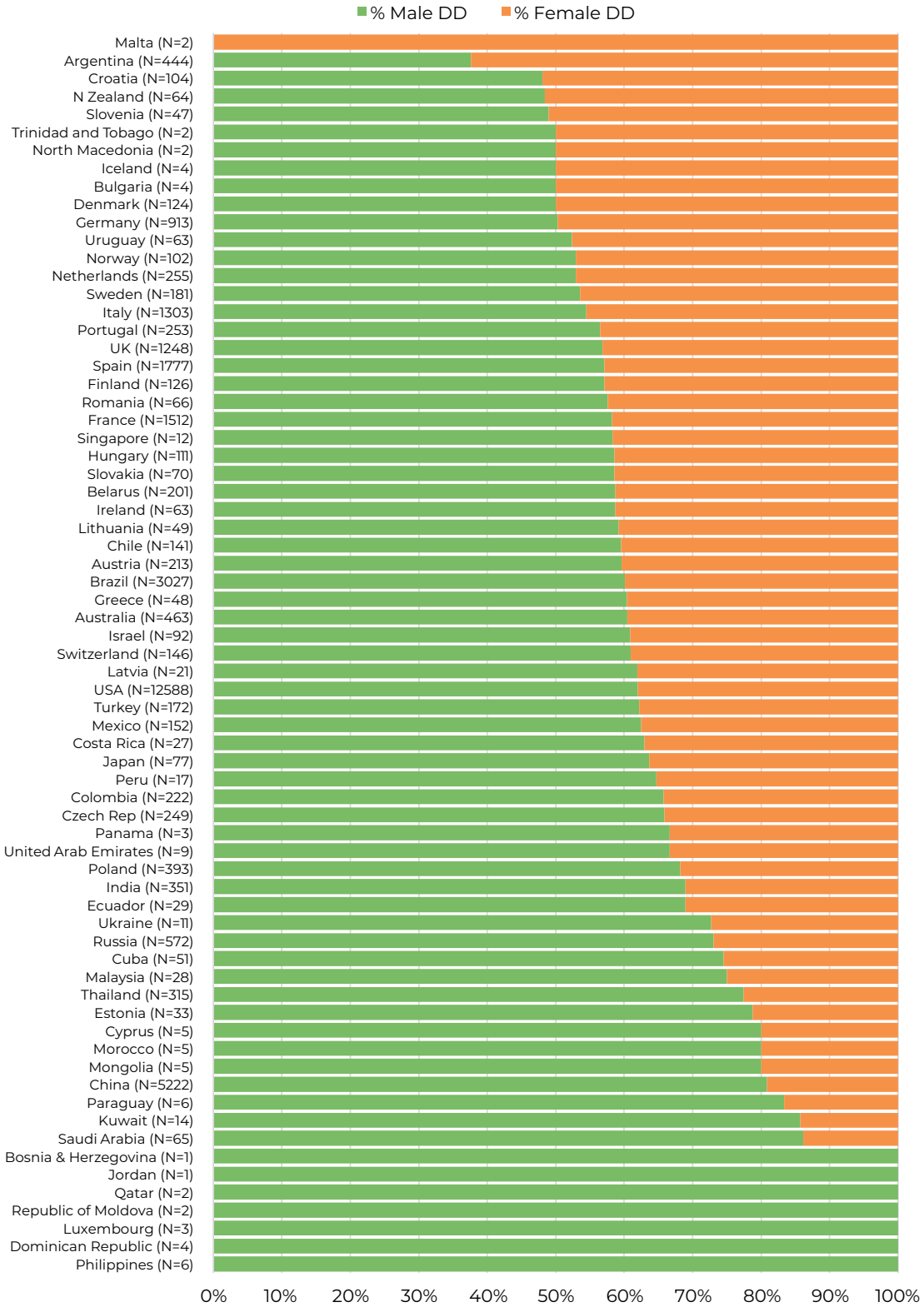


Figure 9. Donation from deceased persons. Absolute number of deceased donors (in brackets) and rates pmp by donor type. Donors declared dead by neurologic criteria (DBD) and by circulatory criteria (DCD). N= 75 countries. Year 2020. ***Utilized deceased donors.***

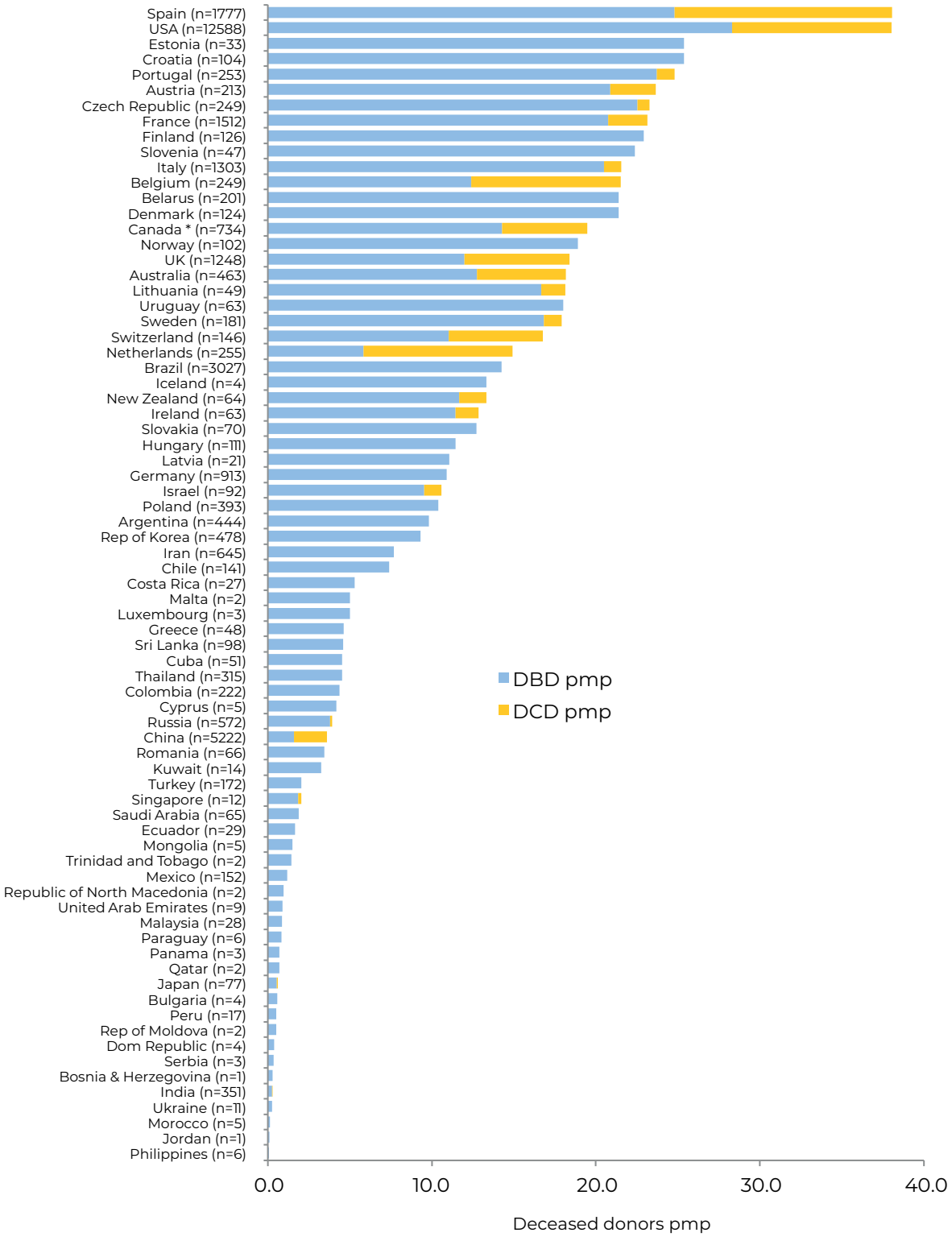


Figure 10. Donation after the determination of death by circulatory criteria. Absolute number and rate of DCD per million population (pmp). Year 2020.

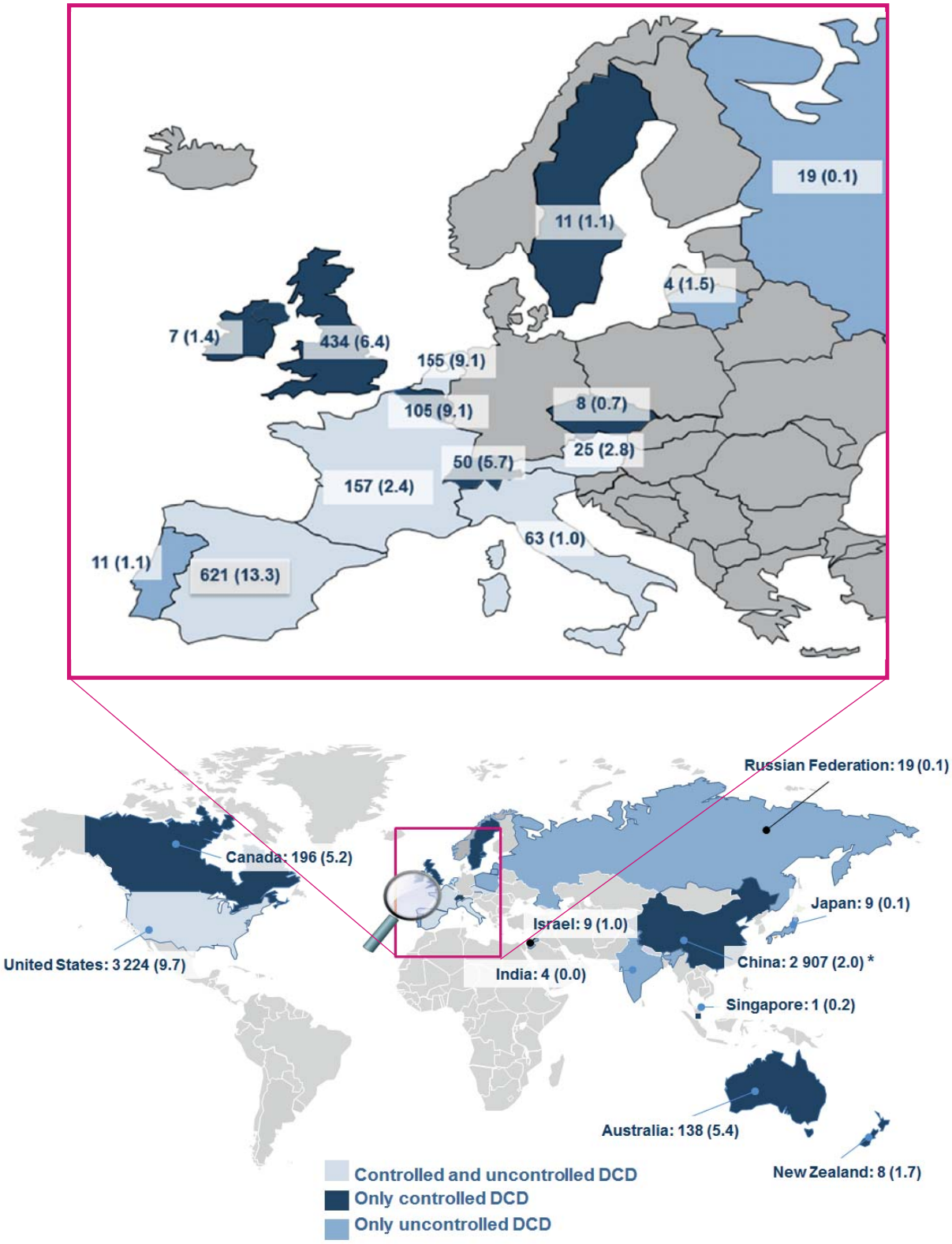


Figure 11. DCD transplants. Absolute number (in brackets) and rates per million population (pmp) per type of organ. N=23 countries. Year 2020.

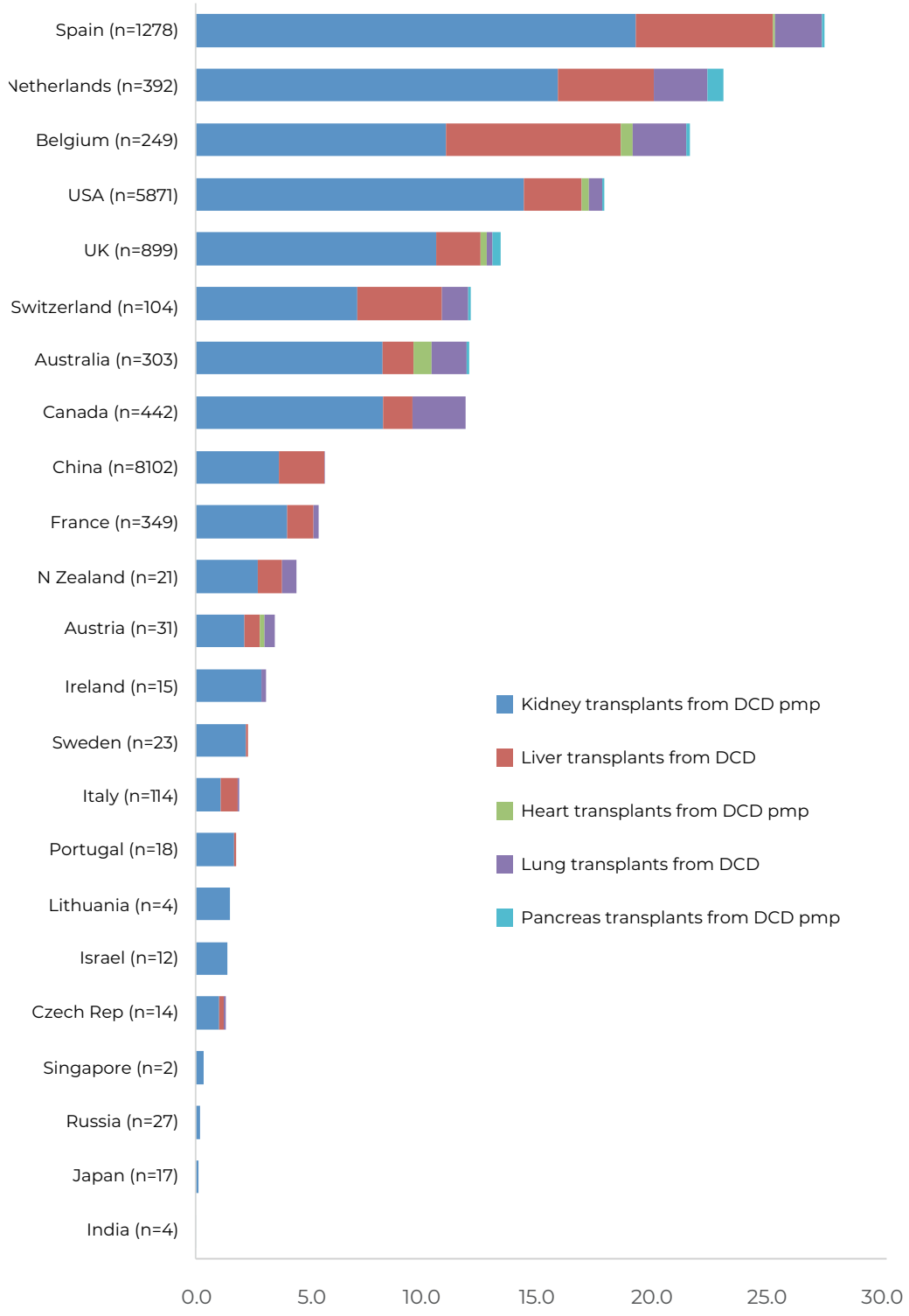


Table 5. DCD donor transplants. Absolute number and rate per million population (pmp). Year 2020.

	DCD Kidney transplants pmp	DCD Liver transplants pmp	DCD Heart transplants pmp	DCD Lung transplants pmp	DCD Pancreas transplants pmp	Total number of transplants from DCD donors
Singapore	2 (0.3)	-	-	-	-	2 (0.3)
India	4 (0.0)	-	-	-	-	4 (0.0)
Lithuania	4 (1.5)	-	-	-	-	4 (1.5)
Israel	12 (1.4)	-	-	-	-	12 (1.4)
Czech Rep	11 (1.0)	2 (0.2)	-	1 (0.1)	-	14 (1.3)
Ireland	14 (2.9)	-	-	1 (0.2)	-	15 (3.1)
Japan	17 (0.1)	-	-	-	-	17 (0.1)
Portugal	17 (1.7)	1 (0.1)	-	-	-	18 (1.8)
New Zealand	13 (2.7)	5 (1.0)	-	3 (0.6)	-	21 (4.4)
Sweden	22 (2.2)	1 (0.1)	-	-	-	23 (2.3)
Russia	27 (0.2)	-	-	-	-	27 (0.2)
Austria	19 (2.1)	6 (0.7)	2 (0.2)	4 (0.4)	-	31 (3.4)
Switzerland	61 (7.0)	32 (3.7)	-	10 (1.1)	1 (0.1)	104 (12.0)
Italy	66 (1.1)	45 (0.7)	-	3 (0.1)	-	114 (1.9)
Belgium	126 (10.9)	88 (7.6)	6 (0.5)	27 (2.3)	2 (0.2)	249 (21.5)
Australia	207 (8.1)	34 (1.3)	20 (0.8)	39 (1.5)	3 (0.1)	303 (11.9)
France	260 (4.0)	74 (1.1)	-	15 (0.2)	-	349 (5.3)
Netherlands	269 (15.7)	71 (4.2)	-	40 (2.3)	12 (0.7)	392 (22.9)
Canada	307 (8.1)	48 (1.3)	-	87 (2.3)	-	442 (11.7)
UK	709 (10.4)	131 (1.9)	18 (0.3)	17 (0.3)	24 (0.4)	899 (13.2)
Spain	894 (19.1)	279 (6.0)	4 (0.1)	95 (2.0)	6 (0.1)	1 278 (27.3)
USA	4 715 (14.2)	830 (2.5)	108 (0.3)	190 (0.6)	28 (0.1)	5 871 (17.7)
China	5 239 (3.6)	2 839 (2.0)	-	24 (0.02)	-	8 102 (5.6)
Total	**13 015**	**4 486**	**158**	**556**	**76**	**18 291**

Figure 12. Percentage of refusals to deceased donation. Number of interviews is presented in brackets. N=53 countries. Year 2020.

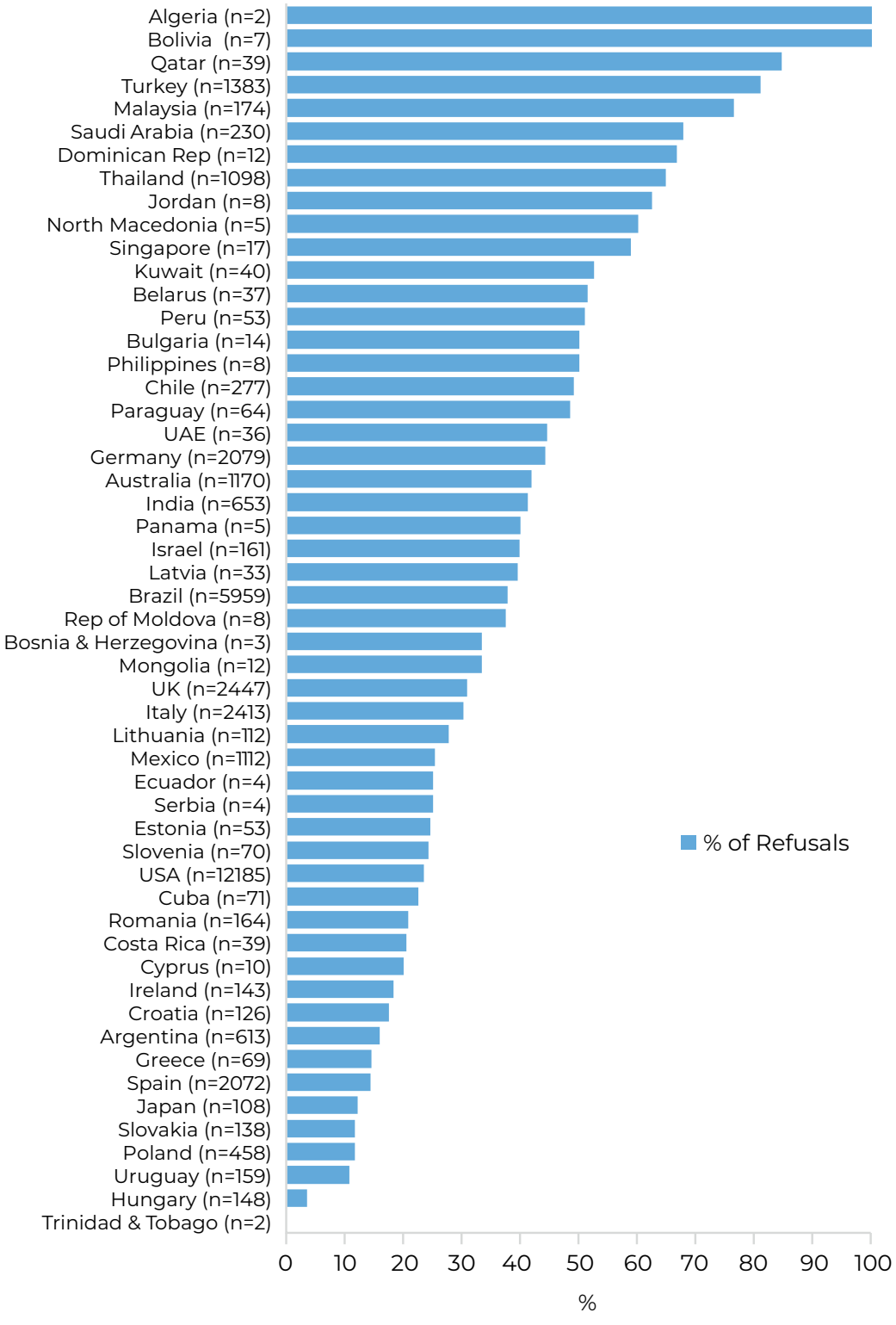


Figure 13. Total living donors per type of organ. Absolute number of living donors (in brackets) and rates per million population (pmp). N=42 countries (rate pmp ≥ 3.5 pmp). Year 2020.

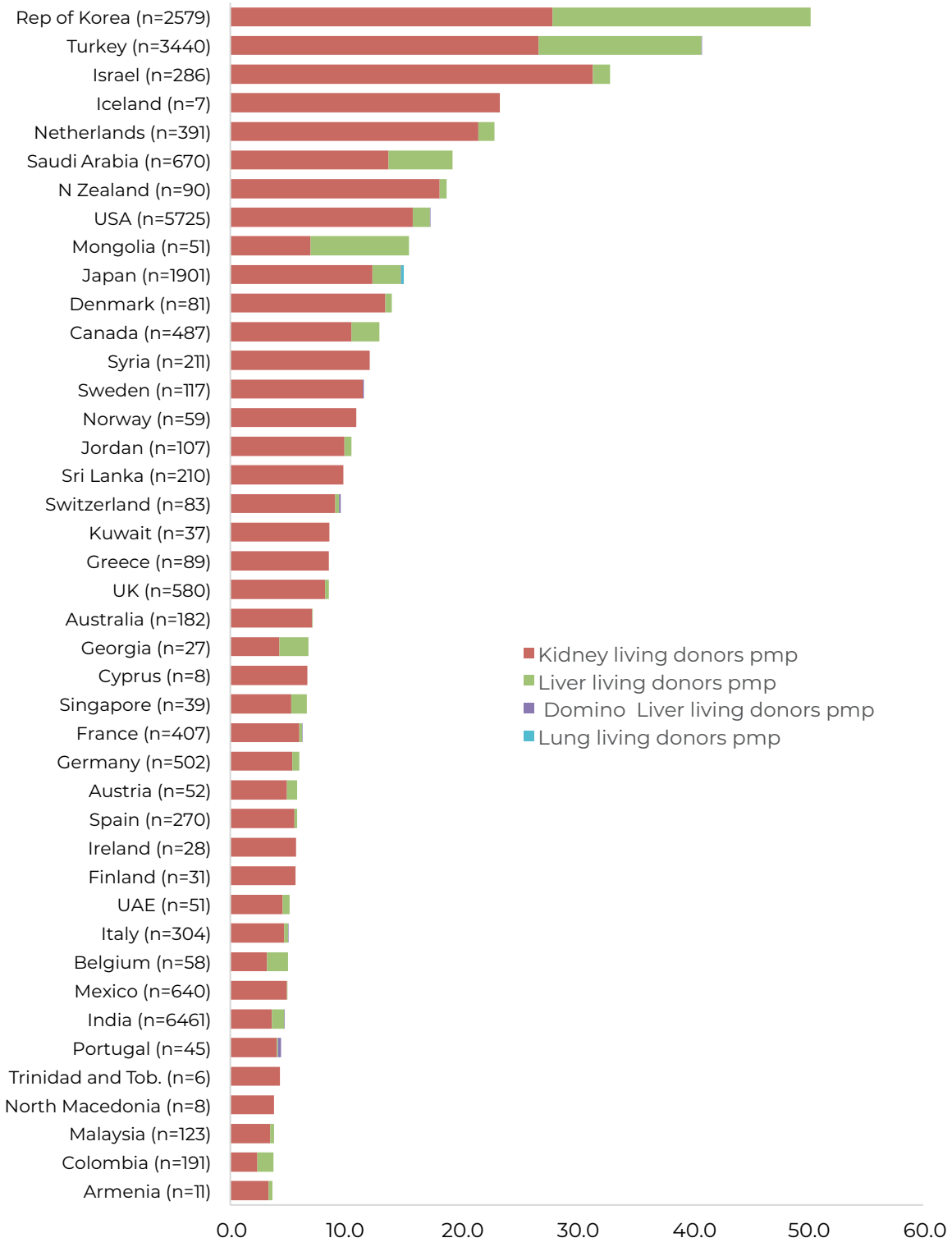


Figure 14. Kidney donation from living persons by donor sex. Absolute number of living donors (in brackets) and percentage by donor sex. N=74 countries. Year 2020.

