## Supplemental Methods

### Donor Typing

HLA data were obtained for all BMT recipients and their donors. Donors were categorized based on the degree of HLA matching, with matching at all typed HLA loci considered *matched*. Donors were classified as matched sibling (MSD), matched unrelated (MUD), mismatched unrelated (mMUD), or haplo.

### Conditioning

Conditioning regimens were defined as MAC or NMAC based on published definitions.[1] MAC consisted of busulfan and cyclophosphamide (Bu/Cy), cyclophosphamide and total body irradiation (Cy/TBI), or high-dose busulfan and fludarabine (Bu/Flu).[2] NMAC consisted of either fludarabine, cyclophosphamide and total body irradiation (Flu/Cy/TBI) or low-dose busulfan and fludarabine (Bu/Flu).[3]

### GVHD Prophylaxis

GVHD prophylaxis for all patients consisted of PTCy 50 mg/kg on days 3 and 4.[4] All patients who underwent NMAC and some MAC patients received mycophenolate mofetil (MMF) 1 g q8hrs on days 5-35 and either tacrolimus or sirolimus starting on day 5 with durations of prophylactic treatment ranging from 55-175 days based on institutional guidelines and available clinical trials.

### Statistical Analysis

NRM was a competing event of relapse when estimating the cumulative incidence of relapse (CIR) and vice versa. Competing events of GVHD included graft failure and death without GVHD. Patients without evidence of relapse were censored at last contact. For patients in CR, MRD testing by flow cytometry and/or BCR-ABL PCR was recorded. Molecular remission was defined as the absence of detectable BCR-ABL transcripts. Graft failure was defined as >95% recipient cells any time after engraftment with no signs of relapse.[5] Acute (a)GVHD and chronic (c)GVHD were assessed according to consensus criteria with aGVHD assigned a grade of 1-4 while cGVHD was given a severity score of mild, moderate, or severe.[6,7] To analyze CIR based on post-transplant MRD status, a landmark analysis from day +75 was employed. As BCR-ABL PCR was not performed pre-transplant for some patients, we performed an additional sensitivity analysis comparing patients who were MRD+ by PCR with those who were either MRD- or had an unknown MRD status.

1. Bacigalupo A, Ballen K, Rizzo D, et al. Defining the intensity of conditioning regimens: Working definitions. *Biol Blood Marrow Transplant*. 2009;15(12):1628-1633.

2. Kanakry CG, Tsai HL, Bolanos-Meade J, et al. Single-agent GVHD prophylaxis with posttransplantation cyclophosphamide after myeloablative, HLA-matched BMT for AML, ALL, and MDS. *Blood*. 2014;124(25):3817-3827.

3. Kasamon YL, Ambinder RF, Fuchs EJ, et al. Prospective study of nonmyeloablative, HLA-mismatched unrelated BMT with high-dose posttransplantation cyclophosphamide. *Blood Adv*. 2017;1(4):288-292.

4. Luznik L, O'Donnell PV, Symons HJ, et al. HLA-haploidentical bone marrow transplantation for hematologic malignancies using nonmyeloablative conditioning and high-dose, posttransplantation cyclophosphamide. *Biol Blood Marrow Transplant*. 2008;14(6):641-650.

5. Olsson R, Remberger M, Schaffer M, et al. Graft failure in the modern era of allogeneic hematopoietic SCT. *Bone Marrow Transplant*. 2013;48(4):537-543.

6. Przepiorka D, Weisdorf D, Martin P, et al. 1994 consensus conference on acute GVHD grading. *Bone Marrow Transplant*. 1995;15(6):825-828.

