Healthcare Resource Utilization and Costs in Patients with AML Treated with Post-Transplant Maintenance Therapy

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Abstract

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Background: Allogeneic hematopoietic cell transplantation (allo-HCT) has improved survival in patients with acute myeloid leukemia (AML); however, post-transplant relapse remains the most common cause of treatment failure and death. There is limited data regarding the economic and clinical burden associated with the progression from diagnosis to post-transplant maintenance therapy, which is intended to maintain remission in patients.

Objective: To describe healthcare resource utilization (HRU) and quantify costs among commercially insured, Medicaid, and Medicare beneficiaries who have and have not received maintenance therapy after allo-HCT.

Methods: We conducted a retrospective cohort study on commercially insured, Medicare, and Medicaid beneficiaries with AML who were and were not prescribed maintenance therapy

following allo-HCT between October 1st, 2015 and March 31st, 2024 using claims from the Merative MarketScan® database. The final analytic cohort included 373 patients, of whom 43 were prescribed maintenance therapy following allo-HCT. To account for observed differences between those who received maintenance therapy and those who only received allo-HCT, we employed inverse probability weighting (IPTW) using propensity scores estimated from baseline characteristics. We assessed differences in all-cause monthly HRU by summarizing the number of emergency department (ED), inpatient (IP), outpatient (OP) visits, and hospital length of stay throughout the 12 month follow up period. We also evaluated monthly supportive therapy utilization patterns, including therapies that stimulate neutrophil production to reduce infection risk and promote red blood cell production to manage anemia, to assess treatment-related care requirements. Poisson regression models were used to estimate monthly event rates for each HRU category. Total healthcare costs were reported as the sum of ER, IP, OP, and outpatient pharmacy costs to provide insights into the costs associated with maintenance therapy. Transfusion burden was evaluated by counting the number of transfusions for each cohort.

Results: The maintenance therapy group demonstrated significantly higher HRU across multiple service types. Office visits were more than doubled (IRR = 2.11, $p < 0.001$), with significant increases in IP visit rates (IRR = 1.39, $p = 0.015$), hospitalization rates (IRR = 1.37, $p = 0.024$), and overall OP utilization (IRR = 1.79, $p < 0.0001$). Specialist clinic and ED visit rates were higher but not statistically significant (IRR = 1.5, $p = 0.151$; IRR = 1.75, $p = 0.309$), respectively. Supportive therapy utilization peaked within the first three months post-transplant in the maintenance therapy group before converging with controls by month eight. Healthcare costs were driven primarily by IP expenses, with the maintenance therapy group incurring

substantially higher costs four to ten months after allo-HCT. Pharmacy costs were expectedly higher in the maintenance therapy group throughout follow-up. Blood transfusion requirements were minimal in both groups, with 93% of maintenance therapy patients and 97.6% of allo-HCT only patients requiring no transfusions during the 12-month follow-up period. The mean monthly length of stay was significantly longer in the allo-HCT only group compared to the maintenance therapy group (33.77 ± 31.49 days vs. 20.97 ± 15.36 days), with a mean difference of 12.72 days (95% CI: 11.14,14.31; p = 0.001).

Discussion: Our findings show that those who received maintenance therapy following allo-HCT were associated with having significantly greater healthcare resource utilization and costs, as shown by higher rates of office visits and hospitalizations. IP visits accounted for the largest share of monthly healthcare expenditures, with the maintenance group incurring notably higher IP costs from months four to ten after allo-HCT. Pharmacy costs were the second largest component and were consistently higher in the maintenance group. Supportive therapy use was substantially higher in the maintenance group during the early post-transplant period, peaking within the initial three months. These findings highlight the need to balance the clinical benefits of maintenance therapy with its increased demands on healthcare resources.

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Acknowledgements

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1. Introduction

Acute myeloid leukemia (AML) comprises a heterogenous group of rapidly progressing myeloid neoplasms characterized by the clonal expansion of immature hematopoietic stem cells in the peripheral blood and bone marrow.[1-3] AML is the second most common type of leukemia and the most common type of acute leukemia in adults in the United States. In 2024, approximately 20,800 individuals in the United States were diagnosed with AML and an estimated 11,220 deaths were attributed to the disease. Outcomes for patients with AML remain suboptimal, with a 5-year relative survival of 32.9%.[4]

Allogeneic hematopoietic cell transplantation (allo-HCT) has improved survival in patients at high risk of relapse. Allo-HCT has been found to improve survival in patients at high risk of relapse when compared to consolidation with chemotherapy, autologous HCT (auto-HCT) to allo-HCT, with studies showing markedly better 5-year overall survival with allo-HCT (74% vs 38% or 49%) and progression-free survival, as well as a lower cumulative incidence of relapse, compared to chemotherapy alone or auto-HSCT ($p < .001$).[5] Although allo-HCT is a curative option for some patients, post-transplant relapse remains the most common cause of treatment failure and death.[6,7] Nearly 20-30% of patients with AML will relapse within the first 1 to 2 years after allo-SCT and face a poor prognosis with a 1 year survival rate of <20%.[8,9]

Currently, there are 3 approaches to therapy after allo-HCT including maintenance, preemptive, and active relapse therapy.[10-12] Multiple randomized controlled trials and meta-analyses have shown that maintenance therapies—such as FLT3 (FMS-like tyrosine kinase 3) inhibitors (e.g., sorafenib, gilteritinib) and hypomethylating agents (e.g., azacitidine)—can reduce relapse rates and improve relapse-free and overall survival in patients with AML who harbor FLT3-ITD mutations (FMS-like tyrosine kinase 3 internal tandem duplication).[13] Maintenance therapy following allo-HCT can be inherently costly, with patients often requiring treatment for prolonged durations, sometimes up to two years. AWP unit prices for these therapies ranges from $156.20 to $12,054, highlighting the significant financial burden associated with long-term maintenance regimens in this population (Appendix R).[14-23] Additionally, clinical benefit varies considerably by therapeutic agent, with ongoing uncertainty regarding optimal treatment duration, patient selection criteria, and long-term tolerability. To date, to our knowledge, there is no real-world data regarding the economic and clinical burden associated with maintenance therapy after AML patients receive allo-HCT. Real-world evidence on healthcare resource utilization (HRU) and direct healthcare costs among commercially insured, Medicaid, and Medicare beneficiaries who have undergone allo-HCT is needed to inform the clinical and economic decision-making process. Therefore, this analysis will examine HRU patterns and quantify direct healthcare costs among patients who have and have not received maintenance therapy after allo-HCT.

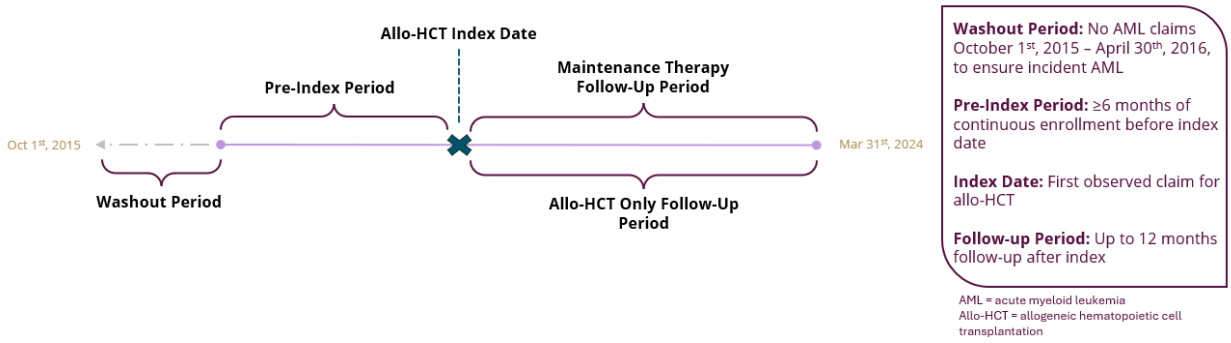
2. Methods

2.1 Study Design and Data Source

We conducted a retrospective cohort study using the Merative MarketScan® database. The MarketScan Commercial and Medicare Supplemental Databases capture healthcare utilization data for over 273 million individuals in the United States. This includes employees, their dependents, and retirees with either primary or Medicare supplemental coverage. These individuals are enrolled in various privately insured plans such as fee-for-service, point-of-service, or capitated health plans. The database contains comprehensive information on enrollment status and healthcare claims, encompassing inpatient (IP), outpatient (OP) services, as well as prescription drug utilization. This includes supportive therapies such as granulocyte colony-stimulating factors, which stimulate the production of neutrophiles and erythropoiesis-stimulating agents, which promote the production of red blood cells. [24] All costs were based on the net payment made by the insurance plan to the provider.

The study period spanned from October 1st, 2015, coinciding with the United States' implementation of International Classification of Diseases 10th revision (ICD-10) coding, through March 31st, 2024 (Figure 1). A six-month washout period from October 1st, 2015 through April 30th, 2016 was implemented to exclude prevalent cases and include only those who were newly diagnosed with AML.

Figure 1. Study design



All data complies with the Health Insurance Portability and Accountability Act (HIPAA) of 1996. This research was exempt from institutional review board approval requirements as specified under 45 CFR 46.101 of the Department of Health and Human Services regulations, since MarketScan® data is structured in a way that prevents subject identification, either directly or through linked identifiers.[25]

2.2 Cohort Selection

Adult patients with AML were identified by the presence of ≥1 IP claim or ≥2 OP claims within 30 days of each other with a diagnosis of AML (ICD-10 codes listed in Appendix A) in any billing position. We defined index date as the date of the first claim with an allo-HCT procedure after AML diagnosis (procedure codes listed in Appendix D & E). We required patients to meet the following inclusion criteria: (1) ≥6 months continuous insurance enrollment before allo-HCT

to ensure this is the first time they had a transplant for AML and to calculate comorbidity scores at baseline (2) ≥12 month follow-up after index with continuous insurance enrollment. Patients were excluded from analyses if they had the presence of any malignancy diagnoses prior to index date except for myelodysplastic syndromes or chronic myelomonocytic leukemia (ICD-10 codes listed in Appendix B). After applying inclusion and exclusion criteria, patients meeting the ≥6 month continuous enrollment requirement were divided into maintenance therapy and allo-HCT only groups based on receipt of maintenance therapy at any time during the follow-up period. The maintenance therapy cohort included patients who received maintenance therapy and remained in remission following allo-HCT, with individuals who experienced relapse were excluded, as maintenance therapy is prescribed only for patients in remission.
Cohort selection was performed using SAS version 9.4 (SAS Institute, Cary, NC).

2.3 Study Measures and Outcomes

Baseline demographics for both cohorts included patient age, age group (18 to 35 years old, 35 to 44 years old, 45 to 54 years old, 55 to 64 years old, ≥65, sex (female/male), insurance plan type (commercial, Medicaid, Medicare Supplemental), geographic region (Northeast, North Central, South, West, Uknown), rurality (urban/rural). Baseline clinical characteristics included year of AML diagnosis, year of allo-HCT, days to transplant, days to maintenance therapy, and previous diagnosis of myelodysplastic syndrome. Weighted Charlson and Elixhauser comorbidity indexes were calculated using ICD-10 diagnosis codes on medical claims collected during the six-month pre-index period. The Charlson Comorbidity Index (CCI) was weighted using revised Quan weights and the van Walraven weights were implemented for the Elixhauser Comorbidity Index (ECI) in the comorbidity package in R.[26-28] Baseline healthcare resource utilization, total costs over the pre-index period, and per patient per month (PPPM) costs for each type of visit or pharmacy visit were also assessed. To characterize the cost over the post-index period, we assessed patient costs over the 12 month follow up period, including costs by HRU category, PPPM costs, and cumulative costs stratified by cohort. We adjusted costs to 2024 US dollars using the medical care component of the US Consumer Price Index.[29]

The primary outcomes were costs from ED, IP, OP visits, and outpatient pharmacy costs and describe healthcare resource utilization following maintenance therapy initiation among those who received therapy compared to patients who only underwent allo-HCT. The secondary outcome was blood transfusion burden in patients with AML who received maintenance therapy compared to those who only underwent allo-HCT.

2.4 Statistical Analysis

Demographic and baseline characteristics were summarized using descriptive statistics. Continuous data was characterized through mean and standard deviation (SD), median, and interquartile range. Categorical variables were presented as frequencies and percentages. Propensity score weighted analysis was performed to mitigate confounding by generating a pseudo-randomized comparison in which the maintenance therapy and allo-HCT only groups have similar distributions of observed baseline characteristics. The propensity score model was a logistic regression that included baseline demographic, clinical characteristics, and costs (Table 4.2). We utilized inverse probability of treatment weighting (IPTW) with a weighting scheme for

the average treatment effect on the treated (ATT) parameter to adjust for baseline differences between the cohorts, as the small sample size precluded the use of propensity score matching (Appendix I).[30] All subsequent analyses, including the calculation of weighted means and regression models, incorporated these weights to describe healthcare resource utilization and quantify healthcare costs incurred after allo-HCT among patients with AML. IPTW was implemented using the WeightIt package in R.[31] Balance between cohorts was assessed using the absolute standardized mean difference (ASMD) and Kolmogorov-Smirnov statistics both before and after weighing, with an ASMD of ≤0.05 considered indicative of adequate balance.

