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ORIGINAL PAPER

Analysis of the Brazilian Transplant Registry 2024

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ABSTRACT

Objectives: To describe and analyze data from the 2024 Brazilian Transplant Registry, comparing it with previous years and projected goals, as well as evaluating Brazil's position in the global transplantation scenario. **Methods:** Descriptive analysis of data from the 2024 Brazilian Transplant Registry, published by the Brazilian Association of Organ Transplantation (ABTO), focusing on donation rates, transplants performed by organ type, regional distribution, and international comparisons. **Results:** In 2024, Brazil performed 26,509 transplants, including 6,297 kidney, 2,449 liver, 440 heart, 93 lung, 141 pancreas, and 17,089 cornea transplants. There was an increase in the absolute number of all types of transplants compared to 2023, but the rates per million population (pmp) were below the projected goals. The notification rate of potential donors (71.0 pmp) reached the expected target, but the donation effectiveness rate (27%) was below the expected rate (30%), mainly due to high family refusal (46%). Brazil ranks fourth worldwide in absolute number of kidney and liver transplants, but holds intermediate positions when analyzing pmp rates. Significant regional disparities persist, with the Southern region leading in various indicators. **Conclusion:** The Brazilian transplant system has demonstrated resilience and post-pandemic recovery capacity, but still faces challenges to achieve projected goals. The high family refusal rate and regional disparities represent the main obstacles to be overcome. It is recommended to intensify awareness campaigns, improve the family interview process, strengthen organ procurement organizations, and implement specific policies to reduce regional disparities.

Descriptors: Organ Transplantation; Organ Donation; Registries; Brazil; Health Policy.

Análise do Registro Brasileiro de Transplantes 2024

RESUMO

Objetivos: Descrever e analisar os dados do Registro Brasileiro de Transplantes (RBT) de 2024, comparando-os com anos anteriores e com as metas projetadas, além de avaliar a posição do Brasil no cenário mundial de transplantes. **Métodos:** Análise descritiva dos dados do RBT de 2024, publicado pela Associação Brasileira de Transplante de Órgãos (ABTO), com foco nas taxas de doação, transplantes realizados por tipo de órgão, distribuição regional e comparações internacionais. **Resultados:** Em 2024, o Brasil realizou 26.509 transplantes, incluindo 6.297 renais, 2.449 hepáticos, 440 cardíacos, 93 pulmonares, 141 de pâncreas e 17.089 de córneas. Houve aumento no número absoluto de todos os tipos de transplantes em relação a 2023, porém as taxas por milhão de população (pmp) ficaram abaixo das metas projetadas. A taxa de notificação de potenciais doadores (71,0 pmp) atingiu a meta prevista, mas a taxa de efetivação da doação (27%) ficou abaixo do esperado (30%), principalmente devido à elevada recusa familiar (46%). O Brasil ocupa o quarto lugar mundial em número absoluto de transplantes renais e hepáticos, mas posições intermediárias quando analisadas as taxas pmp. Persistem disparidades regionais significativas, com a região Sul liderando diversos indicadores. **Conclusão:**

O sistema brasileiro de transplantes demonstra resiliência, mas ainda enfrenta desafios para atingir as metas projetadas. A elevada taxa de recusa familiar e as disparidades regionais representam os principais obstáculos a serem superados. Recomenda-se intensificar as campanhas de conscientização, aprimorar o processo de acolhimento familiar, fortalecer as Organizações de Procura de Órgãos e coordenações hospitalares de transplante, aumentar a taxa de utilização dos órgãos doados e implementar políticas específicas para redução das disparidades regionais.

Descritores: Transplante de Órgãos; Doação de Órgãos; Sistemas de Registros; Brasil; Políticas de Saúde.

INTRODUCTION

Organ transplantation represents one of the most remarkable achievements of modern medicine, offering a second chance at life to patients with terminal diseases of various organs. In Brazil, where organ transplant programs began in the 1960s, the National Transplant System (*Sistema Nacional de Transplantes-SNT*) was established in 1997 and has since established itself as one of the largest public transplant programs in the world. The country has a unique system, predominantly publicly funded, that guarantees universal and free access to transplant procedures for the entire Brazilian population[1,2,3].

The Brazilian Transplant Registry (*Registro Brasileiro de Transplantes-RBT*), published annually by the Brazilian Association of Organ Transplantation (*Associação Brasileira de Transplante de Órgãos-ABTO*), established in 1995, has been the primary source of information on transplant activity in the country. This registry meticulously documents data on notifications of potential donors, actual donations, transplants performed by organ type, regional distribution, survival outcomes, and other essential indicators for monitoring and continuous improvement of the system[4,5-7].

Systematic analysis of RBT data allows us to identify trends, advances, challenges, and regional disparities, providing essential information for strategic planning and the formulation of public policies to strengthen the national transplant program. Furthermore, it enables international comparisons that position Brazil within the global transplant scenario, highlighting its potential and areas requiring greater attention[8-10].

The year 2024 represents an important milestone for evaluating the Brazilian transplant system, especially after the challenges faced during the COVID-19 pandemic, which significantly impacted donation and transplant activities worldwide. The gradual recovery observed in the post-pandemic years and the goals projected for 2024 are crucial elements for understanding the current stage of development of the national program[5-7].

In this context, the present study aims to: (1) describe and analyze the 2024 *RBT* data; (2) compare the results obtained with previous years and with the projected goals; (3) evaluate Brazil's position in the global transplant scenario; (4) identify the main challenges and opportunities for improving the national system; and (5) provide support for strategic planning and the formulation of public policies to strengthen the transplant program in the country.

METHODOLOGY

Data source

This study consists of a descriptive analysis of data from the 2024 RBT, published by ABTO in 2025, which consolidates information related to the year 2024 and historical series from 2015 to 2024. The RBT is an official document that compiles information provided by the State Transplant Centers (*Centrais Estaduais de Transplantes*), Organ Procurement Organizations (*Organizações de Procura de Órgãos-OPOs*), Intra-Hospital Committees for Organ and Tissue Donation for Transplantation (*Comissões Intra-Hospitalares de Doação de Órgãos e Tecidos para Transplante-CIHDOTTs*), and transplant teams from all over the country led by the *SNT*[4,11,12].

For international comparisons, data from the International Registry of Organ Donation and Transplantation (IRODAT) for 2024, the most recent source available for global comparisons, were used. Demographic and population information was obtained from the Brazilian Institute of Geography and Statistics (*Instituto Brasileiro de Geografia e Estatística-IBGE*), considering the estimated population for 2024 of 212.583.750 inhabitants[13-16].

