REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.

1. REPORT DATE *(DD-MM-YYYY)*	**2. REPORT TYPE**	**3. DATES COVERED** *(From - To)*
10/06/2023	Final Technical Report	October 1, 2021 – September 30, 2023

4. TITLE AND SUBTITLE
Development of Medical Technology for Contingency Response to Marrow Toxic Agents – Final Technical Report with SF298 October 1, 2021 – September 30, 2023

5a. CONTRACT NUMBER
N/A

5b. GRANT NUMBER
N00014-21-1-2954

5c. PROGRAM ELEMENT NUMBER
N/A

6. AUTHOR(S)
Spellman, Stephen

5d. PROJECT NUMBER
N/A

5e. TASK NUMBER
Project 1, 2, 3, 4

5f. WORK UNIT NUMBER
N/A

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
National Marrow Donor Program
500 N. 5th St.
Minneapolis, MN 55401-1206

8. PERFORMING ORGANIZATION REPORT NUMBER
N/A

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)

Office of Naval Research
875 N. Randolph Street, Suite 1425
Arlington VA 22203-1995

10. SPONSOR/MONITOR'S ACRONYM(S)
ONR

11. SPONSORING/MONITORING AGENCY REPORT NUMBER
N/A

12. DISTRIBUTION AVAILABILITY STATEMENT
Approved for public release; distribution is unlimited

13. SUPPLEMENTARY NOTES
N/A

14. ABSTRACT

1. Contingency Preparedness: Collect information from transplant centers, build awareness of the Transplant Center Contingency Planning Committee and educate the transplant community about the critical importance of establishing a nationwide contingency response plan.

2. Rapid Identification of Matched Donors: Increase operational efficiencies that accelerate the search process and increase patient access are key to preparedness in a contingency event.

3. Immunogenic Studies: Increase understanding of the immunologic factors important in HSC transplantation.

4. Clinical Research in Transplantation**:** Create a platform that facilitates multicenter collaboration and data management.

15. SUBJECT TERMS
Research in HLA Typing, Hematopoietic Stem Cell Transplantation and Clinical Studies to Improve Outcomes

16. SECURITY CLASSIFICATION OF:			**17. LIMITATION OF ABSTRACT**	**18. NUMBER OF PAGES**	**19a. NAME OF RESPONSIBLE PERSON**
				39	Jeffery Auletta, M.D. - Sr Vice President and Chief Scientific Director
a. REPORT U	**b. ABSTRACT** U	**c. THIS PAGE** U			**19b. TELEPONE NUMBER (*Include area code*)** 763-406-4730

Grant Award N00014-21-1-2954

DEVELOPMENT OF MEDICAL TECHNOLOGY FOR CONTINGENCY RESPONSE TO MARROW TOXIC AGENTS

FINAL RESEARCH PERFORMANCE REPORT

SUBMITTED OCTOBER 6, 2023

Office of Naval Research

And

The National Marrow Donor Program®

500 5th St N

Minneapolis, MN 55401

I. Heading

PI: Jeffery Auletta, M.D.

National Marrow Donor Program

N00014-21-1-2954

Development of Medical Technology for Contingency Response to Marrow Toxic Agents

II. Scientific and Technical Objectives

The main goal of all activities funded through this grant is to develop, test and mature the ability of the NMDP Coordinating Center and NMDP contracted network sites network sites to address contingency events wherein civilian or military personnel are exposed to marrow toxic agents, primarily ionizing radiation or chemical weapons containing nitrogen mustard. As a result of prior efforts in this regard a solid foundation has been established. The proposed new activities will continue to enhance and expand our capabilities in each of the four focus areas. Contingency preparedness activities will continue to integrate NMDP's role with federal, state and local agencies.

An accident, a military incident, or a terrorist act in which a number of individuals are exposed to marrow toxic agents will result in injuries from mild to lethal. But the extent of individual injuries and the likelihood of recovery in many cases will not be apparent until days or weeks after the event. Casualties will be triaged by first responders, and those with major marrow injuries who will need aggressive medical support and may be ultimately candidates for hematopoietic cell transplantation (HCT) will need to be identified. While these patients are being supported, HCT donor identification activities will be initiated because it will not be initially clear which ones may ultimately require HCT. NMDP-approved transplant centers will provide a uniform and consistent clinical foundation for receiving, evaluating and caring for casualties. NMDP Coordinating Center will orchestrate the selection and testing necessary to rapidly identify the best available donor or cord blood unit for each patient utilizing its state-of-the-art communication infrastructure, sample repository, laboratory network, and human leukocyte antigen (HLA) expertise. NMDP's on-going immunobiologic, bioinformatics and clinical research activities promote studies to advance the science and technology of HCT transplantation to improve outcome and quality of life for the patients.

Importantly, most individuals with near-lethal marrow toxic injuries will recover their own marrow function provided they receive intensive supportive care from the medical professionals that are part of the contingency response community. These professionals can save the lives of persons with severe marrow suppression using the knowledge and skills practiced every day to treat patients undergoing HCT coordinated through the NMDP.

III. Approach

A. Contingency Preparedness

HCT teams are uniquely positioned to care for the casualties of marrow toxic injuries. The NMDP manages a network of centers that work in concert to facilitate unrelated HCT. The Radiation Injury Treatment Network (RITN), comprised of a subset of NMDP's network centers, is dedicated to radiological disaster preparedness activities and develops procedures for response to marrow toxic mass casualty incidents.

B. Development of Science and Technology for Rapid Identification of Matched Donors
Disease stage at the time of transplantation is a significant predictor of survival, decreasing the time to identify the best matched donor is critical. Methods are under development to rapidly provide the best matched donor for HCT.

C. Immunogenetic Studies in Transplantation
Improving strategies to avoid and manage complications due to graft alloreactivity is essential to improve the outcomes of HCT. Research efforts are focused on strategies to maximize disease control while minimizing the toxicity related to alloreactivity in HCT.

D. Clinical Research in Transplantation
Clinical research creates a platform that facilitates multi-center collaboration and data management to address issues important for managing radiation exposure casualties. Advancing the already robust research capabilities of the NMDP network will facilitate a coordinated and effective contingency response.

IV. Updates

A. Contingency Preparedness

Maintain the Radiation Injury Treatment Network (RITN) to prepare for the care of patients resulting from a hematopoietic toxic event

- **Radiation disaster and countermeasure research education:**
    - RITN Biennial (2022) Workshop "Past Informing the Present, Past Improving the Plan for a Rad/Nuc Incident" is (1) Targeted towards physicians and other healthcare providers, support staff, hospital and hospital system administrators, emergency managers, research scientists, and appropriate federal agency staff that would be involved in radiation response and treatment of patients with radiation-induced bone marrow injury; and (2) Will (a) highlight recent developments in Covid pandemic response and applicable lessons we have learned, (b) review and disseminate novel radiation countermeasures and dosimetry, (c) discuss optimizing triage and on the ground federal resources, (d) present strategies to ensure the availability and appropriate use of medical and psycho-social supportive care and resilience, and (e) explore applying telemedicine as a force multiplier for care and education.

- The Workshop was held August 4-5, 2022, at The Westin Alexandria Old Town.
- Attendance
  - Participants – 128
  - Speakers
    - Invited – 17
    - Selected Abstract Submissions – 20
- Feedback
  - Very well organized and executed conference. Thank you.
  - Great conference- learned a lot.
  - The speakers were top notch at this conference. Thank you for putting together a great agenda!
  - This was an excellent conference. Very well organized, very informative. Thank you very much.
  - I am looking forward to the next workshop.
- Planning Committee members represent RITN hospitals: Dana Farber Cancer Institute, Duke University, and the Mayo Clinic Rochester; as well as federal partners: The Administration for Strategic Preparedness and Response (formerly the Assistant Secretary for Preparedness and Response - ASPR) and the Biomedical Advanced Research and Development Authority (BARDA).

- Advanced HAZMAT Life Support (AHLS) for Radiological Incidents & Terrorism 4-hour course (1) Has a target audience of physicians, physician multipliers, nursing staff, administrators and coordinators from departments such as bone marrow transplant, hematology, oncology, radiation safety, nuclear medicine, and the emergency department, as well as emergency management, and first responders; and (2) Will include interactive lectures and tabletop exercises that trains healthcare professionals to evaluate and care for irradiated and radiologically contaminated patients.
  - Two, half-day courses were successfully completed July 20, 2022. The Region 9 Healthcare Coalition (Chicago) hosted in Elgin, IL.

- **Hospital radiation disaster preparedness:**
  - Annual disaster readiness tabletop exercises (drills) have been scheduled for current RITN centers to participate for their annual task completion. Six sessions were completed between June and August 2022.
  - Additional disaster readiness exercises (drills) resumed pre-COVID scheduling. Successfully completed include:
    - Full-scale exercise (Franciscan St. Francis, Indianapolis, IN)
    - Functional exercises (Illinois Regions 8 & 9)
    - Regional Tabletop exercise (Region X, Chicago North suburbs) medical response workshop

- **Hospital network growth:**
  - To ensure the appropriate growth in a direction that supports the vision and needs of the Department of Defense-Office of Naval Research as well as the Department of Health and Human Services Assistant Secretary for Preparedness and Response plans for response to a radiological/nuclear disaster with-in the continental U.S.
    - Orlando Health (Orlando, FL) joined in January of 2022.

- **Federal partnership development:**
    - Support the Gryphon Scientific's Center for Disease Control (CDC) funded project as a subcontractor to assess United States laboratory capabilities for ionizing radiation related testing.
        - The project was completed September 22, 2022, with all of the project deliverables submitted to the CDC.
        - Currently the final report is only available to work group members as it has not yet been cleared for public release.

- **Other projects:**
    - RITN Automated Tracking System project seeks to develop an integrated means to collect, review, report and store data related to the activity and annual task deliverables of the hospitals that are part of its' network. This system should automate where feasible all steps that are currently manually accomplished. Users of this system range from staff at RITN headquarters to staff at each individual RITN center across the United States.
        - Currently in Beta testing phase of project.
        - Scheduled completion – November 2022 and will be reported under a subsequent grant.

B. Development of Science and Technology for Rapid Identification of Matched Donors

Expand the genetic diversity of the registry through continued addition of adult donors and cord blood units, utilizing high volume HLA typing methodologies

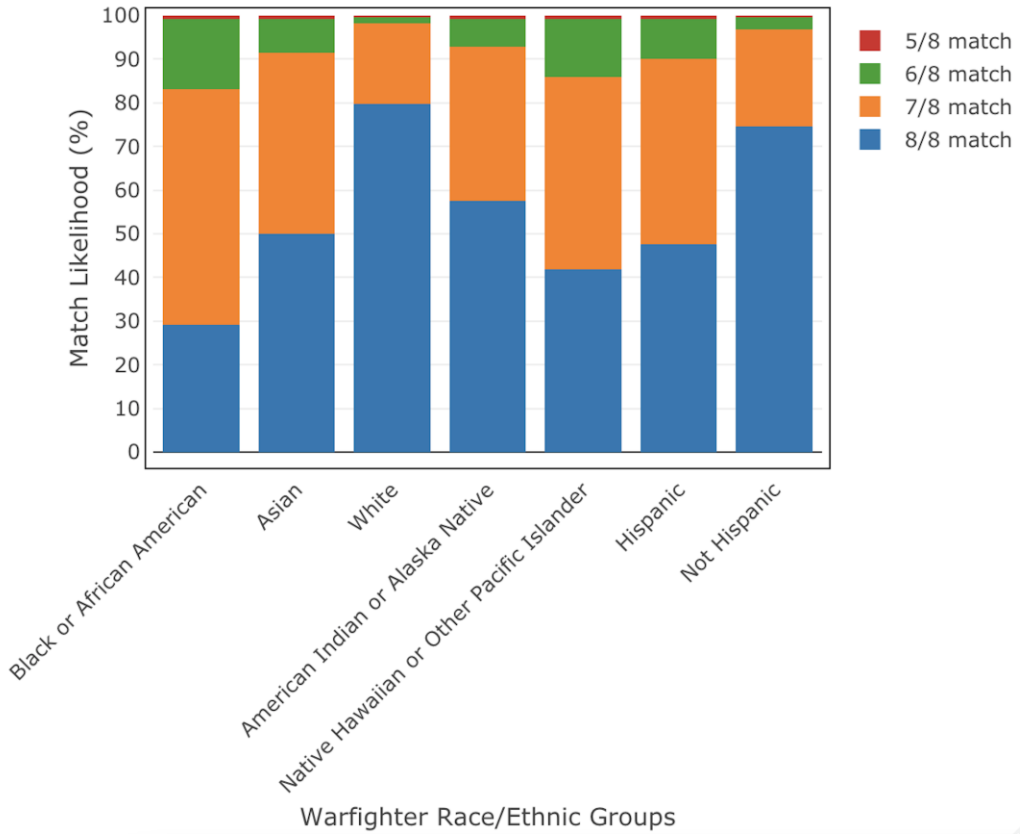
During the grant period, a total of 122,750 newly registered volunteer donors were HLA typed and added to the Be The Match Registry.