Per-patient monthly visit burden and HRU were analyzed using Poisson regression models with bootstrapped 95% confidence intervals (CIs) to address skewed distributions. Models included treatment group and months after allo-HCT as predictors, with Poisson family distribution to model counts of HRU. Initial Poisson regression model for total OP visits demonstrated overdispersion, to address this we employed quasi-Poisson regression for this outcome. We calculated PPPM mean costs with standard deviations (SD), mean differences, bootstrapped 95% confidence intervals (CIs), and p-values for all types of HRU to test whether there were statistically significant differences between groups. For cumulative costs, the mean, bootstrapped 95% CIs, median, and mean difference between cohorts were reported. IPTW weighted mean monthly costs were calculated for each cohort and depicted using a stacked bar chart to visualize the contribution of different cost components to the total expenditure. Transfusion events during the post-index period were categorized as 0, 1, 2, or 3+ events with counts and percentages presented for each category.

Statistical analyses were conducted using R version 4.4.1 (R Foundation for Statistical Computing, Vienna, Austria) via RStudio version 2025.05.0 (RStudio PBC, Boston, MA).

3. Results

3.1 Baseline Characteristics

We identified 10,495 individuals with claims for AML during the index period of May 1st, 2016 to March 31st, 2023. From this population, 7,305 incident AML cases with allo-HCT were identified. A total of 43 individuals met the eligibility criteria of having maintenance therapy and 330 only underwent allo-HCT (Figure 2).

Prior to IPTW, substantial imbalances were evident across multiple covariates, as the allo-HCT cohort was older, had a longer time to transplant, and exhibited higher mean CCI and ECI scores (Table 4.1), as well as higher costs for emergency department and office visits and outpatient pharmacy medications (Appendix L). The maintenance therapy cohort, however, had a higher number of hospitalizations, greater utilization of IP and OP services, and more outpatient pharmacy visits during the pre-index period (Appendix K). These distributional differences between treatment groups were reflected in the absolute standardized mean differences and Kolmogorov-Smirnov statistics exceeding 0.1 for many variables. Following IPTW adjustment, these imbalances were markedly reduced, with many covariates achieving absolute standardized mean differences below 0.05 and substantially improved Kolmogorov-Smirnov statistics. This indicates that the two treatment groups are comparable on observed characteristics and the

validity of causal inferences about the effects of maintenance therapy compared to allo-HCT group is strengthened (Figure 3, Table 4.2).

After IPTW, baseline characteristics were well balanced between the adjusted allo-HCT only cohort (n=44.1) and the maintenance therapy cohort (n=43). The mean age was similar (46.7 ± 13.8 vs. 46.2 ± 12.9 years). Regional and insurance distributions were comparable, with the South being most represented region and commercial insurance as the predominant coverage type. Gender distribution was balanced, and the prevalence of myelodysplastic syndrome was similar between groups. The mean time to transplant did not differ (146.4 vs. 146.3 days). Comorbidity scores were similar after weighting, with a slightly higher mean weighted CCI in the adjusted allo-HCT cohort (2.75 ± 0.90 vs. 2.67 ± 1.00) and a slightly lower mean weighted ECI (3.13 vs. 3.30) compared to the maintenance therapy cohort.

Figure 2. Description of Cohort Composition

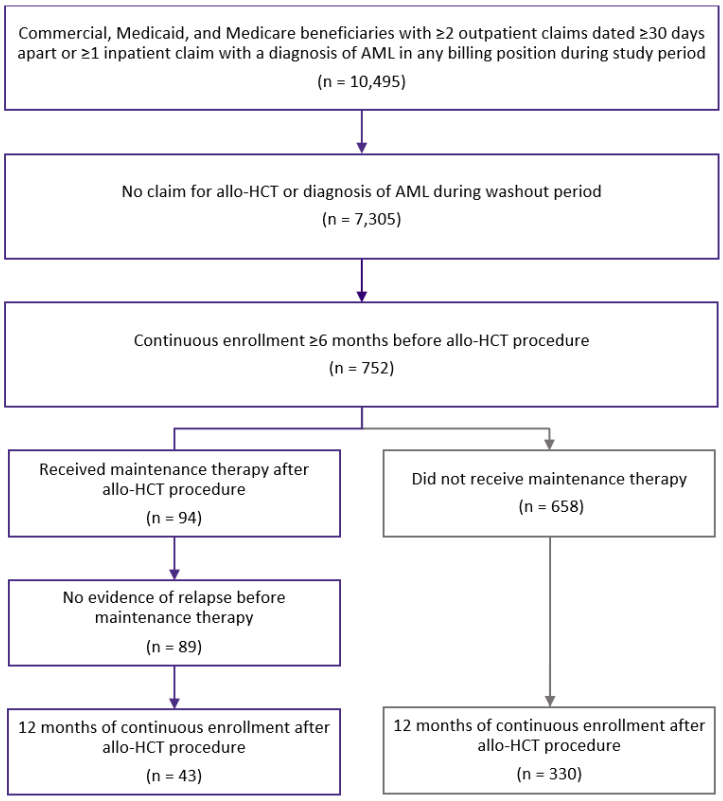
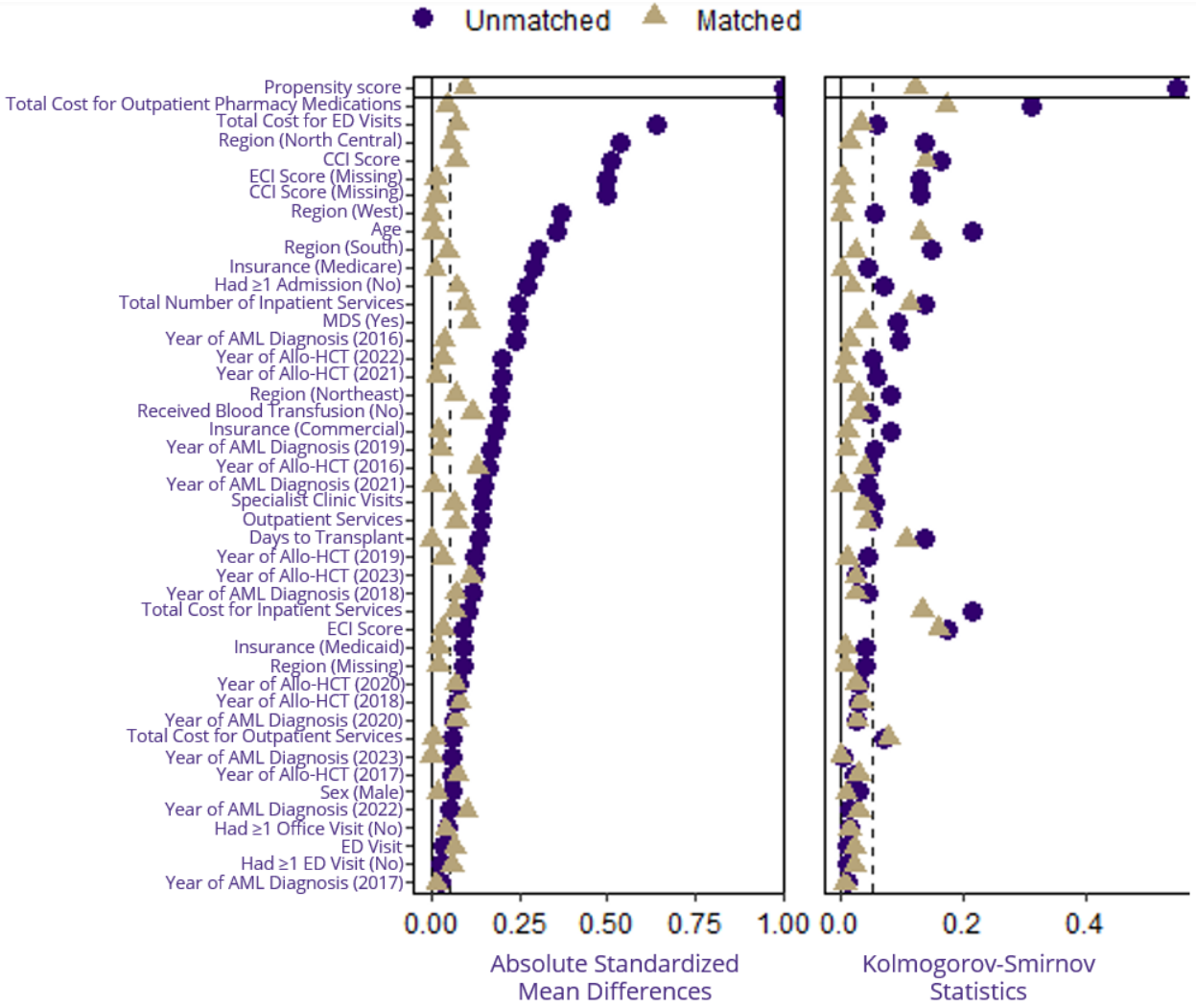


Figure 3. Covariate Balance Before and After Weighting



3.2 Primary Outcome

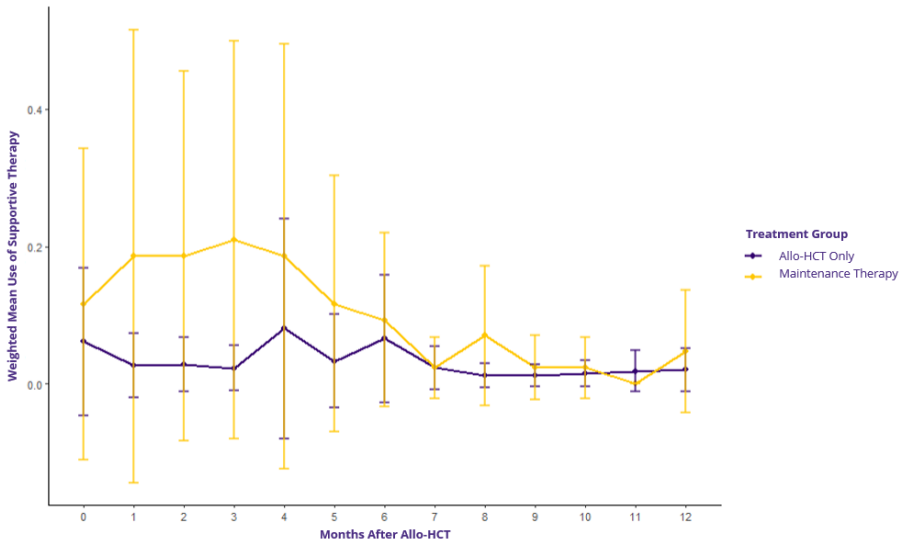
Overall healthcare utilization

Patients in the maintenance therapy group had a significantly higher rate of office visits compared to the control group (incidence rate ratio [IRR] = 2.11, p-value < 0.001), indicating more than a twofold increase in frequency of office visits compared to those who only had allo-HCT (Table 4.4). The rate of IP visits was also significantly higher among patients who received maintenance therapy (IRR = 1.39 p = 0.015), as was the hospitalization rate (IRR = 1.37, p = 0.024). We found that the rate of specialist clinic visits, which included hematology and oncology clinics, was higher in the maintenance therapy cohort (IRR = 1.5, p = 0.151), though this difference was not statistically significant. The same was true for rates of ED visits (IRR = 1.75, p = 0.309). Overall OP utilization pointed towards higher rates in the maintenance therapy group (IRR = 1.794, p < 0.0001). In contrast, the mean monthly length of stay was significantly longer in the allo-HCT only group compared to the maintenance therapy group (33.77 ± 31.49

days vs. 20.97 ± 15.36 days), with a mean difference of 12.72 days (95% CI: 11.14 to 14.31; p = 0.001) (Appendix O).

Use of supportive therapies by month after allo-HCT
The weighted mean monthly use of supportive therapies following allo-HCT differed markedly between maintenance therapy and allo-HCT groups (Figure 4). The maintenance therapy group showed substantially higher supportive therapy utilization during the early post-transplant period. Peak usage of supportive therapy medications occurred within the initial three months, before gradually declining to baseline levels by month eight. In contrast, the allo-HCT only group maintained consistently low supportive therapy use throughout the follow-up. Confidence intervals derived from survey bootstrap methods indicated greater variability in supportive therapy use within the maintenance therapy group until the fifth month after allo-HCT, while the allo-HCT only group presented with narrower confidence bounds across follow-up period. Both groups converged to similar utilization rates after month eight, suggesting that the increased supportive care requirements associated with maintenance therapy are primarily concentrated in the initial months following allo-HCT.