Variables analyzed

The main variables analyzed in this study include:

- Organ donation: number of notifications of potential donors, number of effective donors, rate of effective donors per million population (pmp), donation completion rate, reasons for non-donation (family refusal, cardiac arrest, medical contraindication, and others), donor profile (age, gender, cause of death, and blood type).
- Transplants performed: absolute number and pmp rate of transplants performed by organ type (kidney, liver, heart, lung, pancreas, and cornea), broken down by living and deceased donors when applicable.
- Regional distribution: analysis of donation and transplant indicators by geographic region and by federation unit.
- Transplant teams: number and distribution of active teams by type of transplant and by state.
- Survival: The survival analysis evaluated patient and graft survival rates for each type of transplant—kidney, liver, heart, lung, and others—based on records beginning January 1, 2010. Kaplan-Meier curves were constructed for each modality to compare survival rates across different follow-up periods. It should be noted, however, that these results do not represent all transplants performed in the country, but only those for which data were submitted by the teams, totaling approximately 70% of the expected records.
- Temporal comparisons: evolution of donation and transplant indicators from 2015 to 2024.
- Projected goals: comparison between the results obtained in 2024 and the goals established for the same year.
- International comparisons: Brazil's position in the global transplant scenario, considering the absolute number and pmp rate of transplants performed.
- Origin and destination of organs: analysis of the origin of organs (kidney and liver) in each state and the federation unit where they were transplanted, allowing us to evaluate the actual use of these organs in Brazil and in each state.

Data analysis

Data analysis was performed descriptively, calculating absolute and relative frequencies, pmp rates, and percentage comparisons. To assess compliance with the projected targets for 2024, the percentage difference between the obtained and predicted values was calculated.

Regional disparities were analyzed considering Brazil's five geographic regions (North, Northeast, Central-West, Southeast, and South) and its 27 states. The analysis of organ utilization among states was conducted based on new tables included in the 2024 RBT, which combine the origin of the organs (kidney and liver) in each state with the state where they were transplanted.

The data analyzed comes from the SNT, consolidated by ABTO based on information submitted by State Transplant Centers, OPOs, and transplant teams. It is important to emphasize that any data not entered by some centers does not impact the figures presented, since the RBT uses exclusively the official records available in the system.

The results are presented in the form of text, tables, and figures, following the guidelines of the *Brazilian Journal of Transplantation* for the presentation of scientific articles.

RESULTS

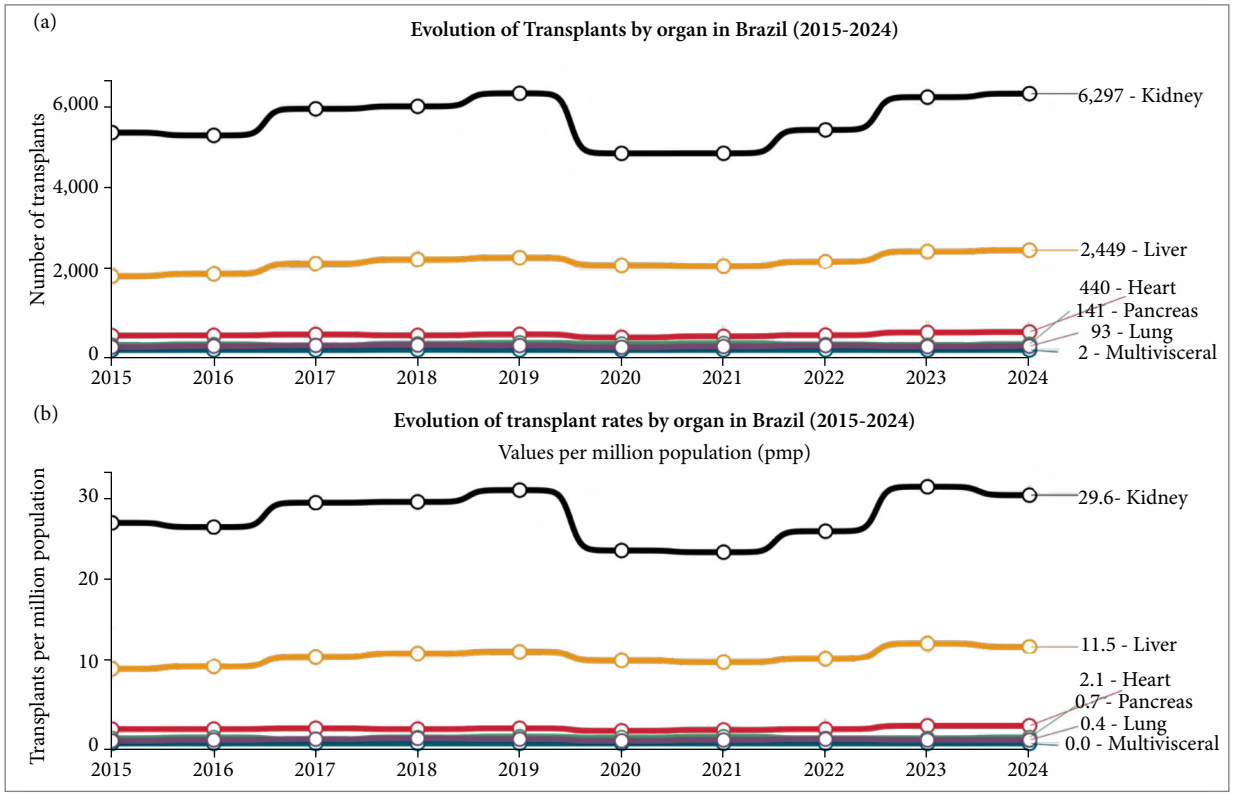
Overview of transplants in Brazil in 2024

In 2024, Brazil performed a total of 26,509 transplants, including solid organs and tissues. Of this total, 6,297 were kidney transplants, 2,449 liver transplants, 440 heart transplants, 93 lung transplants, 141 pancreas transplants, and 17,089 cornea transplants (Fig. 1). These numbers represent an improvement compared to previous years, especially when compared to the period of the COVID-19 pandemic (2020-2021), which significantly impacted donation and transplant activities in the country.

In 2024, there were 842 active transplant teams registered with the SNT, of which 599 performed cornea transplants, 161 kidney transplants, 97 liver transplants, 21 pancreas transplants, 51 heart transplants, and 9 lung transplants.

Analyzing the evolution of transplants from 2015 to 2024, a gradual growth trend is observed, with a pause during the pandemic and recovery in subsequent years. In 2024, the absolute number of kidney transplants increased 1.4% compared to 2023, rising from 6,210 to 6,297. The same percentage increase was observed in liver transplants, which rose from 2,416 in 2023 to 2,449 in 2024. Heart transplants showed a growth of 2.3%, rising from 430 to 440, while lung transplants saw a significant increase of 14.8%, rising from 81 to 93. Pancreas transplants also showed significant growth of 18.5%, rising from 119 to 141. Corneal transplants grew 6.7%, rising from 16,108 to 17,109.

On the global stage, Brazil maintains a prominent position, ranking fourth in absolute numbers of kidney (6,297) and liver (2,449) transplants among 35 countries, behind only the United States, China, and India. However, when analyzing pmp rates, Brazil ranks 30th in kidney transplants (29.6 pmp) and 24th in liver transplants (11.5 pmp), demonstrating that, despite the significant volume in absolute numbers, the country still has considerable potential to increase transplant rates relative to its population.