Modeling and analysis of registry coverage for the Warfighter

Over the grant period, additional methods and data sources for validation of registry models was investigated. Our models seek to better understand the contribution of racially and ethnically diverse donors for matching in diverse groups. Current resources for validation of these results through simulations of donor registry searches with patient-donor HLA match criteria require more frequent and comprehensive data updates and greater flexibility in matching rules along with the ability to consider outcome probabilities in the presence of missing data. Further solutions in this space continue to be explored and evaluated. Population genetics-based registry models projected donor coverage for warfighters as potential patients reaches 100% when considering HLA match levels down to 5 of 8 matching alleles. Results of the modeling was presented as a poster abstract presentation at the 2022 Tandem meeting in April 2022 and a manuscript describing coverage for the U.S. population was submitted under a subsequent grant period. This modeling

aids in preparation for coverage of potential donor sources to Warfighters of diverse race and ethnic backgrounds in case of radiation emergencies.

Figure 1: Match likelihood percentages are shown for various race/ethnic groups represented in warfighter populations at different HLA match levels (5/8-8/8).



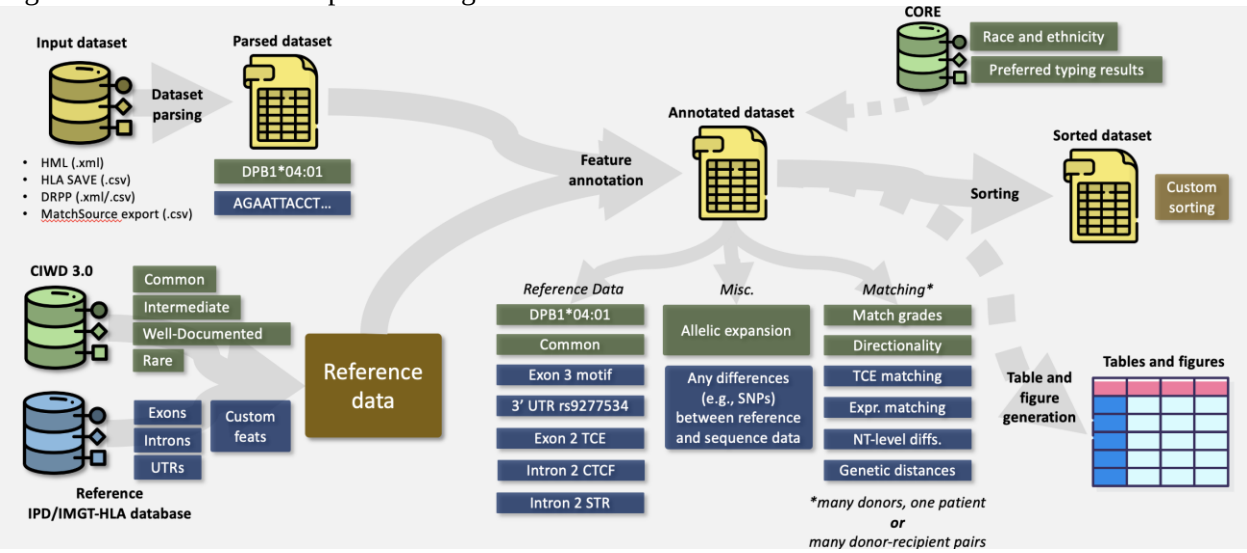
Development of science and technology for rapid communication of HLA data

The previously developed gene feature enumeration (GFE) software was updated to handle versioned references for key immunogenetic genes of interest, e.g. HLA, and allow for unique identification of gene sequences in the database. Additional development was performed for gene sequence alignment and nucleotide polymorphism scoring to identify and track the frequency of new and predetermined variants of interest in HLA genes from histocompatibility markup language input files from large populations.

Services for handling and parsing HLA typing and resolution were centralized as needed to handle input from multiple data sources and annotate features from HLA data in a standard format for detection, assignment, and translation across nomenclatures. Figure 2 below shows the consolidated workflow that takes in HLA data communicated from laboratories in HML (Histoimmunogenetics Markup Language) format or from research and inventory reference files or from transplant center facing user interfaces. This data is then parsed and compared against existing reference data or assigned/translated to further feature

annotation in order to provide rapid handling and communication of HLA data across datasets for use in research studies.

Figure 2: A workflow for rapid handling and communication of HLA data.



Multiple hackathons were held during the 18th International HLA and Immunogenetics workshop. These collaborative hands-on working sessions brought researchers and developers from around the world together to discuss and implement standards and services for handling HLA and other immunogenetic data. HLA and other immunogenetic data was communicated from laboratories in HML (Histoimmunogenetics Markup Language) format, from research and inventory reference files, or from transplant center facing user interfaces. This data is then parsed and compared against existing reference data or assigned/translated to further feature annotation in order to provide rapid handling and communication of HLA data across datasets for downstream use. Further validation and computational efficiencies were introduced and validated for HLA data in higher volumes in addition to added features for automating workflows. These tools and resources pave the way for rapid communication of HLA data to promote both research studies that rely on HLA information and the operational matching of patients and donors.

Use of population genetics and machine learning to automate the donor selection process

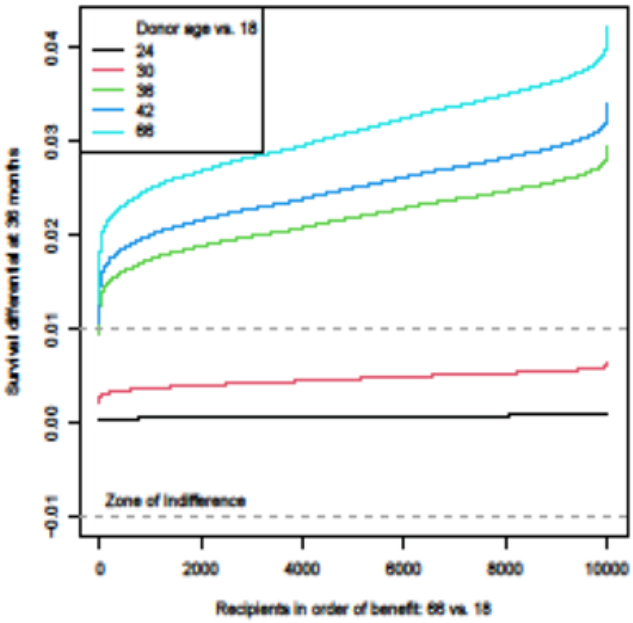
Machine learning models for censored time-to-event and multiple competing risk statistical and machine learning models were explored for prediction of event-free survival after allogeneic stem cell transplant. Event-free survival is defined as survival where the patient does not experience any significant adverse events including graft rejection, moderate or severe chronic graft versus host disease, or relapse. Parallel efforts conducted with the prior use of Bayesian additive regression trees, Cox proportional hazards models, and a variety of machine learning approaches were tested and slated for incorporation into a preliminary machine learning pipeline for flexible application to current and future use cases. The first half of the pipeline (Figure 3) will consist of basic components common to machine learning applications applied to prediction of transplant outcomes. Further solutions architecture to streamline and provide more options to automate data handling for use in machine learning will be incorporated in the next grant period, with the emphasis on optimization of donor selection for best patient transplant outcomes.

Figure 3: High level workflow for the first half of a consolidated pipeline for evaluation of variables that contribute to best prediction of patient transplant outcomes.

To optimize donor selection, we first needed to build a flexible prediction model that could be used to predict patient specific outcomes over a range of potential donors, while also quantifying the uncertainty in such predictions. Since there were limited methods available to serve this purpose, we developed a novel Bayesian machine learning model called Nonparametric Failure Time Bayesian Additive Regression Trees (NFT BART), which can flexibly handle complex time to event survival outcomes and provide prediction uncertainty measures. A revised manuscript describing this novel biostatistical approach was submitted. Prediction models for OS and EFS as a function of patient, disease, transplant, and donor characteristics, using this NFT BART were applied to a cohort of all 8/8 matched unrelated donor transplants between 2016 and 2019. These models allow for patient-specific predictions for any potential donor. After examining the variable importance of each donor characteristic, we identified that donor age and donor gender are the only variables with a measurable impact to date on OS or EFS outcomes.

A summary of the patient specific impact of donor age on overall survival at three years is shown in the following waterfall plot (fig. 4), where the *x* axis denotes each individual patient in the dataset (sorted by donor age), and the *y* axis shows the predicted difference in two-year survival for each of several donor ages relative to an 18 year-old donor. Future work will apply this model to a pool of potential donors for patients extracted from the NMDP donor search archive, to examine the achievable benefit from optimizing the donor selection over donor age and gender.

Figure 4: Patient-specific impact of donor age on Overall patient survival at three years.



In an addition, using an established OS dataset of 6238 unique patients with AML from the CIBMTR outcomes database, we trained an alternative decision tree model with information on patients, donors, disease, transplantation, therapy, and recipient-donor matching. From this model, a cumulative prediction score was calculated for an AML patient by traversing the tree according to their features. Positive and negative cumulative prediction scores represent 'expired' and 'alive' patient outcomes, respectively. For example, the cumulative score for a patient with AML and age <45 years with >1 induction cycle to achieve first complete remission from this model was found to be -0.694 (alive). The higher the absolute cumulative score of a patient for a certain binary outcome, the higher their probability of being classified in that category. In this regard, the ADTree-based model can potentially provide individualized prediction results for a patient with AML even if a subset of the required feature values is unknown. Development of prediction models incorporating these factors may help to complement clinical decision-making. Further validation is needed for these models and future work considers how multiple models can be incorporated for a cohesive outlook on optimization of actionable variables in the patient journey toward best transplant outcomes.

C. Immunogenetic Studies in Transplantation

Evaluate HLA disparity and impact on HCT by adding selected pairs to the Donor/Recipient Pair project utilizing sample selection criteria that optimize the new data generated by the typing project

The NMDP/CIBMTR maintains a research repository of peripheral blood samples from transplant donors (pre-donation) and recipients (pre-transplant). These samples are routinely genotyped through the ongoing Donor/Recipient Pair project (DRPP) to ensure sample identity and enhance the immunogenetic data available for histocompatibility research. This sample inventory and upgraded data are critical for expanding and optimizing research scenarios for evaluation of the role of HLA and other immunogenetic factors in HCT.

During the grant period, samples from an additional 1438 unrelated and 428 related Donor/Recipient Pairs were prepared and sent for DNA extraction and HLA typing upgrades. This figure leaves just under eight thousand remaining pairs eligible for future typing upgrades at this time, though additional Donor/Recipient Pairs continue to accumulate as samples from ongoing transplants are collected. The project team also developed a more comprehensive inventory of the Donor/Recipient Pair collection was initiated to provide a current state outlook of the genomic and upgraded genetic typing data generated on these subjects and samples from our biorepository inventory. Key demographic features were linked for reference and to facilitate future study design and cohort building from the Donor/Recipient Pair inventory. In addition, the Immunobiology Project Research data was successfully migrated from a legacy database (Sybase) to the new test results storage location (Core database) where it will benefit from built-in validation and supported data storage and retrieval methods.

Transplantation practices are constantly evolving, and the DRPP will continue enroll the most recent related and unrelated transplant pairs to ensure that changes in practice can be evaluated using quality-controlled high resolution immunogenetic data. Strategic selection of pairs for genomic and other molecular testing and optimization of practices associated with data storage and management also continue to be conducted to ensure that investigators have timely access to robust, high-quality data to analyze the impact of Donor/Recipient immunogenetic data as either the focus of or as a variable in NMDP/CIBMTR-approved research studies.

Development of a national framework to standardize measurable residual disease evaluation in the clinical care of patients receiving allogeneic transplant for acute myeloid leukemia

While allogeneic HCT is a curative therapy for many patients with acute myeloid leukemia (AML), the risk of relapse even after achieving a cytomorphological complete remission (CR) is the most common form of treatment failure and death. Transplant-related morbidity and mortality is a major obstacle for the effective use of alloHCT, resulting in the potential under- or over-utilization of conditioning regimen intensity to prevent AML relapse. The presence of residual leukemic burden, known as measurable residual disease (MRD), prior to transplant is associated with worse outcomes after transplantation. AML MRD testing is not standardized, and no clear path to translate findings from research laboratories to clinical transplant settings currently exists.

Planning continued on a project designed to address this issue by developing a coordinated national framework to 1) allow collection of leftover initial AML diagnosis material from patients who have received alloHCT in US centers, 2) prospectively collect samples from AML patients after alloHCT to determine optimal timing and method for post-alloHCT MRD monitoring and 3) implement findings from phases 1 and 2, together with a central reference laboratory, to allow local centers to perform standardized MRD testing pre or post alloHCT. This would allow both selection of conditioning intensity, but also inform post-transplant maintenance and allow patient selection for novel clinical trials.

During the grant period the protocol team continued to meet regularly to finalize plans to launch the IRB approved and ClinicalTrials.gov registered study protocol entitled, "MEASURE: **M**olecular **E**valuation of **A**ML patients after **S**tem cell transplant to **U**nderstand **R**elapse **E**vents". At the end of the grant period, 18 centers have committed to participate in the study and combined plan to enroll >250 patients per year. Thirteen of 18 sites have received local IRB approval for the protocol. All sites have initiated submission of regulatory documents required for participation. Eight sites have fully opened the study and have enrolled 13 patients.

