Appendix
The Cost of Hematopoietic Stem-Cell Transplantation in the United States
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Table 1. Transplant Type Identification Algorithm

<table>
<thead>
<tr>
<th>Identification of transplant donor type</th>
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<tr>
<td>To define donor type, we used the following ICD-9 procedure codes in any field of the inpatient claims to identify inpatient HSCT procedures (Majhail, Mau, Denzen, &amp; Arneson, 2013):</td>
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<tr>
<td>• ICD-9 procedure codes for allogeneic HSCT: 41.02, 41.03, 41.05, 41.06, 41.08</td>
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<tr>
<td>• ICD-9 procedure codes for autologous HSCT: 41.01, 41.04, 41.07, 41.09</td>
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<tr>
<td>• ICD-9 procedure code for HSCT, donor source not specified: 41.00</td>
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For the small group of patients with outpatient HSCT, we identified outpatient claims with HSCT diagnosis codes (ICD-9: V42.82 [peripheral stem cells replaced by transplant], V42.81 [transplant, BM]) in any diagnosis field, which also had an HSCT procedure (CPT codes: 38240 [PBSC, BM transplantation, allogeneic], 38241 [PBSC, BM transplantation, autologous]) within the 10 days prior to the HSCT diagnosis claim date (2012 CPT/HCPCS Coding Books).
# Table 2. Conditioning Regimen Identification Algorithm

<table>
<thead>
<tr>
<th>Identification of conditioning regimen type</th>
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<tr>
<td>Based on consultation with clinicians (RAH &amp; SA), we used the following sequential steps to identify each patient’s conditioning regimen. A patient not classified in one step was automatically considered for the following step until all possible classifications were made.</td>
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### Step 1: Identification of a subset of myeloablative (MA) regimens based on diagnosis given for HSCT and chemotherapy type.
Specifically, all claims that occurred +/- 10 days of the index date were reviewed for chemotherapy. Two subsets of MA regimens were identified at this step: 1) autologous HSCT with either multiple myeloma or plasma cell neoplasms diagnoses (ICD-9: 203.xx, 277.3x) and treated with melphalan alone, and 2) autologous HSCT with a lymphoma diagnosis (ICD-9: 196.xx, 200.xx, 201.xx, 202.xx).

### Step 2: Classification based on specific chemotherapy regiment.
All claims that occurred +/- 10 days of the index date were reviewed for chemotherapy. Patients with the following regimens were classified as MA: Cy/TBI, Bu/Cy, BEAM, CVP, Mel/Carbo/VP, or VP/TBI1. Non-myeloablative/ reduced intensity conditioning (NMA/RIC) regimens included the following: Flu/Mel, Flu/Bu, Flu/Cy, Flu/TBI, or Flu/Bu/TT1.

### Step 3: Classification based on radiation management codes [Source: American Society of Radiation Oncologists (ASTRO)]
All claims that occurred +/- 10 days of the index date or during a hospital stay were reviewed for radiation management codes. Patients with a CPT code for radiation management of 77427 were considered to have received MA conditioning. Those with CPT code for radiation management of 77431 were considered to have received a NMA/RIC regimen.

### Step 4: Classification based on total body irradiation (TBI) (Source: ASTRO)
#### Step 4.1 All claims that occurred during an inpatient stay were reviewed for evidence of TBI (ICD-9 procedure codes: 92.24, 92.26, 92.25, 92.27, 92.29; ICD-9 diagnosis code: V58.0; CPT: 77427, 77431, 77402, 77407, 77412). Radiation delivery codes (CPT: 77402, 77407, or 77412) were used to determine the number of days of TBI treatment. A MA regimen was assumed if there was: 1) evidence of TBI without an aplastic anemia diagnosis (ICD-9: 284.xx), or 2) 3 or more days of TBI with an aplastic anemia diagnosis. A NMA/RIC regimen was assumed if there were 1 or 2 days of TBI with aplastic anemia diagnosis.

#### Step 4.2: Outpatient HSCT Patients
All claims that occurred +/- 10 days of the index date were reviewed for TBI. If there were 3 or more days of TBI, the patient was considered to have had a MA regimen. Those with 1 or 2 days of TBI were considered to have had a NMA/RIC regimen.

### Step 5: Classification of certain patients with allogeneic HSCT (Source: Center for International Blood and Marrow Transplant Research). Patients with allogeneic HSCT with acute lymphocytic leukemia (ALL) diagnosis (ICD-9: 204.0x) were assumed to have had MA conditioning. Patients with chronic lymphocytic leukemia (CLL) diagnosis (ICD-9: 204.1x) were assumed to have had a NMA/RIC regimen.
All remaining unclassified patients were assumed to have unknown regimens.
Supplemental Figure 1. Hematopoietic Stem Cell Transplant (HCT) Patient Identification

The figure reflects the assignment of patients in the groups used for analysis regimen.

6,671 patients with HCT (inpatient: 6,617⁴, outpatient: 54) between 1/1/2010 and 9/23/2013 (ID period)
2,850 allogeneic (ALLO), 3,796 autologous (AUTO), and 25 unspecified (US) donor type

113 AUTO with multiple myeloma and plasma cell neoplasms diagnosis and treated with melphalan
1,302 AUTO with lymphoma diagnosis

2 (2 ALLO, 0 AUTO, and 0 US) with one of the following chemo regimens: Cy/TBI, Bu/Cy, BEAM, CVP, Mel/ara/Cy/VP, or VP/TBI

308 (296 ALLO, 10 AUTO, and 2 US) with CPT code of 77427

8 (8 ALLO, 0 AUTO, and 0 US) inpatient TBI without aplastic anemia

0 with 3+ days of inpatient/outpatient TBI

331 allogeneic transplants with diagnosis of ALL

4,322 (1,931 ALLO, 2,369 AUTO, and 22 US)

unknown conditioning regimen

2,064 (637 ALLO, 1,425 AUTO, and 2 US) with MA regimen

285 (282 ALLO, 2 AUTO, and 1 US) with NMA/RIC regimen

2,197 were not continuously enrolled in 1 year prior or 100 days after the index date

N = 4,474

1,369 (308 ALLO, 969 AUTO, and 2 US) with MA regimen
198 (195 ALLO, 2 AUTO, and 1 US) with NMA/RIC regimen
2907 (1,224 ALLO, 1,669 AUTO, and 14 US) with unknown regimen

¹ 163 (2.5%) were died in hospital based on discharge status