7. Jagasia MH, Greinix HT, Arora M, et al. National institutes of health consensus development project on criteria for clinical trials in chronic graft-versus-host disease: I. the 2014 diagnosis and staging working group report. *Biol Blood Marrow Transplant*. 2015;21(3):389-401.e1.

| Supplementary Table 1. Transplant Characteristics | | | | | |
|---|---|---|---|---|---|
| | | CR1 | CR1 | | CR2+ |
| | All (N=81) | Myeloablative (N=26) | Nonmyeloablative (N=43) | p | |
| **Year of Transplant** | | | | | |
| 2008-2013 | 45 (55.5%) | 24 (92.3%) | 13 (30.2%) | 0.0001 | 8 (66.7%) |
| 2014-2018 | 36 (44.4%) | 2 (7.7%) | 30 (69.8%) | | 4 (33.3%) |
| **Median Time from Diagnosis to Transplant (Days)** | | 160 (77-315) | 149 (84-1324) | 0.47 | |
| **Donor** | | | | <0.0001 | |
| MSD | 16 (19.7%) | 11 (42.3%) | 5 (11.6%) | | 0 |
| MUD | 16 (19.7%) | 10 (38.5%) | 3 (7.0%) | | 3 (25%) |
| Haploidentical | 47 (58%) | 5 (19.2%) | 33 (76.7%) | | 9 (75%) |
| MMUD | 2 (2.5%) | 0 | 2 (4.7%) | | 0 |
| **Conditioning Details** | | | | | |
| Busulfan/Cytoxan | 13 (16%) | 12 (46.2%) | 0 | | 1 (8.3%) |
| Flu/Cy/TBI | 53 (65.4%) | | 42 (97.7%) | | 11 (91.7%) |
| Cy/TBI | 7 (8.6%) | 7 (26.9%) | 0 | | 0 |
| Bu/Flu | 8 (9.9%) | 7 (26.9%) | 1 (2.3%) | | 0 |
| **GVHD Prophylaxis** | | | | | |
| Cy/CNI/MMF | 60 (74.1%) | 6 (23.1%) | 43 (100%) | | 11 (91.7%) |
| Cy Alone | 21 (25.9%) | 20 (76.9%) | 0 | | 1 (8.3%) |
| **TKI at Conditioning** | | | | | |
| Imatinib | 27 (33.3%) | 13 (50%) | 11 (25.6%) | | 3 (25%) |
| Dasatinib | 35 (43.2%) | 10 (38.5%) | 22 (51.1%) | | 3 (25%) |
| Nilotinib | 10 (12.3%) | 3 (11.5%) | 7 (16.3%) | | 0 |
| Bosutinib | 1 (1.2%) | | 1 (2.3%) | | 0 |
| Ponatinib | 8 (9.9%) | | 2 (4.7%) | | 6 (50%) |
| **Stem Cell Source** | | | | | |
| PBSCT | 7 (8.6%) | 2 (7.7%) | 0 (0%) | | 5 (41.7%) |
| BMT | 74 (91.4%) | 24 (92.3%) | 43 (100%) | | 7 (58.3%) |

**Supplementary Table 2.** Pre-transplant MRD status by remission status (CR1 vs. CR2+) and by conditioning regimen for patients in CR1

| | All (N=81) | CR1 Myeloablative (N=26) | CR1 Nonmyeloablative (N=43) | p | CR2+ (N=12) |
|---|---|---|---|---|---|
| **MRD Status by MFC** | | | | | |
| Positive | 9 (11.1%) | 6 (23.1%) | 0 | 0.002 | 3 (25%) |
| Negative | 70 (86.4%) | 20 (76.9%) | 42 (97.7%) | | 8 (66.6%) |
| Unknown | 2 (2.5%) | | 1 (2.3%) | | 1 (8.3%) |
| **MRD Status by PCR** | | | | | |
| Positive | 9 (11.1%) | 2 (7.7%) | 5 (11.6%) | 0.15 | 2 (16.7%) |
| Negative | 50 (61.7%) | 20 (76.9%) | 23 (53.5%) | | 7 (58.3%) |
| Unknown | 22 (27.1%) | 4 (15.4%) | 15 (34.9%) | | 3 (25%) |

