

Table S1: Univariate analyses

		OS			NRM			Relapse		
		HR	95% CI	p	HR	95% CI	p	HR	95% CI	p
Donor	MSD-PTCy	Ref			Ref			Ref		
	Haplo-PTCy	0.93	0.78, 1.11	0.41	1.01	0.78, 1.32	0.92	0.85	0.71, 1.03	0.10
Donor	MSD-PTCy	Ref			Ref			Ref		
	Haplo: B-leader-Matched	0.88	0.73, 1.06	0.18	0.89	0.66, 1.19	0.42	0.84	0.68, 1.03	0.09
	Haplo: B-leader-Mismatched	1.02	0.83, 1.24	0.89	1.22	0.9, 1.65	0.21	0.88	0.7, 1.11	0.27
Donor	MSD-PTCy	Ref			Ref			Ref		
	Haplo: DRB1-Mismatched	0.92	0.77, 1.1	0.38	1.02	0.77, 1.34	0.90	0.81	0.66, 0.98	0.03
	Haplo: DRB1-Matched	0.97	0.73, 1.27	0.80	0.98	0.64, 1.51	0.94	1.17	0.88, 1.55	0.29
Patient Age	<50 years	Ref			Ref			Ref		
	>=50 years	1.69	1.45, 1.98	<.0001	2.04	1.6, 2.6	<.0001	1.27	1.07, 1.51	0.0053
Donor Age	Continuous	1.02	1.01, 1.02	<.0001	1.02	1.01, 1.03	<.0001	1.01	1, 1.01	0.05
Conditioning	MAC	Ref			Ref			Ref		
	RIC/NMA	1.28	1.09, 1.49	0.002	1.08	0.85, 1.36	0.54	1.62	1.36, 1.92	<.0001
Graft type	BM	Ref			Ref			Ref		
	PB	1.10	0.94, 1.3	0.238	1.39	1.07, 1.8	0.0137	0.88	0.74, 1.04	0.14
Disease	AML/ALL	Ref			Ref			Ref		
	MDS	1.43	1.18, 1.73	0.0002	1.97	1.51, 2.58	<.0001	1.29	1.03, 1.6	0.03
Disease Stage	Early-Intermediate	Ref			Ref			Ref		
	Advanced	1.80	1.54, 2.12	<.0001	1.68	1.31, 2.15	<.0001	1.86	1.56, 2.23	<.0001
KPS	<90	Ref			Ref			Ref		
	>=90	0.73	0.62, 0.85	<.0001	0.73	0.57, 0.92	0.009	0.75	0.63, 0.89	0.0011
HCT-CI	0-2	Ref			Ref			Ref		
	>=3	1.46	1.26, 1.71	<.0001	1.47	1.16, 1.87	0.001	1.49	1.25, 1.76	<.0001
D/R Sex	Not Fem-to-Male	Ref			Ref			Ref		
	Fem-to-Male	1.07	0.89, 1.28	0.49	1.23	0.94, 1.61	0.13	1.03	0.84, 1.26	0.80
D/R CMV	Neg/Neg	Ref			Ref			Ref		
	Pos/Pos	1.36	1.09, 1.7	0.006	1.73	1.2, 2.49	0.003	0.97	0.77, 1.23	0.81
	Pos/Neg	1.11	0.8, 1.55	0.5318	1.92	1.19, 3.1	0.007	0.72	0.49, 1.06	0.09
	Neg/Pos	1.36	1.07, 1.73	0.01	1.38	0.92, 2.07	0.12	1.30	1.02, 1.66	0.03
Race	Non-Caucasian	Ref			Ref			Ref		
	Caucasian	1.13	0.94, 1.37	0.20	1.16	0.87, 1.55	0.31	1.24	1, 1.53	0.05