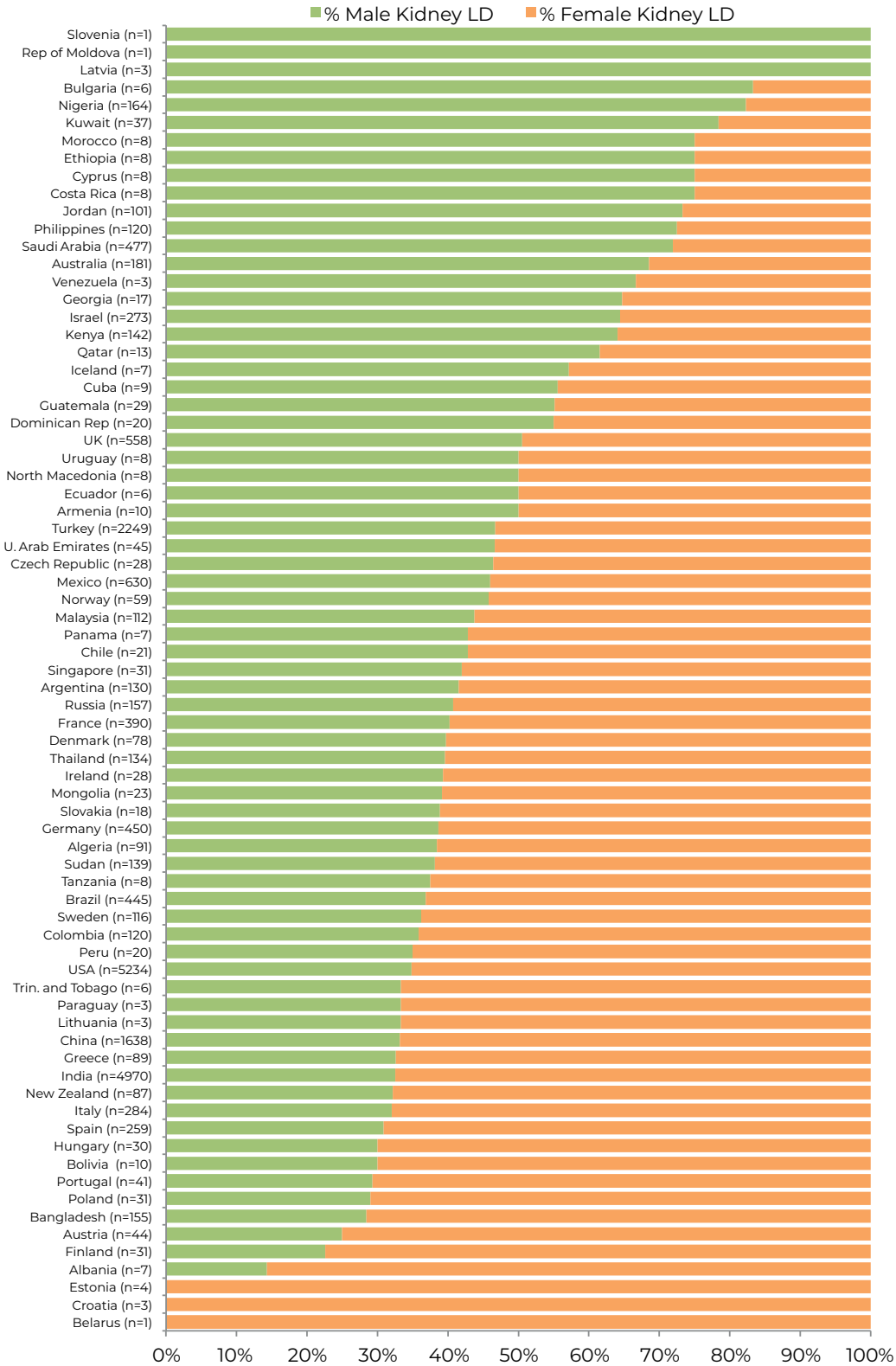
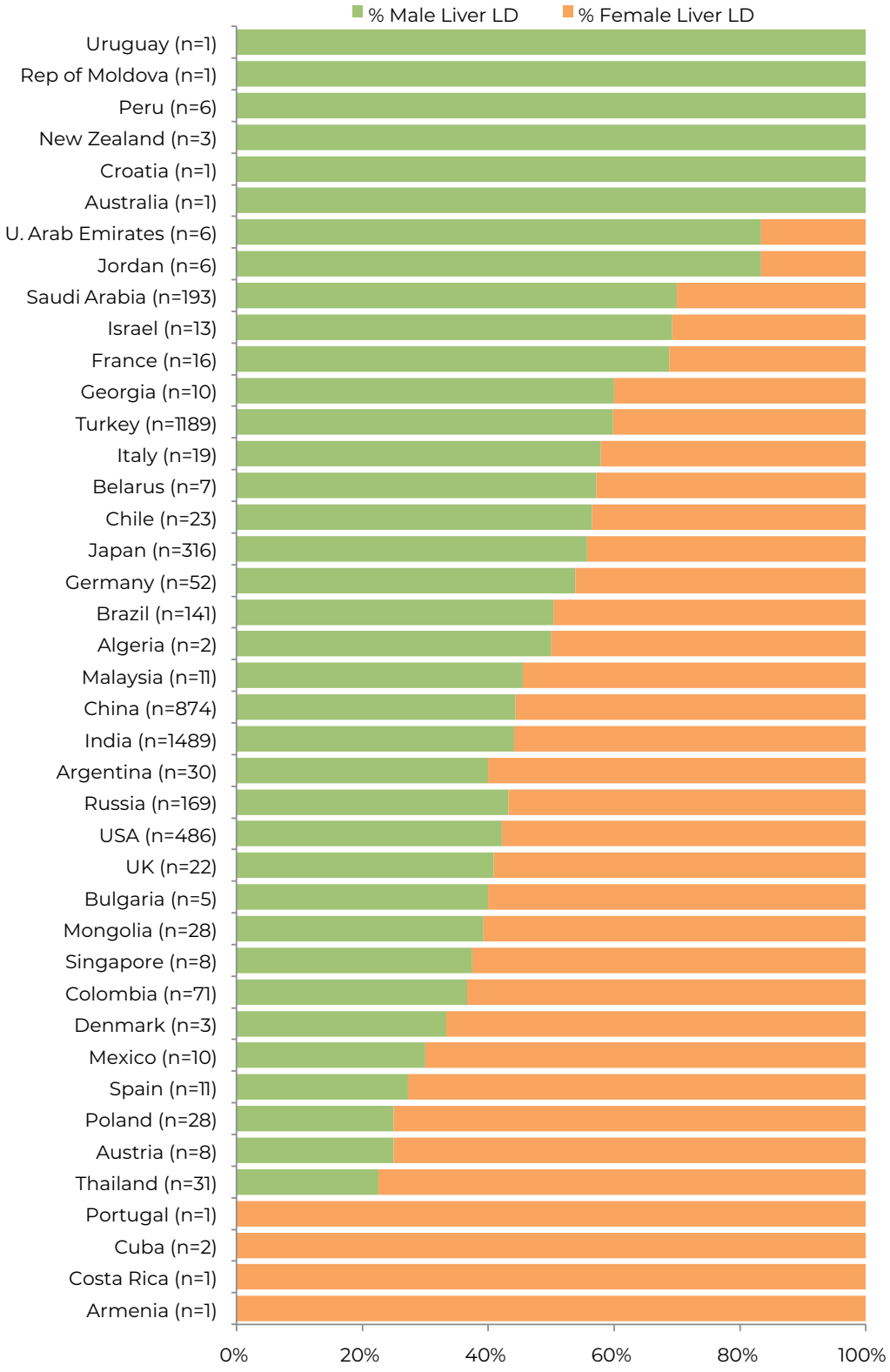


Figure 15. Liver donation from living persons by donor sex. Absolute number of living donors (in brackets) and percentage by donor sex. N=41 countries. Year 2020.



3.3.6 ORGAN DONATION BY WHO REGION

Figure 16 represents organ donation for the six WHO regions (absolute numbers and rate pmp). Living donation (calculated by adding living kidney, liver, domino and lung donors, for those countries that reported such pieces of information) is the only or the predominant type of organ donation in AFR, EMR and SEAR.

3.4 ORGAN TRANSPLANT ACTIVITY 2020

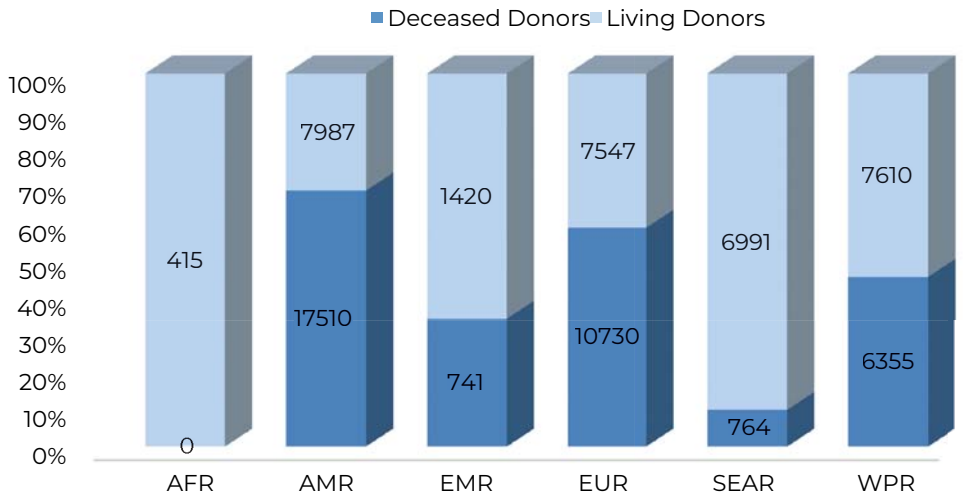
3.4.1 KIDNEY TRANSPLANTATION ACTIVITY 2020

In total, 80 926 kidney transplants were performed in 90 of the 93 reporting countries during 2020. This global kidney transplantation activity represents a 21% decrease compared with 2019. Living kidney transplants were carried out in 88 countries, and kidney transplants from DDs in 74. Kidney transplants from living donors represented 32% and kidney transplants from DDs represented 68% of the global kidney transplantation activity.

The Global map 6 in the Annex 2 and Figure 17 show kidney transplant rates pmp among all Member States that provided any data to the GODT for 2020. Both show extreme disparities in kidney transplant activities that reveal inequities in the access to this therapeutic procedure across the globe. There were 16 countries that exclusively relied in the transplantation of kidneys from living donors (Albania, Algeria, Armenia, Bangladesh, Bolivia, El Salvador, Ethiopia, Georgia, Guatemala, Kenya, Nigeria, Pakistan, Sudan, Syria, Tanzania and Venezuela). Likewise, Malta and Serbia reported that all kidney transplants were performed with organs obtained from DDs. The highest kidney transplant activity was reported by USA and Spain, with 71.4 and 57.7 kidney transplants pmp, respectively.

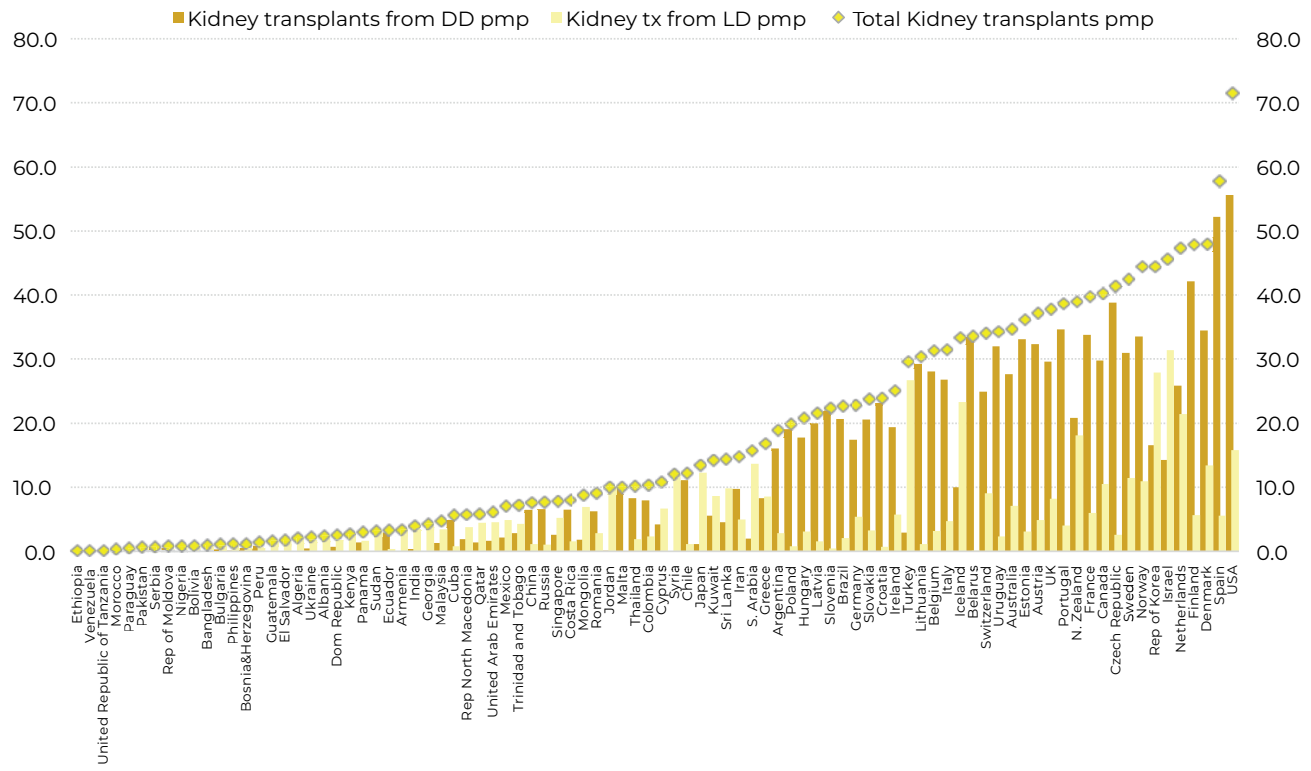
The variation in rates pmp of living kidney transplants is represented in Figure 18. Of the 88 countries reporting living kidney transplants in 2020, the highest rate was described in Israel with 31.4 procedures pmp.

Figure 16. Donation from deceased and living donors by WHO Regions. Year 2020.



	AFR	AMR	EMR	EUR	SEAR	WPR
Total number of organ donors	415	25 497	2 161	18 277	7 755	13 965
Organ donors pmp	0.9	25.9	4.6	21.6	4.7	7.7
% of living donors	100	31	66	41	90	55
Countries with DD activities/countries participating in the GODT	0 / 5	16 / 20	7 / 11	40 / 44	3 / 4	9 / 9

Figure 17. Kidney transplant activity per million population (pmp) by donor type (living and deceased). N= 90 countries. Year 2020



Paediatric (<18 years) kidney transplants accounted for 4% of the total kidney transplants with 2 836 procedures performed in 64 countries. Kidney transplants from DCD donors were reported by 23 countries (See **Table 5**). Globally, 13 015 DCD kidney transplants were performed in 2020, which corresponds to 16% of the overall kidney transplant activity.

Figure 19 displays kidney transplantation activities by WHO Regions, with profound variations in kidney transplants pmp, ranging from 0.9 pmp in AFR to 33.5 pmp in AMR. All kidney transplants in AFR were obtained from living donors, 82% in SEAR and 63% in EMR. To the contrary, the majority of kidney transplants were obtained from DDs in AMR, EUR y WPR.

Figure 18. Living kidney transplant activities. Absolute number (in brackets) and rates per million population (pmp). N= 88 countries. Year 2020.

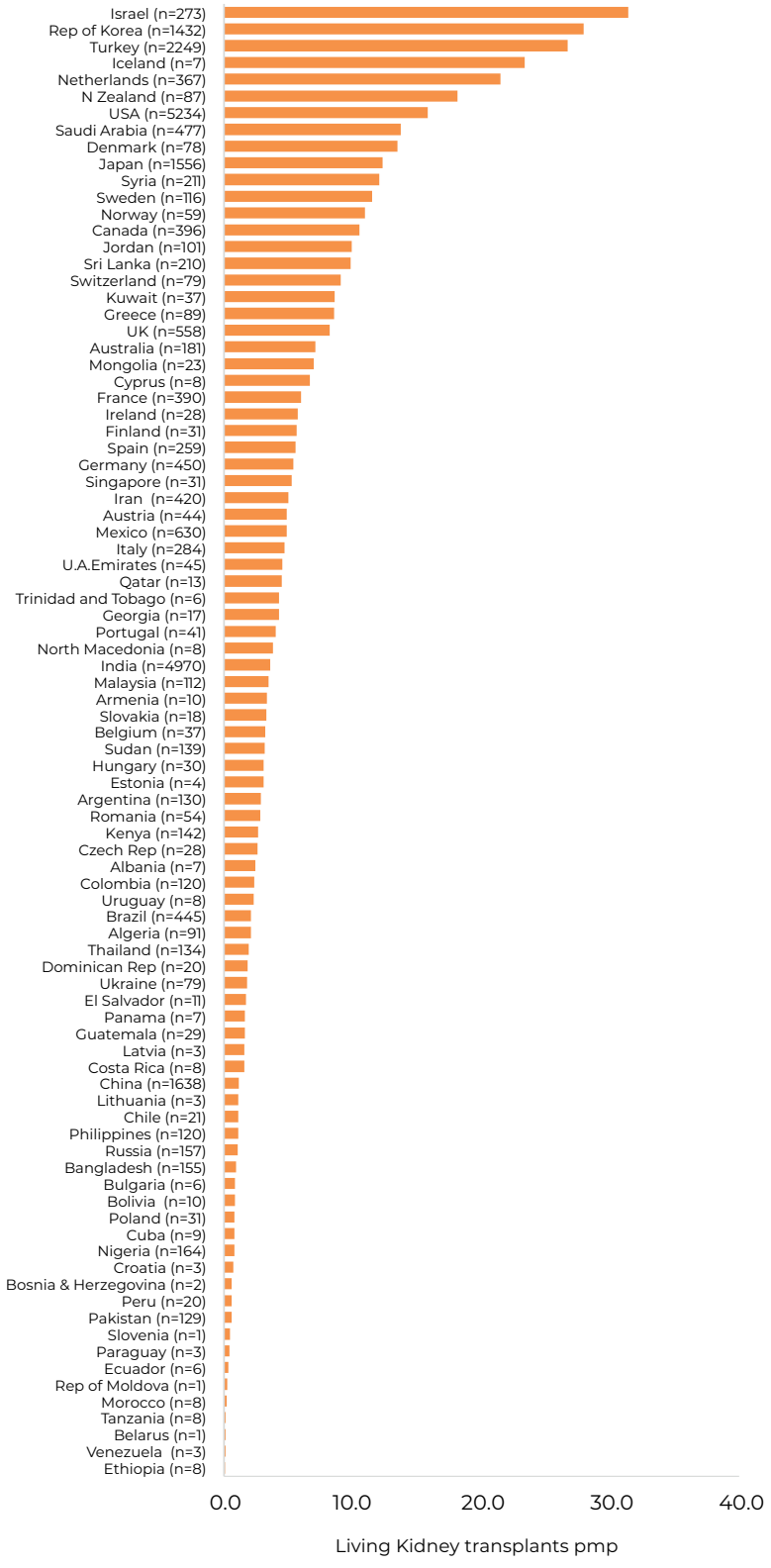
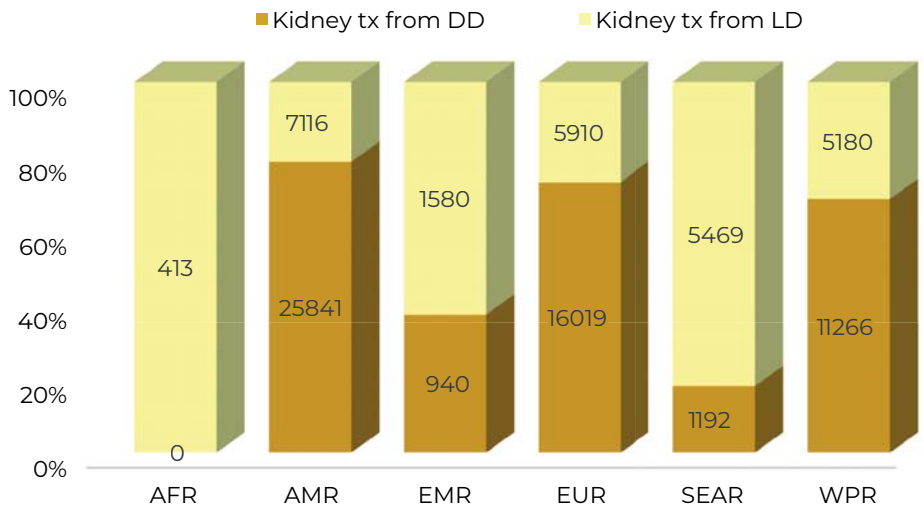


Figure 19. Kidney transplants by WHO Regions. Year 2020.



	AFR	AMR	EMR	EUR	SEAR	WPR
Total number of kidney transplants	413	32 957	2 520	21 929	6 661	16 446
Rate pmp *	0.9	33.5	5.4	25.9	4.1	9.1
% of kidney transplants from LD	100	22	63	27	82	32
Countries with kidney transplant activities from DD / Countries reporting to the GODT	0/5	16/20	7/ 11	39/44	3/4	9/9
Kidney transplant centres (millions inhabitants / centre)**	32 (15.0)	885 (1.1)	75 (6.3)	453(1.9)	623(2.6)	338(5.3)

*Rates (pmp) are calculated by applying the population of the responding countries.

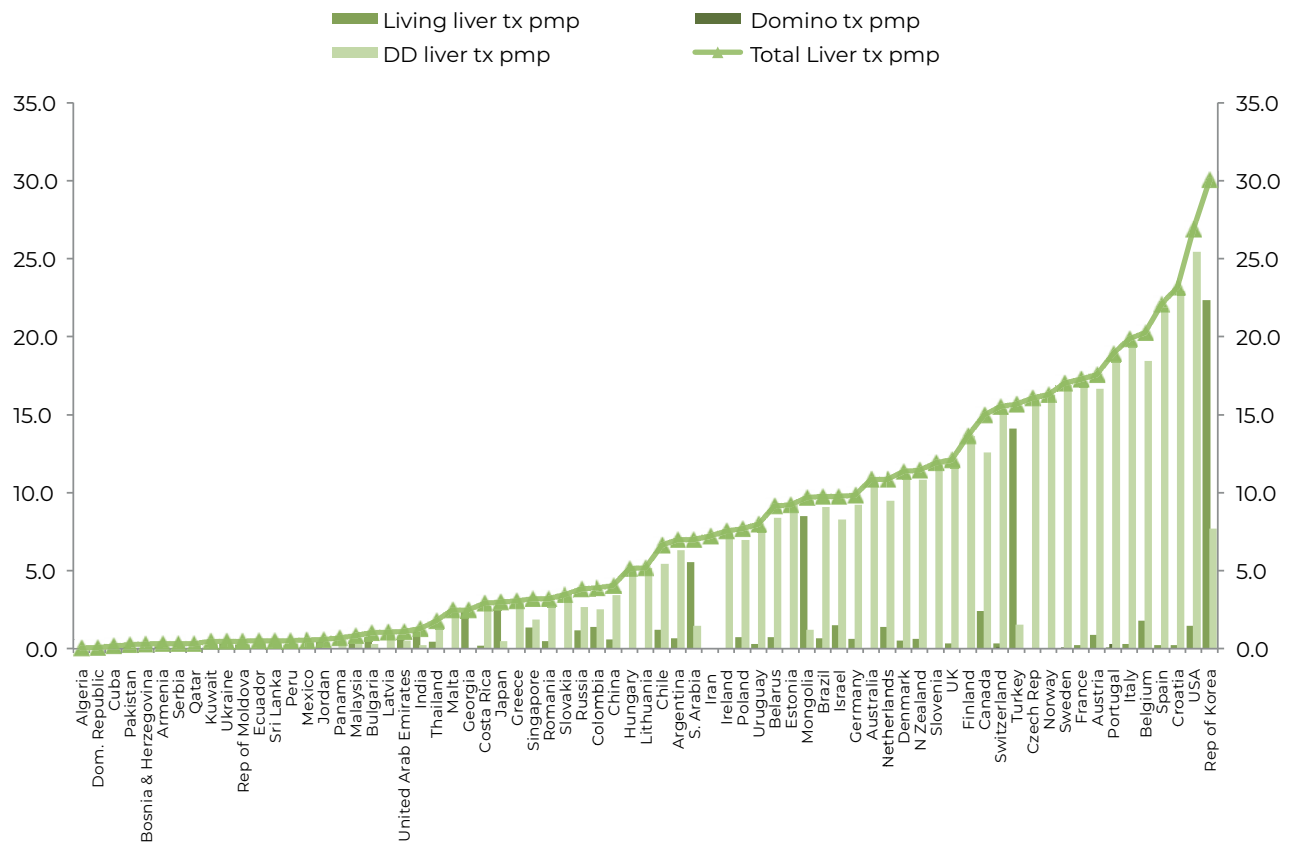
**Million inhabitants per transplant centre are calculated by applying the population of the responding countries.

3.4.2 LIVER TRANSPLANTATION ACTIVITY 2020

Liver transplant activities (32 586 procedures globally) in 2020 decreased by 11% compared with 2019 and were performed in 71 countries. **Global map 7** in the **Annex 2** and **Figure 20** illustrate liver transplant rates (pmp) among all Member States that reported data to the GODT in 2020. Of the 32 586 liver transplants performed globally, the type of donor was known in 31 980 liver transplants; 79% of them derived from DDs, 21% from living donors and 0.1% were domino liver transplants.

Figure 20 represents the rate of liver transplants pmp per country and donor type. The highest liver transplantation activities were reported by Republic of Korea and USA, with 30.1 and 26.9 liver transplants pmp, respectively. Of note, Iran did not indicate the type of liver donor (living versus deceased), so data from this country has not been included in the analysis whenever making this distinction was required. There were five countries where only living liver transplants were performed (Algeria, Armenia, Cuba, Georgia and Pakistan). **Figure 21** describes living liver transplantation activities per country in the 49 Member States that reported at least one

Figure 20. Liver transplant activity per million population (pmp) by donor type (living, deceased and domino). N= 71 countries. Year 2020.



procedure. The highest activity was described in South Korea and Turkey, where more than 1 000 living liver transplants were performed in 2020, corresponding to a rate of 22.4 and 14.1 pmp, respectively.

Domino liver transplantation was a very infrequent practice, with only 32 procedures performed during 2020 in 11 countries: China (14), USA (5), Portugal (3), Turkey (2), India (2), Brazil (1), France (1), Italy (1), Japan (1), Sweden (1) and Switzerland (1).

Paediatric (<18 years) liver transplants represented 11% of the total number of liver transplants procedures, with 3 727 paediatric liver transplants reported by 51 countries. **Table 5** provides information on DCD liver transplant activities, which were undertaken in 16 countries. In total,4486 DCD liver transplants were performed, corresponding to 14% of the total number of liver transplants worldwide.

Figure 22 represents liver transplant activities by WHO Regions — absolute numbers and percentage of liver transplants from DDs. Most liver transplants in EMR and SEAR derived from living donors, as well as the two procedures performed in the AFR. Rates were calculated by applying the population of the responding countries in each of the six WHO regions.

Figure 21. Living liver transplant activities. Absolute numbers (in brackets) and rates per million population (pmp). N=49 countries. Year 2020.