Source: Elaborated by the authors.

Figure 1. Evolution of Transplants.

Organ donation

In 2024, 15,090 potential donors were notified in Brazil, representing a rate of 71.0 pmp, in line with the target for the year (70 pmp). This number represents a 7.2% increase compared to 2023, when 14,073 potential donors were notified (69.3 pmp). However, the donation completion rate (27%) was lower than the target proposed for the year (30%), resulting in 4,088 effective donors, corresponding to a rate of 19.2 pmp, slightly lower than that observed in 2023 (19.9 pmp) and below the target for 2024 (21 pmp).

The main reason for donation failure continues to be family refusal, which affected 46% of interviews conducted in 2024, a 9.5% increase compared to 2023 (42%). Other important causes include medical contraindication (2,705 cases), cardiac arrest (932 cases), and other reasons (3,160 cases)[17-19].

The profile of effective donors in 2024 remained similar to that observed in previous years, with a predominance of males (60%), the age group of 50 to 64 years (34%), and stroke (53%) as the main cause of death. Regarding blood type, the distribution followed the pattern of the Brazilian population, with type O predominating.

Transplants by organ type

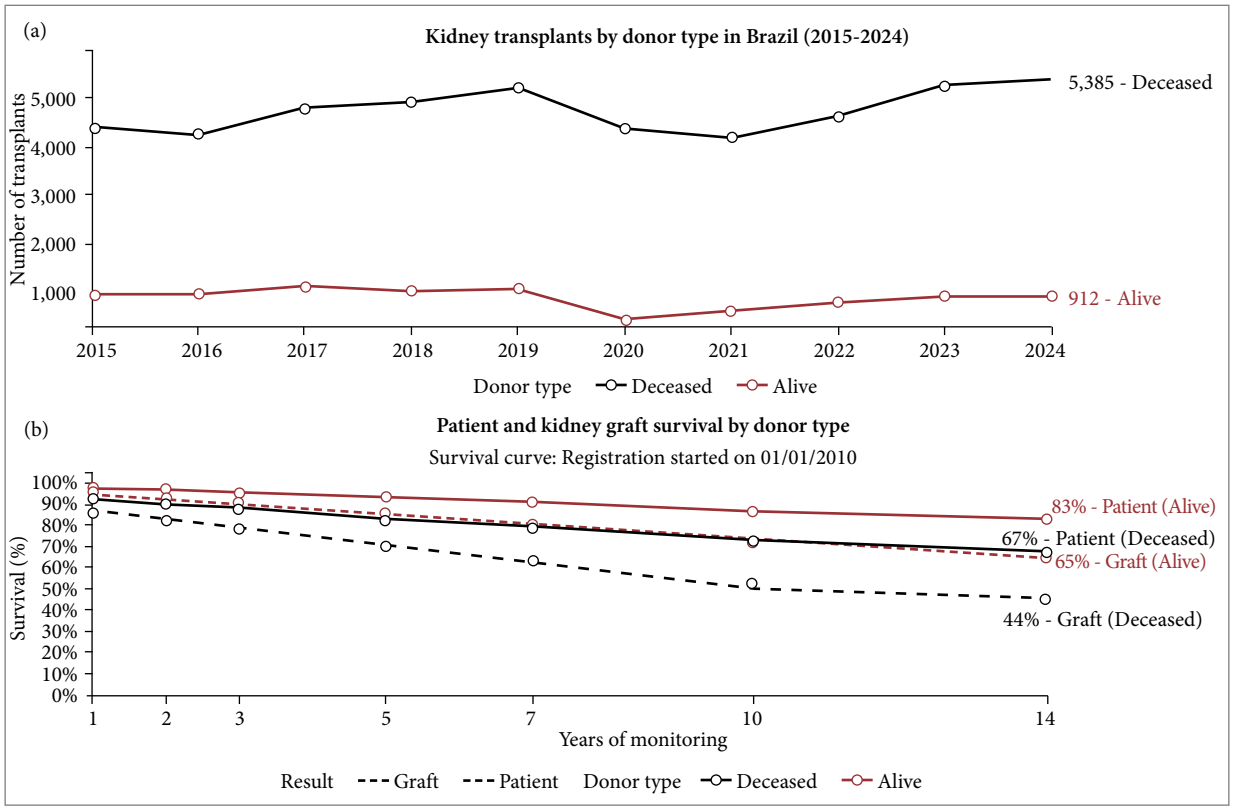
Kidney transplant

Kidney transplantation remains the most frequently performed organ transplant in Brazil, with 6,297 procedures in 2024, representing a rate of 29.6 pmp. Of this total, 5,385 (85.5%) were performed with organs from deceased donors and 912 (14.5%) with organs from living donors. Compared to 2023, there was a 1.4% increase in the absolute number, but a 3.3% decrease in the pmp rate, with 2.7% for transplants from deceased donors and 6.5% for transplants from living donors. Compared to the target for 2024 (32 pmp), the result was 7.5% below expectations.

Regional analysis reveals significant disparities. The South (45.1 pmp), North (8.9 pmp), and Northeast (19.3 pmp) regions achieved the targets proposed for their respective regions, while the Southeast and Central-West regions fell short of expectations. Among the states, Rio Grande do Sul (49.7 pmp), Paraná (46.5 pmp), and São Paulo (40.7 pmp) stood out with the highest rates, while, of the states that perform kidney transplants, Sergipe (0.9 pmp), Alagoas (4.3 pmp), and Acre (4.5 pmp) had the lowest rates.

An important new development in the 2024 RBT was the inclusion of information on the origin and destination of transplanted kidneys. The national kidney utilization rate was 66%, with only Ceará (58%) and Santa Catarina (57%) having utilization rates below 60%. States such as Acre, Alagoas, and Paraíba sent more than 70% of their kidneys to other states. In some states, the kidneys received represented a significant percentage of the number of transplants performed, such as Amazonas (64%), Pernambuco (40%), Rio Grande do Sul (38%), and the Federal District (31%), while in others the rate was lower, such as Minas Gerais (18%) and São Paulo (12%).

Regarding survival, data from the registry initiated on 01/01/2010 show that, after 5 years, patient survival is 93% for living donor transplants and 83% for deceased donor transplants, while graft survival was 85% and 70%, respectively. After 10 years, these percentages fall to 87% and 73% (patient survival) and 72% and 53% (graft survival) (Fig. 2).



Source: Elaborated by the authors.

Figure 2. Kidney transplant.

