

SUPPLEMENTAL MATERIAL

Table S1. Factors Associated with Early Outpatient Follow-up during COVID-19 that were included in the IPW (N = 6,918).

Variables	Model 1			Model 2		
	OR	(95% CI)	P value	OR	(95% CI)	P value
Age	1.00	(1.00-1.01)	.345	1.00	(1.00-1.01)	.696
Female	1.09	(0.97-1.22)	.149	1.09	(0.98-1.22)	.113
Race (Ref: NH White)						
NH Black	1.08	(0.95-1.23)	.252	1.05	(0.93-1.18)	.464
Other	1.02	(0.83-1.27)	.829	1.02	(0.82-1.26)	.891
Currently married	0.95	(0.85-1.07)	.416			
Insurance (Ref: Medicare FFS)						
Medicare Advantage	0.85	(0.75-0.96)	.009			
Medicaid/Self-pay	0.83	(0.66-1.04)	.104			
Other	0.97	(0.82-1.14)	.689			
Disadvantaged neighborhood	0.75	(0.64-0.89)	.001	0.75	(0.64-0.88)	<.001
Acute MI	0.98	(0.78-1.22)	.850			
Angina	0.91	(0.81-1.03)	.137			
Stroke or TIA	1.09	(0.82-1.46)	.542			
Atrial fibrillation or flutter	1.51	(1.35-1.70)	<.001	1.57	(1.40-1.76)	<.001
Mitral or aortic valvular disease	1.19	(1.05-1.36)	.008	1.21	(1.06-1.37)	.004
Peripheral vascular disease	1.02	(0.87-1.18)	.844			
Hypertension	1.13	(0.92-1.37)	.244			
Diabetes mellitus	0.90	(0.81-1.02)	.089			
Hyperlipidemia	1.20	(1.06-1.35)	.004	1.19	(1.07-1.33)	.002
COPD	0.97	(0.86-1.09)	.606			
Renal disease	0.95	(0.82-1.10)	.485			
Depression	1.05	(0.92-1.19)	.506			
Dementia	0.78	(0.63-0.95)	.014			
Coronary artery bypass graft surgery	1.81	(1.30-2.52)	<.001	1.72	(1.25-2.37)	.001
Percutaneous coronary intervention	1.56	(1.12-2.17)	.008	1.54	(1.14-2.06)	.004
Permanent pacemaker	2.04	(1.08-3.87)	.029			
Implantable cardioverter defibrillator	1.64	(1.03-2.61)	.039			
eGFR (Ref: ≥60)						
45 - 60	1.12	(0.96-1.31)	.164	1.07	(0.93-1.24)	.347
30 - 45	1.06	(0.88-1.27)	.558	0.99	(0.85-1.16)	.913
<30	0.89	(0.73-1.08)	.236	0.79	(0.69-0.91)	.001
Unknown	0.76	(0.35-1.66)	.487	0.46	(0.24-0.85)	.014
Potassium (Ref: 4.0 - 4.9)						
<4.0	0.97	(0.87-1.08)	.610			
≥5.0	1.01	(0.82-1.26)	.897			
Unknown	0.56	(0.18-1.80)	.333			
Hemoglobin (Ref: ≥12.0)						
<10.0	0.84	(0.74-0.97)	.017			
10.0 - 11.9	0.91	(0.80-1.04)	.162			
Unknown	0.61	(0.24-1.55)	.301			
Beta blocker	1.16	(1.01-1.33)	.037			
ACEI/ARB/ARNI	1.11	(0.98-1.24)	.091			
Hydralazine	0.85	(0.74-0.97)	.018			
Loop diuretics	1.22	(1.08-1.39)	.002	1.22	(1.08-1.38)	.001

Aldosterone antagonist	1.26 (1.11-1.43)	<.001	1.30 (1.15-1.48)	<.001
Statin	1.02 (0.90-1.17)	.726		
Aspirin	1.25 (1.11-1.41)	<.001	1.24 (1.10-1.39)	<.001
Principle HF hospitalizations	1.77 (1.56-2.02)	<.001	1.77 (1.56-2.01)	<.001
Admission through ED	1.40 (1.24-1.58)	<.001	1.40 (1.25-1.58)	<.001
Length of stay	1.00 (1.00-1.01)	.245		
Discharge to Home with Home Health	1.01 (0.90-1.14)	.857		
Hospitalizations in the past year	1.09 (0.98-1.21)	.104		
Has a PCP on file	2.60 (2.21-3.07)	<.001	2.58 (2.19-3.04)	<.001
BIC	9371.611		9175.515	

Abbreviations: ACEI: Angiotensin-converting enzyme inhibitors; ARB: Angiotensin II receptor blockers; ARNI: Angiotensin receptor neprilysin inhibitor; COPD: Chronic obstructive pulmonary disease; ED: Emergency department, eGFR: Estimated glomerular filtration rate; FFS: Fee-for-Service; HF: Heart Failure; IPW: Inverse probability weighting; IQR: Interquartile range; MI: Myocardial infarction; PCP: Primary care provider; TIA, Transient ischemic attack.