Time to HCT	Continuous	1.00	1, 1	0.55		1.00	1, 1.01	0.07		1.00	0.99, 1	0.52
Year of HCT	Continuous	0.97	0.92, 1.02	0.27		0.98	0.91, 1.07	0.70		0.98	0.93, 1.04	0.55
		Acute GVHD II-IV				Chronic GVHD						
		HR	95% CI	p		HR	95% CI	p				
Donor	MSD-PTCy	Ref				Ref						
	Haplo-PTCy	0.95	0.78, 1.17	0.65		0.93	0.76, 1.14	0.47				
Donor	MSD-PTCy	Ref				Ref						
	Haplo: B-leader-Matched	0.97	0.78, 1.21	0.77		0.89	0.71, 1.11	0.29				
	Haplo: B-leader-Mismatched	0.93	0.73, 1.19	0.58		1.00	0.78, 1.27	0.98				
Donor	MSD-PTCy	Ref				Ref						
	Haplo: DRB1-Mismatched	0.99	0.8, 1.22	0.92		0.94	0.76, 1.16	0.55				
	Haplo: DRB1-Matched	0.76	0.53, 1.08	0.13		0.87	0.62, 1.21	0.41				
Patient Age	<50 years	Ref				Ref						
	>=50 years	0.92	0.77, 1.11	0.40		0.92	0.77, 1.11	0.40				
Donor Age	Continuous	1.00		1.00		1.00	1, 1.01	0.18				
Conditioning	MAC	Ref				Ref						
	RIC/NMA	0.79	0.65, 0.95	0.01		0.80	0.67, 0.96	0.02				
Graft type	BM	Ref				Ref						
	PB	1.31	1.08, 1.6	0.007		2.21	1.78, 2.74	<.0001				
Disease	AML/ALL	Ref				Ref						
	MDS	0.98	0.76, 1.26	0.88		0.96	0.74, 1.24	0.76				
Disease Stage	Early-Intermediate	Ref				Ref						
	Advanced	1.15	0.94, 1.41	0.17		0.98	0.79, 1.21	0.81				
KPS	<90	Ref				Ref						
	>=90	0.80	0.66, 0.96	0.02		0.85	0.71, 1.02	0.08				
HCT-CI	0-2	Ref				Ref						
	>=3	1.07	0.89, 1.29	0.48		1.00	0.84, 1.21	0.96				
D/R Sex	Not Fem-to-Male	Ref				Ref						
	Fem-to-Male	1.11	0.9, 1.38	0.33		1.43	1.17, 1.76	0.0006				
D/R CMV	Neg/Neg	Ref				Ref						
	Pos/Pos	0.92	0.71, 1.19	0.52		1.35	1.05, 1.74	0.02				
	Pos/Neg	0.99	0.68, 1.44	0.94		1.13	0.78, 1.65	0.51				
	Neg/Pos	1.12	0.86, 1.46	0.42		1.12	0.84, 1.48	0.45				
Race	Non-Caucasian	Ref				Ref						
	Caucasian	1.65	1.29, 2.11	<.0001		1.00	0.81, 1.25	0.99				
Time to HCT	Continuous	1.00	0.99, 1	0.20		1.00	1, 1.01	0.61				
Year of HCT	Continuous	1.00	0.94, 1.07	0.93		0.98	0.92, 1.05	0.57				

Abbreviations: ALL, Acute Lymphoblastic Leukemia; AML, Acute Myeloid Leukemia; BM, Bone Marrow; CI, Confidence Interval; CMV, Cytomegalovirus; Fem-to-Male, Female donor to male recipient; GVHD, Graft-versus-Host Disease; Haplo, haploidentical; HR, Hazard Ratio; HCT, Hematopoietic Cell Transplantation; HCT-CI, Hematopoietic Cell Transplantation Comorbidity Index; KPS, Karnofsky Performance Score; MAC, Mycobacterial infection; MDS, Myelodysplastic Syndrome; MSD, Matched Sibling Donor; NMA, Non-myeloablative conditioning; Neg, Negative; NRM, non-relapse mortality; OS, overall survival; Pos, Positive; PB, Peripheral Blood; PTCy, Post-transplant cyclophosphamide; Ref, Reference; RIC, Reduced-intensity conditioning.