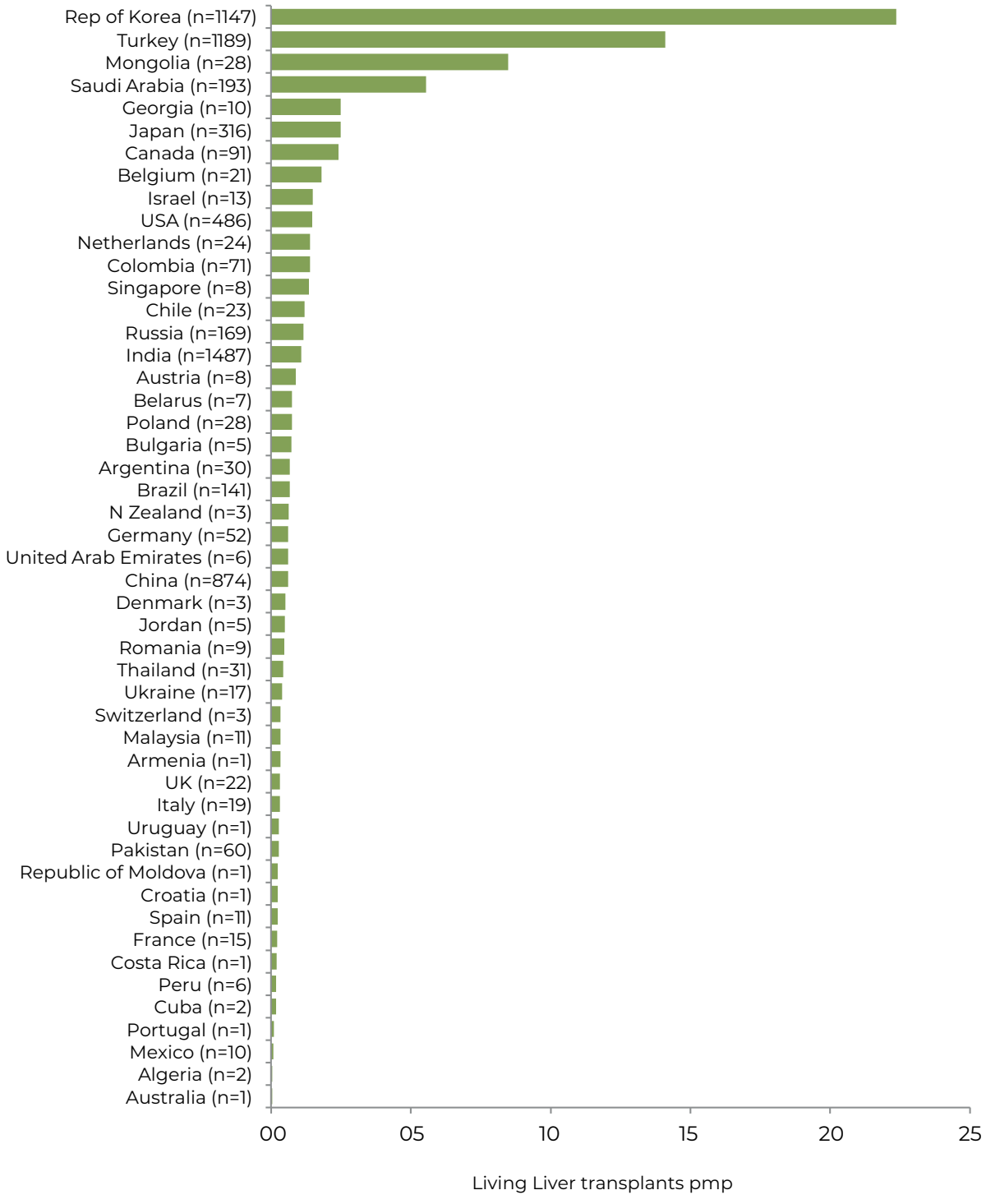
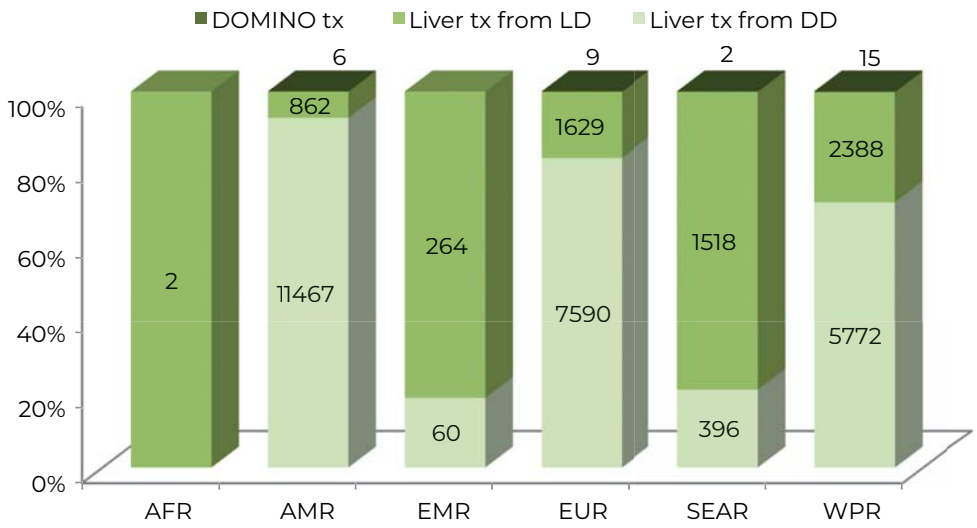


Figure 22. Liver Transplants by WHO regions. Year 2020.



	AFR	AMR	EMR	EUR	SEAR	WPR
Total number of Liver transplants and rate (pmp)	2 (0.0)	12 335 (12.5)	930 (2.0)	9 228 (10.9)	1 916 (1.2)	8 175 (4.5)
% Deceased Donors	0	93	6	82	21	71
Countries with liver transplant activities/Countries reporting to the GODT	1/5	14/20	7/11	38/44	3/4	8/9
Liver transplant centres (millions inhabitants / centre)**	3 (159.5)	401 (2.5)	23 (20.4)	239 (3.5)	201 (8.1)	148 (12.2)

*Rates (pmp) are calculated by applying the population of the responding countries.

**Million inhabitants per transplant centre are calculated by applying the population of the responding countries.

3.4.3. HEART TRANSPLANTATION ACTIVITY 2020

In total, 8 101 heart transplants were carried out in 2020, which represent an 8% decrease compared to 2019. Those transplants were reported to be performed in 57 countries. The **Global map 8** in the **Annex 2** and **Figure 23** show heart transplant rates (pmp) by country in 2020. Slovenia and USA registered the highest rates of heart transplants pmp.

Table 5 shows information of the novel DCD heart transplant programs that have emerged in six countries throughout the world, performing a total of 158 procedures during the year 2020.

According to the information received, 863 paediatric (<18 years) heart transplants were performed in 37 countries, which represent 11% of the total heart transplant activities.

Table 6 displays information on heart transplant activities by WHO region.

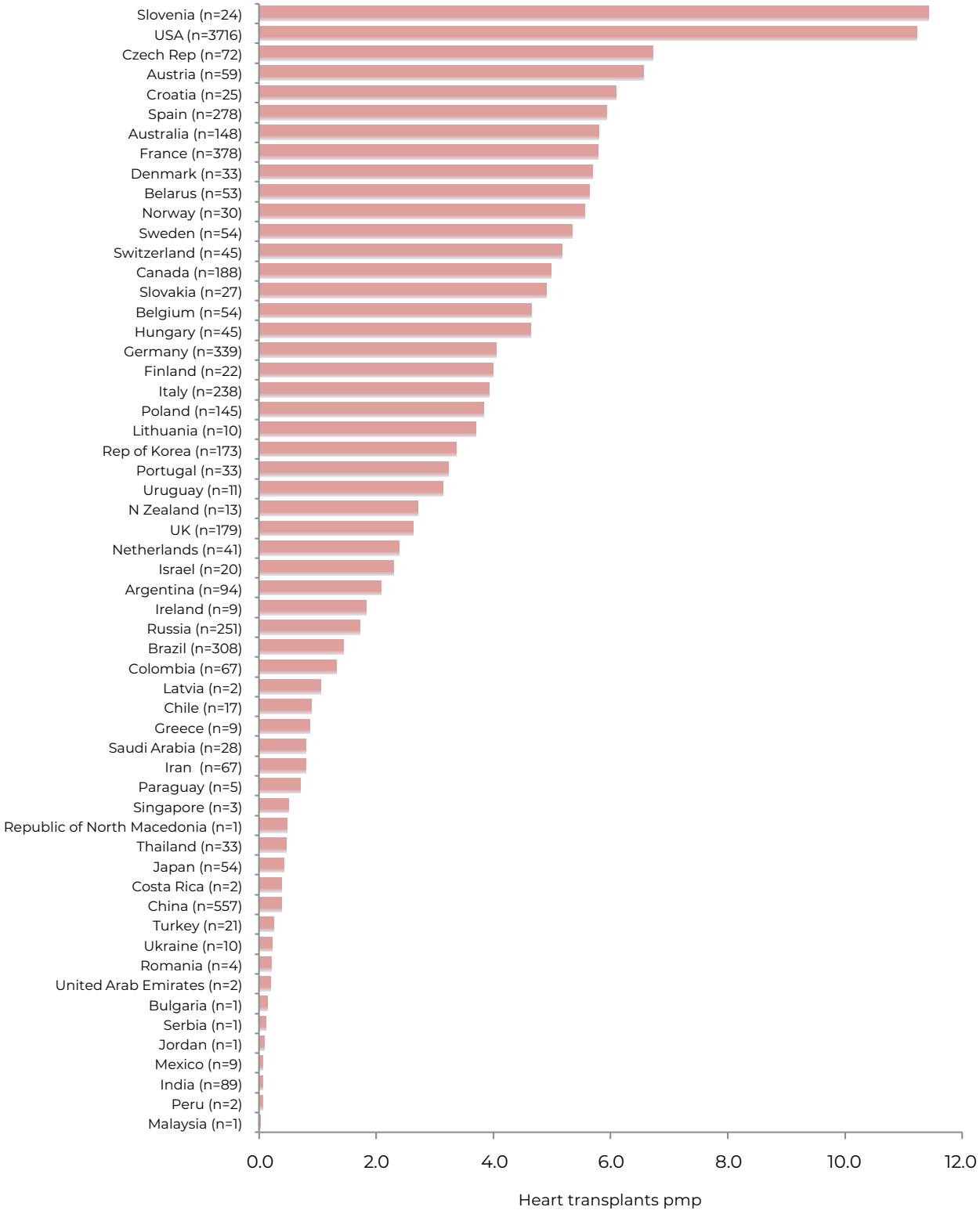
Table 6. Heart transplants by WHO regions. Absolute number and rate per million population (pmp). Year 2020.

WHO Region	Number of heart transplants (pmp)*	Number of paediatric heart transplants (pmp)* (<18 years)	Number of reporting countries with any activity	Number of transplant centres (million inhabitans/centre)**
AFR	0 (0.0)	0 (0.0)	0	0
AMR	4 419 (4.5)	566 (0.6)	11	334 (2.9)
EMR	98 (0.2)	10 (0.0)	4	9 (52.3)
EUR	2 513 (3.0)	209 (0.2)	33	174 (4.9)
SEAR	122 (0.1)	10 (0.0)	2	157 (10.4)
WPR	949 (0.5)	68 (0.0)	7	75 (24.1)

*Rates (pmp) are calculated by applying the population of the responding countries.

**Million inhabitants per transplant centre are calculated by applying the population of the responding countries.

Figure 23. Heart transplant activities. Absolute numbers (in brackets) and rates per million population (pmp). N= 57 countries. Year 2020.



3.4.4 LUNG TRASPLANTATION ACTIVITY 2020

A total of 5 940 lung transplants were globally performed in 2020 (in 48 countries) accounting for 13% of decrease over 2019. The **Global map 9** in the **Annex 2** and **Figure 24** show transplant activities in the reporting countries. Only Japan (n=17) and Russia (n=11) reported lung transplants from living donors in 2020.

In absolute numbers, USA was the only country performing more than 2 500 annual transplant procedures, followed by China with 513 transplants. The remaining 46 countries performing lung transplants reported less than 500 procedures. Looking at the global rates (pmp), Austria registered the highest activity (11.1 pmp) followed by Canada (8.6 pmp).

Lung paediatric transplants (< 18 years) was uncommon, with only 137 procedures performed in 25 countries (although the activity was below 10 paediatric lung transplants in 19 countries). In total, 556 DCD lung transplants were performed in 15 countries (**Table 5**).

Lung transplantation activities by WHO region is represented in **Table 7**.

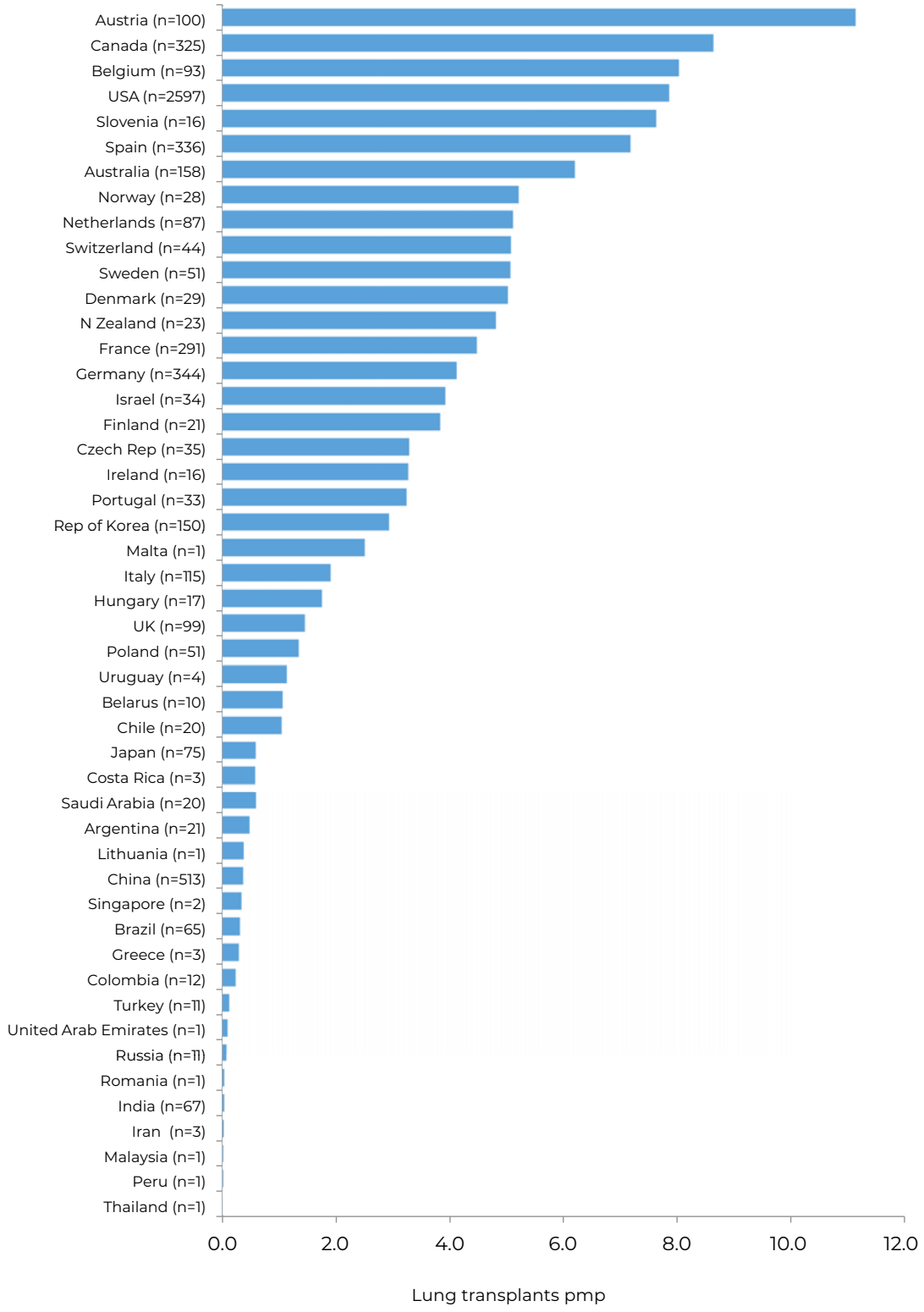
Table 7. Lung transplants by WHO regions. Absolute number and rate per million population (pmp). 2020.

WHO Region	Number of lung transplants (pmp)*	Number of paediatric lung transplants (pmp)* (<18 years)	Number of reporting countries with any activity	Number of lung transplant centres (million inhabitants/ centre)**
AFR	0 (0.0)	0 (0.0)	0	0
AMR	3 048 (3.1)	47 (0.0)	9	118 (8.3)
EMR	24 (0.1)	1 (0.0)	3	3 (156.8)
EUR	1 878 (2.2)	57 (0.1)	27	91 (9.3)
SEAR	68 (0.0)	2 (0.0)	2	83 (19.7)
WPR	922 (0.5)	30 (0.0)	7	81 (29.6)

*Rates (pmp) are calculated by applying the population of the responding countries.

**Million inhabitants per transplant centre are calculated by applying the population of the responding countries.

Figure 24. Lung transplant activities. Absolute numbers (in brackets) and rates per million population (pmp). N= 48 countries. Year 2020.



3.4.5 PANCREAS TRANSPLANTATION ACTIVITY 2020

Global pancreas activities reached 1 970 transplants that were carried out in 42 countries, which represents a decrease of 16% compared to 2019.

The **Global map 10** in the **Annex 2** and **Figure 25** represent pancreas transplant rates (pmp) by country.

Paediatric transplant procedures were anecdotal, with only 34 transplants reported in five countries. **Table 5** presents DCD transplants in the world. In total, 76 pancreas transplants from DCD donors were performed in seven countries. Pancreas transplantation activities by WHO region are represented in **Table 8**.

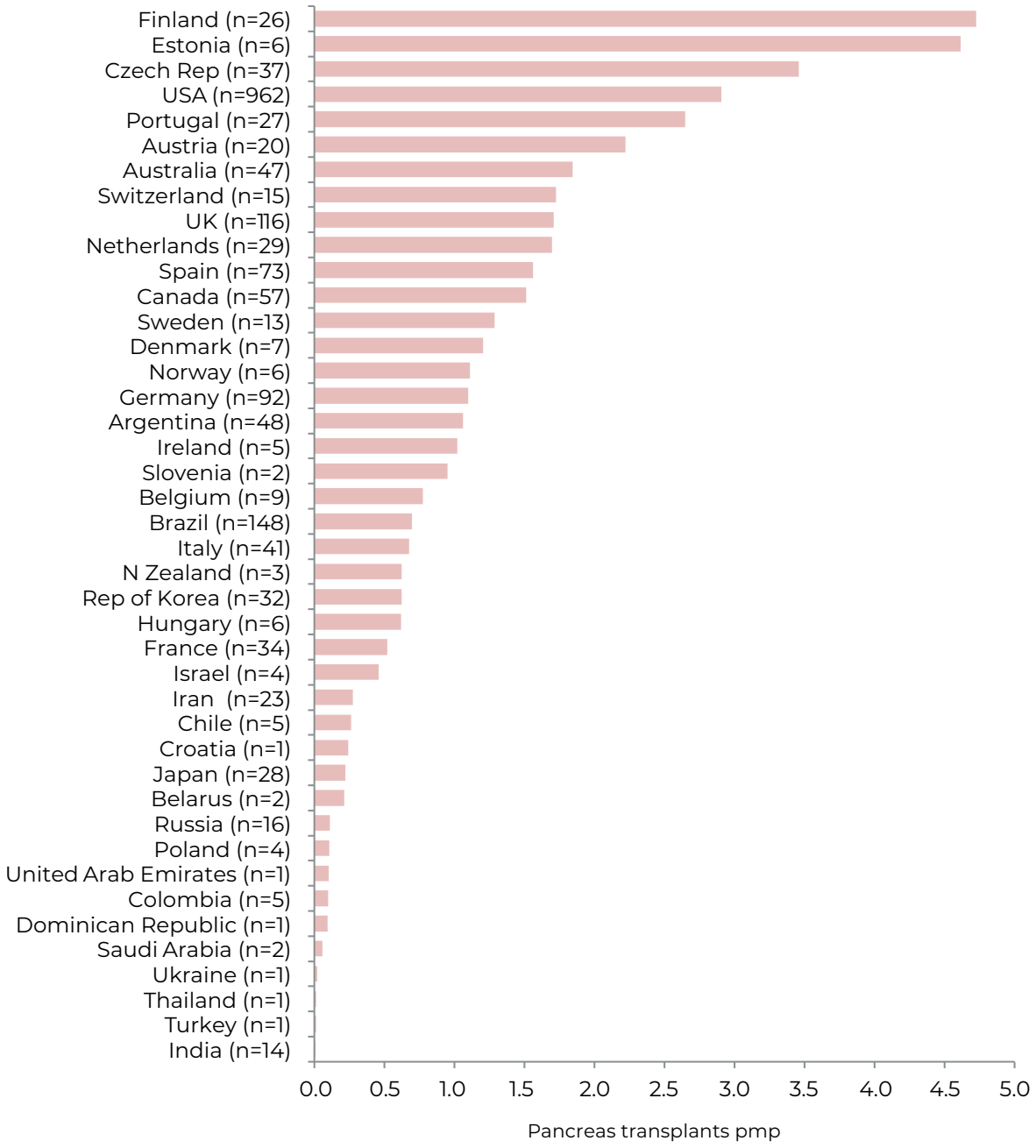
Table 8. Pancreas transplants by WHO regions. Absolute number and rate per million population (pmp). Year 2020.

WHO Region	Number of pancreas transplants (pmp)*	Number of reporting countries with any activity	Number of pancreas transplant centres (million inhabitants/centre)**
AFR	0 (0.0)	0	0
AMR	1 226 (1.2)	7	225 (4.4)
EMR	26 (0.1)	3	5 (94.1)
EUR	593 (0.7)	26	121 (7.0)
SEAR	15 (0.0)	2	54 (30.3)
WPR	110 (0.1)	4	68 (26.6)

*Rates (pmp) are calculated by applying the population of the responding countries.

**Million inhabitants per transplant centre are calculated by applying the population of the responding countries.

Figure 25. Pancreas transplant activities. Absolute numbers (in brackets) and rates per million population (pmp). N= 42 countries. Year 2020.



3.4.6 SMALL BOWEL TRANSPLANTATION ACTIVITY 2020

Only 20 countries reported to have carried out small bowel transplants in 2020. In total, 158 transplant procedures of this type were reported to the GODT in 2020 by 20 countries. Those activities increased by 8% compared with 2019.

The **Global map 11** in the **Annex 2** and **Figure 26** present the worldwide distribution of small bowel transplants. USA carried out 91 (58%) and the UK 17 (11%) of the 158 interventions world-

wide, while each of the remaining countries reported less than ten transplants each.

Of the 158 small bowel transplant procedures, 48 (30%) were performed in paediatric patients. No DCD small bowel transplant was reported.

Small bowel transplant activities by WHO region is represented in **Table 9**.

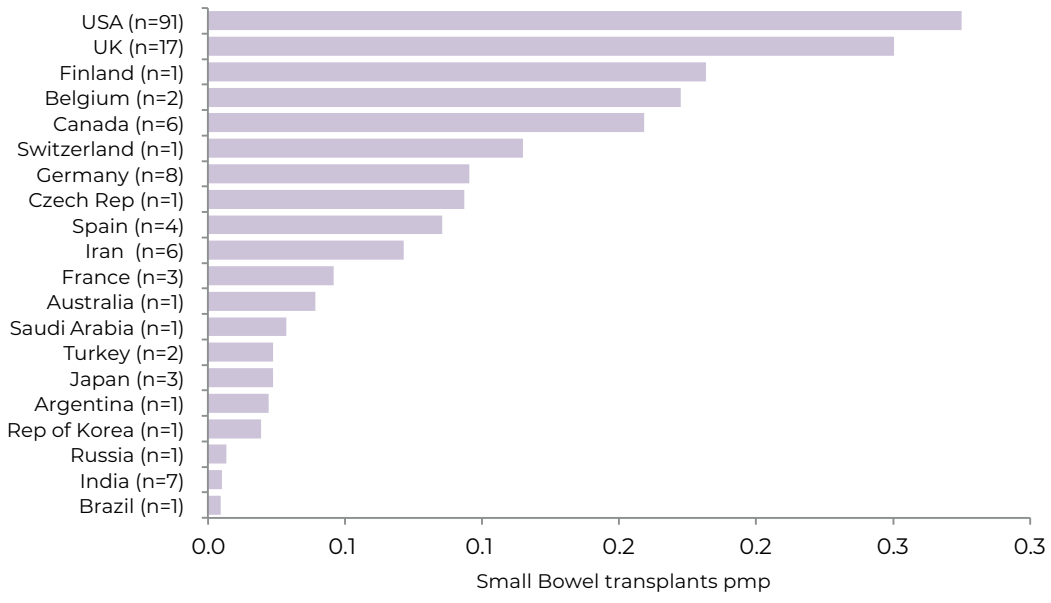
Table 9. Small Bowel transplants by WHO regions. Absolute number and rate per million population (pmp). Year 2020.

WHO Region	Number of small bowel transplants (pmp)*	Number of reporting countries with any activity	Number of small bowel transplant centres (million inhabitants/centre) **
AFR	0 (0.0)	0	0
AMR	99 (0.1)	4	39 (25.2)
EMR	7 (0.0)	2	1 (470.3)
EUR	40 (0.0)	10	46 (18.4)
SEAR	7 (0.0)	1	19 (86.1)
WPR	5 (0.0)	3	55 (32.8)

*Rates (pmp) are calculated by applying the population of the responding countries.

**Million inhabitants per transplant centre are calculated by applying the population of the responding countries.

Figure 26. Small bowel transplant activities. Absolute numbers (in brackets) and rates per million population (pmp). N= 20 countries. Year 2020.



3.4.7 PATIENTS TRANSPLANTED 2020

Information on the number of patients transplanted was received from 89 countries. In addition to Luxembourg, Monaco and Oman that did not reported any transplant activity, Iran did not provide data required for this specific analysis. In total, 124 074 patients received an organ transplant during 2020 in the 89 countries that provided the required information.

Figure 27 shows the large variation in the rates of patients who received an organ transplant pmp between countries. The highest rates were registered in USA (113.5 pmp) and Spain (92.2 pmp). The figure also reveals the extent to what countries rely on donation from living or deceased organ donors. Canada provided the total number of patients transplanted with no distinction of the type of donor, whether living or deceased.

Of patients transplanted worldwide, 6% were recipients under 18 years of age.

Sex-disaggregated data were received from 77 countries, revealing 35% of female recipients versus 65% of male recipients of organs. Distribution of recipients of organs by sex in each country providing relevant data is displayed in **Figure 28**.

3.5 WAITING LISTS 2020

This section describes the volume and management of the waiting list (WL) for solid organ transplantation. The analysis is focused on countries that have been able to provide data on the number of patients who were active on the WL at any time along the year 2020 and/or the number of patients active on the WL at the end of the year and/or the number of patients dead while active on the WL. Information on patients who dropped off from the WL is not currently being collected. Therefore, deaths on the WL is likely an underestimation.

Figures 29-34 display WL data along with information on the rate of transplants pmp performed in each country, which allows assessing the percentage of waitlisted patients along 2020 who received an organ transplant during that same year. Such percentage does not represent the probability of transplantation, since waitlisted patients may have received an organ transplant in subsequent years.

Figure 27. Patients transplanted pmp.2020. N=89 countries. Absolute numbers (in brackets) and rates per million population (pmp). Year 2020.