Note: Regression models compare outcomes for patients who received early outpatient follow-up vs. those who did not receive early outpatient follow-up (reference group).

Model 1 was fully adjusted. Model 2 retained key patient characteristics (age, sex, race, and insurance) and included significant variables based on backward stepwise-selection procedures (.01 threshold).

Table S2. Characteristics of Study Participants in the Pre- and COVID-19 Time Periods.

	Total (N =14,671)	Pre-COVID (N = 7,753)	COVID (N =6,918)	P value
Sociodemographic Characteristics				
Age, median (IQR)	68 (19)	67 (19)	68 (19)	.049
Female	6,807 (46.40)	3,645 (47.0)	3,162 (45.7)	.113
Race				.757
Non-Hispanic White	7,715 (52.6)	4,065 (52.4)	3,650 (52.8)	
Non-Hispanic Black	5,899 (40.2)	3,137 (40.5)	2,762 (39.9)	
Other	1,057 (7.2)	551 (7.1)	506 (7.3)	
Currently married	6,849 (46.7)	3,660 (47.2)	3,189 (46.1)	.178
Insurance				.007
Medicare FFS	6,368 (43.4)	3,452 (44.5)	2,916 (42.2)	
Medicare Advantage	4,226 (28.8)	2,147 (27.7)	2,079 (30.1)	
Medicaid	1,301 (8.9)	697 (9.0)	604 (8.7)	
Other	2,776 (18.9)	1,457 (18.8)	1,319 (19.1)	
Disadvantaged neighborhood	2,081 (14.2)	1,111 (14.3)	970 (14.0)	.593
Diagnosis and Procedures				
Acute MI	1,075 (7.3)	560 (7.2)	515 (7.4)	.608
Angina	6,849 (46.7)	3,660 (47.2)	3,189 (46.1)	.505
Stroke or TIA	1,060 (7.2)	529 (6.8)	531 (7.7)	.047
Atrial fibrillation or flutter	6,003 (40.9)	3,142 (40.5)	2,861 (41.4)	.308
Mitral or aortic valvular disease	3,165 (21.6)	1,660 (21.4)	1,505 (21.8)	.613
Peripheral vascular disease	2,046 (14.0)	1,072 (13.8)	974 (14.1)	.660
Hypertension	13,428 (91.5)	7,079 (91.3)	6,349 (91.8)	.309
Diabetes mellitus	7,442 (50.7)	3,890 (50.2)	3,552 (51.3)	.157
Hyperlipidemia	9,077 (61.9)	4,708 (60.7)	4,369 (63.2)	.002
COPD	3,930 (26.8)	2,150 (27.7)	1,780 (25.7)	.006
Renal disease	7,370 (50.2)	3,845 (49.6)	3,525 (51.0)	.100
Depression	2,976 (20.3)	1,474 (19.0)	1,502 (21.7)	<.001
Dementia	1,060 (7.2)	529 (6.8)	531 (7.7)	.047
Coronary artery bypass graft surgery	419 (2.9)	219 (2.8)	200 (2.9)	.810
Percutaneous coronary intervention	426 (2.9)	215 (2.8)	211 (3.1)	.319
Permanent pacemaker	109 (0.7)	60 (0.8)	49 (0.7)	.644
Implantable cardioverter defibrillator	166 (1.1)	75 (1.0)	91 (1.3)	.047
Lab Values				
eGFR, mL/min/1.73m ²				.002
≥60	6,298 (42.9)	3,283 (42.3)	3,015 (43.6)	
45 - 60	2,764 (18.8)	1,555 (20.1)	1,209 (17.5)	
30 - 45	2,297 (15.7)	1,214 (15.7)	1,083 (15.7)	
<30	3,178 (21.7)	1,632 (21.1)	1,546 (22.4)	
Unknown	134 (0.9)	69 (0.9)	65 (0.9)	
Potassium, mEq/L				.034
<4.0	6,579 (44.8)	3,516 (45.4)	3,063 (44.3)	
4.0 - 4.9	7,118 (48.5)	3,755 (48.4)	3,363 (48.6)	
≥5.0	876 (6.0)	425 (5.5)	451 (6.5)	
Unknown	98 (0.7)	57 (0.7)	41 (0.6)	
Hemoglobin, g/dL				.012
<10.0	4,956 (33.8)	2,587 (33.4)	2,369 (34.2)	
10.0 - 11.9	4,737 (32.3)	2,586 (33.4)	2,151 (31.1)	
≥12.0	4,866 (33.2)	2,514 (32.4)	2,352 (34.0)	
Unknown	112 (0.8)	66 (0.9)	46 (0.7)	
Medications				
Beta blocker	11,473 (78.2)	5,825 (75.1)	5,648 (81.6)	<.001
ACEI/ARB/ARNI	3,900 (26.6)	1,834 (23.7)	2,066 (29.9)	<.001

