

PROJECT OF A DASHBOARD FOR BRAZILIAN CENTERS AFFILIATED WITH CENTER FOR INTERNATIONAL BLOOD AND MARROW RESEARCH

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ABSTRACT

Since the first hematopoietic stem cell transplantation (HSCT) was performed at the Federal University Hospital (Curitiba, PR) in 1979, the number of centers offering this modality of treatment has increased. However, accessing comprehensive HSCT outcomes has become a challenge due to lack of an official Brazilian registry. The partnership between the Brazilian Cellular Therapy and Bone Marrow Transplant Society (SBTMO) and the Center for International Blood and Marrow Research (CIBMTR) was an important milestone in the establishment of the HSCT Brazilian registry (HSCTBR). By using CIBMTR's Data Back to Center (DBtC) tool, we have gained insights into HSCT outcomes through the Brazilian Summary Slides. While understanding the country's transplant scenario is crucial, it is equally important for each center to assess their own outcomes. In order to help the Brazilian centers with the CIBMTR, the data manager of SBTMO working group has developed a business tool solution to facilitate this important task.

Keywords: Data Management. Hematopoietic Stem Cell Transplantation. Dashboard Systems.

INTRODUCTION

Since 2016, various strategies have been implemented to improve the transplant scenario in the country. These strategies include efforts to increase the number of Brazilian centers for affiliation with CIBMTR, the creation of training programs in HSCT for data managers, and the partnership between the SBTMO and the CIBMTR. These collective efforts have made the official registry in Brazil possible. According to the Brazilian Summary Slides – 2023¹, forty centers are now affiliated with CIBMTR and reporting data to it. While the Brazilian Summary Slides provides valuable insights, it is also possible for each affiliated center to know its individual results. However, not all centers have qualified personnel with expertise in data analysis, particularly in the IT field. A way used by centers to learn about some results is presented in a visual format on the CIBMTR portal. Nonetheless, Brazilian researchers need to know other results, including survival analysis with comparative curves. To address this need, the data manager of the SBTMO working group developed a dashboard utilizing data extracted from the DBtC and Power Business Intelligence (PBI). This solution, along with a manual of instruction, will be distributed to all centers affiliated with CIBMTR.

OBJECTIVE

The aim of this project was to create a dashboard template incorporating comparative survival analysis in Power Business Intelligence (PBI) and share it with HSCT/CT centers affiliated with CIBMTR. This initiative enables users to interactively visualize their results.

MATERIAL AND METHODS

The initial step involved creating a dashboard template in PBI utilizing data fields of data extracted from the DBtC on the CIBMTR portal. In this first version, survival curves were created using R script visual in PBI, including p value for comparison curves and risk table. This version was published and tested on a website by two Centers, which have developed the project (Table 1). The second step was to create a comprehensive dashboard template with some reports on eight pages, including graphs using innate statistical and graphs using R script visual in PBI. This version featured a menu navigation (Figure 1), descriptive graphs by disease and transplant type (Figure 2), graphs categorized by age group, event date, donor type and tissue source (Figure 3), overall survival comparing allogeneic and autologous HSCT (Figure 4), acute leukemia survival comparing adult and pediatric curves (Figure 5), acute and chronic leukemia survival comparing disease status curves (Figure 6 and 7), and a report by disease classification according to the Latin-American BMT (LABMT) from the Worldwide Network for Blood & Marrow Transplantation (WBMT), facilitating this registration in the country (Figure 8). All dashboard reports are interactive and include filters by transplant type, age category (adult and pediatric), disease, year of the event and disease status for leukemias. The final step was to create a manual containing software requirements, PBI configuration instructions (data source settings and R statistical folder), and guidance on downloading the DBtC file from the CIBMTR Portal and navigating on the dashboard. The manual and the complete dashboard were distributed via email to seven data managers (DM) from different Brazilian centers and to a North American center (Table 1).

neic and autologous HSCT (Figure 4), acute leukemia survival comparing adult and pediatric curves (Figure 5), acute and chronic leukemia survival comparing disease status curves (Figure 6 and 7), and a report by disease classification according to the Latin-American BMT (LABMT) from the Worldwide Network for Blood & Marrow Transplantation (WBMT), facilitating this registration in the country (Figure 8). All dashboard reports are interactive and include filters by transplant type, age category (adult and pediatric), disease, year of the event and disease status for leukemias. The final step was to create a manual containing software requirements, PBI configuration instructions (data source settings and R statistical folder), and guidance on downloading the DBtC file from the CIBMTR Portal and navigating on the dashboard. The manual and the complete dashboard were distributed via email to seven data managers (DM) from different Brazilian centers and to a North American center (Table 1).

