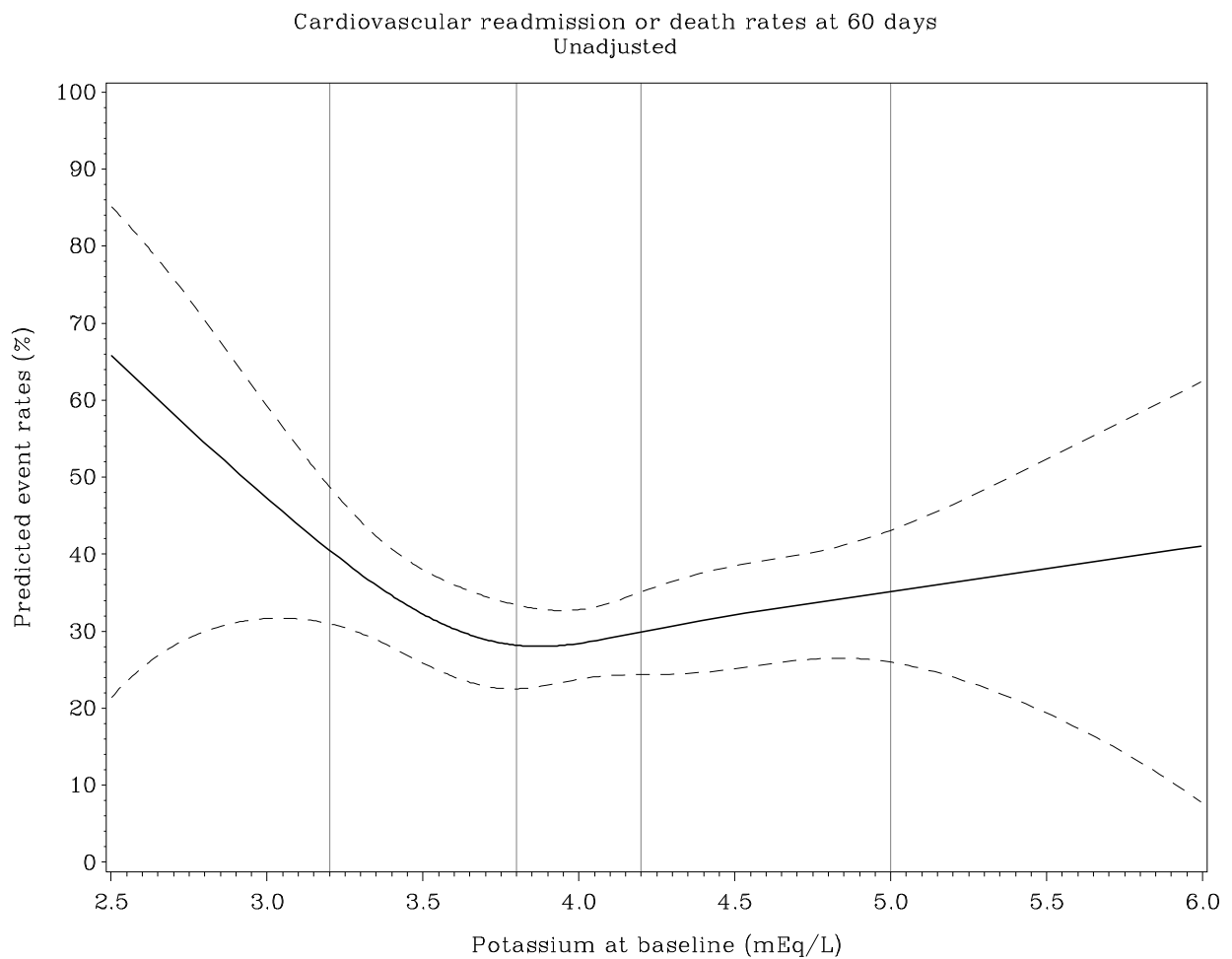


31. Kociol RD, Horton JR, Fonarow GC, Reyes EM, Shaw LK, O'Connor CM, Felker GM, Hernandez AF. Admission, discharge, or change in B-type natriuretic peptide and long-term outcomes: data from Organized Program to Initiate Lifesaving Treatment in Hospitalized Patients with Heart Failure (OPTIMIZE-HF) linked to Medicare claims. *Circ Heart Fail* [Internet]. 2011 [cited 2015 Jan 5];4:628–36. Available from: <http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=3465672&tool=pmcentrez&rendertype=abstract>