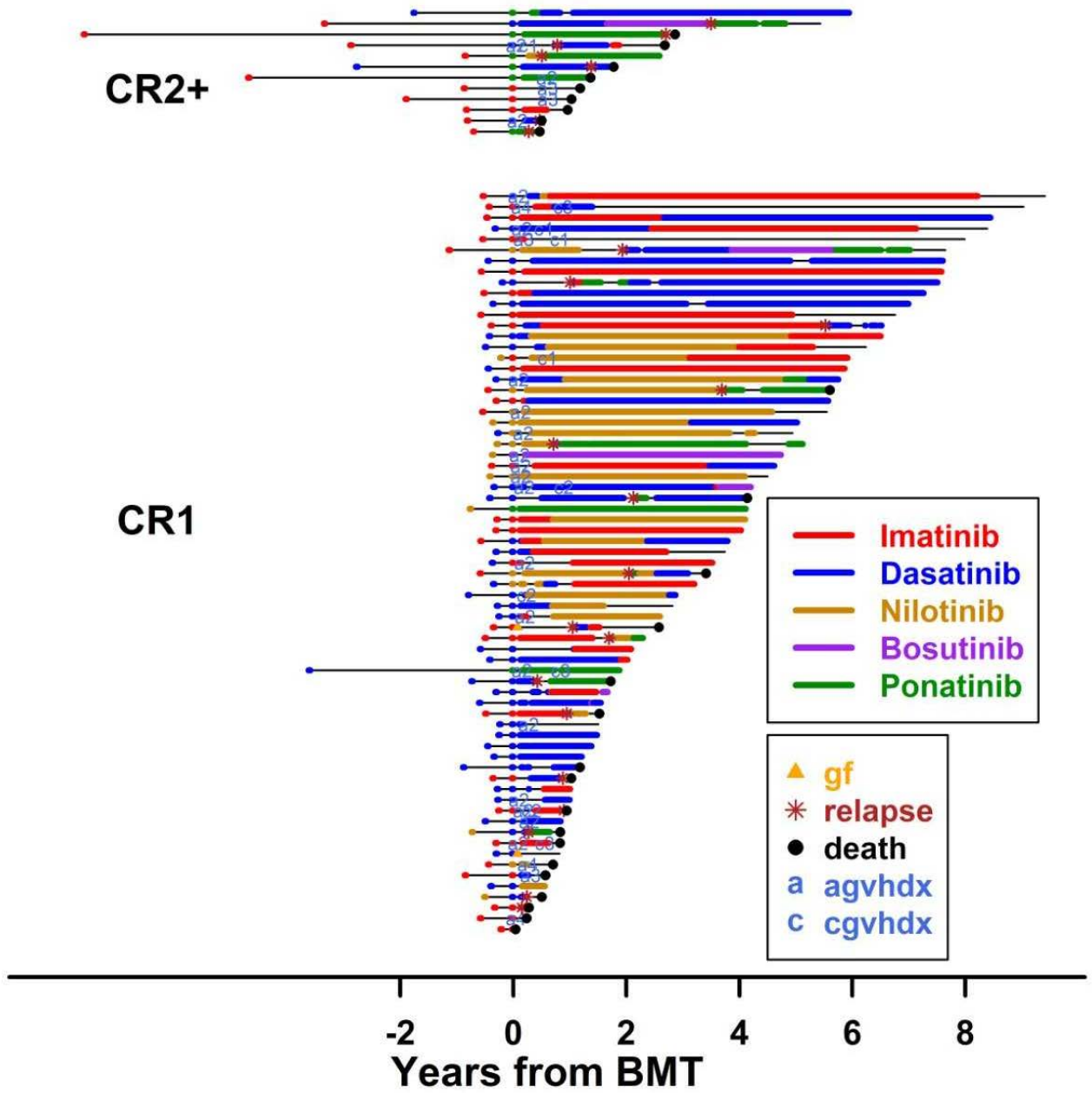
**Supplementary Table 3.** Patients MRD$^+$ by MFC pre-transplant by donor type, and further separated by remission status (CR1 vs. CR2+) and conditioning regimen for patients in CR1