RESULTS

The DBtC allowed the standardized collection and data analysis for Brazilian centers affiliated with CIBMTR using business intelligence tools. In the initial phase of this project, survival graphs with comparative curves were successfully generated using R scripts. Following the inclusion of necessary R software packages to run survival curves, tests of the published dashboard yielded positive outcomes. This progress was presented at the Transplantation & Cellular Therapy Meeting of ASCTC and CIBMTR in 2023² and was awarded the second place in the IT category. In the final phase, six centers participated in this project, two as developers and four receiving the instruction manual via email. Challenges related to PBI and R software installation, as well as downloading the DBtC file were effectively solved. Additional assistance for DM, was provided via WhatsApp and virtual meeting. Two centers have successfully implemented the developed dashboard. The full presentation of this project is available at the 2024 Tandem Meetings Session Recordings website³.

CONCLUSION

Expertise, particularly in R scripting and business intelligence, is essential for effective implementation of this project. An important advantage of this project lies in the utilization of an open-source software. Another advantage is that DMs need to setup PBI and R software only once. Fol-

lowing configuration in PBI, the DM must import the DBtC file in PBI and the dashboard is updated. Subsequent updates require only importing the new DBtC file, replacing the old one. The next step for this project is to present it to the SBTMO coordinator for approval to share the template with all CIBMTR- affiliated centers in Brazil. Future

perspectives include incorporating new outcome analysis such as relapse, GVHD and cellular therapy following the DBtC updates. Additionally, there is potential to provide an interactive dashboard of HSCT/CT results on the SBTMO website and to utilize the BI tool to develop strategies for improving long-term follow-up in Brazil.

TABLE 1. Participating Centers

PARTICIPATING CENTERS	PARTICIPATION
Complexo Hospital de Clínicas – Universidade Federal do Paraná, Curitiba, PR	Developers
Hospital Amaral Carvalho, Jaú, SP	
Hospital Israelita Albert Einstein, São Paulo, SP	Received manual and the complete dashboard
Barretos Cancer Hospital, Barretos, SP	
Hospital Nossa Senhora das Graças – Instituto Pasquini, Curitiba, PR	
Hospital das Clínicas da Faculdade de Medicina da Universidade de São Paulo, SP	
Hospital Pequeno Príncipe, Curitiba, PR	
Instituto Nacional do Câncer (INCA), Rio de Janeiro, RJ	
Hospital Sírío Libanês em Brasília, Brasília, DF	
BMTCT Database & Systems - Bone Marrow Transplantation and Cellular Therapy - St. Jude Children's Research Hospital, Memphis, TN - USA	

FIGURE 1. Menu navigation.

