Impact of Donor Age on HSCT Outcomes

Cord Blood Connect, Sept. 2020

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September 10, 2020

Background

- New graft options for HSCT are evolving
- Donor selection algorithms need to re-align with current clinical data
- Younger donor age has been reported to be associated with improved outcomes following transplantation
- Both unrelated donor transplants (MUD and MMUD) and haploidentical related donor transplants demonstrate higher overall survival with younger donors
- We explored the impact of donor age in a contemporary cohort of adults undergoing HSCT

Kollman et al., Blood 2016;127:260 | Canaani et al. Am J Hematol. 2018;93:246

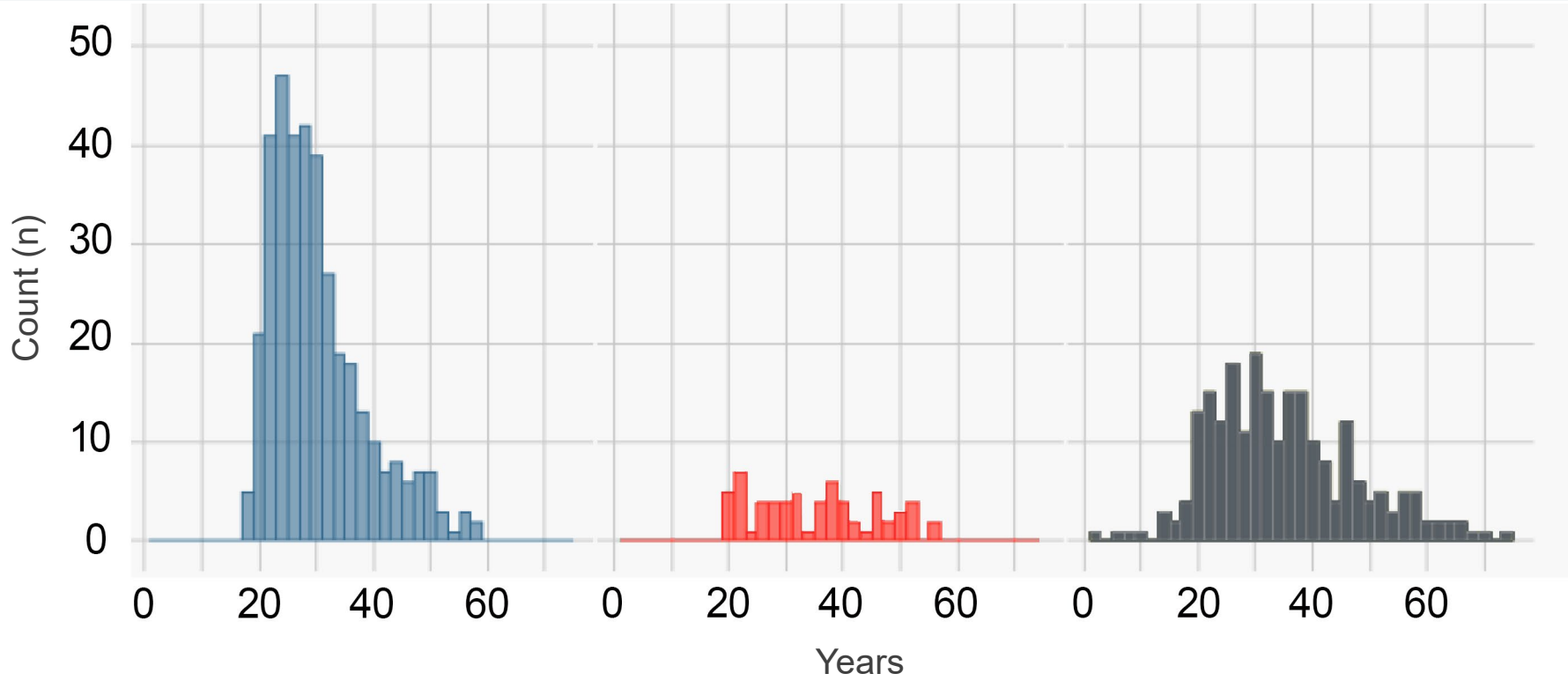
Study Design

Data was collected from the Center for International Blood and Marrow Transplant Research (CIBMTR) according to the following selection criteria:

- Patients:
  - Age 1 month–65 years
  - Myeloablative conditioning
  - Allogeneic HSCT for hematologic malignancy
  - Transplanted between Jan 2017 and Dec 2018
  - Median follow-up was 12 months

- Donors:
  - Haploidentical related, with post-transplant cyclophosphamide (Haplo);
  - 8/8 HLA-matched unrelated (MUD); or
  - 7/8-matched unrelated (MMUD) donor

Distribution of Donor Age

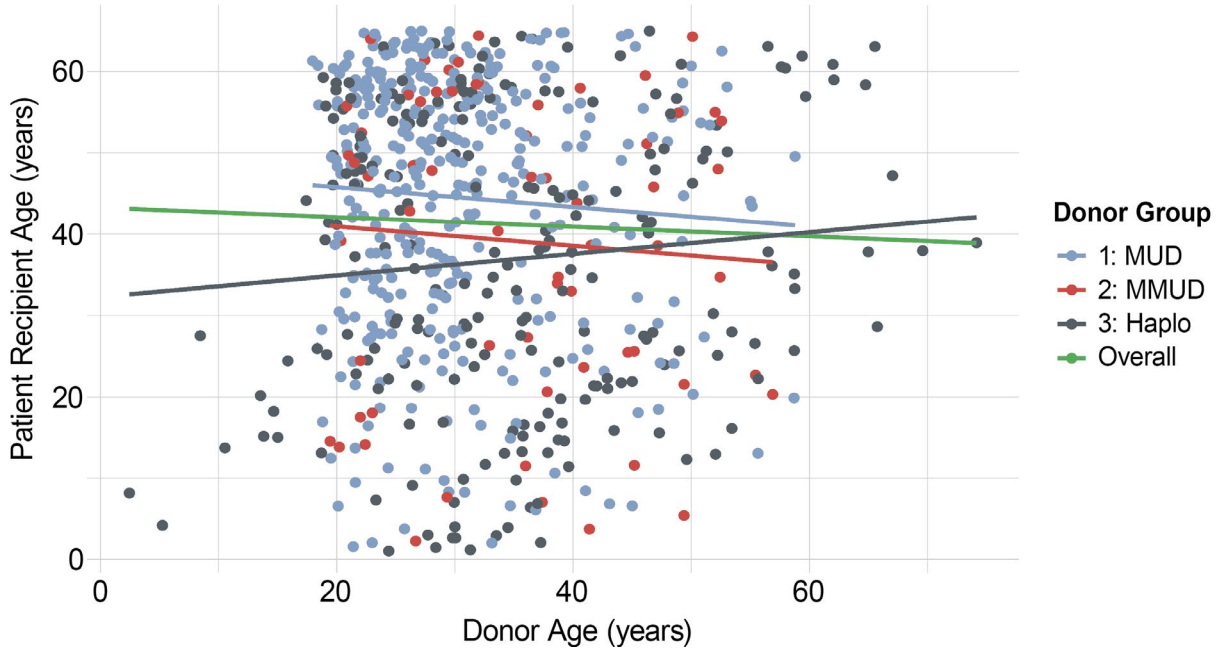


Donor	MUD (N=367)	MMUD (N=64)	Haplo (N=229)
Donor age in years, Median (range)	28 (18-59)	36 (19-57)	33 (2-74)

