

Ninety-Day Episode of Care Spending Following Heart Failure Hospitalization Among Medicare Beneficiaries with Heart Failure

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BACKGROUND

- Heart failure (HF) is a leading cause of morbidity and mortality in the United States and is one of the most expensive health conditions¹
- Total HF-related US healthcare expenditures are projected to increase to \$70 billion by 2030^{1,2}
- HF is the most common admission diagnosis of Medicare beneficiaries,¹ with hospitalizations comprising the majority of HF-related expenditures for all ages³
- The Bundled Payments for Care Improvement Advanced program is a value-based model designed to lower costs by bundling payments for 90-day episodes of care. However, HF spending patterns are poorly understood
- This study aimed to characterize current Medicare payments for HF, spanning the index hospitalization through 90 days post-discharge, to find potential areas to optimize the value of care**

METHODS

- Using Medicare fee-for-service administrative claims data from 2016 to 2018, patients hospitalized for HF were identified by primary discharge diagnostic codes of: 1) systolic HF; 2) diastolic HF; 3) hypertensive heart disease (HHD) with HF; and 4) HHD with HF and chronic kidney disease (CKD)
- Comorbidities were identified using diagnostic codes from Medicare claims within 1 year before HF admission
- Coding patterns over time across these 4 groups, median payments for 90-day episodes of care, and the proportions of total charges allocated to the index hospitalization and post-acute care (PAC) were analyzed
- Temporal trends were assessed for hospitalization volume by diagnosis, payments (index hospitalization, PAC period, and total 90-day payments), 90-day readmission rates, and trends of those data over time

RESULTS

- Overall, 935,962 patients with HF who were hospitalized were included. Most patients had a diagnosis of HHD with HF with or without CKD (**Figure 1**)
- The burden of comorbidities was high and was generally consistent across all 4 diagnoses (**Supplementary Table S1**)
- The total estimated Medicare 90-day payments for HF care were ~\$27 billion over the 3-year study period
- The index hospitalization accounted for 35% of total mean 90-day payments (**Figure 2**)
- Ninety-day payments were substantial with considerable variation (a wide interquartile range). However, overall median payments were stable over the 3-year study period (**Table 1**)
- Admissions for HHD with HF and CKD had the highest median payments (**Table 2**) and were more common over time, comprising > 50% of 2018 admissions (**Supplementary Figure S1**)
- Most 90-day payments were in the PAC period (65%; mean \$11,374), driven by payments for readmission (including observation stays) (36% of 90-day PAC payments; mean \$6828) and skilled nursing facilities (27% of 90-day PAC payments; mean \$5192) (**Figure 2; Supplementary Figure S2**)

Heart failure accounted for ~\$27 billion of Medicare spending over a 3-year period.

Post-acute care accounted for two thirds of 90-day payments following heart failure hospitalization.

Ninety-day post-acute care spending is a prime target to optimize care and improve value for heart failure patients.



Additional details are in the Supplementary Material, downloaded via QR code

For more information, scan the QR code, go to <https://bit.ly/2QuWDVD> or email Nihar.desai@yale.edu