Supplemental Materials

Cardiovascular readmission/death at 60 days and serum potassium at baseline



Supplemental Table 1: Summary statistics by ACEI/ARB use

	Never taking ACE/ARB (N=291)	Started ACE/ARB (N=51)	Stopped ACE/ARB (N=92)	Always taking ACE/ARB (N=313)	p-value
Demographics					
Age, years	69 (60, 78)	71 (65, 79)	70 (62, 79)	67 (56, 77)	0.0201
Male sex	215 (73.9)	35 (68.6)	73 (79.3)	226 (72.2)	0.4702
White race	232 (79.7)	44 (86.3)	68 (73.9)	204 (65.2)	0.0001
Clinical History					
Ejection fraction, %	40 (22, 55)	33 (22, 53)	33 (20, 55)	25 (20, 40)	<0.0001
Ejection fraction <50%	176 (60.9)	34 (68.0)	61 (67.0)	249 (80.6)	<0.0001
Hospitalization for HF in last year	216 (75.0)	36 (72.0)	57 (62.6)	224 (72.5)	0.1519
Ischemia as cause of HF	187 (64.3)	25 (49.0)	53 (57.6)	166 (53.0)	0.0234
Hypertension	233 (80.1)	37 (72.5)	74 (80.4)	267 (85.3)	0.1018
Atrial fibrillation / flutter	174 (59.8)	30 (58.8)	47 (51.1)	160 (51.1)	0.1399
Diabetes	169 (58.1)	28 (54.9)	60 (65.2)	166 (53.0)	0.1936
ICD	100 (34.4)	20 (39.2)	42 (45.7)	124 (39.6)	0.2347
TIA	19 (6.5)	5 (9.8)	4 (4.3)	29 (9.3)	0.3292
Stroke	38 (13.1)	6 (11.8)	6 (6.5)	34 (10.9)	0.3802
Hyperlipidemia	212 (72.9)	36 (70.6)	75 (81.5)	222 (70.9)	0.2385
Peripheral vascular disease	52 (17.9)	11 (21.6)	16 (17.4)	40 (12.8)	0.2128
COPD	83 (28.5)	13 (25.5)	20 (21.7)	81 (25.9)	0.6216
Arrhythmia	190 (65.3)	31 (60.8)	58 (63.0)	169 (54.0)	0.0373
Current smoking or quit <6m ago	39 (13.4)	2 (3.9)	10 (10.9)	65 (20.8)	0.0025
Chronic alcohol use	22 (7.6)	2 (3.9)	7 (7.6)	29 (9.3)	0.5890
Gout	93 (32.0)	18 (35.3)	20 (21.7)	64 (20.4)	0.0037
Hepatic disease	16 (5.5)	1 (2.0)	2 (2.2)	13 (4.2)	0.5445
Malignancy	21 (7.2)	4 (7.8)	9 (9.8)	18 (5.8)	0.5872
Depression	67 (23.0)	10 (19.6)	10 (10.9)	73 (23.3)	0.0629
Trial					<0.0001
CARRESS	82 (28.2)	13 (25.5)	21 (22.8)	51 (16.3)	
DOSE	84 (28.9)	23 (45.1)	29 (31.5)	160 (51.1)	
ROSE	125 (43.0)	15 (29.4)	42 (45.7)	102 (32.6)	
NYHA classification					0.8316
I-II	9 (3.4)	0 (0)	5 (5.7)	10 (3.3)	
III	169 (63.1)	31 (70.5)	56 (63.6)	184 (62.0)	
IV	90 (33.6)	13 (29.5)	27 (30.7)	103 (34.7)	
Medications (Baseline)					
Hydralazine	73 (25.1)	8 (15.7)	8 (8.7)	48 (15.3)	0.0008

