Temporal shifts in guideline-directed medical therapy prescribed at discharge to heart failure patients in a large US integrated health system

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Background

- Heart failure (HF) is a major cause of morbidity and mortality
- While multiple therapies are known to improve clinical outcomes in heart failure (HF), they remain underutilized[1]
- Hospitalization provides a unique opportunity to address this issue[2]
- We sought to better understand temporal changes in prescription of guideline-directed medical therapy (GDMT) for patients hospitalized with HF at the time of discharge

Hypothesis

- We predicted an increase in prescription of GDMT, but with variability across HF types and ongoing opportunity for improvement

Methods

- We performed a cross-sectional analysis of patients discharged with HF from a large integrated health system (Providence) within the western United States between 1/1/2018 and 10/1/2022
- This was part of a larger effort to better understand the demographics, clinical characteristics, and treatment patterns of HF patients (across all payers) as part of a quality improvement initiative
- HF was defined by ICD-10 codes assigned as the primary diagnosis at discharge (I50.2 - Systolic HF, I50.3 - Diastolic HF, I50.4 - Combined systolic and diastolic HF, I11.0 - Hypertensive heart disease with HF, and I13.0 + I13.2 - Hypertensive heart disease with HF and CKD)
- Patient-level analyses were not performed; all hospitalizations were considered independent events
- Prescription rates of HF medications were assessed at discharge:
  - Beta blocker (evidence-based for those with systolic HF and systolic and diastolic HF)
  - ACE inhibitor (ACEi)/angiotensin receptor blocker (ARB) or angiotensin receptor neprilysin inhibitor (ARNI)
  - Mineralocorticoid receptor antagonist (MRA)
  - Sodium-glucose co-transporter-2 inhibitor (SGLT2i)

Despite temporal increases in ARNI and SGTL2i prescribing, there remains substantial opportunity to increase use of these and other GDMT in patients discharged with HF