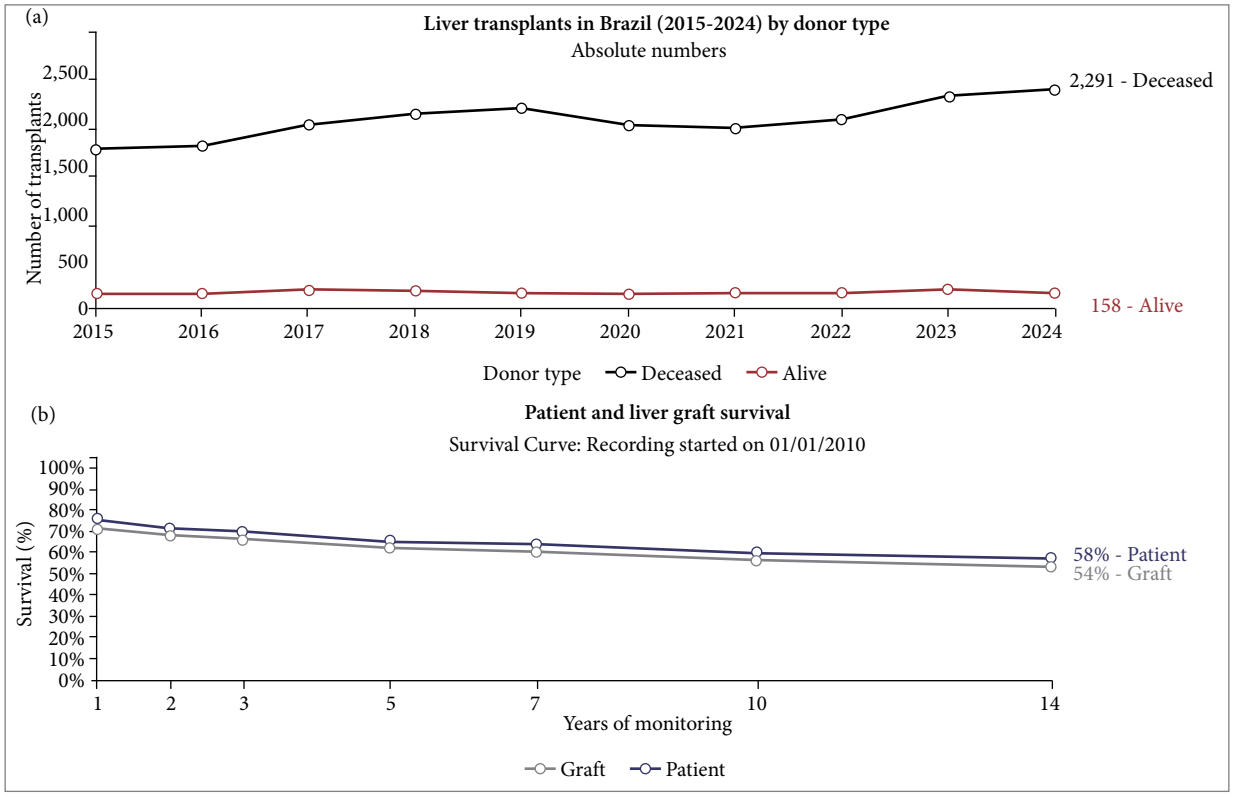
Liver transplant

In 2024, 2,449 liver transplants were performed in Brazil, corresponding to a rate of 11.5 pmp. Of this total, 2,291 (93.5%) were performed with organs from deceased donors and 158 (6.5%) with living donors. Compared to 2023, there was a 1.4% increase in the absolute number, but a 3.3% decrease in the pmp rate. This result was 10.2% below the target set for 2024.

Regional analysis shows that the North (1.5 pmp), Northeast (8.6 pmp), and Central-West (8.8 pmp) regions achieved the projected targets for 2024, while the Southeast and South regions fell short of expectations. Among the federative units, the Federal District (42.9 pmp), Ceará (27.2 pmp), and Paraná (25.7 pmp) had the highest rates, while Goiás (1.4 pmp), Pará (1.4 pmp), and Maranhão (2.3 pmp) had the lowest rates.

The liver utilization rate in Brazil was 56%, and in only three states – Acre (63%), Mato Grosso do Sul (42%), and Ceará (26%) – was there a high rate of liver transplants with organs coming from other states in relation to the total number of transplants.

Regarding survival, data from the registry initiated on January 1, 2010, show that, after 5 years, patient survival is 66% and graft survival is 63%. After 10 years, these percentages fall to 60% and 57%, respectively (Fig. 3).



Source: Elaborated by the authors.

Figure 3. Liver transplant.

Heart transplant

Heart transplants, which had been showing progressive growth in recent years, saw a 2.3% increase in absolute numbers in 2024, rising from 430 to 440 procedures. However, the pmp rate remained stable at 2.1, 12.5% below the forecast for the year (2.4 pmp). Only the South region (2.4 pmp) achieved the target.

Among the federative units, the Federal District (11.7 pmp), Ceará (3.8 pmp), and Minas Gerais (3.8 pmp) stood out with the highest rates, while Rio Grande do Norte (0.3 pmp), Bahia (0.5 pmp), and Santa Catarina (0.6 pmp) had the lowest rates. It is important to note that only 14 states performed heart transplants in 2024, none of them in the North region, highlighting the concentration of this procedure in certain regions of the country.

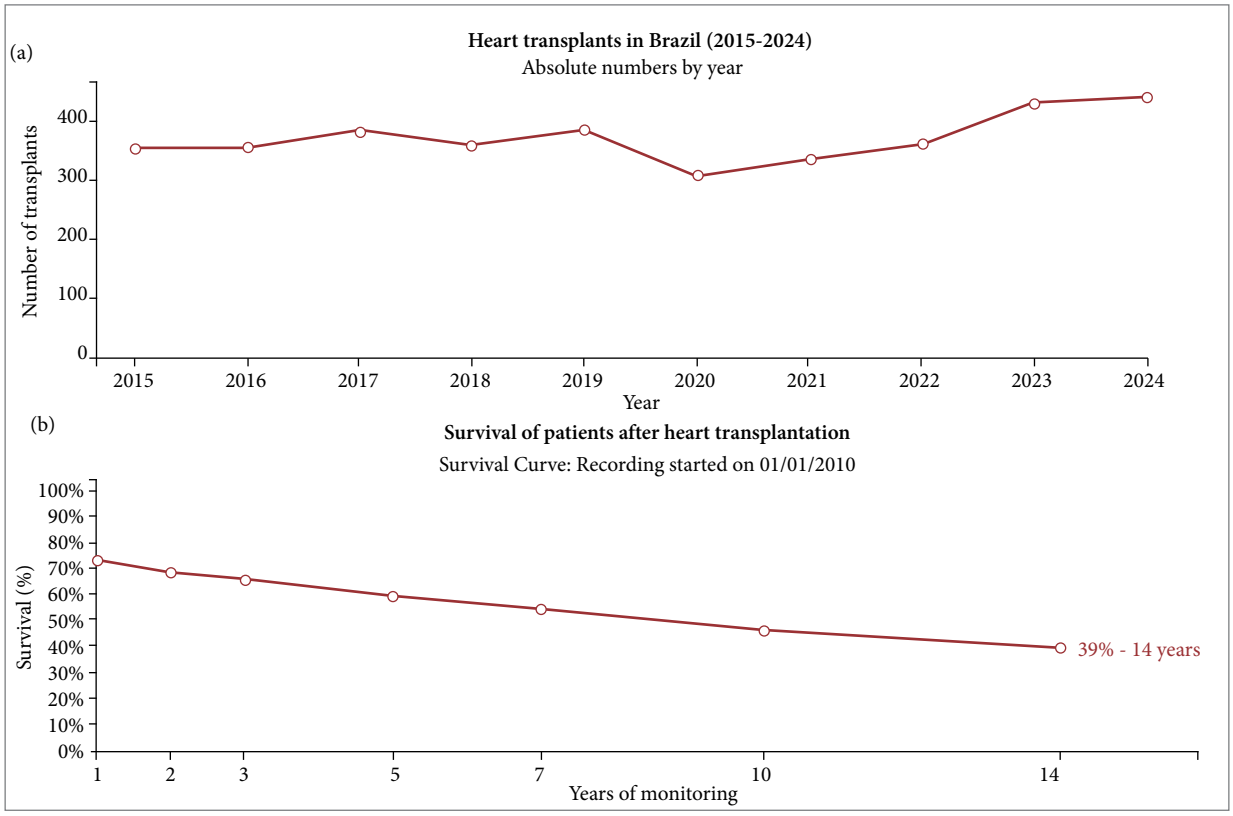
Regarding survival, data from the registry initiated on 01/01/2010 show that, after 5 years, patient survival was 59%. After 10 years, this percentage dropped to 46% (Fig. 4).