	Never taking ACE/ARB (N=291)	Started ACE/ARB (N=51)	Stopped ACE/ARB (N=92)	Always taking ACE/ARB (N=313)	p-value
Nitrates	93 (32.0)	11 (21.6)	19 (20.7)	89 (28.4)	0.1271
Beta-blocker	220 (75.6)	40 (78.4)	78 (84.8)	274 (87.5)	0.0015
Aldosterone antagonist	72 (24.7)	8 (15.7)	32 (34.8)	91 (29.1)	0.0567
Digoxin	62 (21.3)	12 (23.5)	24 (26.1)	91 (29.1)	0.1771
Aspirin	195 (67.0)	39 (76.5)	60 (65.2)	216 (69.0)	0.5180
Warfarin	111 (38.1)	28 (54.9)	42 (45.7)	133 (42.5)	0.1221
Clinical Assessment (Baseline)					
Body mass index, kg/m ²	30.7 (26.8, 36.5)	32.0 (27.5, 40.7)	31.7 (27.8, 38.4)	32.5 (26.5, 38.9)	0.3604
Weight, kg	90 (78, 110)	96 (77, 124)	94 (85, 116)	95 (79, 116)	0.2261
Systolic blood pressure, mmHg	114 (102, 124)	115 (108, 126)	110 (100, 125)	117 (105, 132)	0.0045
Diastolic blood pressure, mmHg	64 (58, 72)	67 (59, 73)	61 (56, 72)	68 (60, 79)	0.0030
Heart rate, beats/min	75 (68, 85)	73 (68, 82)	76 (65, 87)	75 (67, 85)	0.9634
Edema ≥ 2+	239 (82.4)	42 (82.4)	69 (75.0)	233 (74.7)	0.0950
JVP ≥ 8 cm water	257 (93.5)	46 (97.9)	86 (97.7)	282 (94.0)	0.3874
Orthopnea	253 (90.7)	45 (95.7)	79 (90.8)	275 (91.4)	0.7211
Rales	171 (59.4)	29 (58.0)	49 (54.4)	169 (54.0)	0.5795
S3 auscultation	71 (25.1)	11 (21.6)	19 (20.9)	62 (20.3)	0.5467
SpO ₂	96 (94, 98)	96 (95, 98)	97 (95, 98)	97 (95, 98)	0.2440
Self-assessment (Baseline)					
Global VAS	50 (32, 67)	42 (16, 60)	47 (27, 60)	50 (30, 67)	0.0846
Dyspnea VAS	56 (33, 80)	50 (25, 70)	49 (30, 72)	51 (33, 74)	0.1502
Laboratories (Baseline)					
Sodium, mg/L	138 (135, 140)	139 (136, 141)	138 (136, 141)	138 (136, 141)	0.3631
Potassium, mEq/L	4.0 (3.6, 4.3)	4.05 (3.7, 4.3)	4.1 (3.8, 4.5)	4.0 (3.7, 4.3)	0.2422
Bicarbonate, mEq/L	28 (25, 31)	29 (26, 31)	28 (25, 30)	28 (25, 30)	0.2175
Hemoglobin, g/dL	11.0 (9.8, 11.9)	10.6 (9.7, 12.2)	11.8 (10.2, 12.8)	11.8 (10.5, 13.2)	<0.0001
Blood urea nitrogen, mg/dl	45 (30, 64)	38 (28, 50)	48 (31, 61)	31 (21, 46)	<0.0001
GFR, mL/min/1.73m ²	36.7 (27.2, 48.7)	38.0 (31.1, 55.5)	37.2 (29.4, 47.6)	50.7 (37.3, 62.5)	<0.0001
Serum creatinine, mg/dl	1.90 (1.50, 2.40)	1.80 (1.30, 2.10)	1.93 (1.50, 2.35)	1.50 (1.20, 1.88)	<0.0001
NT-proBNP, pg/ml	6379 (2483, 12724)	4627 (2161, 11331)	4339 (1715, 9005)	4141 (2239, 9177)	0.0051
Serum aldosterone, pg/ml	290 (152, 514)	220 (149, 401)	179 (93, 309)	162 (94, 278)	<0.0001
Cystatin C, mg/L	1.95 (1.58, 2.40)	1.62 (1.37, 2.22)	1.87 (1.49, 2.31)	1.48 (1.18, 1.93)	<0.0001
Uric acid, mg/dL	10.5 (8.5, 12.0)	9.5 (8.3, 11.3)	10.7 (8.6, 13.1)	9.7 (8.1, 11.3)	0.0211
Plasma renin activity, ng/mL/hr	5.6 (1.6, 14.5)	3.19 (0.95, 8.69)	5.9 (1.0, 16.6)	3.9 (0.5, 18.6)	0.4515
Days from randomization to discharge	7 (5, 12)	6 (4, 10)	7 (5, 14)	5 (4, 7)	<0.0001