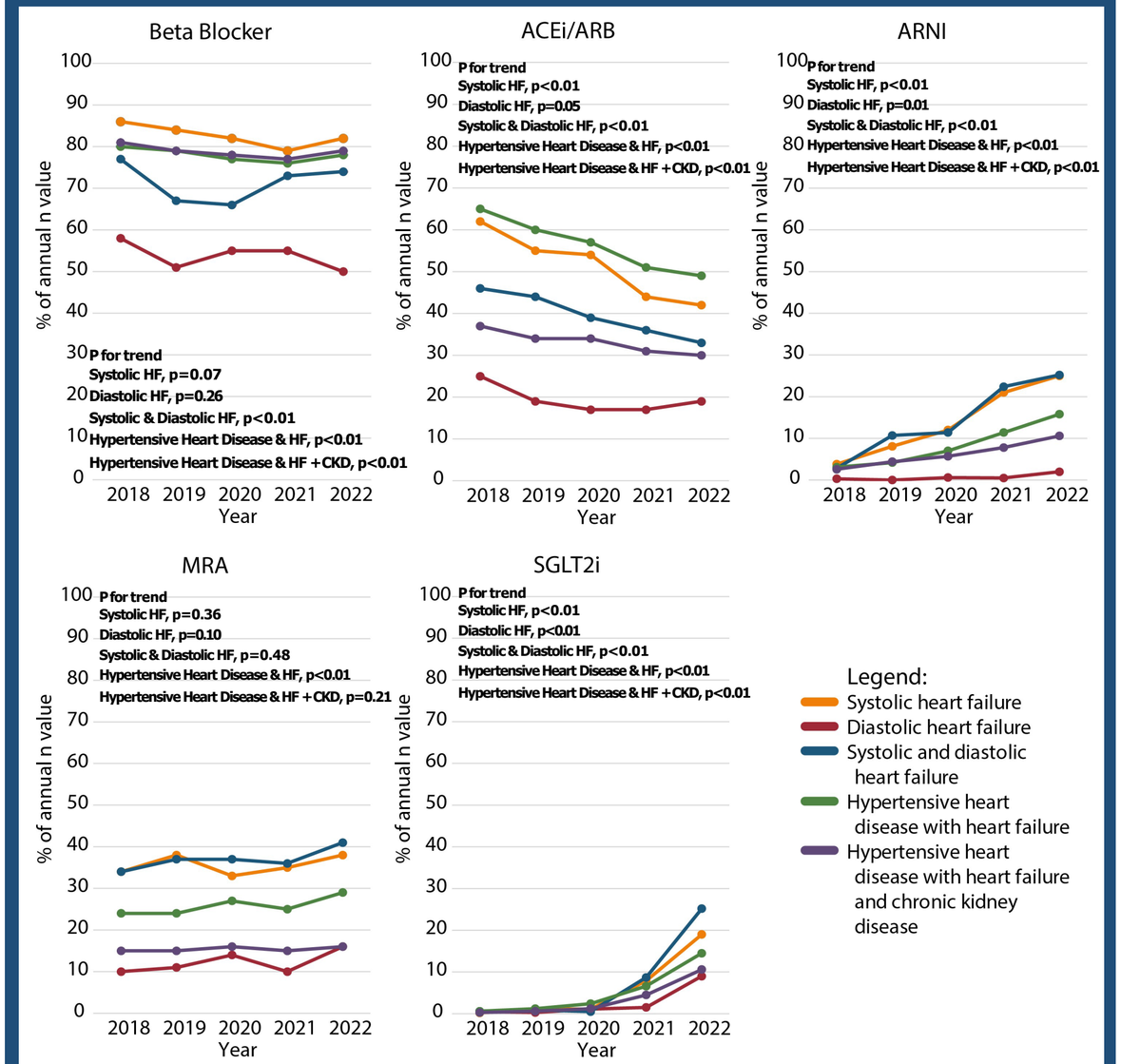

Figure. Temporal distribution of principal heart failure discharge diagnoses by ICD-10 code

Results

- A total of 61,238 HF hospitalizations occurred, involving 43,234 patients, with 76% having only 1 hospitalization
- Demographic and clinical characteristics varied based on the ICD-10 codes assigned (Table)

Table. Subset of demographic and clinical characteristics of patients hospitalized with HF

	I50.2 n=2,663	I50.3 n=1,929	I50.4 n=1,864	I11.0 n=21,823	I13.0 + I13.2 n=32,959
Demographics					
Age, years, median (IQR)	64 (52-76)	76 (64-86)	66 (55-80)	73 (61-83)	76 (65-85)
Female sex	35%	61%	37%	49%	45%
Race					
Asian	3%	3%	4%	3%	5%
Black	5%	2%	5%	6%	8%
White	79%	84%	78%	78%	73%
Other	4%	2%	3%	2%	2%
Ethnicity					
Hispanic/Latino	8%	7%	9%	10%	12%
Clinical characteristics					
Current smoker	28%	13%	22%	18%	10%
Hypertension	35%	46%	40%	100%	100%
Hyperlipidemia	39%	51%	47%	66%	78%
Diabetes mellitus	24%	29%	30%	39%	59%
Coronary artery disease	51%	42%	55%	56%	68%
Peripheral artery disease	13%	17%	16%	18%	29%
Cerebrovascular disease	14%	20%	18%	22%	28%
eGFR <60 ml/min/1.73^2	48%	44%	52%	42%	88%
BMI, kg/m^2, median (IQR)	27.2 (23-32)	29.2 (24-37)	27.4 (24-33)	29.8 (25-37)	29.3 (25-35)

- Prescription rates for a beta blocker decreased slightly over time, with lowest rates among those with diastolic heart failure (Figure)
- Prescription rates for an ACEi or ARB largely fell across all 5 groups; this was offset by a rise in prescriptions rates for an ARNI, particularly among those with systolic HF and systolic and diastolic HF (Figure)
- Prescription rates for an MRA rose modestly over time for most HF groups, with lowest rates among those with diastolic HF and hypertensive heart disease with HF and CKD (Figure)
- Prescription rates for an SGTL2i rose for all 5 groups over time, with the largest increases in those with systolic HF and systolic and diastolic HF (Figure)

Conclusions

- Despite increased utilization of GDMT in patients discharged with HF, substantial opportunity for improvement exists
- Systems-based approaches are needed to facilitate more rapid adoption of evidence-based therapies in this patient population

ACEi=angiotensin converting enzyme inhibitor, ARB=angiotensin receptor blocker, ARNI=angiotensin receptor neprilysin inhibitor, BMI=body mass index, CKD=chronic kidney disease, eGFR=estimated glomerular filtration rate, GDMT=guideline-directed medical therapy, HF=heart failure, ICD=International Classification of Diseases, IQR=interquartile range, MRA=mineralocorticoid receptor antagonist, SGLT2i=sodium-glucose co-transporter-2 inhibitor

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References: [1]Greene SJ, Butler J, Albert NM, et al. *J Am Coll Cardiol.* 2018;72:351-366; [2]Patolia H, Khan MS, Fonarow GC, et al. *J Am Coll Cardiol.* 2023;82:529-543
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