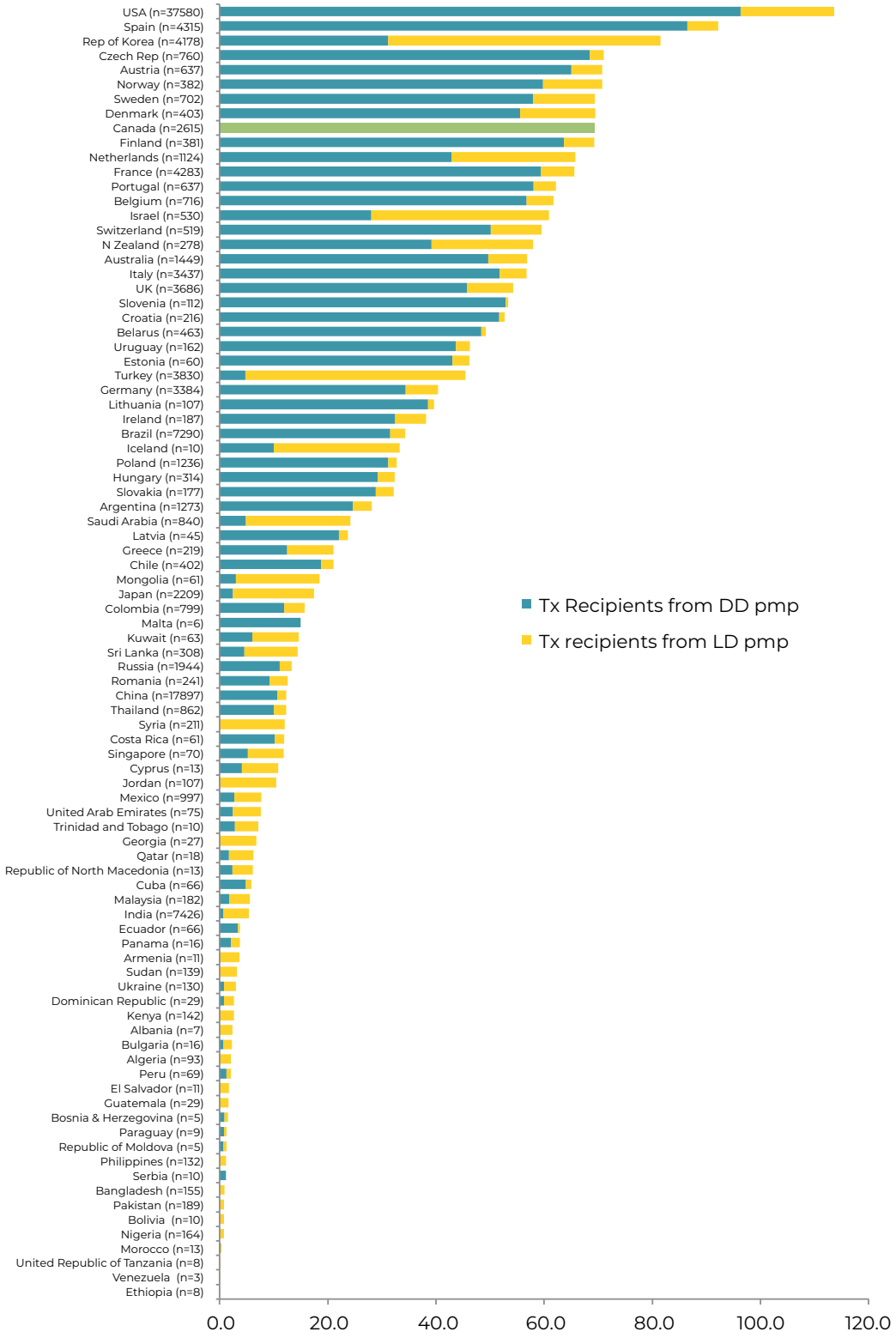
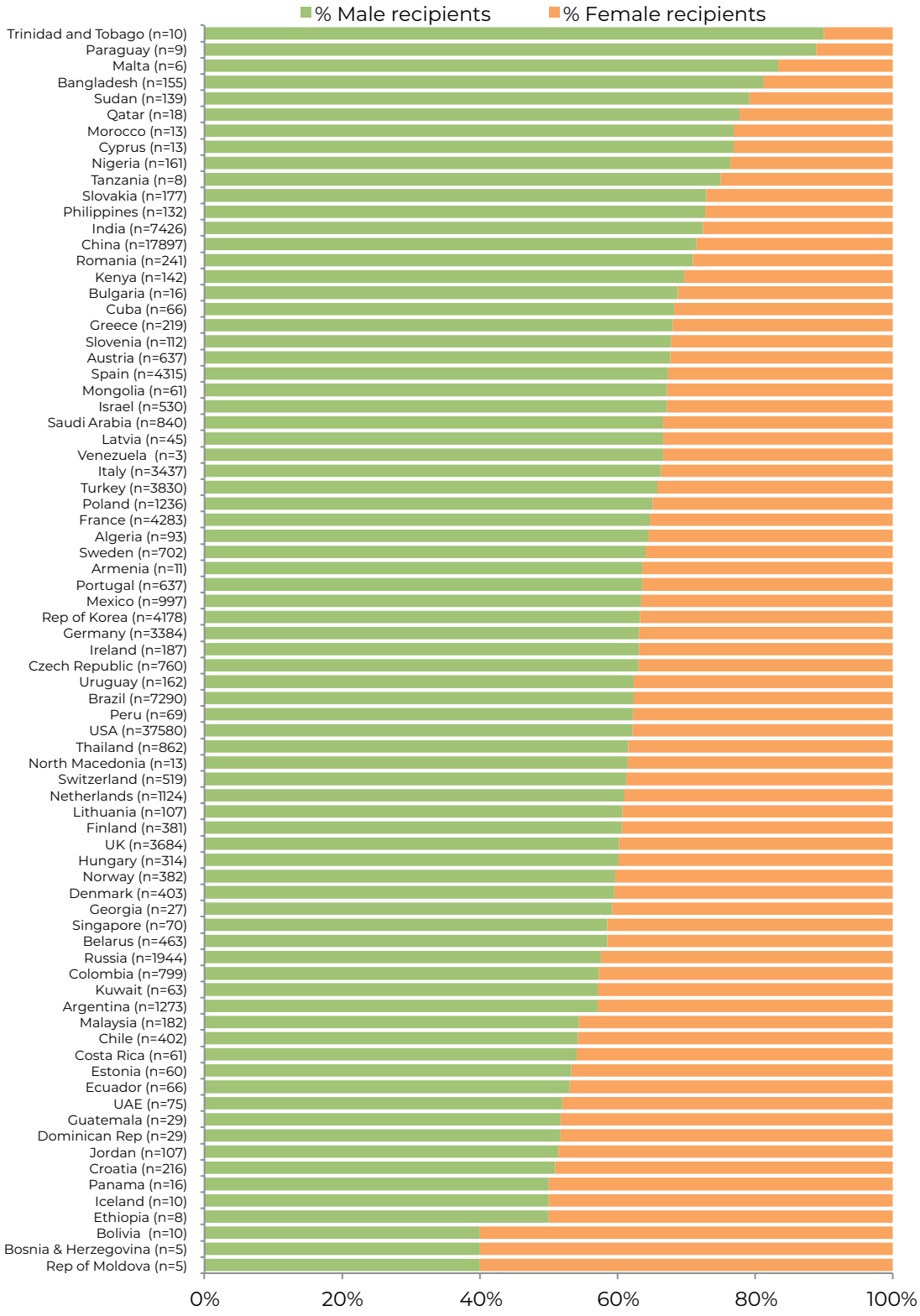
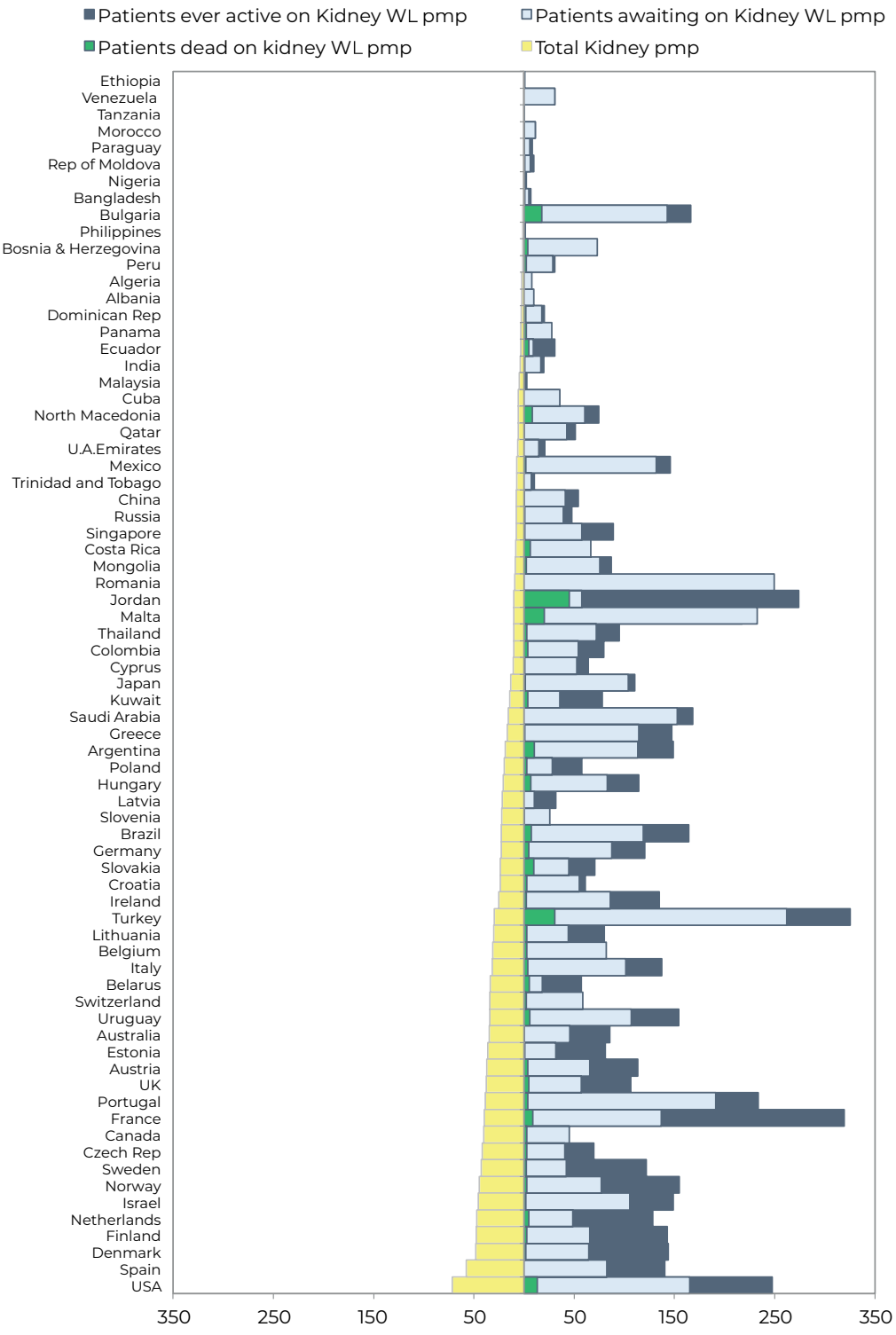


Figure 28. Transplant recipients by sex. Absolute number of recipients (in brackets) and percentage by sex. N=77 countries. Year 2020.



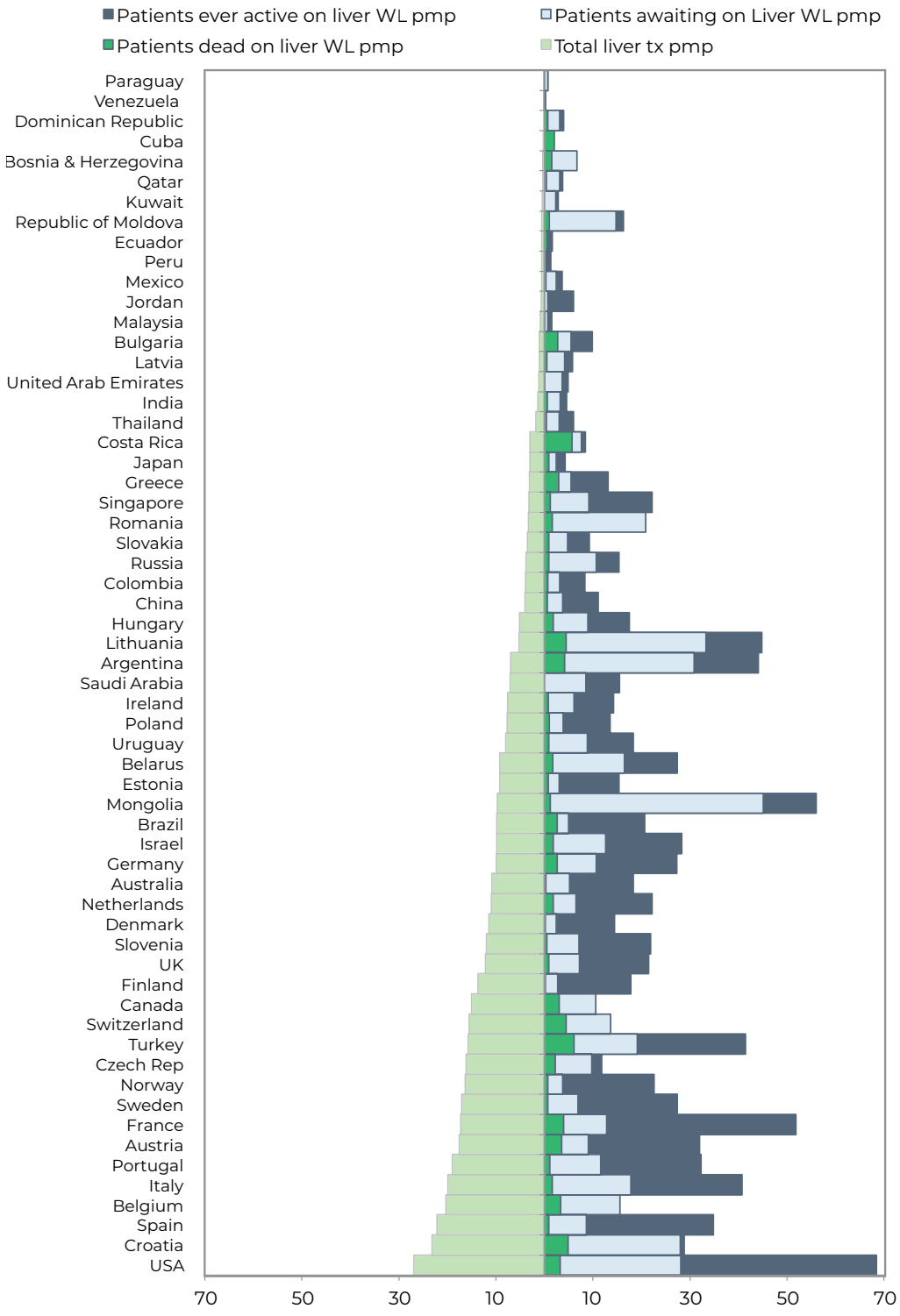
3.5.1 KIDNEY WAITING LIST 2020

Figure 29. Total kidney transplants and number of patients on the waiting list (patients dead, patients ever active in 2020 and patients awaiting at the end of the year) per million population (pmp). N= 73 countries. Year 2020.



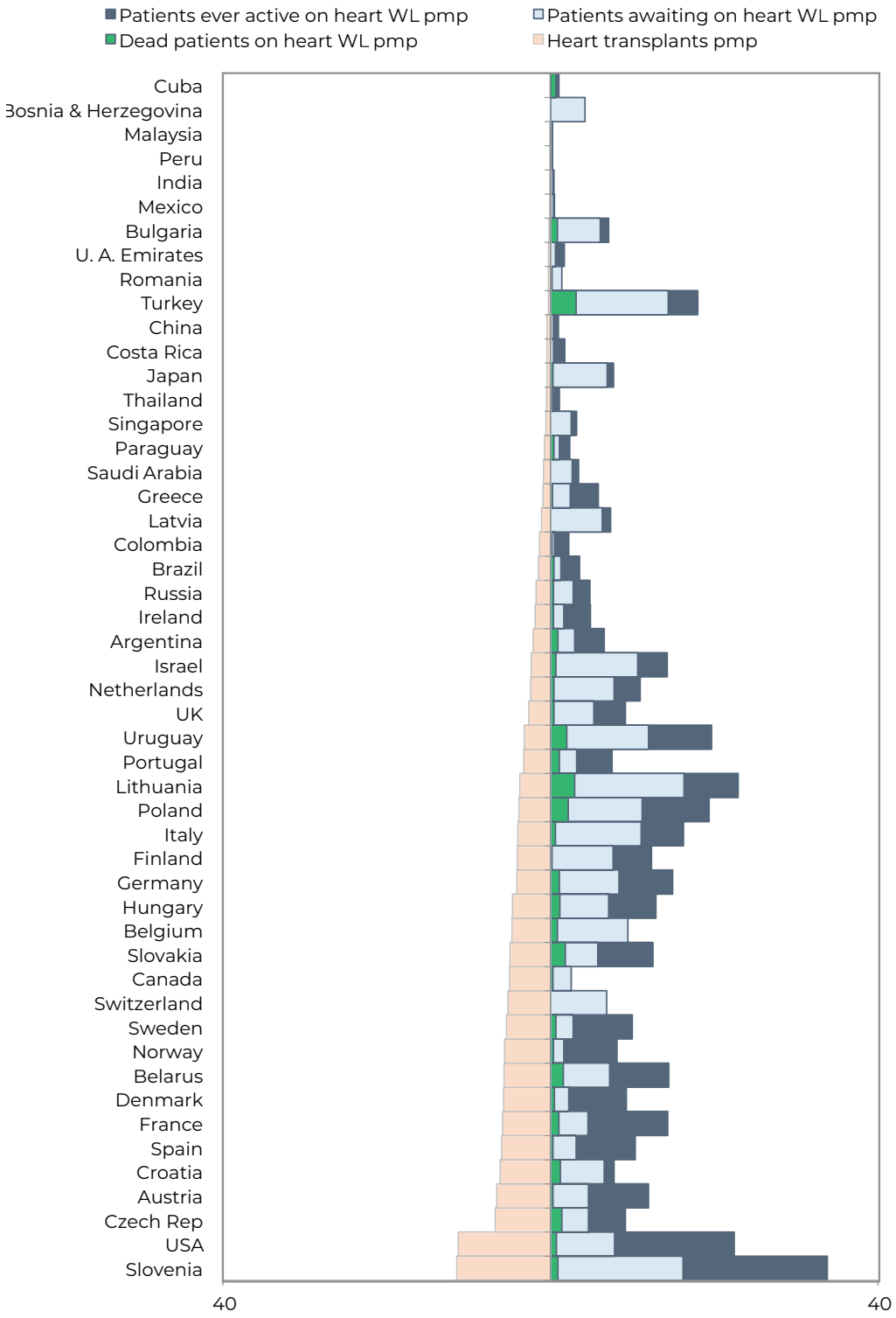
3.5.2 LIVER WAITING LIST 2020

Figure 30. Total liver transplants and number of patients on the waiting list (patients dead, patients ever active in 2020 and patients awaiting at the end of the year) per million population (pmp). N= 60 countries. Year 2020.



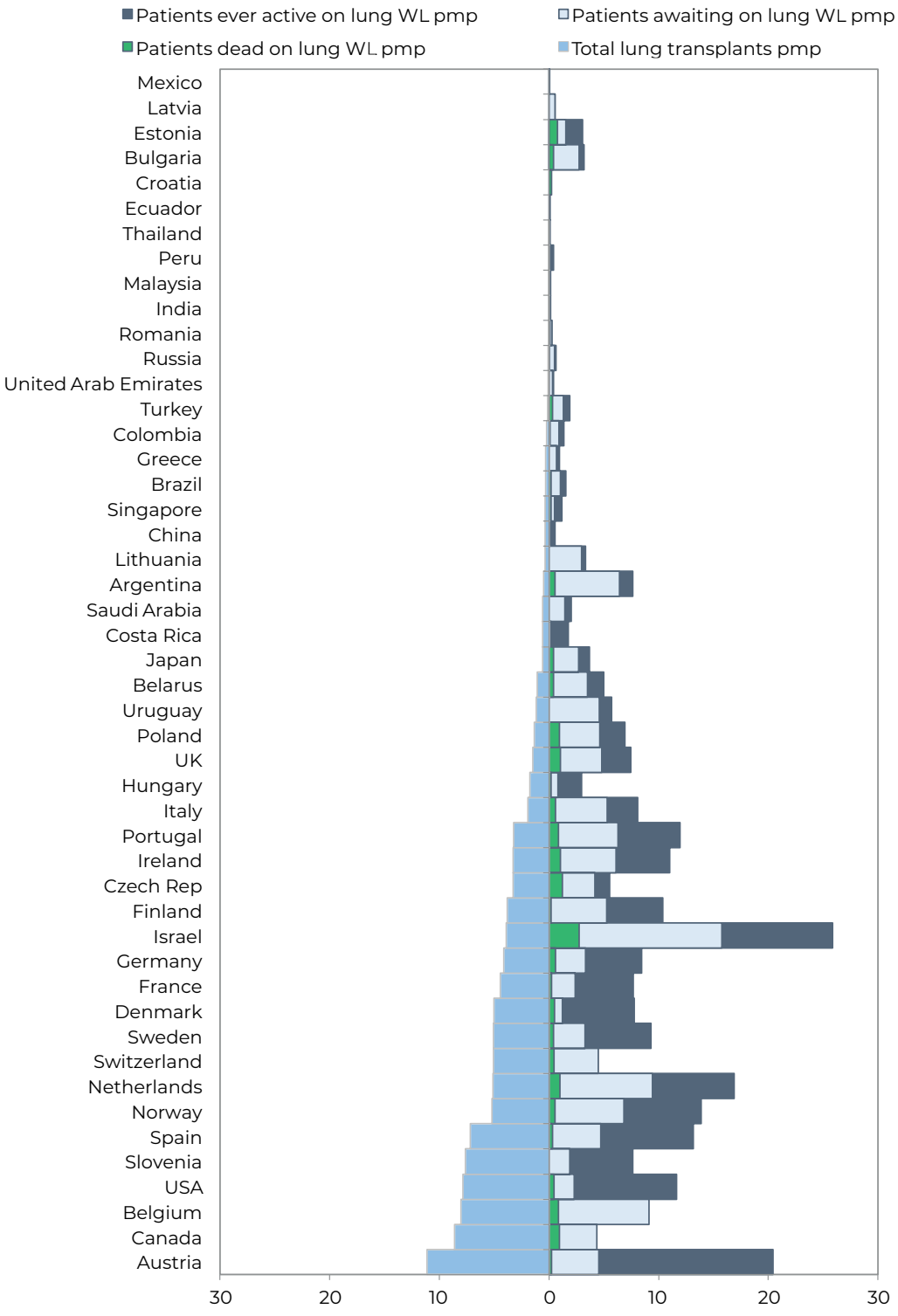
3.5.3 HEART WAITING LIST 2020

Figure 31. Heart transplants and number of patients on the waiting list (patients dead, patients ever active in 2020 and patients awaiting at the end of the year) per million population (pmp). N= 50 countries. Year 2020.



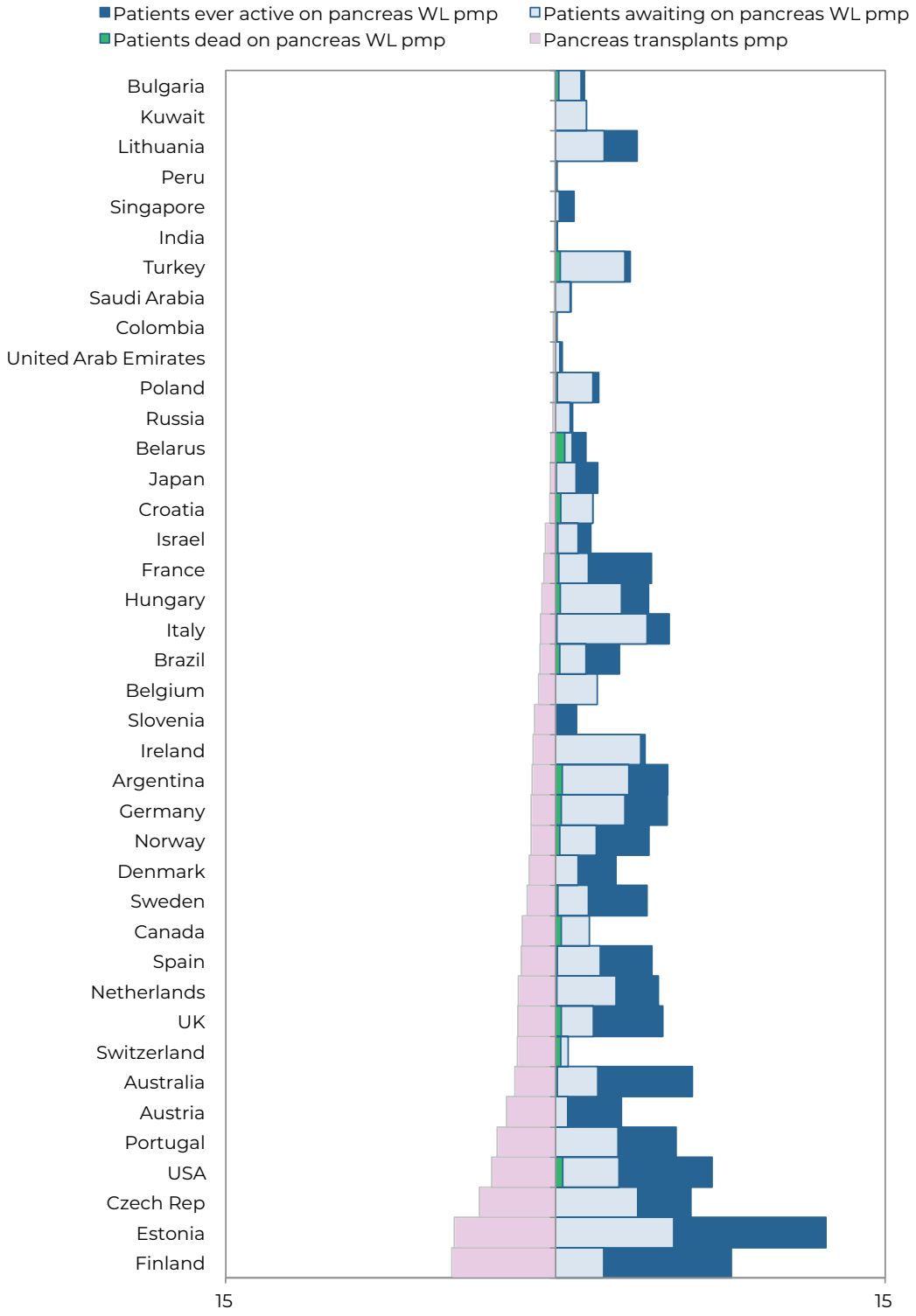
3.5.4 LUNG WAITING LIST 2020

Figure 32. Lung transplants and number of patients on the waiting list (patients dead, patients ever active in 2020 and patients awaiting at the end of the year) per million population (pmp). N= 48 countries. Year 2020.



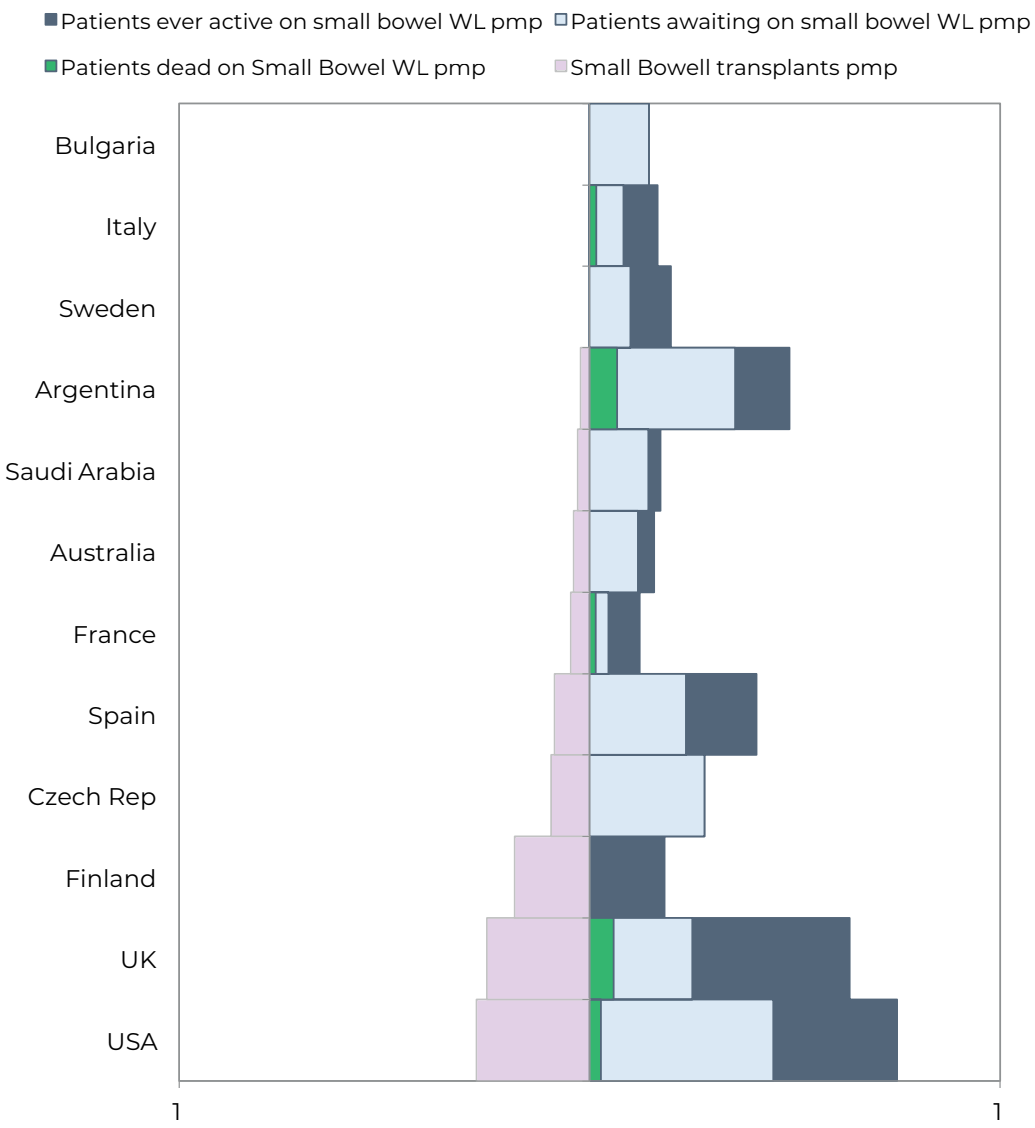
3.5.5 PANCREAS WAITING LIST 2020

Figure 33. Pancreas transplants and number of patients on the waiting list (patients dead, patients ever active in 2020 and patients awaiting at the end of the year per million population (pmp). N= 40 countries. Year 2020.