Table S2: Multivariate Analysis: Propensity Matched Cohort

Overall Survival				
		HR	95% CI	P
Donor	MSD-PTCy	Ref		
	Haplo-PTCy	0.94	0.78, 1.14	0.54
Donor	MSD-PTCy	Ref		
	Haplo: B-leader-Matched	0.89	0.72, 1.09	0.24
	Haplo: B-leader-Mismatched	1.04	0.84, 1.3	0.72
Patient age	<50 years			
	>=50 years	1.41	1.17, 1.69	0.0003
Donor age	Continuous	1.01	1.007, 1.01	0.03
Disease Stage	Early-Intermediate			
	Advanced	1.62	1.37, 1.91	<.0001
HCT-CI	0-2			
	>=3	1.36	1.16, 1.59	0.0002
D/R CMV	Neg/Neg			
	Pos/Pos	1.49	1.19, 1.86	0.0005
	Pos/Neg	1.26	0.9, 1.77	0.17
	Neg/Pos	1.42	1.12, 1.81	0.005
Non-Relapse Mortality				
Donor	MSD-PTCy	Ref		
	Haplo-PTCy	0.98	0.72, 1.32	0.87
Donor	MSD-PTCy	Ref		
	Haplo: B-leader-Matched	0.83	0.6, 1.15	0.27

	Haplo: B-leader-Mismatched	1.21	0.86, 1.69	0.27
Patient age				
	>=50 years	2.08	1.6, 2.7	<.0001
Disease Stage				
	Advanced	1.46	1.13, 1.89	0.004
HCT-CI	0-2			
	>=3	1.41	1.1, 1.8	0.007
D/R CMV	Neg/Neg			
	Pos/Pos	1.91	1.32, 2.76	0.0006
	Pos/Neg	2.26	1.4, 3.67	0.0009
	Neg/Pos	1.41	0.94, 2.11	0.10
Time to HCT		1.01	1, 1.01	0.005
Relapse*				
Donor	MSD-PTCy	Ref		
	Haplo-PTCy	0.87	0.7, 1.08	0.19
Donor	MSD-PTCy	Ref		
	Haplo: DRB1-Mismatched	0.82	0.66, 1.02	0.07
	Haplo: DRB1-Matched	1.14	0.85, 1.54	0.39
Conditioning	MAC	Ref		
	RIC/NMA	1.47	1.22, 1.77	<.0001
HCT-CI	0-2	Ref		
	>=3	1.30	1.09, 1.56	0.004
D/R CMV	Neg/Neg	Ref		
	Pos/Pos	1.07	0.85, 1.36	0.55
	Pos/Neg	0.79	0.53, 1.16	0.22
	Neg/Pos	1.34	1.04, 1.72	0.02

Chronic GVHD				
Donor	MSD-PTCy	Ref		
	Haplo-PTCy	0.99	0.73, 1.34	0.92
Graft type	BM			
	PB	1.76	1.37, 2.27	<.0001
D/R Sex	Not Fem-to-Male			
	Fem-to-Male	1.60	1.29, 1.98	<.0001
Acute GVHD, grade II-IV **				
Donor	MSD-PTCy	Ref		
	Haplo-PTCy	0.95	0.71, 1.27	0.74

* Stratified by Disease Stage

** Stratified by Race

Abbreviations are explained in Table S1.

Table S3: IPTW Analysis of entire cohort comparing haploidentical vs MSD groups

OS		HR	95% CI	p
Donor	MSD-PTCy	Ref		
	Haplo-PTCy	1.08	0.85, 1.37	0.51
Donor	MSD-PTCy	Ref		
	Haplo: B-leader-Matched	0.99	0.78, 1.27	0.96
	Haplo: B-leader-Mismatched	1.24	0.96, 1.59	0.10
Patient age	<50 years	Ref		
	>=50 years	1.47	1.29, 1.68	<.0001
Donor age	Continuous	1.01	1.002,1.01	0.005
Disease Stage	Advanced	Ref		
	Early-Intermediate	0.69	0.61, 0.79	<.0001
HCT-CI	0-2	Ref		
	>=3	1.47	1.29, 1.66	<.0001
KPS	<90	Ref		
	>=90	0.78	0.68-0.88	<.0001
D/R CMV	Neg/Neg	Ref		
	Pos/Pos	1.60	1.33, 1.85	<.0001
	Pos/Neg	1.37	1.07, 1.75	0.01
	Neg/Pos	1.51	1.27, 1.79	<.0001
NRM		HR		p
Donor	MSD-PTCy	Ref		
	Haplo-PTCy	1.22	0.86, 1.74	0.27
Donor	MSD-PTCy	Ref		