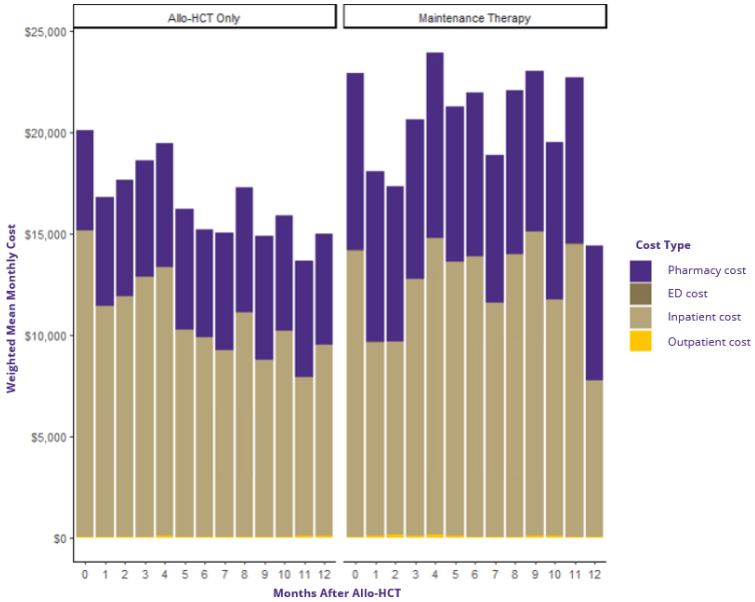
Figure 4. Weighted Mean Monthly Use of Supportive Therapy After Allo-HCT



Healthcare expenditure by cost type
IP visits make up the largest proportion of monthly healthcare expenditures in both cohorts. In the initial three months following allo-HCT, IP costs were the highest overall expenditures, comprising approximately 68–75% of total costs in the allo-HCT group and 54–62% in the maintenance therapy group (Appendix N). During the subsequent nine months in the follow up period, the cost distribution remained relatively stable, with IP costs maintaining 57–69% of total expenses. The maintenance therapy group noticeably incurs higher IP costs from months four to ten compared to allo-HCT during this period. This pattern observed likely reflects the increased healthcare resources required during the active treatment phase for those receiving maintenance therapy. Pharmacy costs make up the second largest component of monthly healthcare expenditures in both groups, accounting for 25–32% of total costs in the allo-HCT group and 38–

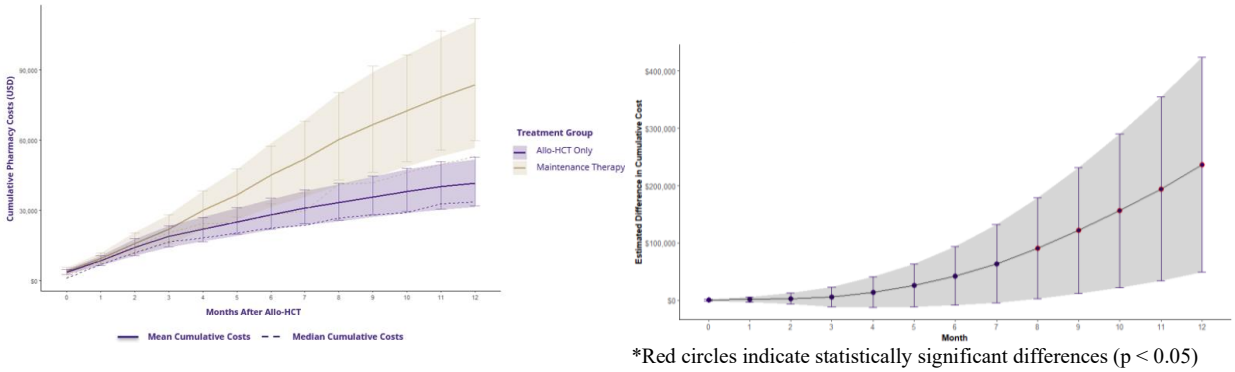
47% in the maintenance therapy group. The maintenance therapy group exhibits higher pharmacy costs compared to the allo-HCT group, as expected given the additional medications the former group is prescribed (Figure 5).

Figure 5. Weighted Mean Monthly Health Care Costs by Treatment Group



Patients receiving maintenance therapy following allo-HCT experienced significantly higher weighted mean PPPM pharmacy costs than those treated with allo-HCT alone ($7,005.75 vs $3,892.21, p=0.009; Table 4.3). The maintenance therapy group also had higher OP PPPM costs ($30.88 vs $13.51, p=0.397), ED PPPM costs ($11.84 vs $5.72, p=0.307), though these differences were not statistically significant. In contrast, IP costs were lower in the maintenance therapy group ($14,450.22 vs $20,769.02, p=0.234) and total healthcare PPPM costs ($21,488.49 vs $24,677.61, p=0.568), though these differences observed were also not statistically significant. This cost differential widened over time with increased uptake in maintenance therapy (Figure 6). This finding is supported by our analysis showing that maintenance therapy was associated with a statistically significant and clinically meaningful increase in monthly outpatient pharmacy expenditures throughout the follow-up period.

Figure 6. Stratified Weighted Mean, Median, and Bootstrapped Cumulative Outpatient Pharmacy Costs and Weighted Differences in Means of Cumulative Medication Costs Over Time



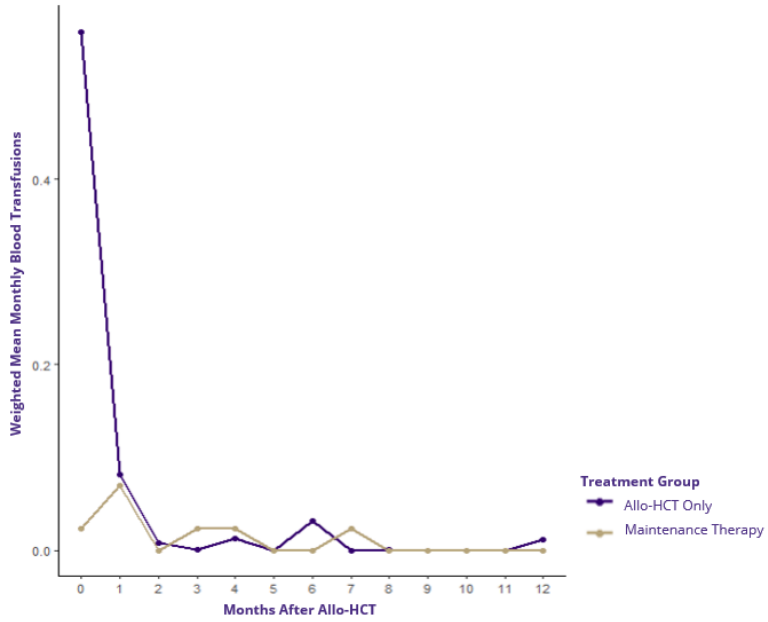
*Red circles indicate statistically significant differences ($p < 0.05$)

3.3 Secondary Outcome

During the 12-month post-index period, the weighted mean monthly number of blood transfusions were comparable between cohorts (Figure 7). The highest transfusion rate was observed in the month allo-HCT was performed for the allo-HCT only cohort and had a marked decline thereafter for both groups. Across the follow-up period the mean monthly transfusion rates remained below 0.1 for both the allo-HCT only and maintenance therapy groups.

Analysis of the total number of blood transfusions received demonstrated that the vast majority of patients required no transfusions during the post-index period with 97.6% (n = 322) of patients in the allo-HCT only cohort and 93% (n = 40) in the maintenance therapy cohort had zero blood transfusions. A small portion of patients received one blood transfusion (0.9% allo-HCT only compared to 4.7% maintenance therapy).

Figure 7. Weighted Mean Monthly Blood Transfusions by Treatment Group



4. Tables

4.1 Baseline characteristics before adjusting allo-HCT only cohort

	Allo-HCT Only (N=330)	Maintenance Therapy (N=43)	Overall (N=373)
Age			
Mean (SD)	50.76 ± 13.03	46.26 ± 12.71	50.24 ± 13.06
Median (IQR)	53.00 (43.00 - 61.00)	49.00 (39.50 - 56.00)	53.00 (41.00 - 61.00)
Range	19.00 - 77.00	20.00 - 72.00	19.00 - 77.00
Age Group, n (%)			
<35	54 (16.4%)	9 (20.9%)	63 (16.9%)
35-44	38 (11.5%)	9 (20.9%)	47 (12.6%)
45-54	81 (24.5%)	10 (23.3%)	91 (24.4%)
55-64	131 (39.7%)	14 (32.6%)	145 (38.9%)
65+	*	*	*
Sex, n (%)			
Female	147 (44.5%)	18 (41.9%)	165 (44.2%)
Male	183 (55.5%)	25 (58.1%)	208 (55.8%)
Insurance Plan Type, n (%)			
CDHP	22 (6.7%)	5 (11.6%)	27 (7.2%)
Comprehensive	*	*	*
Fee for Service	*	*	*
HDHP	*	*	*
HMO	*	*	*
Medicaid	97 (29.4%)	11 (25.6%)	108 (29.0%)
POS	*	*	*
POS with Capitation	*	*	*
PPO	122 (37.0%)	13 (30.2%)	135 (36.2%)
EPO	*	*	*
Region, n (%)			
North Central	*	*	*
Northeast	50 (21.5%)	10 (31.2%)	60 (22.6%)
South	89 (38.2%)	18 (56.2%)	107 (40.4%)
West	*	*	*
Missing	97 (29.4%)	11 (25.6%)	108 (29.0%)
Rurality, n (%)			
Metro Area	105 (45.1%)	12 (37.5%)	117 (44.2%)
Missing	97 (29.4%)	11 (25.6%)	108 (29.0%)
Year of AML Diagnosis, n (%)			
2016	37 (11.2%)	9 (20.9%)	46 (12.3%)
2017	51 (15.5%)	7 (16.3%)	58 (15.5%)
2018	68 (20.6%)	7 (16.3%)	75 (20.1%)
2019	56 (17.0%)	5 (11.6%)	61 (16.4%)
2020	46 (13.9%)	7 (16.3%)	53 (14.2%)

2021	*	*	*
2022	*	*	*
2023	*	*	*
Year of Allo-HCT, n (%)			
2016	15 (4.5%)	4 (9.3%)	19 (5.1%)
2017	54 (16.4%)	8 (18.6%)	62 (16.6%)
2018	60 (18.2%)	9 (20.9%)	69 (18.5%)
2019	60 (18.2%)	6 (14.0%)	66 (17.7%)
2020	44 (13.3%)	7 (16.3%)	51 (13.7%)
2021	*	*	*
2022	*	*	*
2023	*	*	*
Days to Transplant			
Mean (SD)	166.63 ± 212.06	146.33 ± 148.94	164.29 ± 205.71
Median (IQR)	120.50 (78.25 - 171.25)	105.00 (76.00 - 157.00)	119.00 (78.00 - 166.00)
Range	0.00 - 1601.00	0.00 - 931.00	0.00 - 1601.00
Days to Maintenance Therapy			
Mean (SD)	-	333.30 ± 369.70	333.30 ± 369.70
Median (IQR)	-	244.00 (108.00 - 343.00)	244.00 (108.00 - 343.00)
Myelodysplastic Syndrome, n (%)			
	24 (7.3%)	7 (16.3%)	31 (8.3%)
Cardiac Arrhythmia, n (%)			
	27 (8.2%)	7 (16.3%)	34 (9.1%)
Weighted CCI			
Mean (SD)	3.18 ± 1.09	2.67 ± 1.00	3.12 ± 1.09
Median (IQR)	3.00 (2.00 - 4.00)	2.00 (2.00 - 3.00)	3.00 (2.00 - 4.00)
Range	2.00 - 7.00	2.00 - 6.00	2.00 - 7.00
Missing	65 (19.7%)	3 (7.0%)	68 (18.2%)
0	0 (0.0%)	0 (0.0%)	0 (0.0%)
1	0 (0.0%)	0 (0.0%)	0 (0.0%)
2	88 (33.2%)	23 (57.5%)	111 (36.4%)
3	79 (29.8%)	11 (27.5%)	90 (29.5%)
≥4	98 (37.0%)	6 (15.0%)	104 (34.1%)
Missing	65 (19.7%)	3 (7.0%)	68 (18.2%)
Weighted ECI			
Mean (SD)	3.75 ± 4.93	3.30 ± 5.13	3.69 ± 4.95
Median (IQR)	3.00 (0.00 - 6.00)	3.00 (0.00 - 6.00)	3.00 (0.00 - 6.00)
Range	-7.00 - 25.00	-7.00 - 21.00	-7.00 - 25.00
Missing	65 (19.7%)	3 (7.0%)	68 (18.2%)
<0	20 (7.5%)	4 (10.0%)	24 (7.9%)
0	89 (33.6%)	14 (35.0%)	103 (33.8%)
1	1 (0.4%)	0 (0.0%)	1 (0.3%)
2	3 (1.1%)	1 (2.5%)	4 (1.3%)

3	45 (17.0%)	5 (12.5%)	50 (16.4%)
≥4	107 (40.4%)	16 (40.0%)	123 (40.3%)
Missing	65 (19.7%)	3 (7.0%)	68 (18.2%)

* Denotes patient counts of <5; CCI = Charlson Comorbidity Index; ECI = Elixhauser Comorbidity Index; SD = standard deviation

4.2 Baseline Characteristics of Maintenance Therapy and Weighted Allo-HCT Only Cohorts Included in Propensity Score Calculations

	Weighted Allo-HCT Only (N = 44.15)	Maintenance Therapy (N = 43.00)	SMD
Age Mean (SD)	46.17 ± 13.06	46.26 ± 12.71	0.007
Region, n (%)			0.089
North Central	2.5 (5.6)	3.0 (7.0)	
Northeast	11.5 (26.1)	10.0 (23.3)	
South	17.5 (39.5)	18.0 (41.9)	
West	1.0 (2.3)	1.0 (2.3)	
Missing	11.7 (26.4)	11.0 (25.6)	
Insurance, n (%)			0.022
Commercial	31.4 (71.1)	31.0 (72.1)	
Medicaid	11.7 (26.4)	11.0 (25.6)	
Medicare	1.1 (2.5)	1.0 (2.3)	
Sex, n (%)			0.017
Female	18.1 (41.0)	18.0 (41.9)	
Male	26.0 (59.0)	25.0 (58.1)	
Myelodysplastic syndrome, n (%)			0.103
	8.9 (20.3)	7.0 (16.3)	
Days to Transplant Mean (SD)	146.35 ± 145.23	146.33 ± 148.94	<0.001
Year of AML Diagnosis, n (%)			0.144
2016	9.9 (22.4)	9.0 (20.9)	
2017	7.4 (16.8)	7.0 (16.3)	
2018	8.3 (18.8)	7.0 (16.3)	
2019	5.5 (12.4)	5.0 (11.6)	
2020	6.0 (13.6)	7.0 (16.3)	
2021	*	*	
2022	*	*	
2023	0.0 (0.0)	0.0 (0.0)	
Year of Allogeneic Transplant, n (%)			0.213
2016	5.8 (13.1)	4.0 (9.3)	
2017	6.9 (15.7)	8.0 (18.6)	
2018	10.7 (24.2)	9.0 (20.9)	
2019	6.6 (15.0)	6.0 (14.0)	
2020	6.1 (13.8)	7.0 (16.3)	
2021	*	*	
2022	*	*	
2023	*	*	
Had ≥1 Hospitalization, n (%)			0.078
	41.9 (94.9)	40.0 (93.0)	