Lung transplant

Lung transplants, performed in only four states (São Paulo, Rio Grande do Sul, Rio de Janeiro, and Ceará), showed an absolute increase of 14.8% in 2024, rising from 81 to 93 procedures. However, the pmp rate remained the same as in 2023 (0.4 pmp), far from the target established for the year (0.8 pmp).

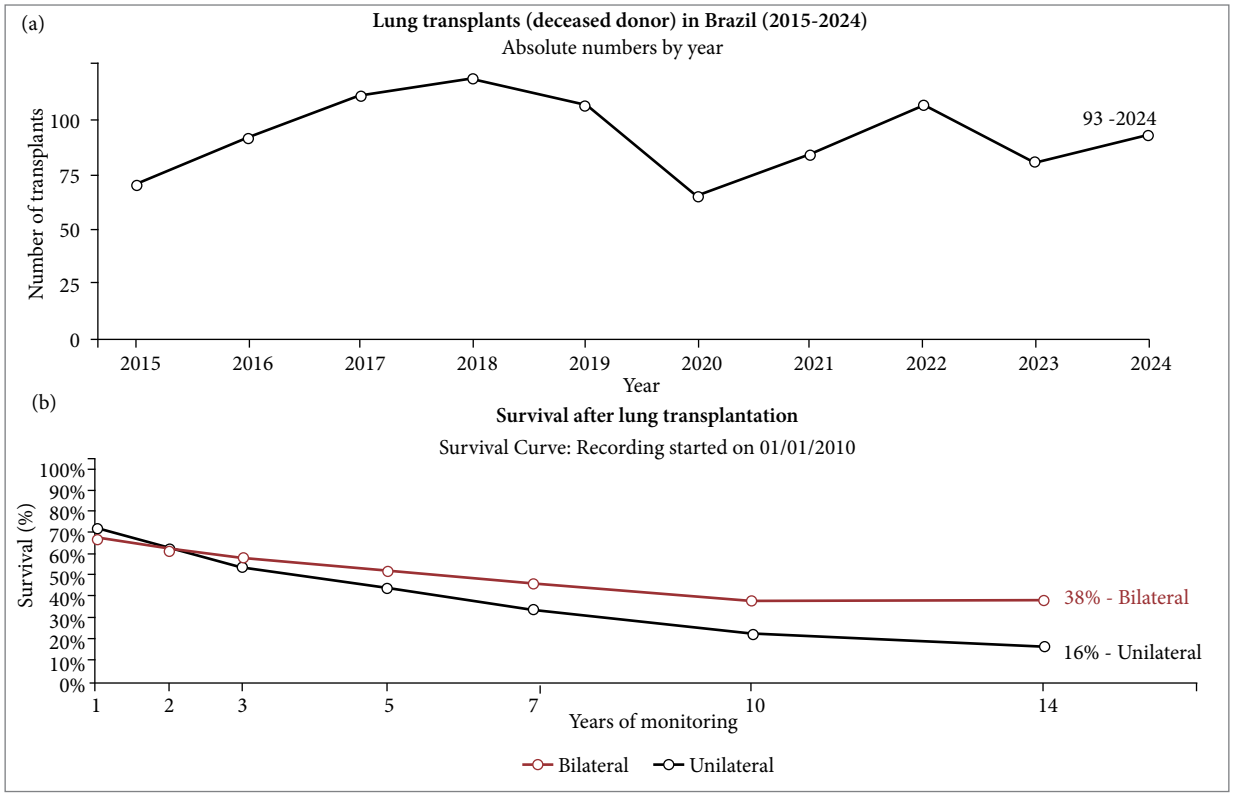
Among the states that perform this type of transplant, Rio Grande do Sul has the highest rate (3.1 pmp), followed by São Paulo (1.0 pmp), Rio de Janeiro (0.5 pmp), and Ceará (0.3 pmp). The concentration of this procedure in a few transplant centers reflects its technical complexity and the need for specialized infrastructure.

Regarding survival, data from the registry initiated on January 1, 2010, show significant differences between unilateral and bilateral transplants. After 5 years, patient survival was 44% for unilateral transplants and 52% for bilateral transplants. After 10 years, these percentages dropped to 22% and 38%, respectively (Fig. 5).



Source: Elaborated by the authors.

Figure 4. Heart transplant.



Source: Elaborated by the authors.