Determine the impact of peripheral blood stem cell graft composition on the outcome of hematopoietic cell transplantation

While allogeneic HCT offers potentially curative therapy to patients with a variety of benign and malignant diseases, both acute and chronic GVHD continue to plague the field and often limit the longevity and quality of life for patients. The composition of PBSC grafts has been evaluated in multiple studies to attempt to discern associations between various cellular subsets and outcomes. The BMT CTN 0201 randomized trial of bone marrow versus PBSC found that PBSC grafts were associated with a higher risk of cGVHD and worse quality of life following unrelated donor HCT compared to BM. A correlative study of graft immunophenotype failed to identify any associations between PBSC graft composition and outcomes. However, the PBSC cohort included only 147 evaluable products limiting the power to evaluate various cellular subsets. The association between PBSC graft immunophenotype and outcomes remains unclear.

The primary aim of this study is to evaluate PBSC graft stem cell and associated immune cell composition and to determine at 12-months of follow-up how either the comprehensive graft cellular composition profile or specific graft composition elements influences the primary outcomes of time to neutrophil engraftment and overall survival. Secondary outcomes of interest include, but not limited to, incidence of acute and chronic GVHD, primary disease relapse, TRM, and DFS. The study will evaluate approximately 2,100 PBSC products over a 3-year accrual period with 1,100 collected in the U.S. through the NMDP and an additional 1,000 collected in Germany for U.S. based patients through the DKMS. The U.S. testing will be supported through this grant and DKMS will support testing of German collected products. Data will be merged with CIBMTR collected clinical outcomes for analysis and correlation with clinical outcomes.

Analyses include:

- Stem cell subset composition (not just number) influences time to engraftment and immune reconstitution
- Both conventional and novel unconventional T cell subsets within the graft influence GVHD, relapse, infection and immune reconstitution after transplant
- Natural killer cells have a role in transplant biology and number and phenotype in the donor graft influence GVHD, relapse, infection and immune reconstitution after transplant.
- The myeloid/antigen presenting cell compartment of the graft influences infection risk and immune reconstitution, thus play a role in long term patient outcome

The secondary aims of this study are:

- Explore potential associations of favorable PBSC graft composition features that may be predicted by analysis of peripheral blood samples at time of unrelated donor work-up such that these biomarkers could be incorporated into donor selection algorithms.

- Evaluate graft composition association with >12-month outcomes for overall survival, primary disease relapse, DFS and the incidence of late transplant effects including, but not limited to, chronic GVHD, diseases of the cardiovascular, pulmonary, and endocrine systems, dysfunction of the thyroid gland, bone diseases and the development of secondary primary malignancies.
- Establish a cohort of pre-transplant recipient and pre-donation adult unrelated donor biologic samples (whole blood, plasma, viable PBMC and viable donor PBSC graft mononuclear cells) collected prospectively from donors and patients enrolled on this study. This important biospecimen resource will be critical for the support of additional protocol team defined allogeneic HCT related correlative studies that will extend the knowledge gained from the primary study.

During the grant period accrual continued for U.S. based donors A total of 365 product samples were received and tested through March 31, 2023.

Even when patient and donor are HLA matched, post-transplant complications occur, therefore, other loci may play a role

---

With pre-transplant whole genome sequencing results from a cohort of 494 patients with MDS and their respective donors, we sought to identify the contribution of genomic factors beyond HLA to the prediction of overall survival outcomes following allogeneic HCT. Previously we identified a number of genomic factors that correlated well with transplant overall survival outcomes in this cohort and used random survival forest modeling to build prediction models first with the foundation of the known revised international prognostic scoring system data (base model) on these patients. After adding other known clinical patient data (clinical model = base model + MDS type, hypomethylating agent treatment, chemo

data) and then adding previously selected genomic candidates, we were able to obtain a striking increase of almost 0.2 in the concordance index for prediction of overall survival in patients with MDS.

Further analyses were conducted on a more a comprehensive set of genomic variants with a concentration on calling structural variants with a new machine learning framework applied to classify somatic variants validated by cytogenetic data. We previously observed when additional genomic variants were combined with clinical data that machine-learned prediction models produced an even higher concordance (~0.8) for prediction of overall survival in patients with MDS. With this new framework, we seek to apply high confidence structural variant detection to the dataset to leverage this information for use in future models. Our preliminary results show promise for the detection of true somatic structural variants. The evaluation of the contribution of structural variant genomic features in patients versus donors will contribute to downstream association analyses with transplant outcomes for patients with MDS. Additional related efforts on the analysis of mitochondrial genome contributions and the effect of deleterious variants are also under way. These efforts support the analysis and discovery of additional factors that play a role in patient transplant outcomes and will continue with funding under a subsequent grant.

D. Clinical Research in Transplantation

Conduct clinical outcomes research using the CIBMTR research database and repository.

Observational Research

- Published 139 manuscripts in peer-reviewed journals during grant period (see publications below).
- Presented 32 abstracts at the 2021 American Society of Hematology Annual Meeting held in December 2021 in Atlanta, GA. Presentation titles and type are detailed in Table 1 below and abstracts published in Blood (https://ashpublications.org/blood.issue/138/Supplement% 201).
- Presented 23 abstracts at the 2022 BMT Tandem Annual Meeting held April 23-26, 2022 in Salt Lake City, UT. Presentation titles and type are detailed in the Table 2 below and abstracts were published in a supplemental issue of the Transplantation and Cellular Therapy Journal.
- 384 proposals were received for consideration within the 15 CIBMTR Working Committee meetings held at the 2022 annual Tandem BMT Meeting. 92 were accepted for presentation in the various working committee meetings and 20 proposals were selected for activation in the 2022-2023 academic year (July 1, 2022-June 30, 2023).
- A total of 31 abstracts were presented at the 2022 American Society of Hematology (ASH) Annual Meeting held Dec. 10-13, 2022 in New Orleans, LA. Presentation titles and type are detailed in table 1 below. Abstracts are posted on the ASH annual meeting website and published in Blood.
- A total of 21 abstracts were presented at the 2023 BMT Tandem Meetings of the CIBMTR and American Society for Transplant and Cellular Therapy held February 15-19, 2023 in Orlando, FL. Presentation titles and type are detailed in table 4 below. Abstracts were published in a supplement to the Journal of Transplant and Cellular Therapy.

Table 1: CIBMTR presentations at 2021 American Society of Hematology Annual Meeting

Title	Presentation Type
Single HLA Class I Mismatches with High Peptide Divergence in the Graft-Versus-Host Direction Are Associated with Inferior Survival after 9/10 HLA-Matched UD-HCT: A Retrospective Study from the CIBMTR	Oral
Efficacy and Long-Term Outcomes of Autologous Stem Cell Transplant (ASCT) for Patients with POEMS Syndrome (Polyneuropathy, Organomegaly, Endocrinopathy, Monoclonal Protein, Skin Changes): A CIBMTR Analysis	Oral
Haploidentical Vs. Matched Unrelated Donor Transplants Using Post-Transplant Cyclophosphamide for Lymphoma: A Joint CIBMTR/EBMT Study	Oral
Deleterious Germline Variants Are Present in Patients with Myelodysplastic Syndrome of All Ages Treated with Related Allogeneic Stem Cell	Oral
The Impact of Pre-Apheresis Health Related Quality of Life on Peripheral Blood Progenitor Cell Yield and Donor's Health and Outcome: Secondary Analysis of Rdsafe and BMT CTN 0201	Poster
The Impact of Pre-Apheresis Health Related Quality of Life on Peripheral Blood Progenitor Cell Yield and Donor's Health and Outcome: Secondary Analysis of Rdsafe and BMT CTN 0201	Poster
Health-Related Quality of Life in a Biologic Assignment Trial of Reduced Intensity Hematopoietic Cell Transplantation Based on Donor Availability in Patients Aged 50-75 with Advanced Myelodysplastic Syndrome	Oral
Real-World Efficacy and Safety Outcomes for Patients with Relapsed or Refractory (R/R) Aggressive B-Cell Non-Hodgkin's Lymphoma (aBNHL) Treated with Commercial Tisagenlecleucel: Update from the Center for International Blood and Marrow Transplant Research (CIBMTR) Registry	Oral
The Impact of Somatic Mutations on Allogeneic Hematopoietic Cell Transplantation in Chronic Myelomonocytic Leukemia: A Center for International Blood and Marrow Transplant Research (CIBMTR) Analysis	Oral
Late Effects after Allogeneic Hematopoietic Cell Transplantation Among Children and Adolescents with Non-Malignant Disorders: A Report from the Center for International Blood and Marrow Transplant Research (CIBMTR)	Oral
Prompt CR Plus Consolidation Therapy Yields Improve Survival after Allogeneic Transplantation for AML Patients Receiving Myeloablative, but Not Reduced-Intensity Conditioning: A CIBMTR Analysis	Oral
Real-World Outcomes of Axicabtagene Ciloleucel (Axi-cel) for the Treatment of Large B-Cell Lymphoma (LBCL): Impact of Age and Specific Organ Dysfunction	Oral

Title	Presentation Type
Lessons from an Ongoing, Multi-Center Trial Involving Biospecimen Collection for Prospective Microbiome and Immune Profiling in Patients Undergoing Reduced Intensity Conditioning Allogeneic HCT	Poster
The Incidence and Impact of Clostridioides Difficile Infection (CDI) on Outcomes after Allogeneic Hematopoietic Cell Transplant (alloHCT) – a CIBMTR Study	Poster
COVID-19 in Pediatric Hematopoietic Cell Transplant Recipients: A CIBMTR Study	Poster
Cryopreservation of Allogeneic Hematopoietic Cell Grafts Did Not Adversely Affect Early Post-Transplant Survival during the First Six Months of the COVID-19 Pandemic	Poster
A Refined Model of HLA-DP Permissiveness Improves Stratification of Acute Graft-Versus-Host Disease Risks after Unrelated Hematopoietic Cell Transplantation: A Retrospective Study from the CIBMTR	Poster
Bacterial Prophylaxis in Patients with Acute Gvhd; Who Is at Risk for Bloodstream Infections?	Poster
Peri-Transplant Alemtuzumab Levels Predict Risk of Secondary Graft Failure and Inversely Impact CXCL9 Levels after RIC HCT (A Correlative Biology Study to BMT-CTN 1204 RICHI)	Oral
Donor Socioeconomic Status As a Predictor of Altered Immune Function and Treatment Response Following Hematopoietic Cell Transplantation for Hematologic Malignancy	Oral
Trends in Use and Outcomes of Autologous and Allogeneic Hematopoietic Cell Transplantation in Racial/Ethnic Minorities	Oral
Racial and Socioeconomic Disparities in Long-Term Outcomes in ≥ 1 Year Allogeneic Hematopoietic Cell Transplantation Survivors: A CIBMTR Analysis	Poster
Impact of Allogeneic Hematopoietic Cell Transplantation (HCT) As Consolidation Following CD19 Chimeric Antigen Receptor (CAR) T Cell Therapy for Treatment of Relapsed Acute Lymphoblastic Leukemia (ALL)	Poster
Identification of Novel Prognostic Biomarkers DDX11 and CHD1 of Allogeneic Hematopoietic Cell Transplantation Outcomes for Patients with MDS: A CIBMTR Comprehensive Genomic Screening	Poster
Genomic Subgroups Impact Post-Transplant Survival in Patients with Myelodysplastic Syndrome: A CIBMTR Analysis	Poster
Impact of Center Experience with Donor Type and Treatment Platform on Outcomes: A Secondary Analysis BMT CTN 1101	Poster

Title	Presentation Type
Impact of HLA Molecular Mismatch on Haploidentical Hematopoietic Stem Cell Transplantation: A Center for International Blood and Marrow Transplant Research Study	Poster
Trends in Allogeneic Hematopoietic Cell Transplantation Utilization and Estimated Unmet Need Among Medicare Beneficiaries with Acute Myeloid Leukemia	Poster
Improved Overall Survival of Patients Treated with Abatacept in Combination with a Calcineurin Inhibitor and Methotrexate Following 7/8 HLA-Matched Unrelated Allogeneic Hematopoietic Stem Cell Transplantation: Analysis of the Center for International Blood and Marrow Transplant Research Database	Poster
Major ABO Incompatibility Significantly Influences the Survival and Outcomes after Allogeneic Hematopoietic Cell Transplantation in Leukemia – CIBMTR Analysis	Oral
Impact of Autologous Hematopoietic Cell Transplant (HCT) Followed By Dendritic Cell/Myeloma Fusion Vaccine with Lenalidomide Maintenance in Increasing Multiple Myeloma (MM) Immunity (BMT CTN 1401)	Oral
Superior Outcomes with Fludarabine-Busulfan (Flu/Bu) Based Conditioning for Allogeneic Hematopoietic Cell Transplantation in Myelofibrosis - a Comparative Analysis By CIBMTR	Oral

Table 2: CIBMTR presentations at 2022 BMT Tandem Annual Meeting

Title	Presentation Type
Outcomes of Allogeneic Hematopoietic Cell Transplantation in Blastic Plasmacytoid Dendritic Cell Neoplasm: A CIBMTR Analysis	Poster
A Pilot Study Exploring the Link between Donor-Engrafted Clonal Hematopoiesis and Outcomes of Allogeneic Hematopoietic Cell Transplantation from Older Matched Sibling Donors	Poster
Improved Overall Survival of Patients Treated with Abatacept in Combination with a Calcineurin Inhibitor and Methotrexate Following Allogeneic Hematopoietic Stem Cell Transplantation: Analysis of the Center for International Blood and Marrow Transplant Research Database	Poster