3.5.6 SMALL BOWEL WAITING LIST 2020

Figure 34. Small Bowel transplants and number of patients on the waiting list (patients dead, patients ever active in 2020 and patients awaiting at the end of the year) per million population (pmp). N= 12 countries. Year 2020.



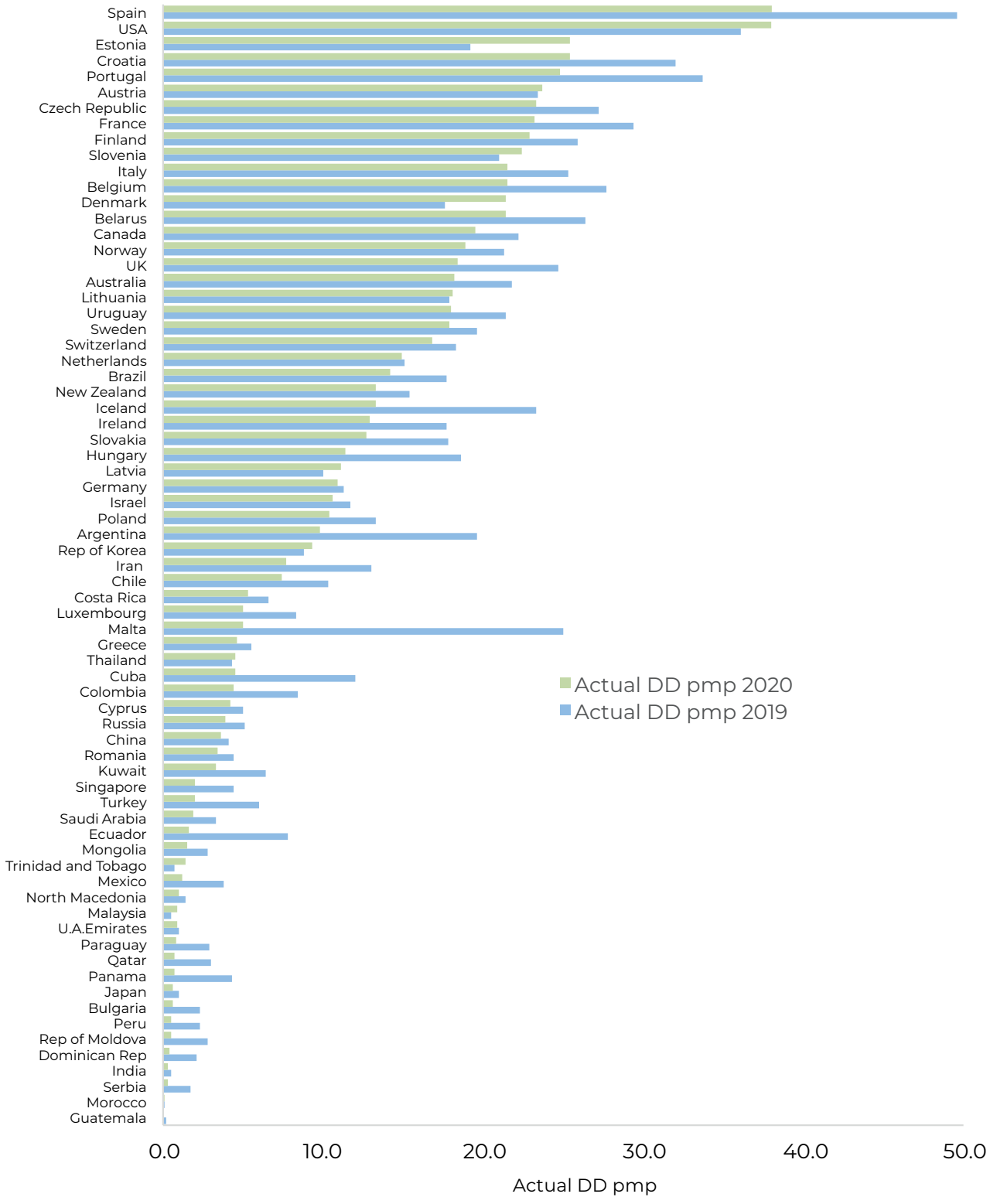
3.6 COMPARISON OF 2019-2020 ACTIVITIES

This section represents a comparison of organ donation and transplantation activities in 2020 versus 2019. Comparisons are made between countries and regions of the WHO. Data are representative of the impact of the COVID-19 pandemic on worldwide transplant programs.

3.6.1 ACTUAL DECEASED DONATION 2019-2020

Globally, DD decreased by 13 % in 2020 compared with 2021. **Figure 35** represents variations in DD rates pmp across Member States. Of 71 countries providing data for the two analysed years, 57 (79%) experienced a decrease in DD rates of at least 5%.

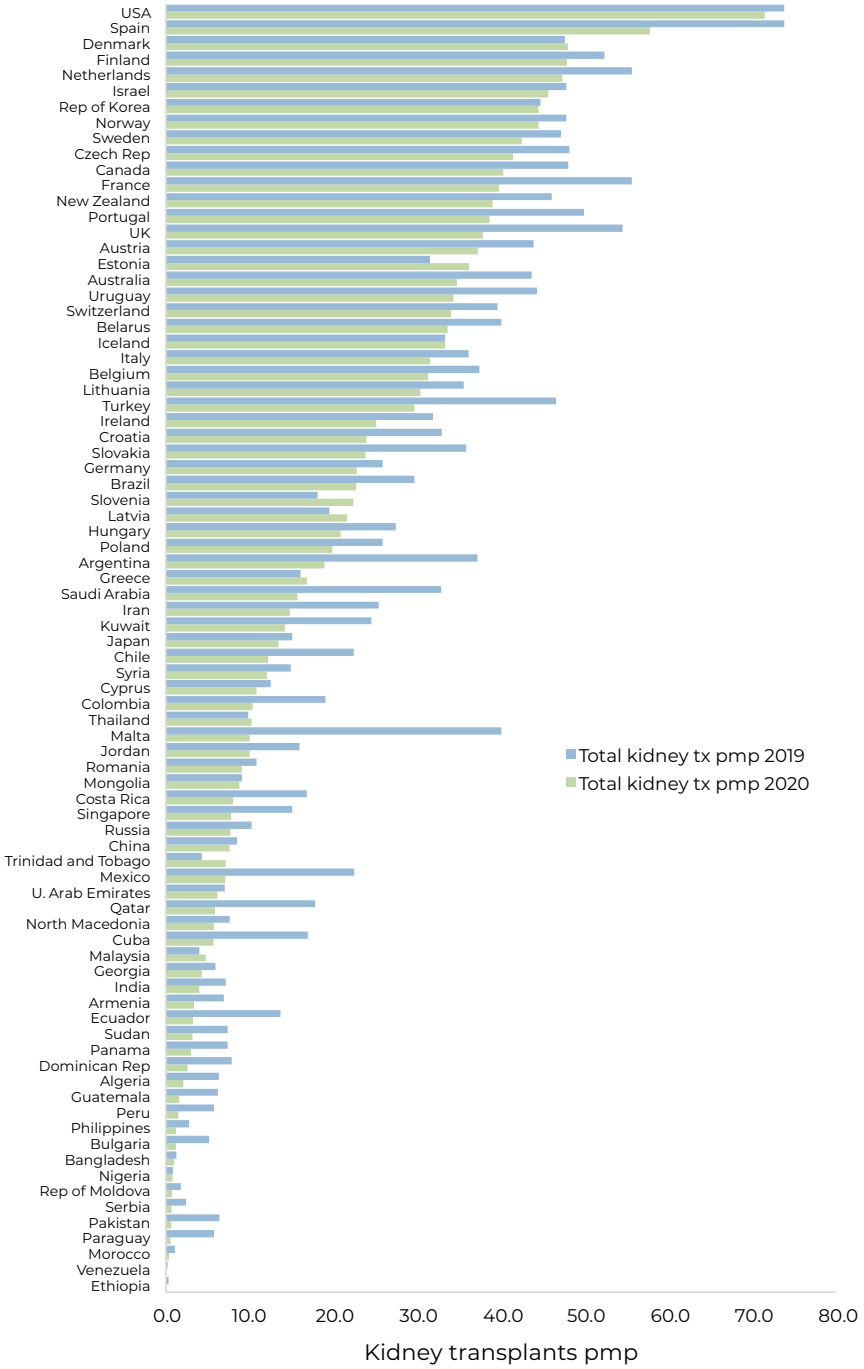
Figure 35. Deceased donors per million population (pmp) in 2019 versus 2020. N= 71 countries.



3.6.2 KIDNEY TRANSPLANTS 2019-2020

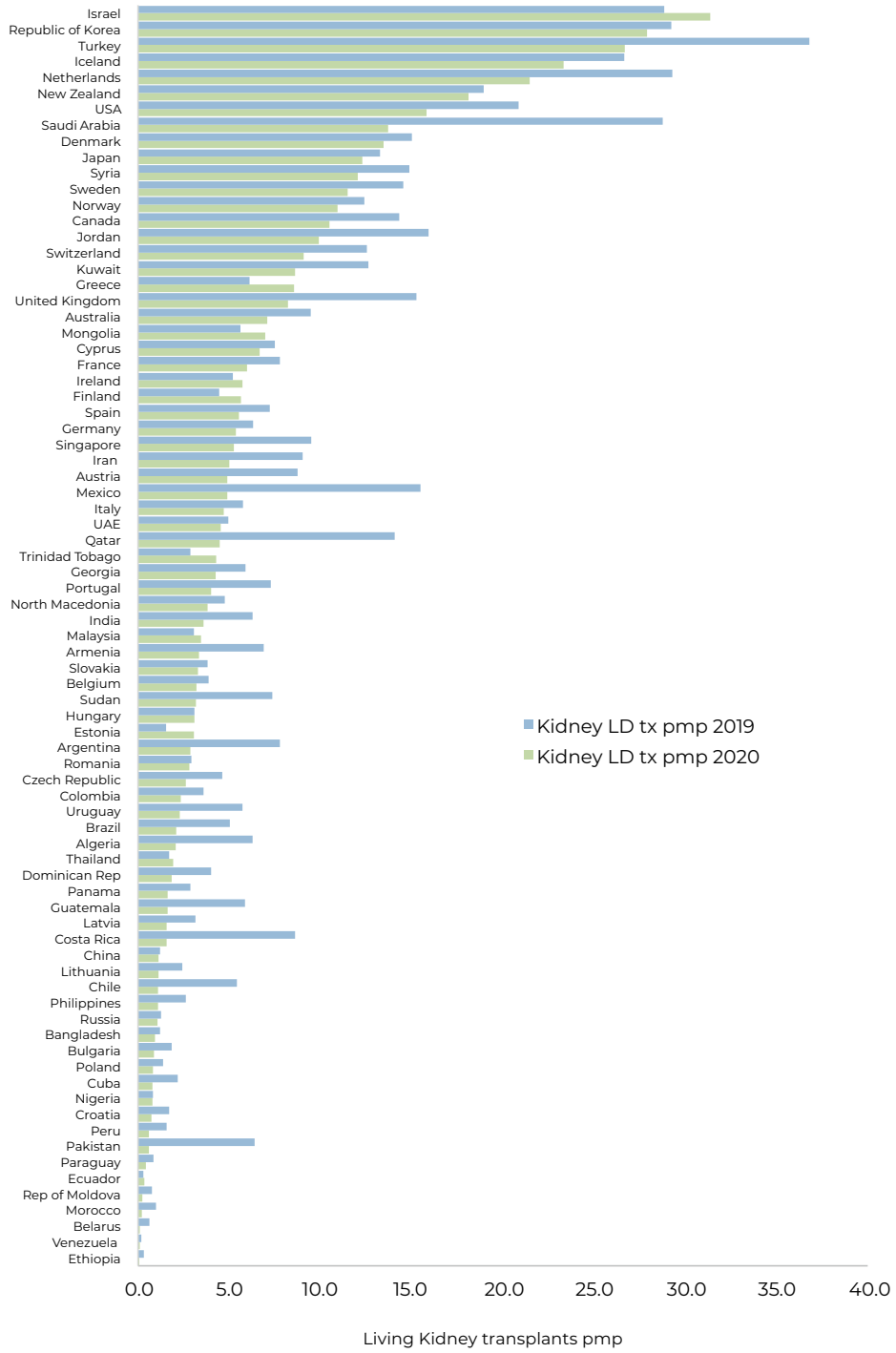
In total, 80 926 kidney transplants were performed in 90 of the 93 reporting countries during 2020. This global kidney transplantation activity represents a 21 % decrease compared with 2019. While kidney transplants from DDs decreased by 14%, living kidney transplant procedures declined by 33% globally. Variations in kidney transplants

Figure 36. Total Kidney transplants per million population (pmp) in 2019 versus 2020. N= 82 countries.



rates in 2020 versus 2019 by country are represented in **Figure 36** (total kidney transplants) and **Figure 37** (living donor kidney transplants). Of 82 countries providing data for the two analysed years, 68 (83%) experienced a decrease in total kidney transplant rates of at least 5%.

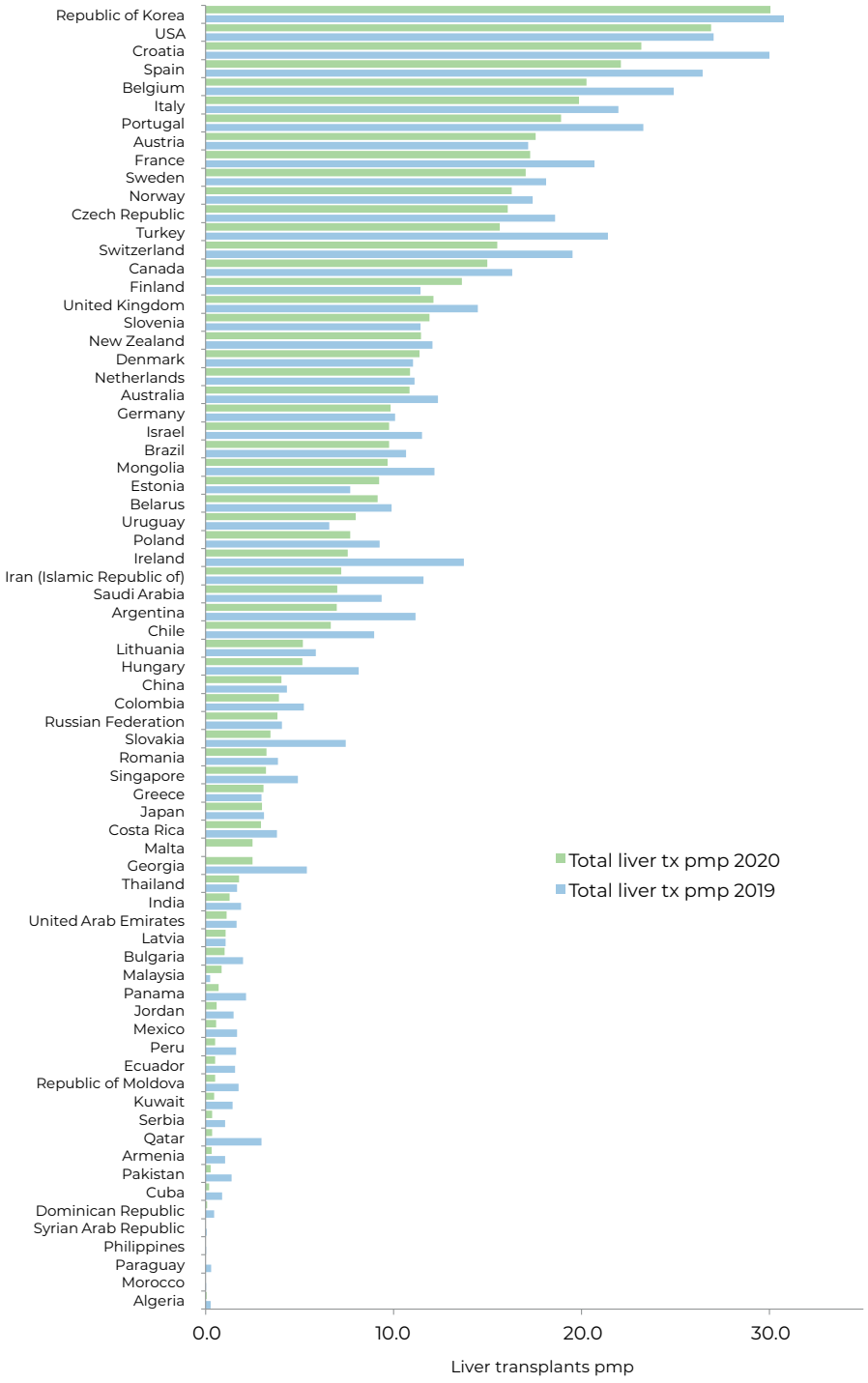
Figure 37. Kidney transplants from living donors per million population (pmp) in 2019 versus 2020. N=79 countries.



3.6.3 LIVER TRANSPLANTS 2019-2020

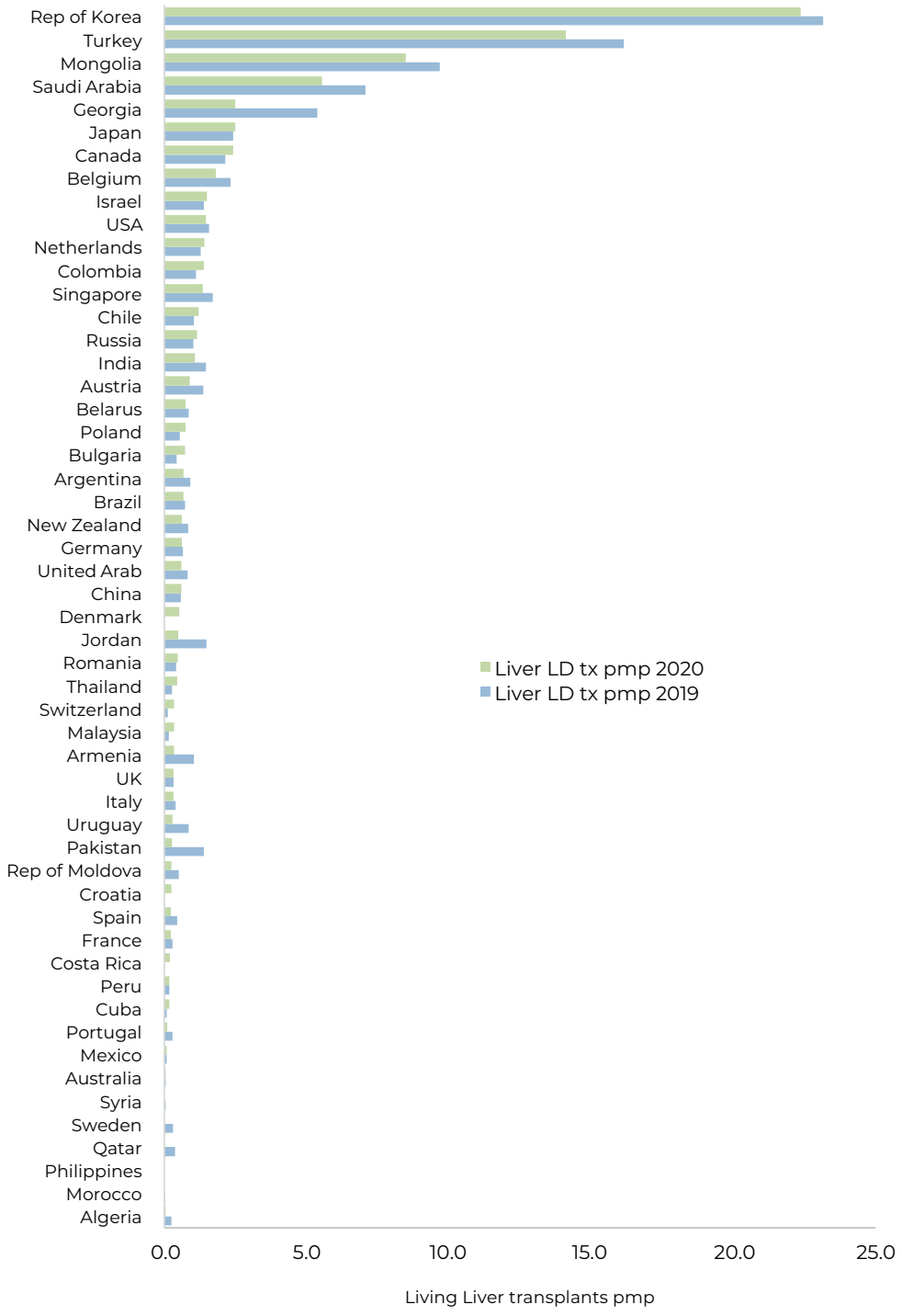
The 32 586 liver transplant procedures performed in 2020 represented an 11% decrease compared with activities registered in 2019. DD liver transplants decreased by 10%, living donor liver transplants by 12% and domino liver transplants by 26%. Variations in liver transplant rates compa-

Figure 38. Liver transplants per million population. 2019-2020. N=72 countries.



ring 2020 with 2019 by country are displayed in **Figure 38** (total liver transplants) and **Figure 39** (living liver transplants). Of 72 countries providing data for the two analysed years, 56 (78%) experienced a decrease in liver transplant rates of at least 5%.

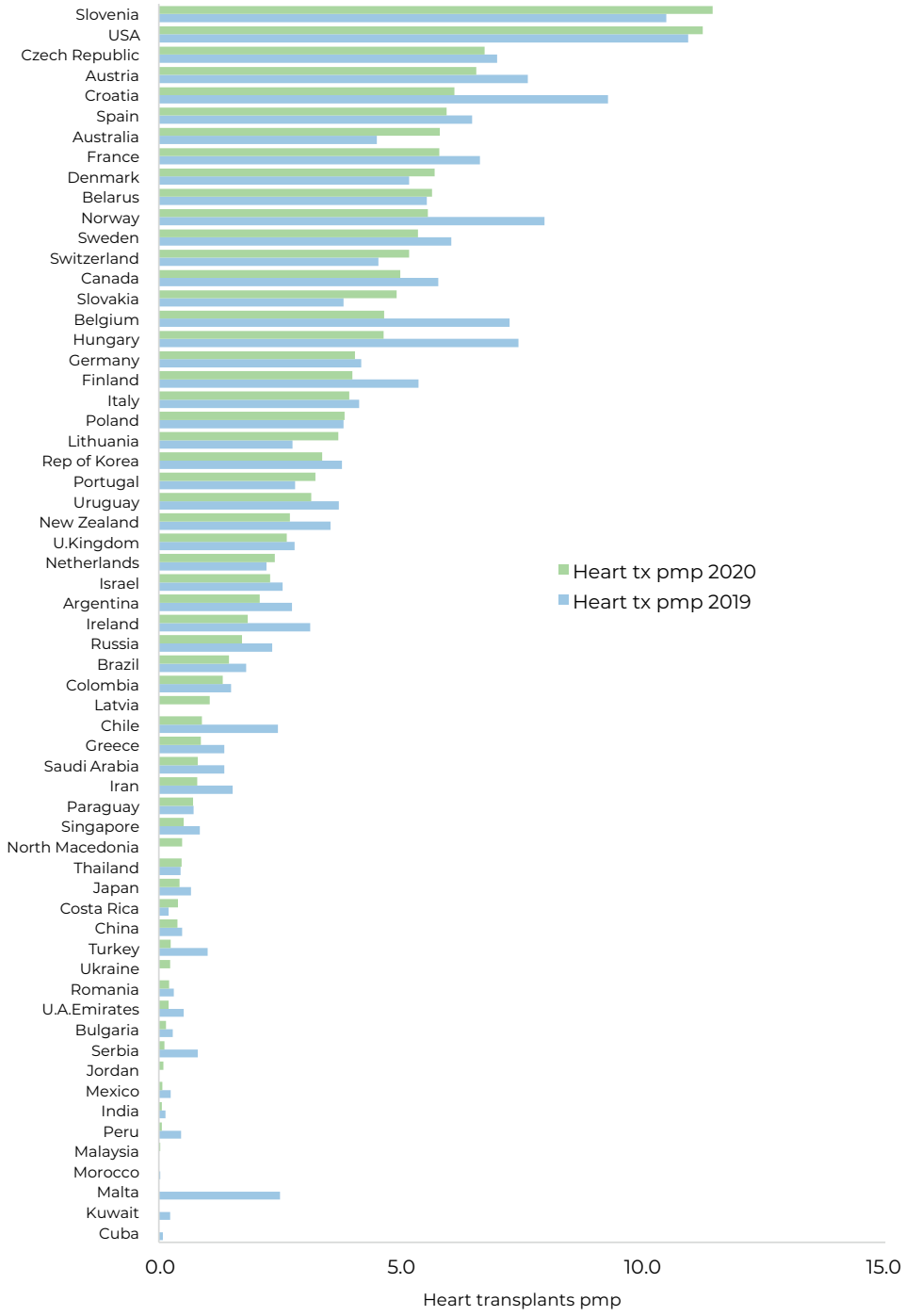
Figure 39. Liver transplants from living donors per million population (pmp) in 2019 versus 2020.N= 53 countries.



3.6.4 HEART TRANSPLANTS 2019-2020

In total, 8 101 heart transplants were carried out in 2020, representing an 8% decrease compared with 2019. Variation in heart transplant rates pmp are represented in **Figure 40**. Of 61 countries providing data for the two analysed years, 39 (64%) experienced a decrease in heart transplant rates of at least 5%.

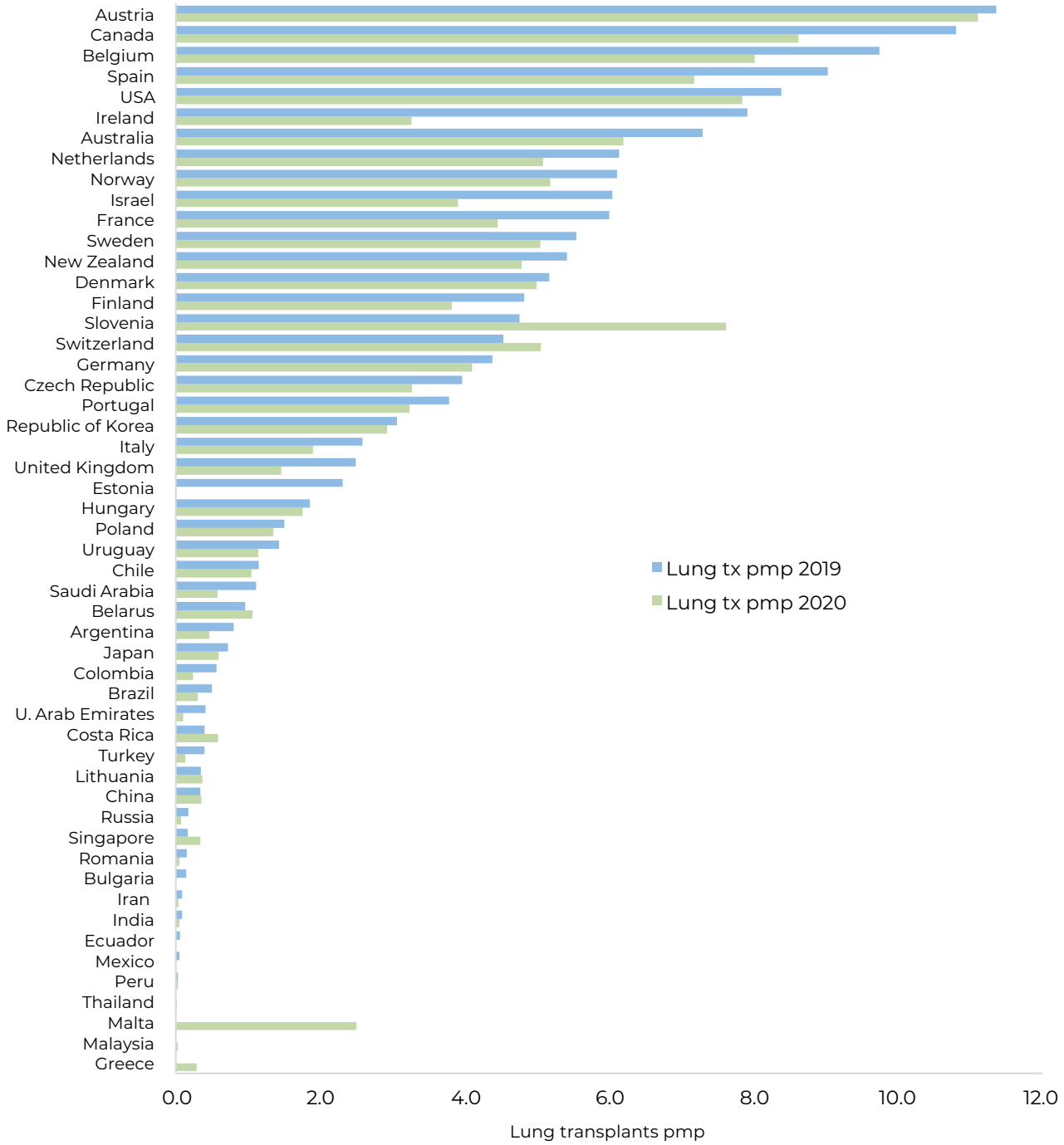
Figure 40. Heart transplants per million population (pmp) in 2020 versus 2019. N=61 countries.



