

SUPPLEMENTAL MATERIAL

Table S1. ICD -10 Codes for CHF.

DIAGNOSIS CODE	DIAGNOSIS DESCRIPTION
I43	Cardiomyopathy in diseases classified elsewhere
I50	Heart failure
I099	Hypertensive heart disease with heart failure
I110	Hypertensive heart disease with heart failure
I130	Hypertensive heart and chronic kidney disease with heart failure and stage 1 through stage 4 chronic kidney disease, or unspecified chronic kidney disease
I132	Hypertensive heart and chronic kidney disease with heart failure and with stage 5 chronic kidney disease, or end stage renal disease
I255	Ischemic cardiomyopathy
I420	Dilated cardiomyopathy
I425	Other restrictive cardiomyopathy
I426	Alcoholic cardiomyopathy
I427	Cardiomyopathy due to drug and external agent
I428	Other cardiomyopathies
I429	Cardiomyopathy, unspecified
P290	Neonatal cardiac failure

Table S2. Variable Definitions and Specifications for Modelling.

Variable	Definition	Source
Demographics		
Sex	Categorized as: Male, Female	UPMC Discharge and Inpatient Billing Data
Race	Categorized as: White, Black, Other Missing data replaced with "white"	UPMC Discharge and Inpatient Billing Data
Age	Categorized as: 18 – 55 years, 56 – 65 years, 66 – 75 years, 76 – 85 years, 86 years and older	UPMC Discharge and Inpatient Billing Data
Marital Status	Categorized as: Married, Not Married; missing data replaced with "married"	
Insurance	Categorized as: Commercial, Medicare, Medicaid, Self-Pay, Other (e.g., veterans administration, auto insurance payers and homeowners liability claims)	UPMC Discharge and Inpatient Billing Data
Median Household Income	Based on patient ZIP code and categorized based on the quartile distribution; median value imputed for missing data	Census Data
Clinical		
Length of stay	Categorized as: 0 – 3 days, >3 – 6 days, >7 – 9 days, >9 days based on quartile distribution	UPMC Discharge and Inpatient Billing Data
ICU use	Yes/no: Intensive care unit use during inpatient stay	UPMC Discharge and Inpatient Billing Data
Severity of Illness	APR-DRG classification: categorized as minor, moderate, major, extreme	UPMC Discharge and Inpatient Billing Data
Risk of Mortality	APR-DRG classification: categorized as minor, moderate, major, extreme; mean value imputed for missing data	UPMC Discharge and Inpatient Billing Data
Indicators for comorbidities	Yes/no: peripheral vascular disease, chronic pulmonary disease, diabetes (complicated), renal failure, liver disease, coagulopathy, obesity, blood loss anemia, alcohol abuse, drug abuse, depression, neurological disorder, and cancer	UPMC Discharge and Inpatient Billing Data
Elixhauser comorbidity count	Ranges from 0 – 31; categorized as: 3 or less, 4 – 5, 6 – 7, 8 or more	UPMC Discharge and Inpatient Billing Data
AM-PAC Mobility Score	Categorized by functional mobility limitations: 6 –unable to perform any tasks, 7-13 – major mobility limitations, 14-18 - moderate mobility limitations, 19-23 – minor mobility limitations, 24 – no mobility limitations Moderate mobility limitations imputed for missing data	UPMC Electronic Health Record
Discharge Destination	Categorized as: Home: home with outpatient services or without home health services, Home Health: Home with home health services, Post-Acute Care facility: Skilled nursing facility or Inpatient rehabilitation facility	UPMC Electronic Health Record
Therapy Visits (amount)	Categorized as: total number of visits from PT or OT: 1-3 visits, 4-6 visits, 7 or more visits	UPMC Discharge and Inpatient Billing Data
Therapist Recommendation Agreement	Categorized as: agreed (PT and OT recommendation exactly the same), disagree (PT and OT recommendation not the same)	UPMC Electronic Health Record
Outcomes		
Died within 30 days	Yes/no: Died within 30 days with or without an in-system readmission	Social Security Death Index (SSDI)
Within system 30-day Readmission	Yes/no: Readmitted to a UPMC hospital within 30 days	UPMC Discharge and Inpatient Billing Data
Readmitted or died within 30 days	Yes/no: Readmitted within system or died within 30 days	UPMC Discharge and Inpatient Billing Data & SSDI

Table S3. Therapist Recommended Post-acute Setting versus Actual Discharge Setting, 4-level definition

Therapist-Recommendations		Actual Discharge Setting			
		Community (Comm)		Post-Acute Care Facility (PAC)	
Comm	Home	Home	HH	SNF	IRF
	HH	Home	HH	SNF	IRF
PAC	SNF	Home	HH	SNF	IRF
	IRF	Home	HH	SNF	IRF

: Home: Home without home services, HH: Home with home health services, PAC: Post-acute care facilities, Comm: Community setting

Red shading: actual discharge setting is discordant when setting is less intensive than therapist recommendation

Green shading: actual discharge setting is concordant when setting is equal to or more intensive than therapist recommendation

Table S4. CHF: Patient Demographic & Clinical Characteristics between Definitive vs. Unclear vs. Missing Discharge recommendations (N=39 220).