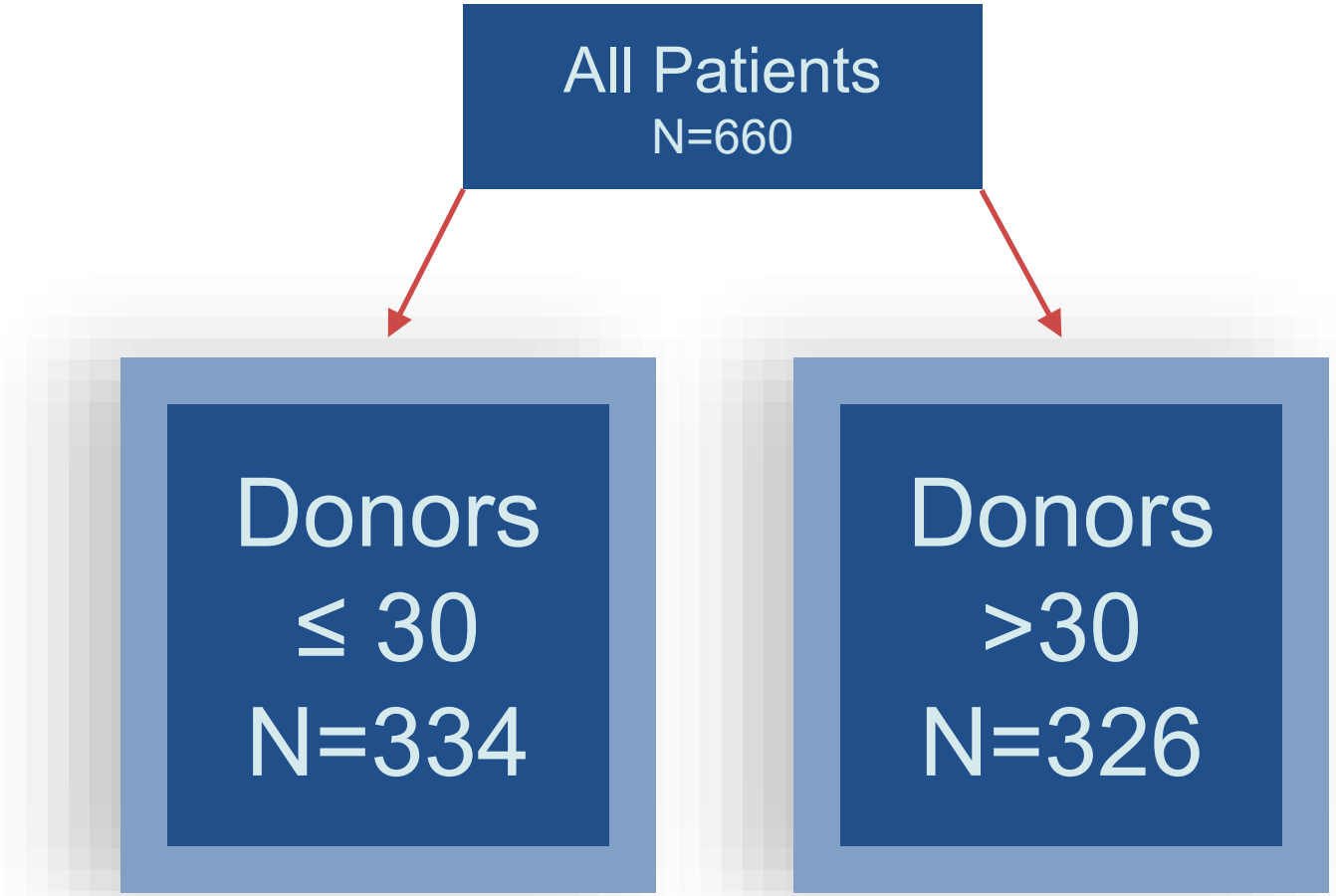
Donor Age Did Not Correlate with Patient Age

Patient age in years, Median (range)

- **MUD:** 49 (2-65)
- **MMUD:** 45 (2-64)
- **Haplo:** 38 (1-65)