Title	Presentation Type
Effect of Autograft CD34 + Dose on Outcome in Pediatric Patients Undergoing Autologous Hematopoietic Stem Cell Transplant for Central Nervous System Tumors.	Poster
Impact of CD34+ Cell Dose on Outcome Among Children Undergoing Autologous Hematopoietic Stem Cell Transplant for High-Risk Neuroblastomas.	Poster
Single HLA Class I Mismatches with High Peptide Divergence in the Graft-Versus-Host Direction Are Associated with Inferior Survival after 9/10 HLA- Matched UD-HCT: A Retrospective Study from the CIBMTR	Poster
Return to School Practices after Hematopoietic Cell Transplantation: A Survey of Transplant Centers in the United States	Poster
What Do Patients Think about Palliative Care? A National Survey of Hematopoietic Stem Cell Transplant Recipients	Poster
Enhancing Administrative Claims Data to Identify and Address Barriers to Treatment: NMDP Search and CMS Medicare Claims Merged Dataset	Poster
Humoral Immunogenicity of Sars-Cov-2 Vaccination in the First Year after Hematopoietic Cell Transplant or Chimeric Antigen Receptor T Cell Therapy: A CIBMTR and BMT CTN Study	Poster
The Use of Search Summary Score Tool for Rapid Unrelated Bone Marrow Search Assessment	Poster
A Tool to Assess Functional HLA-DPB1 Variation in Transplantation	Poster
Unrelated Donor Registry HLA Match Likelihoods in the Mismatched Setting	Poster
A report from the National Marrow Donor Program: Neither COVID-19, nor cryopreservation, prevented allogeneic product infusion.	Poster
Impact of Bortezomib-Based Vs. Lenalidomide Maintenance Therapy on Outcomes of Patients with High-Risk Multiple Myeloma	Oral
A refined model of HLA-DP permissiveness improves stratification of acute graft-versus-host disease risks after unrelated hematopoietic cell transplantation: a retrospective study from the CIBMTR	Oral

Title	Presentation Type
Mutation Analysis in Patients with High-Risk Myelodysplastic Syndrome Receiving Allogeneic Hematopoietic Cell Transplantation Based on Biological Donor Availability: Blood and Marrow Transplant Clinical Trials Network (BMT CTN) Study 1102.	Oral
Trends in Late Mortality Amongst Two-Year Survivors of Pediatric and Young Adult Allogeneic Hematopoietic Cell Transplantation for Acute Leukemias: On Behalf of the CIBMTR Late Effects Working Committee	Oral
Chimeric Antigen Receptor t-Cell (CAR-T) Therapy Recipients and Worsening Financial Impact over Time: A Mixed Methods Longitudinal Study	Oral
Impact of Donor Socioeconomic Status on Recipient Outcomes Following Hematopoietic Cell Transplantation	Oral
Racial and Ethnic Diversity on Blood and Marrow Transplant Clinical Trials Network (BMT CTN) Trials – We Can Do Better.	Oral
Haploidentical Versus Matched Unrelated Donor Transplants for Lymphomas Using Post-Transplant Cyclophosphamide: A Joint CIBMTR/EBMT Study	Oral
Cryopreservation of Allogeneic Hematopoietic Cell Grafts Did Not Adversely Impact Early Post-Transplant Survival during the First Six Months of the COVID-19 Pandemic	Oral

Table 3: CIBMTR presentations at 2022 ASH Annual Meeting

Title	Presentation Type
Does Race/Ethnicity Impact Umbilical Cord Blood Transplant Outcomes in a Contemporary Era?	Oral
Association between patient-reported outcomes and the social transcriptome profile as a predictor of clinical outcomes following hematopoietic stem cell transplant	Oral
Graft Failure in MDS and Acute Leukemia Patients After Allogeneic Stem Cell Transplantation Receiving Post Transplant Cyclophosphamide	Oral
Younger Matched Unrelated Donors Confer a Decreased Relapse Risk As Compared to Older Sibling Donors for Adult B-Cell ALL Patients Undergoing Allogeneic Hematopoietic Cell Transplantation	Oral
Comparison of Allogeneic Hematopoietic Cell Transplantation Outcomes from Younger Matched Unrelated Donor Versus Older Sibling Donor for Acute Myeloid Leukemia	Oral
Germline-somatic interactions drive JAK2-mediated clonal expansion in myelofibrosis.	Oral

Title	Presentation Type
A Real-World Evidence Comparison of One-Year Overall Survival and Relapse-Free Survival Between Patients Treated with Abatacept in Combination with a Calcineurin Inhibitor and Methotrexate versus Antithymocyte Globulin or Post-Transplant Cyclophosphamide Following Allogeneic Hematopoietic Cell Transplantation	Oral
Real-World Outcomes for Patients with Relapsed or Refractory (R/R)Aggressive B-Cell Non-Hodgkin's Lymphoma (aBNHL) Treated withCommercial Tisagenlecleucel: Subgroup Analyses from the Center for International Blood and Marrow Transplant Research (CIBMTR) Registry	Oral
Clinical outcomes following allogenic transplant with omidubicel or other donor sources in patients with hematologic malignancies: comparison of clinical trial results to external controls drawn from the CIBMTR database	Oral
Development of A risk score to predict the incidence of acute graft versus host disease after allogeneic hematopoietic cell transplantation (HCT)	Oral
Observational cohort study of people living with HIV treated with CD19-directed CAR T cell therapy for B-cell lymphoid malignancies	Oral
Improved Outcomes of UM171-Expanded Cord Blood Transplantation Compared with Other Graft Sources: A Real-World Database Study	Oral
Ongoing Risk of Unrelated Donors Testing Positive for COVID-19 Following Medical Clearance and Impact on Operations: A Report from the National Marrow Donor Program	Oral
Associations of Minor Histocompatibility Antigens with Clinical Outcomes Following Allogeneic Hematopoietic Cell Transplantation	Oral
International Collaborative Study to Compare the Prognosis for Acute Leukemia Patients Transplanted with Intensified Myeloablative Regimens	Poster
Impact of center specific analysis on hematopoietic cell transplant center volumes	Poster
Comorbidities, Toxicities and Efficacy Outcomes after Chimeric Antigen Receptor T-cell Therapy in B cell Lymphoma	Poster
Impact of Age on Outcomes after CD19 Directed CAR T Cell Therapy for Large B Cell Lymphomas: Real World Experience from the Center for International Blood & Marrow Transplant Research (CIBMTR)	Poster
Racial, ethnicity and socioeconomic disparity in outcome of patients with chronic graft-versus-host disease	Poster
Utilization of Autologous HCT in Multiple Myeloma: A novel linkage of CIBMTR, cancer registry and hospitalization data in California	Poster
Subsequent Solid Neoplasms Following Hematopoietic Cell Transplantation (HCT) for Hematologic Malignancies: Comparing Center For International Blood And Marrow Transplant Research (CIBMTR) and California Cancer Registry (CCR) Data	Poster
Comparison of vital status and cause-specific mortality after Hematopoietic Cell Transplantation between the Center for International Blood and Marrow Transplant Research and the California Cancer Registry: a record-linkage analysis from 1991 to 2018	Poster
Access: A Multi-Center, Phase II Trial of HLA-Mismatched Unrelated Donor Hematopoietic Cell Transplantation with Post-Transplantation Cyclophosphamide for Patients with Hematologic Malignancies	Poster

Title	Presentation Type
Quality of Life in Patients Undergoing Double Umbilical Cord Blood vs. Haploidentical Marrow Transplantation: a QOL Analysis Report of BMT CTN 1101	Poster
Comparable Incidence Rates of Hematologic and Non-Hematologic Malignancies, Thrombotic Events, and Autoimmune Disorders in Unrelated Adult Donors Undergoing Bone Marrow Collection Versus Peripheral Blood Stem Cell Mobilization with Recombinant Human Granulocyte Colony-Stimulating Factor (rHuG-CSF): Results of the Donor Long-Term Follow-up Study By the National Marrow Donor Program (NMDP)	Poster
An Exploration of Unrelated Donor Existence for Patients Who Received Haploidentical Hematopoietic Cell Transplants	Poster
Analysis of US Registry Data on Patient Characteristics, Treatment Patterns and Outcomes of Patients Receiving Extracorporeal Photopheresis with or without Ruxolitinib	Poster
Veno-Occlusive Disease Risk and Other Outcomes in Patients with B-Cell Precursor Acute Lymphoblastic Leukemia Who Received Inotuzumab Ozogamicin and Proceeded to Hematopoietic Stem Cell Transplantation: A Registry-Based, Observational Study	Poster
Shared Graft Versus Leukemia Minor Histocompatibility Antigens in DISCOVeRY-BMT	Poster
Genome-Wide Non-HLA Mismatches Improve Risk Stratification for Overall Survival and Cause Specific Mortality after Unrelated Donor Allogeneic HCT	Poster

Table 4. CIBMTR presentations at 2023 BMT Tandem Meetings

Title	Status
Posttransplant Cyclophosphamide-Based Transplantation from Haploidentical Donors Has Similar Outcomes As Unrelated Donor Transplantation in Myelofibrosis: A Center for International BMT Research (CIBMTR) Study	Oral
Comparison of Allogeneic Hematopoietic Cell Transplantation Outcomes from Younger Matched Unrelated Donor Versus Older Sibling Donor for Acute Myeloid Leukemia	Oral
Younger Matched Unrelated Donors Confer a Decreased Relapse Risk As Compared to Older Sibling Donors for Adult B-Cell ALL Patients Undergoing Allogeneic Hematopoietic Cell Transplantation	Oral
Associations of Minor Histocompatibility Antigens with Clinical Outcomes Following Allogeneic Hematopoietic Cell Transplantation	Oral
Improved Relapse-Free Survival (RFS) for Pediatric and Young Adult Patients with Relapsed or Refractory (R/R) B-Cell Acute Lymphoblastic Leukemia (B-ALL) and Low or Intermediate Preinfusion Disease Burden Treated with Tisagenlecleucel: Results from the CIBMTR Registry	Oral
Shared Graft Versus Leukemia Minor Histocompatibility Antigens in Discovery-BMT	Oral

Title	Status
HLA Evolutionary Divergence Does Not Predict Relapse and Survival Following Allogeneic Hematopoietic Stem Cell Transplant for Myeloid and Lymphoid Malignancies	Poster
Impact of Public Reporting of Center-Specific Analysis Scores on Hematopoietic Cell Transplant Center Volumes	Poster
Access: A Multi-Center, Phase II Trial of HLA-Mismatched Unrelated Donor Hematopoietic Cell Transplantation with Post-Transplantation Cyclophosphamide for Patients with Hematologic Malignancies	Poster
An Exploration of Unrelated Donor Existence for Patients Who Received Haploidentical Hematopoietic Cell Transplants	Poster
Association between Patient-Reported Social Determinant of Health Outcomes and a Social Genomics Profile in Allogeneic Hematopoietic Cell Transplantation: A Center for International Blood and Marrow Transplant Research (CIBMTR) Analysis	Poster
Can You Spare 100 Days? The Allogeneic Hematopoietic Cell Transplant Caregiver Requirement	Poster
Can You Spare 100 Days? Allogeneic Hematopoietic Cell Transplant Caregiver Requirements from the Perspective of Recipients and Caregivers	Poster
Does Race/Ethnicity Impact Umbilical Cord Blood Transplant in a Contemporary Era?	Poster
Delayed CD4+ T Cell Recovery after Allogeneic Hematopoietic Cell Transplantation Is Associated with Decreased Overall Survival in Adult but Not Pediatric Recipients	Poster
Patient-Reported Outcomes in Long-Term Survivors of Autologous Hematopoietic Cell Transplantation (AHCT) for Hodgkin (HL) and Non-Hodgkin Lymphoma (NHL): Secondary Analysis from Two Multicenter Randomized Controlled Trials (RCT) of Hematopoietic Cell Transplant Survivorship Interventions	Poster
Ph-Positive ALL Patients Who Are Treated with Tyrosine Kinase Inhibitors Have Similar Post-Transplant Survival As Ph-Negative Patients	Poster
Ongoing Risk of Unrelated Donors Testing Positive for COVID-19 Following Medical Clearance and Impact on Operations: A Report from the National Marrow Donor Program	Poster
Trends in Utilization of Autologous and Allogeneic Hematopoietic Cell Transplantation in Racial/Ethnic Minorities	Poster
Disease-Specific Overall Survival Prediction after Allogeneic Hematopoietic Cell Transplantation	Poster
A Retrospective Analysis of Genotype Copy Number (GCN) in Unrelated Donor Transplants and Future Implications for Mismatched Transplants	Poster

Research data collection and systems enhancements

During the grant period, CIBMTR has continued support for electronic data submission initiatives, production FormsNet Recipient, FormsNet Donor, and AGNIS customers, as well as Data Warehouse users. Progress has been made on the following critical projects to upgrade our technology supporting the program:

Simplify Data Acquisition
To acquire timely, high quality, data with less administrative burden to current and new partners/patients.

FormsNet (FN3)
Continued the quarterly releases of recipient form revisions to be current with existing treatment practices, as well as implemented revisions of forms to support the cellular therapies registry. Completed and in-process enhancements within Data Capture applications.