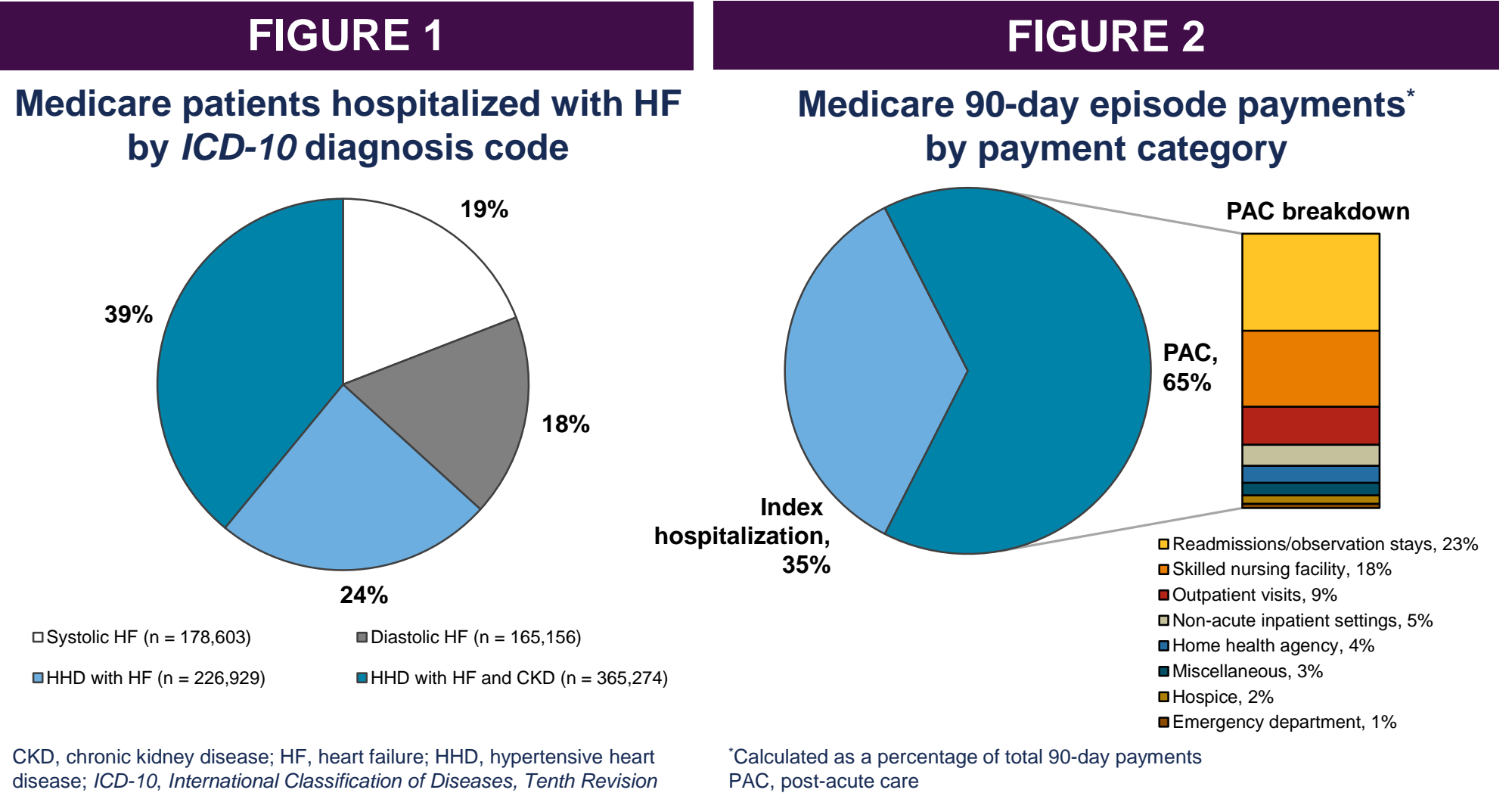


References
1. Heidenreich PA, et al. *Circ Heart Fail*. 2013;6(3):606–619.
2. Virani SS, et al. *Circulation*. 2020;141(9):e139–e596.
3. Dunlay SM, et al. *Circ Cardiovasc Qual Outcomes*. 2011;4(1):68–75.

- There was significant variation across median 90-day spending, with the third quartile of patients spending 3 times the amount of the first quartile (**Table 2**)
- Overall, 36% of Medicare patients hospitalized with HF were readmitted within 90 days (**Supplementary Table S2**). The readmission rate was stable throughout the 3-year study period

CONCLUSION

- This is the first episode-level analysis to examine 90-day healthcare utilization and payments for HF hospitalizations among Medicare beneficiaries
- There are substantial PAC payments from day 31 to 90 following an HF hospitalization
- With the anticipated expansion of the Medicare Bundled Payments for Care Improvement Advanced program, the 90-day episode of care payments will become an increasingly important benchmark
- Understanding the drivers of 90-day episode of care payments can help guide alternative models to improve value in HF care among an aging population



CKD, chronic kidney disease; HF, heart failure; HHD, hypertensive heart disease; ICD-10, International Classification of Diseases, Tenth Revision

*Calculated as a percentage of total 90-day payments
PAC, post-acute care

TABLE 1
Total annual Medicare 90-day episode of care payments for HF

Standardized payments	2016	2017	2018
	Median, \$ (IQR)		
Total index hospitalization	9370 (6622–10,574)	9683 (7123–10,730)	9420 (7630–10,508)
Total 90-day PAC	11,217 (3199–26,050)	11,454 (3245–26,235)	11,437 (3277–25,934)
Total 90-day	21,219 (12,041–37,344)	21,970 (12,638–38,060)	21,758 (12,552–36,464)
	Mean, \$ (SD)		
	10,214 (7885)	10,707 (7883)	10,550 (7816)
Total index hospitalization	10,214 (7885)	10,707 (7883)	10,550 (7816)
Total 90-day PAC	18,417 (34,419)	18,545 (22,265)	18,407 (22,183)
Total 90-day	28,631 (35,656)	29,251 (24,143)	28,957 (23,993)

HF, heart failure; IQR, interquartile range; PAC, post-acute care; SD, standard deviation

TABLE 2
Medicare 90-day episode of care payments by HF diagnostic code

Standardized payments	Overall	Systolic HF	Diastolic HF	HHD with HF	HHD with HF and CKD
	Median, \$ (IQR)				
Total index hospitalization	9518 (6871–10,610)	8903 (6544–10,656)	9179 (6530–10,373)	7779 (6206–9813)	9962 (9332–11,104)
Total PAC	11,374 (3241–26,075)	10,768 (2930–25,548)	11,818 (3494–26,457)	8705 (2638–22,664)	13,041 (3787–28,159)
Total 90-day	21,658 (12,423–37,630)	21,226 (11,798–37,776)	21,227 (12,076–36,817)	17,723 (10,666–32,550)	24,405 (14,256–40,875)
	Mean, \$ (SD)				
	10,500 (7863)	10,735 (9487)	9619 (6654)	8979 (7124)	11,729 (7715)
Total index hospitalization	10,500 (7863)	10,735 (9487)	9619 (6654)	8979 (7124)	11,729 (7715)
Total PAC	18,458 (26,584)	18,188 (23,002)	18,654 (40,834)	16,168 (20,385)	19,923 (23,121)
Total 90-day	28,958 (28,152)	28,922 (25,353)	28,273 (41,716)	25,147 (21,908)	31,652 (24,799)

CKD, chronic kidney disease; HF, heart failure; HHD, hypertensive heart disease; IQR, interquartile range; PAC, post-acute care; SD, standard deviation

DISCLOSURE INFORMATION

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