



Organ Donation and Transplantation Activities

2015 Report

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Introduction

The Global Observatory on Donation and Transplantation (GODT) is a collaborative effort of the World Health Organization (WHO) and the Organización Nacional de Trasplantes (ONT) of Spain. It is running since 2007 and came up in response to the request of the World Health Assembly, in Resolutions WHA57.18 and WHA63.22, to collect global data on the practices, safety, quality, efficacy, epidemiology and ethical issues of allogeneic transplantation. This database collects data on global donation and transplantation practices, and it is recognized as a tool for ensuring transparency, equity and monitoring national transplant systems.

Currently, the GODT represents the most comprehensive source to date of worldwide data concerning activities in organ donation and transplantation derived from official sources. Recently remodelled and revamped, it allows wide accessibility to the data in a friendly manner.

The Council of Europe Newsletter Transplant database, as well as other international sources of data, such as that from the Iberoamerican Council/Network of Donation and Transplantation, are connected with the GODT to avoid duplication of efforts. Therefore, those collective data are also included in this Global Database.

The aim of the present report is to provide a detailed overview of the current international situation in relation to organ donation and transplantation activities in 2015, as well as the progress which took place between 2011 and 2015.

It is not the purpose of this report either to make statements derived from the data or to analyse the causes that may lead to the differences among the countries.

Methods

The methods applied to prepare this study are fully described at <http://www.transplant-observatory.org/methodology/>.

An ad hoc standard questionnaire for the activities related to organ donation and transplantation practices is annually distributed to the identified health authorities and

focal points contributing to the global database.

This questionnaire has been used since the creation of the GODT. However, as some limitations were identified after several years of running it, and there was the need of including additional variables, a global consultation process was conducted to improve the original survey in 2012.

The definitions applied for the completion of this standardized questionnaire are derived from the WHO Global Glossary on Donation and Transplantation, which is accessible at <http://www.transplant-observatory.org/download/global-glossary/> or through the WHO website (<http://www.who.int/transplantation/activities/en/>).

In summary,

- Actual donor (=donor): a deceased person from whom at least one organ has been recovered for the purpose of organ removal.
- DBD donor: a deceased donor whose death has been determined by neurological criteria.
- DCD donor: a deceased donor whose death has been determined by circulatory criteria.

Transplants are counted as those performed only within the country. Counts for the multiorgan or double organ transplants are counted as follows:

- One double kidney transplant is considered as one transplant.
- One heart-lung transplant is counted as one lung transplant and one heart transplant.
- One double lung transplant is considered as one transplant.
- One Kidney-pancreas transplant is counted as one kidney transplant and one pancreas transplant.

The period to collect the 2015 information began in April 2016 and ended in January 2017.

The most recent available national figures were used to avoid missing data. This is a common method used in clinical trials and longitudinal studies where individuals are followed, since it allows examining trends over time.

It should be noted that countries may occasionally only provide aggregated data on the total number of organ donors or the total number of organ transplants, with no indication of donor type (living or deceased, DCD or DBD donor) or type of transplant (single or double). This circumstance has been indicated in the report where appropriate.

To calculate rates per million inhabitants, the State of World Population reports, from the United Nations Population Fund (UNFPA), has been used as the source to estimate the population size. However, in statistics prior 2012, the most up-to-date figure available from an official source has been applied instead of the UNFPA figures.

Two different rates have been estimated for the global transplant activities (section 1) and the donor activities (section 2):

- Rates estimated by using the regional or global population as the denominator.
- Rates calculated by applying the population of those countries providing estimates of donation or transplantation activities, i.e. the reporting countries.

These two rates consist each of a different approach to estimate the accessibility of the population to transplantation procedures. The first one provides a better estimation of the accessibility of the population of that region or global population to transplant therapies, whereas the second approach provides an estimation of the accessibility of the population only for the countries providing data.

The sections dedicated to describe the activities for each organ, only present the rates estimated with the entire regional or global population.

Data were analysed using descriptive statistics. Statistical analysis was performed with SPSS software (version 15.0).

The official maps are annually produced by the Information Evidence and Research (IER) Department at WHO, derived from a datasheet of the Global Database.

Regions mentioned in the report refer to those specified by WHO, i.e: African Region (AFR); Region of the Americas (AMR); Eastern Mediterranean Region (EMR); European Region (EUR); South-East Asia Region (SEAR); Western Pacific Region (WPR). Figure 1 shows the distribution of countries within the WHO regions.



Figure 1. Distribution of countries within the WHO regions

Results

A total of 111 out of 194 Member States were included in this 2015 exercise (82.2% of the global population).

Table 1 points out the proportion of countries reporting to the GODT database, and the population covered for each of the six WHO regions. WPR is one of the regions with lower number of represented countries (40.7% of countries), but the percentage of the population covered by these WPR countries is one of the highest (98.3).

Table 1. Proportion of countries and population covered by the GODT database in the WHO regions. Year 2015.

REGION	COUNTRIES N	COUNTRIES WITH DATA N (%)	POPULATION Millions	POPULATION WITH DATA Millions (%)
AFR	46	10 (21.7)	1139.1	506.6 (44.5)
AMR	35	21 (60.0)	986.5	968.5 (98.2)
EMR	22	15 (68.2)	656.1	535 (81.5)
EUR	53	49 (92.5)	909.7	904.2 (99.4)
SEAR	11	5 (45.5)	1928.4	1408.8 (73.1)
WPR	27	11 (40.7)	1847.7	1815.3 (98.3)
TOTAL	194	111 (57.2)	7467.5	6138.4 (82.2)

The present analysis considers 89 countries with data for 2015, and 22 from the last year with available data, i.e. 9 with data from the year 2014, 7 from 2013, 2 from 2012, 3 from 2011 and 1 from the year 2010. Therefore, the 20% of the countries had data previous to 2015.

These are the countries that have been included in this analysis:

2015: Argentina; Armenia; Australia; Austria; Azerbaijan; Belarus; Belgium; Bosnia and Herzegovina; Brazil; Bulgaria; Canada; Chile; China; Colombia; Costa Rica; Croatia; Cuba; Cyprus; Czech Republic; Denmark; Dominican Republic; Ecuador; Estonia; Ethiopia; Fiji; Finland; France; Georgia; Germany; Greece; Guatemala; Honduras; Hungary; Iceland; Iran (Islamic Republic of); Ireland; Israel; Italy; Japan; Jordan; Kenya; Kuwait; Kyrgyzstan; Latvia; Lebanon; Lithuania; Luxembourg; Malaysia; Maldives; Malta; Mexico; Mongolia; Montenegro; Morocco; Netherlands; New Zealand; Nigeria; Norway; Pakistan; Panama; Paraguay; Peru; Poland; Portugal; Qatar; Republic of Korea; Republic of Moldova; Romania; Russian Federation; Saudi Arabia; Singapore; Slovakia; Slovenia; South Africa; Spain; Sudan; Sweden; Switzerland; Syrian Arab Republic; Thailand; The former Yugoslav Republic of Macedonia; Turkey; Ukraine; United Arab Emirates; United Kingdom; United States of America; Uruguay; Uzbekistan and Venezuela (Bolivarian Republic of).

2014: Algeria; Bolivia; Ghana; India; Kazakhstan; Libya; Oman; Philippines and Viet Nam

2013: Albania; Bhutan; Cameroon; Mali; Serbia; Tajikistan and Tunisia

2012: Nicaragua and Senegal

2011: Egypt; El Salvador and Mauritius

2010: Nepal

Figure 2 shows the progress on the number of responses between 2011 and 2015.

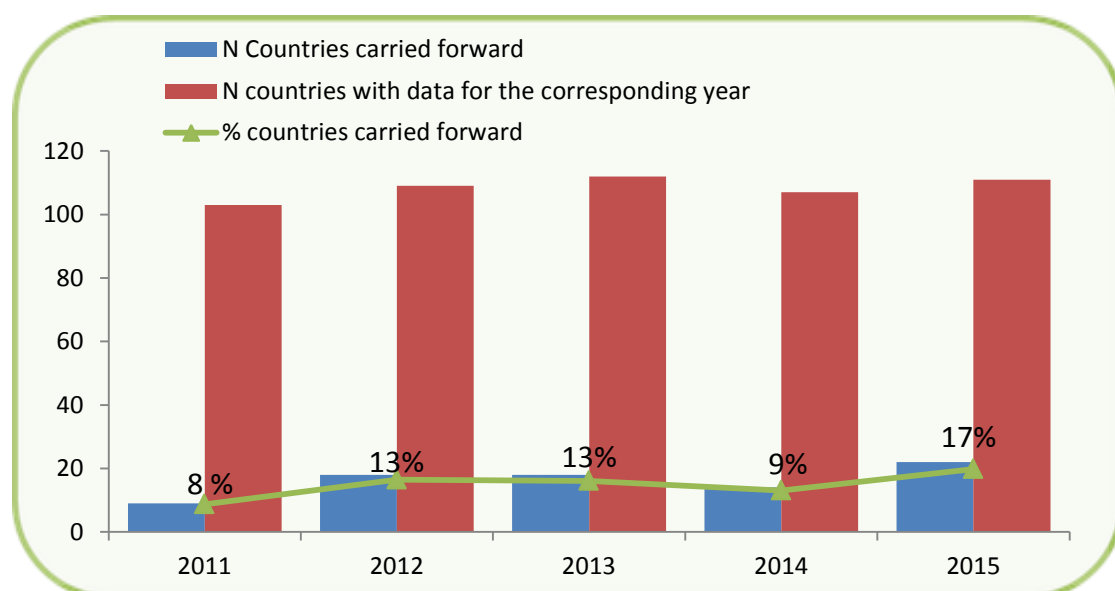


Figure 2. Progress of the responses from countries. 2011-2015.

1. TOTAL / GLOBAL TRANSPLANT ACTIVITY

126,670 solid organs (kidney, liver, heart, lung, pancreas and small bowel) were reported to be transplanted in 2015: 84,347 kidney transplants (41.8% from living donors), 27,759 liver transplants (21.0% from living donors), 7,023 heart transplants, 5,046 lung transplants, 2,299 pancreas transplants and 196 small bowel transplants.

The percentages for each organ transplant are shown in Figure 3, being the kidneys and the livers the more frequent therapeutic options (67% and 22% respectively).

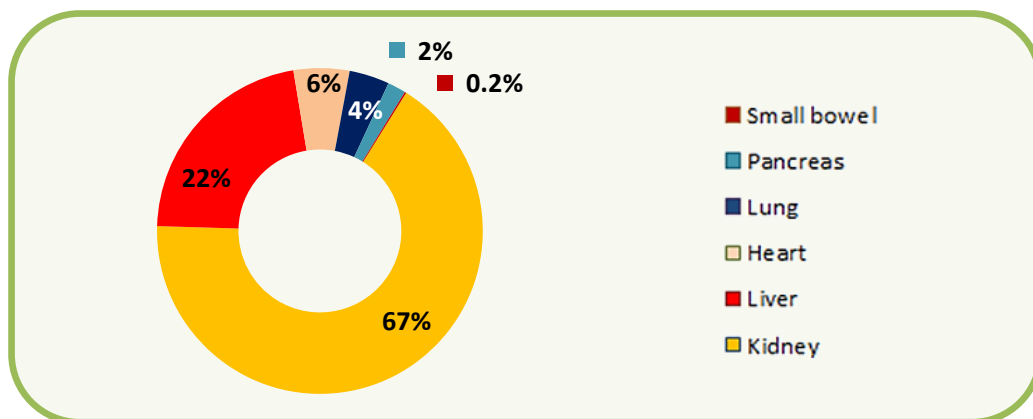


Figure 3. Percentages of transplanted organs in 2015.

The evolution of the transplants activities (absolute numbers) per type of organ is presented in Figure 4. A steady progress in transplantation practices is observed from 2011 to 2014. However in 2015 there was a sharp increase of 5.8% over 2014.

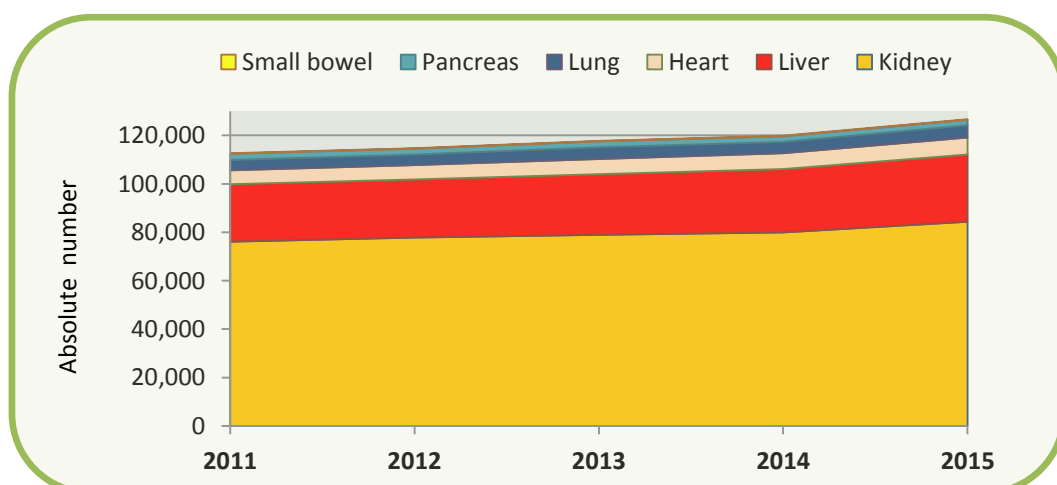


Figure 4. Evolution of global organ transplant activities per type of organ. Absolute numbers. 2011-2015.

In terms of global organ transplant rates per million population (pmp), a significant upward trend is observed in the two last years regarding the previous ones (Figure 5). This increase is mainly owed to the rise in kidney and liver transplants. When considering the reporting countries alone, overall rates changed little, showing a steady slight increase, from 16.3 to 17, in a five years period.

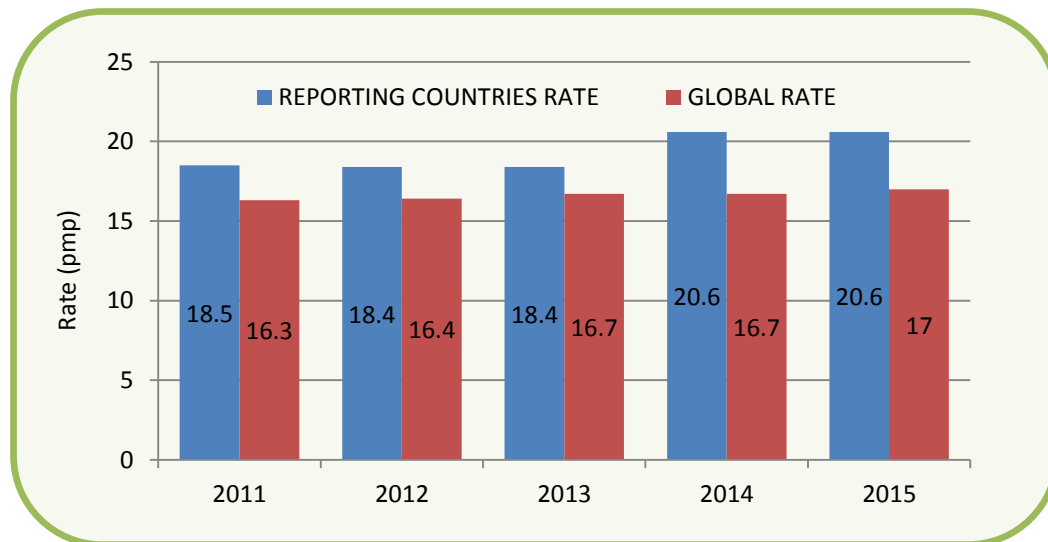


Figure 5. Progression of organ transplant rates (pmp) worldwide. 2011-2015

Global rates: calculated by applying the global population.

Reporting countries rates: calculated by applying the population of those countries that were able to provide estimates of donation and transplantation activities.

The global map 1 in the Annex shows transplant rates (pmp) in all the Member States that reported to the Global Observatory database in 2015, 9 out of 111 did not have any transplantation activity at all. The 102 countries with any transplant activities showed a large variability in the number of transplants (pmp).

This same information, making evidence of such variability, is further detailed in Figure 6. It shows the 75 most active countries in transplantation, with total rates between 6.2 pmp in Venezuela to 103.4 pmp in Spain. This bar chart presents the total number of transplants (in brackets next to the country) and the rates pmp, and per type of organ.