3.6.5 LUNG TRANSPLANTS 2019-2020

A total of 5 940 lung transplants were globally performed in 2020, which represents a 13% decrease compared with 2019. Variations in lung transplants rates pmp in 2020 versus 2019 are displayed in **Figure 41**. Of 52 countries providing data for the two analysed years, 37 (71%) experienced a decrease in lung transplant rates of at least 5%.

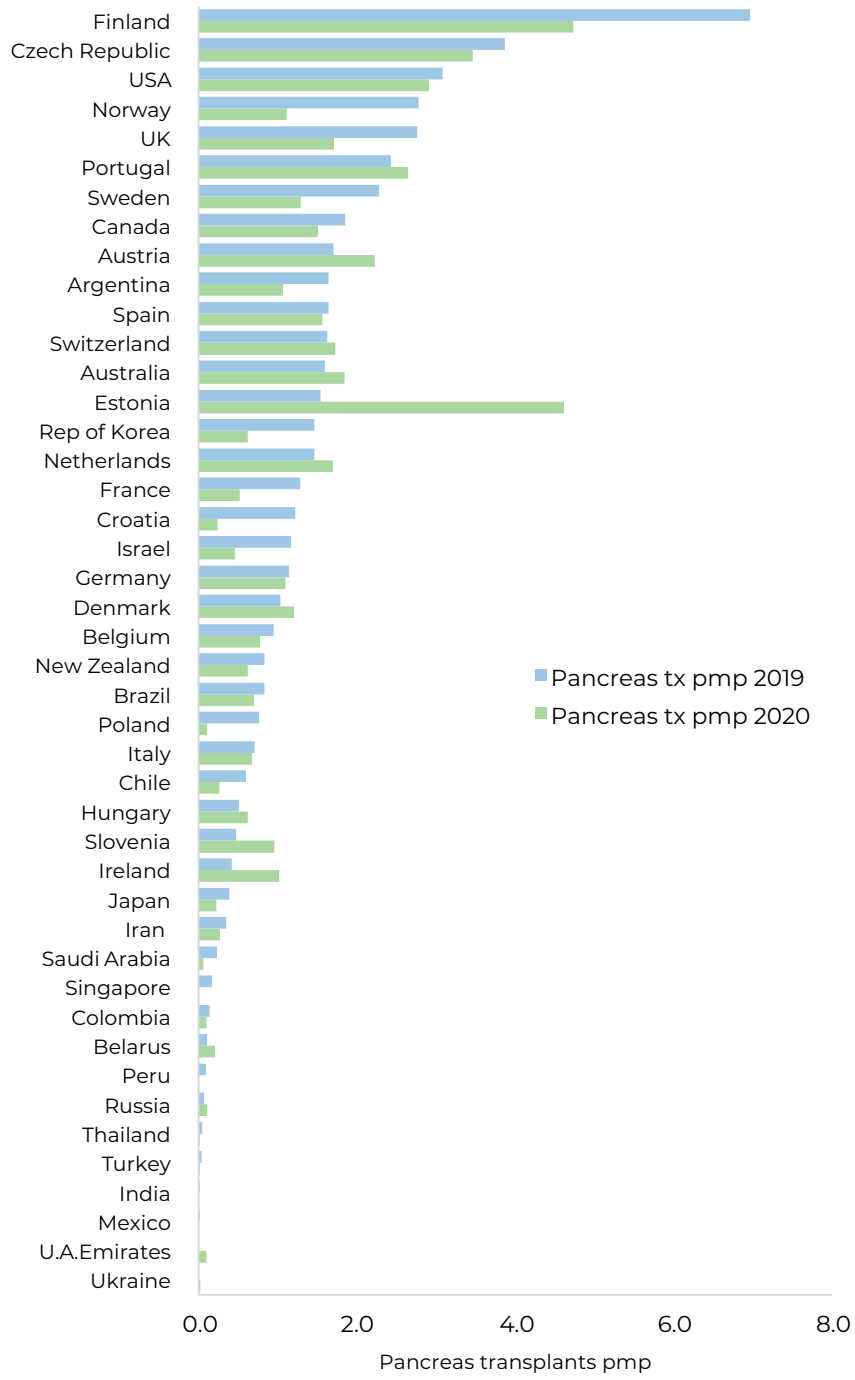
Figure 41. Lung transplants per million population (pmp) in 2020 versus 2019. N= 52 countries.



3.6.6 PANCREAS TRANSPLANTS 2019-2020

Globally, 1 970 pancreas transplants were carried out in 2020 – a 16% decrease compared with 2019. **Figure 42** represents variations in pancreas transplants rates pmp in 2020 versus 2019 by country. Of 44 countries providing data for the two analysed years, 27 (61%) experienced a decrease in pancreas transplant rates of at least 5%.

Figure 42. Pancreas transplants per million population (pmp) in 2020 versus 2019. N= 44 countries.



3.6.7 SMALL BOWEL TRANSPLANTS 2019-2020

In 2020, 158 small bowel transplant procedures were performed globally. This represents an 8% of increase compared with 2019. **Figure 43** displays variations in rates pmp across countries.

3.6.8 DONATION AND TRANSPLANTATION ACTIVITIES BY WHO REGION 2019-2020

Table 10 shows variation in donation and transplantation activities in 2020 versus 2019 by WHO regions. COVID-19 has caused a profound impact on donation and transplantation programs with a variable reduction in donation and transplantation activities. During 2020, there was a global decrease of 13% in deceased donation and of 18% in the total number of organ transplants. The decline was more prominent for kidney transplant (21%) followed by pancreas (16%), lung (13%), liver (11%) and heart transplants (8%). Also, a high variability is observed when comparing the six WHO regions, as seen in **Table 10**.

Figure 43. Small bowel transplants per million population (pmp) in 2020 versus 2019. N=25 countries.

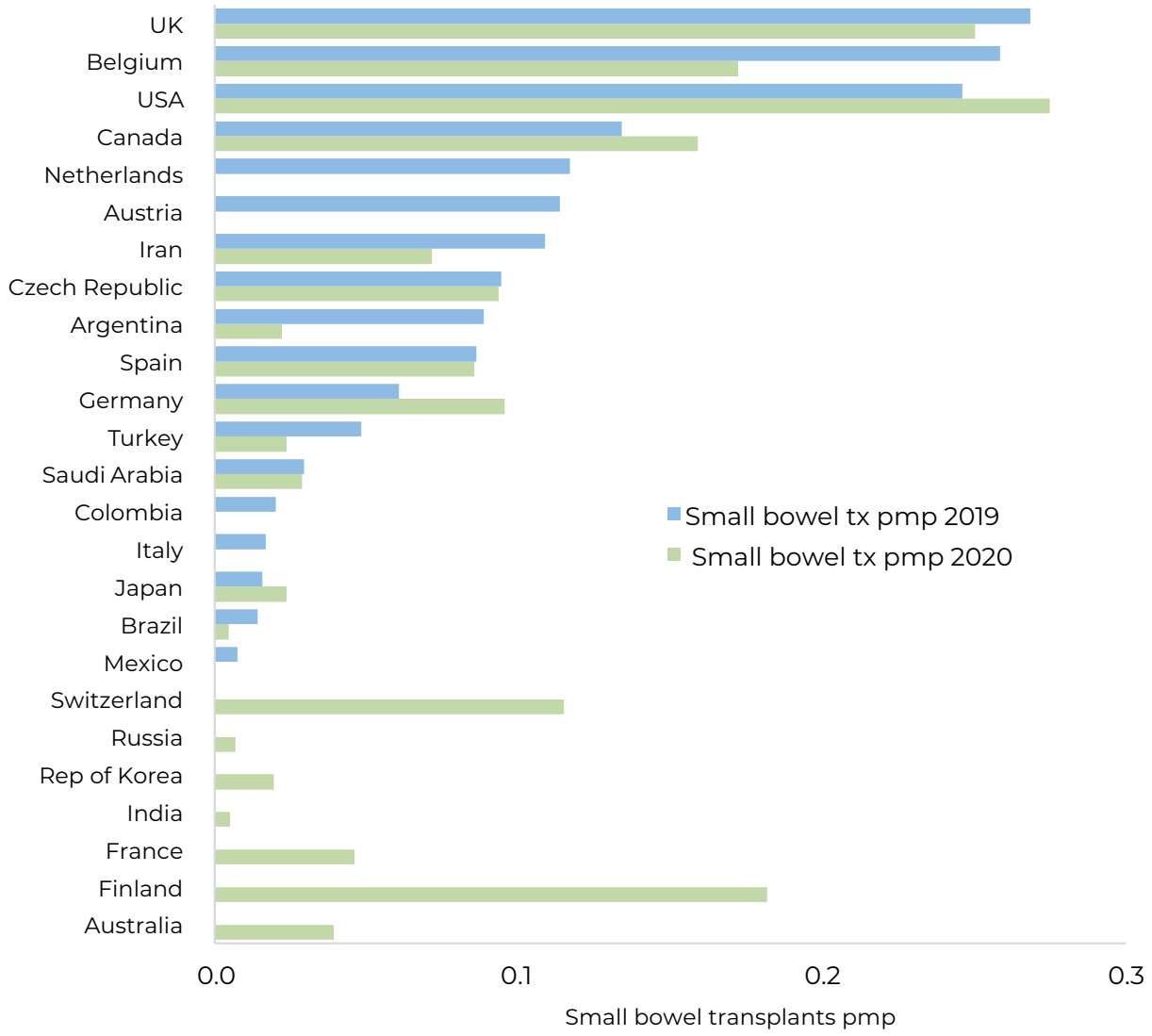


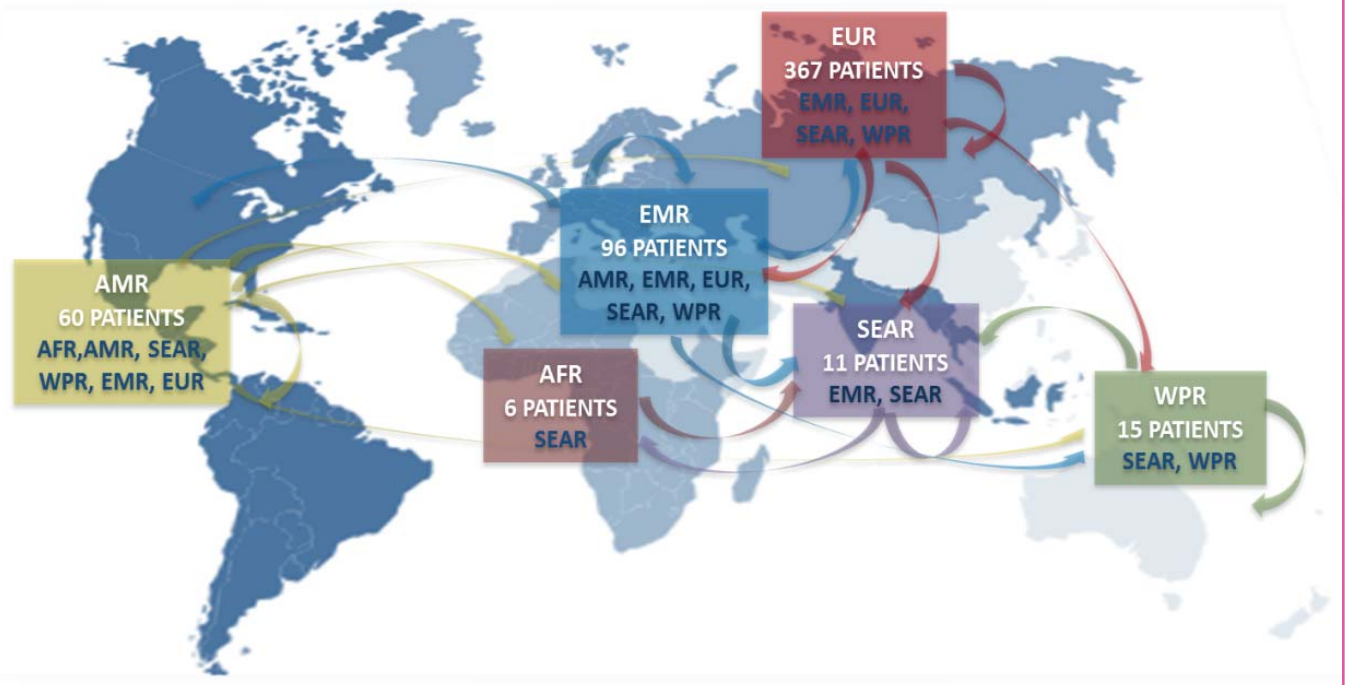
Table 10. Donation and transplantation activities in 2019 versus 2020, according to data derived from the Global Observatory on Donation and Transplantation (GODT)

Africa			America			Eastern Mediterranean			Europe			South East region			Western Pacific			Global		
2019	2020	% Variation	2019	2020	% Variation	2019	2020	% Variation	2019	2020	% Variation	2019	2020	% Variation	2019	2020	% Variation	2019	2020	% Variation
1 (0.0)	0 (0.0)	- 100	18 974 (19.5)	17 510 (17.8)	-7.7	1 241 (2.8)	741 (1.6)	-40.3	13 388 (16.9)	10 730 (12.7)	-19.9	1 016 (0.6)	764 (0.5)	-24.8	7 066 (4.0)	6 355 (3.5)	-10.1	41 686 (7.0)	36 100 (5.8)	-13.4
1 (0.0)	0 (0.0)	-100	16 013 (16.4)	14 090 (14.3)	-12.0	1 241 (2.8)	741 (1.6)	-40.3	11 233 (14.2)	9 051 (10.7)	-19.4	1 016 (0.6)	760 (0.5)	-25.2	2 940 (1.65)	3 292 (1.8)	+12.0	32 444 (5.4)	27 934 (4.5)	-13.9
0 (0.0)	0 (0.0)	(-)	2 961 (3.0)	3 420 (3.5)	+15.5	0 (0.0)	0 (0.0)	(-)	2 155 (2.7)	1 679 (2.0)	-22.0	0 (0.0)	4(0.0)	(-)	4 126 (-2.3)	3 063 (-1.7)	-25.8	9 242 (1.6)	8 166 (1.3)	-11.6
470 (1.3)	413 (0.9)	-12.1	39 515 (40.5)	32 957 (33.5)	-16.6	5 536 (12.4)	2 520 (5.4)	-54.5	28 053 (35.5)	21 929 (25.9)	-21.8	10 635 (6.6)	6 661 (4.1)	-37.4	18 194 (10.2)	16 446 (9.1)	-9.6	102 403 (17.2)	80 926 (13.0)	-21.0
2 (0.0)	0 (0.0)	-100	28 035 (28.8)	25 841 (26.3)	-7.8	1 578 (3.5)	940 (2.0)	-40.4	20 287 (25.6)	16 019 (18.9)	-21.0	1 698 (1.1)	1 192 (0.7)	-29.8	12 491 (7.0)	11 266 (6.2)	-9.8	64 091 (10.8)	55 258 (8.9)	-13.8
468 (1.3)	413 (0.9)	-11.8	11 480 (11.8)	7 116 (7.2)	-38.0	3 958 (8.9)	1 580 (3.4)	-60.1	7 766 (9.8)	5 910 (7.0)	-23.9	8 937 (5.6)	5 469 (3.3)	-38.8	5 703 (3.2)	5 180 (2.9)	-9.2	38 312 (6.4)	25 668 (4.1)	-33.0
12 (0.0)	2 (0.0)	-83.3	13 070 (13.4)	12 335 (12.5)	-5.6	1 612 (3.6)*	930 (2.0)**	-42.3	10 754 (13.6)	9 228 (10.9)	-14.2	2 708 (1.7)	1 916 (1.2)	-29.25	8 589 (4.8)	8 175 (4.5)	-4.8	36 745 (6.2)	32 586 (5.2)	-11.3
1 (0.0)	0 (0.0)	-100	12 166 (12.5)	11 467 (11.7)	-5.7	99 (0.2)	60 (0.1)	-39.4	8 963 (11.3)	7 590 (9.0)	-15.3	697 (0.4)	396 (0.2)	-43.2	6 205 (3.5)	5 772 (3.2)	-7.0	28 131 (4.7)	25 285 (4.1)	-10.1
11 (0.0)	2 (0.0)	-81.8	8 870 (0.9)	862 (0.9)	-2.8	552 (1.2)	264 (0.6)	-52.2	1 774 (2.2)	1 629 (1.9)	-8.1	2 009 (1.25)	1 518 (0.9)	-24.4	2 377 (1.3)	2 388 (1.3)	+0.5	7 610 (1.3)	6 663 (1.1)	-12.4
0 (0.0)	0 (0.0)	(-)	4 506 (4.6)	4 419 (4.5)	-1.9	179 (0.4)	98 (0.2)	-45.3	2 853 (3.6)	2 513 (3.0)	-11.9	218 (0.1)	122 (0.1)	-44.0	1 092 (0.6)	949 (0.5)	-13.1	8 848 (1.5)	8 101 (1.3)	-8.4
0 (0.0)	0 (0.0)	(-)	3 369 (3.5)	3 048 (3.1)	-9.5	49 (0.1)	24 (0.1)	-51.0	2 327 (2.9)	1 878 (2.2)	-19.3	114 (0.1)	68 (0.0)	-40.4	948 (0.5)	922 (0.5)	-2.7	6 807 (1.1)	5 940 (1.0)	-12.7
0 (0.0)	0 (0.0)	(-)	1 358 (1.4)	1 226 (1.2)	-9.7	37 (0.1)	26 (0.1)	-29.7	763 (1.0)	593 (0.7)	-22.3	25 (0.0)	15 (0.0)	-40.0	169 (0.09)	110 (0.1)	-34.9	2 352 (0.4)	1 970 (0.3)	-16.2
0 (0.0)	0 (0.0)	(-)	95 (0.1)	99 (0.1)	+4.2	10 (0.0)	7 (0.0)	-30.0	39 (0.0)	40 (0.0)	+2.6	0 (0.0)	7 (0.0)	(-)	2 (0.0)	5 (0.0)	+150.0	146 (0.02)	158 (0.0)	+8.2
482 (1.4)	415 (0.9)	-13.9	61 913 (63.5)	54 084 (55.0)	-12.6	7 423 (16.7)	3 605 (7.7)	-51.4	44 789 (56.6)	36 181 (42.7)	-19.2	13 700 (8.5)	8 789 (5.4)	-35.9	28 994 (16.2)	26 607 (14.7)	-8.2	157 301 (26.4)	129 681 (20.9)	-17.6

* Type of donor not reported in 961 Liver Tx .

** Type of donor not reported in 606 Liver Tx

Figure 44. WHO Regional distribution of patients travelling for transplantation abroad. N=33 countries. Year 2020.



3.7 TRANSPLANTS PERFORMED ABROAD

Attention needed to improve this data reporting

Only 44 out of 93 Member States reported any information on transplants performed outside their boundaries, since most of the remaining countries left that field in blank or revealed the lack of registries to collect this type of data. A minority of those 44 countries were able to give exact figures, both on the number and the destination countries. Therefore, the data presented in **Figure 44** should be considered as estimates that likely underrepresents the global reality. The data appear distributed by the six WHO regions.

Absolute numbers reflect the patients travelling from one particular region to other countries within the same region or to countries located in a different WHO region. The destination region/s are also shown. The arrows represent the movement of patients between regions.

At least 555 patients travelled for transplantation abroad (33 countries reported at least one patient travelling for transplantation). In some occasions, the responses indicated whether patients travelled together with their living donor or if there was any collaboration agreement with the destination country to perform transplants abroad. Therefore, the travel of patients for transplantation abroad may represent ethical travel for transplantation or transplant tourism – defined by the Declaration of Istanbul as travel for transplantation that involves trafficking in persons for the purpose of organ removal or trafficking in human organs, or if the resources devoted to providing transplants to non-resident patients undermine the country's ability to provide transplant services for its own population.[6]

4. CONCLUSIONS

This GODT report provides an overview of the current situation of donation and transplantation programs throughout the world. The World Health Assembly, though different Resolutions, has requested the WHO to promote the collection of the sort of data presented in this report and has urged Member States to contribute to such data collection. Moreover, through Resolution 71/322, the

[6] The Declaration of Istanbul on Organ Trafficking and Transplant Tourism. Available at: https://www.declarationofistanbul.org/the-declaration. Access: June 2022.

General Assembly of the United Nations urges Member States to the voluntary contribution of periodic information to the GODT[7]. In its attempt to represent a source that ensures transparency of practices and allows international benchmarking, the importance of contributing to this data-sharing exercise must be emphasized.

5. ACKNOWLEDGEMENTS

The GODT team is thankful to the identified focal points in Member States for their valuable contribution to its database, the Council of Europe for its contribution through the Newsletter Transplant and the WHO GIS Centre for Health for the production of the global maps.

[7] 71/322. Strengthening and promoting effective measures and international cooperation on organ donation and transplantation to prevent and combat trafficking in persons for the purpose of organ removal and trafficking in human organs. Available at: https://documents-dds-ny.un.org/doc/UNDOC/GEN/N17/281/76/PDF/N1728176.pdf?O. Access: April 2022

ANNEX 1

COUNTRIES WITH INFORMATION ABOUT LEGISLATIVE AND ORGANIZATIONAL SYSTEMS

ANNEX 1

COUNTRIES WITH INFORMATION ABOUT LEGISLATIVE AND ORGANIZATIONAL SYSTEMS

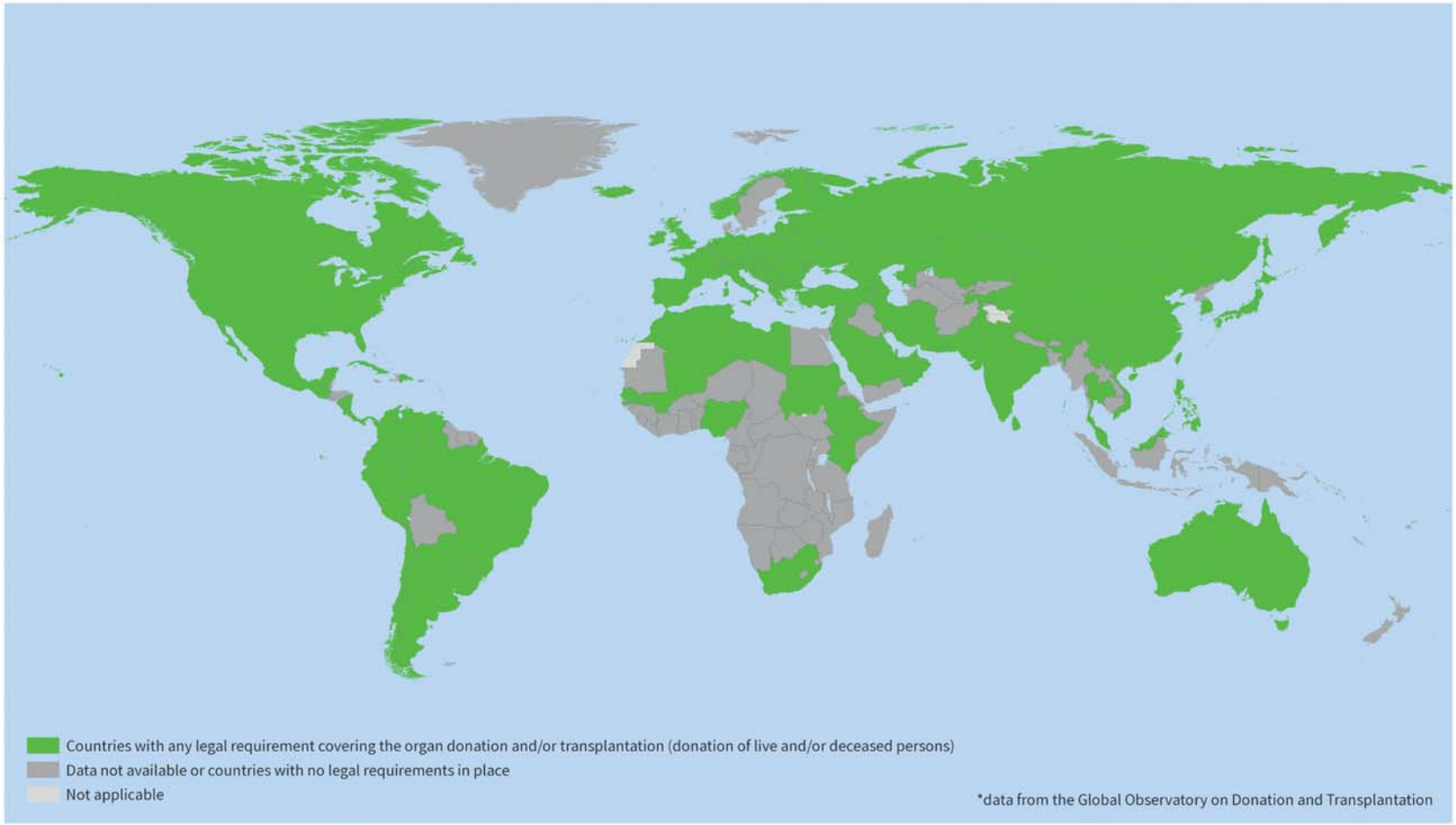
1. Albania
2. Algeria
3. Argentina
4. Armenia
5. Australia
6. Austria
7. Azerbaijan
8. Belarus
9. Belgium
10. Bhutan
11. Bosnia and Herzegovina
12. Brazil
13. Bulgaria
14. Cameroon
15. Canada
16. Chile
17. China
18. Colombia
19. Costa Rica
20. Croatia
21. Cuba
22. Cyprus
23. Czech Republic
24. Dominican Republic
25. Ecuador
26. Estonia
27. Ethiopia
28. Fiji
29. Finland
30. France
31. Georgia
32. Germany
33. Ghana
34. Greece
35. Hungary
36. Iceland
37. India
38. Iran (Islamic Republic of)
39. Ireland
40. Israel
41. Italy
42. Japan
43. Jordan
44. Kazakhstan
45. Kenya
46. Kuwait
47. Kyrgyzstan
48. Latvia
49. Lebanon
50. Libyan Arab Jamahiriya
51. Lithuania
52. Malaysia
53. Maldives
54. Mali
55. Malta
56. Mexico
57. Monaco
58. Mongolia
59. Montenegro
60. Morocco
61. Netherlands
62. Nicaragua
63. Nigeria
64. Norway
65. Oman
66. Pakistan
67. Panama
68. Paraguay
69. Peru
70. Philippines
71. Poland
72. Portugal
73. Qatar
74. Republic of Korea
75. Republic of Moldova
76. Republic of North Macedonia
77. Romania
78. Russian Federation
79. Saudi Arabia
80. Senegal
81. Serbia
82. Singapore
83. Slovakia
84. Slovenia
85. South Africa
86. Spain