Hydralazine	3,214 (21.9)	1,574 (20.3)	1,640 (23.7)	<.001
Loop diuretics	10,337 (70.5)	5,169 (66.7)	5,168 (74.7)	<.001
Aldosterone antagonist	3,290 (22.4)	1,579 (20.4)	1,711 (24.7)	<.001
Statin	9,602 (65.5)	4,769 (61.5)	4,833 (69.9)	<.001
Aspirin	9,385 (64.0)	4,660 (60.1)	4,725 (68.3)	<.001
Healthcare Utilization				
Principle HF hospitalizations	3,529 (24.1)	1,917 (24.7)	1,612 (23.3)	.044
Admission through ED	9,885 (67.4)	5,125 (66.1)	4,760 (68.8)	<.001
Length of stay, median (IQR)	4.13 (4.9)	4.04 (4.8)	4.3 (5.3)	<.001
Discharge destination				.021
Home without Home Health	10,457 (71.3)	5,589 (72.1)	4,868 (70.4)	
Home with Home Health	4,214 (28.7)	2,164 (27.9)	2,050 (29.6)	
Hospitalizations in the past year*	7,441 (50.7)	4,058 (52.3)	3,383 (48.9)	<.001
Has a PCP on file	12,538 (85.5)	6,611 (85.3)	5,927 (85.7)	.487
30-day readmission	2,782 (19.0)	1,470 (19.0)	1,312 (19.0)	.994
30-day readmission or mortality	2,952 (20.1)	1,560 (20.1)	1,392 (20.1)	1.00
Early outpatient follow-up				<.001
No early follow-up	8,138 (55.5)	4,427 (57.1)	3,711 (53.6)	
Early follow-up – in person	5,986 (40.8)	3,305 (42.6)	2,681 (38.8)	
Early follow-up – telemedicine	547 (3.7)	21 (0.3)	526 (7.6)	

Abbreviations: ACEI: Angiotensin-converting enzyme inhibitors; ARB: Angiotensin II receptor blockers; ARNI: Angiotensin receptor neprilysin inhibitor; COPD: Chronic obstructive pulmonary disease; COVID-19: Coronavirus Disease 2019; ED: Emergency department, eGFR: Estimated glomerular filtration rate; FFS: Fee-for-Service; HF: Heart Failure; IQR: Interquartile range; MI: Myocardial infarction; PCP: Primary care provider; TIA, Transient ischemic attack.

Note: Categorical variables reported as n (%) and continuous variables reported as median (IQR).

Pre-COVID-19 period: 03/17/2019-03/15/2020. COVID-19 period: 03/16/2020-03/14/2021.

Table S3. Unadjusted and Adjusted Odds Ratios for the Association between Early Outpatient Follow-up within 7 Days and 30-Day Readmission and Mortality in Patients with Heart Failure (N = 6,918)

	Unadjusted OR (95% CI)	P value	Adjusted OR (95% CI)	P value
30-Day Readmission				
No early follow-up	1.00 (reference)		1.00 (reference)	
In-person	0.69 (0.59-0.81)	<.001	0.70 (0.60-0.82)	<.001
Telemedicine	0.76 (0.56-1.03)	.078	0.69 (0.51-0.94)	.018
30-Day Readmission or mortality				
No early follow-up	1.00 (reference)		1.00 (reference)	
In-person	0.65 (0.56-0.76)	<.001	0.66 (0.56-0.78)	<.001
Telemedicine	0.74 (0.55-1.00)	.051	0.68 (0.50-0.91)	.011

Abbreviations: CI: Confidence Interval; OR: Odds ratio.