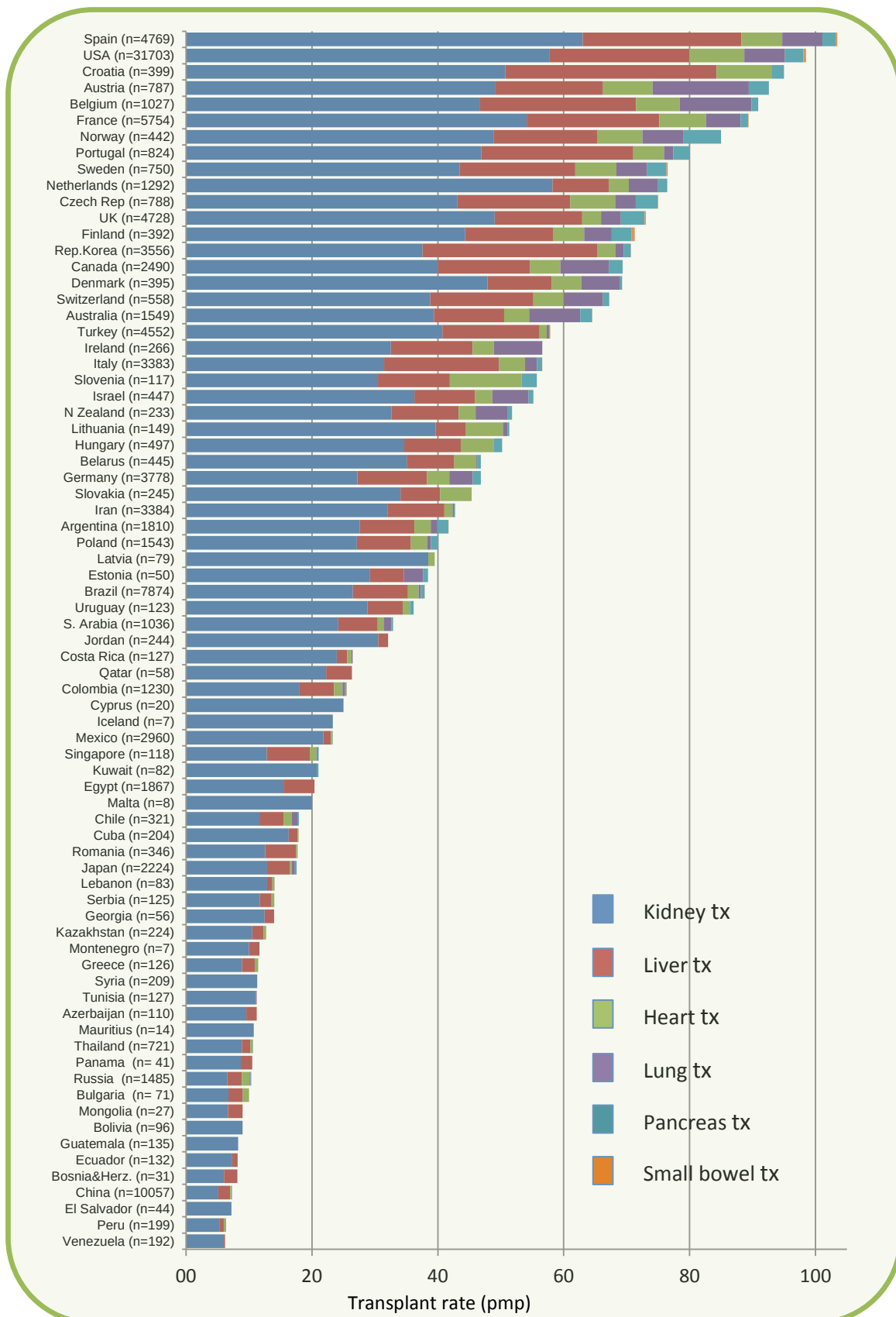


Figure 6. Solid organ transplant activity for the 75 most active countries in organ transplantation globally. Absolute numbers and rates (pmp). 2015.

When comparing the regional transplant rates (pmp), the most active region in organ transplantation is AMR with 51.4 pmp, followed by EUR (45.7 pmp), as shown in figure 7. The accompanying table 2 describes the absolute numbers and rates of the organ transplants activities among the six WHO regions. Rates are calculated by applying the population of those countries that were able to provide estimates of donation and transplantation alone.

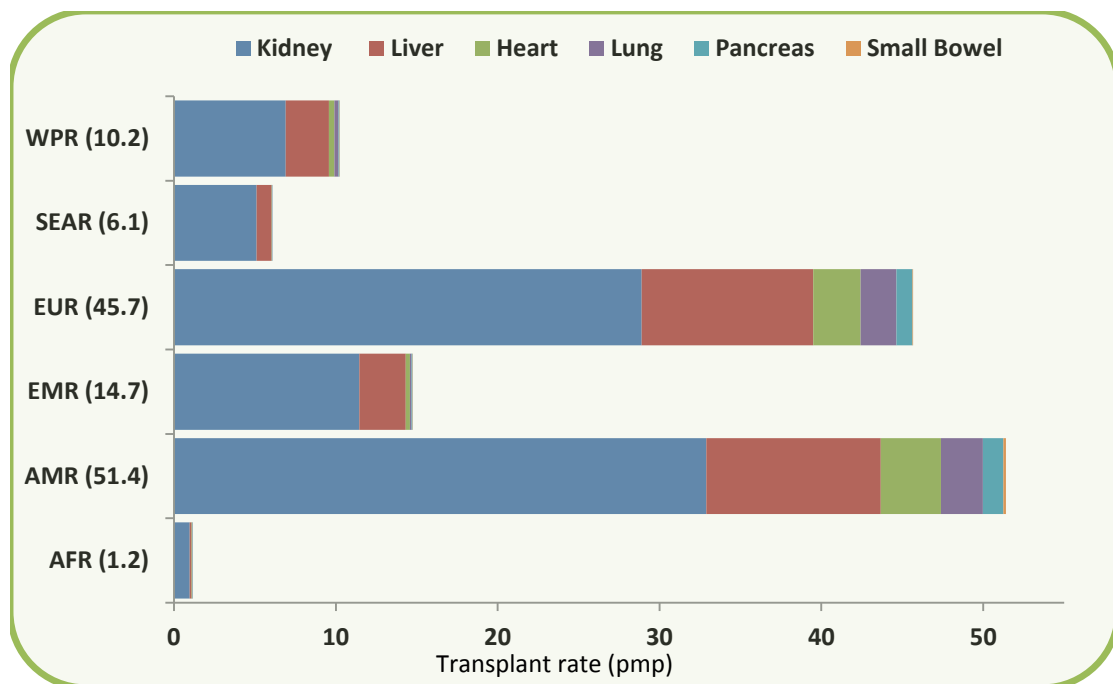


Figure 7. Rates organ transplant activities per WHO region. 2015.

Table 2. Absolute Numbers and rates of the organ transplant activities per WHO region. 2015.

	Africa Region (AFR)	America Region (AMR)	Eastern Mediterranean Region (EMR)	Europe (EUR)	South East Asia Region (SEAR)	Western Pacific Region (WPR)
Kidney	488 (1.0)	31859 (32.9)	6127 (11.5)	26131 (28.9)	7202 (5.1)	12540 (6.9)
Liver	67 (0.1)	10426 (10.8)	1539 (2.9)	9582 (10.6)	1292 (0.9)	4853 (2.7)
Heart	14 (0.03)	3604 (3.7)	135 (0.3)	2646 (2.9)	40 (0.03)	584 (0.3)
Lung	12 (0.02)	2507 (2.6)	56 (0.1)	2007 (2.2)	1 (0.0)	463 (0.3)
Pancreas	5 (0.01)	1236 (1.3)	24 (0.04)	890 (1.0)	1 (0.0)	143 (0.1)
Small Bowel	0 (0.0)	147 (0.2)	4 (0.01)	43 (0.05)	0 (0.0)	2 (0.0)
Total organs	586 (1.2)	49779 (51.4)	7885 (14.7)	41299 (45.7)	8536 (6.1)	18585 (10.2)

Note: Rates estimated with the population of the reporting countries alone.

Figure 8 and Table 3 show the organ transplant rates (pmp) by applying the total regional population as the denominator. The table also presents the absolute numbers in the six WHO regions.

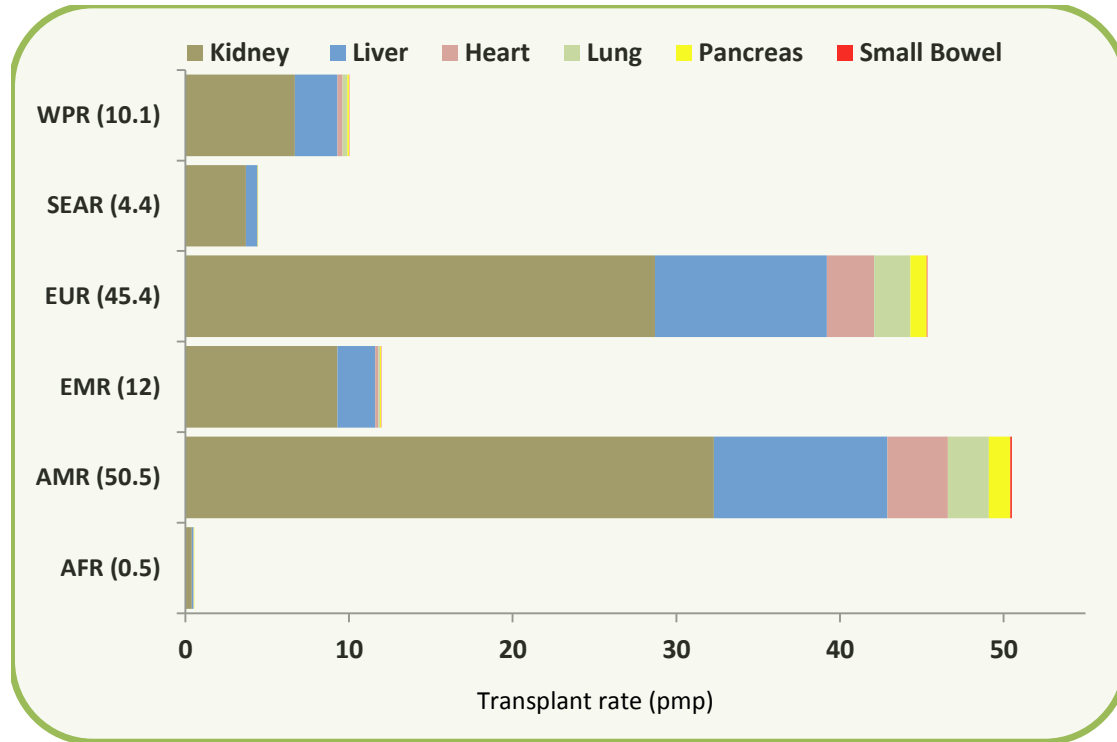


Figure 8. Rates of the organ transplant activities per WHO region. 2015.

Table 3. Absolute Numbers and rates of the organ transplant activities per WHO region. 2015.

	Africa Region (AFR)	America Region (AMR)	Easter Mediterranean Region (EMR)	Europe (EUR)	South East Asia Region (SEAR)	Western Pacific Region (WPR)
Kidney	488 (0.4)	31859 (32.3)	6127 (9.3)	26131 (28.7)	7202 (3.7)	12540 (6.7)
Liver	67 (0.06)	10426 (10.6)	1539 (2.3)	9582 (10.5)	1292 (0.7)	4853 (2.6)
Heart	14 (0.01)	3604 (3.7)	135 (0.2)	2646 (2.9)	40 (0.02)	584 (0.3)
Lung	12 (0.01)	2507 (2.5)	56 (0.1)	2007 (2.2)	1 (0.0)	463 (0.3)
Pancreas	5 (0.0)	1236 (1.3)	24 (0.04)	890 (1.0)	1 (0.0)	143 (0.1)
Small Bowel	0 (0.0)	147 (0.2)	4 (0.01)	43 (0.05)	0 (0.0)	2 (0.0)
Total organs	586 (0.5)	49779 (50.5)	7885 (12)	41299 (45.4)	8536 (4.4)	18585 (10.1)

Note: Rates estimated with the whole regional population.

The percentage of transplants from living donors was 32.4% of the total transplants of organs, and this type of procedure was more frequent in the SEAR (94.4%), the EMR (66.6%) and AFR (63%). (Figure 9).

As described in the methods section, only few countries provided aggregated data on the total organ transplants, with no information about the type of donor (living or deceased). This fact should be taken into consideration, since the figures of such countries are not included in this bar chart.

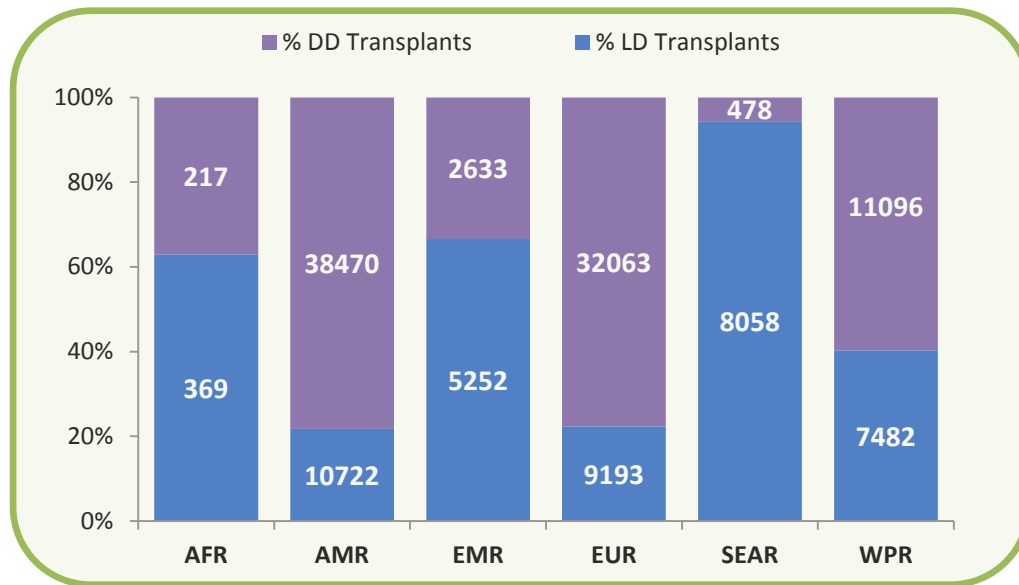


Figure 9. Absolute numbers and proportions of organ transplants depending on the type of donor (deceased vs living) in the six WHO regions. 2015.

2. DECEASED DONOR ACTIVITY

There were 31,812 deceased donors from whom at least one organ was recovered for the purpose of transplantation in 2015.

Over 83% (83.1 %) corresponds to donors after brain death (DBD), i.e, donors in whom death has been determined by neurological criteria. Donation after brain death is reported by 74 Member States but only 22 (30%) have implemented programmes of donation after circulatory death.

Figure 10 shows the evolution in the number of actual deceased organ donors between 2011 and 2015 globally. It is observed a sharp increase in the number of actual deceased organ donors in whom death has been determined by circulatory criteria i.e. donors after circulatory death (DCD). DCD represented 16.9% of all deceased donors in 2015 compared to 9.5 % in the previous year.

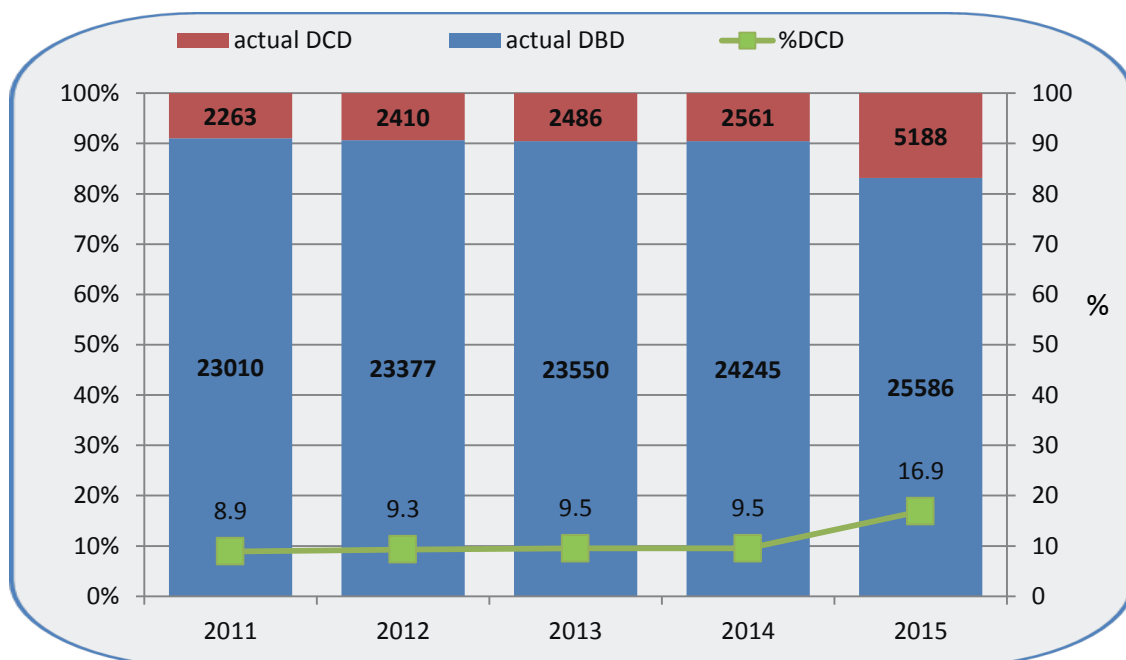


Figure 10. Absolute numbers of DCD and DBD. Percentage of DCD. Global data. 2011-2015.

Note: % of DCD is calculated with available data. There is a percentage (3-4%) of Actual DD, where the pieces of information about the type of donor (DBD or DCD) were unknown.

According to the reported data on deceased donors, the global number pmp has increased in the last year (2015), compared with the plateau observed in the previous years. In Figure 11 we can observe its evolution during the last five years. As described in the methods section, these rates are calculated by applying the total population as the denominator and, on the other hand, by using the population of the reporting countries alone.

