

The Direct Medical Costs of Treatment Discontinuation among Higher-Risk Myelodysplastic Syndrome Patients Receiving Hypomethylating Agents

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INTRODUCTION

- Myelodysplastic syndromes (MDS) are a group of heterogeneous, malignant bone marrow disorders.¹
- Hypomethylating agent (HMA) treatment is recommended to be given to higher-risk myelodysplastic syndrome (HR-MDS) patients for least 4-6 treatment cycles and premature termination is likely to result in poor outcomes and considerable healthcare spending.²

OBJECTIVES

- The objective of this study was to assess healthcare resource use and direct medical costs associated with HMA treatment non-persistence among HR-MDS patients

METHODS

Study Design and Data Source

- This was a retrospective cohort study including newly diagnosed patients with HR-MDS between January 1, 2011 and December 31, 2015 using the Surveillance, Epidemiology and End Results (SEER) - Medicare linked database

Study Population

- Patients diagnosed with MDS were identified using International Classification of Diseases for Oncology, 3rd edition (ICD-O-3) code 9983/3 (refractory anemia with excess blasts [RAEB]), a histologic designation that overlaps with International Prognostic Scoring System (IPSS) HR-MDS

Inclusion Criteria

- ≥66 years at HR-MDS diagnosis
- Higher-risk MDS as their primary and first cancer
- Continuously enrolled in Medicare Parts A and B for ≥12 months prior to initial MDS diagnosis until the end of the study period

Exclusion Criteria

- Any other cancer diagnosis in the 12 months prior to MDS diagnosis
- Enrolled in a health maintenance organization (HMO) in the 12 months before diagnosis
- Had an unknown diagnosis month or year
- Received an allogeneic stem cell transplant (alloHSCT), or lenalidomide at any time during the follow-up period

Outcomes

- HR-MDS patients receiving HMAs were stratified into HMA persistent (receiving 4 or more HMA cycles without any gap of ≥90 days between cycles) and HMA non-persistent (receiving less than 4 cycles or a gap of ≥90 days between cycles) groups
- Healthcare resource use (HCRU) and associated direct medical costs incurred during the follow-up period were described as per-patient-per-month (PPPM)