Note: Adjusted logistic regression models included patient sociodemographic characteristics, diagnoses and procedures, lab values, medications, healthcare utilization measures, and neighborhood disadvantage.

Figure S1. Confounding Factors among HF Patients with and without an Early Follow-up Compared Using Standardized Differences.

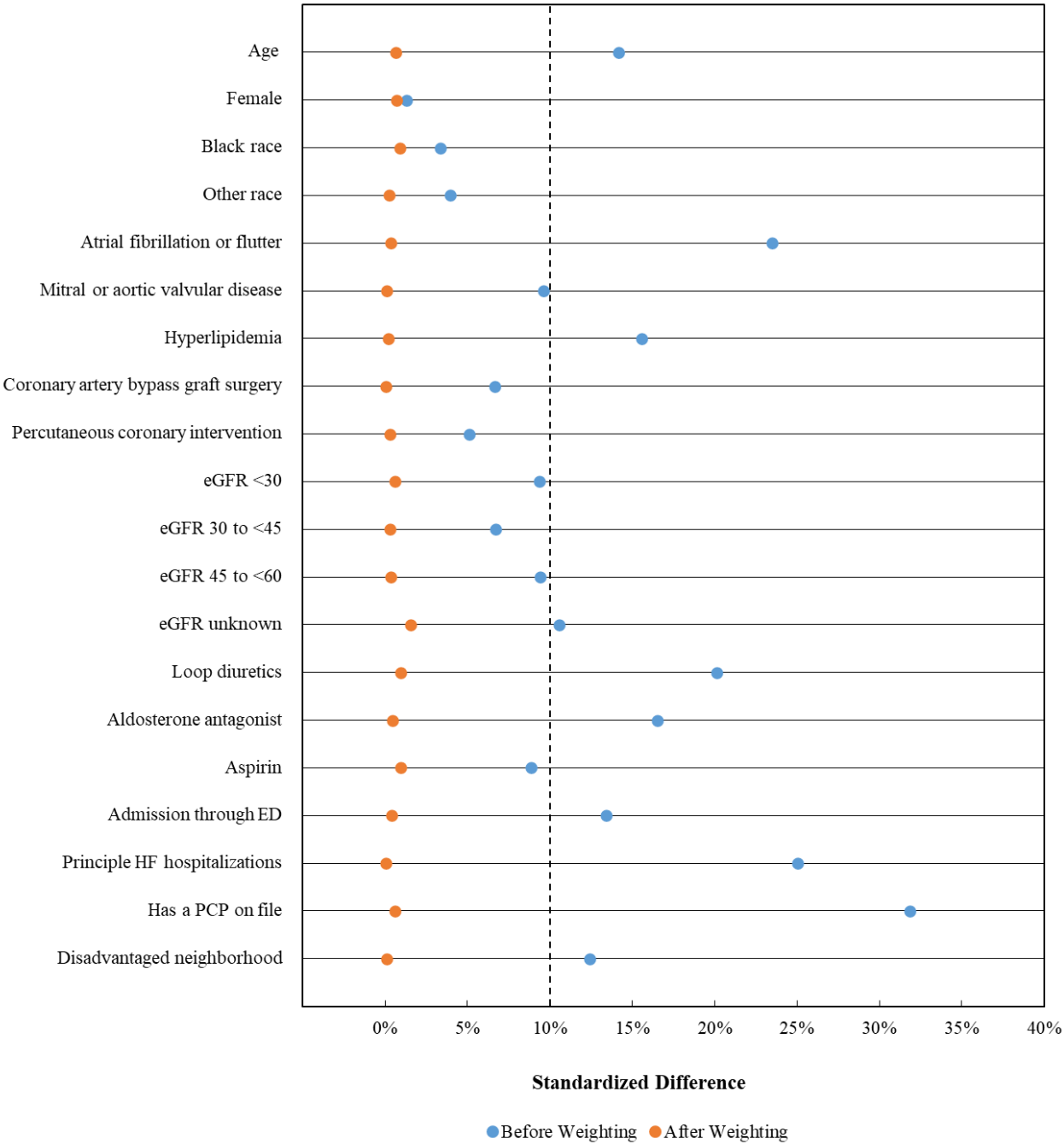


Figure S2. Estimated Density of the Propensity Scores (PS) among HF Patients with and without an Early Follow-up before and after PS Weighting.