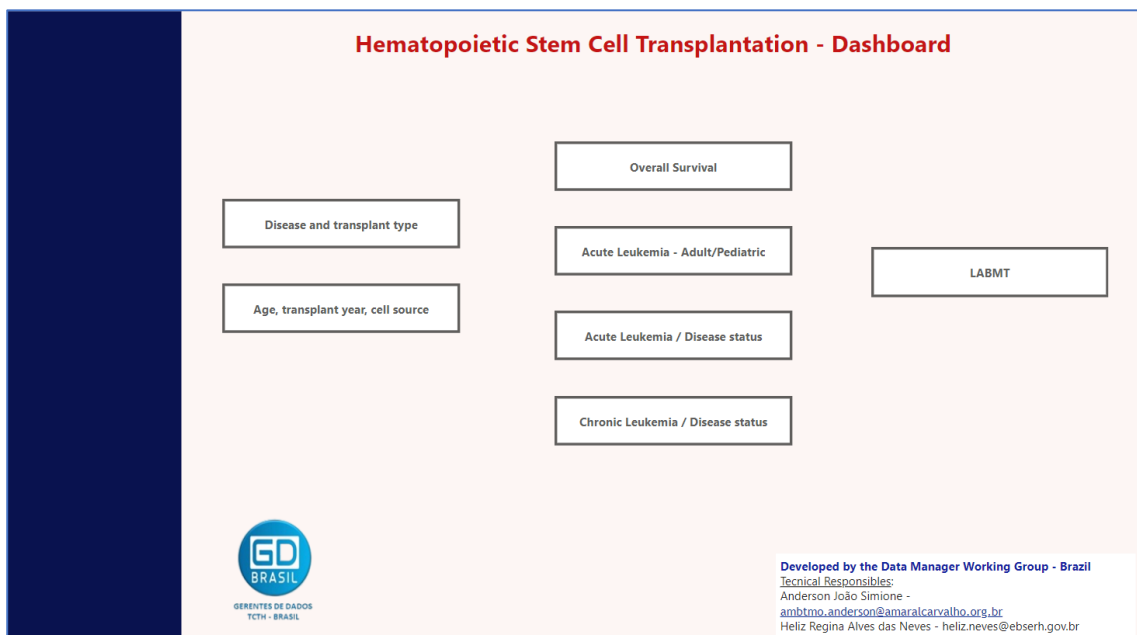


FIGURE 2. Descriptive graphs by disease and transplant type.

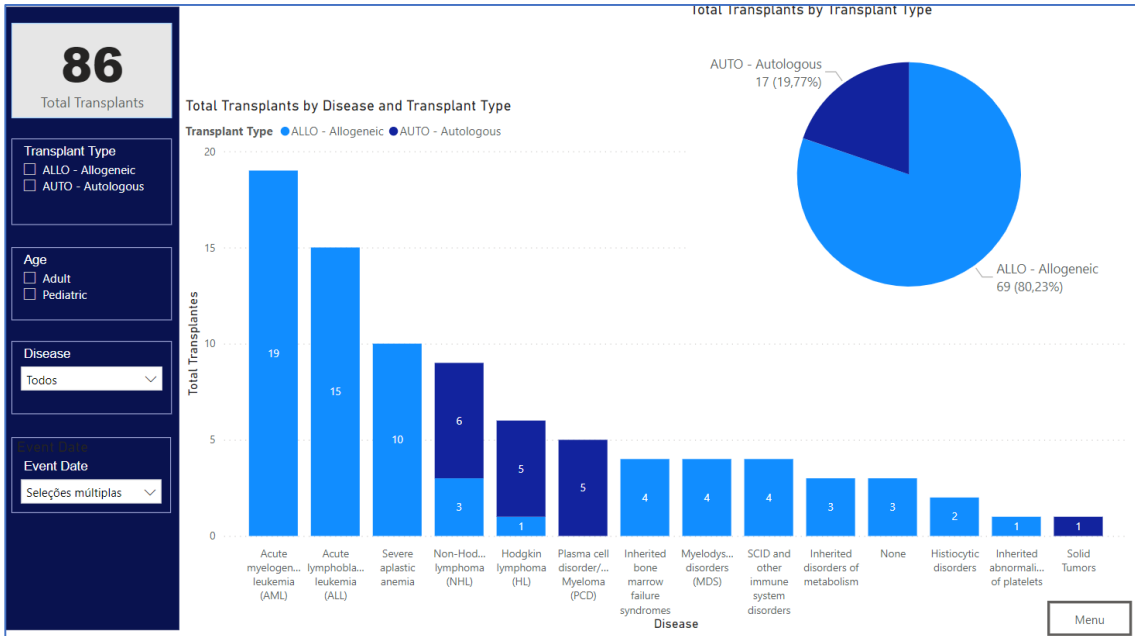


FIGURE 3. Graphs by age group, event date, donor type and tissue source.