Statistical Analysis

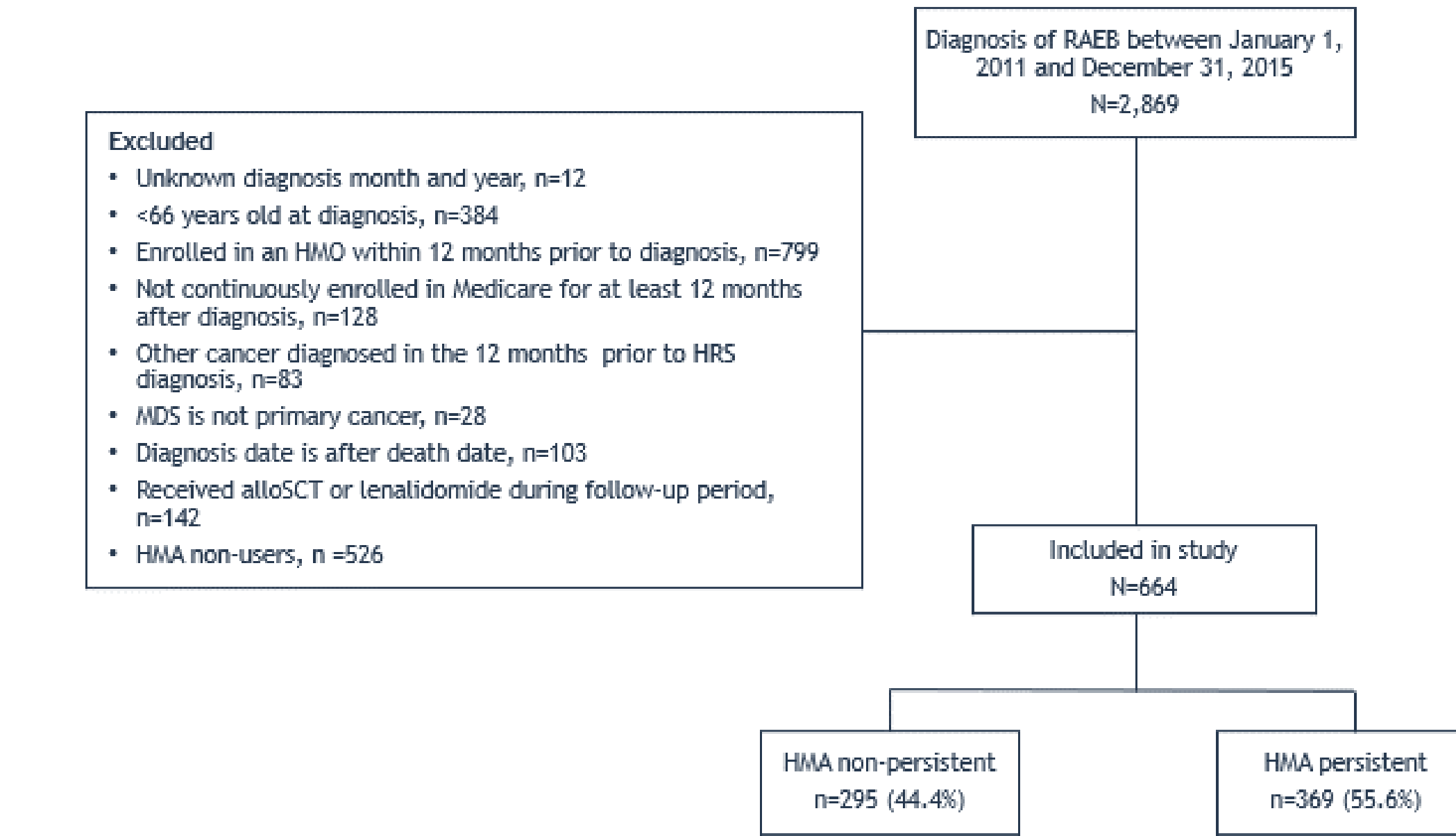
- Descriptive statistics were used to summarize HMA groups
- To account for baseline differences between HMA persistent and non-persistent groups, propensity score-based inverse probability of treatment weights (IPTW) were calculated
- Covariates for IPTW model included age at diagnosis, gender, race, marital status, census location, urban-rural status, National Cancer Institute (NCI) Comorbidity Index, poor performance status
- Weighted HCRU and costs (PPPM) were further estimated using generalized linear models (GLMs)
- Costs were inflated to 2019 USD using medical component of consumer price index

RESULTS

Cohort Description

- There were 664 patients identified with RAEB, of which 295 (44.4%) patients were classified in the HMA non-persistent group and 369 (55.6%) patients in the HMA persistent group (Figure 1)

Figure 1. Creation of Study Cohort



- HMA persistent and non-persistent groups were similar in baseline demographic and clinical characteristics (Table 1)
- Compared to persistent HMA users, non-persistent users were older at HR-MDS diagnosis, a lower proportion of patients were married and started azacitidine (versus decitabine) as first HMA

Table 1. Baseline Demographic and Clinical Characteristics of Patients Stratified by HMA Persistence Status