Inpatient Services			
Mean (SD)	2.62 ± 1.58	2.77 ± 1.57	0.094
Total Cost for Inpatient Services			
Mean (SD)	100,611.43 ± 118,799.32	93,387.89 ± 10,8631.42	0.063
Had ≥1 ED Visit, n (%)			0.059
	7.2 (16.4)	8.0 (18.6)	
ED Visits			
Mean (SD)	0.18 ± 0.42	0.21 ± 0.47	0.070
Total Cost for ED Visits			
Mean (SD)	12.07 ± 73.64	18.41 ± 86.21	0.079
Had ≥1 Office Visit, n (%)			0.042
	4.6 (10.3)	5.0 (11.6)	
Outpatient Services			
Mean (SD)	4.09 ± 16.49	5.47 ± 19.68	0.075
Total Cost for Outpatient Services			
Mean (SD)	49.86 ± 386.60	50.62 ± 168.51	0.003
Specialist Clinic Visits			
Mean (SD)	0.55 ± 3.47	0.79 ± 3.79	0.066
Total Cost for Outpatient Pharmacy Medications			
Mean (SD)	6,152.21 ± 9,377.55	6,628.27 ± 10,732.83	0.047
Weighted CCI Mean (SD)	2.75 ± 0.90	2.67 ± 1.00	0.075
Weighted ECI Mean (SD)	3.13 ± 4.44	3.30 ± 5.13	0.035

ED = emergency department; CCI = Charlson Comorbidity Index; ECI = Elixhauser Comorbidity Index; SMD = standardized mean difference

4.3 Weighted PPPM Costs in the Post-Index Period

Cost Type	Allo-HCT Only (n = 325) Mean (SD)	Maintenance Therapy (n = 43) Mean (SD)	Δ Mean Difference	95% Confidence Interval	P-value
Outpatient Pharmacy	3,892.21 ± 4,575.05	7,005.75 ± 7,253.32	3,113.54	(799.57-5,427.52)	0.009
Inpatient	20,769.02 ± 56,316.46)	14,450.22 ± 20,715.44	-6,318.81	(-16,698.78-4,061.16)	0.234
Outpatient	13.51 ± 324.32	30.88 ± 126.61	17.37	(-22.79-57.54)	0.397
ED	5.72 ± 28.02	11.84 ± 37.29	6.12	(-5.59-17.83)	0.307
Total	24,677.61 ± 56,104.46	21,488.49 ± 23,274.86	-3,189.12	(-14,114.62-7,736.39)	0.568

ED = emergency department; SD: standard deviation; SE: standard error

4.4 Poisson Regression Model in the Post Index Period

Type of HRU	Incident Rate Ratio (IRR)	P-value
Hospitalization	1.37	0.024
Inpatient	1.39	0.015
Outpatient	1.79	< 0.0001
Specialist Visit	1.5	0.151
Office	2.11	< 0.001
ED	1.75	0.309

ED = emergency department

5. Discussion

We conducted a retrospective cohort study using Merative MarketScan® claims data to quantify healthcare costs and resource utilization among patients with AML who received maintenance therapy following allo-HCT compared to those who only underwent allo-HCT. As a secondary outcome, we also assessed the differences in transfusion burden between the two cohorts.

The main findings of our study highlight several important differences between patients receiving maintenance therapy after allo-HCT and those who only underwent allo-HCT. Firstly, there was a meaningful increase in supportive therapy utilization among the maintenance therapy group, specifically in the early post-transplant period, with peak usage observed within the initial three months before declining to baseline by month eight. In contrast, the allo-HCT only group maintained consistently low levels of supportive therapy use throughout the follow-up period, and both groups converged to similar utilization rates after month eight. Secondly, patients in the maintenance therapy cohort experienced significantly higher weighted mean PPPM outpatient pharmacy costs compared to the allo-HCT only group, and also had higher OP and ED costs, although these latter differences were not statistically significant. Notably, IP and total healthcare PPPM costs were lower in the maintenance therapy group, but these differences did not reach statistical significance. The observed differences in costs between groups were primarily attributable to increased outpatient pharmacy expenditures in the maintenance therapy cohort, underscoring the impact of maintenance therapy on prescription medication spending throughout the follow-up period.

Meanwhile, for most patients regardless of which group they belonged to, blood transfusion burden was minimal throughout the follow-up period. There were slightly more patients in the maintenance therapy group receiving at least one transfusion compared to the allo-HCT only group. However, it should be noted that the maintenance therapy cohort was smaller compared to the allo-HCT cohort, which may influence the observed differences in patterns of transfusion utilization. Although maintenance therapy is prescribed with the intention of reducing the risk of relapse, it can increase the need for ongoing monitoring, supportive care, and management of therapy-related toxicities. In summary, our findings suggest that while maintenance therapy is associated with higher pharmacy costs and greater early supportive care needs, the overall cost difference between groups is largely driven by prescription medication expenditures, with minimal differences observed in use of the supportive care or blood transfusion burden.

Our study demonstrated that maintenance therapy after allo-HCT was associated with significantly higher HRU across multiple service types including office visits, IP visits, and hospitalizations. In addition, we found that the maintenance therapy was associated with significantly higher outpatient pharmacy costs. Our findings are different from those reported in a recent study that showed no substantial increase in HRU among patients with FLT3 mutations who received maintenance therapy.[32] These differences may reflect variations in patient populations as our study only included patients who only underwent allo-HCT, maintenance regimens, or changes in healthcare delivery practices. In addition, the higher utilization we found may be driven by the need for closer monitoring and managing toxicities related to transplantation amongst those who have high-risk AML. Although several retrospective and small-sample prospective studies have suggested that post-transplant maintenance therapy with

hypomethylating agents may lower relapse rates and improve survival, especially among those considered to have high-risk AML, other studies found no significant survival benefit to using hypomethylating agents as part of maintenance therapy.[33-39] Inconsistency in the literature underscores that maintenance therapy effectiveness may be highly dependent on the patient population and regimens utilized. This highlights the need for further research to clarify the drivers of HRU and to optimize the balance between clinical benefit and economic impact. To our knowledge, this is the first study to directly compare HRU and costs between patients who receive maintenance therapy after allo-HCT and those who only underwent allo-HCT.

Our study has several limitations inherent to claims-based research such as coding errors or variations in billing practices. We were unable to capture key clinical indicators that may influence the decision to initiate maintenance therapy, including measurable residual disease, type and intensity of conditioning regimen administered before allo-HCT, and presence of mutations that negatively impact prognosis. These clinical factors may influence treatment selection and subsequent outcomes as they would not have been adequately controlled for through propensity score weighting. Patients who experienced relapse were excluded from the maintenance therapy cohort to ensure that the medications of interest were only administered to individuals in remission; however, this approach may introduce selection bias by favoring the maintenance therapy group, as relapsed patients were not similarly excluded from the allo-HCT cohort. Our study may be subject to survivor bias, as we restricted the sample to patients with at least 12 months of follow-up who had already successfully undergone allo-HCT, potentially excluding patients who experienced early mortality. Additionally, the limited follow-up period restricts our ability to assess long-term clinical outcomes and healthcare costs between the cohorts. Given that maintenance therapy can be given over the span of two years, longer-term studies are needed to understand the outcomes.

Furthermore, the relatively small sample size may limit the statistical power for meaningful subgroup analyses. Our results may not be generalizable to uninsured populations as this study only included those with commercial insurance or Medicare supplemental coverage or were enrolled in Medicaid. The exclusion of dependents and spouses and focus on primary beneficiaries in our analysis may also introduce selection bias related to employment status and socioeconomic factors. Lastly, claims-based costs utilized in the study reflect insurance reimbursement amounts rather than actual costs incurred from delivering healthcare services and may not fully capture the true economic burden of care. The complexity of claims adjudication including post-payment adjustments and the inclusion of patients with Medicare supplemental insurance means that reported costs may not accurately reflect the overall Medicare spending.

Future research on maintenance therapy administered after allo-HCT should consider defining the index date as the initiation of maintenance therapy, rather than the date of allo-HCT itself. Anchoring the index date to the start of maintenance therapy would more accurately capture the period during which patients are exposed to the intervention, thereby providing a clearer assessment of the clinical and economic impact attributable to maintenance therapy strategies. Moreover, future research should stratify HRU and costs incurred before and after the initiation of maintenance therapy to better distinguish the impact of pre-vs. post-maintenance care after allo-HCT on overall healthcare costs and utilization patterns.

6. Conclusion

This retrospective cohort study assessed HRU and costs among commercially insured, Medicaid, and Medicare enrolled patients with AML who received maintenance therapy following allo-HCT. Our findings reveal that patients who receive maintenance therapy incur high HRU across multiple domains, including office visits, hospitalizations, ED visits, and OP services, compared to those who underwent allo-HCT alone. Notably, these patients also experienced significantly greater cumulative pharmacy costs after eight months.

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8. Appendices

8.1 Appendix A – ICD-10-CM Diagnosis Codes Inclusion Criteria

Type of Cancer	ICD-10-CM	Description
Acute myeloid leukemia		
	C9200	Acute myeloblastic leukemia, not having achieved remission
	C9260	Acute myeloid leukemia with 11q23-abnormality not having achieved remission
	C92A0	Acute myeloid leukemia with multilineage dysplasia, not having achieved remission
Myelodysplastic syndrome		
	C94.6	Myelodysplastic disease, not classified
	D46%	Myelodysplastic syndromes
Monocytic leukemia		
	C931%	Chronic myelomonocytic leukemia

8.2 Appendix B – ICD-10-CM Diagnosis Codes Exclusion Criteria

Type of Cancer	ICD-10-CM	Description
Malignant neoplasm of oral cavity and pharynx		
	C04%	Malignant neoplasm of floor of mouth
	C05%	Malignant neoplasm of palate
	C06%	Malignant neoplasm of other and unspecified parts of mouth
	C07	Malignant neoplasm of parotid gland
	C08%	Malignant neoplasm of other and unspecified major salivary glands
	C09%	Malignant neoplasm of tonsil
	C10%	Malignant neoplasm of oropharynx
	C11%	Malignant neoplasm of nasopharynx
	C12	Malignant neoplasm of pyriform sinus
	C13%	Malignant neoplasm of hypopharynx
	C14%	Malignant neoplasm of other and ill-defined sites in the lip, oral cavity and pharynx
Malignant neoplasms of digestive organs		
	C15%	Malignant neoplasm of esophagus
	C16%	Malignant neoplasm of stomach
	C17%	Malignant neoplasm of small intestine
	C18%	Malignant neoplasm of colon
	C19	Malignant neoplasm of rectosigmoid junction
	C20	Malignant neoplasm of rectum

	C21%	Malignant neoplasm of anus and anal canal
	C22%	Malignant neoplasm of liver and intrahepatic bile ducts
	C23	Malignant neoplasm of gallbladder
	C24%	Malignant neoplasm of other and unspecified parts of biliary tract
	C25%	Malignant neoplasm of pancreas
	C26%	Malignant neoplasm of other and ill-defined digestive organs
Malignant neoplasms of respiratory and intrathoracic organs		
	C30%	Malignant neoplasm of nasal cavity and middle ear
	C31%	Malignant neoplasm of accessory sinuses
	C32%	Malignant neoplasm of larynx
	C33	Malignant neoplasm of trachea
	C34%	Malignant neoplasm of bronchus and lung
	C37	Malignant neoplasm of thymus
Malignant neoplasms of bone and articular cartilage		
	C40%	Malignant neoplasm of bone and articular cartilage of limbs
	C41%	Malignant neoplasm of bone and articular cartilage of other and unspecified sites
Melanoma and other malignant neoplasms of skin		
	C43%	Malignant melanoma of skin
	C44%	Other and unspecified malignant neoplasm of skin
Malignant neoplasms of mesothelial and soft tissue		
	C45%	Mesothelioma
	C46%	Kaposi's sarcoma
	C47%	Malignant neoplasm of peripheral nerves and autonomic nervous system
	C48%	Malignant neoplasm of retroperitoneum and peritoneum
	C49%	Malignant neoplasm of other connective and soft tissue
Malignant neoplasm of breast		
	C50%	Malignant neoplasm of breast
Malignant neoplasms of female genital organs		
	C51%	Malignant neoplasm of vulva
	C52	Malignant neoplasm of vagina
	C53%	Malignant neoplasm of cervix uteri