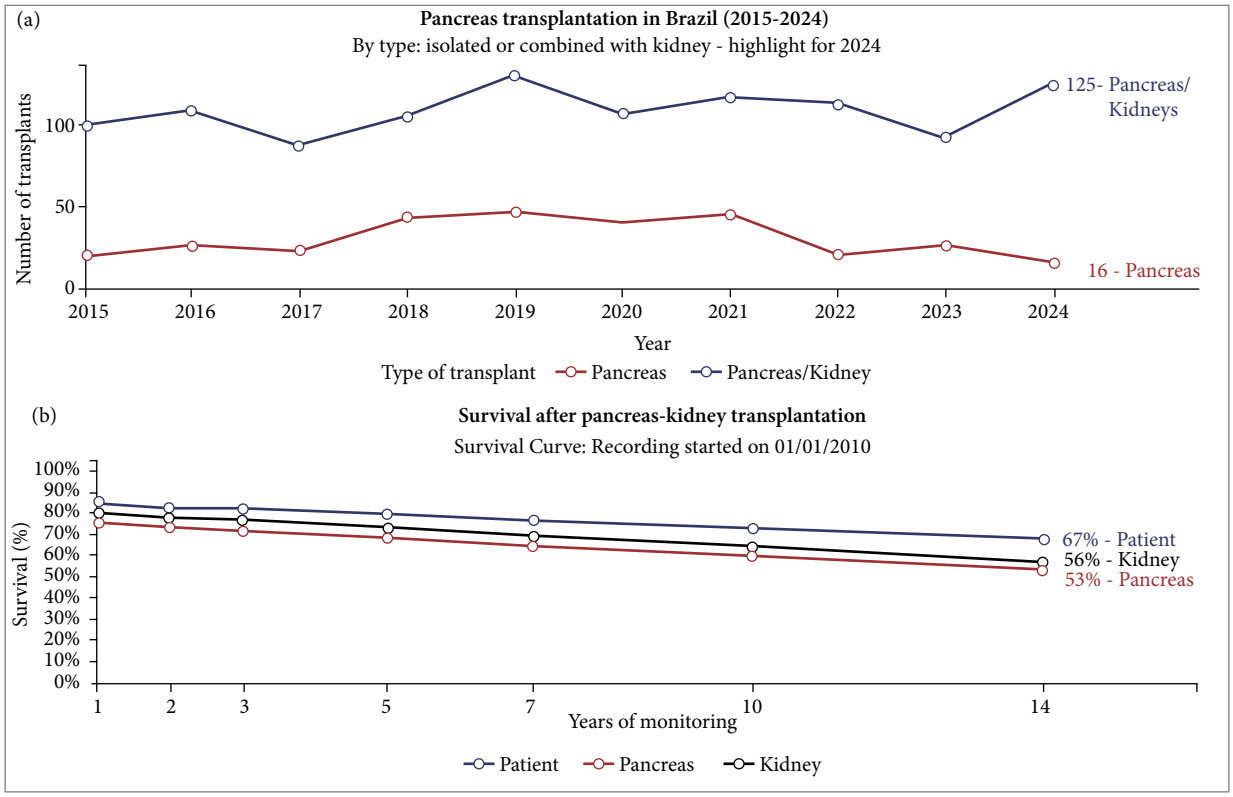
Figure 5. Lung transplant.

Pancreas transplant

Pancreas transplants, performed in seven states, showed an absolute growth of 18.5% in 2024, rising from 119 to 141 procedures. The pmp rate rose from 0.6 to 0.7, still far from the forecast for the year (0.9 pmp).

Of the 141 transplants performed, 125 (88.7%) were combined pancreas-kidney transplants and 16 (11.3%) were isolated pancreas transplants. São Paulo leads the number of procedures (1.6 pmp), followed by Minas Gerais (1.4 pmp), Santa Catarina (1.1 pmp), Goiás (0.7 pmp), Pernambuco (0.6 pmp), Rio de Janeiro (0.5 pmp), Paraná (0.5 pmp), and Ceará (0.3 pmp).

Regarding survival for combined pancreas-kidney transplants, data from the registry initiated on January 1, 2010, show that after 5 years, patient survival was 79%, kidney survival was 72%, and pancreas survival was 68%. After 10 years, these percentages dropped to 72%, 63%, and 59%, respectively (Fig. 6).



Source: Elaborated by the authors.

Figure 6. Pancreas transplant.

Corneal transplant

Corneal transplants showed an absolute increase of 6.6% in 2024, rising from 16,028 to 17,089 procedures. The pmp rate grew by 1.9%, rising from 78.9 to 80.4, still well below the new predicted need (110 to 120 pmp).

Regional analysis

A regional analysis of donation and transplant indicators reveals persistent disparities between Brazilian regions. The South region maintains the lead in several indicators, such as the potential donor notification rate (95.2 pmp), the effective donor rate (33.8 pmp), and the kidney (45.1 pmp) and liver (17.9 pmp) transplant rates.

The Southeast region, despite concentrating the highest absolute number of transplants, has lower rates than the South region when analyzed per unit. The Central-West and Northeast regions have similar donation and transplant rates, intermediate between those obtained in the Southeast and North regions, with the Federal District, Ceará, and Pernambuco standing out in these regions. The North region, the most underserved in this area, with rates much lower than the other regions, has been experiencing growth in recent years, with Rondônia standing out in donation and Amazonas in kidney transplants.

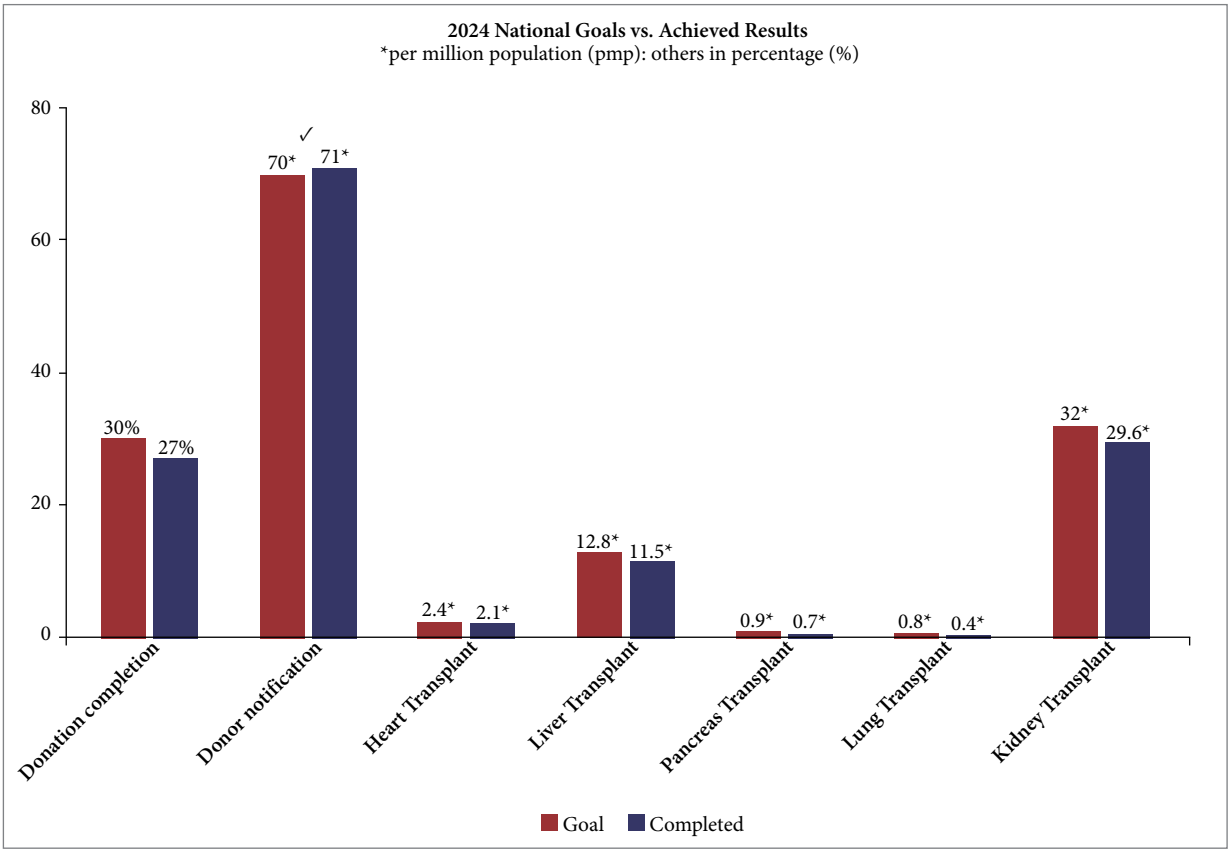
Among states, the disparities are even more evident. While Rio Grande do Sul, Paraná, São Paulo, and the Federal District lead in several indicators, states like Roraima, Amapá, Tocantins, Rondônia, and Mato Grosso still do not perform or have suspended kidney transplant programs.