	Definite DC Rec (N= 26 798^a)	Unclear (N=2 516)	Missing (N=9 906)	Total (N=39 220)
Age, n (%)				
18-55	1 518 (5.7)	120 (4.8)	763 (7.7)	2 401 (6.1)
56-65	3 828 (14.3)	304 (12.1)	1 656 (16.7)	5 788 (14.8)
66-75	6 422 (24.0)	471 (18.7)	2 512 (25.4)	9 405 (24.0)
76-85	8 162 (30.5)	704 (28.0)	2 760 (27.9)	11 626 (29.6)
86+	6 868 (25.6)	917 (36.5)	2 215 (22.4)	10 000 (25.5)
Sex, n (%)				
Male	12 242 (45.7)	1027 (40.8)	4 784 (48.3)	18 053 (46.0)
Female	14 556 (54.3)	1 489 (59.2)	5 122 (51.7)	21 167 (54.0)
Race, n (%)				
White	23 913 (89.2)	2 229 (88.6)	8 658 (87.4)	34 800 (88.7)
Black	2 639 (9.9)	263 (10.5)	1 148 (11.6)	4 050 (10.3)
Other	246 (0.9)	24 (1.0)	100 (1.0)	370 (0.9)
Hospital LOS, Mean (SD)	8.7 (7.9)	7.1 (6.4)	5.4 (7.3)	7.8 (7.8)
Median (IQR)	6.8 (4.2-10.4)	5.7 (3.8-8.5)	3.7 (2.3-6.1)	5.8 (3.7-9.5)
% ICU Use, n (%)	7 867 (29.4)	572 (22.7)	1 424 (14.4)	9 863 (25.2)
Mean (SD) ICU days ^b	4.9 (6.8)	4.5 (5.2)	3.1 (13.5)	4.6 (8.0)
Median Income by ZIP code, Mean (SD)	47 816.5 (15 789.2)	47 198.1 (15 229.3)	47 229.6 (1 5267.4)	47 628.6 (15 625.5)
AM-PAC mobility, n (%)				
6 (Total Assistance)	1 659 (6.2)	144 (5.7)	400 (4.0)	2 203 (5.6)
7-13 (Major Limitations)	7 574 (28.3)	688 (27.3)	1 469 (14.8)	9 731 (24.8)
14-18 (Moderate limitations)	8 126 (30.3)	896 (35.6)	2 510 (25.3)	11 532 (29.4)
19-23 (Minor limitations)	5 112 (19.1)	468 (18.6)	2 451 (24.7)	8 031 (20.5)
24 (Total independence)	2 928 (10.9)	205 (8.2)	1 841 (18.6)	4 974 (12.7)
Missing, n (%)	1 479 (5.5)	138 (5.5)	344 (3.5)	1 961 (5.0)
Elixhauser Comorbidity Index, Mean (SD)	6.9 (2.1)	6.8 (2.1)	6.3 (2.0)	6.7 (2.1)
Median (IQR)	7 (5-8)	7 (5-8)	6 (5-8)	7 (5-8)

HH: Home health; PAC: Post-acute care facility; AM-PAC: activity measure for post-acute care; DC: Discharge; LOS: length of stay; ICU: intensive care unit

^aincluding patients who died within 30 days without a readmission preceding the event (n=1 298)

^bconditional on ICU use

Table S5. Full model*: Outcome readmission at 30 days (N=25 500).