Developed and released the following data collection forms during the grant period:

Quarter 1:

Form	Form Name	Category
2003R1	Gene Therapy Product	New recipient form
2037R3	Leukodystrophies Pre-Infusion	Revised recipient form
2137R3	Leukodystrophies Post-Infusion	Revised recipient form
2400R9	Pre-Transplant Essential Data	Revised recipient form
2450R6	Post-Transplant Essential Data	Revised recipient form
2814R4	Indication for CRID Assignment	Revised recipient form
2900R5	Recipient Death Data	Revised recipient form

Quarter 2:

Form	Form Name	Category
4003R5	Cellular Therapy Product	Revised cellular therapy form
4006R6	Cellular Therapy Infusion	Revised cellular therapy form
4100R8	Cellular Therapy Essential Data Follow-up	Revised cellular therapy form

Quarter 3:

Form	Form Name	Category
2058R1	Thalassemia Pre-Infusion Data	New form
2158R1	Thalassemia Post-Infusion Data	New form

Quarter 4:

Form	Form Name	Category
2400R10	Pre-Transplant Essential Data	Revised recipient form
2402R7	Disease Classification	Revised recipient form
2006R6	Hematopoietic Cellular Transplant (HCT) Infusion	Revised recipient form
4000R9	Cellular Therapy Essential Data Pre-Infusion	Revised recipient form
2450R7	Post-Transplant Essential Data	Revised recipient form
2100R8	Post-Infusion Follow-Up	Revised recipient form
2199R1	Donor Lymphocyte Infusion	New recipient form
710r8/712r8/713r8/714r8	Filgrastim Mobilized PBSC Day One / Day Two / Day Three / Day Four Donor Assessment	Revised Donor Form
Form 715r5	Neupogen (filgrastim) Administration Confirmation	Revised Donor Form
Form 730/731	Filgrastim Mobilized PBSC Day Five and Day Six Donor Assessment / Apheresis Procedure	Revised Donor Form

Electronic data submission/AGNIS
CIBMTR continued support for electronic data submission initiatives and production AGNIS customers. Effort focused on development of new AGNIS instances of CIBMTR disease specific forms, and support for CIBMTR form revision updates to existing forms. The team is in process of completing communication, educational and technical project implementations to lower AGNIS submission burden.

Automated data exchange using electronic data collection systems that interface directly with source health and laboratory records
CIBMTR has continued to update its reporting application to exchange additional discrete electronic data records. Using the data extracted directly from data collection systems at partner centers, CIBMTR further expanded capabilities to populate additional laboratory data points on 26 forms at both pre-infusion and post-infusion time points. These expanded capabilities provide partner transplant centers with improved time savings and eliminate the potential of manual data entry errors. Additionally, the underlying structures for data exchange and storage were updated based on current standards – these updates are the foundation upon which we will be able to expand the types of data that can be exchanged electronically.

Integrated Data Warehouse (IDW)
CIBMTR continued to increase the capabilities of the IDW, which is the Operational Data Warehouse utilized for delivery of key data to stakeholders. Accomplishments include:

- Incorporated ongoing forms revisions into the warehouse
- Continued enhancing processes to support CIBMTR's Domestic and International CPI Processes.
- Completed Cord Blood Bank requests to the Cord Blood Data Quality Report.
- Continued enhancing study information and visualizations to support our Prospective Research team.
- Began planning to enhance our Sample Inventory data processes with Labvantage
- Completed 2021 Center Volumes Data Reporting project and initiated first round of 2022 project.
- Provided ePRO data for use in Data Back to Centers (DBtC) dashboard.
- Provided Survivorship Plans for external partners use through the DBtC portal

Unified Domain Model (UDM)
Continuing the process of building this single source of truth of data that will contain high quality, validated data readily available to researchers for immunobiology, outcomes, and other types of analyses.

- Continued transitioning HCT data from the Research Database to the Unified Domain Model (UDM) including delivery of 45 data extracts directly from UDM and continued development of a relapse-specific data domain.
- Continued delivery of monthly and quarterly CAR T-cell data sets to our Japan (JDCHCT) and pharmaceutical partners.
- Continued refinement and delivery of Periodic Safety Update Reports (PSUR) for two CAR T-cell therapies.
- Provided quarterly Stem Cell Therapeutic Outcomes Data required for the HRSA SCTOD quarterly report.
- We have recently completed the work allowing UDM to fully ingest the HLA and match grade data pertaining to all allogeneic and autologous transplants tracked by the CIBMTR. This data is provided internally through an HLA Save extract and can be combined with any other data extracts.
- Added new donor lymphocyte infusion (DLI) table structure to enable loading of this new FormsNet form data into UDM.

Enhance Data Sharing and Visualization
Deliver data visualization and analytic tools that will enable stakeholders to more efficiently interact with data to identify relevant trends and patterns.

- Enhanced the Data Back to Centers (DBtC) dashboard and Data Back to Centers Download (DBtC-Download) to leverage the extracts produced from UDM and the HCT Centralization project
- Created additional reports in new Business Intelligence tool, Looker, to support CIBMTR Prospective Research team needs. Enhanced Business Intelligence reports to support ePRO Data Quality efforts.
- Business Intelligence Data Sharing- Continued expansion of business intelligence tool capabilities. Adding to the existing suite of external Business Intelligence data sharing applications including the introduction of more data, dimensions and measures, stakeholder groups, and continuing data quality initiatives.

- Released a new version of the HLA Save extract. This extract has been developed on CIBMTR's new UDM data platform. This delivery has dramatically transformed the production of this important data set. The HLA Save extract contains the best match grade information (HLA typing and computed match grade scores) for every transplant known to the CIBMTR. This includes all allogeneic transplants

reported to CIBMTR including NMDP facilitated and non-NMDP facilitated unrelated and related transplants. The extract contains ~174,000 cases from 1999 to 2022, and the technical changes that have occurred have reduced the preparation time from 3-4 weeks down to less than one day. In the past, the process involved 7-8 people performing tasks, and the new process needs only a single person to do the technical work, and a single person to check the automated QA results. Our new platform will allow for new service integrations, new match grade computations, and much better integration with patient outcomes.

Publications

1. Pasvolsky O, Yeshurun M, Fraser R, et al. Maintenance therapy after second autologous hematopoietic cell transplantation for multiple myeloma. A CIBMTR analysis. Bone Marrow Transplantation. doi:10.1038/s41409-021-01455-y. Epub 2021 Oct 4. Impact Factor: 5.48

2. Bhatt VR, Wang T, Chen K, et al. Chronic Graft-Versus-Host Disease, Non-Relapse Mortality and Disease Relapse in Older versus Younger Adults Undergoing Matched Allogeneic Peripheral Blood Hematopoietic Cell Transplantation: A CIBMTR Analysis. Transplantation and Cellular Therapy. doi:10.1016/j.jtct.2021.10.002. Epub 2021 Oct 9. Impact Factor: 5.60

3. Cancio M, Hebert K, Kim S, et al. Outcomes in hematopoietic stem cell transplantation for congenital amegakaryocytic thrombocytopenia. Transplantation and Cellular Therapy. doi:10.1016/j.jtct.2021.10.009. Epub 2021 Oct 17. Impact Factor: 5.60

4. Hamadani M, Gopal AK, Pasquini MC, et al. Allogeneic Transplant and CAR-T Therapy After Autologous Transplant Failure in DLBCL: A Noncomparative Cohort Analysis. Blood Advances. doi:10.1182/bloodadvances.2021005788. Epub 2021 Oct 21. Impact Factor: 6.79

5. Cusatis R, Flynn KE, Vasu S, Pidala J, Muffly L, Uberti J, Tamari R, Mattila D, Mussetter A, Bruzauskas R, Chen M, Leckrone E, Myers J, Mau L-W, Rizzo JD, Saber W, Horowitz M, Lee SJ, Burns LJ, Shaw B. Adding centralized electronic patient-reported outcome data collection to an established international clinical outcomes registry. Transplantation and Cellular Therapy. 2022 Feb 1; 28(2):112.e1-112.e9. doi:10.1016/j.jtct.2021.10.016. Epub 2021 Oct 29. PMC8915447. Impact Factor: 5.60

6. Phelan R, Im A, Hunter RL, Inamoto Y, et al. Male-specific late effects in adult hematopoietic cell transplantation recipients: a systematic review from the Late Effects and Quality of Life Working Committee of the Center for International Blood and Marrow Transplant Research and Transplant Complications Working Party of the European Society of Blood and Marrow Transplantation. Transplantation and Cellular Therapy. doi:10.1016/j.jtct.2021.10.013. Epub 2021 Oct 29. Impact Factor: 5.60

7. Fuchs EJ, McCurdy SR, Solomon SR, et al. HLA informs risk predictions after haploidentical stem cell transplantation with post-transplantation cyclophosphamide. Blood. doi:10.1182/blood.2021013443. Epub 2021 Nov 1. Impact Factor: 22.11

8. Zou J, Wang T, He M, Bolon YT, et al. Number of HLA mismatched eplets is not associated with major outcomes in haploidentical transplantation with post-transplantation cyclophosphamide: A Center for International Blood and Marrow Transplant Research Study. Transplantation and Cellular Therapy. doi:10.1016/j.jtct.2021.11.001. Epub 2021 Nov 11. Impact Factor: 5.60

9. O' Donnell PV, Brunstein CG, Fuchs EJ, et al. Umbilical cord blood or HLA-haploidentical transplantation: Real world outcomes vs randomized trial outcomes. Transplantation and Cellular Therapy. doi:10.1016/j.jtct.2021.11.002. Epub 2021 Nov 11. Impact Factor: 5.60

10. Sidana S, Kumar S, Fraser R, et al. Impact of induction therapy with VRD vs. VCD on outcomes in patients with multiple myeloma in partial response or better undergoing upfront autologous stem cell transplantation. Transplantation and Cellular Therapy. doi:DOI: 10.1016/j.jtct.2021.10.022. Epub 2021 Nov 12. Impact Factor: 5.60

11. Martin PJ, Levine DM, Storer BE, Zheng X, Jain D, Heavner B, Norris BM, Geraghty DE, Spellman SR, Sather CL, Wu F, Hansen JA. A model of minor histocompatibility antigens in allogeneic hematopoietic cell transplantation. Frontiers in Immunology. 12:782152. doi:10.3389/fimmu.2021.782152. Epub 2021 Nov 18. PMC8636906. Impact Factor: 6.42

12. Tan CR, Estrada-Merly N, Landau H, et al. A second autologous hematopoietic cell transplantation is a safe and effective salvage therapy in select relapsed or refractory AL amyloidosis patients. Bone Marrow Transplantation. doi:10.1038/s41409-021-01527-z. Epub 2021 Nov 20. Impact Factor: 5.48

13. Meyers G, Hamadani M, Martens MJ, et al. Lessons learned from early closure of a clinical trial for steroid-refractory acute GVHD Bone Marrow Transplantation. doi:10.1038/s41409-021-01529-x. Epub 2021 Nov 23. Impact Factor: 5.48

14. Luznik L, Pasquini M, Logan B, et al. Randomized Phase III BMT CTN Trial of Calcineurin Inhibitor-Free Chronic Graft-Versus-Host Disease Interventions in Myeloablative Hematopoietic Cell Transplantation for Hematologic Malignancies. Journal of Clinical Oncology. doi:10.1200/JCO.21.02293. Epub 2021 Dec 2. Impact Factor: 44.54

15. Hamadani M, Ngoya M, Sureda A, et al. Outcome of allogeneic transplantation for mature t-cell lymphomas: impact of donor source and disease characteristics. Blood Advances. doi:10.1182/bloodadvances.2021005899. Epub 2021 Dec 3. Impact Factor: 6.79

16. Epperla N, Hamadani M. Double-refractory Hodgkin lymphoma: tackling relapse after brentuximab vedotin and checkpoint inhibitors. Hematology / the Education Program of the American Society of Hematology. 2021 Dec 10; 2021(1):247-253. doi:10.1182/hematology.2021000256. Epub 2021 Dec 10. Impact Factor: 3.06

17. Schetelig J, Baldauf H, Koster L, et al. Corrigendum: Haplotype motif-based models for kir-genotype informed selection of hematopoietic cell donors fail to predict outcome of patients with myelodysplastic syndromes or secondary acute myeloid leukemia. Frontiers in Immunology. 2021 Dec 21; 12:813838. doi:10.3389/fimmu.2021.813838. Epub 2021 Dec 21. Impact Factor: 7.56

18. Iqbal M, Savani BN, Hamadani M. New indications and platforms for CAR-T therapy in lymphomas beyond DLBCL. EJHaem. 2022 Jan 1; 3(Suppl 1):11-23. doi:10.1002/jha2.323. Epub 2022 Jan 1. Impact Factor: 2.99

19. Martin PJ, Levine D, Storer BE, et al. Genetic associations with immune-mediated outcomes after allogeneic hematopoietic cell transplantation. Blood Advances. doi:10.1182/bloodadvances.2021005620. Epub 2022 Jan 7. Impact Factor: 5.48

20. Guru Murthy GS, Kim S, Hu Z-H, et al. Relapse and disease-free survival in patients with myelodysplastic syndrome undergoing allogeneic hematopoietic cell transplantation using older matched sibling donors vs younger matched unrelated donors. JAMA Oncology. doi:10.1001/jamaoncol.2021.6846. Epub 2022 Jan 13. Impact Factor: 31.77

