Predictors of Inpatient Cost of Care in Patients with Cardiovascular Disease Enrolled in the Centers for Medicare and Medicaid (CMS) Bundled Payments for Care Improvement – Advanced (BPCI-A) Initiative

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Introduction

- The Centers for Medicare & Medicaid Services Bundled Payments For Care Improvement Advanced (BPCI-A) is a payment model designed to incentivize health care providers to invest in practice innovation and care redesign to promote delivery of high-value care to Medicare beneficiaries
- Under this model, participating hospitals or physician groups agree on taking responsibility for the total costs of care during a pre-defined "episode" of care, starting on either a procedure or a hospitalization and extending for 90 days thereafter
- Our study aims to identify predictors of cost of care (CoC) in inpatients enrolled in the cardiac care bundle comprising heart failure (HF), myocardial infarction (MI), and arrhythmias (Ar) as primary diagnosis on admission

Methods

- Clinical, echocardiographic and social determinants of health (SDOH) data were retrospectively collected for 451 inpatients (552 total episodes of care) participating in the CMS Cardiac Care Bundle from the University of Alabama at Birmingham enrolled in BPCI-A from 2020-2021
- SDOH were aggregated using 2020 U.S. Census data and the area deprivation index based on patients' zip code at admission
- Multivariate predictors of CoC were identified by a causal discovery algorithm

Table 1: Multivariate Predictors for Log Inpatient Cost of Care Identified by Causal Discovery Algorithm

Variable	Mean Inpatient Cost of Care	95% CI
Intercept	19,292	(15,944, 23,303)
Primary Diagnosis on Admission (Ar = ref)		
HF	1.095	(0.909, 1.322)
MI	1.495	(1.233, 1.797)
ACE Inhibitors	0.992	(0.827, 1.19)
Diagnosis of Cancer: (None = ref)		
Yes: Recent	1.203	(0.696, 2.119)
Yes: Recurrent	0.692	(0.454,1.062)
Final Severity: (High = ref)		
Low	0.900	(0.74, 1.095)
Moderate	1.033	(0.881, 1.204)
Length of Stay	1.087	(1.071, 1.103)
Discharge Disposition (Home = ref)		
Home Health	1.272	(1.083, 1.494)
Subacute Nursing Facility	1.082	(0.851, 1.386)
Other	1.136	(0.91, 1.423)

Table 2: Baseline Characteristics

Variables	Total Episodes of Care = 552
Demographics	
Age	72±13
Gender (Male)	269 (49%)
Race (White)	301 (55%)
Employed	298 (54%)
Disabled	97 (18%)
Average Income	66,070±25,950
HF as Primary Diagnosis	240 (43%)
MI as Primary Diagnosis	207 (38%)
ARH as Primary Diagnosis	105 (19%)
LVEF Greater than 55%	4 (0.07%)
LVEF Less than 35%	112 (20%)
Comorbidities	
History of MI	97 (18%)
History of HF	145 (26%)
History of Cancer	90 (16%)
History of COPD	106 (19%)
History of Stroke/TIA	82 (15%)
History of ESRD	198 (36%)
History of Diabetes	184 (33%)
Discharge Medications	
Beta Blockers	112 (20%)
ACEi/ARB/ARNI	89 (16%)
Hydralazine and Nitrates	41 (7%)
Discharge Disposition	
Home	266 (48%)
Home Health	132 (24%)
Subacute Nursing Facility/Nursing Home	45 (82%)
Other	109 (20%)

Results

- The overall adjusted average inpatient CoC was $49,162.039 ± $55,512.816
- Significant predictors of cost included a diagnosis of MI, length of stay, and the utilization of home health at discharge
- The mean age was 72±13 years (60% male, 67% white). Primary diagnoses on admission were HF (43%), 37% MI (37%), and Ar (19%)
- 15 patients (8 with a primary HF diagnosis) had a diagnosis of cancer
- Discharge destinations were as follows: 48% home, 24% home health, 20% inpatient rehab, and 8.2% to a skilled nursing facility

Conclusion

- A combination of clinical and SDOH factors (the latter reflected on the discharge disposition) influenced the inpatient CoC for our BPCI-A patients
- A recent diagnosis of cancer was found to have a significant effect, stressing the role of non-cardiovascular comorbidities in inpatient CoC
- Expenditure was influenced by discharge disposition with home health expenditure having a greater influence than subacute nursing facility
- MI greatly increased CoC compared to Ar with a mean expenditure 1.495 times as much ($19,292 x 1.495 = $28,842)