	Haplo: B-leader-Matched	1.07	0.74, 1.56	0.72
	Haplo: B-leader-Mismatched	1.48	1.01, 2.17	0.04
Patient age	< 50 years			
	>=50 years	1.89	1.54, 2.31	<.0001
Disease	AML			
	ALL	1.17	0.9, 1.53	0.24
	MDS	1.80	1.46, 2.23	<.0001
KPS	<90			
	>=90	0.74	0.61, 0.9	0.003
HCT-CI	0-2			
	>=3	1.34	1.11, 1.63	0.003
D/R CMV	Neg/Neg			
	Pos/Pos	2.14	1.63, 2.8	<.0001
	Pos/Neg	2.43	1.71, 3.46	<.0001
	Neg/Pos	1.41	1.05, 1.9	0.02
Relapse *				
Donor	MSD-PTCy	Ref		
	Haplo-PTCy	1.00	0.76, 1.32	0.99
Donor	MSD-PTCy	Ref		
	Haplo: DRB1-Mismatched	0.94	0.71, 1.24	0.66
	Haplo: DRB1-Matched	1.32	0.96, 1.82	0.08
Disease	AML	Ref		
	ALL	1.15	0.96, 1.38	0.14
	MDS	0.70	0.57, 0.86	0.0006
Conditioning	MAC	Ref		
	RIC/NMA	1.45	1.25, 1.68	<.0001

Graft type	BM	Ref		
	PB	0.80	0.67, 0.95	0.01
KPS	<90	Ref		
	>=90	0.85	0.74, 0.98	0.02
HCT-CI	0-2	Ref		
	>=3	1.39	1.21, 1.6	<.0001
D/R CMV	Neg/Neg	Ref		
	Pos/Pos	1.02	0.86, 1.21	0.84
	Pos/Neg	0.83	0.63, 1.09	0.18
	Neg/Pos	1.29	1.08, 1.54	0.005

* Stratified by Disease Stage

Abbreviations are explained in Table S1.

Table S4: IPTW Analysis restricted to AML patients only comparing haploidentical vs MSD groups

OS				
		HR	95% CI	p
Donor	MSD-PTCy	Ref		
	Haplo	1.03	0.78, 1.36	0.81
Donor	MSD-PTCy	Ref		
	Haplo: B leader matched	0.96	0.72, 1.28	0.80
	Haplo: B leader mismatched	1.17	0.86, 1.55	0.33
Patient Age	<50 years	Ref		
	>=50 years	1.61	1.38, 1.87	<.0001
Disease Stage	Advanced	Ref		
	Early-Intermediate	0.51	0.43, 0.61	<.0001
HCT-CI	0-2	Ref		
	>=3	1.35	1.16, 1.58	<.0001
KPS	<90	Ref		
	>=90	0.83	0.71-0.97	0.02
D/R CMV	Neg/Neg	Ref		
	Pos/Pos	1.39	1.13, 1.70	0.002
	Pos/Neg	1.23	0.90, 1.68	0.22
	Neg/Pos	1.48	1.19, 1.84	0.0003
NRM				
		HR	95% CI	p
Donor	MSD-PTCy	Ref		
	Haplo	1.22	0.85, 1.74	0.29

Donor	MSD-PTCy	Ref		
	Haplo: B leader matched	1.05	0.71, 1.55	0.80
	Haplo: B leader mismatched	1.50	1.01, 2.23	0.05
Patient Age	< 50 years	Ref		
	>=50 years	1.62	1.26, 2.07	0.0001
HCT-CI	0-2	Ref		
	>=3	1.49	1.17, 1.9	0.0012
D/R CMV	Neg/Neg	Ref		
	Pos/Pos	2.22	1.51, 3.28	<.0001
	Pos/Neg	2.46	1.49, 4.06	0.0004
	Neg/Pos	1.69	1.13, 2.55	0.01
Relapse *				
		HR	95% CI	p
Donor	MSD-PTCy	Ref		
	Haplo	1.11	0.8, 1.55	0.54
Donor	MSD-PTCy	Ref		
	Haplo: DRB1 mismatched	1.06	0.76, 1.48	0.75
	Haplo: DRB1 matched	1.48	0.99, 2.2	0.06
Conditioning	MAC	Ref		
	RIC/NMA	1.46	1.21, 1.76	<.0001
Graft type	BM	Ref		
	PB	0.76	0.61, 0.96	0.02
KPS	<90	Ref		
	>=90	0.91	0.76, 1.09	0.31
HCT-CI	0-2	Ref		