21. Xu Y, Kim S, Zhang M-J, et al. Competing risks regression models with covariates-adjusted censoring weight under the generalized case-cohort design. Lifetime Data Analysis. doi:10.1007/s10985-022-09546-8. Epub 2022 Jan 15. Impact Factor: 1.58
22. Kim S, Kim J-K, Ahn KW. A calibrated Bayesian method for the stratified proportional hazards model with missing covariates. Lifetime Data Analysis. doi:10.1007/s10985-021-09542-4. Epub 2022 Jan 16. Impact Factor: 1.58

23. Murthy HS, Ahn KW, Estrada-Merly N, et al. Outcomes of allogeneic hematopoietic cell transplantation in T-cell prolymphocytic leukemia: a contemporary analysis from the Center for International Blood and Marrow Transplant Research. Transplantation and Cellular Therapy. 2022 Feb 8; 6(3):920-930. doi:10.1016/j.jtct.2022.01.017. Epub 2022 Jan 23. Impact Factor: 5.60

24. Hu Z-H, Wang H-L, Gale RP, et al. Correction to: A SAS macro for estimating direct adjusted survival functions for time-to-event data with or without left truncation. Bone Marrow Transplantation. doi:10.1038/s41409-021-01533-1. Epub 2022 Feb 1. Impact Factor: 5.48

25. Savani M, Ahn KW, Chen Y, et al. Impact of conditioning regimen intensity on the outcomes of peripheral T-cell lymphoma, anaplastic large cell lymphoma and angioimmunoblastic T-cell lymphoma patients undergoing allogeneic transplant. British Journal of Haematology. doi:10.1111/bjh.18052. Epub 2022 Feb 2. Impact Factor: 6.99

26. Mei M, Hamadani M, Ahn KW, et al. Autologous hematopoietic cell transplantation in diffuse large B-cell limphoma after 3 or more lines of prior therapy: evidence of durable benefit. Haematologica. doi:10.3324/haematol.2021.279999. Epub 2022 Feb 3. Impact Factor: 9.94

27. Dispenzieri A, Krishnan A, Arendt B, et al. Mass-Fix better predicts for PFS and OS than standard methods among multiple myeloma patients participating on the STAMINA trial (BMT CTN 0702 /07LT) Blood Cancer Journal. 2022 Feb 10; 12(2):27. doi:10.1038/s41408-022-00624-6. Epub 2022 Feb 10. Impact Factor: 11.03

28. Stewart MD, McCall B, Pasquini M, et al. Need for aligning the definition and reporting of cytokine release syndrome (CRS) in immuno-oncology clinical trials. Cytotherapy. doi:10.1016/j.jcyt.2022.01.004. Epub 2022 Feb 23. Impact Factor: 5.41

29. Petersdorf EW, Bengtsson M, Horowitz MM, et al. HLA-DQ heterodimers in hematopoietic-cell transplantation. Blood. doi:10.1182/blood.2022015860. Epub 2022 Mar 10. Impact Factor: 23.63

30. St. Martin A, Hebert KM, Serret-Larmande A, et al. Long-term survival after hematopoietic cell transplant for sickle cell disease compared to the United States population. Transplantation and Cellular Therapy. doi:10.1016/j.jtct.2022.03.014. Epub 2022 Mar 14. Impact Factor: 5.60

31. Abou-Ismail MY, Fraser R, Allbee-Johnson M, et al. Does recipient body mass index inform donor selection for allogeneic haematopoietic cell transplantation? British Journal of Haematology. doi:10.1111/bjh.18108. Epub 2022 Mar 14. Impact Factor: 5.67

32. Jimenez Jimenez AM, De Lima M, Komanduri KV, et al. Correction to: An adapted European LeukemiaNet genetic risk stratification for acute myeloid leukemia patients undergoing allogeneic hematopoietic cell transplant. A CIBMTR analysis. Bone Marrow Transplantation. doi:10.1038/s41409-022-01625-6. Epub 2022 Mar 16. Impact Factor: 5.48

33. Patel SS, Ahn KW, Khanal M, et al. Non-infectious pulmonary toxicity after allogeneic hematopoietic cell transplantation. Transplantation and Cellular Therapy. doi:10.1016/j.jtct.2022.03.015. Epub 2022 Mar 18. Impact Factor: 5.60

34. Baccarani M, Bonifazi F, Soverini S, et al. Questions concerning tyrosine kinase-inhibitor therapy and transplants in chronic phase chronic myeloid leukaemia. Leukemia. 2022 May 1; 36(5):1227-1236. doi:10.1038/s41375-022-01522-3. Epub 2022 Mar 25. PMC9061294. Impact Factor: 11.53

35. Correa C, Gonzalez-Ramella O, Baldomero H, et al. Increasing access to hematopoietic cell transplantation in Latin America: Results of the 2018 LABMT activity survey and trends since 2012. Bone Marrow Transplantation. 2022 Jun 1; 57(6):881-888. doi:10.1038/s41409-022-01630-9. Epub 2022 Mar 28. Impact Factor: 6.50

36. Maakaron JE, Zhang M-J, Chen K, et al. Age is no barrier for adults undergoing HCT for AML in CR1: Contemporary CIBMTR analysis. Bone Marrow Transplantation. 2022 Jun 1; 57(6):911-917. doi:10.1038/s41409-022-01650-5. Epub 2022 Apr 2. PMC9232949. Impact Factor: 5.48

37. Brunstein CG, O'Donnell P, Logan B, et al. Impact of Center Experience with Donor Type on Outcomes: A Secondary Analysis BMT CTN 1101Open for Accrual June 2012 Open for Accrual June 2012 Transplantation and Cellular Therapy. doi:10.1016/j.jtct.2022.03.024. Epub 2022 Apr 4. Impact Factor: 5.60

38. Morishima Y, Morishima S, Stevenson P, et al. Race and survival in unrelated hematopoietic-cell transplantation. Transplantation and Cellular Therapy. doi:10.1016/j.jtct.2022.03.026. Epub 2022 Apr 8. Impact Factor: 5.60

39. Phelan R, Chen M, Bupp C, et al. Updated trends in hematopoietic cell transplantation in the United States with an additional focus on adolescent and young adult transplantation activity and outcomes. Transplantation and Cellular Therapy. doi:10.1016/j.jtct.2022.04.012. Epub 2022 Apr 18. Impact Factor: 5.60

40. Mei M, Pillai R, Kim S, et al. The mutational landscape in chronic myelomonocytic leukemia and its impact on allogeneic hematopoietic cell transplantation outcomes: a Center for Blood and Marrow Transplantation Research (CIBMTR) analysis. Haematologica. doi:10.3324/haematol.2021.280203. Epub 2022 Apr 21. Impact Factor: 9.94

41. Thanarajasingam G, Minasian LM, Bhatnagar V, et al. Reaching beyond maximum grade: progress and future directions for modernising the assessment and reporting of adverse events in haematological malignancies. The Lancet Haematology. 2022 May 1; 9(5):e374-e384. doi:10.1016/S2352-3026(22)00045-X. Epub 2022 Apr 29. Impact Factor: 18.95

42. Kansagra A, Dispenzieri A, Fraser R, et al. Outcomes after autologous hematopoietic cell transplantation in POEMS syndrome and comparison with multiple myeloma. Blood Advances. doi:10.1182/bloodadvances.2022007218. Epub 2022 May 4. Impact Factor: 5.48

43. Phelan R, Im A, Hunter RL, et al. Male-specific late effects in adult hematopoietic cell transplantation recipients: A systematic review from the Late Effects and Quality of Life Working Committee of the Center for International Blood and Marrow Transplant Research and Transplant Complications Working Party of the European Society of Blood and Marrow Transplantation. Bone Marrow Transplantation. doi:10.1016/j.jtct.2021.10.013. Epub 2022 May 6. Impact Factor: 5.48

44. Hamilton BK, Cutler C, Divine C, et al. Are We Making PROGRESS in Preventing Graft-versus-Host Disease and Improving Clinical Outcomes? Impact of BMT CTN 1301 Study Results on Clinical Practice. Transplantation and Cellular Therapy. doi:10.1016/j.jtct.2022.05.002. Epub 2022 May 9. Impact Factor: 5.60

45. D'Souza A, Brazauskas R, Stadtmauer E, et al. Trajectories of quality of life recovery and symptom burden after autologous hematopoietic cell transplantation in multiple myeloma American Journal of Hematology. doi:10.1002/ajh.26596. Epub 2022 May 14. Impact Factor: 10.04

46. Broglie L, Friend BD, Chhabra S, et al. Differential use of the hematopoietic cell transplantation-comorbidity index among adult and pediatric transplant physicians. Leukemia & Lymphoma. doi:10.1080/10428194.2022.2076848. Epub 2022 May 18. Impact Factor: 3.28

47. Pearce EE, Alsaggaf R, Katta S, et al. Telomere length and epigenetic clocks as markers of cellular aging: A comparative study. GeroScience. 2022 Jun 1; 44(3):1861-1869. doi:10.1007/s11357-022-00586-4. Epub 2022 May 18. PMC9213578. Impact Factor: 7.71

48. Holstein SA, Bhutani M, Hillengass J. Proceedings from the BMT CTN Myeloma Intergroup Workshop on Immune and Cellular Therapy in Multiple Myeloma Transplantation and Cellular Therapy. doi:10.1016/j.jtct.2022.05.019. Epub 2022 May 20. Impact Factor: 5.60

49. Munshi PN, Chen Y, Ahn KW, et al. Outcomes of Autologous Hematopoietic Cell Transplantation in Older Patients with Diffuse Large B Cell Lymphoma. Transplantation and Cellular Therapy. doi:10.1016/j.jtct.2022.05.029. Epub 2022 May 21. Impact Factor: 5.60

50. Jacobson CA, Locke FL, Ma L, et al. Real-world evidence of axicabtagene ciloleucel for the treatment of large B cell lymphoma in the United States. Transplantation and Cellular Therapy. doi:10.1016/j.jtct.2022.05.026. Epub 2022 May 21. Impact Factor: 5.60

51. Arrieta-Bolaños E, Crivello P, He M, et al. A core group of structurally similar HLA-DPB1 alleles drives permissiveness after hematopoietic cell transplantation. Blood. doi:10.1182/blood.2022015708. Epub 2022 May 24. Impact Factor: 22.11

52. Ambinder AJ, Jain T, Tsai HL, et al. HLA-matching with PTCy: A reanalysis of a CIBMTR dataset with propensity score matching and donor age. Blood Advances. doi:10.1182/bloodadvances.2022007741. Epub 2022 May 25. Impact Factor: 5.48

53. Farhadfar N, Ahn KW, Bo-Subait S, et al. The impact of pre-apheresis Health Related Quality of Life on peripheral blood progenitor cell yield and donor's health and outcome: Secondary analysis of Patient-Reported Outcome Data from the RDSafe and BMT CTN 0201 Clinical Trials Transplantation and Cellular Therapy. doi:10.1016/j.jtct.2022.05.042. Epub 2022 Jun 7. Impact Factor: 5.60

54. Osoegawa K, Marsh SGE, Holdsworth R, et al. A new strategy for systematically classifying HLA alleles into serological specificities. HLA. 2022 Sep 1; 100(3):193-231. doi:10.1111/tan.14662. Epub 2022 Jun 22. Impact Factor: 8.76

55. McReynolds LJ, Rafati M, Wang Y, et al. Genetic testing in severe aplastic anemia is required for optimal hematopoietic cell transplant outcomes. Blood. 2022 Aug 25; 140(8):909-921. doi:10.1182/blood.2022016508. Epub 2022 Jul 1. Impact Factor: 22.11

56. Krishnamurti L, Arnold SD, Haight A, et al. Sickle Cell Transplantation Evaluation of Long-term and Late Effects Registry (STELLAR) to compare long-term outcomes after hematopoietic cell transplantation to those in siblings without sickle cell disease and in nontransplanted individuals with sickle cell disease: Design and feasibility study. JMIR Research Protocols. 11(7):e36780. doi:10.2196/36780. Epub 2022 Jul 6. PMC9301564. Impact Factor: 7.08

57. Bashir Q, Nishihori T, Pasquini MC, et al. Multicenter phase II, double-blind placebo-controlled trial of maintenance ixazomib after allogeneic transplantation for high-risk multiple myeloma: Results of the BMT CTN 1302 Trial Transplantation and Cellular Therapy. doi:10.1016/j.jtct.2022.07.007. Epub 2022 Jul 12. Impact Factor: 5.60

58. Saliba RM, Majid AA, Pidala J, et al. Characteristics of graft-versus-host disease (GvHD) after post-transplant cyclophosphamide versus conventional GvHD prophylaxis. Transplantation and Cellular Therapy. doi:10.1016/j.jtct.2022.07.013. Epub 2022 Jul 17. Impact Factor: 5.60

59. Lee CJ, Wang T, Chen K, et al. Association of chronic graft-versus-host disease with late effects following allogeneic hematopoietic cell transplantation for children with hematologic malignancy. Transplantation and Cellular Therapy. doi:10.1016/j.jtct.2022.07.014. Epub 2022 Jul 18. Impact Factor: 5.60