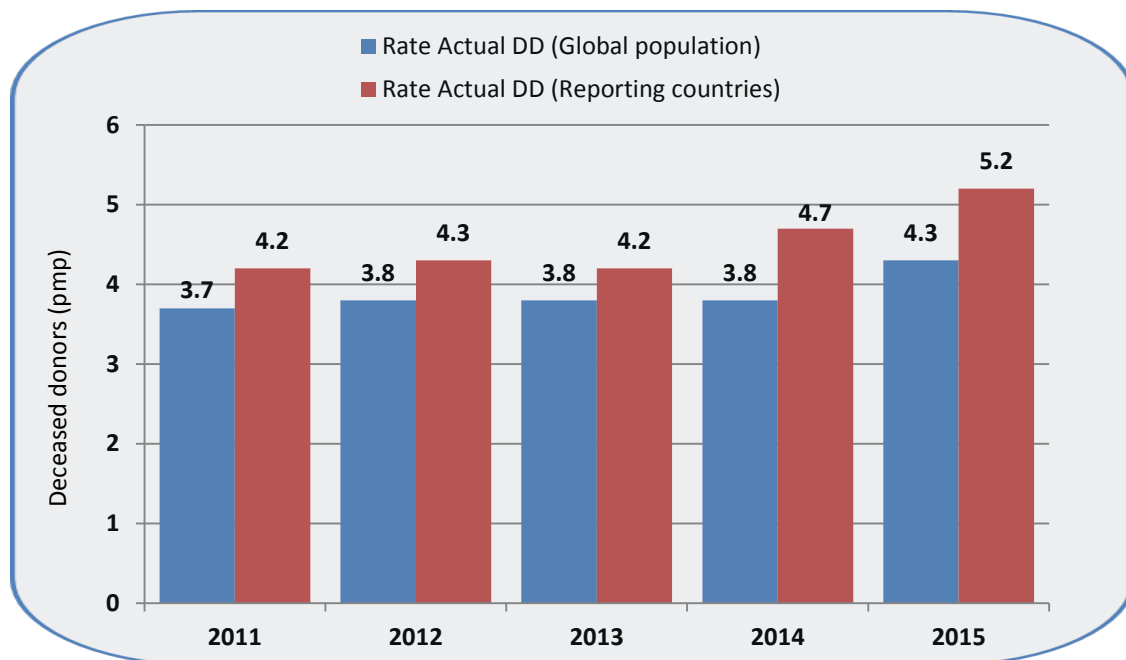


Figure 11. Evolution of global actual deceased donors rates (pmp). 2011-2015.

Global rates: calculated by applying the global population.

Reporting countries rates: calculated by applying the population of those countries that were able to provide estimates of donation and transplantation activities.

The global map 2 in the Annex shows the actual deceased donor rate (pmp) among all the Member States that reported data to the GODT in 2015.

As observed in Figure 12, Croatia and Spain were the countries with the highest rates (40.2 pmp) for actual deceased organ donors. Croatia only reported DBD alone, while in Spain deceased donation relies on both, DBD and DCD.

It can be also seen that Belgium and Canada provided only the aggregated figures for the total actual deceased donors, with none indication about the characteristic of the actual DD, i.e. whether they were actual DBD or DCD.

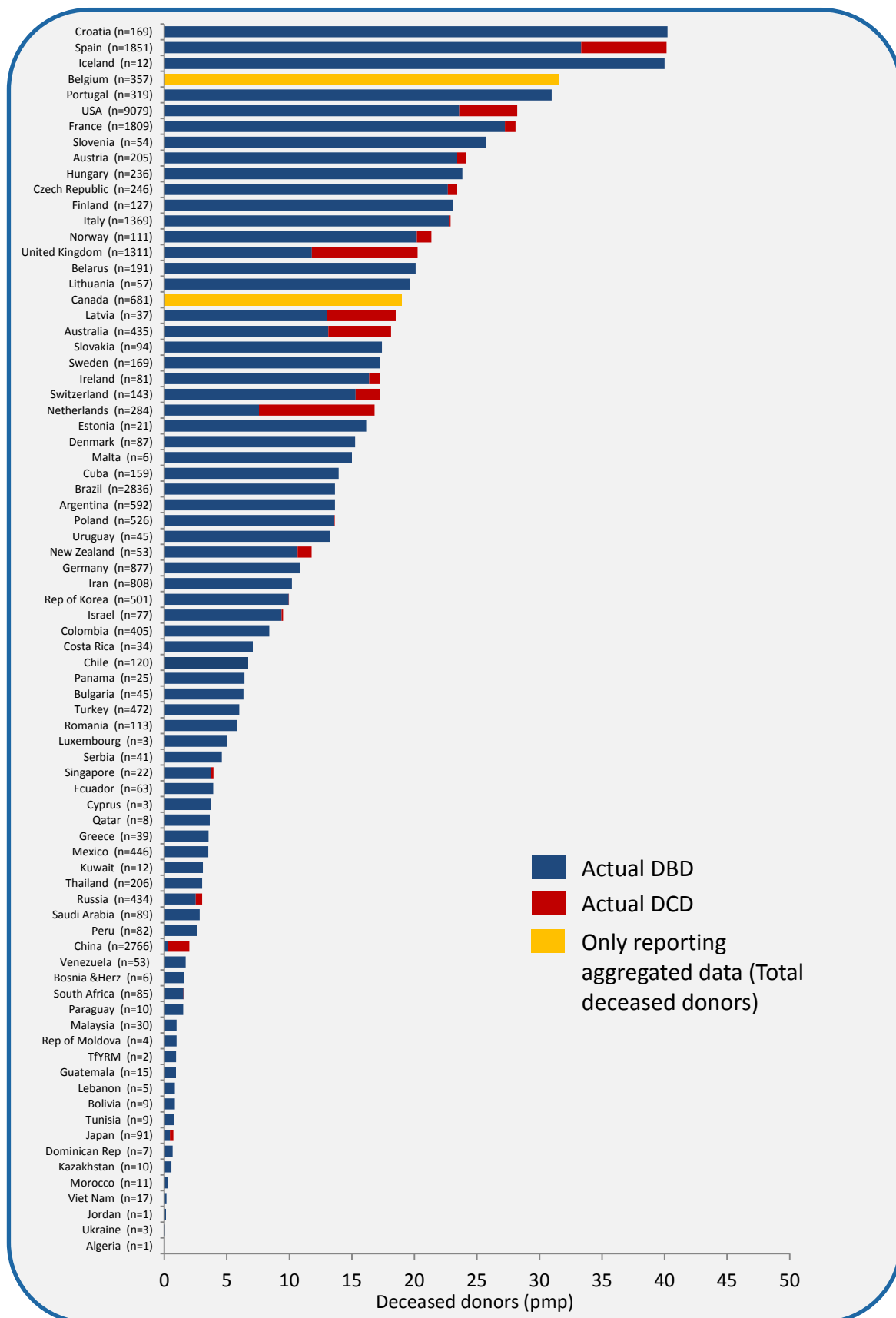


Figure 12. Donation from deceased persons. Absolute numbers and rates (pmp) of actual deceased donors. 2015.

67 countries out of the 78 with any activity in deceased organ donor programmes provided data according to the age categories. Adults (> 15 y.o.) represent the most frequent group (76.7% of the total actual donors), while paediatric deceased donation is a minority practice.

The global situation about the actual DCD donors is presented in figure 13.

5,188 DCD donors were reported in 22 countries for 2015. According to the collected figures, this type of donation is being performed in a higher proportion in WPR (47.9%), owed mainly to the Chinese program on DCD. However 63.3% of the countries carrying out this type of donation belong to the EUR region.

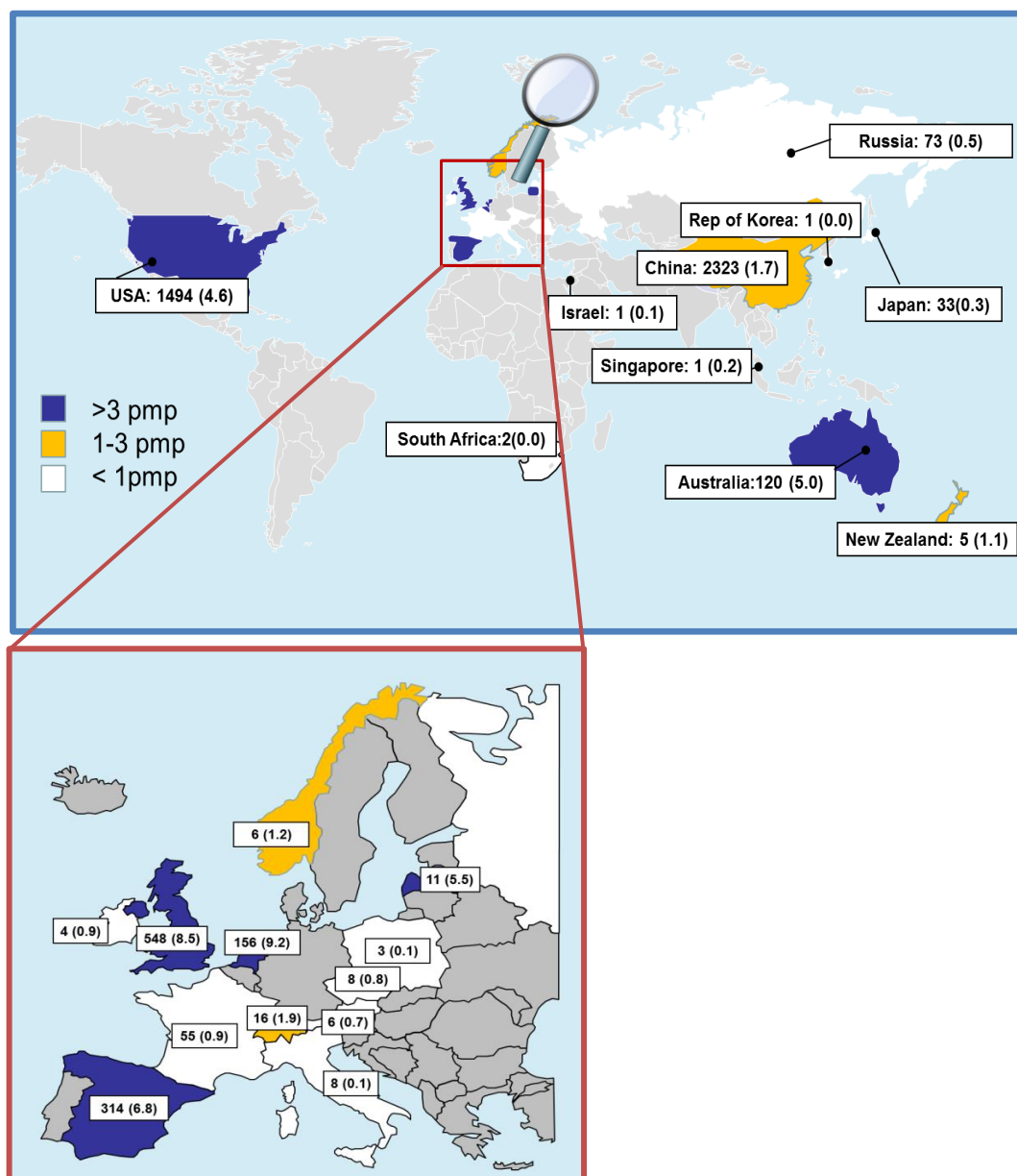


Figure 13. Actual donors after circulatory death (DCD): Absolute numbers and Rates (pmp). 2015.

Figure 14 shows actual DD rates vs the transplant from DD rates. The Actual DD per million inhabitants appear on the left side of the graphic, while the transplantation activities for each organ, in rates (pmp), are shown on the right side, whenever the transplant/s came from a deceased donor.

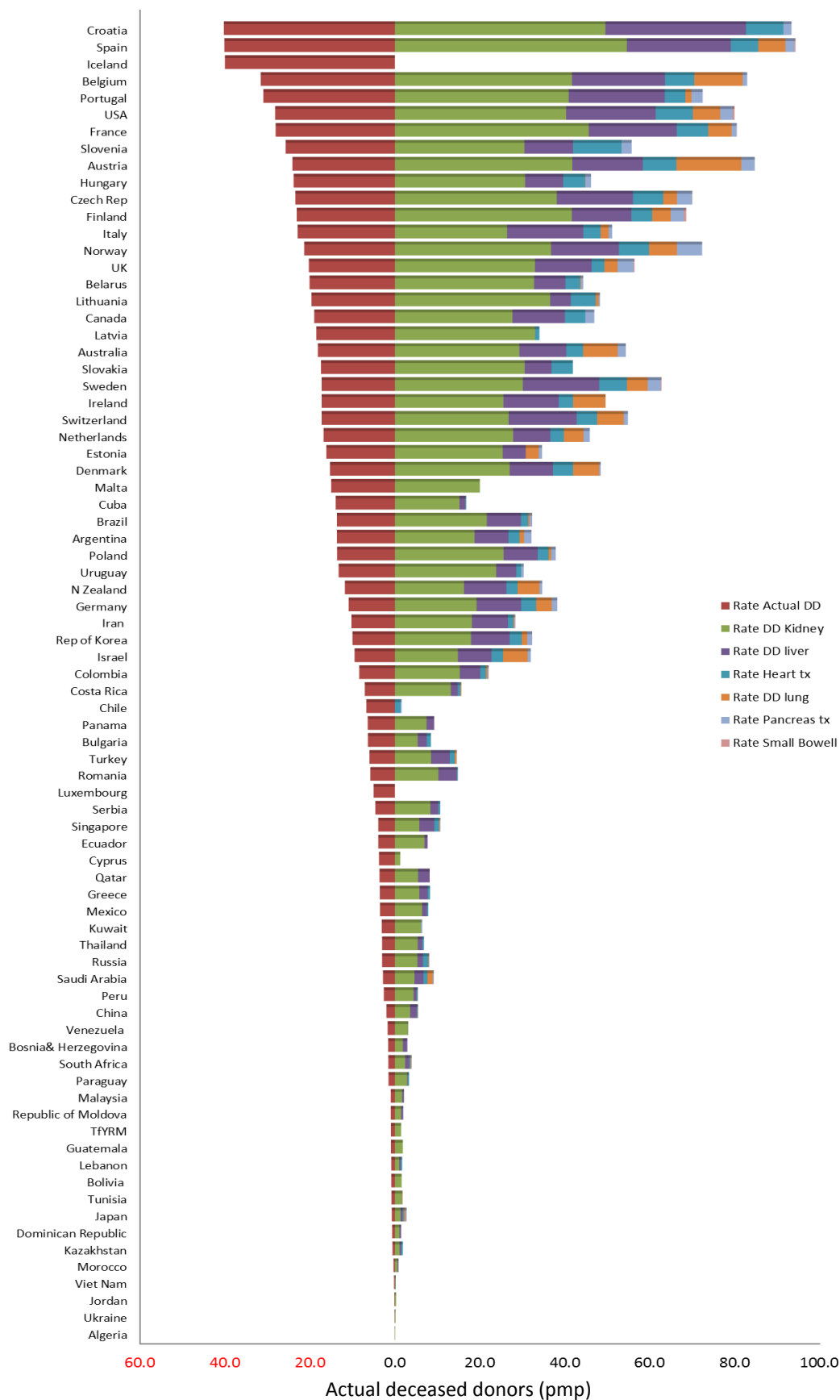


Figure 14. Deceased Donation (Rate) vs Transplants from Deceased Donors (Rate). 2015.

3. KIDNEY ACTIVITY

84,347 kidney transplants were done worldwide in 2015 (41.8% from living donors), representing an increase of 5.5% over 2014.

Kidney transplants were performed in 102 of the 111 countries. Living kidney transplants were carried out in 98 of these countries and transplants from deceased donors in 76. Chile only provided the aggregated figures for the total kidney transplants, with no indication about the type of donor, i.e. whether they were donors from deceased or from living persons.

The evolution of kidney transplant practices in the last five years is shown in Figure 15.

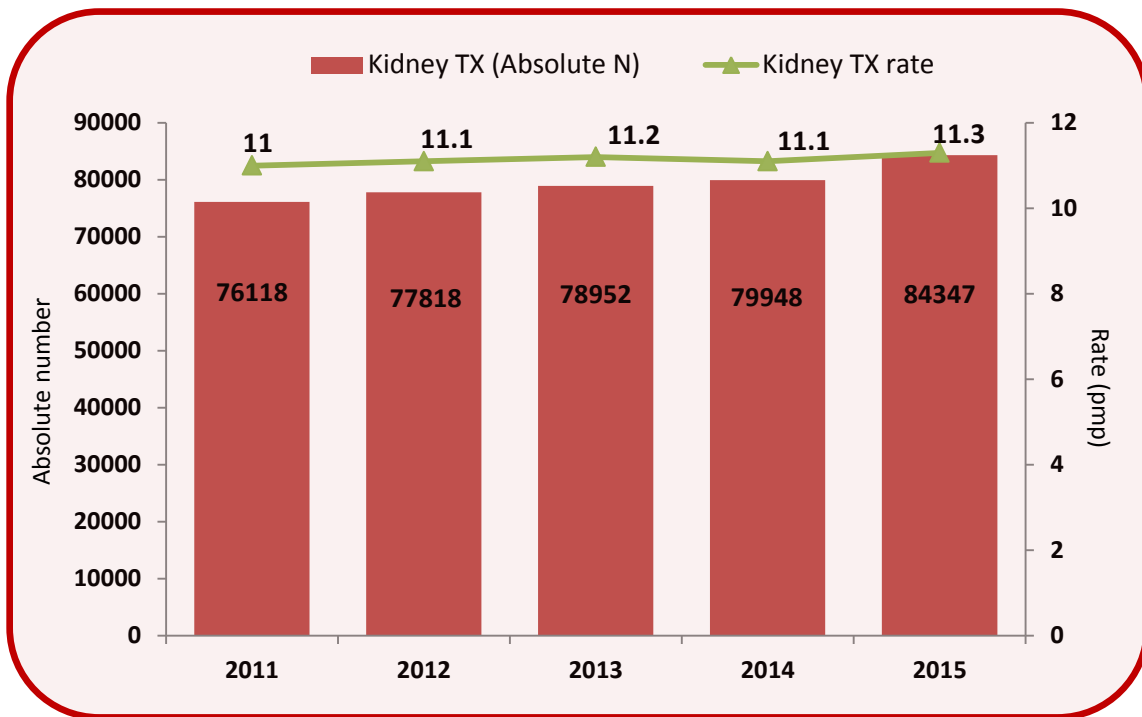


Figure 15. Progress of kidney transplant activities worldwide. Absolute numbers and rates. 2011-2015.