Patient Groups



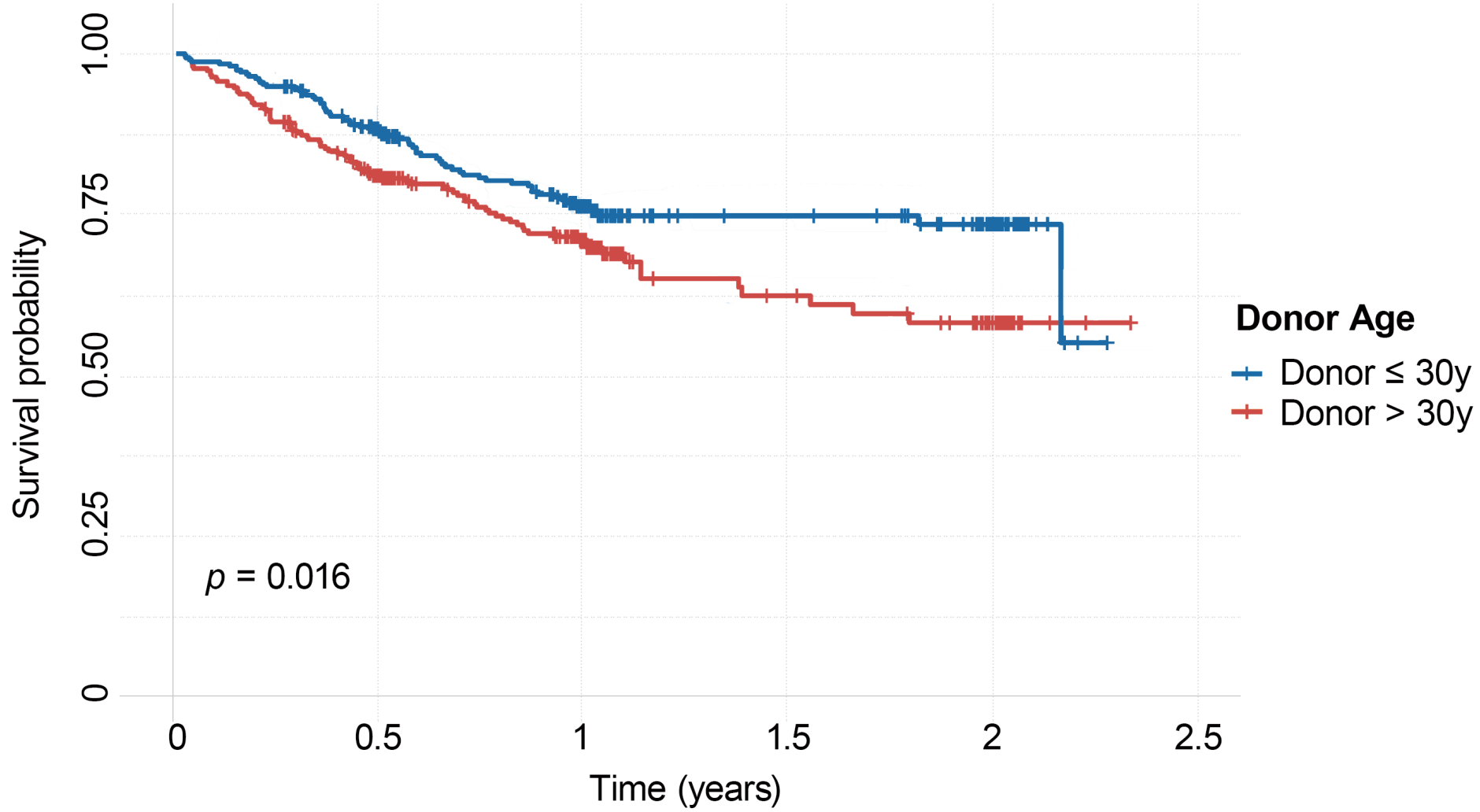
Baseline Characteristics: Patients

PARAMETER	Value	Donor ≤ 30y (n=334)	Donor > 30y (n=326)
Sex	Male	192 (57%)	181 (56%)
	Female	142 (43%)	145 (44%)
Age	median (range)	47 (1 - 65)	44 (1 - 65)
Disease	AML	134 (40%)	120 (37%)
	ALL	100 (30%)	87 (27%)
	MDS	73 (21%)	66 (20%)
	Other	27 (8%)	53 (16%)
Karnofsky / Lansky performance score	≥ 90	202 (60%)	202 (62%)
	<90	132 (40%)	124 (38%)

Baseline Characteristics: Donors

PARAMETER	Value	Donor ≤ 30y (n=334)	Donor > 30y (n=326)
Sex	Male	226 (68%)	195 (60%)
	Female	108 (32%)	130 (40%)
Donor	MUD	221 (66%)	146 (45%)
	MMUD	24 (7%)	40 (12%)
	Haplo	89 (27%)	140 (43%)
Graft Source	Bone marrow	125 (37%)	114 (35%)
	Peripheral blood	209 (63%)	212 (65%)

