



# Biology of Blood and Marrow Transplantation

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Clinical Research: Analysis

## Practice Patterns and Preferences Among Hematopoietic Cell Transplantation Clinicians



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### A B S T R A C T

Hematopoietic cell transplantation can cure many high-risk diseases but is associated with complexity, cost, and risk. Several areas in transplantation practice were identified in the 2014 Blood and Marrow Transplant Clinical Trials Network State of the Science Symposium (BMT CTN SOSS) as high priorities for further study. We developed a survey for hematopoietic cell transplantation clinicians to identify current practices in BMT CTN SOSS priority areas and to understand, more generally, the variation in approach to transplantation and estimation of transplantation benefit in current medical practice. Of 1439 transplantation clinicians surveyed, 305 responded (20% response rate). Clinicians were well represented by age, experience, geography, and size of practice. We found that several techniques identified in the BMT CTN SOSS, such as maintenance therapy for acute myeloid leukemia or myelodysplastic syndromes after allogeneic transplantation, were already being utilized in practice on and off study, with higher rates of use in higher-volume centers. There was significant variation among clinicians in use of transplantation technologies and approaches to common transplantation scenarios. Appraisals of risks and benefits of transplantation appeared to converge upon similar estimates despite the presentation of different hypothetical scenarios. These results suggest overall equipoise in several BMT CTN SOSS high-priority areas and support the need for better data to inform clinical practice.

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### INTRODUCTION

Hematopoietic cell transplantation (HCT) is a life-extending or life-saving therapy for many patients with malignant and nonmalignant diseases, but it is 1 of the more costly and complex areas of contemporary medical practice [1]. For almost any condition that is potentially amenable to transplantation, there are a wide array of management approaches that incorporate variations in patient selection criteria, pretransplantation conditioning regimens, donor type, graft source, and prevention and management of infectious and noninfectious post-transplantation complications. Thus, it is important to subject areas of uncertainty or new technology to scientific scrutiny, to identify new standards for the field.

The 2014 Blood and Marrow Transplant Network (BMT CTN) State of the Science symposium (SOSS) identified several areas that were deemed to be high priorities for further study [2].

To facilitate the implementation of studies in high-priority areas from the BMT CTN SOSS, we sought to determine the extent to which emerging transplantation techniques in these areas were already being used in current transplantation practice. Further, by studying practice variation, an area highlighted in earlier transplantation studies [3], we hoped to better understand the degree to which transplantation clinicians might differ from each other in their utilization of new technologies, their preferences for approaches to common transplantation problems, and the way in which they estimated the benefits or risks of these therapies. As part of this effort, we hoped to find ways to increase the development and implementation of research to address areas of practice uncertainty.

We developed a survey to identify current practice patterns and preferences among HCT clinicians. Our immediate goal was to inform the BMT CTN about current practices

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among transplantation clinicians in BMT CTN SOSS priority areas to assist future BMT CTN study planning. For example, if the survey indicated wide variability in the use of a given intervention, that would argue in favor of a study evaluating the utility of that intervention. On the other hand, if the survey found broad off-study use of an intervention, that would suggest that a study comparing that intervention to a placebo might be difficult to complete. Our larger goal was to begin to observe and understand variation in clinicians' approaches to transplantation in contemporary practice. For example, many of the interventions described in the BMT CTN SOSS are associated with high costs and potential toxicities, leading to their prioritization as topics worthy of study in clinical trials. If our survey found that there were high rates of use of these technologies in practice ahead of well-designed clinical trials, this would suggest that additional ways to assess benefits and risks of these techniques in usual practice are needed. Lastly, by studying treatment preferences among HCT clinicians, we hoped to gain insight into the way that decisions are made in usual practice and identify potential contributors to practice variation that could be addressed in future work.

