

# Economic Burden of Hematopoietic Cell Transplantation (HCT) Among Commercially Insured Patients With Hematological Malignancies in the United States (US)

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## Background

- Hematopoietic cell transplantation (HCT) is a potentially curative treatment option for high-risk hematologic malignancies<sup>1,2</sup>
  - Approximately 20,000 HCTs are performed in the United States (US) annually<sup>3</sup>
- A wide range of costs for both autologous HCT (auto-HCT) and allogeneic HCT (allo-HCT) are reported
  - For commercially insured patients with hematologic malignancies, the economic burden of an auto-HCT was estimated at \$390,159 and allo-HCT at \$745,341 in 2011-2014 over a 6-month pre- and 12-month post-HCT period<sup>4</sup>
  - Indirect and caregiver costs were not included in these estimates and may further increase burden<sup>5,6</sup>

## Objective

- To characterize all-cause healthcare resource utilization (HRU) and costs among commercially insured patients with hematologic malignancies who received an auto- or allo-HCT in a more contemporary era

## Methods

- Adults with hematologic malignancies and ≥1 inpatient admission for an auto- or allo-HCT (Jan 2015-Mar 2020) were identified from the MarketScan Commercial and Medicare Supplemental Databases
- Patients were indexed on the date of first HCT inpatient admission
  - Included patients:
    - had ≥12 months of continuous enrollment before and after the index date
    - had ≥2 medical claims with a diagnosis code for an eligible hematologic malignancy (acute myeloid leukemia, myelodysplastic syndrome, myelofibrosis, myeloproliferative disease, acute lymphoblastic leukemia, chronic myeloid leukemia, multiple myeloma, Hodgkin disease, or lymphoma) with ≥1 claim occurring on or before the index date
  - Patients with an HCT prior to the index date were excluded
- Controls were selected from patients meeting study criteria with the exception of an HCT claim requirement
  - The index date for patients in the control group was randomly assigned based on the time between diagnosis and HCT for the HCT cohort
- Controls and HCT recipients were matched 3:1 based on age, sex, insurance type, Deyo-Charlson Comorbidity Index categories, and hematologic malignancy
- Total all-cause HRU and inpatient, outpatient (ie, emergency department [ED], physician office, other visits), and pharmacy costs were compared between the HCT cohorts and controls over the 6-month pre- and 12-month post-index periods
  - Healthcare costs (2021 US\$) were based on paid amounts of adjudicated claims, including insurer/health plan payments and patient cost-sharing (copayment, deductible, and coinsurance)

## Statistical Analysis

- Categorical variables are presented as counts and percentage of patients in each category; continuous variables are presented as means and standard deviations
- Differences were considered significant if the *P*-value was less than 0.05

## Results

- A total of 1,653 auto-HCT recipients were matched to 4,959 controls and 411 allo-HCT recipients matched to 1,233 controls
- After matching, HCT cohorts and controls were similar in age, sex, insurance type, Deyo-Charlson Comorbidity Index categories, and hematologic malignancy (Figure 1, Figure 2)
  - Multiple myeloma was the most common eligible indication for auto-HCT (Figure 2A), whereas acute myeloid leukemia/myelodysplastic syndrome/myelofibrosis/myeloproliferative disease were the most common indications for allo-HCT (Figure 2B)
  - Pre-index comorbidities differed among the HCT and control cohorts, with psychiatric disturbances, infections, and heart valve disease significantly more common in both the auto- and allo-HCT recipients vs matched controls (*P*<0.001 for all)

Figure 1. Demographic and Clinical Characteristics for Matched HCT Recipients and Controls