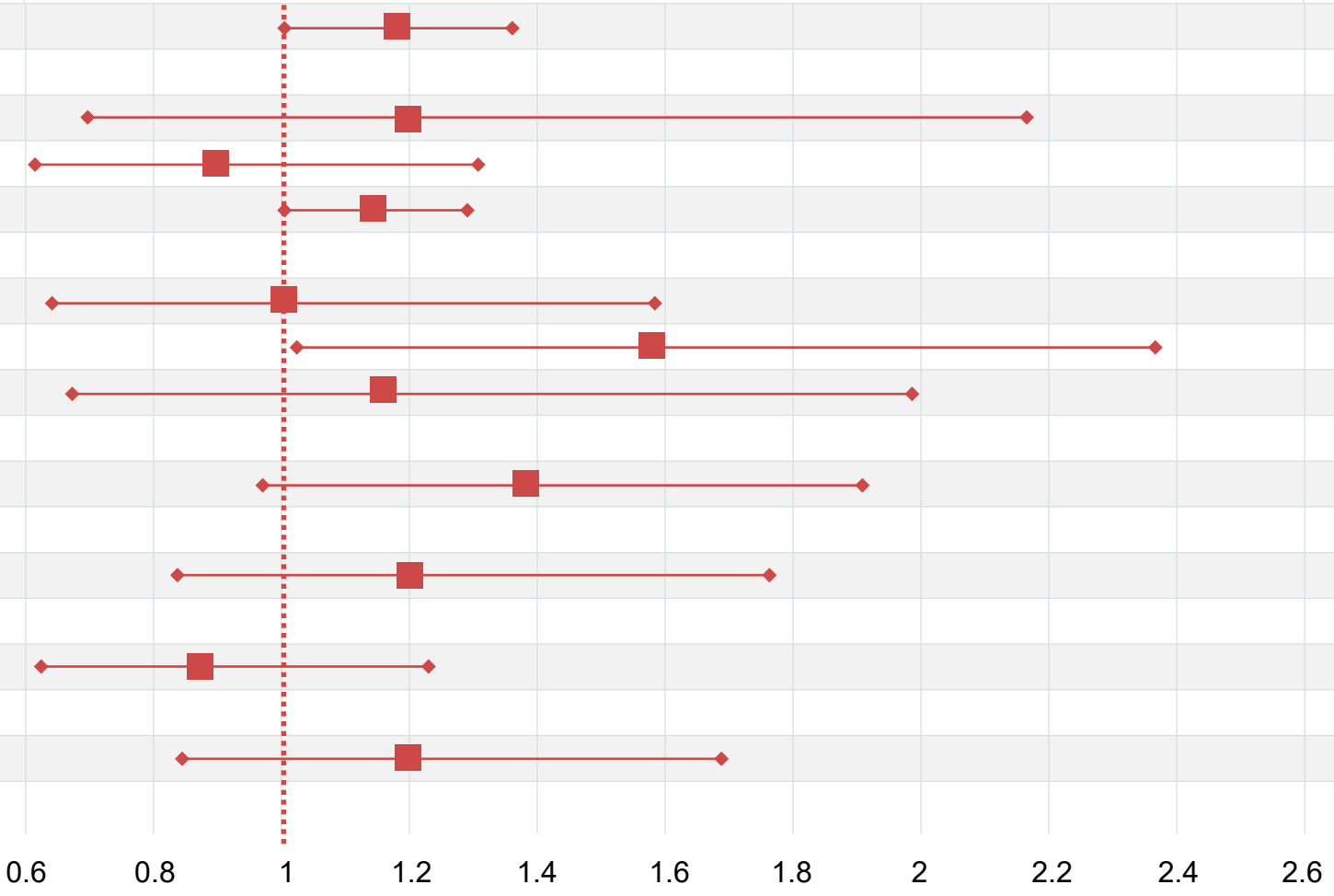
Overall Survival is Associated with Donor Age