The global map 3 in the Annex shows kidney transplant rates (pmp) among all the Member States that provided any data to the GODT for 2015.

The distribution of these reported practices by WHO Regions is presented in figures 16 and 17. The percentages correspond to the transplants from deceased and living donors. Kidney transplants from deceased donors were more common in EUR (69.9%), AMR (67.7%) and WPR (55.1%) than transplants from living donors.

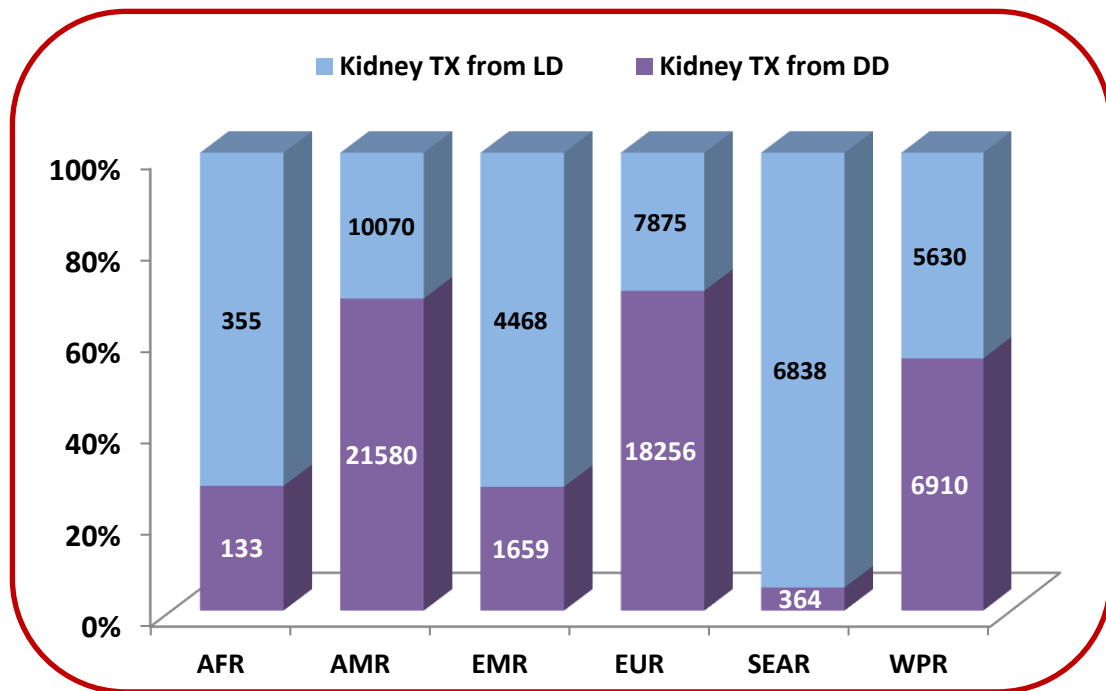


Figure 16. Distribution of kidney transplants by WHO Regions. Percentages of transplants and absolute numbers depending on the type of donor. 2015.

Note: Chile, that provided only the aggregated figures for the total kidney transplants, with none indication about the type of donor, is not included.

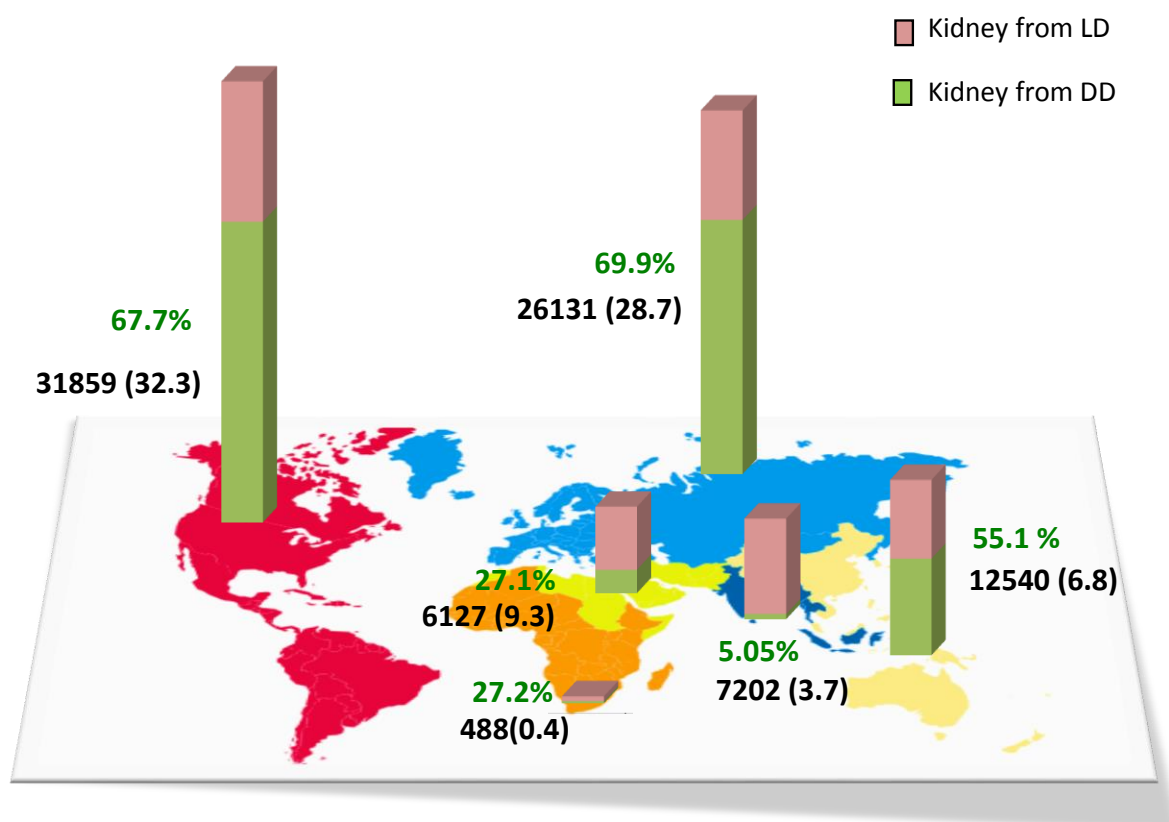


Figure 17. Distribution of kidney transplants among the WHO Regions. 2015.

Note: Green numbers represent the proportions of kidney transplants from DD.

Black numbers represent the total kidney transplants, in absolute numbers and rates (pmp), performed within the region.

Following the last available data, 24 countries were carrying out only kidney living transplants. Therefore, 28.2% of the global population had access to this therapeutic option alone within their country. The list of those countries is as follows:

Albania, Azerbaijan, Egypt, El Salvador, Ethiopia, Georgia, Ghana; Honduras, Iceland, India, Kenya, Kyrgyzstan, Libya, Mauritius, Mongolia, Montenegro, Nepal, Nicaragua, Nigeria, Pakistan, Sudan, Syria, Tajikistan, United Arab Emirates.

There were two countries (Malta and Slovenia), performing deceased kidney transplants alone as the only therapeutic option for end stage renal disease.

Of the 84,347 total kidney transplants carried out globally, 1,950 (2.3%) were paediatric transplants, i.e. performed in patients < 15 years old. Only 66 countries reported this type of practice.

Figure 18 shows 102 countries that reported to have kidney transplants. Total kidney transplant rates vary from 0.09 to 63.02.

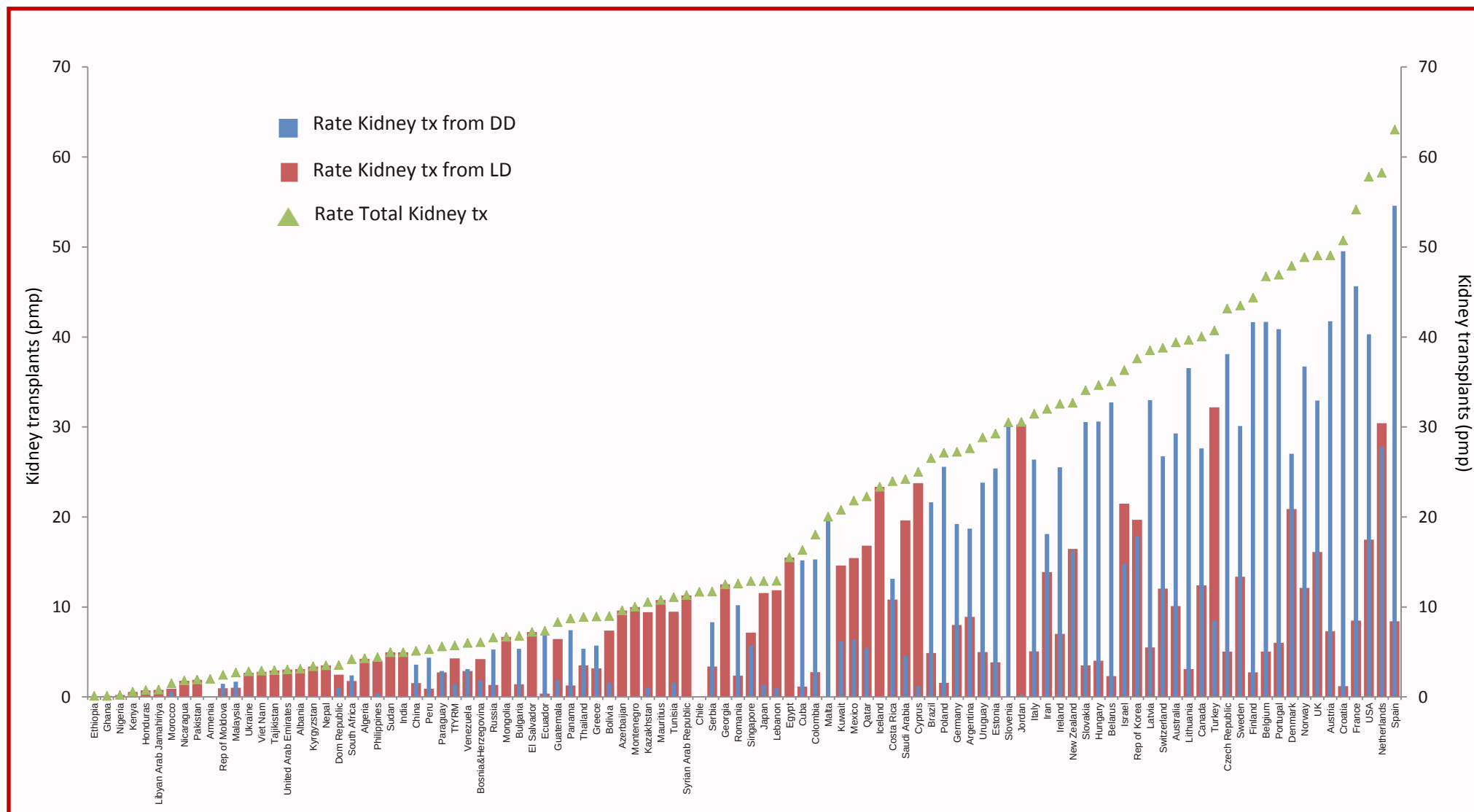


Figure 18. Kidney transplantation Rates (pmp) per countries. 2015.

4. LIVER ACTIVITY

27,759 liver transplants were performed in 2015 (21% from living donors), which represents an increase of 6.1% in the global liver transplant activities over 2014.

Liver transplants were performed in 78 of the 111 reporting countries. Liver transplants from living donors were carried out in 59 countries and transplants from deceased donors in 66 countries.

According to the last available data, there were 12 countries with living liver transplants alone (*Albania, Algeria, Azerbaijan, Georgia, Egypt, India, Jordan, Kyrgyzstan, Mongolia, Montenegro, Pakistan and Ukraine*) and 19 countries performing only liver transplants from deceased persons (*Costa Rica, Cuba, Czech Republic, Denmark, Dominican Republic, Estonia, Finland, Greece, Hungary, Ireland, Lithuania, Malaysia, Panama, Paraguay, Peru, Serbia, Slovakia, Slovenia and Tunisia*).

Domino liver transplant is a very infrequent practice, only 59 of these transplants were performed during 2015 in 11 countries (*Australia, Belgium, France, Germany, Japan, Portugal, Spain, Sweden, Switzerland, United Kingdom and United States of America*).

The progression of the liver transplant practices worldwide in the last five years is presented in Figure 19. Global rates (pmp) reached the 8.8% of increase during such study period.

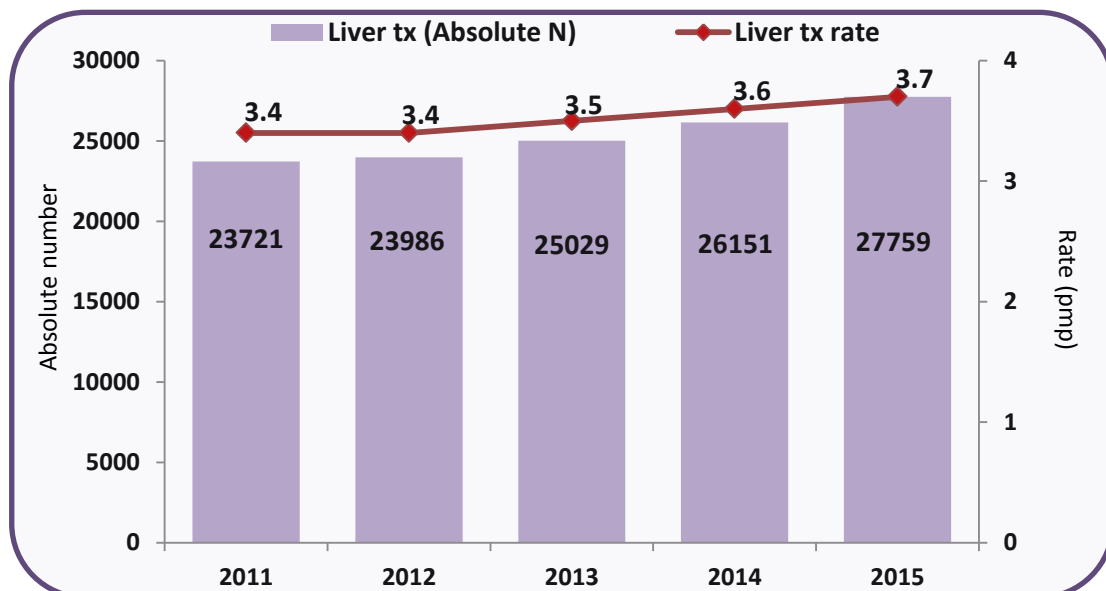


Figure 19. Evolution of the global liver transplant activities. Absolute numbers and rates. 2011-2015.

The global map 4 in the Annex shows liver transplant rates (pmp) among all the Member States that reported to the GODT in 2015.

The distribution of global liver transplants among the six WHO regions is represented in Figures 20 and 21. As with kidneys, this type of transplant was more frequent in AMR and EUR. Liver transplants from deceased donors were more prevalent in almost all regions, with the exception of EMR (50.9%) and SEAR (94.4%). In this regard, the last available data showed that only Thailand and India are carrying out liver transplants in SEAR.

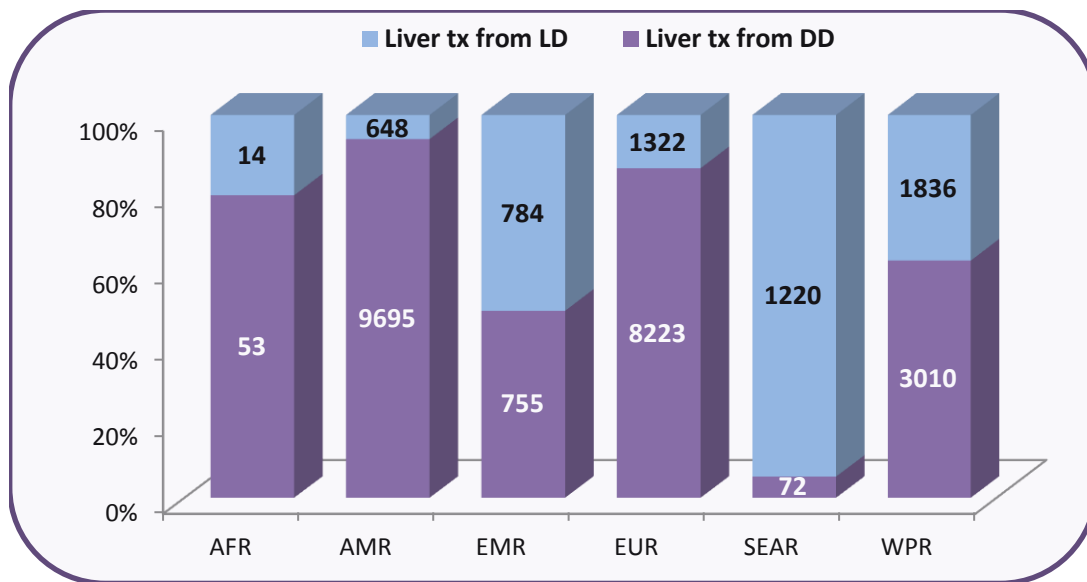


Figure 20. Distribution of liver transplants by WHO Regions. Percentages of transplants and absolute numbers depending on the type of donor. 2015.

Note: Domino tx (n=59) is not included.