Variable	Odds Ratio	2.50%	97.50%	P-value
Concordant	1.00	---	---	---
Discordant	1.12	1.04	1.20	0.002
Male	0.99	0.93	1.05	0.702
Race: White	1.00	---	---	---
Black	1.16	1.05	1.29	0.003
Other	0.75	0.54	1.04	0.086
Age: 18 - 55 years	1.00	---	---	---
56 - 65 years	1.02	0.88	1.17	0.815
66 - 75 years	0.98	0.84	1.14	0.788
76 - 85 years	1.02	0.88	1.18	0.833
>85 years	0.93	0.79	1.09	0.351
Marital Status: Not Married	1.00	---	---	---
Married	0.91	0.86	0.97	0.005
Insurance: Commercial	1.00	---	---	---
Medicare	1.07	0.99	1.16	0.068
Medicaid	1.14	0.98	1.33	0.088
Self-Pay	1.11	0.54	2.31	0.770
Other	0.82	0.61	1.11	0.193
Median Household Income Q1	1.00	---	---	---
Median Household Income Q2	1.00	0.91	1.09	0.999
Median Household Income Q3	1.09	1.00	1.19	0.042
Median Household Income Q4	1.14	1.05	1.25	0.003
Length of stay: 0-3 days	1.00	---	---	---
4-6 days	1.07	0.98	1.17	0.138
7-9 days	1.24	1.12	1.38	< 0.001
>9 days	1.34	1.19	1.50	< 0.001
Intensive Care Unit use	1.00	0.93	1.08	0.968
Severity of Illness: minor	1.00	---	---	---
moderate	1.01	0.76	1.35	0.952
major	1.16	0.86	1.55	0.328
extreme	1.23	0.90	1.67	0.189
Risk of Mortality: minor	1.00	---	---	---
moderate	0.87	0.55	1.40	0.575
major	0.94	0.59	1.51	0.807
extreme	0.96	0.59	1.55	0.864

**controlling for demographics, insurance, median income, comorbidities, length of stay, ICU use, mortality risk, illness severity, AM-PAC mobility scores only, total visits from physical and occupational therapy*

Table S5. Full model*: Outcome readmission at 30 days (N=25 500) (continued)

Variable	Odds Ratio	2.50%	97.50%	P-value
Comorbidities				
Peripheral Vascular Disease	1.09	1.02	1.17	0.013
Chronic Pulmonary Disease	1.10	1.04	1.18	0.002
Diabetes (complicated)	1.10	1.02	1.17	0.009
Renal Failure	1.19	1.11	1.27	< 0.001
Liver Disease	1.10	0.98	1.24	0.105
Coagulopathy	1.07	0.97	1.17	0.161
Obesity	0.96	0.89	1.04	0.331
Blood loss anemia	1.02	0.82	1.26	0.875
Alcohol Abuse	0.82	0.69	0.98	0.030
Drug Abuse	1.04	0.85	1.28	0.695
Depression	1.06	0.99	1.14	0.094
Neurological Disorder	0.89	0.82	0.97	0.007
Cancer	1.25	1.12	1.39	< 0.001
Elixhauser comorbidity index:				
0-3 comorbidities	1.00	---	---	---
4-5 comorbidities	1.21	1.02	1.45	0.034
6-7 comorbidities	1.20	1.00	1.43	0.051
8+ comorbidities	1.44	1.18	1.75	< 0.001
AM-PAC mobility: 6: total assist				
7-13: major limitations	1.07	0.94	1.22	0.310
14-18: moderate limitations	1.11	0.97	1.27	0.127
19-23: minor limitations	1.00	0.87	1.15	0.959
24: total independence	0.90	0.77	1.04	0.153
<i>missing</i>	0.30	0.23	0.38	< 0.001
1-3 therapist visits				
4-6 therapist visits	0.93	0.86	1.00	0.055
7 or more therapist visits	0.92	0.84	1.02	0.100
Constant	0.16	0.09	0.28	< 0.001
Hospital Variance	0.0027	0.0004	0.02	---

controlling for demographics, insurance, median income, comorbidities, length of stay, ICU use, mortality risk, illness severity, AM-PAC mobility scores only, total visits from physical and occupational therapy

Table S6. Sensitivity Analyses: Comparing discordance classifications on 30-day readmission outcome*