Comparison with projected goals

An analysis of compliance with the projected targets for 2024 reveals mixed results. The potential donor notification rate (71 pmp) reached the expected target (70 pmp), demonstrating progress in identifying potential donors. However, the donation completion rate (27%) fell below the target (30%), mainly due to the high family refusal rate (46%).

Regarding transplants, no type of organ has fully reached the national goals established for 2024. Kidney transplants were 7.5% below the target (29.6 pmp vs. 32 pmp), liver transplants 10.2% below (11.5 pmp vs. 12.8 pmp), heart transplants 12.5% below (2.1 pmp vs. 2.4 pmp), lung transplants 50% below (0.4 pmp vs. 0.8 pmp), and pancreas transplants 22.2% below (0.7 pmp vs. 0.9 pmp).

Regionally, some specific targets were achieved. The North, South, and Northeast regions achieved their targets for kidney transplantation, while the North, Northeast, and Central-West regions achieved their targets for liver transplantation. Only the South region achieved the target for heart transplantation (Fig. 7).



Source: Elaborated by the authors.

Figure 7. National goals.

DISCUSSION

The results presented in this study demonstrate that the Brazilian transplant system, despite significant advances in recent decades, still faces significant challenges in achieving projected goals and reducing regional disparities. The year 2024 represents a milestone in the post-pandemic recovery, with an increase in the absolute number of transplants across all organ types, but with pmp rates still below established targets.

One of the main challenges identified is the high rate of family refusal (46%), which directly impacts donation success and, consequently, the number of transplants performed. This percentage is significantly higher than that observed in countries with successful transplant systems, such as Spain (15-20%) and Portugal (25-30%). Previous studies point to several factors associated with family refusal in Brazil, including lack of knowledge of the potential donor's wishes, distrust of the healthcare system, religious and cultural issues, and communication failures during the family interview[14,15,17,19-21].

The inclusion of information on the origin and destination of organs (kidney and liver) in the 2024 RBT represents an important step forward in understanding the actual utilization of these organs in the country. The data reveal that, despite the national

organ allocation system, significant disparities in utilization remain between states. While some states send the majority of their harvested organs to others, some transplant centers rely significantly on organs from other states.

Persistent regional disparities reflect not only differences in healthcare infrastructure and the availability of transplant teams, but also variations in state donation and transplant policies, the training of professionals involved, and public awareness. The experience of states like Rio Grande do Sul, Paraná, and São Paulo, which consistently present indicators above the national average, can provide valuable insights for improving the system in less developed regions.

Brazil's position in the global transplant scenario is paradoxical. On the one hand, the country ranks fourth in absolute numbers of kidney and liver transplants, demonstrating the robustness of the national system. On the other hand, when analyzing pmp rates, Brazil occupies intermediate to low positions, highlighting the still untapped potential for expanding donation and transplant activities[13,20,22].

Lung transplantation deserves special attention, as it presents the largest discrepancy between the achieved rate (0.4 pmp) and the established target (0.8 pmp). The concentration of this procedure in only four states and the technical complexity involved represent significant barriers to its expansion. Specific strategies, such as the formation of new teams, investment in specialized infrastructure, and the creation of training programs, are necessary to expand access to this type of transplant.

The survival data presented in RBT 2024 are comparable to those observed in international registries, demonstrating the technical quality of transplants performed in Brazil. However, a detailed analysis of the factors associated with patient and graft survival, as well as the causes of graft loss, could provide additional information for improving clinical protocols and post-transplant follow-up strategies.

The projected goals for the coming years (2025-2028) foresee a gradual growth in donation and transplant rates, intending to reach 30 effective donors per million by 2028. To achieve these goals, a coordinated effort involving various actors will be necessary, including public administrators, health professionals, scientific societies, non-governmental organizations, and civil society[10].

Some potentially effective strategies include: (1) intensifying awareness campaigns on the importance of organ donation; (2) improving the family interview process, with specific training for the professionals involved; (3) strengthening CIHDOTTs and OPOs, with investment in infrastructure and human resources; (4) expanding the number of transplant teams, especially in regions with lower coverage; (5) implementing specific policies to reduce regional disparities; and (6) improving information and monitoring systems, allowing for more detailed analyses and more precise interventions.

Limitations of this study include the descriptive nature of the analysis, based on secondary data, and the impossibility of establishing causal relationships between the identified factors and the observed outcomes. Furthermore, some important information, such as socioeconomic data on transplant patients, details on the organ allocation process, and cost-effectiveness analyses, is not available in the RBT and could enrich our understanding of the Brazilian transplant system.

CONCLUSION

The 2024 RBT analysis reveals a resilient national transplant system that demonstrated a capacity for recovery after the impact of the COVID-19 pandemic, with an increase in the absolute number of transplants across all organ types. However, pmp rates remain below projected targets, highlighting the untapped potential for expanding donation and transplant activities in the country[4,5-7].

Brazil maintains its leading position in the world in absolute numbers of transplants, ranking fourth in kidney and liver transplants. However, when analyzing pmp rates, the country ranks intermediate to low, reflecting the need to intensify efforts to increase donations and reduce regional disparities[9,13,20,22].

The high family refusal rate (46%) remains the main obstacle to increasing the number of effective donors, requiring specific education and awareness strategies, as well as improvements in the family interview process. The inclusion of information on the origin and destination of organs in the RBT 2024 represents an important step forward in understanding the actual utilization of organs in the country and can contribute to the development of more effective allocation policies[17-19].

Persistent regional disparities reflect not only differences in healthcare infrastructure and the availability of transplant teams, but also variations in state donation and transplant policies. The experience of states with indicators consistently above the national average can provide valuable insights for system improvement in less developed regions[8-10].