C54%	Malignant neoplasm of corpus uteri
C55	Malignant neoplasm of uterus, part unspecified
C56%	Malignant neoplasm of ovary
C57%	Malignant neoplasm of other and unspecified female genital organs
C58%	Malignant neoplasm of placenta
Malignant neoplasms of male genital organs	
C60%	Malignant neoplasm of penis
C61	Malignant neoplasm of prostate
C62%	Malignant neoplasm of testis
C63%	Malignant neoplasm of other and unspecified male genital organs
Malignant neoplasms of urinary tract	
C64%	Malignant neoplasm of kidney, except renal pelvis
C65%	Malignant neoplasm of renal pelvis
C66%	Malignant neoplasm of ureter
C67%	Malignant neoplasm of bladder
C68%	Malignant neoplasm of other and unspecified urinary organs
Malignant neoplasms of eye, brain and other parts of central nervous system	
C69%	Malignant neoplasm of eye and adnexa
C70%	Malignant neoplasm of meninges
C71%	Malignant neoplasm of brain
C72%	Malignant neoplasm of spinal cord, cranial nerves and other parts of central nervous system
Malignant neoplasms of thyroid and other endocrine glands	
C73	Malignant neoplasm of thyroid gland
C74%	Malignant neoplasm of adrenal gland
C75%	Malignant neoplasm of other endocrine glands and related structures
Other malignant neoplasms	
C76%	Malignant neoplasm of other and ill-defined sites
Malignant neoplasms of ill-defined, other secondary and unspecified sites	
C77%	Secondary and unspecified malignant neoplasm of lymph nodes
C78%	Secondary malignant neoplasm of respiratory and digestive organ
C79%	Secondary malignant neoplasm of other and unspecified sites

	C80%	Malignant neoplasm without specification of site
Malignant neoplasms of lymphoid, hematopoietic and related tissue		
	C81%	Hodgkin lymphoma
	C82%	Follicular lymphoma
	C83%	Non-follicular lymphoma
	C84%	Mature T/NK-cell lymphomas
	C85%	Other specified and unspecified types of non-Hodgkin lymphoma
	C86%	Other specified types of T/NK-cell lymphoma
	C88%	Malignant immunoproliferative diseases and certain other B-cell lymphomas
	C90%	Multiple myeloma and malignant plasma cell neoplasms
Lymphoid leukemia		
	C91%	Lymphoid leukemia
Myeloid leukemia		
	C921%	Chronic myeloid leukemia, BCR/ABL-positive
	C922%	Atypical chronic myeloid leukemia, BCR/ABL-negative
	C924%	Acute promyelocytic leukemia
Monocytic leukemia		
	C933%	Juvenile myelomonocytic leukemia
Other leukemias of specified cell type		
	C943%	Mast cell leukemia
	C944%	Acute panmyelosis with myelofibrosis
Leukemia of unspecified cell type		
	C951%	Chronic leukemia of unspecified cell type
Other and unspecified malignant neoplasms of lymphoid, hematopoietic and related tissue		
	C96%	Other and unspecified malignant neoplasms of lymphoid, hematopoietic and related tissue

8.3 Appendix C – Diagnoses Codes for Relapse

Type of Cancer	ICD-10-CM	Description
AML Relapse		
	C9202	Acute myeloblastic leukemia, in relapse
	C9262	Acute myeloid leukemia with 11q23-abnormality in relapse

	C92A2	Acute myeloid leukemia with multilineage dysplasia, in relapse

8.4 Appendix D – Current Procedural Terminology (CPT®) Code Allo-HCT

Type of Procedure	ICD-10-CM	Description
Allogeneic Stem Cell Transplant		
	38240	Transplantation and Post-Transplantation Cellular Infusion Procedures on the Hemic and Lymphatic Systems

8.5 Appendix E – ICD-10-PCS Allo-HCT Procedure Codes

Type of Procedure	ICD-10-PCS	Description	Note
Allogeneic bone marrow transplant			
	DRG 014	Allogeneic bone marrow transplant	
	30230AZ	Transfusion of Embryonic Stem Cells into Peripheral Vein, Open Approach	Deleted code effective **Sep. 30, 2021**
	30230X1	Transfusion of Nonautologous Cord Blood Stem Cells into Peripheral Vein, Open Approach	Deleted code, effective **Sep. 30, 2016**
	30230X2	Transfusion of Allogeneic Related Cord Blood Stem Cells into Peripheral Vein, Open Approach	Deleted code effective **Sep. 30, 2021**
	30230X3	Transfusion of Allogeneic Unrelated Cord Blood Stem Cells into Peripheral Vein, Open Approach	Deleted code effective **Sep. 30, 2021**
	30230X4	Transfusion of Allogeneic Unspecified Cord Blood Stem Cells into Peripheral Vein, Open Approach	Deleted code effective **Sep. 30, 2021**
	30230Y1	Transfusion of Nonautologous Hematopoietic Stem Cells into Peripheral Vein, Open Approach	Deleted code, effective **Sep. 30, 2016**
	30230Y2	Transfusion of Allogeneic Related Hematopoietic Stem Cells into Peripheral Vein, Open Approach	Deleted code effective **Sep. 30, 2021**

30230Y3	Transfusion of Allogeneic Unrelated Hematopoietic Stem Cells into Peripheral Vein, Open Approach	Deleted code effective **Sep. 30, 2021**
30230Y4	Transfusion of Allogeneic Unspecified Hematopoietic Stem Cells into Peripheral Vein, Open Approach	Deleted code effective **Sep. 30, 2021**
30230G1	Transfusion of Nonautologous Bone Marrow into Peripheral Vein, Open Approach	Deleted code, effective **Sep. 30, 2016**
30230G2	Transfusion of Allogeneic Related Bone Marrow into Peripheral Vein, Open Approach	Deleted code effective **Sep. 30, 2021**
30230G3	Transfusion of Allogeneic Unrelated Bone Marrow into Peripheral Vein, Open Approach	Deleted code effective **Sep. 30, 2021**
30230G4	Transfusion of Allogeneic Unspecified Bone Marrow into Peripheral Vein, Open Approach	Deleted code effective **Sep. 30, 2021**
30230U2	Transfusion of Allogeneic Related T-cell Depleted Hematopoietic Stem Cells into Peripheral Vein, Open Approach	Deleted code effective **Sep. 30, 2021**
30230U3	Transfusion of Allogeneic Unrelated T-cell Depleted Hematopoietic Stem Cells into Peripheral Vein, Open Approach	Deleted code effective **Sep. 30, 2021**
30230U4	Transfusion of Allogeneic Unspecified T-cell Depleted Hematopoietic Stem Cells into Peripheral Vein, Open Approach	Deleted code effective **Sep. 30, 2021**
30233AZ	Transfusion of Embryonic Stem Cells into Peripheral Vein, Percutaneous Approach	
30233G1	Transfusion of Nonautologous Bone Marrow into Peripheral Vein, Percutaneous Approach	Deleted code, effective **Sep. 30, 2016**
30233G2	Transfusion of Allogeneic Related Bone Marrow into	

	Peripheral Vein, Percutaneous Approach	
30233G3	Transfusion of Allogeneic Unrelated Bone Marrow into Peripheral Vein, Percutaneous Approach	
30233G4	Transfusion of Allogeneic Unspecified Bone Marrow into Peripheral Vein, Percutaneous Approach	
30233U2	Transfusion of Allogeneic Related T-cell Depleted Hematopoietic Stem Cells into Peripheral Vein, Percutaneous Approach	
30233U3	Transfusion of Allogeneic Unrelated T-cell Depleted Hematopoietic Stem Cells into Peripheral Vein, Percutaneous Approach	
30233U4	Transfusion of Allogeneic Unspecified T-cell Depleted Hematopoietic Stem Cells into Peripheral Vein, Percutaneous Approach	
30233X1	Transfusion of Nonautologous Cord Blood Stem Cells into Peripheral Vein, Percutaneous Approach	Deleted code, effective **Sep. 30, 2016**
30233X2	Transfusion of Allogeneic Related Cord Blood Stem Cells into Peripheral Vein, Percutaneous Approach	
30233X3	Transfusion of Allogeneic Unrelated Cord Blood Stem Cells into Peripheral Vein, Percutaneous Approach	
30233X4	Transfusion of Allogeneic Unspecified Cord Blood Stem Cells into Peripheral Vein, Percutaneous Approach	
30233Y1	Transfusion of Nonautologous Hematopoietic Stem Cells into Peripheral Vein, Percutaneous Approach	Deleted code, effective **Sep. 30, 2016**

30233Y2	Transfusion of Allogeneic Related Hematopoietic Stem Cells into Peripheral Vein, Percutaneous Approach	
30233Y3	Transfusion of Allogeneic Unrelated Hematopoietic Stem Cells into Peripheral Vein, Percutaneous Approach	
30233Y4	Transfusion of Allogeneic Unspecified Hematopoietic Stem Cells into Peripheral Vein, Percutaneous Approach	
30240AZ	Transfusion of Embryonic Stem Cells into Central Vein, Open Approach	Deleted code effective **Sep. 30, 2021**
30240G1	Transfusion of Nonautologous Bone Marrow into Central Vein, Open Approach	Deleted code, effective **Sep. 30, 2016**
30240G2	Transfusion of Allogeneic Related Bone Marrow into Central Vein, Open Approach	Deleted code effective **Sep. 30, 2021**
30240G3	Transfusion of Allogeneic Unrelated Bone Marrow into Central Vein, Open Approach	Deleted code effective **Sep. 30, 2021**
30240G4	Transfusion of Allogeneic Unspecified Bone Marrow into Central Vein, Open Approach	Deleted code effective **Sep. 30, 2021**
30240X1	Transfusion of Nonautologous Cord Blood Stem Cells into Central Vein, Open Approach	Deleted code, effective **Sep. 30, 2016**
30240X2	Transfusion of Allogeneic Related Cord Blood Stem Cells into Central Vein, Open Approach	Deleted code effective **Sep. 30, 2021**
30240X3	Transfusion of Allogeneic Unrelated Cord Blood Stem Cells into Central Vein, Open Approach	Deleted code effective **Sep. 30, 2021**
30240X4	Transfusion of Allogeneic Unspecified Cord Blood Stem Cells into Central Vein, Open Approach	Deleted code effective **Sep. 30, 2021**

30240Y1	Transfusion of Nonautologous Hematopoietic Stem Cells into Central Vein, Open Approach	Deleted code, effective **Sep. 30, 2016**
30240Y2	Transfusion of Allogeneic Related Hematopoietic Stem Cells into Central Vein, Open Approach	Deleted code effective **Sep. 30, 2021**
30240Y3	Transfusion of Allogeneic Unrelated Hematopoietic Stem Cells into Central Vein, Open Approach	Deleted code effective **Sep. 30, 2021**
30240Y4	Transfusion of Allogeneic Unspecified Hematopoietic Stem Cells into Central Vein, Open Approach	Deleted code effective **Sep. 30, 2021**
30243AZ	Transfusion of Embryonic Stem Cells into Central Vein, Percutaneous Approach	
30240U2	Transfusion of Allogeneic Related T-cell Depleted Hematopoietic Stem Cells into Central Vein, Open Approach	Deleted code effective **Sep. 30, 2021**
30240U3	Transfusion of Allogeneic Unrelated T-cell Depleted Hematopoietic Stem Cells into Central Vein, Open Approach	Deleted code effective **Sep. 30, 2021**
30240U4	Transfusion of Allogeneic Unspecified T-cell Depleted Hematopoietic Stem Cells into Central Vein, Open Approach	Deleted code effective **Sep. 30, 2021**
30243G1	Transfusion of Nonautologous Bone Marrow into Central Vein, Percutaneous Approach	Deleted code, effective **Sep. 30, 2016**
30243G2	Transfusion of Allogeneic Related Bone Marrow into Central Vein, Percutaneous Approach	
30243G3	Transfusion of Allogeneic Unrelated Bone Marrow into Central Vein, Percutaneous Approach	
30243G3	Transfusion of Allogeneic Unspecified Bone Marrow into Central Vein, Percutaneous Approach	

30243U2	Transfusion of Allogeneic Related T-cell Depleted Hematopoietic Stem Cells into Central Vein, Percutaneous Approach	
30243U3	Transfusion of Allogeneic Unrelated T-cell Depleted Hematopoietic Stem Cells into Central Vein, Percutaneous Approach	
30243U4	Transfusion of Allogeneic Unspecified T-cell Depleted Hematopoietic Stem Cells into Central Vein, Percutaneous Approach	
30243X1	Transfusion of Nonautologous Cord Blood Stem Cells into Central Vein, Percutaneous Approach	Deleted code, effective **Sep. 30, 2016**
30243X2	Transfusion of Allogeneic Related Cord Blood Stem Cells into Central Vein, Percutaneous Approach	
30243X3	Transfusion of Allogeneic Unrelated Cord Blood Stem Cells into Central Vein, Percutaneous Approach	
30243X4	Transfusion of Allogeneic Unspecified Cord Blood Stem Cells into Central Vein, Percutaneous Approach	
30243Y1	Transfusion of Nonautologous Hematopoietic Stem Cells into Central Vein, Percutaneous Approach	Deleted code, effective **Sep. 30, 2016**
30243Y2	Transfusion of Allogeneic Related Hematopoietic Stem Cells into Central Vein, Percutaneous Approach	
30243Y3	Transfusion of Allogeneic Unrelated Hematopoietic Stem Cells into Central Vein, Percutaneous Approach	
30243Y4	Transfusion of Allogeneic Unspecified Hematopoietic	