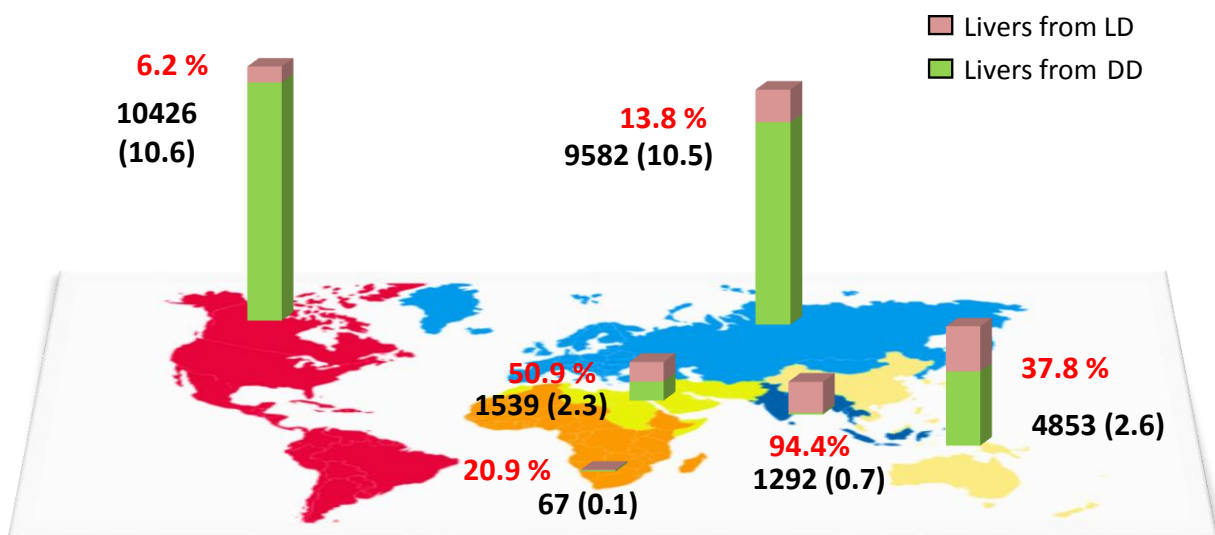


Figure 21. Distribution of liver transplants among the WHO Regions. 2015.

Note: Red numbers represent the proportions of liver transplants from DD.

Black numbers represent the total liver transplants, in absolute numbers and rates (pmp), performed within the region.

Figure 22 shows the 78 countries that reported liver transplant activity. Total liver transplant rates vary from 0.03 pmp in Algeria to 33.6 pmp in Croatia. Chile was the only country that provided aggregated figures for total liver transplants, with no indication about the type of donation, i.e. from deceased or living donors.

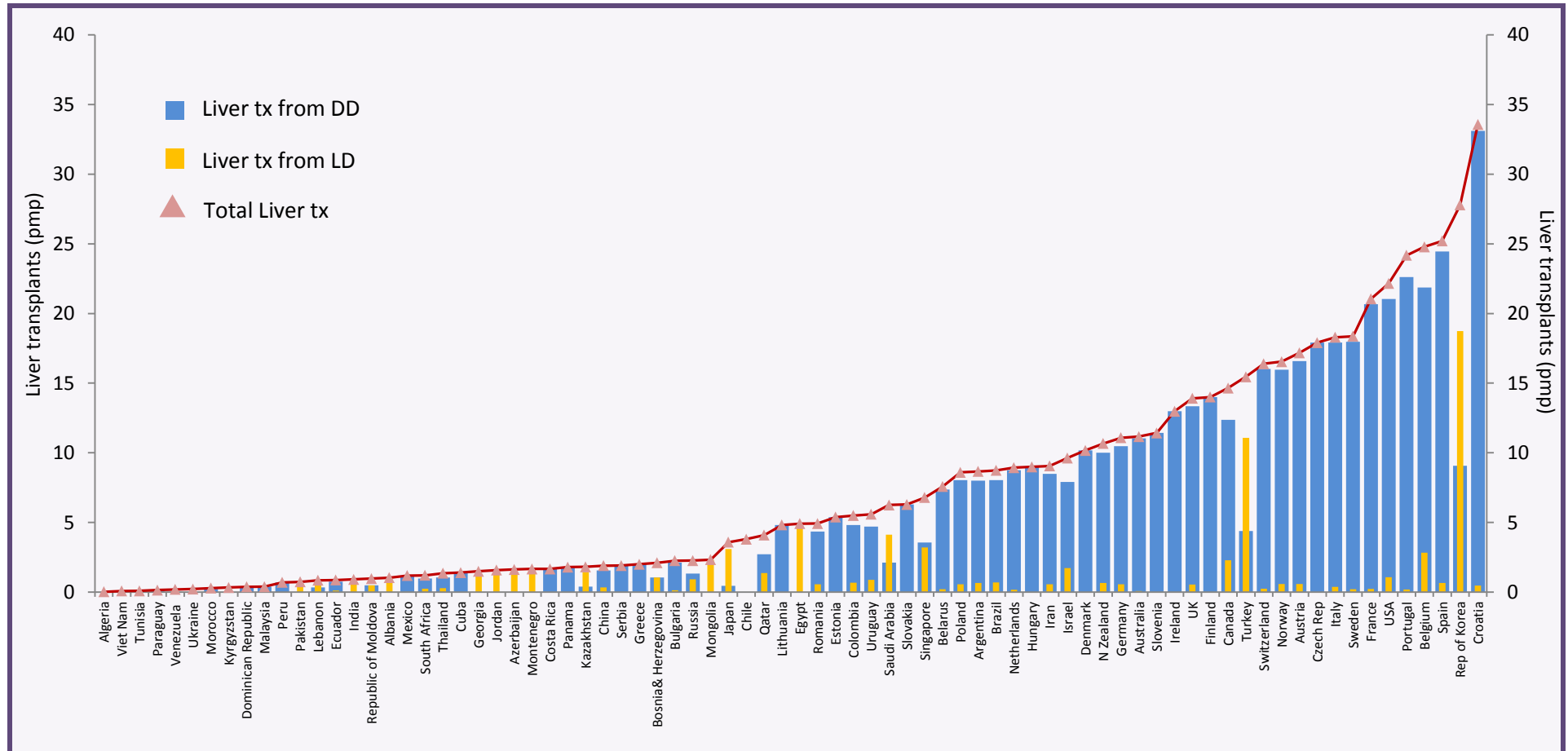


Figure 22. Liver transplantation Rates (pmp) per countries. 2015.

5. HEART ACTIVITY

7,023 heart transplants were carried out in 2015, which represent a 7.4% increase over 2014. Those transplants were reported to be performed in 59 countries. The heart transplant rate worldwide was 0.94 pmp. With regards the paediatric heart transplants (<15 years old), a total of 641 procedures were performed in 37 countries (0.09 pmp).

The global map 5 in the Annex shows the rates of heart transplants around the world. The rates for those countries that stated to carry out this practice vary from 0.01 pmp to 11.4 pmp. It should be noted that Slovenia presents the highest rate (11.4), followed by Croatia and USA (8.8 pmp respectively).

The evolution of this worldwide transplantation practice is seen in Figure 23, in absolute numbers and rates pmp, for the last five years. From 2013 on, the global number of heart transplants annually performed were over 6,000 procedures, and exceeded 7,000 annual transplants in 2015.

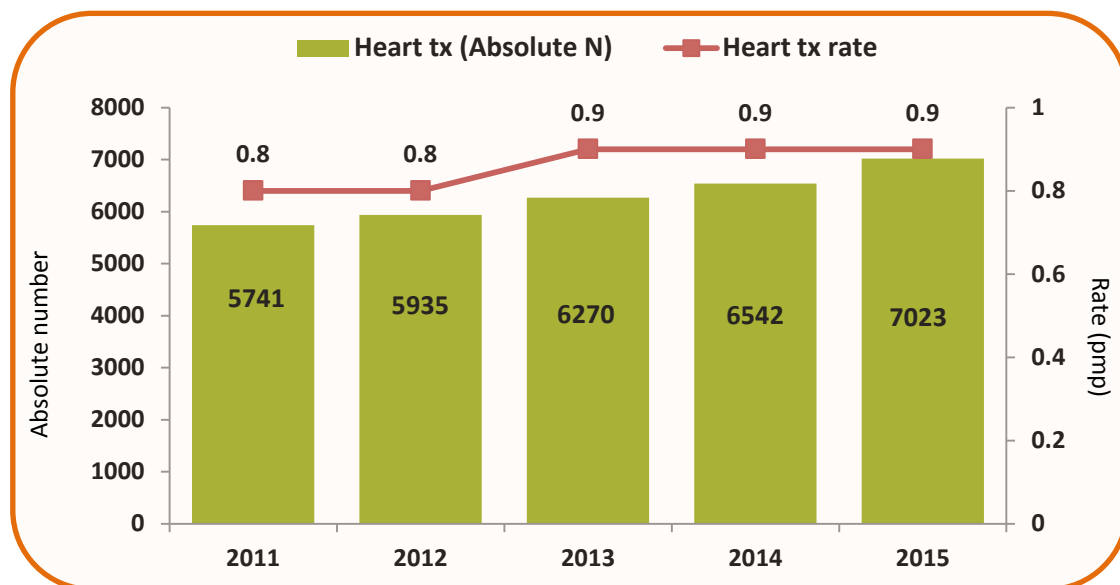


Figure 23. Progression of global heart transplant activities. Absolute numbers and rates. 2011-2015.

Table 4 summarises the distribution of heart transplants, total and paediatric procedures, both in terms of absolute numbers and rates pmp, for each of the WHO regions. The number of countries that are carrying out this type of procedure is also shown.

Table 4. Distribution of heart transplants in the WHO regions. 2015.

WHO Region	Number of Heart Transplants (pmp)	Number of Paediatric Heart Transplants (pmp) (<15 years old)	Number of countries
AFR	14 (0.03)	0 (0.00)	1
AMR	3604 (3.7)	401 (0.4)	12
EMR	135 (0.2)	13 (0.02)	4
EUR	2646 (2.9)	195 (0.2)	32
SEAR	40(0.03)	3(0.00)	2
WPR	584 (0.3)	29 (0.02)	8

The most active countries, in terms of absolute numbers, for each of the regions are: South Africa for AFR; USA for AMR; Iran for EMR; France for EUR; Thailand for SEAR and China for WPR. When looking at the rates (pmp), those countries are different in two regions: Slovenia shows the highest rate in EUR (11.4) and Australia in WPR (4.0).

6. LUNG ACTIVITY

A total of 5,046 lung transplants were globally performed in 2015 (in 44 countries). These practices increased by 7.6% over 2014.

Of the total of lung transplants, 93.7% were from deceased donors. Only Japan (n=16), Brazil (n=4) and Germany (n=2) reported to perform lung transplants from living donors in 2015.

Figure 24 shows the evolution of total lung transplants carried out from 2011 to 2015.

In absolute numbers, USA was the only country performing more than 2,000 annual transplant procedures. The remaining 43 countries performing lung transplants did not report to perform more than 500 in 2015.

The global map 6 in the Annex shows that only South Africa reported to perform lung transplants in AFR, eight countries in AMR, three in EMR, 24 in EUR, only Thailand in SEAR and seven countries in WPR. According to the global rates (pmp), Austria had the highest activity (15.3 pmp) followed by Belgium (11.4 pmp). Most countries (54.5 %) fall into the range <2.9 pmp and 40.9 % show rates between 3.0 and 8.9 pmp.

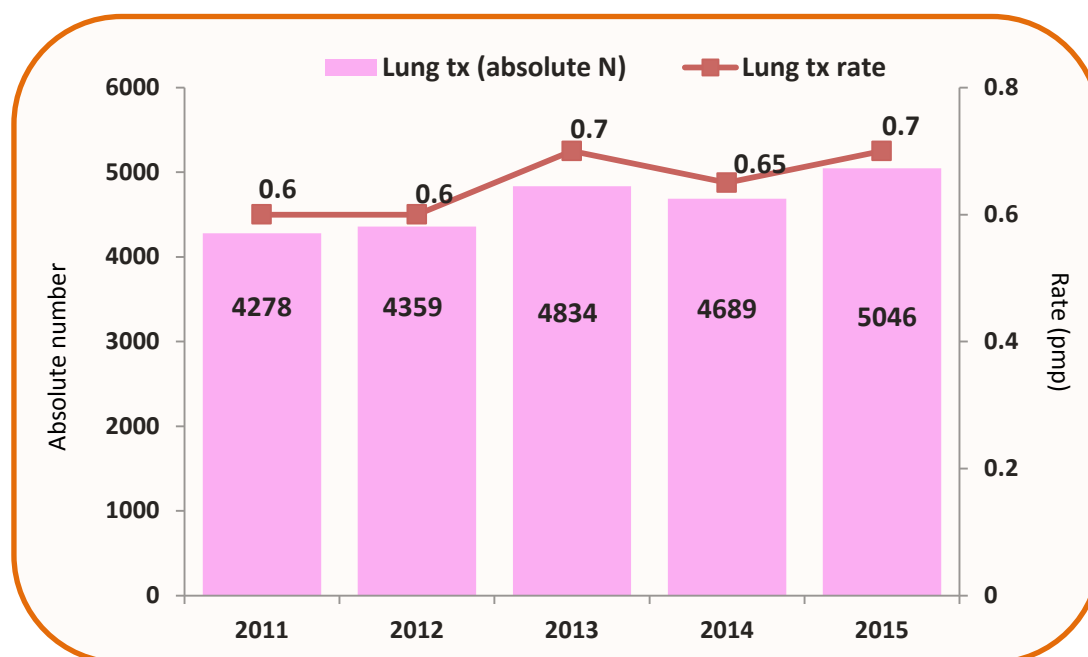


Figure 24. Evolution of worldwide lung transplant activities. Absolute numbers and rates. 2011-2015

In regard to paediatric transplantation activity, 79 lung transplants were performed globally in 2015. This procedure was only done in 17 countries, although it was very infrequent in most of them (less than five transplants in twelve countries).

Table 5 shows the distribution of lung transplants (total and paediatric procedures) in terms of absolute numbers and rates pmp, for each of the WHO regions. The number of countries that are carrying out this type of procedure is also presented.

Table 5. Distribution of lung transplants in the WHO regions. 2015.

WHO Region	Number of Lung Transplants (pmp)	Number of Paediatric Lung Transplants (pmp) (<15 years old)	Number of countries
AFR	12 (0.01)	0 (0.0)	1
AMR	2507 (2.5)	28 (0.03)	8
EMR	56 (0.1)	4 (0.01)	3
EUR	2007 (2.2)	4.00 (0.04)	24
SEAR	1 (0.0)	0 (0.0)	1
WPR	463 (0.25)	7 (0.004)	7

7. PANCREAS ACTIVITY

2,299 pancreas transplants were carried out in 45 countries in 2015, which represents a 1.2% decrease compared to 2014.

Only three countries reported to perform paediatric pancreas transplants: USA; France and United Kingdom.

The global map 7 in the Annex presents the distribution of countries with pancreas transplant activity in rates pmp. As observed, most of the countries belong to the EUR region. The three countries with the highest rates are Norway (6.0 pmp), followed by UK (3.8 pmp) and Czech Republic (3.5 pmp).

Figure 25 shows the evolution of pancreatic transplants that were carried out from 2011 to 2015. A continuous slight decrease is observed in the last years of compilation of data.

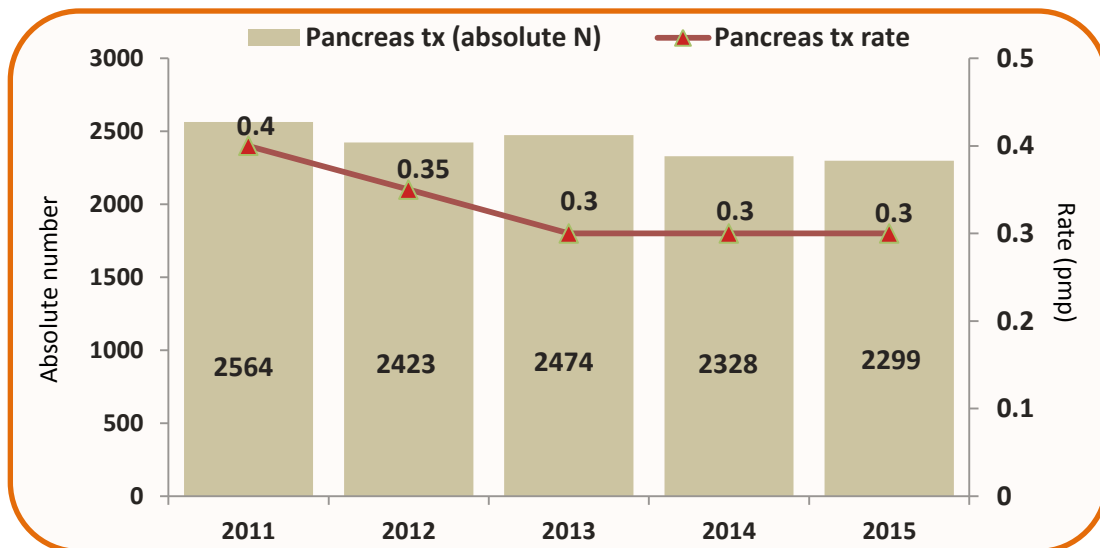


Figure 25. Evolution of global pancreas transplant activities. Absolute numbers and rates. 2011-2015.

8. SMALL BOWEL ACTIVITY

Only 15 countries reported to carry out small bowel transplants. 196 procedures of this type of transplant were reported to the GODT in 2015, although it seems to be underestimated.

Figure 26 presents the evolution of small bowel transplants from 2011 to 2015. It is observed that these practices declined by 8.8% from 2014 to 2015.