## METHODS

### Survey Development

A 3-section survey was developed for HCT clinicians. In the first section, 11 questions collected participant and practice characteristics, including age, experience, center geographic region, and center transplantation volume. A second section of 22 questions asked participants to describe their current use, on or off study, of transplantation technologies identified within high-priority research areas from the 2014 BMT CTN SOSS. Examples included the use of maintenance therapy after allogeneic transplantation for FLT3<sup>+</sup> acute myeloid leukemia (AML), the use of autologous transplantation for multiple sclerosis, and the use of pretransplantation risk stratification variables to guide patient selection and decision-making [4–6]. In the third section, questions included 2 hypothetical clinical vignettes: 1 about a 45-year-old woman with intermediate-risk AML considering transplantation and the other about a 30-year-old male with BCR/ABL-negative B cell acute lymphoblastic leukemia (ALL) considering transplantation. Each vignette was associated with 7 or 8 questions that asked participants to indicate their treatment recommendation for the hypothetical patient or variations of the hypothetical patient (eg, the same patient but a different age, or the same patient with a different comorbidity profile) and their estimates of long-term success or toxicity of their selected approach. The survey was designed so that participants would be asked to answer all questions from the first and second sections and then randomized to answer questions from 1 of the 2 vignettes in the third section. The survey was pilot tested by 2 of the investigators (W.A.W. and S.J.L.), as well as by 4 additional transplantation physicians, and revised for clarity. A final copy of the survey is attached in the Appendix. Subsequent distribution of the finalized survey to a larger national sample of transplantation clinicians was approved by the institutional review board at the University of North Carolina. The survey introduction contained the elements of informed consent, and completion of the survey indicated consent.

### Survey Distribution and Data Collection

The finalized survey was distributed to an electronic mailing list maintained by the Center for Blood and Marrow Transplant Research (CIBMTR), using Survey Gizmo ([www.surveygizmo.com](http://www.surveygizmo.com)). The intent was to identify practicing transplantation clinicians using the CIBMTR mailing list, and the list was reviewed by 1 of the investigators to remove participants who were not identified as transplantation clinicians. The final sample size of potential participants was 1439. The survey was open from April 24, 2015 through May 26, 2015. Weekly email reminders were sent to all potential participants, and 2 sequential survey drawings (\$500 and \$250 prizes, respectively) for respondents were held to incentivize participation.

### Statistical Methods

Statistical analyses were performed using SAS 9.4. Summaries of subject responses to survey questions with categorical responses were examined using frequency tables, and percentages are reported.

Exploratory analyses were conducted using Fisher's exact tests, with Monte Carlo estimates of the exact *P* values to compare responses across characteristic categories; unadjusted *P* values are reported.

## RESULTS

### Participants

Of the 1439 potential participants invited to complete the survey, we received 305 responses. Eleven individuals declined to fill out the survey after initially responding. Six participants reported spending 0% time on patient care and were excluded from analysis. Fifteen participants did not provide information beyond the "general information" section of the survey. The overall survey response rate was 20%.

Participant characteristics are described in Table 1. Most participants (86%) were from academic centers, with 65% providing care primarily for adult patients. Seventy-seven percent of participants had at least 5 years of experience as a transplantation physician, with an average of 14.8 years of postfellowship experience per participant. A majority of participants (54%) practiced at a BMT CTN core center, and about one-third of participants practiced at centers performing a high volume (>100/year) of either autologous or allogeneic transplantations.

**Table 1**

Survey Respondents Self-Report of HCT Physician, HCT Center, and Patients

HCT Physician Characteristics	n (%)
Practice setting	
Academic	262 (85.9%)
Community	43 (14.1%)
Age	
30–40 yr	73 (24.8%)
41–50 yr	90 (30.6%)
51–60 yr	79 (26.9%)
≥ 60 yr	52 (17.7%)
Percent effort in clinical duties	
<20%	13 (4.3%)
20%–39%	59 (19.3%)
40%–59%	80 (26.2%)
60%–79%	91 (29.8%)
80%–100%	62 (20.3%)
Duration of practice as HCT physician	
≤1 yr	68 (23.2%)
5–15 yr	83 (28.3%)
15–25 yr	69 (23.6%)
≥9 yr	73 (24.9%)
Adult	190 (64.9%)
Pediatric	93 (31.7%)
Adult and pediatric	10 (3.4%)
HCT Center and Patient Characteristics	n (%)
BMT CTN center status	
Core	164 (53.8%)
Affiliate	108 (35.4%)
Not a BMT CTN center	33 (10.8%)
Geographic location	
Mid-Atlantic	34 (11.2%)
Midwest	85 (27.9%)
Northeast	59 (19.3%)
Pacific	42 (13.8%)
Southeast	48 (15.7%)
Southwest	37 (12.1%)
Center auto experience	
<20	65 (22.2%)
20–50	66 (22.5%)
50–100	58 (19.8%)
>100	104 (35.5%)
Center allo experience	
<20	46 (15.7%)
20–50	81 (27.7%)
50–100	77 (26.3%)
>100	89 (30.4%)

Allo indicates allogeneic.

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