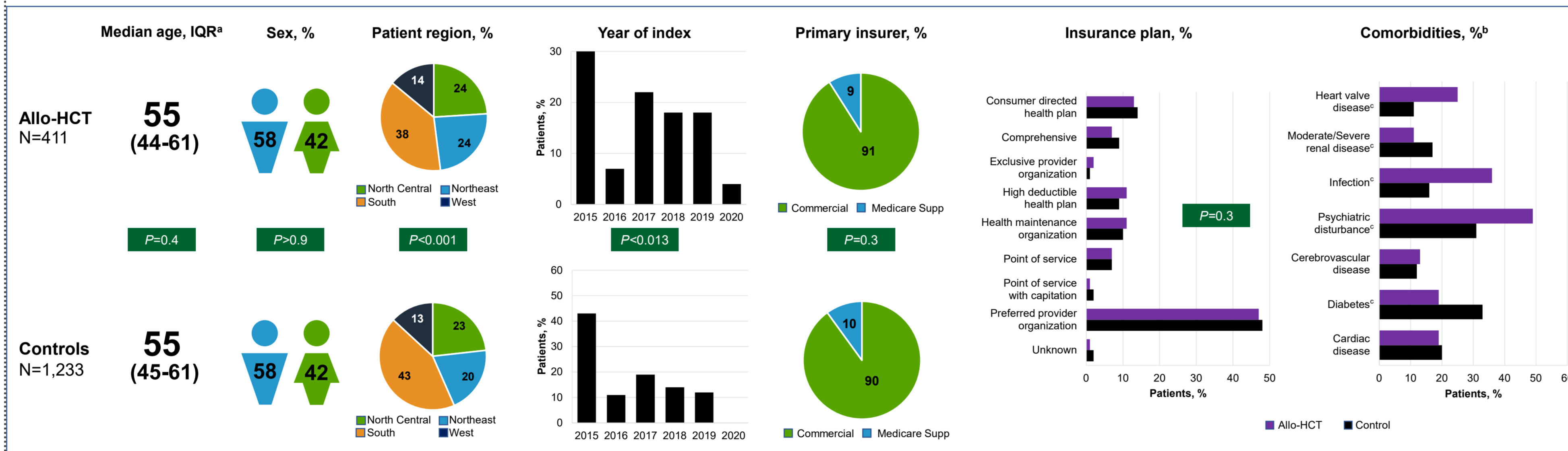
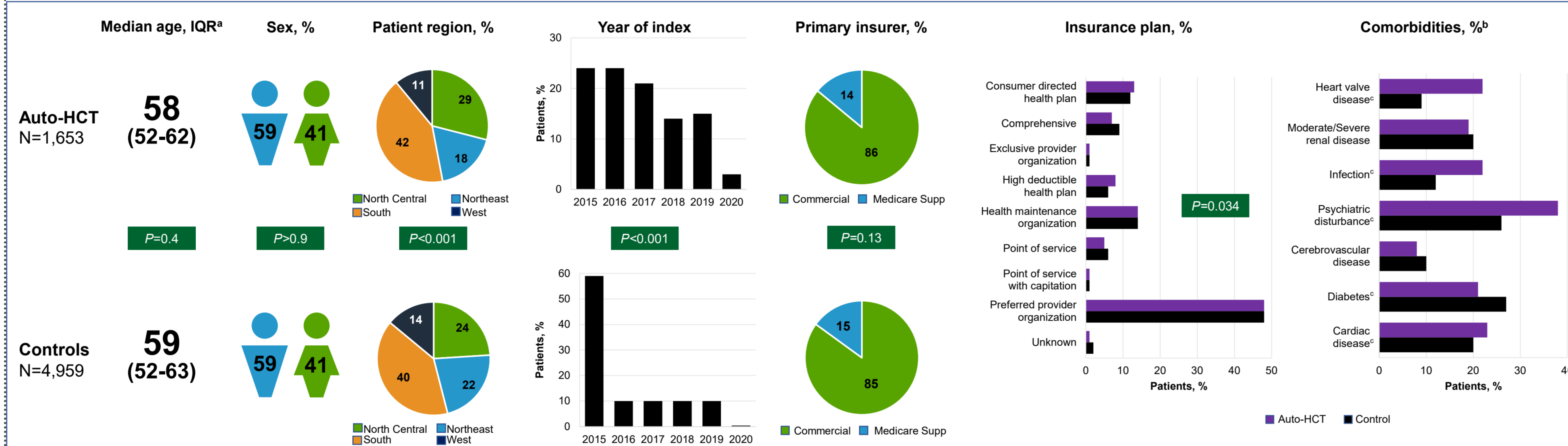


Figure 2. Distribution of HCT-Eligible Indications for Matched Auto-HCT (A) and Allo-HCT (B)



Abbreviations: AML, acute myeloid leukemia; ALL, acute lymphoblastic leukemia; allo, allogeneic; auto, autologous; CML, chronic myeloid leukemia; HCT, hematopoietic cell transplantation; HL, Hodgkin lymphoma; MDS, myelodysplastic syndrome; MPD, myeloproliferative disease