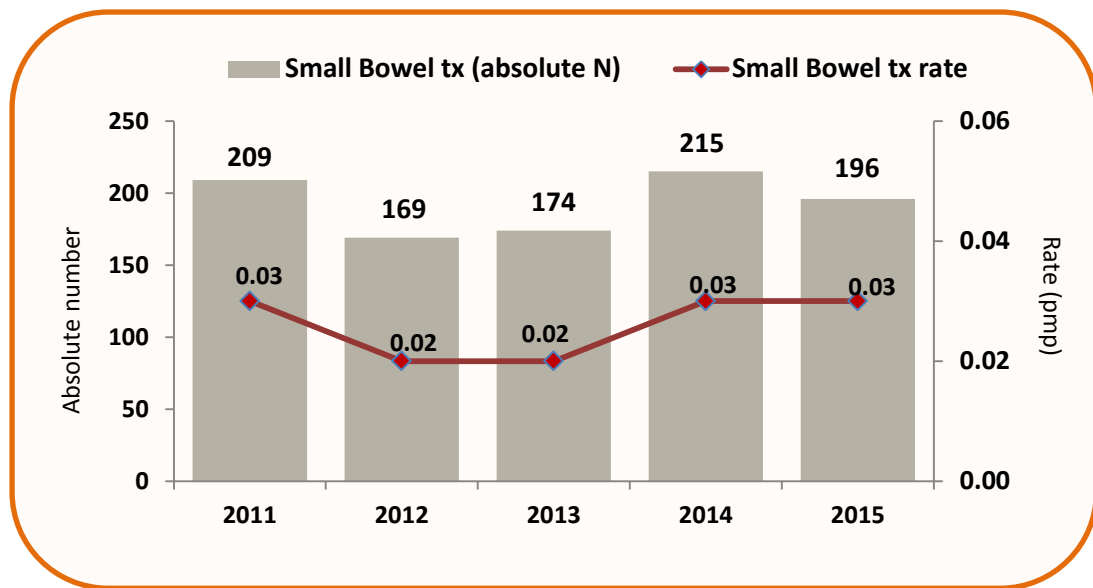


Figure 26. Evolution of global small bowel transplant activities. Absolute numbers and rates. 2011-2015.

According to the figures received for 2015, the global map 8 in the Annex presents the worldwide distribution of small bowel transplant rates. The rates vary from 0.1 to 0.5 pmp. Finland is the country with the highest rate (0.55 pmp) followed by USA (0.44 pmp).

9. ORGAN TRANSPLANT CENTRES

The number of transplant centres also varies among the countries which have reported their data on donation and transplantation activities.

Table 6 summarises the median number of inhabitants (MILLIONS) covered by each transplant centre, depending on the organ and the region.

Table 6. Distribution of transplant centres among the WHO regions. Median numbers (Millions). 2015.

WHO REGION	KIDNEY CENTRES	LIVER CENTRES	HEART CENTRES	LUNG CENTRES	PANCREAS CENTRES	S. BOWEL CENTRES
AFR	27.8	189.9	284.8	569.6	1139.1	.
AMR	1.2	2.9	3.5	8.9	4.6	17.9
EMR	5.6	17.6	32.8	131.2	164.0	656.1
EUR	2	3.5	5.1	9.8	6.6	21.7
SEAR	6.6	38.6	101.5	137.7	241.1	642.8
WPR	4.6	9.6	16.5	19.5	16.5	24.6
TOTAL	3.6	8.9	12.5	23.8	16.0	43.2

Acknowledgements

The GODT team is grateful to the identified focal points in Member States for their valuable contribution to the database, the Council of Europe for its contribution through the Newsletter Transplant and the Information Evidence and Research (IER) Department at WHO for the production of the global maps.

Acronyms

DBD: Actual donors after brain death

DCD: Actual donors after circulatory death (DCD)

DD: Deceased Organ Donors

LD: Living organ Donors

pmp: per million inhabitants

AFR: Africa Region

AMR: The Americas Region

EMR: Eastern Mediterranean Region

EUR: Europe Region

SEAR: South– East Asia Region

WPR: Western Pacific Region

GODT: Global Observatory on Donation and Transplantation

LK Tx: Living kidney transplants

DK Tx: Kidney transplants from deceased organ donors

Table of data:

K Tx: Kidney transplants

Pancr. Tx: Pancreas transplants

S.B: Small Bowel

Annexes

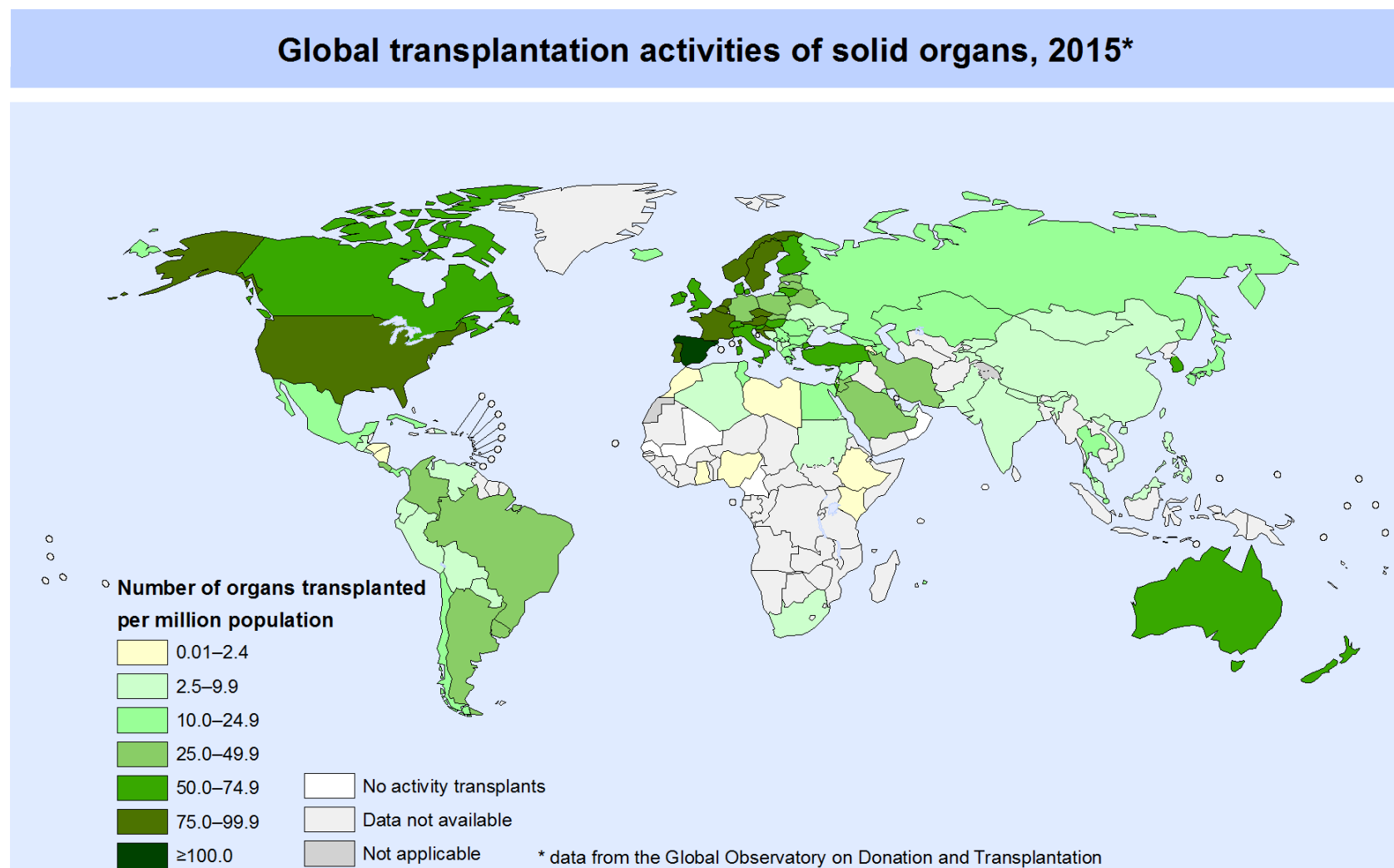
Table 7. Summary of the reported activities on donation and transplantation in the last available year.

COUNTRY	DBD	DCD	KIDNEY TX	LIVER TX	HEART TX	LUNG TX	PANCREAS TX	SMALL BOWEL TX
Albania			X	X				
Algeria	X		X	X				
Argentina	X		X	X	X	X	X	X
Armenia			X					
Australia	X	X	X	X	X	X	X	X
Austria	X	X	X	X	X	X	X	
Azerbaijan			X	X				
Belarus	X		X	X	X	X	X	
Belgium			X	X	X	X	X	
Bhutan								
Bolivia	X		X					
Bosnia& Herzegovina	X		X	X				
Brazil	X		X	X	X	X	X	X
Bulgaria	X		X	X	X			
Cameroon								
Canada			X	X	X	X	X	
Chile			X	X	X	X	X	
China	X	X	X	X	X	X		
Colombia	X		X	X	X	X	X	X
Costa Rica	X		X	X	X	X		
Croatia	X		X	X	X		X	
Cuba	X		X	X	X			
Cyprus	X		X					
Czech Rep	X	X	X	X	X	X	X	X
Denmark	X		X	X	X	X	X	
Dominican Republic	X		X	X				
Ecuador	X		X	X				
Egypt			X	X				
El Salvador			X					
Estonia	X		X	X		X	X	
Ethiopia			X					
Fiji								
Finland	X		X	X	X	X	X	X
France	X	X	X	X	X	X	X	X
Georgia			X	X				
Germany	X		X	X	X	X	X	

COUNTRY	DBD	DCD	KIDNEY TX	LIVER TX	HEART TX	LUNG TX	PANCREAS TX	SMALL BOWEL TX
Ghana			X					
Greece	X		X	X	X			
Guatemala			X					
Honduras			X					
Hungary	X		X	X	X	X	X	
Iceland	X		X					
India			X	X	X			
Iran	X		X	X	X	X	X	X
Ireland	X	X	X	X	X	X		
Israel	X	X	X	X	X	X	X	
Italy	X	X	X	X	X	X	X	X
Japan	X	X	X	X	X	X	X	
Jordan	X		X	X				
Kazakhstan	X		X	X	X			
Kenya			X					
Kuwait	X		X				X	
Kyrgyzstan			X	X				
Latvia	X	X	X		X			
Lebanon	X		X	X	X			
Libyan Arab Jamahiriya			X					
Lithuania	X		X	X	X	X	X	
Luxembourg	X							
Malaysia	X		X	X	X	X		
Maldives								
Mali								
Malta	X		X					
Mauritius			X					
Mexico	X		X	X	X		X	
Mongolia			X	X				
Montenegro			X	X				
Morocco	X		X	X	X			
Nepal			X					
Netherlands	X	X	X	X	X	X	X	
New Zealand	X	X	X	X	X	X	X	
Nicaragua			X					
Nigeria			X					
Norway	X	X	X	X	X	X	X	
Oman								
Pakistan			X	X				

COUNTRY	DBD	DCD	KIDNEY TX	LIVER TX	HEART TX	LUNG TX	PANCREAS TX	SMALL BOWEL TX
Panama	x		x	x				
Paraguay	x		x	x	x			
Peru	x		x	x	x	x		
Philippines			x					
Poland	x	x	x	x	x	x	x	
Portugal	x		x	x	x	x	x	
Qatar	x		x	x				
Republic of Moldova	x		x	x				
Rep of Korea	x	x	x	x	x	x	x	x
Romania	x		x	x	x		x	
Russia	x	x	x	x	x	x	x	
Saudi Arabia	x		x	x	x	x	x	
Senegal								
Serbia	x		x	x	x			
Singapore	x	x	x	x	x	x	x	
Slovakia	x		x	x	x			
Slovenia	x		x	x	x		x	
South Africa	x	x	x	x	x	x	x	
Spain	x	x	x	x	x	x	x	x
Sudan			x					
Sweden	x		x	x	x	x	x	x
Switzerland	x	x	x	x	x	x	x	
Syria			x					
Tajikistan			x					
Thailand	x		x	x	x	x	x	
The former Yugoslav Republic of Macedonia	x		x					
Tunisia	x		x	x		x		
Turkey	x		x	x	x	x	x	x
UK	x	x	x	x	x	x	x	x
Ukraine	x		x	x				
United Arab Emirates			x					
Uruguay	x		x	x	x		x	
USA	x	x	x	x	x	x	x	x
Uzbekistan								
Venezuela	x		x	x				
Viet Nam	x		x	x	x		x	

Global map 1. Global organ transplant activities. Rate (pmp)



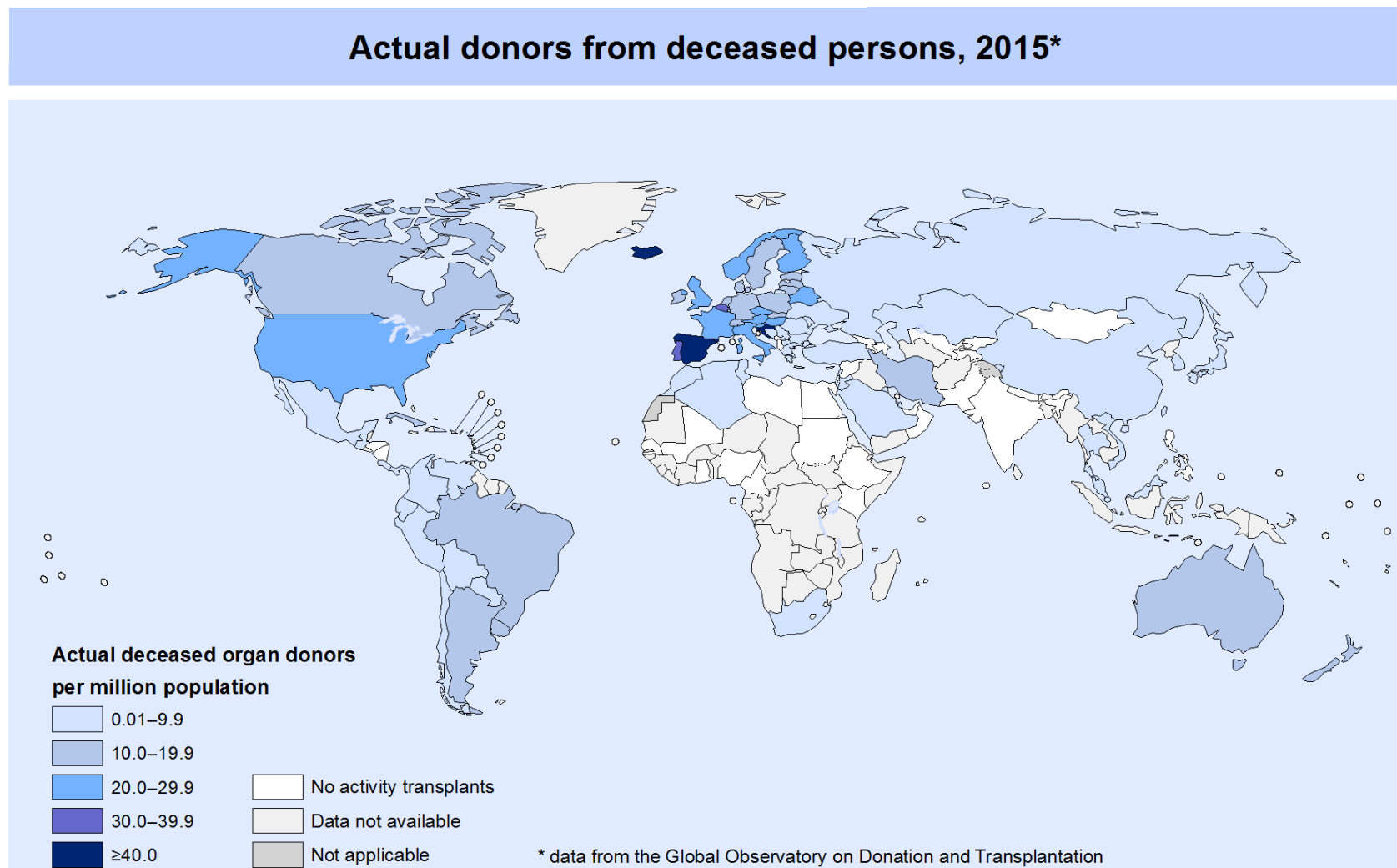
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Data Source: Global Observatory on Donation & Transplantation. Map Production: Information Evidence and Research (IER)
World Health Organization



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Global map 2. Global organ actual deceased donor donation. Rate (pmp)