	Stem Cells into Central Vein, Percutaneous Approach	
30250G1	Transfusion of Nonautologous Bone Marrow into Peripheral Artery, Open Approach	Deleted code, effective **Sep. 30, 2019**
30250X1	Transfusion of Nonautologous Cord Blood Stem Cells into Peripheral Artery, Open Approach	Deleted code, effective **Sep. 30, 2019**
30250Y1	Transfusion of Nonautologous Hematopoietic Stem Cells into Peripheral Artery, Open Approach	Deleted code, effective **Sep. 30, 2019**
30253G1	Transfusion of Nonautologous Bone Marrow into Peripheral Artery, Percutaneous Approach	Deleted code, effective **Sep. 30, 2019**
30253X1	Transfusion of Nonautologous Cord Blood Stem Cells into Peripheral Artery, Percutaneous Approach	Deleted code, effective **Sep. 30, 2019**
30253Y1	Transfusion of Nonautologous Hematopoietic Stem Cells into Peripheral Artery, Percutaneous Approach	Deleted code, effective **Sep. 30, 2019**
30260G1	Transfusion of Nonautologous Bone Marrow into Central Artery, Open Approach	Deleted code, effective **Sep. 30, 2019**
30260X1	Transfusion of Nonautologous Cord Blood Stem Cells into Central Artery, Open Approach	Deleted code, effective **Sep. 30, 2019**
30260Y1	Transfusion of Nonautologous Hematopoietic Stem Cells into Central Artery, Open Approach	Deleted code, effective **Sep. 30, 2019**
30263G1	Transfusion of Nonautologous Bone Marrow into Central Artery, Percutaneous Approach	Deleted code, effective **Sep. 30, 2019**
30263X1	Transfusion of Nonautologous Cord Blood Stem Cells into Central Artery, Percutaneous Approach	Deleted code, effective **Sep. 30, 2019**
30263Y1	Transfusion of Nonautologous Hematopoietic Stem Cells into	Deleted code, effective **Sep. 30, 2019**

			Central Artery, Percutaneous Approach

8.6 Appendix F – Blood Transfusion Procedure Codes

Type of Procedure	Type of Code	Code Number	Description
Blood Transfusion			
	HCPCS	**P9010**	Blood (whole), for transfusion, per unit
	HCPCS	**P9011**	Blood, split unit
	HCPCS	**P9016**	Red blood cells, leukocytes reduced, each unit
	HCPCS	**P9019**	Platelets, each unit
	HCPCS	**P9020**	Platelet rich plasma, each unit
	HCPCS	**P9021**	Red blood cells, each unit
	HCPCS	**P9022**	Red blood cells, washed, each unit
	HCPCS	**P9031**	Platelets, leukocytes reduced, each unit
	HCPCS	**P9032**	Platelets, irradiated, each unit
	HCPCS	**P9033**	Platelets, leukocytes reduced, irradiated, each unit
	HCPCS	**P9034**	Platelets, leukocytes reduced, irradiated, each unit
	HCPCS	**P9035**	Platelets, pheresis, leukocytes reduced, each unit
	HCPCS	**P9036**	Platelets, pheresis, irradiated, each unit
	HCPCS	**P9037**	Platelets, pheresis, leukocytes reduced, irradiated, each unit
	HCPCS	**P9038**	Red blood cells, irradiated, each unit
	HCPCS	**P9039**	Red blood cells, deglycerolized, each unit
	HCPCS	**P9040**	Red blood cells, leukocytes reduced, irradiated, each unit
	HCPCS	**P9051**	Whole blood or red blood cells, leukocytes reduced, CMV-negative, each unit
	HCPCS	**P9052**	Platelets, HLA-matched leukocytes reduced, apheresis/pheresis, each unit
	HCPCS	**P9053**	Platelets, pheresis, leukocytes reduced, CMV-negative, irradiated, each unit
	HCPCS	**P9054**	Whole blood or red blood cells, leukocytes reduced, frozen, deglycerolized, washed, each unit
	HCPCS	**P9055**	Platelets, leukocytes reduced, cmv-negative, apheresis/pheresis, each unit.
	HCPCS	**P9056**	Whole blood, leukocytes reduced, irradiated, each unit
	HCPCS	**P9057**	Red blood cells, frozen/deglycerolized/washed, leukocytes reduced, irradiated, each unit
	HCPCS	**P9058**	Red blood cells, leukocytes reduced, CMV-negative, irradiated, each unit
	CPT	**36430**	Transfusion, blood or blood components
	CPT	**36440**	Procedure of blood push transfusion

CPT	**36455**	Exchange transfusion, blood; other than newborn

8.7 Appendix G – Medication Procedure and NDC Codes

Medication	Code Type	Code Number
Erythropoiesis-Stimulating Agents		
	HCPCS	**Q5105, Q5106, J0881, J0882, J0885, J0886, J0887, J0888, Q4081**
	NDC	**4569313700, 55513012601, 55513014410, 55513014801, 55513026701, 55513026710, 55513028301, 55513028310, 55513047801, 55513047810, 55513082301, 55513082310, 55513012601, 55513012610, 55513012010, 00069131104, 59353022010, 00069131110, 00069130510, 00069130710, 00069130810, 00069130904, 00069130910, 00069130610, 00069131804, 00069131810, 59676030200, 59676030201, 59676030300, 59676030301, 59676030400, 59676031000, 59676031200, 59676032000, 59676034000, 59676034001, 59676030401, 59676031001, 59676031002, 59676031204, 59676032004, 54868580200, 54868567301, 54868252301, 00069130501, 00069130510, 00069130601, 00069130610, 00069130701, 00069130710, 00069130801, 00069130810, 00069130901, 00069130904, 00069131810, 00069131101, 59353000201, 59353000210, 59353000301, 59353000310, 59353000401, 59353000410, 59353001001, 59353001010, 59353014401, 59353014410, 59353014810, 59353012001, 59353022001**
Darbepoetin alfa		
	NDC	**55513000201, 55513000204, 55513000301, 55513000304, 55513000401, 55513000404, 55513000501, 55513000504, 55513000601, 55513002101, 55513002104, 55513002301, 55513002301, 55513002304, 55513002501, 55513002504, 55513002701, 55513002704, 55513002801, 55513003201, 5301, 55513005304, 55513005701, 55513005704, 55513009801, 55513009804, 55513011001, 55513011101**
Filgrastim		
	HCPCS	**J1440, J1441, J1442, J1446, J1447, J2505, Q5101, Q5125, C9096**
	NDC	**54569482400, 54868252200, 54868252201, 54868502000, 54868305000, 55513020901,**

		55513020910, 55513020991, 55513034701, 55513034710, 55513034801, 55513034810, 55513053001, 55513053010, 55513054601, 55513054610, 55513092401, 55513092410, 55513092491, 61314030401, 61314030410, 61314031201, 61314031210, 61314031801, 61314032601, 61314030401, 61314030410, 61314031810, 61314032610, 61314032605, 00069029101, 00069029110, 00069029201, 00069029210, 00069029401, 00069029301, 00069029310, 00069029410, 70121157001, 70121157007, 70121156801, 70121156807, 72374010101, 72374010110, 72374010201, 72374010210
Pegfilgrastim		
	HCPCS	**Q5111, Q5122, Q5130, C9058**
	NDC	**67457083306, 83257000541, 70114010101, 70114012001, 61314086601, 00069032401, 70121162701, 70114013001, 55513019201, 55513019001**
Granulocyte-colony stimulating factor		
	HCPS	**S9537**
Romiplostim		
	HCPCS	**J2796, J2802**
	NDC	**55513022101, 55513022201, 55513022301**
Sargramostim		
	HCPCS	**J2820**
	NDC	**00024584301, 00024584305, 00024584401, 00024584405, 58468018002, 71837584301, 71837584305, 00039011301, 00039011401, 50419059501, 50419059505, 54868318800, 58406000101, 58406000135, 58406000201, 58406000233, 58406005014, 58406005030**
Tbo-filgrastim		
	NDC	**63459091001, 63459091011, 63459091012, 63459091015, 63459091017, 6359091018, 63459091036, 63459091201, 63459091211, 63459091212, 63459091215, 63459091217, 63459091218, 63459091236, 63459091853, 63459091859, 63459092053, 63459092059**
Hydroxyurea		
	HCPCS	**S0176**
	NDC	**42291032101, 55154714300, 49884072401, 69315016401, 00904693961, 10135070201, 70069082001, 00555088202, 24535083101, 54868477300, 54868477301, 54868477302,**

		54868477303, 54868477304, 55154355400, 69315016401, 70518361500, 10135070201, 60429026501, 68084028401, 68084028411, 51407090901, 67184060701, 70069082001, 70518091600, 70518361500, 00003083050, 70518361500, 00003633517, 00003633617, 00003633717, 61269040260, 61269040360, 61269083510, 71770010560, 71770012030, 62484001504, 62484001505
Azacitidine		
	HCPCS	**J9025, C9218, S0168**
	NDC	**00781325394, 59572073007, 59572074007, 59572073014, 16729030610, 60505627101, 72485020101, 71288015395, 68001052754, 68001062054, 68001031356, 43598030562, 43598067811, 43598014362, 55150039301, 63323077139, 00143960601, 71288011530, 67457025430, 16714092701, 16714077701, 00781325394, 64679009601, 64679009602, 43598046562, 16714057801, 51991079798, 00781925394, 70121123701, 72606055801, 59572010201, 5957207400**
Decitabine		
	HCPCS	**J0894, C9231**
	NDC	**67457031625, 55111055610, 25021023120, 70860021920, 70121164401, 00143938501, 50742043001, 68001042237, 72205003101, 47335036141, 16729022405, 72205003601, 71288011920, 68001057341, 55150037601, 72603010701, 25021021920, 43598042737, 16729022405, 68001064241, 68001061837, 68001034728, 31722030431, 55150037601, 63323082520, 67457031625, 167114092801, 75843019001, 70860021920, 25021023120, 00781329680, 00781313980, 47335036140, 64679006701, 64679006702, 43598034837, 72205003601, 59148004670**
Enasidenib		
	NDC	**59572070530, 59572071030**
Gemtuzumab Ozogamicin		
	HCPCS	**J9203, J9300**
	NDC	**00008451001**
Gilteritinib		
	HCPCS	**XW0DXV5**

Glasdegib	**NDC**	**00469142521, 00469142590**
Ivosidenib	**NDC**	**0069153130, 0069029860**
Midostaurin	**NDC**	**71334010001, 72694061760**
Quizartinib	**NDC**	**00078069802, 00078069819, 00078069851, 00078069899**
Sorafenib	**NDC**	**65597050404, 65597050428, 65597051104, 65597051128**
Venetoclax	**NDC**	**000378120178, 43598045804, 43598045836, 50419048858, 50419048901, 00378120178, 00480542589, 1366868212, 24979071504, 24979071544, 13668068230, 13668068260, 13668068274, 51990020106, 51990020112, 51407076012, 43826006604**
	HCPCS	**XW0DXR5**
	NDC	**00074056114, 00074056111, 00074056607, 00074956611, 00074957611, 00074057630, 00074057622, 00074057634, 00074057928**

8.8. Appendix H – Code Indicator for Setting Service was Provided

Location of Healthcare Service	Code Type	Code Number	Description
Inpatient			
	Place of Service	21	Inpatient hospital
	Provider Type	1	Acute care hospital
Emergency Department			
	Place of Service	23	Emergency room - hospital
	Procedure group	111	Emergency department visits
Inpatient Hospice			
	Place of Service	34	Hospice
Outpatient Services			
	Place of Service	1	Outpatient pharmacy
	Place of Service	11	Office
	Place of Service	12	Home care
	Place of Service	19	Outpatient hospital -off campus
	Place of Service	20	Urgent care
	Place of Service	22	Outpatient hospital -on campus
	Place of Service	24	Ambulatory surgical center
	Place of Service	31	Skilled nursing facility

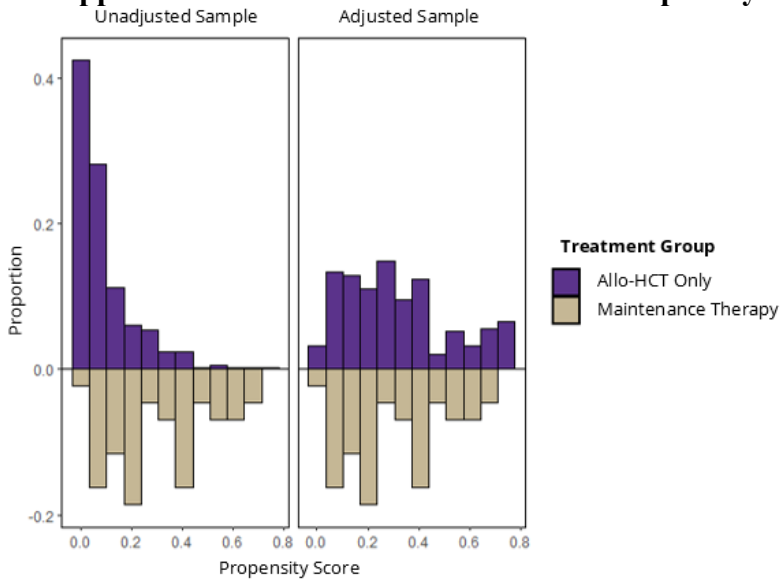
	Place of Service	50	Federally qualified health center
	Provider Type	920	Home health organization/agency
	Procedure group	101	Office visits, new patient
	Procedure group	104	Office visits, established patient
	Procedure group	110	Office visits, emergency
Specialist			
	Provider Type	280	Hematologist
	Provider Type	380	Oncologist

8.9 Appendix I – Formula for Calculating Propensity Score Weights

$$\mathbf{w}_{ATT} = Z + \frac{e(1-Z)}{1-e}$$

- Z = indicator variable denoting treatment status
- e = propensity score

8.10 Appendix J – Distributional Balance for Propensity Scores



8.11 Appendix K – Healthcare Resource Utilization by Treatment Group in the Baseline Period

	Allo-HCT Only (N=330)	Maintenance Therapy (N=43)	Overall (N=373)
Inpatient Hospitalizations			
Had ≥1 Hospitalization, n (%)	284 (86.1%)	40 (93.0%)	324 (86.9%)
Length of Stay			
Mean (SD)	21.14 ± 17.03	20.73 ± 15.18	21.09 ± 16.81
Median (IQR)	22.05 (5.00 - 30.00)	18.93 (9.96 - 29.50)	22.00 (6.00 - 30.00)
Range	0.00 - 105.71	0.00 - 73.35	0.00 - 105.71