## All-Cause Costs of Auto- and Allo-HCT

- Over the 18-month observation period, total all-cause costs were significantly higher for auto-HCT recipients vs matched controls (\$540,194 vs \$182,846; *P*<0.001; Figure 3)
  - Auto-HCT recipients had significantly higher costs than controls for all categories evaluated except ED visits during the post-index period (\$817 vs \$879; *P*<0.4; Table 1)
  - Auto-HCT costs were driven by inpatient and outpatient costs
- For allo-HCT recipients vs matched controls, total all-cause costs were significantly higher (\$929,799 vs \$190,776; *P*<0.001) during the 18-month observation period (Figure 3)
  - Allo-HCT recipients had significantly higher costs than controls for all categories evaluated except ED visits during the pre- and post-index periods (\$568 vs \$533; *P*=0.11, \$824 vs \$862; *P*>0.9; Table 1)
  - Allo-HCT costs were driven by inpatient costs

Figure 3. Mean Medical Costs for Patients With HCT and Matched Controls in 18-month Observation Period (2015-2020)

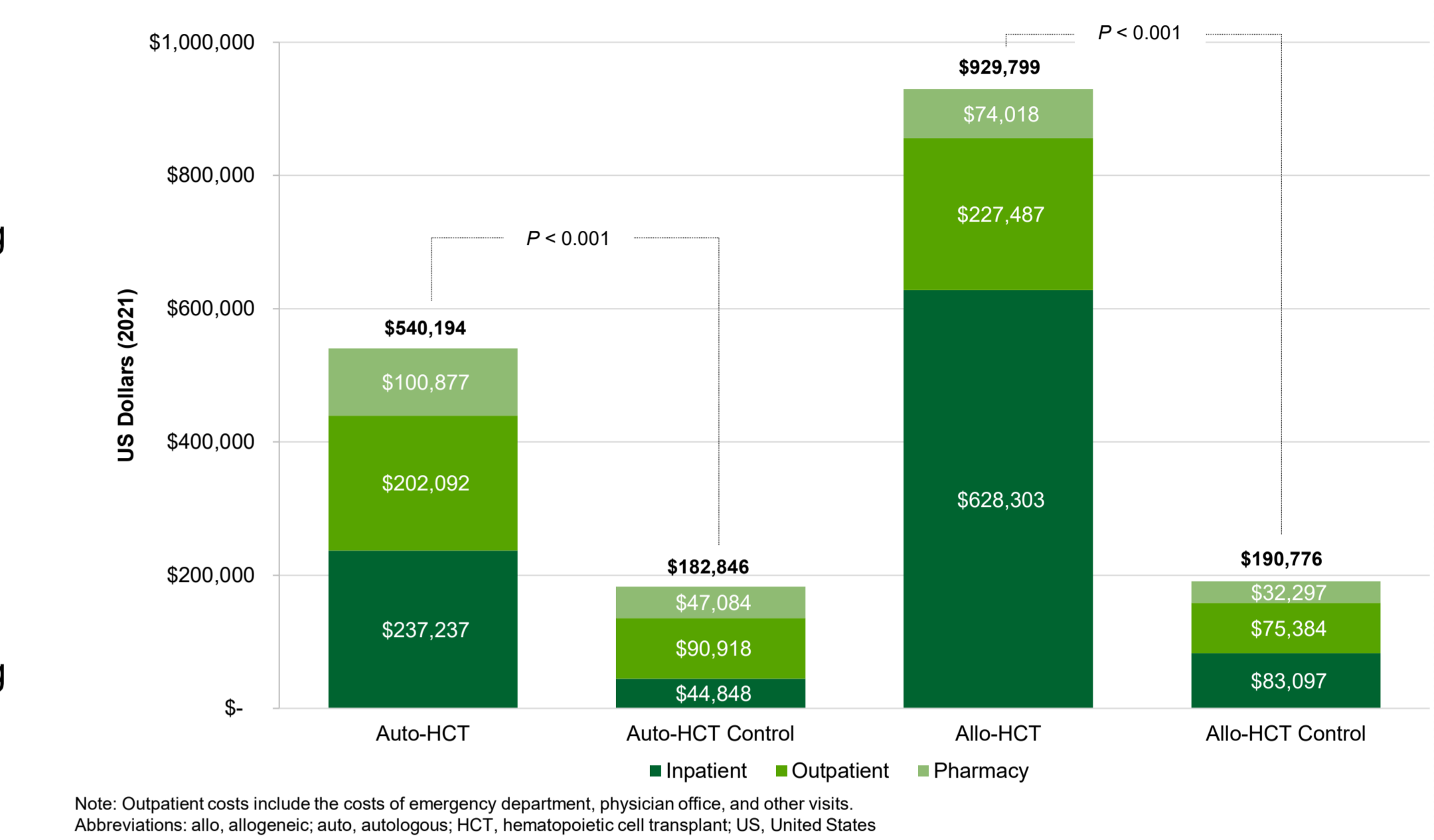


Table 1. Mean Medical and Prescription Costs (2021 US Dollars) for Patients With Auto- or Allo-HCT in the 6-month Pre-index and 12-month Post-index Periods