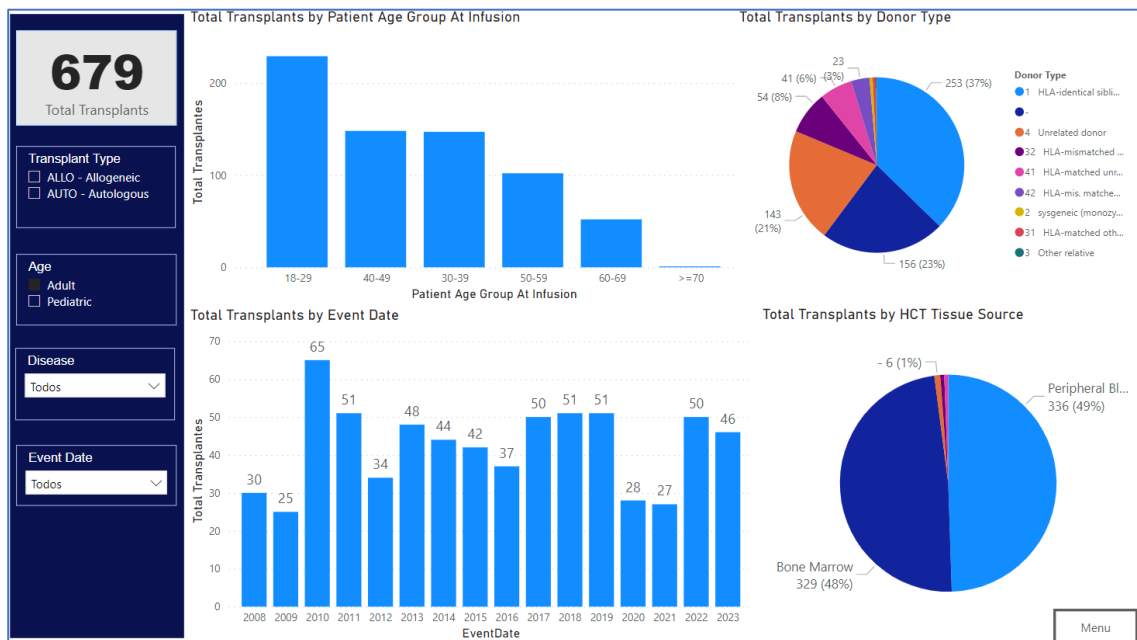


FIGURE 4. Overall survival comparing allogeneic and autologous HSCT.

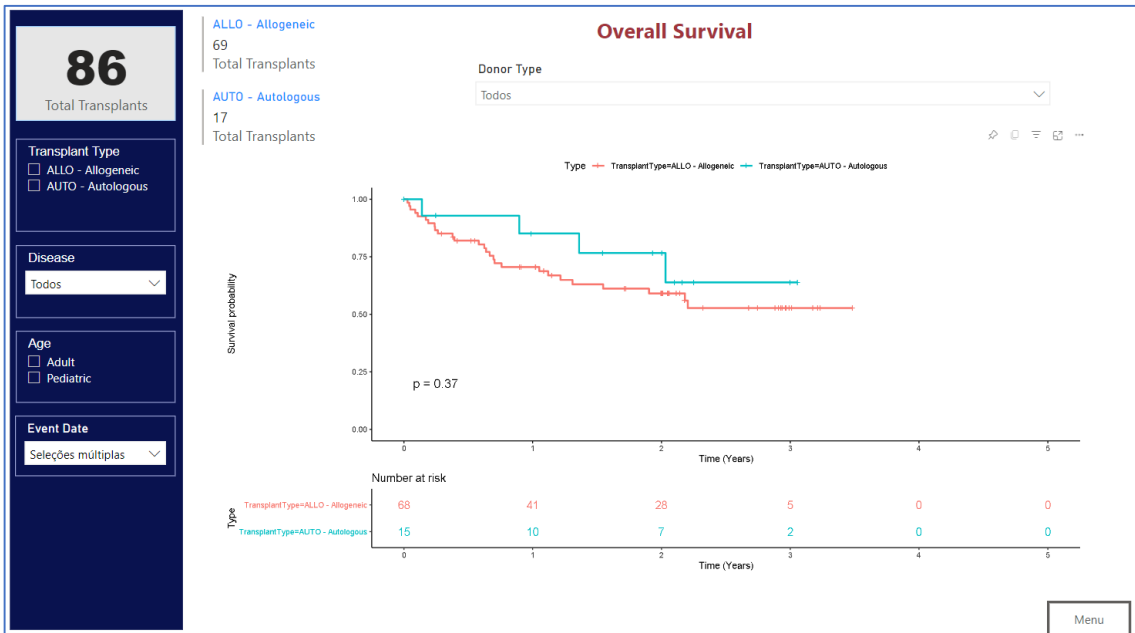


FIGURE 5. Acute leukemia survival comparing adult and pediatric curves.