Achieving the goals projected for the coming years will require a coordinated effort involving various stakeholders, including public administrators, health professionals, scientific societies, non-governmental organizations, and civil society. The implementation of strategies such as: intensifying awareness campaigns; improving the family interview process; strengthening

CIHDOTTs and OPOs; expanding the number of transplant teams, especially in regions with lower coverage; implementing specific policies to reduce regional disparities; and improving information and monitoring systems is recommended[11,12,21,23].

The Brazilian transplant system, despite the challenges identified, remains an international benchmark for its comprehensiveness, equitable access, and results comparable to those of developed countries. A continued commitment to improving donation and transplant processes, combined with effective public policies and public engagement, will be essential for Brazil to further advance in this field and achieve the goals projected for the coming years[1-3].

CONFLICT OF INTEREST

Nothing to declare.

AUTHOR'S CONTRIBUTION

Substantive scientific and intellectual contributions to the study: Ferreira GF, Andrade LGM, Garcia VD; **Conception and design:** Ferreira GF, Andrade LGM, Garcia VD; **Data analysis and interpretation:** Ferreira GF, Andrade LGM, Garcia VD; **Article writing:** Ferreira GF, Haddad LBP, Andrade LGM, Sandes-Freitas TV, Manfro RC, Atik FA, Garcia VD; **Critical revision:** Ferreira GF, Haddad LBP, Andrade LGM, Sandes-Freitas TV, Manfro RC, Atik FA, Garcia VD; **Final approval:** Ferreira GF.

DATA AVAILABILITY STATEMENT

All data analyzed in this study are available can be accessed on website https://site.abto.org.br/.

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REFERENCES

1. Garcia VD, Abbud-Filho M, Neumann J, Pestana JOM. Transplante de órgãos e tecidos. 2ª ed. São Paulo: Segmento Farma; 2015.
2. Brasil. Ministério da Saúde. Sistema Nacional de Transplantes: como funciona o Sistema Nacional de Transplantes. Brasília: Ministério da Saúde; 2023 [access on 15 Apr 2025]. Available at: https://www.gov.br/saude/pt-br/composicao/saes/snt
3. Brasil. Ministério da Saúde. Portaria nº 2.600, de 21 de outubro de 2009. Aprova o Regulamento Técnico do Sistema Nacional de Transplantes. Diário Oficial da União. 21 out 2009.
4. Associação Brasileira de Transplante de Órgãos. Registro Brasileiro de Transplantes 2024. São Paulo: ABTO; 2024.
5. Associação Brasileira de Transplante de Órgãos. Registro Brasileiro de Transplantes 2023. São Paulo: ABTO; 2023.
6. Associação Brasileira de Transplante de Órgãos. Registro Brasileiro de Transplantes 2022. São Paulo: ABTO; 2022.
7. Associação Brasileira de Transplante de Órgãos. Registro Brasileiro de Transplantes 2021. São Paulo: ABTO; 2021.
8. Medina-Pestana JO, Galante NZ, Tedesco-Silva H Jr, Harada KM, Garcia VD, Abbud-Filho M, et al. Kidney transplantation in Brazil and its geographic disparity. J Bras Nefrol, 2011; 33(4): 472-84. https://doi.org/10.1590/S0101-28002011000400014
9. Marinho A, Cardoso SS, Almeida VV. Disparidades nas filas para transplantes de órgãos nos estados brasileiros. Cad Saude Publica, 2010; 26(4): 786-96. https://doi.org/10.1590/S0102-311X2010000400020
10. Associação Brasileira de Transplante de Órgãos. Dimensionamento dos Transplantes no Brasil e em cada estado (2015-2022). São Paulo: ABTO; 2022.

11. Brasil. Ministério da Saúde. Portaria nº 2.601, de 21 de outubro de 2009. Institui, no âmbito do Sistema Nacional de Transplantes, o Plano Nacional de Implantação de Organizações de Procura de Órgãos e Tecidos - OPO. Diário Oficial da União. 21 out 2009.

12. Brasil. Ministério da Saúde. Portaria nº 845, de 2 de maio de 2012. Estabelece estratégia de qualificação e ampliação do acesso aos transplantes de órgãos sólidos e de medula óssea, por meio da criação de novos procedimentos e de custeio diferenciado para a realização de procedimentos de transplantes e processo de doação de órgãos. Diário Oficial da União. 2 maio 2012.

13. International Registry in Organ Donation and Transplantation. Final Numbers 2023. Barcelona: IRODAT; 2023 [access on 15 Apr 2025]. Available at: http://www.irodat.org/

14. Organización Nacional de Trasplantes. Actividad de donación y trasplante 2023. Madrid: ONT; 2023 [access on 15 Apr 2025]. http://www.ont.es/

15. Instituto Português do Sangue e da Transplantação. Relatório de atividade de doação e transplantação 2023. Lisboa: IPST; 2023 access on 15 Apr 2025]. Available at: http://ipst.pt/

16. Instituto Brasileiro de Geografia e Estatística. Estimativas da população residente para os municípios e para as unidades da federação brasileiros com data de referência em 1º de julho de 2024. Rio de Janeiro: IBGE; 2024.

17. Pessoa JLE, Schirmer J, Roza BA. Evaluation of the causes for family refusal to donate organs and tissue. Acta Paul Enferm, 2013; 26(4): 323-30. https://doi.org/10.1590/S0103-21002013000400005

18. Westphal GA, Garcia VD, Souza RL, Franke CA, Vieira KD, Birckholz VRZ, et al. Guidelines for the assessment and acceptance of potential brain-dead organ donors. Rev Bras Ter Intensiva, 2016; 28(3): 220-55. https://doi.org/10.5935/0103-507X.20160049

19. Moraes EL, Santos MJ, Merighi MAB, Massarollo MCKB. Experience of nurses in the process of donation of organs and tissues for transplant. Rev Lat Am Enfermagem, 2014; 22(2): 226-33. https://doi.org/10.1590/0104-1169.3276.2406

20. Matesanz R, Domínguez-Gil B, Coll E, Mahíllo B, Marazuela R. How Spain reached 40 deceased organ donors per million population. Am J Transplant, 2017; 17(6): 1447-54. https://doi.org/10.1111/ajt.14104

21. Domínguez-Gil B, Murphy P, Procaccio F. Ten changes that could improve organ donation in the intensive care unit. Intensive Care Med, 2016; 42(2): 264-7. https://doi.org/10.1007/s00134-015-3833-y

22. Rudge C, Matesanz R, Delmonico FL, Chapman J. International practices of organ donation. Br J Anaesth, 2012; 108 Suppl 1: i48-55. https://doi.org/10.1093/bja/aer399

23. Associação Brasileira de Transplante de Órgãos. Diretrizes básicas para captação e retirada de múltiplos órgãos e tecidos da Associação Brasileira de Transplante de Órgãos. São Paulo: ABTO; 2009.