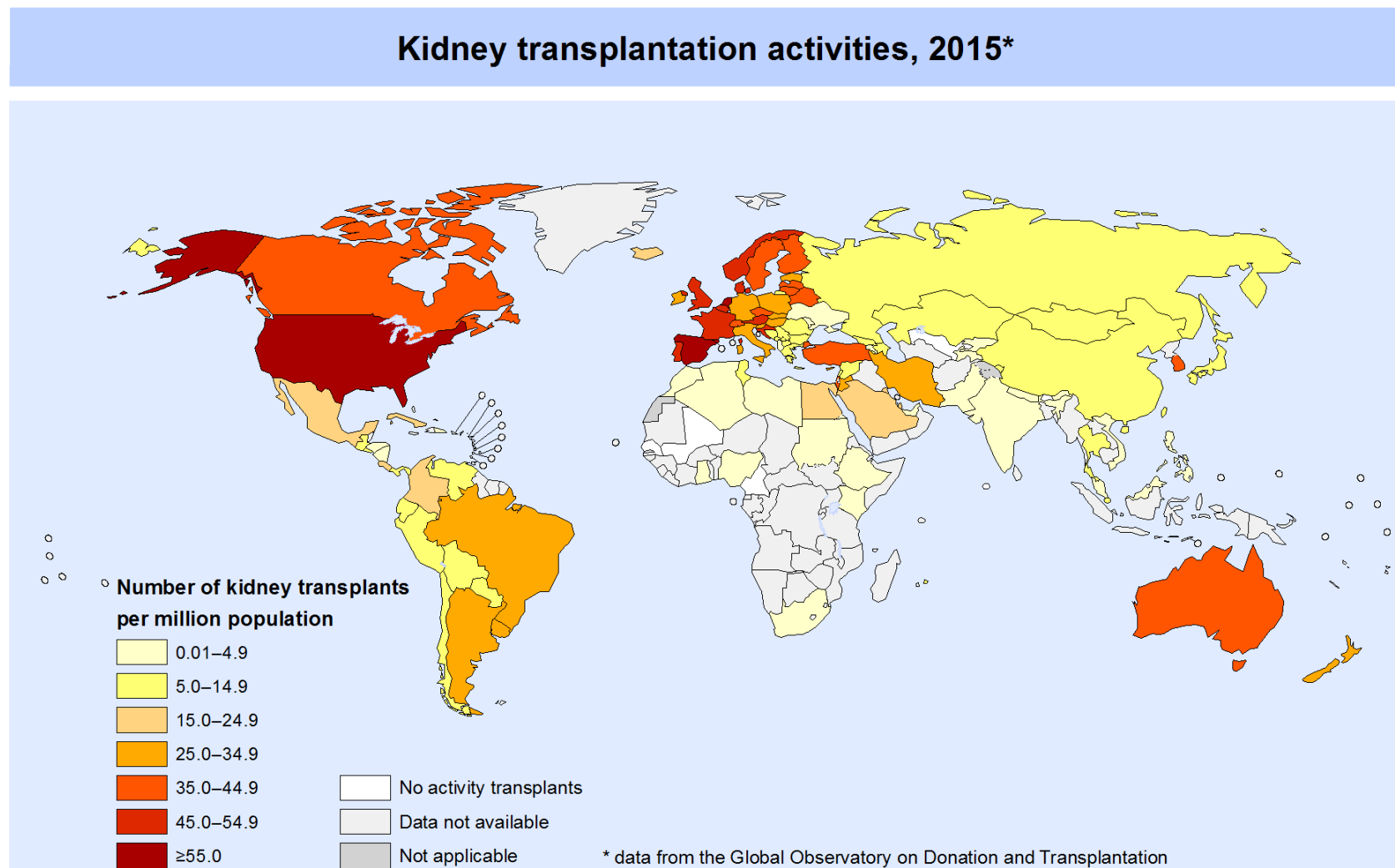
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Global map 3. Global Kidney transplant activities. Rate (pmp)



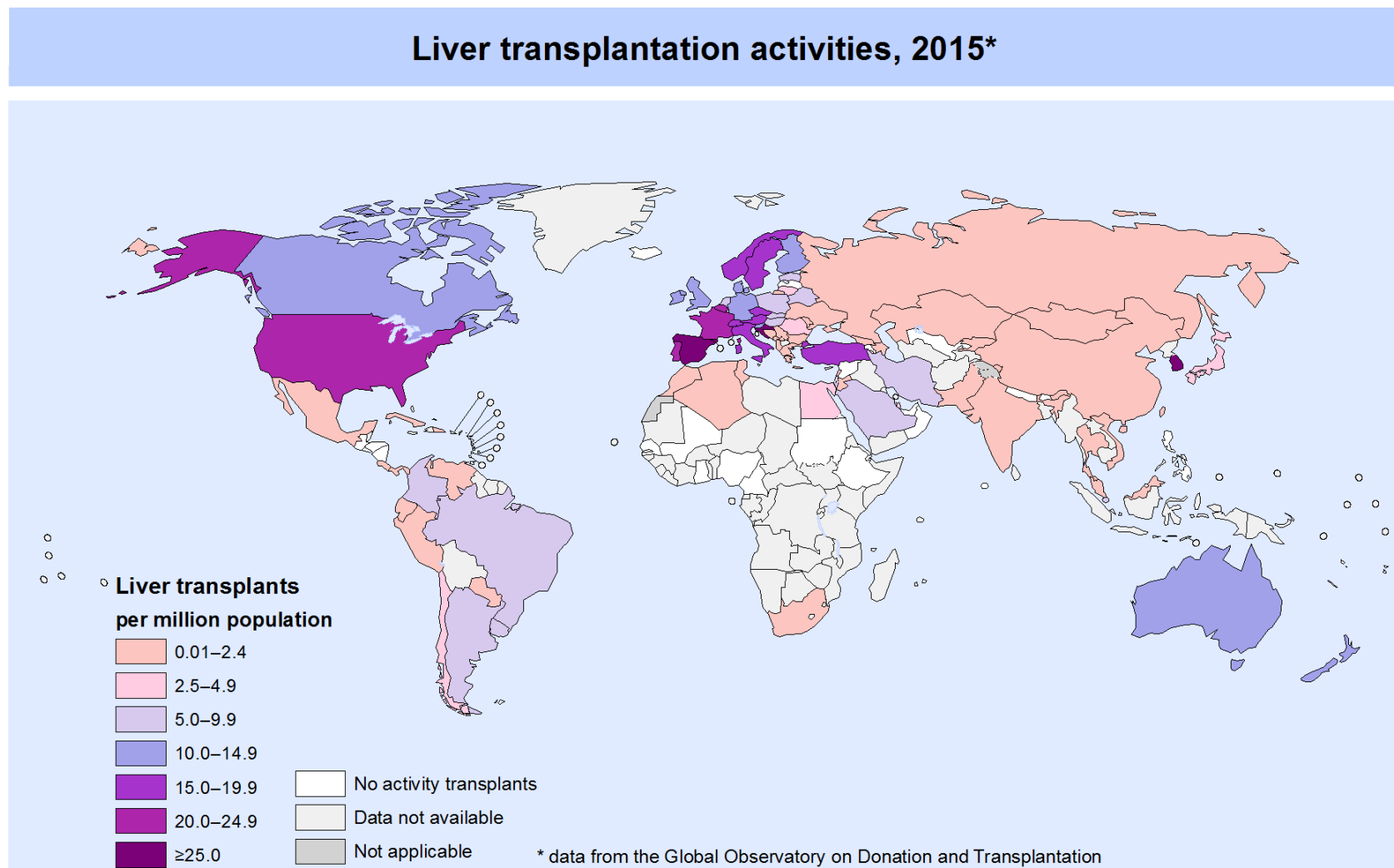
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Global map 4. Global Liver transplant activities. Rate (pmp)



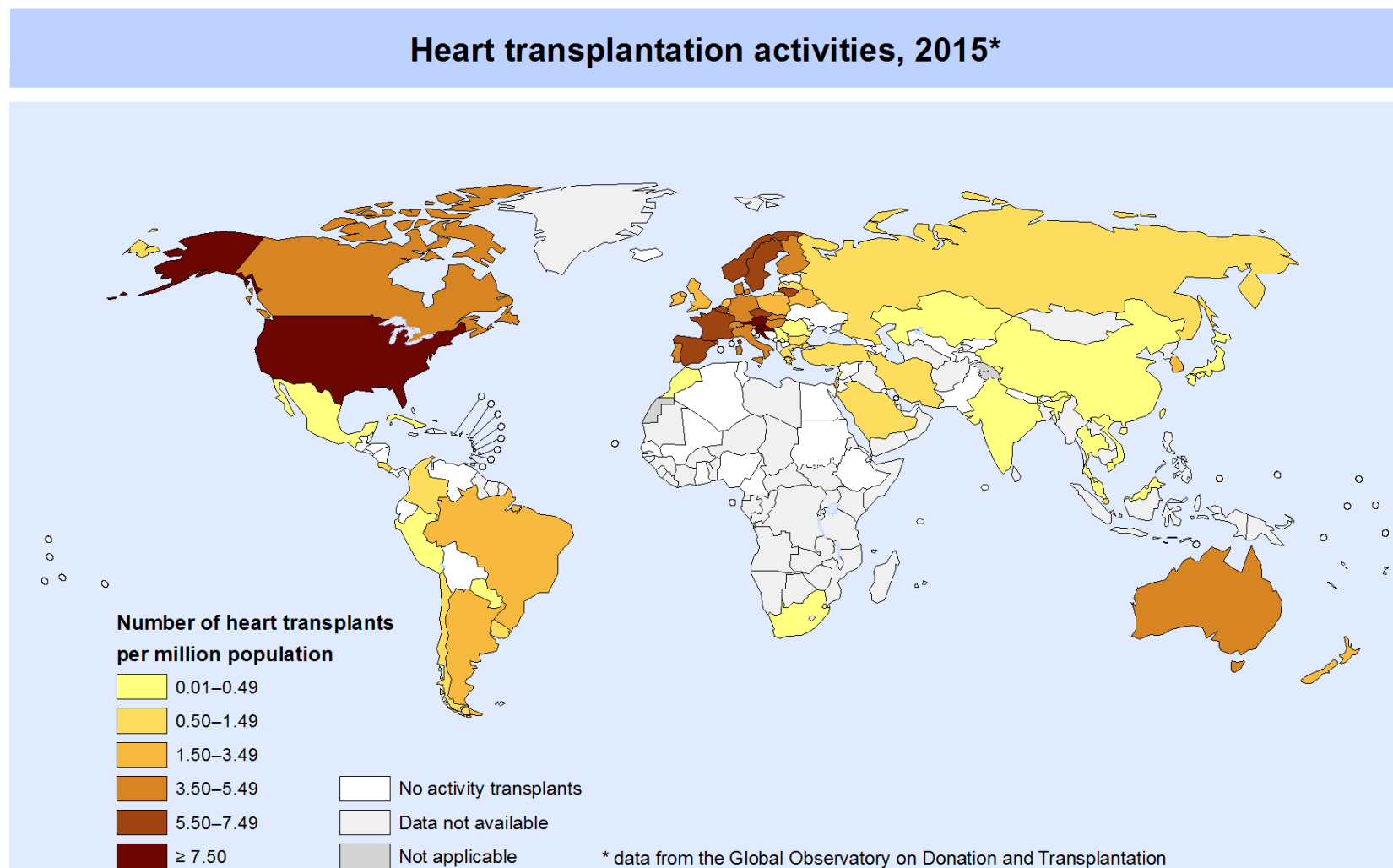
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Global map 5. Global Heart transplant activities. Rate (pmp)



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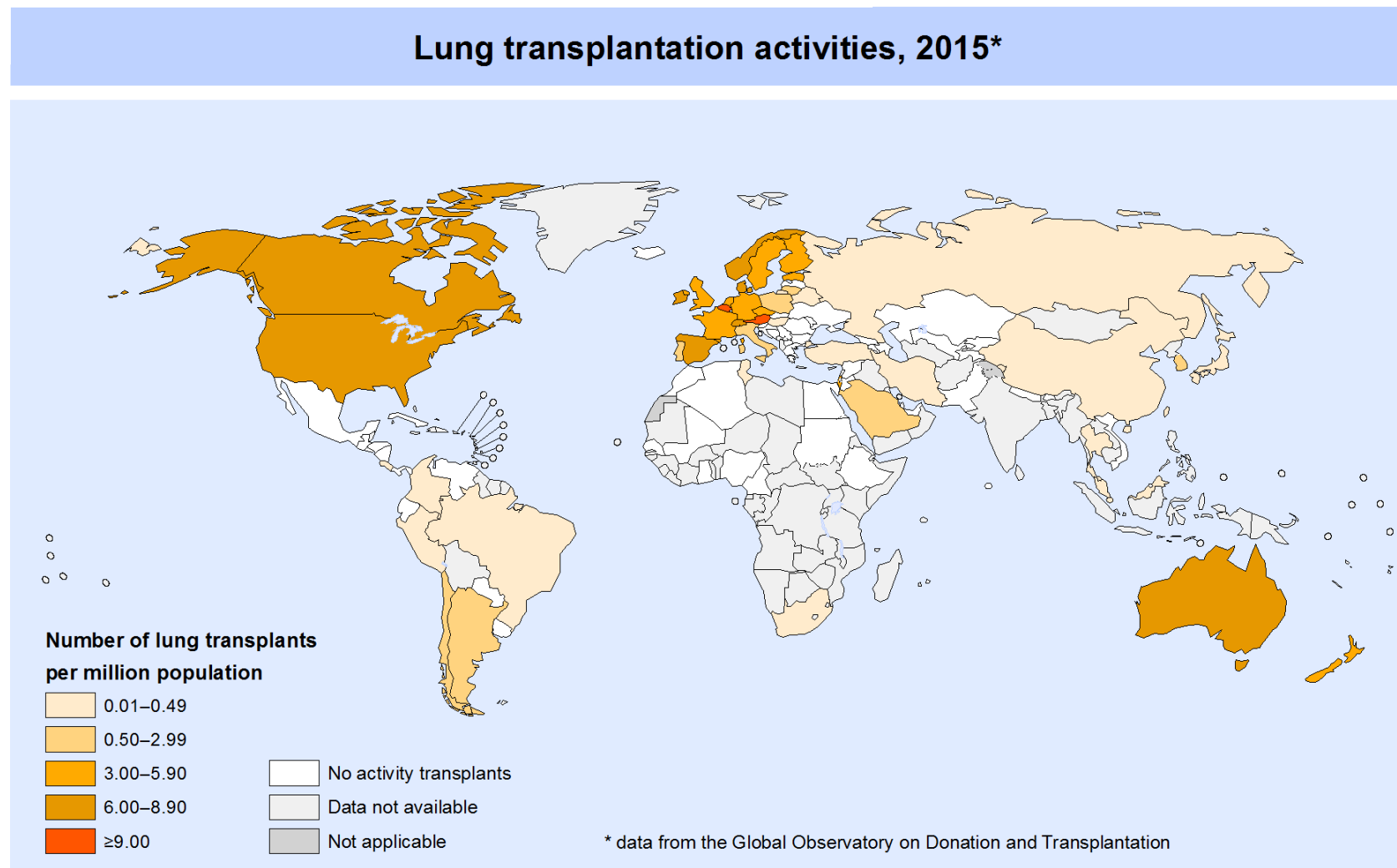
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Global map 6. Global Lung transplant activities. Rate (pmp)



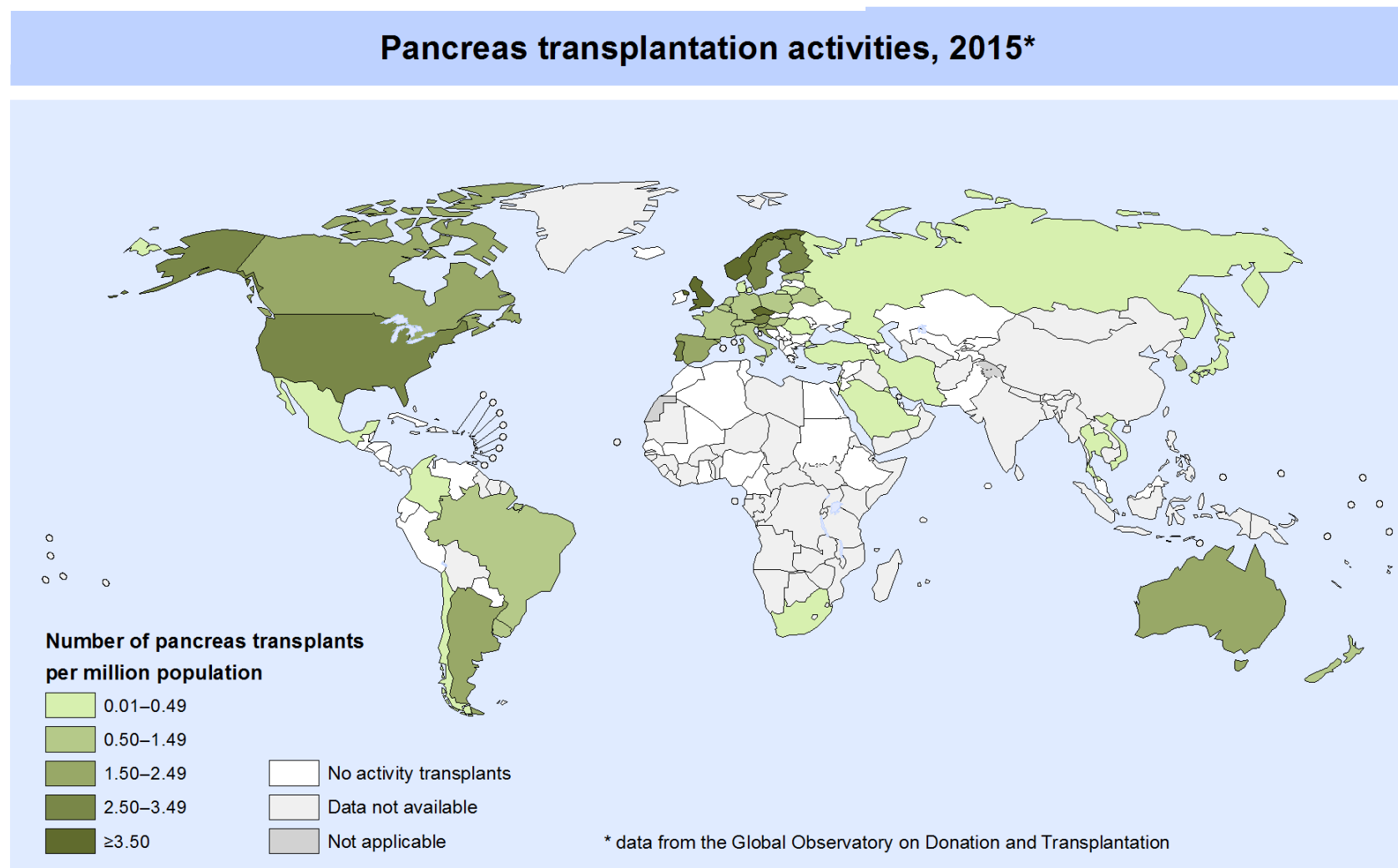
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Global map 7. Global Pancreas transplant activities. Rate (pmp)