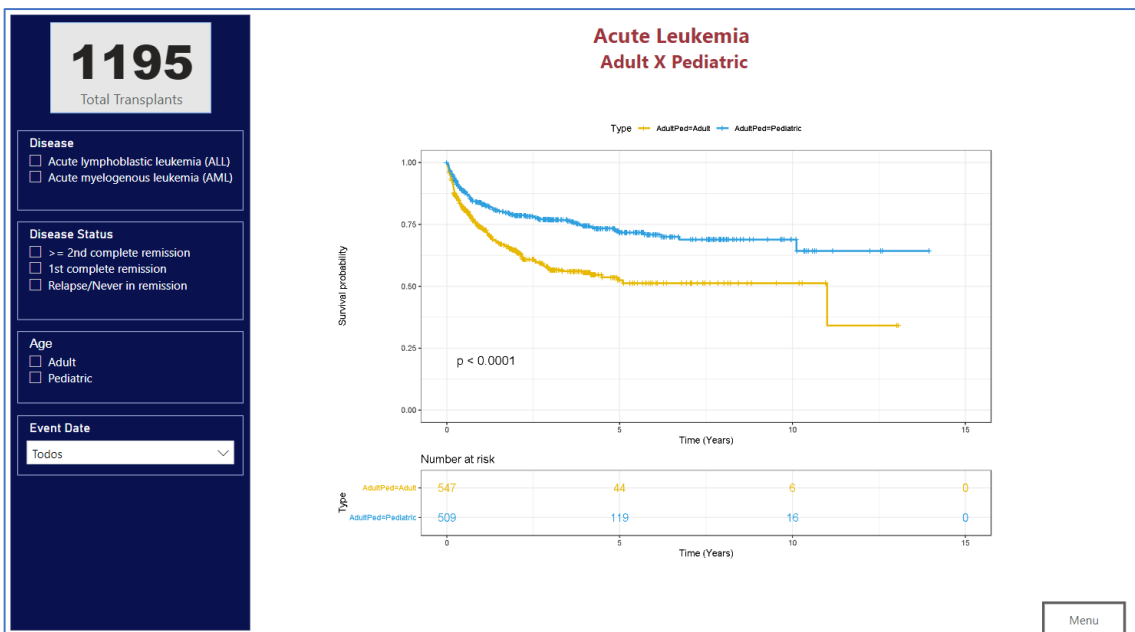


FIGURE 6. Acute leukemia survival comparing disease status curves.

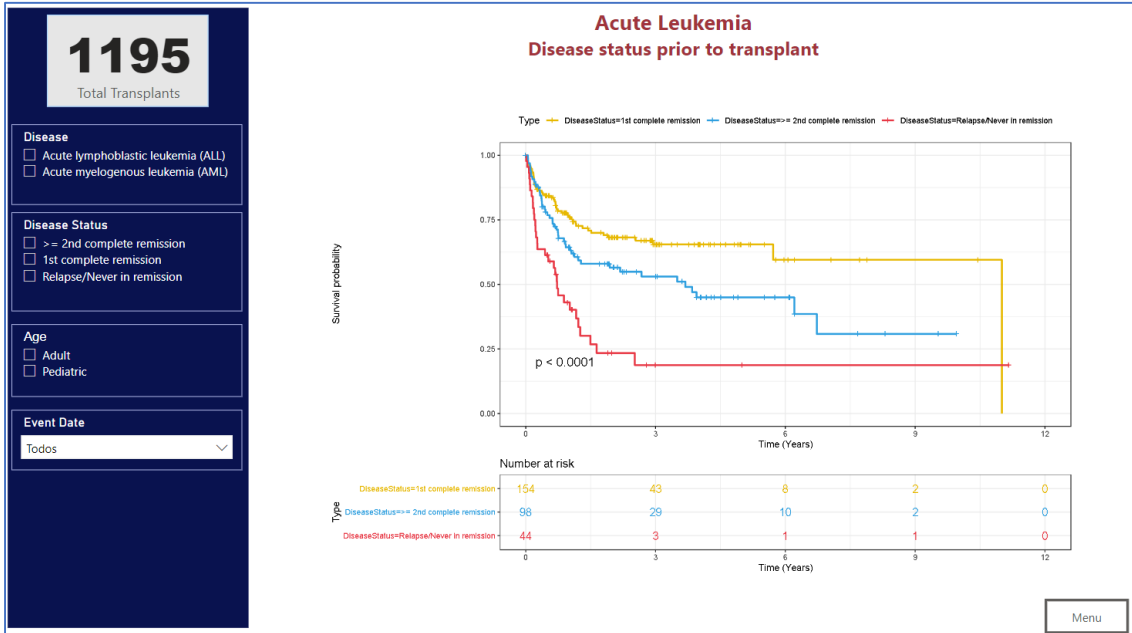


FIGURE 7. Chronic leukemia survival comparing disease status curves.