Characteristic	All Patients (N = 664)	HMA Persistent (N = 369)	HMA Nonpersistent (N = 295)	P-value
Male	77.81 (6.34)	77.3 (6.1)	78.4 (6.6)	0.027
Race/ethnicity	413 (62.2)	239 (64.8)	174 (59.0)	0.127
Non-Hispanic white	568 (85.5)	325 (88.1)	243 (82.4)	0.069
Non-Hispanic black	32 (4.8)	17 (4.6)	15 (5.1)	
Hispanic/other	64 (9.6)	27 (7.3)	37 (12.5)	
Marital status at diagnosis ^a				0.031
Unmarried	207 (31.2)	105 (28.5)	102 (33.6)	
Married	394 (59.3)	235 (63.7)	159 (53.9)	
Unknown	63 (9.5)	29 (7.9)	34 (11.5)	
Census location				0.176
West	221 (33.3)	112 (30.4)	109 (36.9)	
South	182 (27.4)	110 (29.8)	72 (24.4)	
Northeast	151 (22.7)	89 (24.1)	62 (21.0)	
Midwest	110 (16.6)	58 (15.7)	52 (17.6)	
NCI Comorbidity Index ^a				0.943
0-1	395 (59.5)	221 (59.9)	174 (59.0)	
2	78 (11.7)	42 (11.4)	36 (12.2)	
≥3	191 (28.8)	106 (28.7)	85 (28.8)	
Poor performance status	293 (44.1)	154 (41.7)	139 (47.1)	0.165
Red blood cell transfusions within 8 weeks before first HMA ^a				0.714
0	25 (3.8)	13 (3.5)	12 (4.1)	
≥1	639 (96.2)	356 (96.5)	283 (95.9)	
Platelet transfusions within 8 weeks before first HMA ^a				0.729
0	184 (27.7)	98 (26.6)	86 (29.2)	
1	80 (12.0)	44 (11.9)	36 (12.2)	
≥2	400 (60.2)	227 (61.5)	173 (58.6)	
ESA before HMA ^a	78 (12.9)	40 (12.1)	38 (13.8)	0.712
HMA type				0.008
Azacitidine	518 (78.0)	302 (81.8)	216 (73.2)	
Decitabine	146 (22.0)	67 (18.2)	79 (26.8)	

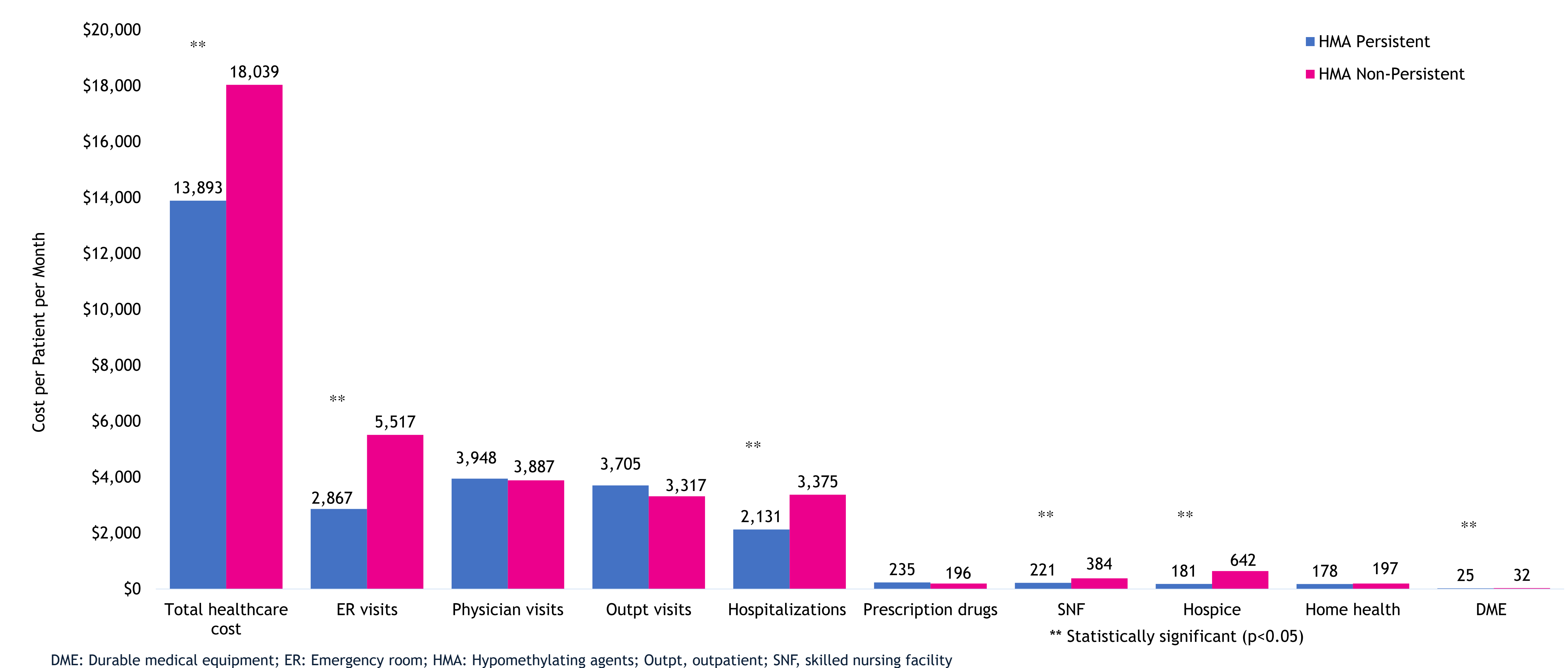
^aTotal sample size and percentages are calculated for only those who received HMA. Data are presented as n (%) unless otherwise indicated. Abbreviations: ESA=erythrocyte-stimulating agent; HMA=hypomethylating agent; HR-MDS=higher-risk myelodysplastic syndrome; MDS= myelodysplastic syndrome; NCI=National Cancer Institute.