Number of Hospitalizations			
Mean (SD)	2.19 ± 1.60	2.56 ± 1.55	2.23 ± 1.59
Median (IQR)	2.00 (1.00 - 3.00)	2.00 (1.50 - 3.50)	2.00 (1.00 - 3.00)
Range	0.00 - 8.00	0.00 - 7.00	0.00 - 8.00
Inpatient Services			
Mean (SD)	2.38 ± 1.80	2.77 ± 1.57	2.43 ± 1.78
Median (IQR)	2.00 (1.00 - 3.00)	3.00 (2.00 - 4.00)	2.00 (1.00 - 3.00)
Range	0.00 - 10.00	0.00 - 7.00	0.00 - 10.00
ED Visits			
Mean (SD)	0.19 ± 0.44	0.21 ± 0.47	0.20 ± 0.44
Median (IQR)	0.00 (0.00 - 0.00)	0.00 (0.00 - 0.00)	0.00 (0.00 - 0.00)
Range	0.00 - 2.00	0.00 - 2.00	0.00 - 2.00
ED visits among patients with ≥1 visit			
Had ≥1 ED visit, n (%)	58 (17.6%)	8 (18.6%)	66 (17.7%)
Mean (SD)	1.10 ± 0.31	1.12 ± 0.35	1.11 ± 0.31
Median (IQR)	1.00 (1.00 - 1.00)	1.00 (1.00 - 1.00)	1.00 (1.00 - 1.00)
Range	1.00 - 2.00	1.00 - 2.00	1.00 - 2.00
Missing	272 (82.4%)	35 (81.4%)	307 (82.3%)
Office Visits			
Mean (SD)	1.45 ± 6.11	2.26 ± 7.36	1.54 ± 6.26
Range	0.00 - 59.00	0.00 - 39.00	0.00 - 59.00
Office Visits Among Patients with ≥ 1 Visit			
Had ≥1 Office Visit, n (%)	43 (13.0%)	5 (11.6%)	48 (12.9%)
Mean (SD)	11.09 ± 13.53	19.40 ± 12.36	11.96 ± 13.54
Median (IQR)	4.00 (1.50 - 16.50)	16.00 (14.00 - 22.00)	5.00 (2.00 - 17.50)
Range	1.00 - 59.00	6.00 - 39.00	1.00 - 59.00
Missing	287 (87.0%)	38 (88.4%)	325 (87.1%)
Outpatient Services			
Mean (SD)	2.68 ± 12.45	5.47 ± 19.68	3.01 ± 13.47
Range	0.00 - 110.00	0.00 - 94.00	0.00 - 110.00
Specialist Clinic Visits			
Mean (SD)	0.25 ± 2.22	0.79 ± 3.79	0.31 ± 2.45
Range	0.00 - 29.00	0.00 - 23.00	0.00 - 29.00
Outpatient Pharmacy Visits			
Mean (SD)	1.38 ± 2.54	2.26 ± 4.14	1.48 ± 2.78
Median (IQR)	1.00 (0.00 - 2.00)	1.00 (1.00 - 3.00)	1.00 (0.00 - 2.00)
Range	0.00 - 36.00	0.00 - 25.00	0.00 - 36.00

ED: emergency department; SD = standard deviation; Healthcare resource utilization was calculated during the 6 months preceding allo-HCT; Inpatient services included hospitalizations and emergency department visits; Outpatient service visits included office visits of any type, skilled nursing facility, ambulatory surgical center, urgent care, outpatient hospital, home care, and home health aid services; Specialist visits included hematologist and oncologist clinic visits

8.12 Appendix L – Total Costs for Healthcare Resource Utilized by Treatment Group in the Baseline Period

	Allo-HCT Only	Maintenance Therapy	Overall
	(N=330)	(N=43)	(N=373)
Total Cost for Inpatient Services			
Mean (SD)	82,001.47 ± 119,172.34	93,387.89 ± 108,631.42	83,314.12 ± 117,923.78
Median (IQR)	19,827.36 (108.65 – 122,006.77)	60,557.92 (6,118.62 – 136,684.48)	23,896.94 (211.49 – 122,356.11)
Range	0.00 – 732,355.66	0.00 – 380,801.18	0.00 – 732,355.66
Total Cost for ED Visits			
Mean (SD)	73.54 ± 413.63	18.41 ± 86.21	67.18 ± 390.46
Range	0.00 – 6,143.89	0.00 - 477.97	0.00 – 6,143.89
Total Cost for Outpatient Services			
Mean (SD)	60.70 ± 529.10	50.62 ± 168.51	59.53 ± 500.80
Range	0.00 – 8,430.67	0.00 - 835.25	0.00 – 8,430.67
Total Cost for Outpatient Pharmacy Medications			
Mean (SD)	19,321.61 ± 30,057.51	6,628.27 ± 10,732.83	17,858.30 ± 28,783.77
Median (IQR)	8,104.96 (384.91 – 24,057.09)	1,284.70 (311.39 - 8347.03)	7,535.59 (368.71 – 23,157.93)
Range	-4.27 – 216,190.58	0.00 – 47,584.85	-4.27 – 216,190.58

ED = emergency department

8.13 Appendix M – Weighted PPPM Costs in the Baseline Period

Cost Type	Allo-HCT Only (n = 325) Mean (SD)	Maintenance Therapy (n = 43) Mean (SD)	Δ Mean Difference	95% Confidence Interval	P-value
Outpatient Pharmacy	1,476.07 ± 2,116.85	1,052.94 ± 1,790.84	-423.13	(-1,096.42-250.16)	0.219
Inpatient	22,548.60 ± 27,456.26	22,059.29 ± 28,084.9)	-489.31	(-11,138.06-10,159.43)	0.928
Outpatient	16.78 ± 135.88	16.44 ± 67.01	-0.34	(-32.86-32.19)	0.984
ED	2.65 ± 19.43	3.68 ± 16.84	1.02	(-4.20-6.25)	0.701
Total	24,075.90 ± 27,269.97)	23,139.88 ± 28,028.93	-936.02	(-11,503.37-9631.34)	0.862

ED = emergency department; SD: standard deviation; SE: standard error

8.14 Appendix N – Weighted Mean Costs and Percent of Total Monthly Costs in the Post-Index Period

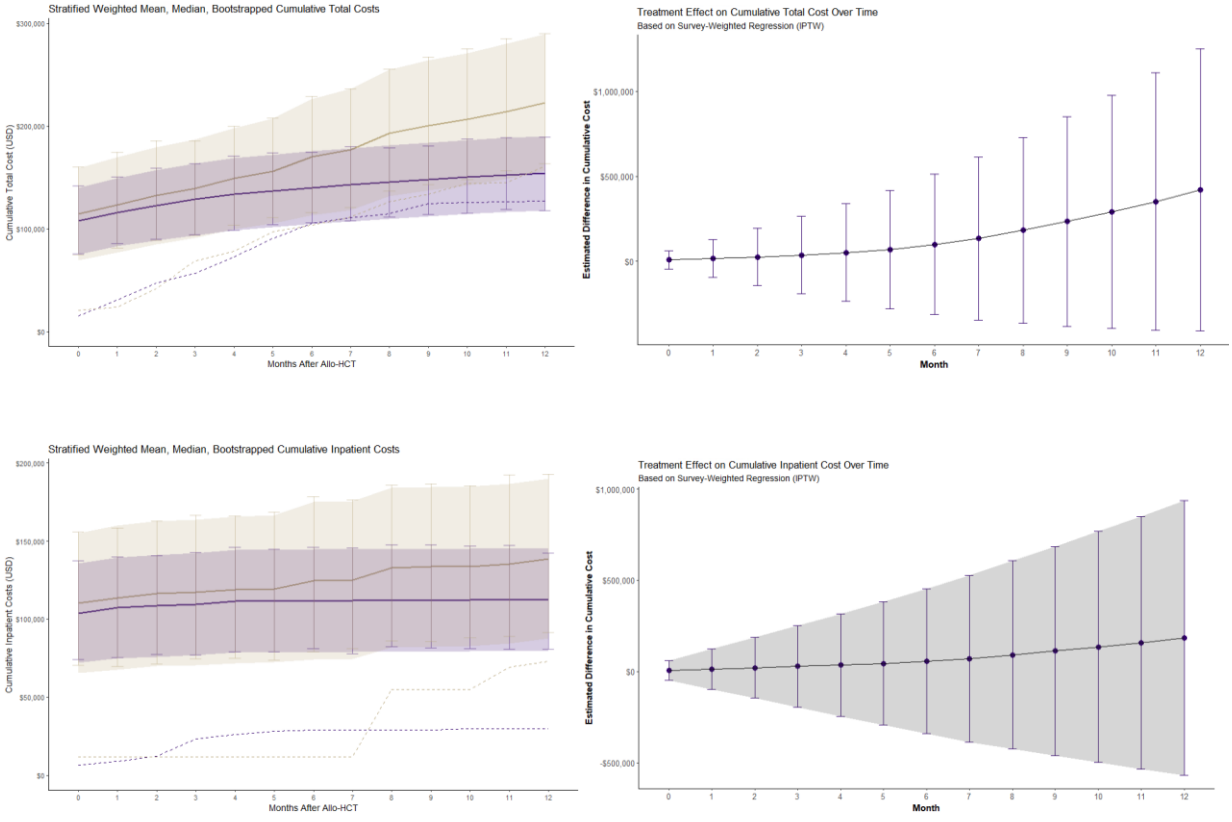
Month	Allo-HCT Only	Maintenance Therapy	Allo-HCT Only	Maintenance Therapy	Allo-HCT Only	Maintenance Therapy	Allo-HCT Only	Maintenance Therapy
	Mean Inpatient ($, %)		Mean Outpatient ($, %)		Mean ED ($, %)		Mean Outpatient Pharmacy ($, %)	
0	15,155.60 (75.4%)	14,133.45 (61.6%)	5.24 (0%)	19.77 (0.1%)	8.10 (0%)	13.61 (0.1%)	4,921.18 (24.5%)	8,767.18 (38.2%)
1	11,389.40 (67.9%)	9,593.70 (53.1%)	19.94 (0.1%)	34.22 (0.2%)	12.39 (0.1%)	16.06 (0.1%)	5,353.48 (31.9%)	8,412.04 (46.6%)
2	11,871.56 (67.2%)	9,623.67 (55.5%)	16.88 (0.1%)	43.07 (0.2%)	10.43 (0.1%)	19.78 (0.1%)	5,767.62 (32.6%)	7,656.69 (44.1%)
3	12,787.64 (68.8%)	12,713.80 (61.7%)	49.19 (0.3%)	23.29 (0.1%)	8.65 (0%)	16.62 (0.1%)	5,742.00 (30.9%)	7,862.21 (38.1%)
4	13,275.42 (68.2%)	14,762.82 (61.7%)	65.82 (0.3%)	21.78 (0.1%)	6.36 (0%)	10.50 (0%)	6,117.34 (31.4%)	9,147.65 (38.2%)
5	10,194.82 (63.0%)	13,585.47 (64.0%)	51.54 (0.3%)	13.70 (0.1%)	7.83 (0%)	12.59 (0.1%)	5,931.99 (36.6%)	7,629.85 (35.9%)
6	9,820.22 (64.7%)	13,842.86 (63.0%)	30.85 (0.2%)	7.12 (0%)	11.61 (0.1%)	12.28 (0.1%)	5,307.96 (35.0%)	8,103.31 (36.9%)
7	9,203.62 (61.3%)	11,552.30 (61.2%)	37.06 (0.2%)	14.86 (0.1%)	10.42 (0.1%)	16.18 (0.1%)	5,770.29 (38.4%)	7,300.22 (38.7%)
8	11,050.35 (63.9%)	13,960.72 (63.2%)	29.80 (0.2%)	15.98 (0.1%)	10.23 (0.1%)	10.24 (0%)	6,198.03 (35.9%)	8,098.82 (36.7%)
9	8,706.89 (58.5%)	15,070.85 (65.4%)	36.38 (0.2%)	27.50 (0.1%)	8.75 (0.1%)	13.37 (0.1%)	6,119.30 (41.1%)	7,917.33 (34.4%)
10	10,147.02 (63.9%)	11,688.12 (60.0%)	41.27 (0.3%)	26.11 (0.1%)	9.75 (0.1%)	11.35 (0.1%)	5,686.30 (35.8%)	7,762.00 (39.8%)
11	7,851.52 (57.4%)	14,434,69 (63.6%)	63.56 (0.5%)	30.80 (0.1%)	9.49 (0.1%)	15.78 (0.1%)	5,753.16 (42.1%)	8,198.14 (36.1%)
12	9,404.77 (62.9%)	7,722.67 (53.6%)	100.28 (0.7%)	18.35 (0.1%)	10.02 (0.1%)	8.39 (0.1%)	5,443.16 (36.4%)	6,646.85 (46.2%)