	>=3	1.10	0.93, 1.31	0.27
D/R CMV	Neg/Neg	Ref		
	Pos/Pos	1.17	0.94, 1.47	0.16
	Pos/Neg	0.89	0.64, 1.25	0.50
	Neg/Pos	1.48	1.18, 1.86	0.0006

* *Stratified by Disease Stage*

Abbreviations are explained in Table S1.

Table S5: Multivariate Analysis: Younger Haploidentical vs Older MSD

OS				
		HR	95% CI	p
Donor	MSD-PTCy	Ref		
	Younger Haplo-PTCy	0.76	0.57, 1.01	0.0559
Donor	MSD-PTCy	Ref		
	Younger Haplo: B-leader-Matched	0.65	0.48, 0.9	0.0087
	Younger Haplo: B-leader-Mismatched	0.99	0.7, 1.39	0.9507
Disease Stage	Early-Intermediate	Ref		
	Advanced	1.69	1.29, 2.21	0.0002
HCT-CI	0-2	Ref		
	>=3	1.26	0.97, 1.64	0.0879
D/R CMV	Neg/Neg	Ref		
	Pos/Pos	1.88	1.3, 2.73	0.0009
	Pos/Neg	1.52	0.85, 2.72	0.1540
	Neg/Pos	1.79	1.2, 2.66	0.0042
NRM				
Donor	MSD-PTCy	Ref		
	Younger Haplo-PTCy	0.96	0.7, 1.33	0.8237
Donor	MSD-PTCy	Ref		
	Younger Haplo: B-leader-Matched	0.87	0.61, 1.23	0.4281
	Younger Haplo: B-leader-Mismatched	1.12	0.78, 1.6	0.5487
Patient Age	Continuous	1.02	1.01, 1.03	<.0001
Disease Stage	Early-Intermediate	Ref		
	Advanced	1.57	1.22, 2.04	0.0005

HCT-CI	0-2	Ref		
	>=3	1.29	1, 1.65	0.0475
D/R CMV	Neg/Neg	Ref		
	Pos/Pos	1.80	1.26, 2.55	0.0012
	Pos/Neg	2.13	1.32, 3.42	0.0019
	Neg/Pos	1.14	0.76, 1.7	0.5306
Time to HCT	Continuous	1.00	1, 1.01	0.3554
Relapse*				
Donor	MSD-PTCy	Ref		
	Younger Haplo-PTCy	0.71	0.52, 0.98	0.0365
Donor	MSD-PTCy	Ref		
	Younger Haplo: DRB1-Mismatched	0.63	0.46, 0.87	0.0043
	Younger Haplo: DRB1-Matched	1.03	0.68, 1.57	0.8754
Conditioning	MAC	Ref		
	RIC/NMA	1.59	1.13, 2.22	0.0075
Chronic GVHD				
Donor	MSD-PTCy	Ref		
	Younger Haplo-PTCy	0.78	0.49, 1.25	0.3051
Graft type	BM	Ref		
	PB	1.76	1.09, 2.84	0.0219
Acute GVHD, grade II-IV **				
Donor	MSD-PTCy	Ref		
	Younger Haplo-PTCy	0.90	0.58, 1.39	0.6362

* Stratified by Disease Stage

**** Stratified by Race**

Abbreviations are explained in Table S1.

Initial cohort
Haploidentical, n=1432
MSD, n=401

Younger haploidentical, n=692
Older haploidentical, n=740
Younger MSD, n=240
Older MSD, n=161

Aim 1: Entire Cohort

Aim 2: Older Patients

Propensity Score Matched Cohort

Haploidentical (n=1052) vs. MSD (n=400)

Younger haploidentical, n=266
Older haploidentical, n=786

Younger MSD, n=239
Older MSD, n=161

Propensity Score Matched Cohort

Younger Haploidentical (n=347) vs. Older MSD (n=143)