87. Sri Lanka
88. Sudan
89. Switzerland
90. Syrian Arab Republic
91. Tajikistan
92. Thailand
93. Trinidad and Tobago
94. Tunisia
95. Turkey
96. Ukraine
97. United Arab Emirates
98. United Kingdom
99. United Republic of Tanzania
100. United States of America
101. Uruguay
102. Uzbekistan
103. Venezuela (Bolivarian Republic of)
104. Viet Nam

ANNEX 2

GLOBAL MAPS

Global distribution of countries with legal frameworks for organ donation and /or transplantation*



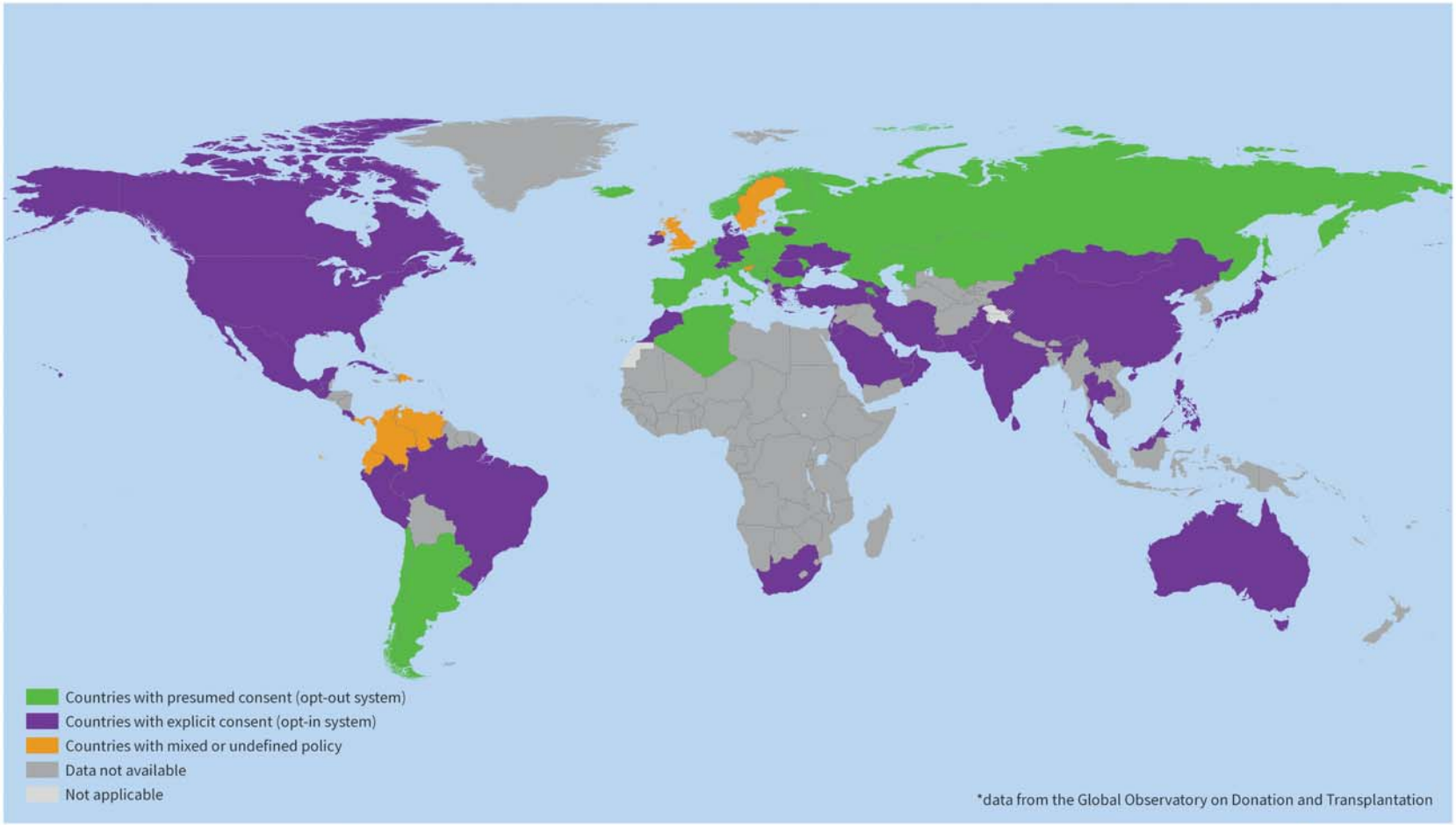
The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of WHO concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement.

Data Source: Global Observatory on Donation and Transplantation
Map Production: WHO GIS Centre for Health, DNA/DDI

Map Creation Date: **29 June 2022**

World Health Organization

Global distribution of countries per type of consent for deceased organ donation*



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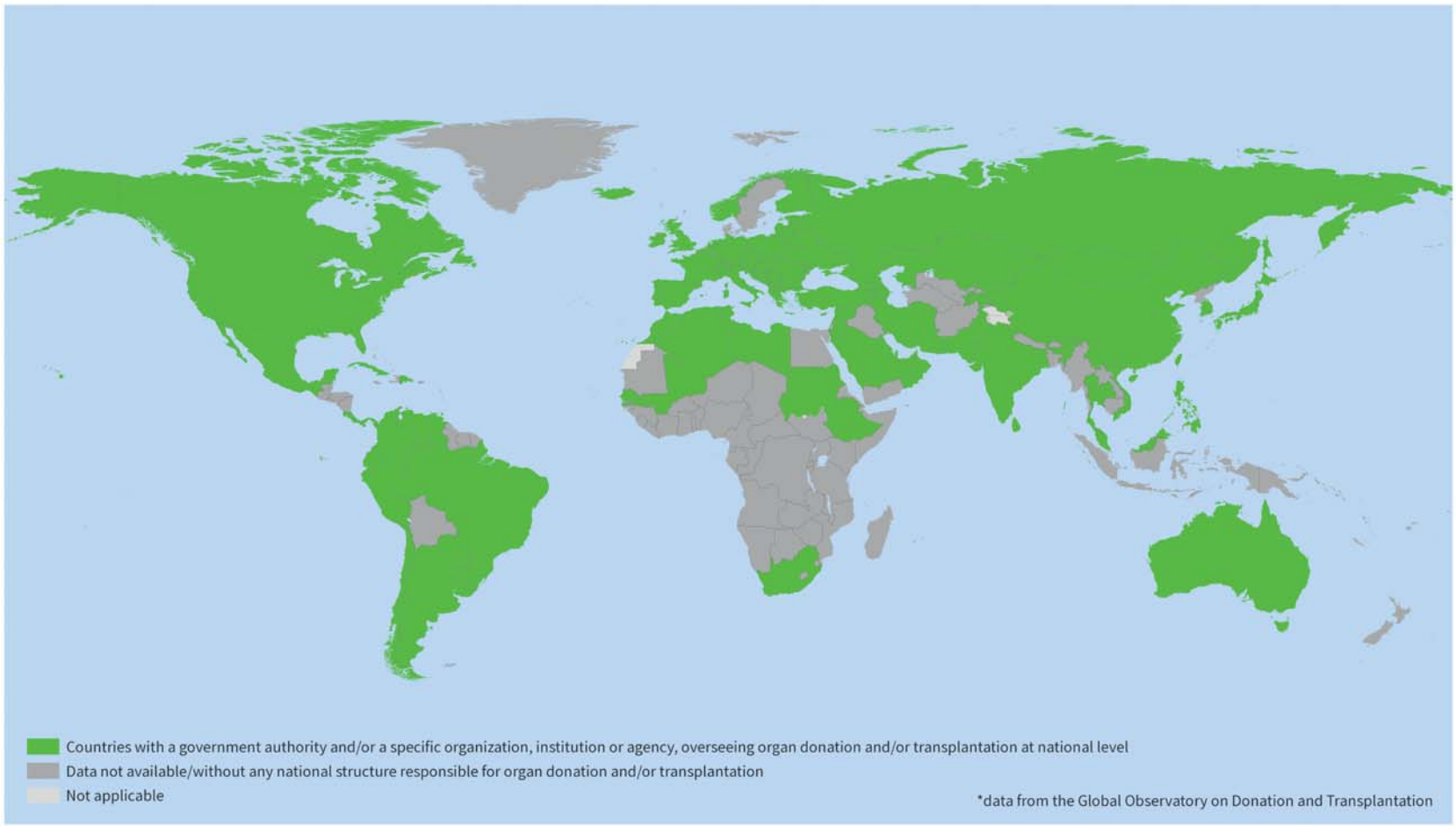
Data Source: Global Observatory on Donation and Transplantation
Map Production: WHO GIS Centre for Health, DNA/DDI

Map Creation Date: **30 June 2022**

World Health Organization

Distribution of countries with national oversight on donation and/or transplantation*



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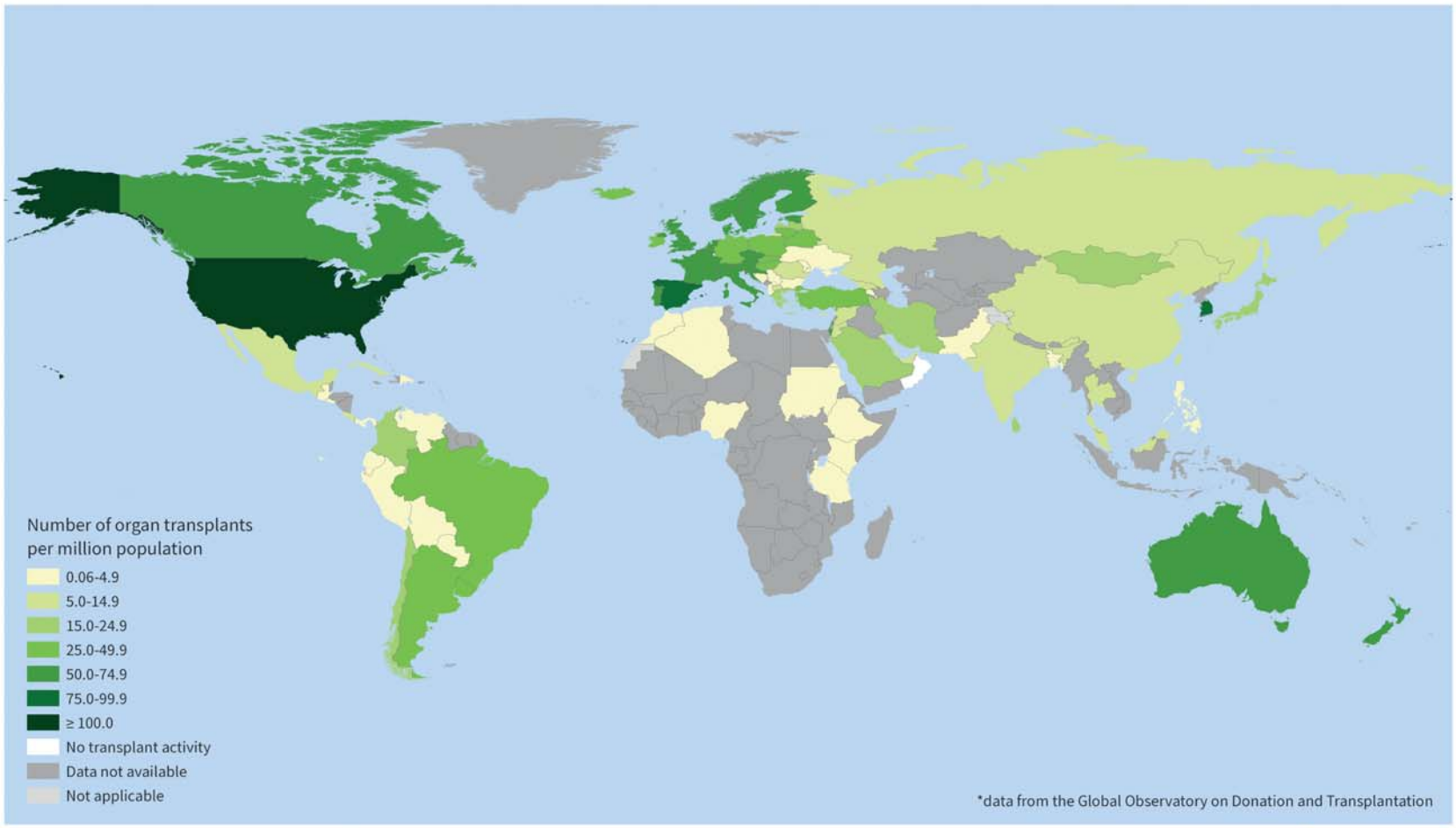
Data Source: Global Observatory on Donation and Transplantation
Map Production: WHO GIS Centre for Health, DNA/DDI

Map Creation Date: **29 June 2022**

World Health Organization

Global transplantation activities of solid organs, 2020*

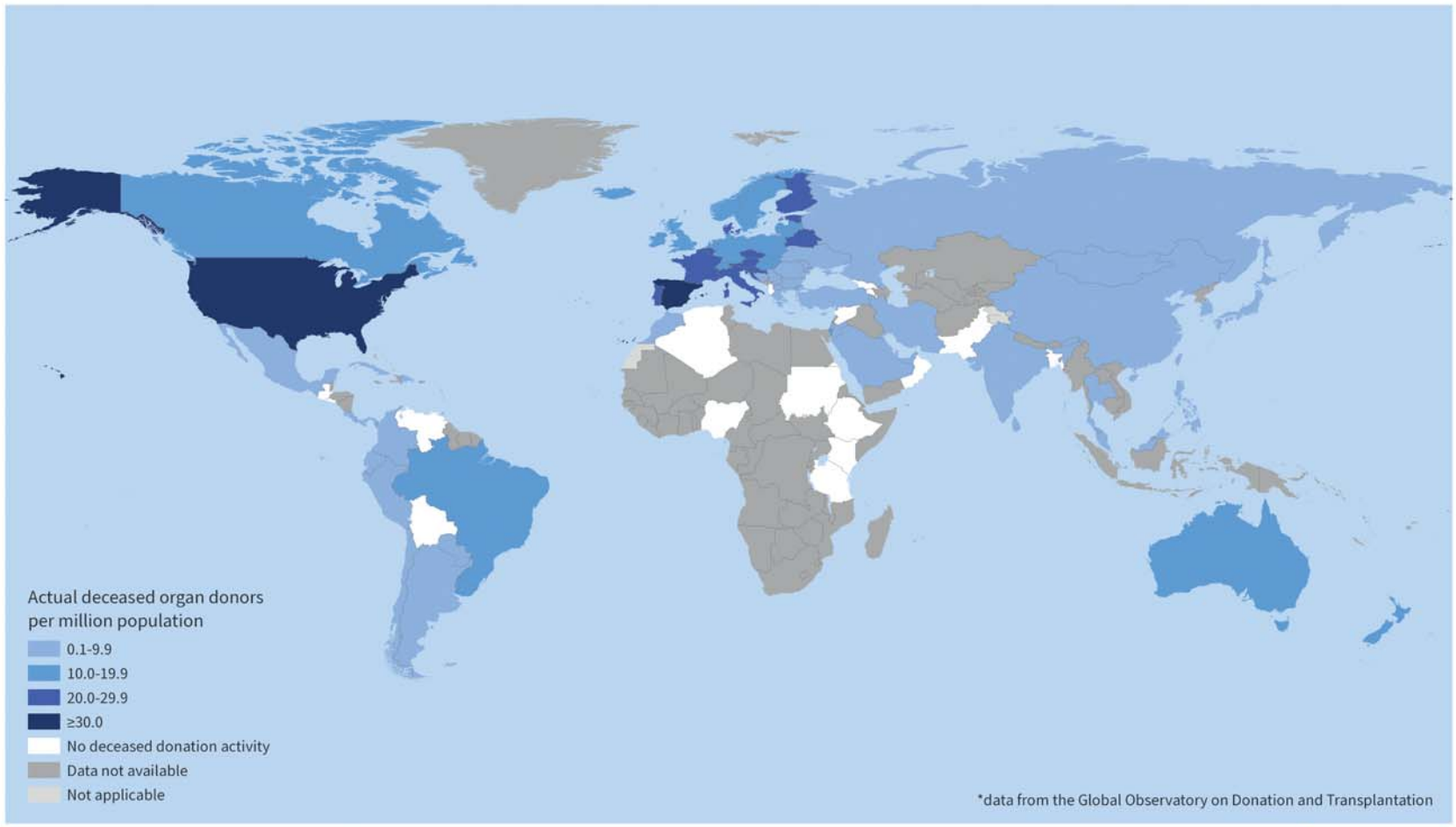


Data Source: Global Observatory on Donation and Transplantation
Map Production: WHO GIS Centre for Health, DNA/DDI

Map Creation Date: **13 July 2022**

World Health Organization

Actual donors from deceased persons, 2020*



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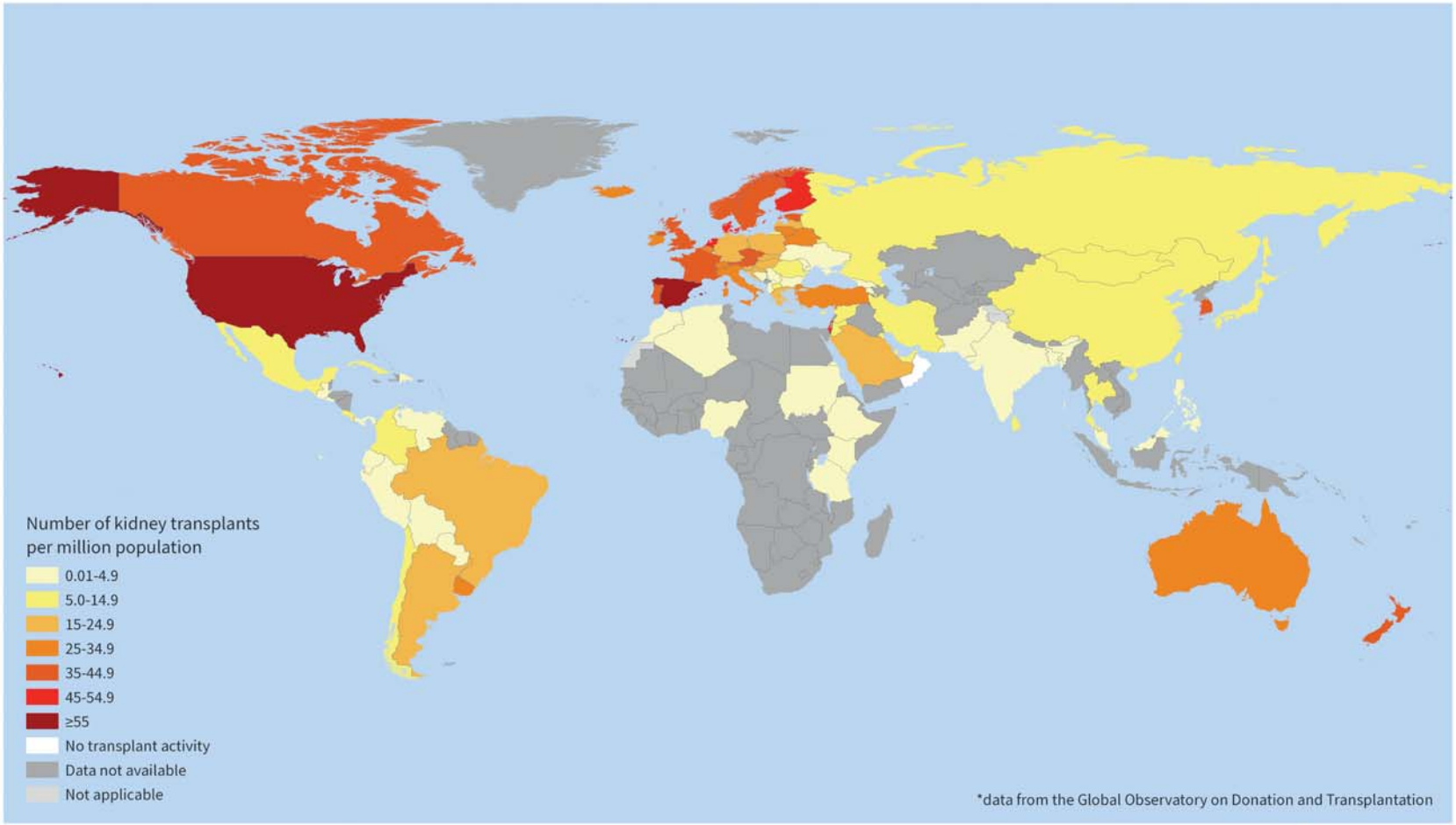
Data Source: Global Observatory on Donation and Transplantation
Map Production: WHO GIS Centre for Health, DNA/DDI

Map Creation Date: **13 July 2022**

World Health Organization

Kidney transplantation activities, 2020*

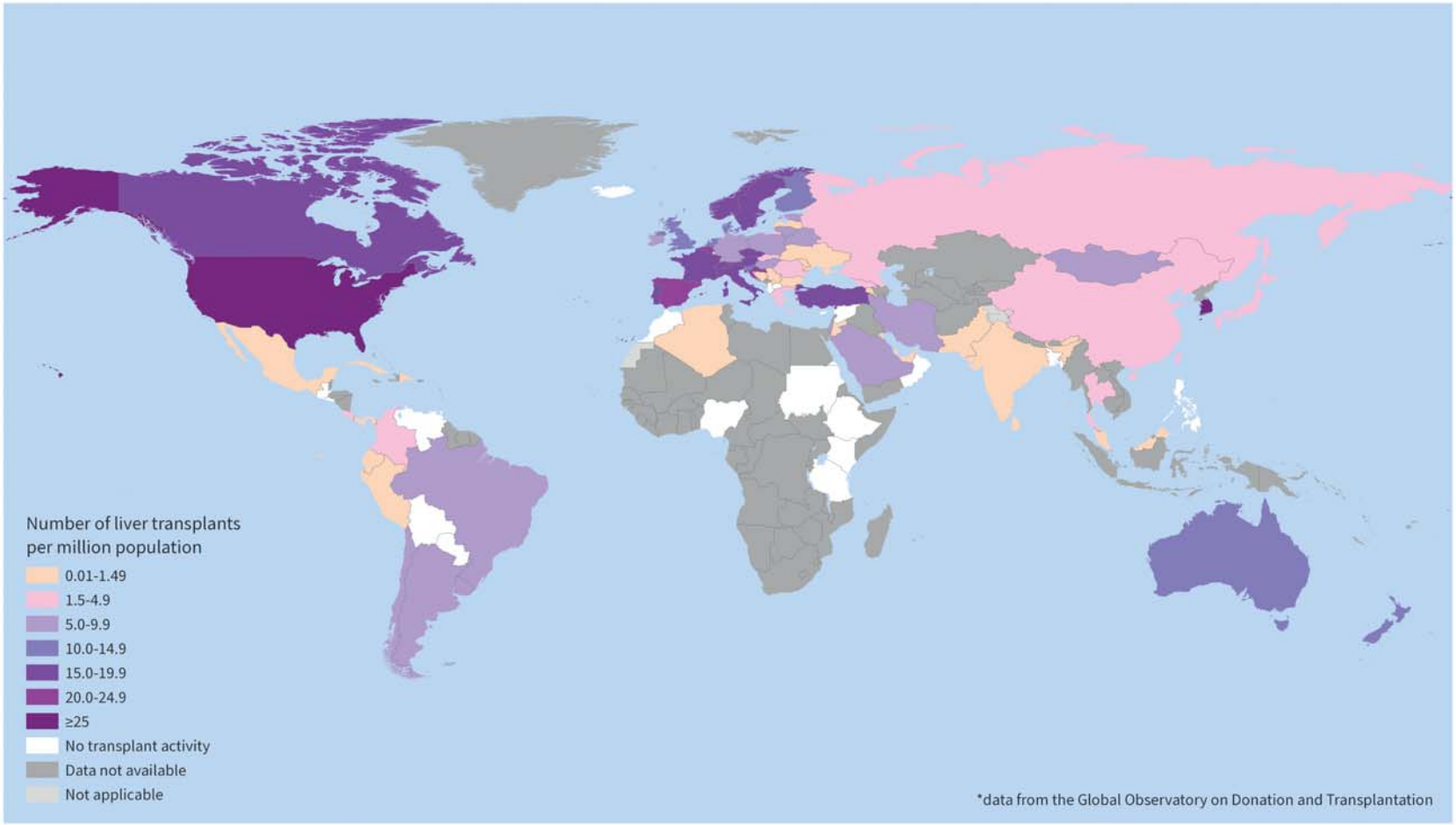


Data Source: Global Observatory on Donation and Transplantation
Map Production: WHO GIS Centre for Health, DNA/DDI

Map Creation Date: **13 July 2022**

World Health Organization

Liver transplantation activities, 2020*



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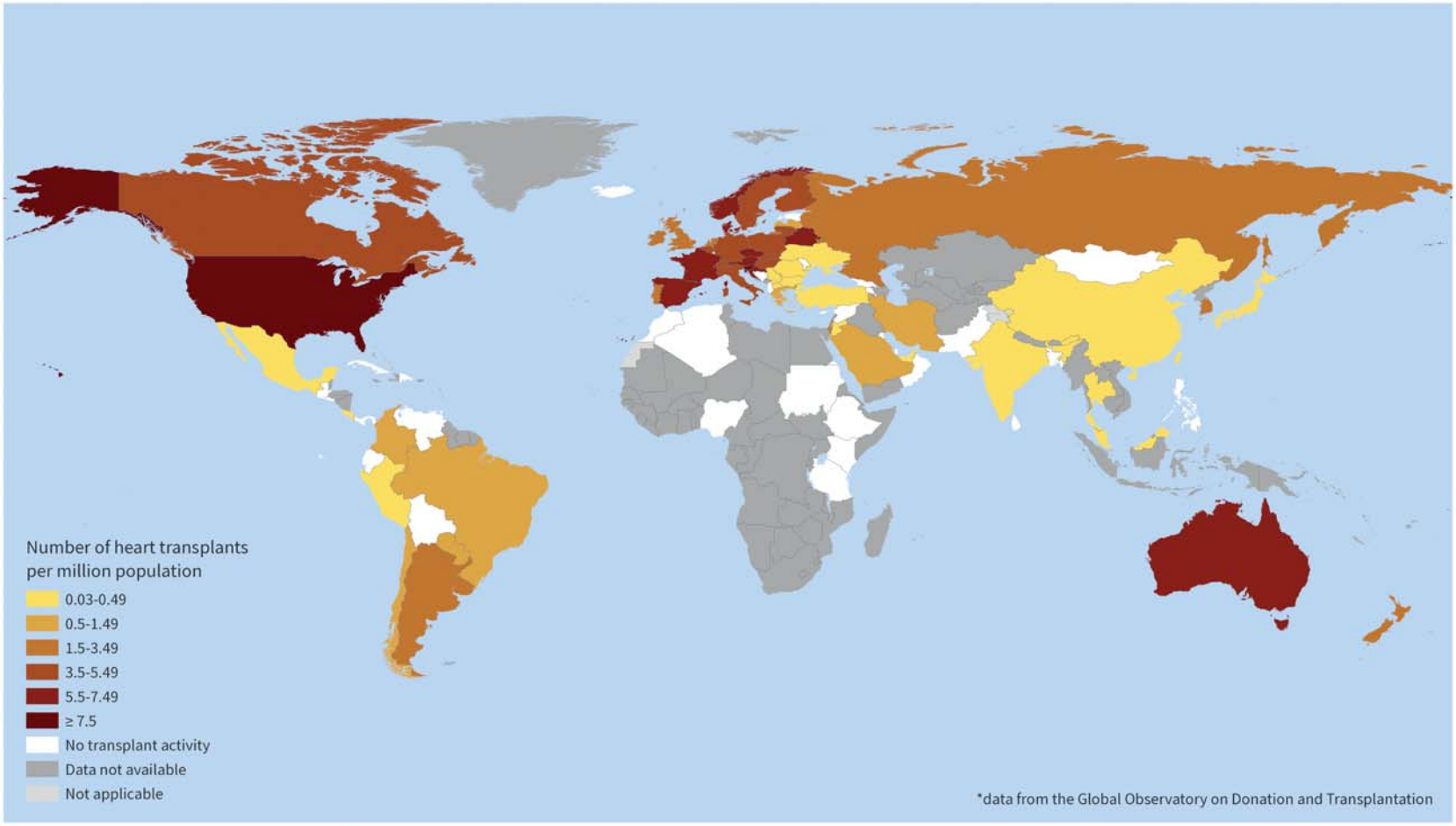
Data Source: Global Observatory on Donation and Transplantation
Map Production: WHO GIS Centre for Health, DNA/DDI