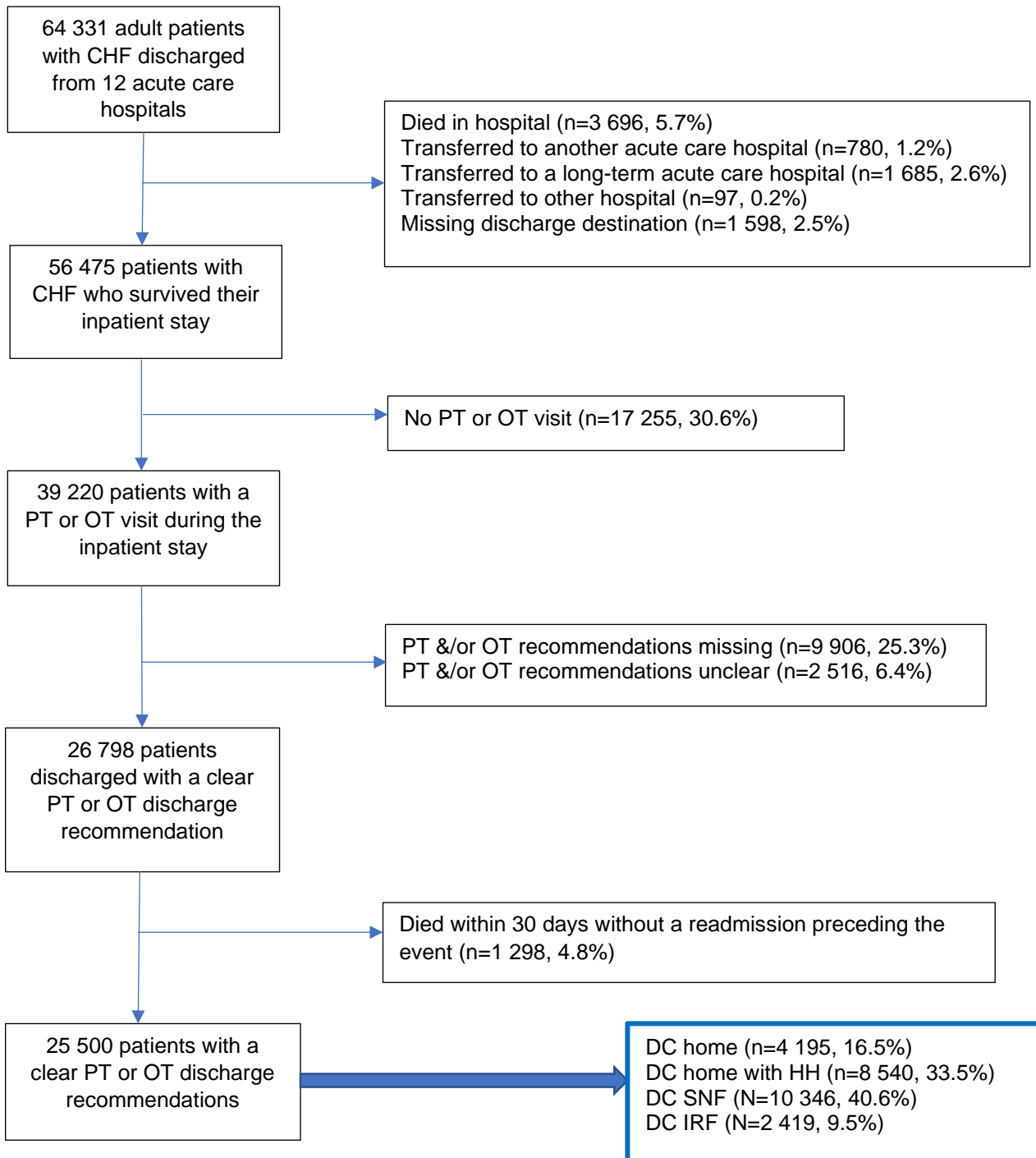
		30-Day readmission											
		Full Model				Mobility - Low			Mobility - High				
		ODDS RATIO	95% CI		P-value	ODDS RATIO	95% CI		P-value	ODDS RATIO	95% CI		P-value
Concordant		1.00	-	-	-	1.00	-	-	-	1.00	-	-	-
Discordance models	3-level, less# (Final model) n=25 500	1.12	1.04	1.20	0.002	1.20	1.08	1.33	0.001	1.10	0.99	1.22	0.064
	3-level, less# (with post-discharge deaths)@, n= 26 798	1.07	1.00	1.15	0.058	1.11	1.01	1.23	0.036	1.08	0.98	1.19	0.125
	3-level, less# (excluding all imputed missing variables), n= 24 508	1.13	1.05	1.22	0.001	1.16	1.04	1.29	0.006	1.07	0.97	1.19	0.162
	4-level, less#, n=25 500	1.06	0.99	1.13	0.089	1.13	1.03	1.24	0.011	1.01	0.92	1.11	0.820
	3-level, less# (primary diagnosis CHF only), n=4 480	1.18	1.01	1.039	0.038	1.12	0.87	1.45	0.370	1.27	1.03	1.57	0.026

*controlling for demographics, insurance, median income, comorbidities, length of stay, ICU use, mortality risk, illness severity, AM-PAC mobility scores only, total visits from physical and occupational therapy

#Less= actual discharge setting is discordant when setting is less intensive than therapist recommendation

@outcome: readmission or death

Figure S1. Cohort Diagram.



CHF, Congestive Heart Failure; PT, physical therapist; OT, occupational therapist; DC, discharge; HH, home health; SNF, skilled nursing facility; IRF, inpatient rehabilitation facility