| | All | CR1 Myeloablative | CR1 Nonmyeloablative | CR2+ |
|---|---|---|---|---|
| MSD (N=16) | 4 (25%) | 4/11 (36.4%) | 0/5 (0%) | |
| MUD (N=14)* | 2 (14.3%) | 1/10 (10%) | 0/2 (0%) | 1/2 (50%) |
| Haplo (N=47) | 3 (6.4%) | 1/5 (20%) | 0/33 (0%) | 2/9 (22.2%) |
| MMUD (N=2) | 0 (0%) | | 0/2 (0%) | |
| * Pre-transplant MRD by MFC was not available for two patients who were omitted from this analysis | | | | |

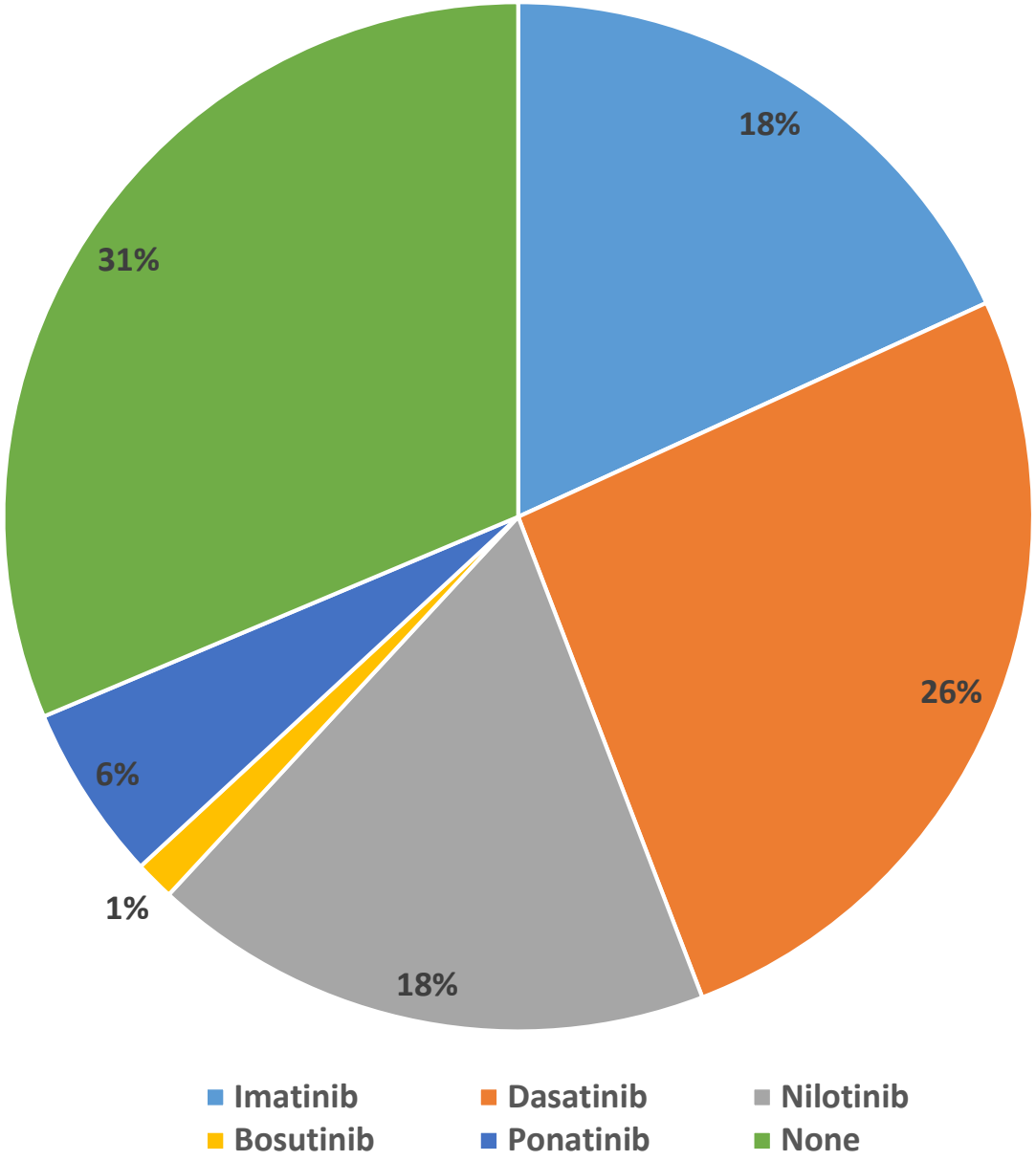
**Supplementary Table 4.** Correlation between pre-transplant MRD status by MFC and MRD status by BCR-ABL PCR.