Map Creation Date: **13 July 2022**

World Health Organization

Heart transplantation activities, 2020*

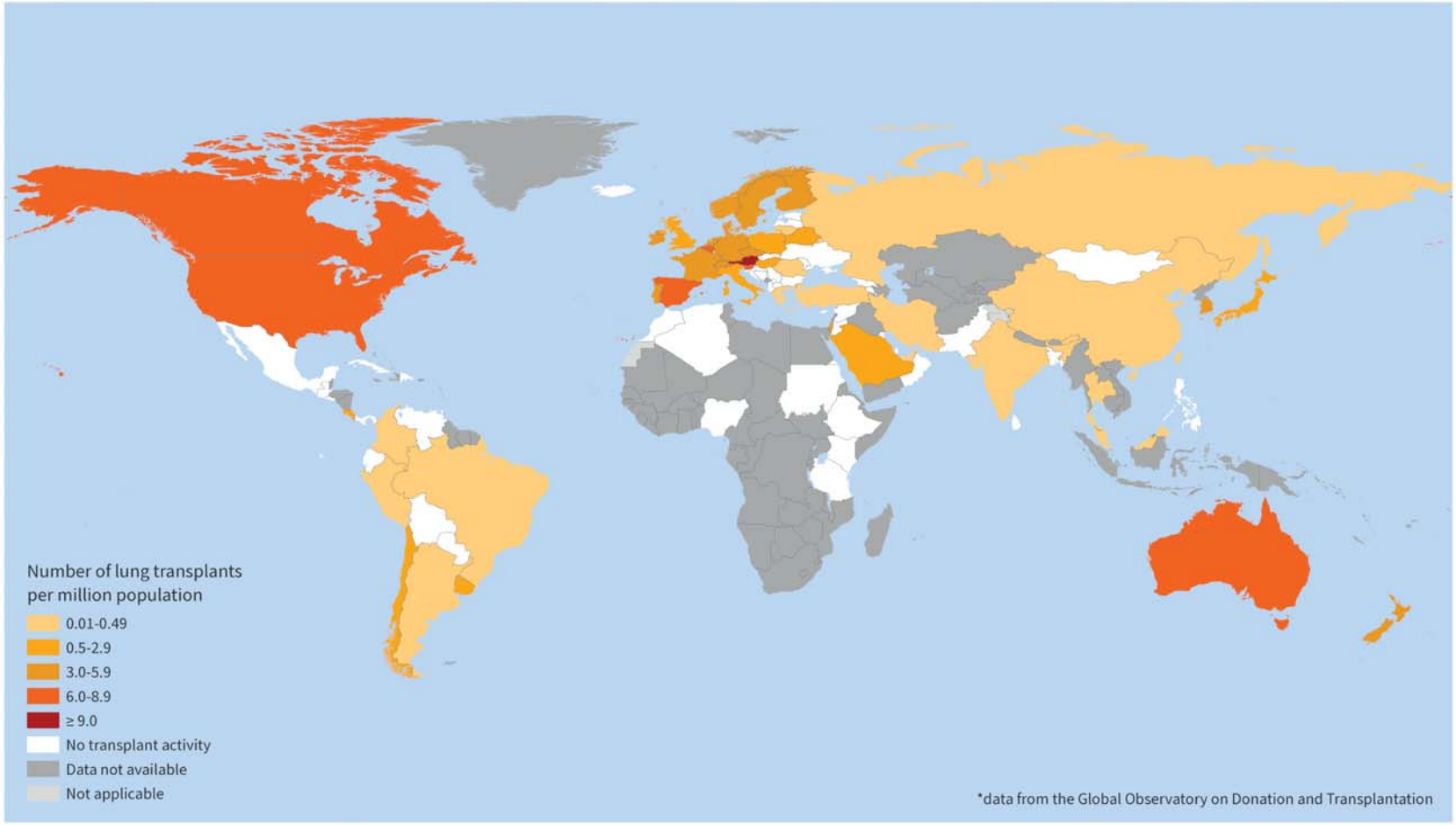


Data Source: Global Observatory on Donation and Transplantation
Map Production: WHO GIS Centre for Health, DNA/DDI

Map Creation Date: **13 July 2022**

World Health Organization

Lung transplantation activities, 2020*

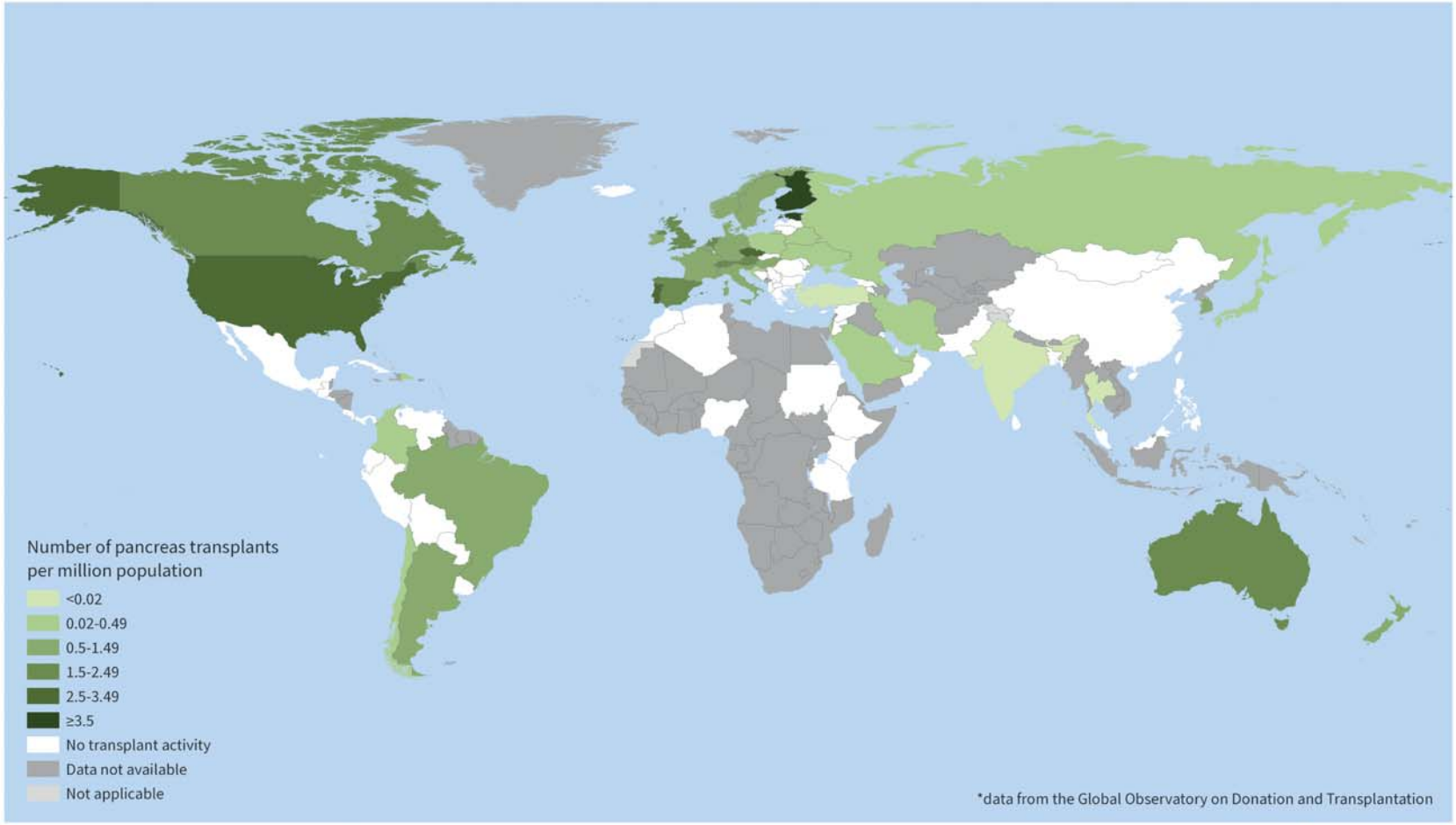


Data Source: Global Observatory on Donation and Transplantation
Map Production: WHO GIS Centre for Health, DNA/DDI

Map Creation Date: **13 July 2022**

World Health Organization

Pancreas transplantation activities, 2020*

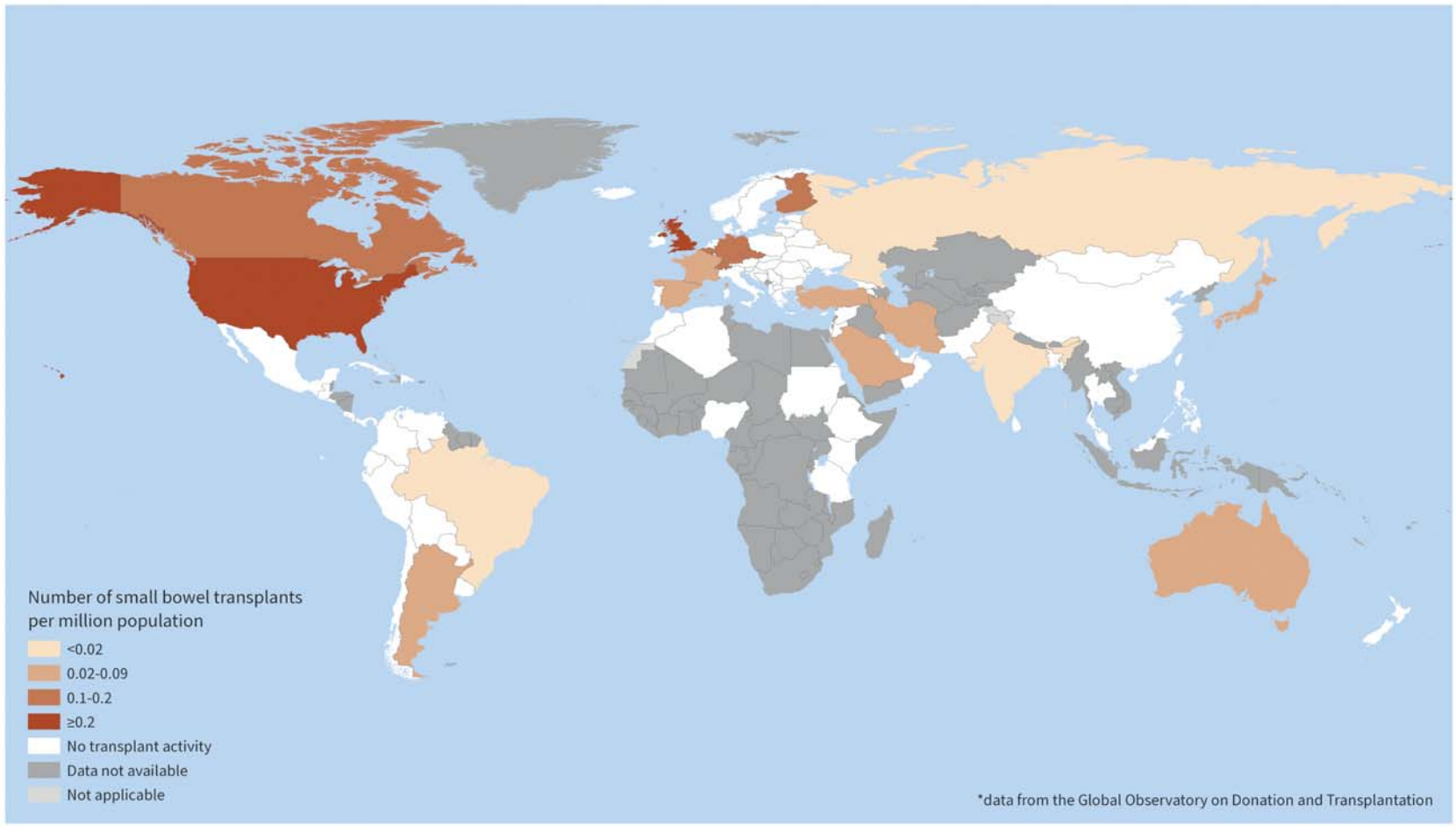


Data Source: Global Observatory on Donation and Transplantation
Map Production: WHO GIS Centre for Health, DNA/DDI

Map Creation Date: **13 July 2022**

World Health Organization

Small bowel transplantation activities, 2020*



Data Source: Global Observatory on Donation and Transplantation
Map Production: WHO GIS Centre for Health, DNA/DDI

Map Creation Date: **13 July 2022**

World Health Organization

ANNEX 3

2020 ACTIVITY DATA TABLE BY COUNTRY

2020 activity data table by country.

		Actual Deceased Donors		Kidney transplant		Liver transplant		Heart transplant		Lung transplant		Pancreas transplant		SmallBowel transplant		Total patients transplanted		Total organ transplant	
	Population	n	pmp	n	pmp	n	pmp	n	pmp	n	pmp	n	pmp	n	pmp	n	pmp	n	pmp
Albania	2.9	0	0.0	7	2.4	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	7	2.4	7	2.4
Algeria	43.9	0	0.0	91	2.1	2	0.0	0	0.0	0	0.0	0	0.0	0	0.0	93	2.1	93	2.1
Argentina	45.2	444	9.8	854	18.9	316	7.0	94	2.1	21	0.5	48	1.1	1	0.0	1273	28.2	1334	29.5
Armenia	3.0	0	0.0	10	3.3	1	0.3	0	0.0	0	0.0	0	0.0	0	0.0	11	3.7	11	3.7
Australia	25.5	463	18.2	885	34.7	277	10.9	148	5.8	158	6.2	47	1.8	1	0.0	1449	56.8	1516	59.5
Austria	9.0	213	23.7	335	37.2	158	17.6	59	6.6	100	11.1	20	2.2	0	0.0	637	70.8	672	74.7
Bangladesh	164.7	0	0.0	155	0.9	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	155	0.9	155	0.9
Belarus	9.4	201	21.4	316	33.6	86	9.1	53	5.6	10	1.1	2	0.2	0	0.0	463	49.3	467	49.7
Belgium	11.6	249	21.5	363	31.3	235	20.3	54	4.7	93	8.0	9	0.8	2	0.2	716	61.7	756	65.2
Bolivia	11.7	0	0.0	10	0.9	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	10	0.9	10	0.9
Bosnia and Herzegovina	3.3	1	0.3	4	1.2	1	0.3	0	0.0	0	0.0	0	0.0	0	0.0	5	1.5	5	1.5
Brazil	212.6	3027	14.2	4830	22.7	2075	9.8	308	1.4	65	0.3	148	0.7	1	0.0	7290	34.3	7427	34.9
Bulgaria	6.9	4	0.6	8	1.2	7	1.0	1	0.1	0	0.0	0	0.0	0	0.0	16	2.3	16	2.3
Canada	37.7	734	19.5	1518	40.3	565	15.0	188	5.0	325	8.6	57	1.5	6	0.2	2615	69.4	2659	70.5
Chile	19.1	141	7.4	233	12.2	127	6.6	17	0.9	20	1.0	5	0.3	0	0.0	402	21.0	402	21.0
China	1447.4	5222	3.6	11037	7.6	5842	4.0	557	0.4	513	0.4		0.0		0.0	17897	12.4	17949	12.4
Colombia	50.9	222	4.4	526	10.3	199	3.9	67	1.3	12	0.2	5	0.1	0	0.0	799	15.7	809	15.9
Costa Rica	5.1	27	5.3	41	8.0	15	2.9	2	0.4	3	0.6	0	0.0	0	0.0	61	12.0	61	12.0
Croatia	4.1	104	25.4	98	23.9	95	23.2	25	6.1	0	0.0	1	0.2	0	0.0	216	52.7	219	53.4
Cuba	11.3	51	4.5	64	5.7	2	0.2	0	0.0	0	0.0	0	0.0	0	0.0	66	5.8	66	5.8
Cyprus	1.2	5	4.2	13	10.8		0.0		0.0		0.0	0	0.0		0.0	13	10.8	13	10.8
Czech Republic	10.7	249	23.3	443	41.4	172	16.1	72	6.7	35	3.3	37	3.5	1	0.1	760	71.0	760	71.0
Denmark	5.8	124	21.4	278	47.9	66	11.4	33	5.7	29	5.0	7	1.2	0	0.0	403	69.5	413	71.2
Dominican Republic	10.8	4	0.4	28	2.6	1	0.1	0	0.0	0	0.0	1	0.1	0	0.0	29	2.7	30	2.8
Ecuador	17.6	29	1.6	57	3.2	9	0.5	0	0.0	0	0.0	0	0.0	0	0.0	66	3.8	66	3.8
El Salvador	6.5	0	0.0	11	1.7	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	11	1.7	11	1.7

2020 activity data table by country. *(continue)*

		Actual Deceased Donors		Kidney transplant		Liver transplant		Heart transplant		Lung transplant		Pancreas transplant		SmallBowel transplant		Total patients transplanted		Total organ transplant	
	Population	n	pmp	n	pmp	n	pmp	n	pmp	n	pmp	n	pmp	n	pmp	n	pmp	n	pmp
Estonia	1.3	33	25.4	47	36.2	12	9.2		0.0	0	0.0	6	4.6		0.0	60	46.2	65	50.0
Ethiopia	115.0	0	0.0	8	0.1	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	8	0.1	8	0.1
Finland	5.5	126	22.9	263	47.8	75	13.6	22	4.0	21	3.8	26	4.7	1	0.2	381	69.3	408	74.2
France	65.3	1512	23.2	2595	39.7	1128	17.3	378	5.8	291	4.5	34	0.5	3	0.0	4283	65.6	4429	67.8
Georgia	4.0	0	0.0	17	4.3	10	2.5	0	0.0	0	0.0	0	0.0	0	0.0	27	6.8	27	6.8
Germany	83.8	913	10.9	1909	22.8	826	9.9	339	4.0	344	4.1	92	1.1	8	0.1	3384	40.4	3518	42.0
Greece	10.4	48	4.6	175	16.8	32	3.1	9	0.9	3	0.3	0	0.0	0	0.0	219	21.1	219	21.1
Guatemala	17.9	0	0.0	29	1.6	0	0.0		0.0		0.0		0.0		0.0	29	1.6	29	1.6
Hungary	9.7	111	11.4	202	20.8	50	5.2	45	4.6	17	1.8	6	0.6	0	0.0	314	32.4	320	33.0
Iceland	0.3	4	13.3	10	33.3	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	10	33.3	10	33.3
India	1380.0	351	0.3	5486	4.0	1780	1.3	89	0.1	67	0.0	14	0.0	7	0.0	7426	5.4	7443	5.4
Iran (Islamic Republic of)	84.0	645	7.7	1240	14.8	606	7.2	67	0.8	3	0.0	23	0.3	6	0.1		0.0	1945	23.2
Ireland	4.9	63	12.9	123	25.1	37	7.6	9	1.8	16	3.3	5	1.0	0	0.0	187	38.2	190	38.8
Israel	8.7	92	10.6	397	45.6	85	9.8	20	2.3	34	3.9	4	0.5		0.0	530	60.9	540	62.1
Italy	60.5	1303	21.5	1907	31.5	1202	19.9	238	3.9	115	1.9	41	0.7	0	0.0	3437	56.8	3503	57.9
Japan	126.5	77	0.6	1697	13.4	380	3.0	54	0.4	75	0.6	28	0.2	3	0.0	2209	17.5	2237	17.7
Jordan	10.2	1	0.1	102	10.0	6	0.6	1	0.1		0.0		0.0		0.0	107	10.5	109	10.7
Kenya	53.8	0	0.0	142	2.6	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	142	2.6	142	2.6
Kuwait	4.3	14	3.3	61	14.2	2	0.5	0	0.0	0	0.0	0	0.0	0	0.0	63	14.7	63	14.7
Latvia	1.9	21	11.1	41	21.6	2	1.1	2	1.1	0	0.0	0	0.0	0	0.0	45	23.7	45	23.7
Lithuania	2.7	49	18.1	82	30.4	14	5.2	10	3.7	1	0.4		0.0		0.0	107	39.6	107	39.6
Luxembourg	0.6	3	5.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	0	0.0
Malaysia	32.4	28	0.9	153	4.7	28	0.9	1	0.0	1	0.0	0	0.0	0	0.0	182	5.6	183	5.6
Malta	0.4	2	5.0	4	10.0	1	2.5	0	0.0	1	2.5	0	0.0	0	0.0	6	15.0	6	15.0
Mexico	128.9	152	1.2	913	7.1	72	0.6	9	0.1	0	0.0	0	0.0	0	0.0	997	7.7	994	7.7
Monaco	0.0	0		0		0		0		0		0		0		0		0	
Mongolia	3.3	5	1.5	29	8.8	32	9.7	0	0.0	0	0.0	0	0.0	0	0.0	61	18.5	61	18.5

2020 activity data table by country. *(continue)*

		Actual Deceased Donors		Kidney transplant		Liver transplant		Heart transplant		Lung transplant		Pancreas transplant		SmallBowel transplant		Total patients transplanted		Total organ transplant	
	Population	n	pmp	n	pmp	n	pmp	n	pmp	n	pmp	n	pmp	n	pmp	n	pmp	n	pmp
Morocco	36.9	5	0.1	13	0.4	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	13	0.4	13	0.4
Netherlands	17.1	255	14.9	809	47.3	186	10.9	41	2.4	87	5.1	29	1.7	0	0.0	1124	65.7	1152	67.4
New Zealand	4.8	64	13.3	187	39.0	55	11.5	13	2.7	23	4.8	3	0.6	0	0.0	278	57.9	281	58.5
Nigeria	206.1	0	0.0	164	0.8	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	164	0.8	164	0.8
Norway	5.4	102	18.9	240	44.4	88	16.3	30	5.6	28	5.2	6	1.1		0.0	382	70.7	392	72.6
Oman	5.1	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Pakistan	220.9	0	0.0	129	0.6	60	0.3	0	0.0	0	0.0	0	0.0	0	0.0	189	0.9	189	0.9
Panama	4.3	3	0.7	13	3.0	3	0.7	0	0.0	0	0.0	0	0.0	0	0.0	16	3.7	16	3.7
Paraguay	7.1	6	0.8	4	0.6	0	0.0	5	0.7	0	0.0	0	0.0	0	0.0	9	1.3	9	1.3
Peru	33.0	17	0.5	49	1.5	17	0.5	2	0.1	1	0.0	0	0.0	0	0.0	69	2.1	69	2.1
Philippines	109.6	6	0.1	132	1.2	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	132	1.2	132	1.2
Poland	37.8	393	10.4	751	19.9	291	7.7	145	3.8	51	1.3	4	0.1	0	0.0	1236	32.7	1242	32.9
Portugal	10.2	253	24.8	394	38.6	193	18.9	33	3.2	33	3.2	27	2.6	0	0.0	637	62.5	680	66.7
Qatar	2.9	2	0.7	17	5.9	1	0.3	0	0.0	0	0.0	0	0.0	0	0.0	18	6.2	18	6.2
Republic of Korea	51.3	478	9.3	2280	44.4	1542	30.1	173	3.4	150	2.9	32	0.6	1	0.0	4178	81.4	4178	81.4
Republic of Moldova	4.0	2	0.5	3	0.8	2	0.5	0	0.0		0.0		0.0		0.0	5	1.3	5	1.3
Republic of North Macedonia	2.1	2	1.0	12	5.7	0	0.0	1	0.5	0	0.0	0	0.0	0	0.0	13	6.2	13	6.2
Romania	19.2	66	3.4	174	9.1	62	3.2	4	0.2	1	0.1	0	0.0	0	0.0	241	12.6	241	12.6
Russian Federation	145.9	572	3.9	1124	7.7	559	3.8	251	1.7	11	0.1	16	0.1	1	0.0	1944	13.3	1962	13.4
Saudi Arabia	34.8	65	1.9	547	15.7	244	7.0	28	0.8	20	0.6	2	0.1	1	0.0	840	24.1	842	24.2
Serbia	8.7	3	0.3	6	0.7	3	0.3	1	0.1	0	0.0	0	0.0	0	0.0	10	1.1	10	1.1
Singapore	5.9	12	2.0	46	7.8	19	3.2	3	0.5	2	0.3	0	0.0	0	0.0	70	11.9	70	11.9

2020 activity data table by country. *(continue)*

		Actual Deceased Donors		Kidney transplant		Liver transplant		Heart transplant		Lung transplant		Pancreas transplant		SmallBowel transplant		Total patients transplanted		Total organ transplant	
	Population	n	pmp	n	pmp	n	pmp	n	pmp	n	pmp	n	pmp	n	pmp	n	pmp	n	pmp
Slovakia	5.5	70	12.7	131	23.8	19	3.5	27	4.9	0	0.0	0	0.0	0	0.0	177	32.2	177	32.2
Slovenia	2.1	47	22.4	47	22.4	25	11.9	24	11.4	16	7.6	2	1.0	0	0.0	112	53.3	114	54.3
Spain	46.8	1777	38.0	2702	57.7	1034	22.1	278	5.9	336	7.2	73	1.6	4	0.1	4315	92.2	4427	94.6
Sri Lanka	21.4	98	4.6	308	14.4	11	0.5	0	0.0	0	0.0	0	0.0	0	0.0	308	14.4	319	14.9
Sudan	43.8	0	0.0	139	3.2	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	139	3.2	139	3.2
Sweden	10.1	181	17.9	429	42.5	172	17.0	54	5.3	51	5.0	13	1.3	0	0.0	702	69.5	719	71.2
Switzerland	8.7	146	16.8	296	34.0	135	15.5	45	5.2	44	5.1	15	1.7	1	0.1	519	59.7	536	61.6
Syrian Arab Republic	17.5	0	0.0	211	12.1	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	211	12.1	211	12.1
Thailand	69.8	315	4.5	712	10.2	125	1.8	33	0.5	1	0.0	1	0.0	0	0.0	862	12.3	872	12.5
Trinidad and Tobago	1.4	2	1.4	10	7.1	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	10	7.1	10	7.1
Turkey	84.3	172	2.0	2498	29.6	1320	15.7	21	0.2	11	0.1	1	0.0	2	0.0	3830	45.4	3853	45.7
Ukraine	43.7	11	0.3	99	2.3	21	0.5	10	0.2	0	0.0	1	0.0	0	0.0	130	3.0	131	3.0
United Arab Emirates	9.9	9	0.9	61	6.2	11	1.1	2	0.2	1	0.1	1	0.1	0	0.0	75	7.6	76	7.7
United Kingdom	67.9	1248	18.4	2567	37.8	823	12.1	179	2.6	99	1.5	116	1.7	17	0.3	3686	54.3	3801	56.0
United Republic of Tanzania	59.7	0	0.0	8	0.1	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	8	0.1	8	0.1
United States of America	331.0	12588	38.0	23644	71.4	8906	26.9	3716	11.2	2597	7.8	962	2.9	91	0.3	37580	113.5	39916	120.6
Uruguay	3.5	63	18.0	120	34.3	28	8.0	11	3.1	4	1.1	0	0.0	0	0.0	162	46.3	163	46.6
Venezuela (Bolivarian Republic of)	28.4	0	0.0	3	0.1	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	3	0.1	3	0.1