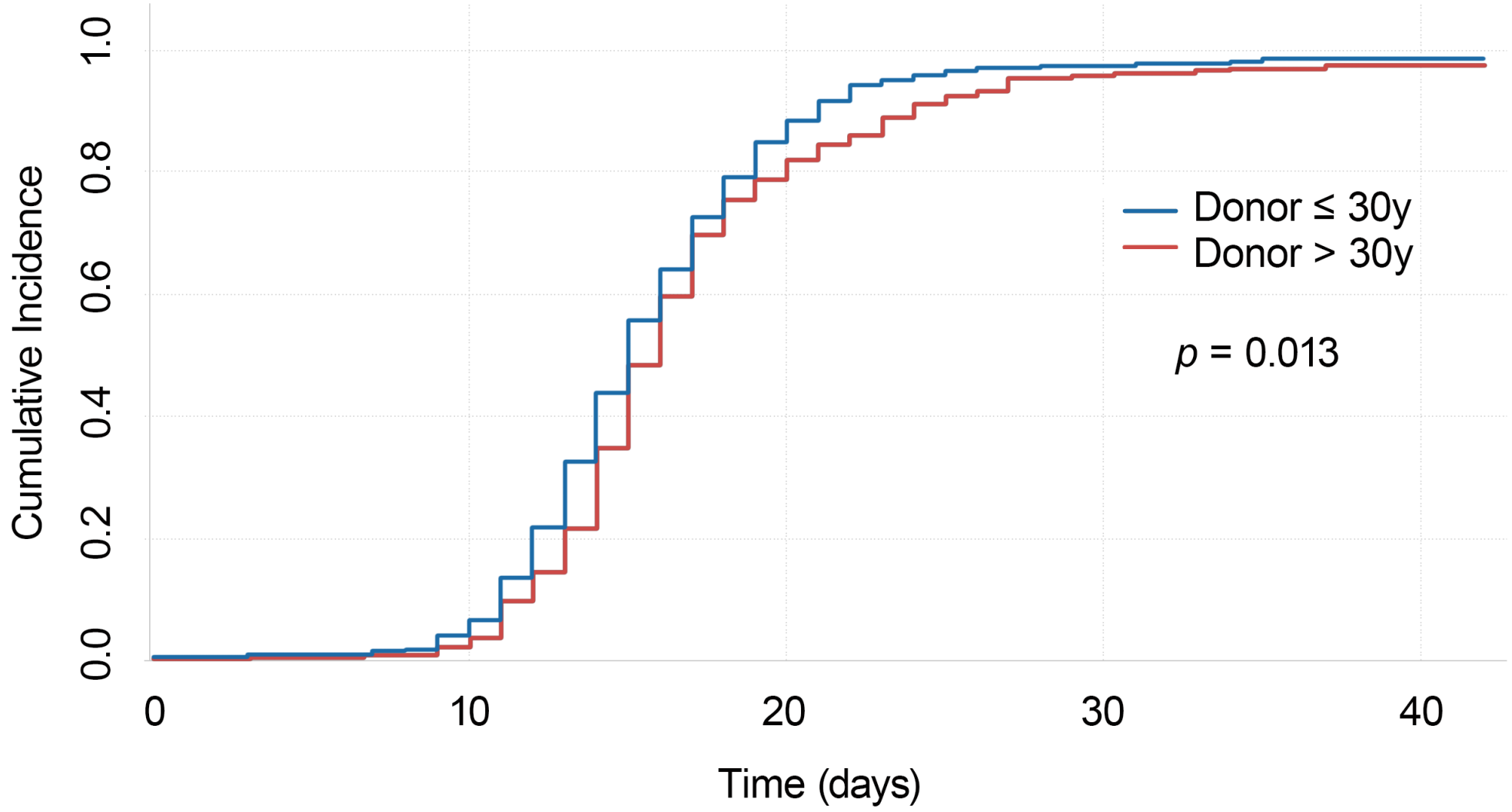
Overall Survival by Donor Age — Multivariable Analysis: 17% Excess Risk for Every Additional Decade of Donor Age

Overall Survival: Continuous Age

		HR	p-value
Donor age		1.17	*0.038*
Donor	MUD	reference	
	MMUD	1.20	*0.523*
	Haplo	0.89	*0.546*
Patient age		1.12	*0.103*
Disease	AML	reference	
	ALL	1.00	*0.99*
	MDS	1.55	*0.034*
	Other	1.14	*0.629*
KPS	≥ 90	reference	
	< 90	1.36	*0.063*
Graft source	Bone marrow	reference	
	Peripheral blood	1.21	*0.311*
Patient sex	Male	reference	
	Female	0.87	*0.415*
Donor sex	Male	reference	
	Female	1.21	*0.263*



Neutrophil Recovery is More Rapid in Patients with Younger Donors



Conclusions

- Donor age is an important consideration for donor selection
- In patients transplanted with unrelated or haploidentical related donor grafts in recent years, younger donor age (≤ 30 years) was associated with improved time to neutrophil recovery, non-relapse mortality and overall survival
- This analysis did not include data for umbilical cord blood, for which donor age is not a relevant variable
- Other factors that may be associated with HSCT outcomes should also be considered
- Advances in the development of graft sources and new approaches to prioritizing donors may broaden the availability of HSCT and improve patient outcomes

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