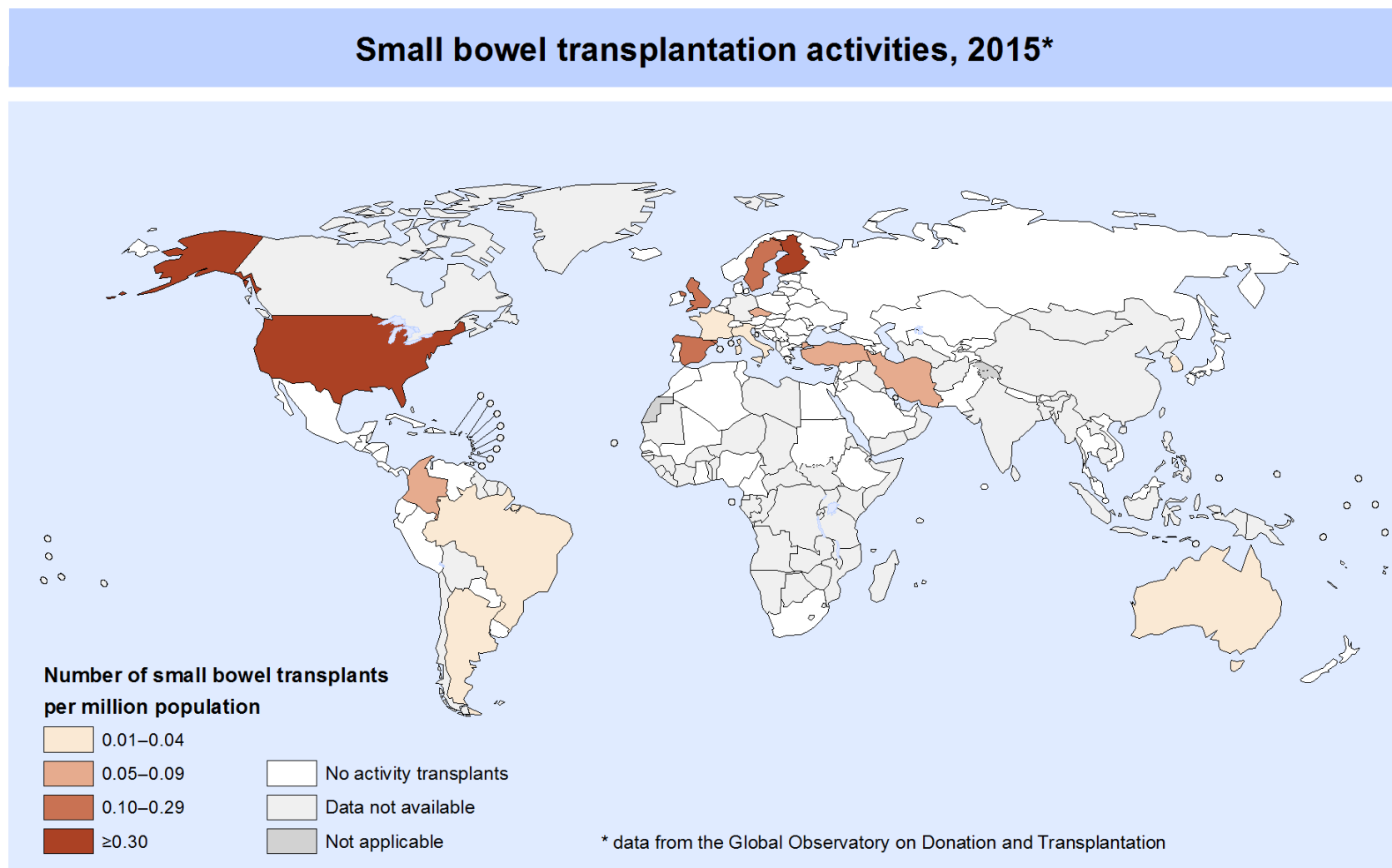
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Global map 8. Global Small Bowel transplant activities. Rate (pmp)



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Table 8. Summary of activities for each country in the last available year.

Country	Region	Population	Actual DD		K Tx		Liver Tx		Heart Tx		Lung Tx		Pancr. Tx		S.B Tx	
			N	pmp	N	pmp	N	pmp	N	pmp	N	pmp	N	pmp	N	pmp
Albania	EUR	2.9			9	3.1	3	1.3								
Algeria	AFR	39.7	1	0.3	170	4.3	1	0.3	0		0		0		0	
Argentina	AMR	43.4	592	13.6	1198	27.6	376	8.7	114	2.6	46	1.6	74	1.8	2	0.5
Armenia	EUR	3.0	0		6	2.0	0		0		0		0		0	
Australia	WPR	24.0	435	18.1	945	39.4	268	11.2	95	4.0	195	8.1	45	1.9	1	0.4
Austria	EUR	8.5	205	24.1	417	49.6	146	17.2	67	7.9	130	15.3	27	3.2	0	
Azerbaijan	EUR	9.8	0		94	9.6	16	1.6	0		0		0		0	
Belarus	EUR	9.5	191	2.2	333	35.5	72	7.6	33	3.5	2	0.2	5	0.5	0	
Belgium	EUR	11.3	357	31.6	528	46.7	280	24.8	78	6.9	129	11.4	12	1.6	0	
Bhutan	SEAR	0.8	0		0		0		0		0		0		0	
Bolivia	AMR	10.7	9	0.8	96	9.0										
Bosnia&Herz.	EUR	3.8	6	1.6	23	6.5	8	2.2	0		0		0		0	
Brazil	AMR	207.8	2836	13.6	5510	26.5	1816	8.7	352	1.7	74	0.4	121	0.6	1	0.5
Bulgaria	EUR	7.1	45	6.3	48	6.8	16	2.3	7	1.0	0		0		0	
Cameroon	AFR	23.3	0		0		0		0		0		0		0	
Canada	AMR	35.9	681	19.0	1437	4.3	526	14.7	172	4.8	279	7.8	76	2.1		
Chile	AMR	17.9	120	6.7	209	11.7	68	3.8	24	1.3	16	0.9	4	0.2		
China	WPR	1376.0	2766	2.1	7040	5.1	2620	1.9	279	0.2	118	0.9				
Colombia	AMR	48.2	405	8.4	869	18.3	265	5.5	65	1.3	17	0.4	11	0.2	3	0.6
Costa Rica	AMR	4.8	34	7.8	115	24.0	8	1.7	3	0.6	1	0.3	0		0	
Croatia	EUR	4.2	169	4.2	213	5.7	141	33.6	37	8.9	0		8	1.9	0	
Cuba	AMR	11.4	159	13.9	186	16.3	16	1.4	2	0.2	0		0		0	
Cyprus	EUR	0.8	3	3.8	20	25.0	0		0		0		0		0	
Czech Rep	EUR	10.5	246	23.4	453	43.1	188	17.9	75	7.1	34	3.2	37	3.5	1	1.0

Country	Region	Population	Actual DD		K Tx		Liver Tx		Heart Tx		Lung Tx		Pancr. Tx		S.B Tx	
			N	pmp	N	pmp	N	pmp	N	pmp	N	pmp	N	pmp	N	pmp
Denmark	EUR	5.7	87	15.3	273	47.9	58	1.2	27	4.7	35	6.1	2	0.4	0	
Dominican Rep	AMR	10.5	7	0.7	37	3.5	4	0.4	0		0		0		0	
Ecuador	AMR	16.1	63	3.9	118	7.3	14	0.9	0		0		0		0	
Egypt	EMR	91.5	0		1417	15.5	450	4.9	0		0		0		0	
El Salvador	AMR	6.1	0		44	7.2	0		0		0		0		0	
Estonia	EUR	1.3	21	16.2	38	29.2	7	5.4	0		4	3.8	1	0.8	0	
Ethiopia	AFR	99.4	0		9	1.0	0		0		0		0		0	
Fiji	WPR	0.9	0		0		0		0		0		0		0	
Finland	EUR	5.5	127	24.0	244	44.4	77	14.0	27	5.0	24	4.4	17	4.0	3	0.5
France	EUR	64.4	1809	29.0	3486	54.1	1355	21.4	479	7.4	353	5.5	78	1.2	3	0.5
Georgia	EUR	4.0	0		50	12.5	6	1.5	0		0		0		0	
Germany	EUR	80.7	877	1.9	2196	27.2	894	11.8	286	3.5	297	3.7	105	1.3		
Ghana	AFR	27.4	0		3	0.2	0		0		0		0		0	
Greece	EUR	11.0	39	3.5	98	9.0	22	2.0	6	0.5	0		0		0	
Guatemala	AMR	16.3	15	0.9	135	8.3	0		0		0		0		0	
Honduras	AMR	8.1	0		6	0.7	0		0		0		0		0	
Hungary	EUR	9.9	236	23.8	343	34.6	89	9.0	51	5.2	1	0.1	13	1.3	0	
Iceland	EUR	0.3	12	4.0	7	23.3	0		0		0		0		0	
India	SEAR	1311.1			6500	5.0	1200	0.9	15	0.1						
Iran	EMR	79.1	808	1.2	2531	32.0	716	9.5	102	1.3	16	0.2	15	0.2	4	0.6
Ireland	EUR	4.7	81	17.2	153	32.6	61	13.0	16	3.4	36	7.7	0		0	
Israel	EUR	8.1	77	9.6	294	36.3	78	9.6	22	2.7	47	5.8	6	0.7	0	
Italy	EUR	59.8	1369	22.9	1881	31.5	1094	18.3	245	5.0	112	1.9	50	0.8	1	0.2
Japan	WPR	126.6	91	0.7	1629	12.9	454	3.6	44	0.3	61	0.5	36	0.3	0	

Country	Region	Population	Actual DD		K Tx		Liver Tx		Heart Tx		Lung Tx		Pancr. Tx		S.B Tx	
			N	pmp	N	pmp	N	pmp	N	pmp	N	pmp	N	pmp	N	pmp
Jordan	EMR	7.6	1	0.1	232	30.5	12	1.6	0		0		0		0	
Kazakhstan	EUR	17.6	10	0.6	185	1.5	32	1.8	7	0.4	0		0		0	
Kenya	AFR	46.1			26	0.6										
Kuwait	EMR	3.9	12	3.8	81	2.8	0		0		0		1	0.3	0	
Kyrgyzstan	EUR	5.9	0		20	3.4	2	0.3	0		0		0		0	
Latvia	EUR	2.0	37	18.5	77	38.5	0		2	1.0	0		0		0	
Lebanon	EMR	5.9	5	0.8	76	12.9	5	0.8	2	0.3						
Libya	EMR	6.3	0		5	0.8										
Lithuania	EUR	2.9	57	19.7	115	39.7	14	4.8	17	5.9	2	0.7	1	0.3	0	
Luxembourg	EUR	0.6	3	5.0	0		0		0		0		0		0	
Malaysia	WPR	30.3	30	1.0	82	2.8	12	0.4	1	0.3	1	0.3	0		0	
Maldives	WPR	0.4	0		0		0		0		0		0		0	
Mali	AFR	17.6	0		0		0		0		0		0		0	
Malta	EUR	0.4	6	15.0	8	2.0	0		0		0		0		0	
Mauritius	AFR	1.3	0		14	1.8	0		0		0		0		0	
Mexico	AMR	127.0	446	3.5	2770	21.8	151	1.2	38	0.3	0		1	0.8	0	
Mongolia	WPR	3.0			20	6.7	7	2.3								
Montenegro	EUR	0.6	0		6	1.0	1	1.7	0		0		0		0	
Morocco	EMR	34.4	11	0.3	52	1.5	10	0.3	1	0.3	0		0		0	
Nepal	SEAR	28.5	0		100	3.6	0		0		0				0	
Netherlands	EUR	16.9	284	16.8	984	58.2	151	8.9	54	3.2	78	4.6	25	1.5	0	
New Zealand	WPR	4.5	53	11.8	147	32.7	48	1.7	12	2.7	23	5.1	3	0.7	0	
Nicaragua	AMR	6.1	0		11	1.8	0		0		0		0		0	
Nigeria	AFR	182.2	0		39	0.2	0		0		0		0		0	
Norway	EUR	5.2	111	21.3	254	48.8	86	16.5	37	7.1	34	6.5	31	6.0	0	

Country	Region	Population	Actual DD		K Tx		Liver Tx		Heart Tx		Lung Tx		Pancr. Tx		S.B Tx	
			N	pmp	N	pmp	N	pmp	N	pmp	N	pmp	N	pmp	N	pmp
Oman	EMR	4.5					0									
Pakistan	EMR	188.9			361	1.9	139	0.7	0		0		0		0	
Panama	AMR	3.9	25	6.4	34	8.7	7	1.8	0		0		0		0	
Paraguay	AMR	6.6	10	1.5	37	5.7	1	0.2	2	0.3	0		0		0	
Peru	AMR	31.4	82	2.6	166	5.3	22	0.8	9	0.3	2	0.6	0		0	
Philippines	WPR	100.7			444	4.5										
Poland	EUR	38.6	526	13.6	1047	27.1	332	8.6	99	2.6	24	0.6	41	1.6	0	
Portugal	EUR	10.3	319	4.0	483	46.9	249	24.2	50	4.9	15	1.5	27	2.6	0	
Qatar	EMR	2.2	8	3.6	49	22.3	9	5.0	0		0		0		0	
Rep of Korea	WPR	50.3	501	10.0	1891	37.6	1398	27.8	145	2.9	64	1.3	57	1.1	1	0.2
Rep of Moldova	EUR	4.1	4	1.0	10	2.4	4	1.0	0		0		0		0	
Romania	EUR	19.5	113	5.8	245	12.6	96	4.9	4	0.3	0		1	0.5	0	
Russia	EUR	143.5	434	3.2	945	6.6	325	2.3	179	1.2	24	0.2	12	0.8	0	
Saudi Arabia	EMR	31.5	89	2.8	762	24.2	197	6.3	30	1.0	39	1.2	8	0.3	0	
Senegal	AFR	15.1	0		0		0		0		0		0		0	
Serbia	EUR	8.9	41	4.7	104	11.7	17	1.9	4	0.4	0		0		0	
Singapore	WPR	5.6	22	3.9	72	12.9	38	6.8	6	1.7	1	0.2	1	0.2	0	
Slovakia	EUR	5.4	94	17.5	184	34.7	34	6.3	27	5.0	0		0		0	
Slovenia	EUR	2.1	54	25.7	64	3.5	24	11.4	24	11.4	0		5	2.4	0	
South Africa	AFR	54.5	85	1.6	227	4.2	66	1.2	14	0.3	12	0.2	5	0.9	0	
Spain	EUR	46.1	1851	4.2	2905	63.2	1162	25.3	299	6.5	294	6.4	97	2.1	12	0.3
Sudan	EMR	40.2	0		199	5.0	0		0		0		0		0	
Sweden	EUR	9.8	169	17.2	426	43.5	180	18.4	64	6.5	48	4.9	30	3.6	2	0.2
Switzerland	EUR	8.3	143	17.2	322	38.8	136	16.4	40	4.8	52	6.3	8	1.0	0	
Syria	EMR	18.5	0		209	11.3	0		0		0		0		0	

Country	Region	Population	Actual DD		K Tx		Liver Tx		Heart Tx		Lung Tx		Pancr. Tx		S.B Tx	
			N	pmp	N	pmp	N	pmp	N	pmp	N	pmp	N	pmp	N	pmp
Tajikistan	EUR	8.5	0		25	2.9	0		0		0		0		0	
Thailand	SEAR	68.0	206	3.3	602	8.9	92	1.4	25	0.4	1	0.1	1	0.1	0	
TfYR of Maced.	EUR	2.1	2	1.0	12	5.7	0		0		0		0		0	
Tunisia	EMR	11.3	9	0.8	125	11.6	1	0.9	0		1	0.9	0		0	
Turkey	EUR	78.7	472	6.0	3204	4.7	1216	15.5	89	1.1	30	0.4	7	0.9	6	0.8
Ukraine	EUR	44.8	3	0.7	126	2.8	10	0.2	0		0		0		0	
United Arab Emirates	EMR	9.2	0		28	3.4	0		0		0		0		0	
United Kingdom	EUR	64.7	1311	2.3	3173	49.4	900	13.9	194	3.0	202	3.1	244	3.8	15	0.2
United States of America	AMR	321.8	9079	28.2	18597	57.8	7127	22.1	2819	8.8	2072	6.4	947	2.9	141	0.4
Uruguay	AMR	3.4	45	13.2	98	28.8	19	5.6	4	1.2	0		2	0.6	0	
Uzbekistan	EUR	29.9	0		0		0		0		0		0		0	
Venezuela	AMR	31.1	53	1.7	186	6.0	6	0.2	0		0		0		0	
Viet Nam	WPR	93.4	17	0.2	270	2.9	8	0.9	2	0.2	0		1	0.2	0	

Note:

- For any references to this report, the following should be quoted: Organ Donation and Transplantation Activities 2015 Report. Global Observatory on Donation and Transplantation (GODT).
- For citations of the 2015 GODT data please quote the following: Those 2015 data are based on the Global Observatory on Donation and Transplantation (GODT) data, produced by the WHO-ONT collaboration.
- For any references in Charts and bar chart please quote: * Data of the WHO-ONT Global Observatory on Donation and Transplantation.