60. Rotz SJ, Yi JC, Hamilton BK, et al. Health Related Quality of Life in Young Adults Survivors of Hematopoietic Cell Transplantation Transplantation and Cellular Therapy. doi:10.1016/j.jtct.2022.07.018. Epub 2022 Jul 22. Impact Factor: 5.60

61. DeZern AE, Eapen M, Wu J, et al. Haploidentical bone marrow transplantation in patients with relapsed or refractory severe aplastic anaemia in the USA (BMT CTN 1502): A multicentre, single-arm, phase 2 trial. The Lancet Haematology. 2022 Sep 1; 9(9):e660-e669. doi:10.1016/S2352-3026(22)00206-X. Epub 2022 Jul 27. PMC9444987. Impact Factor: 18.95

62. Worel N, Aljurf M, Anthias C, et al. Suitability of haematopoietic cell donors: Updated consensus recommendations from the WBMT standing committee on donor issues. The Lancet Haematology. 2022 Aug 1; 9(8):e605-e614. doi:10.1016/S2352-3026(22)00184-3. Epub 2022 Jul 29. Impact Factor: 30.15

63. Feurstein SK, Trottier AM, Estrada-Merly N, et al. Germline predisposition variants occur in myelodysplastic syndrome patients of all ages. Blood. doi:10.1182/blood.2022015790. Epub 2022 Aug 19. Impact Factor: 25.48

64. Brown DW, Zhou W, Wang Y, et al. Germline-somatic JAK2 interactions are associated with clonal expansion in myelofibrosis. Nature Communications. 13(1):5284. doi:10.1038/s41467-022-32986-7. Epub 2022 Sep 8. PMC9458655. Impact Factor: 17.69

65. Furqan F, Ahn KW, Chen Y, et al. Allogeneic haematopoietic cell transplant in patients with relapsed/refractory anaplastic large cell lymphoma. British Journal of Haematology. doi:10.1111/bjh.18467. Epub 2022 Sep 19. Impact Factor: 8.61

66. Mau LW, Preussler JM, Meyer CL, et al. Trends in allogeneic hematopoietic cell transplantation utilization and estimated unmet need among Medicare beneficiaries with acute myeloid leukemia. Transplantation and Cellular Therapy. 2022 Dec 1; 28(12):852-858. doi:10.1016/j.jtct.2022.09.015.. Epub 2022 Sep 25. Impact Factor: 5.60

67. Auletta JJ, Sandmaier BM, Jensen E, et al. The ASTCT-NMDP ACCESS initiative: A collaboration to address and sustain equal outcomes for all across the hematopoietic cell transplantation and cellular therapy ecosystem. Transplantation and Cellular Therapy. 2022 Dec 1; 28(12):802-809. doi:10.1016/j.jtct.2022.09.020. Epub 2022 Sep 30. Impact Factor: 5.60

68. Cusatis R, Balza J, Uttke Z, et al. Patient-reported cognitive function among hematopoietic stem cell transplant and cellular therapy patients: A scoping review. Quality of Life Research. doi:10.1007/s11136-022-03258-0. Epub 2022 Oct 6. Impact Factor: 4.14

69. Olson TS, Frost BF, Duke JL, et al. Pathogenicity and impact of HLA class I alleles in aplastic anemia patients of different ethnicities. Journal of Clinical Investigation Insight. 2022 Nov 22; 7(22):e163040. doi:10.1172/jci.insight.163040. Epub 2022 Oct 11. PMC9746824. Impact Factor: 9.48

70. Boyiadzis M, Zhang MJ, Chen K, et al. Impact of pre-transplant induction and consolidation cycles on AML allogeneic transplant outcomes: A CIBMTR analysis in 3113 AML patients. Leukemia. doi:10.1038/s41375-022-01738-3. Epub 2022 Oct 12. Impact Factor: 12.88

71. Pagliuca S, Gurnari C, Hercus C, et al. Molecular landscape of immune pressure and escape in aplastic anemia. Leukemia. doi:10.1038/s41375-022-01723-w. Epub 2022 Oct 17. Impact Factor: 12.88

72. Cusatis R, Martens MJ, Nakamura R, Cutler CS, Saber W, Lee SJ, Logan BR, Shaw BE, Gregory A, D'Souza A, Hamilton BK, Horowitz MM, Flynn KE. Health-related quality of life in reduced intensity hematopoietic cell transplantation based on donor availability in patients aged 50-75 with advanced myelodysplastic syndrome: BMT CTN 1102 American Journal of Hematology. doi:10.1002/ajh.26768. Epub 2022 Oct 17. Impact Factor: 10.04

73. Vasu S, Holtan S, Shimamura A, et al. Bringing patient and caregivers voices to the clinical trial chorus: A report from the BMT CTN patient and caregiver advocacy task force. Transplantation and Cellular Therapy. doi:10.1016/j.jtct.2022.10.016. Epub 2022 Oct 22. Impact Factor: 5.60

74. Johnstone BH, Woods JR, Goebel WS, et al. Characterization and function of cryopreserved bone marrow from deceased organ donors: A potential viable alternative graft source. Transplantation and Cellular Therapy. doi:10.1016/j.jtct.2022.11.010. Epub 2022 Nov 16. Impact Factor: 5.60

75. Hong S, Zhao J, Wang S, et al. Health-related quality of life outcomes in older hematopoietic cell transplant (HCT) survivors. Transplantation and Cellular Therapy. doi:10.1016/j.jtct.2022.11.016.. Epub 2022 Nov 22. Impact Factor: 5.60

76. Schoettler M, Carreras E, Cho B, et al. Harmonizing definitions for diagnostic criteria and prognostic assessment of transplant associated thrombotic microangiopathy: A report on behalf of the European Society for Blood and Marrow Transplantation (EBMT), American Society for Transplantation and Cellular Therapy (ASTCT), Asia-Pacific Blood and Marrow Transplantation Group (APBMT) and the Center for International Blood and Marrow Transplant Research (CIBMTR). Transplantation and Cellular Therapy. doi:10.1016/j.jtct.2022.11.015. Epub 2022 Nov 25. Impact Factor: 5.60

77. Friend B, Broglie L, Logan B, et al. Adapting the HCT-CI definitions for children, adolescents, and young adults with hematologic malignancies undergoing allogeneic hematopoietic cell transplantation. Transplantation and Cellular Therapy. doi:10.1016/j.jtct.2022.11.019. Epub 2022 Nov 25. Impact Factor: 5.60

78. Broglie L, Friend BD, Chhabra S, et al. Expanded HCT-CI definitions capture comorbidity better for younger patients of allogeneic HCT for non-malignant diseases. Transplantation and Cellular Therapy. doi:10.1016/j.jtct.2022.11.020. Epub 2022 Nov 25. Impact Factor: 5.60

79. Putta S, Young BA, Levine J, et al. Prognostic biomarkers for hepatic veno-occlusive disease/sinusoidal obstruction syndrome (VOD/SOS) in myeloablative allogeneic hematopoietic cell transplantation: Results from the BMT CTN 1202 study. Transplantation and Cellular Therapy. doi:10.1016/j.jtct.2022.11.024. Epub 2022 Nov 26. Impact Factor: 5.60

80. Olsen KS, Jadi O, Dexheimer S, et al. Shared graft-vs-leukemia minor histocompatibility antigens in DISCOVeRY-BMT. Blood Advances. doi:10.1182/bloodadvances.2022008863. Epub 2022 Dec 7. Impact Factor: 7.36

81. Spellman SR. Hematology 2022-What is complete HLA match in 2022? Hematology / the Education Program of the American Society of Hematology. 2022 Dec 9; 2022(1):83-89. doi:10.1182/hematology.2022000326. Epub 2022 Dec 9. PMC9821192. Impact Factor: 3.06

82. Mussetti A, Kanate AS, Wang T, et al. Haploidentical versus matched unrelated donor transplants using post-transplant cyclophosphamide for lymphomas. Transplantation and Cellular Therapy. doi:10.1016/j.jtct.2022.11.028. Epub 2022 Dec 25. Impact Factor: 5.60

83. Ramanathan M, Kim S, He N, et al. The incidence and impact of clostridioides difficile infection on transplant outcomes in acute leukemia and MDS after allogeneic hematopoietic cell transplant-a CIBMTR study. Bone Marrow Transplantation. doi:10.1038/s41409-022-01896-z. Epub 2022 Dec 25. Impact Factor: 5.48

84. Dhakal B, Zhang MJ, Burns LJ, et al. Efficacy, safety, and cost of mobilization strategies in multiple myeloma: A prospective observational study. Haematologica. doi:10.3324/haematol.2022.282269. Epub 2023 Jan 5. Impact Factor: 9.94

85. Turcotte LM, Whitton JA, Leisenring WM, et al. Chronic conditions, late mortality, and health status after childhood AML: A Childhood Cancer Survivor Study report. Blood. 2023 Jan 5; 141(1):90-101. doi:10.1182/blood.2022016487. Epub 2023 Jan 5. PMC9837436. Impact Factor: 22.11

86. Guru Murthy GS, Logan BR, Bo-Subait S, et al. Association of ABO mismatch with the outcomes of allogeneic hematopoietic cell transplantation for acute leukemia. American Journal of Hematology. doi:10.1002/ajh.26834. Epub 2023 Jan 6. Impact Factor: 10.04

87. Gragert L, Spellman S, Shaw B, et al. Unrelated stem cell donor HLA match likelihoods in the US Registry incorporating HLA-DPB1 permissive mismatching. Transplantation and Cellular Therapy. doi:10.1016/j.jtct.2022.12.027. Epub 2023 Jan 6. Impact Factor: 5.60

88. Eapen M, Brazauskas R, Williams DA, et al. Secondary neoplasms after hematopoietic cell transplant for sickle cell disease. Journal of Clinical Oncology. doi:10.1200/JCO.22.01203. Epub 2023 Jan 9. Impact Factor: 44.54

89. Garcia-Abadillo J, Morales L, Buerstmayr H, et al. Alternative scoring methods of fusarium head blight resistance for genomic assisted breeding. Frontiers in Plant Science. 13:1057914. doi:10.3389/fpls.2022.1057914. Epub 2023 Jan 11. PMC9876611. Impact Factor: 5.75

90. Crivello P, Arrieta-Bolaños E, He M, et al. Impact of the HLA immunopeptidome on survival of leukemia patients after unrelated donor transplantation. Journal of Clinical Oncology. doi:10.1200/JCO.22.01229. Epub 2023 Jan 20. Impact Factor: 44.54

91. Akdemir D, Somo M, Isidro-Sánchez J. An expectation-maximization algorithm for combining a sample of partially overlapping covariance matrices. Axioms. 12(2):161. doi:10.3390/axioms12020161. Epub 2023 Feb 4. Impact Factor: 1.84

92. Murthy GSG, Kim S, Estrada-Merly N, et al. Association between the choice of the conditioning regimen and outcomes of allogeneic hematopoietic cell transplantation for myelofibrosis. Haematologica. doi:10.3324/haematol.2022.281958. Epub 2023 Feb 9. Impact Factor: 11.04

93. Petersdorf EW, McKallor C, Malkki M, et al. Stevenson PA. Role of NKG2D ligands and receptor in haploidentical related donor hematopoietic cell transplantation. Blood Advances. doi:10.1182/bloodadvances.2022008922. Epub 2023 Feb 10. Impact Factor: 7.64

94. Auletta JJ, Kou J, Chen M, et al. Real-world data showing trends and outcomes by race and ethnicity in allogeneic hematopoietic cell transplantation: A report from the Center for International Blood and Marrow Transplant Research. Transplantation and Cellular Therapy. doi:10.1016/j.jtct.2023.03.007. Epub 2023 Mar 14. Impact Factor: 5.60

95. Sparapani RA, Logan BR, Maiers M, et al. Nonparametric failure time: Time-to-event machine learning with heteroskedastic bayesian additive regression trees and low information omnibus dirichlet process mixtures. Biometrics. doi:10.1111/biom.13857. Epub 2023 Mar 18. Impact Factor: 1.70

96. Boyiadzis M, Zhang MJ, Chen K, et al. Correction to: Impact of pre-transplant induction and consolidation cycles on AML allogeneic transplant outcomes: A CIBMTR analysis in 3113 AML patients. Leukemia. doi:10.1038/s41375-023-01814-2. Epub 2023 Mar 22. Impact Factor: 11.53

97. Knight TE, Ahn KW, Hebert KM, et al. Effect of autograft CD34+ dose on outcome in pediatric patients undergoing autologous hematopoietic stem cell transplant for central nervous system tumors. Transplantation and Cellular Therapy. doi:10.1016/j.jtct.2023.03.024. Epub 2023 Mar 27. Impact Factor: 5.60

98. Narayan R, Niroula A, Wang T, et al. HLA Class I genotype is associated with relapse risk after allogeneic stem cell transplantation for NPM1-mutated AML. Transplantation and Cellular Therapy. doi:10.1016/j.jtct.2023.03.027. Epub 2023 Mar 28. Impact Factor: 5.60

99. Pagkrati I, Duke JL, Mbunwe E, et al. Genomic characterization of HLA class I and class II genes in ethnically diverse sub-Saharan African populations: A report on novel HLA alleles. HLA. doi:10.1111/tan.15035. Epub 2023 Mar 30. Impact Factor: 9.20