Cost Category	Mean Costs (SD)		<i>P</i> -value	Mean Costs (SD)		<i>P</i> -value
	Auto-HCT recipients n=1653	Controls n=4959		Allo-HCT recipients n=411	Controls n=1233	
<b>6-month pre-index period</b>						
Inpatient admissions	40,483 (84,340)	18,023 (70,782)	<0.001	189,413 (228,560)	33,868 (96,645)	<0.001
Outpatient visits and services	120,921 (92,758)	27,427 (54,619)	<0.001	99,828 (93,288)	22,543 (58,946)	<0.001
ED	1,084 (9,568)	480 (2,301)	<0.001	568 (2,001)	533 (1,837)	0.11
Physician office visits	1,821 (1,497)	987 (1,781)	<0.001	1,732 (1,675)	813 (991)	<0.001
Other	119,839 (92,519)	26,947 (54,244)	<0.001	99,264 (93,083)	22,010 (58,817)	<0.001
Pharmacy	32,314 (30,317)	12,908 (26,913)	<0.001	22,668 (35,936)	8,738 (21,330)	<0.001
<b>Total all-cause costs</b>	<b>193,712 (127,788)</b>	<b>58,356 (101,786)</b>	<b>&lt;0.001</b>	<b>311,906 (249,107)</b>	<b>65,148 (123,352)</b>	<b>&lt;0.001</b>
<b>12-month post-index period</b>						
Inpatient admissions	196,754 (160,936)	26,825 (99,084)	<0.001	438,890 (370,623)	49,228 (169,166)	<0.001
Outpatient visits and services	81,171 (139,092)	63,491 (112,622)	<0.001	127,660 (143,124)	52,841 (98,255)	<0.001
ED	817 (5,303)	879 (3,625)	0.4	824 (3,322)	862 (2,970)	>0.9
Physician office visits	2,014 (1,756)	1,907 (2,513)	<0.001	3,384 (4,137)	1,783 (2,153)	<0.001
Other	80,355 (138,855)	62,612 (112,224)	<0.001	126,836 (143,006)	51,979 (98,032)	<0.001
Pharmacy	68,563 (70,797)	34,176 (60,629)	<0.001	51,350 (55,375)	23,560 (52,147)	<0.001
<b>Total all-cause costs</b>	<b>346,482 (228,264)</b>	<b>124,489 (187,301)</b>	<b>&lt;0.001</b>	<b>617,893 (451,561)</b>	<b>125,628 (234,308)</b>	<b>&lt;0.001</b>

Abbreviations: allo, allogeneic; auto, autologous; ED, emergency department; HCT, hematopoietic cell transplantation

## Limitations

- This analysis did not include indirect costs, caregiver burden, or donor costs and therefore likely underestimates the true burden of HCT for patients with hematologic malignancies
- Other limitations include those inherent to retrospective claims analyses
  - Clinical information is based only on diagnosis and procedure codes and is limited by corresponding caveats
  - As claims data are collected for billing purposes, lack of clinical completeness and accuracy may exist
  - MarketScan Commercial and Medicare data represent a sample of commercially insured patients and may not be generalizable to all patients or to all practice settings

## Conclusions

- The use of HCT, a potentially curative treatment for some patients with hematologic malignancies, is associated with considerable HRU and economic burden

## References

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## Disclosures

Mayur Narkhede: membership of board of directors/advisory committee: TG Therapeutics and ADC Therapeutics; research funding: TG Therapeutics, Genmab, Genentech, Roche, Gilead, Gilead/Forty Seven, EUSA Pharma, and Seagen Inc.; Nicholas Liu: employee and equity holder of Seagen Inc.; Andy Surinach: consulting fees: Seagen Inc.; Michelle A. Fanale: employee and equity holder of Seagen Inc.; Kristina S. Yu: employee and equity holder of Seagen Inc.; Allison Winter: membership of board of directors/advisory committee: Seagen Inc. and Janssen; consulting fees: Seagen Inc. and Janssen; honoraria: OncLive

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