| | | MRD by BCR-ABL PCR | | |
|---|---|---|---|---|
| MRD by MFC | | Negative | Positive | Unknown |
| | Negative | 43 | 7 | 20 |
| | Positive | 6 | 2 | 1 |
| | Unknown | 1 | 0 | 1 |

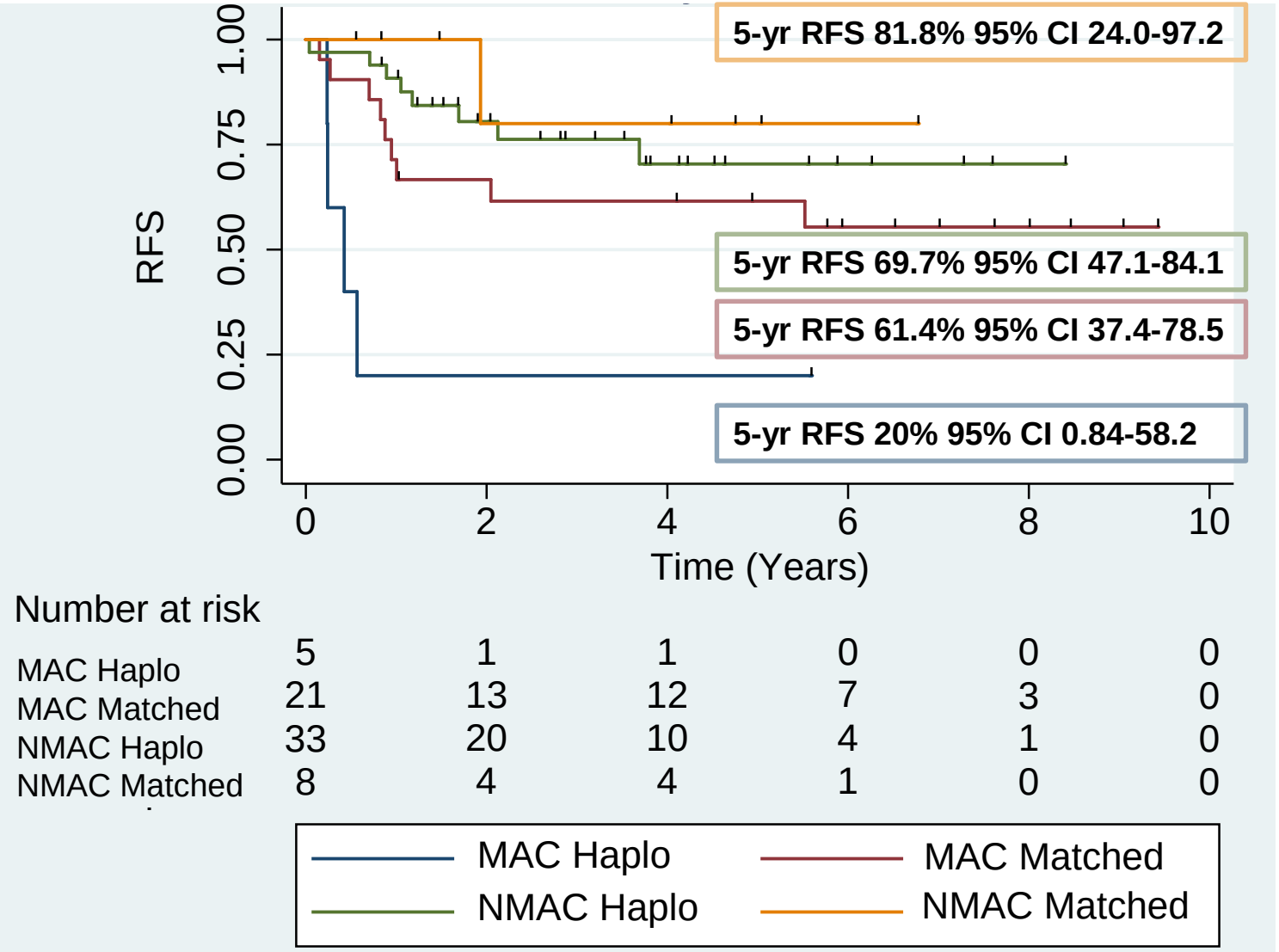
**Supplementary Figure 1:** Overview of post-transplant TKI use by pre-transplant disease status.