100. Bumma N, Dhakal B, Fraser R, et al. Impact of bortezomib-based versus lenalidomide maintenance therapy on outcomes of patients with high-risk multiple myeloma. Cancer. 2023 Jul 15; 129(14):2179-2191. doi:10.1002/cncr.34778. Epub 2023 Apr 6. Impact Factor: 6.92

101. Juckett M, Dandoy C, DeFilipp, et al. How do we improve the translation of new evidence into the practice of hematopoietic cell transplantation and cellular therapy? Blood Reviews. doi:10.1016/j.blre.2023.101079. Epub 2023 Apr 7. Impact Factor: 10.63

102. Devine SM, Bo-Subait S, Kuxhausen M, et al. Clinical Impact of Cryopreservation of Allogeneic Hematopoietic Cell Grafts During the Onset of the COVID-19 Pandemic. Blood Advances. doi:10.1182/bloodadvances.2023009786. Epub 2023 Apr 10. Impact Factor: 7.64

103. Hofmann JA, Bochtler W, Robinson J, et al. World Marrow Donor Association guidelines for the reporting of novel HLA alleles. HLA. 2023 Jul 1; 102(1):62-64. doi:10.1111/tan.15048. Epub 2023 Apr 10. N/A. Impact Factor: 9.20

104. Zhang T, Auer P, Dong J, et al. Whole-genome sequencing identifies novel predictors for hematopoietic cell transplant outcomes for patients with myelodysplastic syndrome: A CIBMTR study. Journal of Hematology & Oncology. 2023 Apr 11; 16(1):37. doi:10.1186/s13045-023-01431-7. Epub 2023 Apr 11. PMC10088148. Impact Factor: 23.16

105. Geerlink AV, Scull B, Krupski C, et al. Alemtuzumab and CXCL9 levels predict likelihood of sustained engraftment after reduced intensity conditioning HCT. Blood Advances. doi:10.1182/bloodadvances.2022009478. Epub 2023 Apr 12. Impact Factor: 7.64

106. Eapen M, Brazaukas R. Reply to R. Meisel. Journal of Clinical Oncology. 2023 Jun 10; 41(17):3273-3274. doi:10.1200/JCO.23.00508. Epub 2023 Apr 12. N/A. Impact Factor: 50.71

107. Jadi O, Tang H, Olsen K, et al. Associations of minor histocompatibility antigens with outcomes following allogeneic hematopoietic cell transplantation. American Journal of Hematology. 2023 Jun 1; 98(6):940-950. doi:10.1002/ajh.26925. Epub 2023 Apr 13. Impact Factor: 13.26

108. El Jurdi N, Martens MJ, Brunstein CG, et al. Heath-related quality of life in double umbilical cord blood vs. haploidentical marrow transplantation: A QOL analysis report of BMT CTN 1101. Transplantation and Cellular Therapy. doi:10.1016/j.jtct.2023.04.009. Epub 2023 Apr 21. Impact Factor: 5.60

109. Ansbacher-Feldman Z, Israeli S, Maiers M, et al. GRAMM: A new method for analysis of HLA in families. HLA. doi:10.1111/tan.15075. Epub 2023 Apr 26. Impact Factor: 9.20

110. Ramsey SD, Bansal A, Li L, et al. Cost-effectiveness of unrelated umbilical cord blood vs. HLA haploidentical related bone marrow transplant: evidence from BMT CTN 1101. Transplantation and Cellular Therapy. doi:10.1016/j.jtct.2023.04.017. Epub 2023 Apr 27. Impact Factor: 5.60

111. Gale RP, Hinterberger W, Young NS, et al. Leukemia. 2023 Jun 1; 37(6):1191-1193. doi:10.1038/s41375-023-01892-2. Epub 2023 Apr 27. Impact Factor: 12.89

112. Sajulga R, Bolon YT, Maiers M, et al. Assessment of HLA-DPB1 genetic variation with an HLA-DP tool and implications in clinical transplantation. Blood Advances. doi:10.1182/bloodadvances.2022009554. Epub 2023 May 1. Impact Factor: 7.64

113. Hill JA, Martens MJ, Young JH, et al. SARS-CoV-2 vaccination in the first year after allogeneic hematopoietic cell transplant: A prospective, multicentre, observational study. EClinicalMedicine. 59:101983. doi:10.1016/j.eclinm.2023.101983. Epub 2023 May 1. PMC10133891. Impact Factor: 15.10

114. Tamari R, McLornan D, Ahn KW, et al. A simple prognostic system in myelofibrosis patients undergoing allogeneic stem cell transplant: A CIBMTR/EBMT analysis. Blood Advances. doi:10.1182/bloodadvances.2023009886. Epub 2023 May 3. Impact Factor: 7.64

115. Mohan M, Janz S, Brazauskas R, et al. Increased CXCL10 is seen at 1-year after autologous hematopoietic cell transplantation in multiple myeloma patients on maintenance lenalidomide therapy. Bone Marrow Transplantation. doi:10.1038/s41409-023-02004-5. Epub 2023 May 6. Impact Factor: 5.17

116. Sharma A, Logan B, Estrada-Merly N, et al. Impact of public reporting of Center-Specific Survival Analysis scores on Patient volumes at hematopoietic cell transplant centers. Transplantation and Cellular Therapy. doi:10.1016/j.jtct.2023.05.013. Epub 2023 May 21. Impact Factor: 5.60

117. Cusatis R, Ibrahim A, Knight JM, et al. Prevalence of sleep aid medication use in patients receiving a hematopoietic cell transplant on an inpatient unit. Hematology/Oncology and Stem Cell Therapy. 2023 May 23; 16(4):366-369. doi:10.56875/2589-0646.1036. Epub 2023 May 23. Impact Factor: 0.457

118. Yusuf RA, Preussler JM, Meyer CL, et al. Reducing barriers of access and care related to hematopoietic cell transplantation and cellular therapy: The mission-driven role of the National Marrow Donor Program. Best Practice & Research in Clinical Haematology. 2023 Jun 1; 36(2):101480. doi:10.1016/j.beha.2023.101480. Epub 2023 May 25. N/A. Impact Factor: 3.67

119. Nakamura R, Patel BA, Kim S, et al. Conditional survival and standardized mortality ratios of patients with severe aplastic anemia surviving at least one year after hematopoietic cell transplantation or immunosuppressive therapy. Haematologica. doi:10.3324/haematol.2023.282781. Epub 2023 Jun 1. Impact Factor: 11.04

120. Mack SJ, Schefzyk D, Millius RP, et al. Genotype List String 1.1: Extending the Genotype List String grammar for describing HLA and Killer-cell Immunoglobulin-like Receptor genotypes. HLA. doi:10.1111/tan.15126. Epub 2023 Jun 7. Impact Factor: 9.20

121. Thakar MS, Logan BR, Puck JM, et al. Measuring the effect of newborn screening on survival after haematopoietic cell transplantation for severe combined immunodeficiency: A 36-year longitudinal study from the Primary Immune Deficiency Treatment Consortium. Lancet. doi:10.1016/S0140-6736(23)00731-6. Epub 2023 Jun 20. Impact Factor: 202.73

122. Martens MJ, Kim S, Ahn KW. Sample size and power determination for multiparameter evaluation in nonlinear regression models with potential stratification. Biometrics. doi:10.1111/biom.13897. Epub 2023 Jun 25. Impact Factor: 1.70

123. Abid MB, Estrada-Merly N, Zhang MJ, et al. Impact of donor age on allogeneic hematopoietic cell transplantation outcomes in older adults with acute myeloid leukemia. Transplantation and Cellular Therapy. 2023 Sep 1; 29(9):578.e1-578.e9. doi:10.1016/j.jtct.2023.06.020. Epub 2023 Jul 3. Impact Factor: 5.60

124. Mack SJ, Sauter J, Robinson J, et al. The genotype list string code syntax for exchanging nomenclature-level genotyping results in clinical and research data management and analysis systems. HLA. 2023 Oct 1; 102(4):501-507. doi:10.1111/tan.15145. Epub 2023 Jul 5. Impact Factor: 9.20

125. Cho C, Devlin S, Maloy M, Horowitz MM, Logan B, Rizzo JD, Giralt SA, Perales MA. Application of the CIBMTR one year survival outcomes calculator as a tool for retrospective analysis. Bone Marrow Transplantation. doi:10.1038/s41409-023-02031-2. Epub 2023 Jul 8. NIHMS1915851. Impact Factor: 5.48

126. Chung DJ, Shah N, Wu J, et al. Randomized trial of a personalized dendritic cell vaccine after autologous stem cell transplant for multiple myeloma. Clinical Cancer Research. doi:10.1158/1078-0432.CCR-23-0235. Epub 2023 Jul 18. Impact Factor: 13.80

127. Cohen S, Bambace N, Ahmad I, et al. Improved outcomes of UM171-expanded cord blood transplantation compared with other graft sources: Real-world evidence. Blood Advances. doi:10.1182/bloodadvances.2023010599. Epub 2023 Jul 19. Impact Factor: 7.50

128. Augusto DG, Murdolo LD, Chatzileontiadou DSM, et al. A common allele of HLA is associated with asymptomatic SARS-CoV-2 infection. Nature. 2023 Aug 1; 620(7972):128-136. doi:10.1038/s41586-023-06331-x. Epub 2023 Jul 19. PMC10396966. Impact Factor: 64.80

129. Myers RM, Jacoby E, Pulsipher MA, et al. INSPIRED Symposium part 1: Clinical variables associated with improved outcomes for children and young adults treated with chimeric antigen receptor t cells for b cell acute lymphoblastic leukemia. Transplantation and Cellular Therapy. doi:10.1016/j.jtct.2023.07.016. Epub 2023 Jul 20. Impact Factor: 5.60

130. Abid MB, Meryl NE, Zhang MJ, et al. Younger matched unrelated donors confer decreased relapse compared to older sibling donors in older B-cell all patients undergoing allogeneic hematopoietic cell transplantation. Transplantation and Cellular Therapy. doi:10.1016/j.jtct.2023.07.015. Epub 2023 Jul 20. Impact Factor: 5.60

131. Gillis N, Padron E, Wang T, et al. A pilot study of donor-engrafted clonal hematopoiesis evolution and clinical outcomes in allogeneic hematopoietic cell transplant recipients using a national registry. Transplantation and Cellular Therapy. doi:10.1016/j.jtct.2023.07.021. Epub 2023 Jul 28. Impact Factor: 5.60

132. Gui G, Dillon LW, Ravindra N, et al. Measurable residual IDH1 before allogeneic transplant for acute myeloid leukemia. medRxiv : The Preprint Server for Health Sciences. doi:10.1101/2023.07.28.23293166. Epub 2023 Aug 1. PMC10418565. Impact Factor: N/A

133. Zinter MS, Brazauskas R, Strom J, et al. Critical illness risk and long-term outcomes following intensive care in pediatric hematopoietic cell transplant recipients. medRxiv : The Preprint Server for Health Sciences. doi:10.1101/2023.07.31.23293444. Epub 2023 Aug 5. PMC10418579. Impact Factor: N/A

134. Chowdhury AS, Maiers M, Spellman SR, et al. Existence of HLA-mismatched unrelated donors closes the gap in donor availability regardless of recipient ancestry. Transplantation and Cellular Therapy. doi:10.1016/j.jtct.2023.08.014. Epub 2023 Aug 14. Impact Factor: 5.60

135. Versluis J, Saber W, Tsai HK, et al. Allogeneic hematopoietic cell transplantation improves outcome in myelodysplastic syndrome across high-risk genetic subgroups: Genetic analysis of the Blood and Marrow Transplant Clinical Trials Network 1102 Study. Journal of Clinical Oncology. doi:10.1200/JCO.23.00866. Epub 2023 Aug 22. Impact Factor: 45.30

136. Magenau JM, Jaglowski S, Uberti J, Farag SS, Mansour Riwes M, Pawarode A, Anand S, Ghosh M, Maciejewski J, Braun TM, Devenport M, Lu S, Banerjee B, DaSilva C, Devine SM, Zhang MJ, Burns LJ, Liu Y, Zheng P, Reddy P. A Phase 2 Trial of CD24Fc for Prevention of Graft-vs-Host Disease. Blood. doi:10.1182/blood.2023020250. Epub 2023 Aug 30. Impact Factor: 25.47

137. Knight TE, Ahn KW, Hebert KM, et al. No impact of CD34+ cell dose on outcome among children undergoing autologous hematopoietic stem cell transplant for high-risk neuroblastoma. Bone Marrow Transplantation. doi:10.1038/s41409-023-02092-3. Epub 2023 Sep 4. Impact Factor: 5.48

138. Miller A, Davies J, Young K, et al. The effect of increased collect pump rate on collection efficiency in hematopoietic progenitor cell collection by apheresis in allogeneic adult donors-A single center analysis. Transfusion. doi:10.1111/trf.17533. Epub 2023 Sep 5. Impact Factor: 3.33

139. Meyers G, Hamadani M, Martens M, et al. Anti-CD3/CD7 immunoconjugate (T-Guard) for severe, steroid-refractory GVHD: Final report of BMT CTN 2002. Bone Marrow Transplantation. doi:10.1038/s41409-023-02110-4. Epub 2023 Sep 25. Impact Factor: 5.48