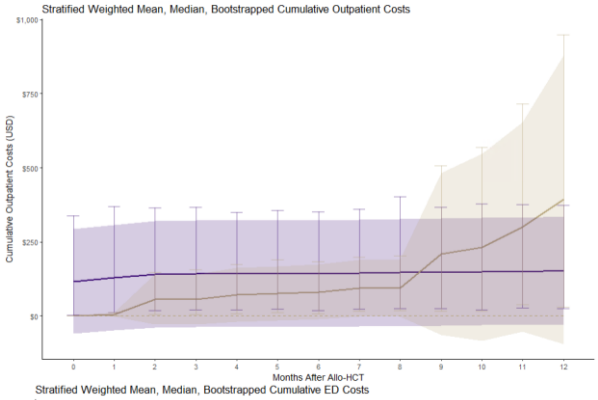
ED = emergency department

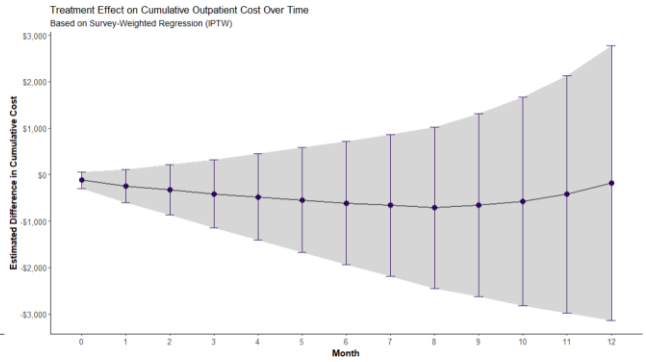
8.15 Appendix O – Weighted HRU in the Post Index Period

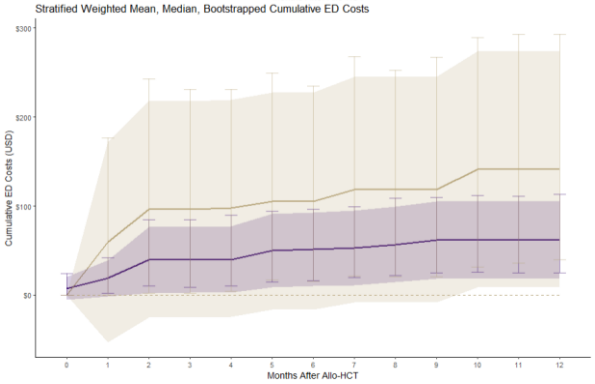
Type of HRU	Allo-HCT Only (n = 330) Mean (SD)	Maintenance Therapy (n = 43) Mean (SD)	Δ Mean Difference	95% Confidence Interval	P-value
Hospitalization	0.16 ± 0.39	0.22 ± 0.47	0.06	(0.01-0.1)	0.01
Length of Stay	33.77 ± 31.49	20.97 ± 15.36	-12.72	(-14.31, -11.14)	0.001
Inpatient	0.17 ± 0.43	0.23 ± 0.53	0.07	(0.02-0.12)	0.01
Outpatient	0.18 ± 1.25	0.33 ± 1.64	0.15	(0.01-0.29)	0.04
Office	0.06 ± 0.55	0.13 ± 0.70	0.07	(0.01-0.13)	0.02
ED	0.01 ± 0.10	0.02 ± 0.14	0.01	(-0.01-0.02)	0.27
Specialist Visit	0.04 ± 0.36	0.06 ± 0.37	0.02	(-0.02-0.05)	0.28

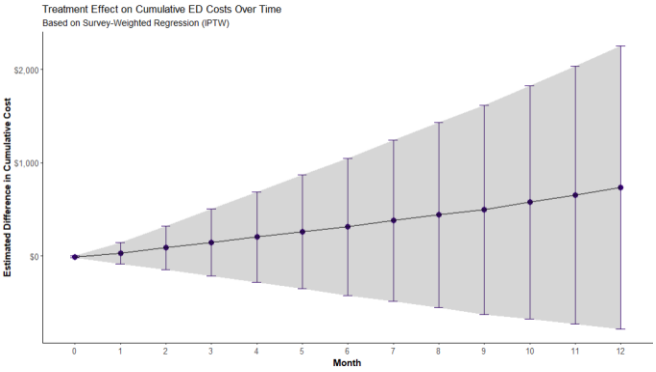
8.16 Appendix P – Stratified Weighted Mean, Median, and Bootstrapped Cumulative Costs and Bootstrapped Differences Between Mean Cumulative Costs

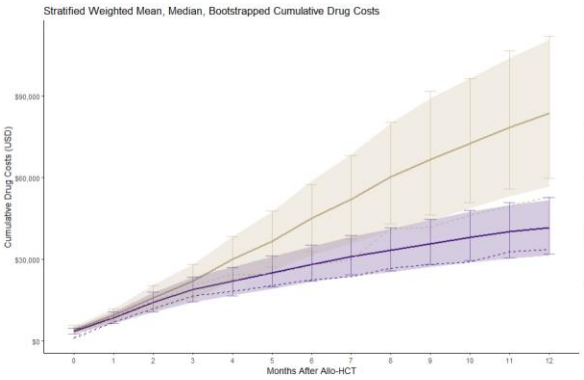


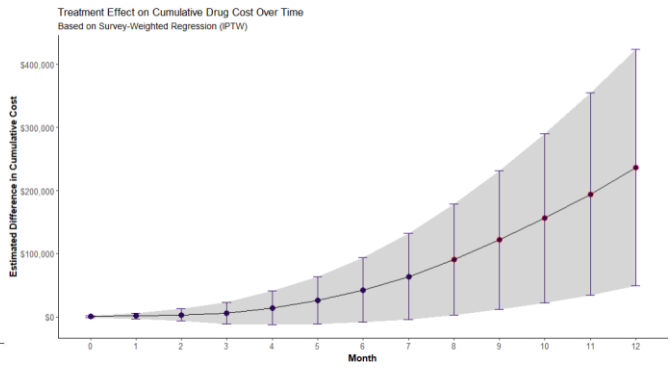

Stratified Weighted Mean, Median, Bootstrapped Cumulative Outpatient Costs
Cumulative Outpatient Costs (USD)
$1,000
$750
$500
$250
$0
0 1 2 3 4 5 6 7 8 9 10 11 12
Months After Allo-HCT


Treatment Effect on Cumulative Outpatient Cost Over Time
Based on Survey-Weighted Regression (IPTW)
Estimated Difference in Cumulative Cost
$3,000
$2,000
$1,000
$0
-$1,000
-$2,000
-$3,000
0 1 2 3 4 5 6 7 8 9 10 11 12
Month

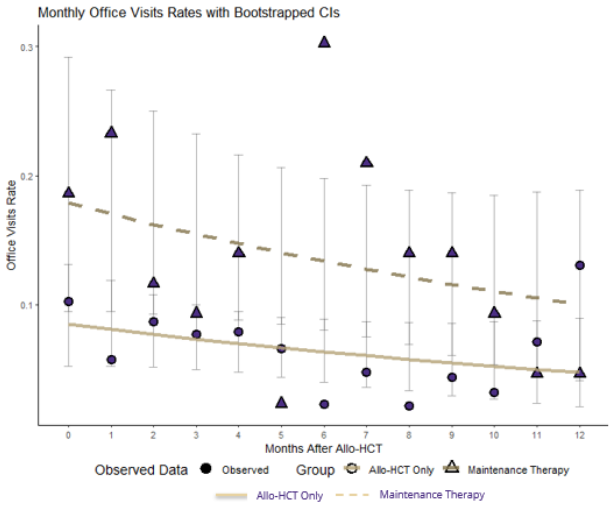

Stratified Weighted Mean, Median, Bootstrapped Cumulative ED Costs
Cumulative ED Costs (USD)
$300
$200
$100
$0
0 1 2 3 4 5 6 7 8 9 10 11 12
Months After Allo-HCT

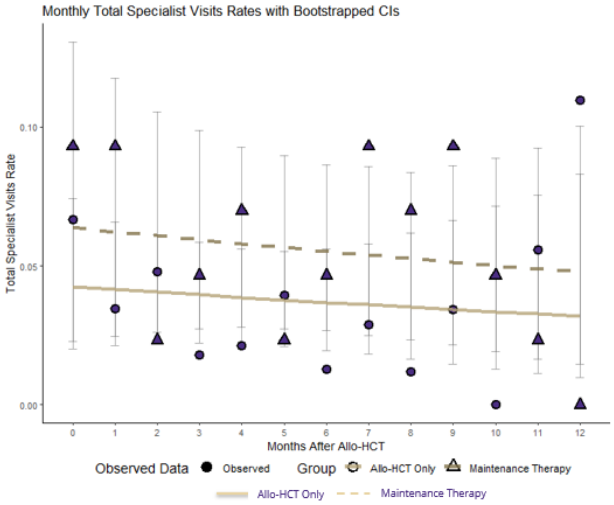

Treatment Effect on Cumulative ED Costs Over Time
Based on Survey-Weighted Regression (IPTW)
Estimated Difference in Cumulative Cost
$2,000
$1,000
$0
0 1 2 3 4 5 6 7 8 9 10 11 12
Month

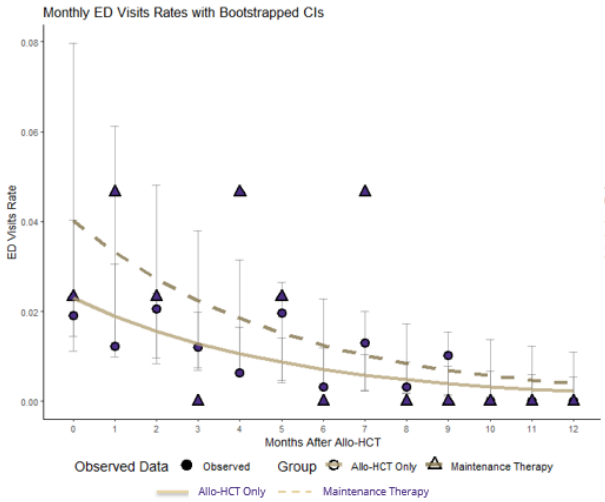

Stratified Weighted Mean, Median, Bootstrapped Cumulative Drug Costs
Cumulative Drug Costs (USD)
$90,000
$60,000
$30,000
$0
0 1 2 3 4 5 6 7 8 9 10 11 12
Months After Allo-HCT

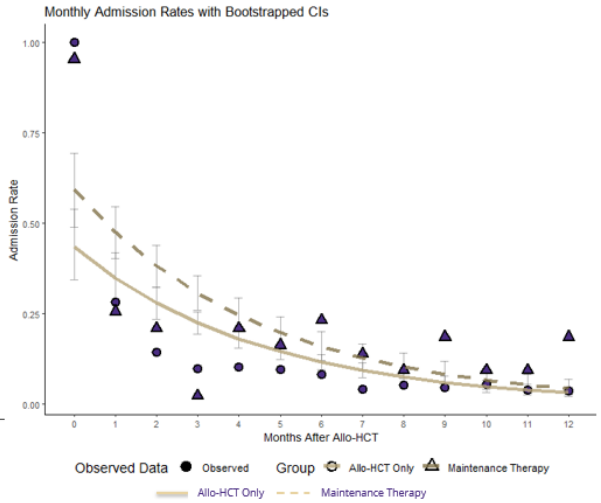

Treatment Effect on Cumulative Drug Cost Over Time
Based on Survey-Weighted Regression (IPTW)
Estimated Difference in Cumulative Cost
$400,000
$300,000
$200,000
$100,000
$0
0 1 2 3 4 5 6 7 8 9 10 11 12
Month

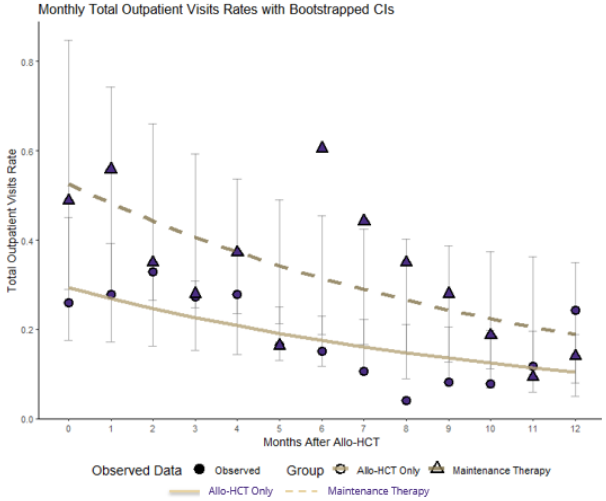
8.17 Appendix Q – Stratified Poisson Rate for Each Type of HRU with Observed Mean Events

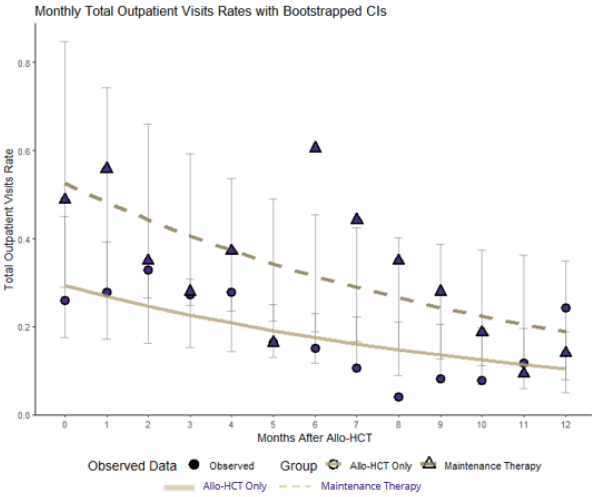












8.18 Appendix R – Average Wholesale Unit Prices for Maintenance Therapy Medications

Drug Name	AWP Unit Price ($)
Azacitidine	617.62
Decitabine	720.00
Enasidenib (Idhifa)	1,441.36
Gemtuzumab ozogamicin (Mylotarg)	12,054
Gilteritinib (Xospata)	386.39
Glasdegib (Daurismo)	442.76
Ivosidenib (Tibsovo)	682.98
Midostaurin (Rydapt)	261.50
Quizartinib (Vanflyta)	701.12
Sorafenib (Nexavar)	210.83
Venetoclax (Venclexta)	156.20