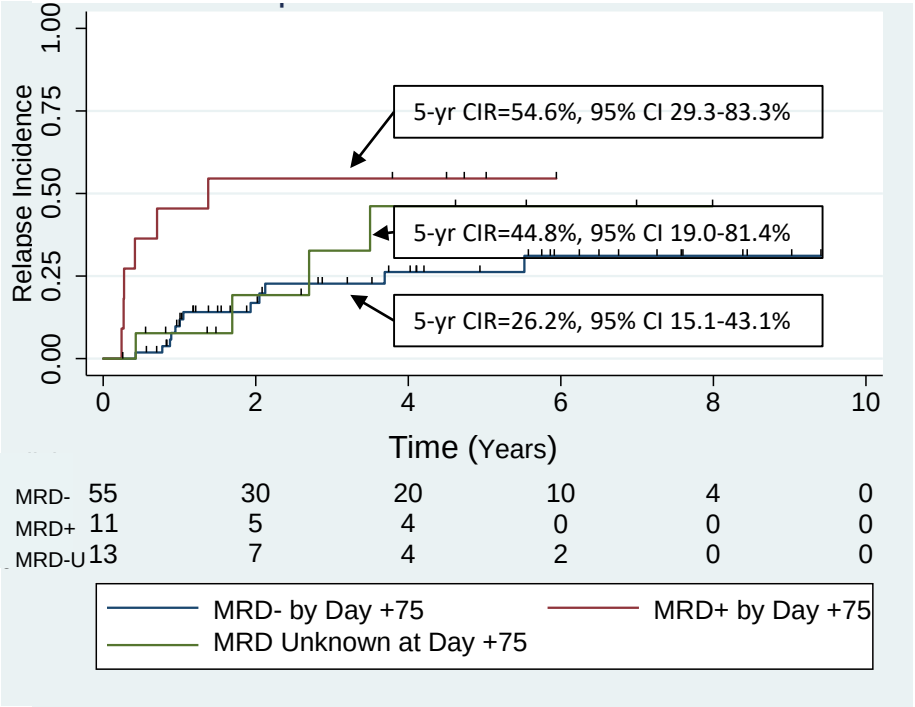
**Supplementary Figure 2.** TKI use on non-relapse, evaluable days from post-transplant day +31-395



**Supplementary Figure 3.** RFS for patients transplanted in CR1 by conditioning and donor HLA match* (matched vs. haploidentical).




*Patients who received mismatched unrelated donor (MMUD) transplants are not included in this analysis.




**Supplementary Figure 4.** Landmark analysis at day 75 of the cumulative incidence of relapse for all transplants based on post-transplant MRD status by BCR-ABL PCR.