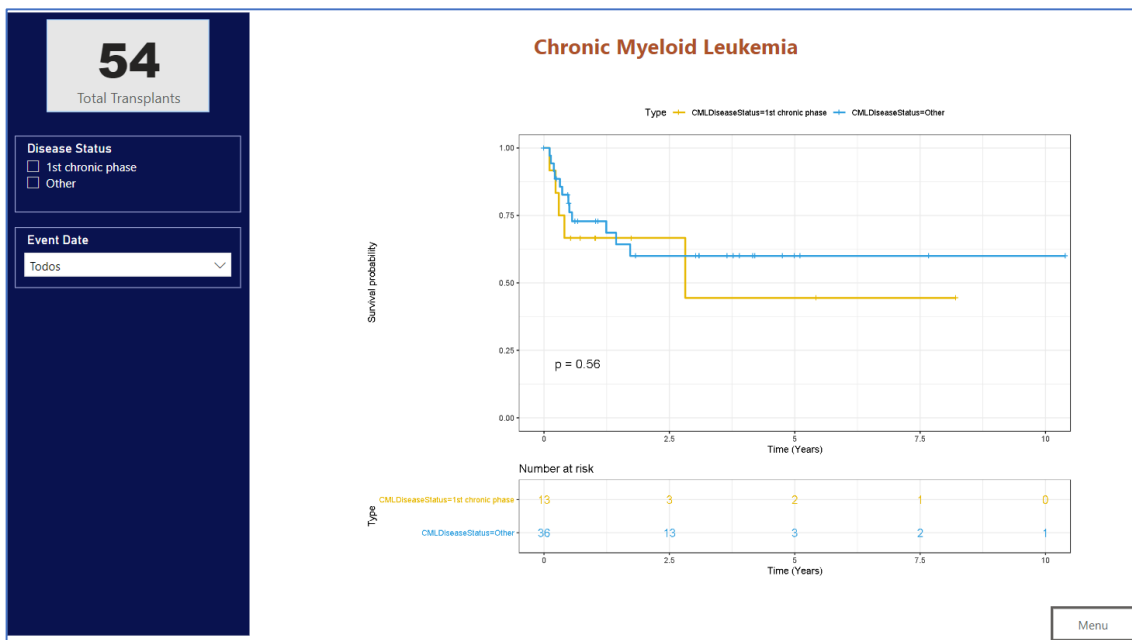
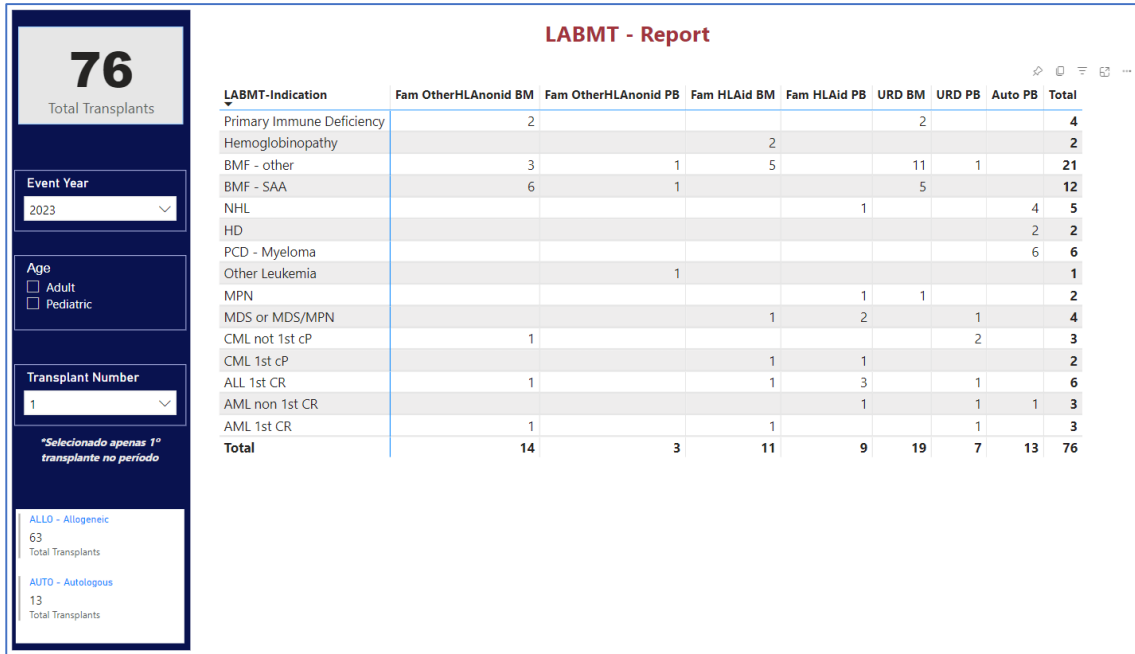


FIGURE 8. Report by disease classification according to LABMT from WBMT.



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