RESULTS (cont'd)

Weighted Costs

- Further, HMA non-persistent patients had significantly ($P<0.05$) higher total PPPM costs than HMA persistent patients (\$18,039 vs. \$13,893, $p<0.05$); particularly for hospitalizations (\$3,375 vs. \$2,131), and ER costs (\$5,517 vs. \$2,867) (Figure 2)

Figure 2. Weighted healthcare costs per patient per month (PPPM) among HMA persistent and non-persistent patients



Weighted Healthcare Resource Use

- Results from weighted GLM analysis indicated higher PPPM resource utilization in HMA non-persistent patients compared to HMA persistent patients specifically for hospitalizations, ER visits, SNF use, home health and hospice care use (Table 2)

Table 2. Weighted Healthcare Resource Use per Patient per Month

Resource Type	HMA Persistent (N=369) Mean (95% CI)	HMA Nonpersistent (N=295) Mean (95% CI)	IRR (95% CI)	P-value
Hospitalizations	0.069 (0.058-0.082)	0.107 (0.087-0.132)	1.543 (1.181-2.018)	0.001
ER visits	0.290 (0.265-0.317)	0.383 (0.342-0.428)	1.322 (1.146-1.524)	<.001
Length of hospital stay	1.796 (1.235-2.612)	4.090 (2.905-5.758)	2.277 (1.369-3.788)	0.002
SNF visits	0.023 (0.016-0.032)	0.049 (0.033-0.072)	2.158 (1.308-3.560)	0.003
DME use	0.263 (0.220-0.315)	0.342 (0.275-0.424)	1.299 (0.980-1.721)	0.068
Hospice visits	0.065 (0.055-0.077)	0.165 (0.135-0.201)	2.555 (1.972-3.309)	<.001
Home health visits	0.057 (0.048-0.067)	0.076 (0.062-0.092)	1.335 (1.039-1.714)	0.024
Outpatient visits	3.368 (3.114-3.643)	2.933 (2.671-3.220)	0.871 (0.771-0.984)	0.026
Physician visits	13.760 (12.925-14.650)	16.925 (15.737-18.204)	1.230 (1.117-1.354)	<.001
Prescription drugs	2.981 (2.473-3.595)	2.896 (2.340-3.585)	0.972 (0.732-1.290)	0.842

IRR: Incident rate ratio; DME: Durable medical equipment; ER: Emergency room; SNF: Skilled nursing facility

CONCLUSIONS

- A significant proportion of HR-MDS (RAEB) patients discontinue HMA treatment
- Non-persistence with HMA treatments was associated with substantial resource use and cost burden
- The study findings call for closer care management by healthcare providers to ensure HMA treatment is completed as scheduled to manage outcomes and healthcare spending

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DISCLOSURE

- The study was sponsored by Taiho Oncology, Inc.
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