	Never taking ACE/ARB (N=291)	Started ACE/ARB (N=51)	Stopped ACE/ARB (N=92)	Always taking ACE/ARB (N=313)	p-value
Clinical Assessment (Discharge/Day 7)					
Edema ≥2	75 (26.8)	16 (32.0)	30 (34.5)	61 (20.7)	0.0344
JVP ≥ 8 cm water	157 (60.6)	25 (61.0)	54 (68.4)	107 (42.1)	<0.0001
Heart rate	73 (66, 84)	72 (65, 84)	74 (64, 86)	72 (65, 82)	0.8385
Systolic blood pressure, mmHg	109 (98, 123)	112 (102, 134)	108 (99, 125)	112 (100, 128)	0.1630
Diastolic blood pressure, mmHg	60 (54, 68)	62 (55, 70)	60 (55, 69)	62 (56, 72)	0.0334
Weight, kg	83 (72, 103)	90 (73, 120)	87 (77, 110)	89 (75, 111)	0.0775
BMI, kg/m ²	28.5 (24.4, 34.1)	30.9 (25.6, 39.7)	30.5 (25.1, 36.3)	30.2 (24.8, 36.9)	0.2242
Orthopnea	169 (66.5)	28 (68.3)	52 (69.3)	177 (68.9)	0.9399
Orthoedema score					0.0487
0	145 (51.8)	27 (54.0)	37 (42.5)	178 (59.7)	
1	25 (8.9)	7 (14.0)	15 (17.2)	28 (9.4)	
2	63 (22.5)	7 (14.0)	22 (25.3)	62 (20.8)	
3	34 (12.1)	6 (12.0)	7 (8.0)	25 (8.4)	
4	13 (4.6)	3 (6.0)	6 (6.9)	5 (1.7)	
SpO ₂	96 (95, 98)	97 (96, 98)	96 (95, 98)	97 (95, 98)	0.5260
Medications (Discharge/Day 7)					
Hydralazine	88 (30.2)	7 (13.7)	19 (20.7)	47 (15.0)	<0.0001
Nitrates	97 (33.3)	12 (23.5)	28 (30.4)	94 (30.0)	0.5274
Beta-blocker	210 (72.2)	41 (80.4)	73 (79.3)	273 (87.2)	0.0001
Aldosterone antagonist	77 (26.5)	13 (25.5)	27 (29.3)	111 (35.5)	0.0882
Digoxin	65 (22.3)	15 (29.4)	26 (28.3)	102 (32.6)	0.0467
Aspirin	213 (73.2)	39 (76.5)	59 (64.1)	225 (71.9)	0.3209
Warfarin	124 (42.6)	27 (52.9)	36 (39.1)	138 (44.1)	0.4399
Laboratories (Discharge/Day7)					
Sodium, mg/L	137 (134, 139)	138 (136, 141)	137 (134, 140)	137 (135, 140)	0.0208
Potassium, mEq/L	4.0 (3.7, 4.3)	4.0 (3.8, 4.3)	4.1 (3.7, 4.4)	4.1 (3.8, 4.4)	0.0139
BUN, mg/dL	51 (34, 72)	44 (32, 65)	57 (36, 72)	36 (26, 53)	<0.0001
Bicarbonate, mEq/L	29 (27, 32)	29 (27, 32)	29 (27, 32)	29 (27, 32)	0.9722
Creatinine, mg/dL	1.90 (1.49, 2.50)	1.70 (1.40, 2.10)	1.93 (1.60, 2.40)	1.54 (1.20, 1.91)	<0.0001
GFR	35.5 (25.7, 48.7)	37.7 (30.6, 49.3)	35.7 (27.6, 44.9)	46.8 (35.4, 65.5)	<0.0001

Supplemental Table 2: Baseline Characteristics – Overall and by timing of readmission/death

	Overall	Readmission / death ≤ 30d of discharge (N=195)	Readmission / death 31-60d of discharge (N=89)	No readmission / death (N=460)
Demographics				
Age, years	69 (60, 78)	68 (58, 77)	71 (63, 79)	69 (60, 79)
Sex, Male	559 (75.1)	140 (71.8)	65 (73.0)	354 (77.0)
White race	554 (74.5)	144 (73.8)	61 (68.5)	349 (75.9)
Clinical History				
Ejection fraction, %	30 (20, 53)	28.5 (20.0, 51.0)	32.5 (23.0, 50.0)	32 (20, 55)
Ejection fraction <50%	516 (70.0)	136 (70.8)	65 (73.9)	315 (68.9)
Hospitalization for HF in last year,	524 (71.2)	150 (77.7)	71 (81.6)	303 (66.4)
Ischemia as cause of HF,	438 (58.9)	122 (62.6)	48 (53.9)	268 (58.3)
Hypertension	611 (82.1)	154 (79.0)	73 (82.0)	384 (83.5)
Atrial fibrillation / flutter	412 (55.4)	107 (54.9)	47 (52.8)	258 (56.1)
Diabetes	419 (56.3)	113 (57.9)	58 (65.2)	248 (53.9)
ICD	294 (39.5)	76 (39.0)	42 (47.2)	176 (38.3)
TIA	57 (7.7)	13 (6.7)	7 (7.9)	37 (8.0)
Stroke	80 (10.8)	14 (7.2)	13 (14.6)	53 (11.5)
Hyperlipidemia	556 (74.7)	149 (76.4)	69 (77.5)	338 (73.5)
Peripheral vascular disease	114 (15.3)	34 (17.4)	12 (13.5)	68 (14.8)
Chronic obstructive pulmonary disease	201 (27.0)	61 (31.3)	24 (27.0)	116 (25.2)
Arrhythmia	451 (60.6)	121 (62.1)	52 (58.4)	278 (60.4)
Current smoking or quit <6m ago	117 (15.7)	30 (15.4)	16 (18.0)	71 (15.4)
Chronic alcohol use	58 (7.8)	11 (5.6)	7 (7.9)	40 (8.7)
Gout	206 (27.7)	53 (27.2)	33 (37.1)	120 (26.1)
Hepatic disease	33 (4.4)	7 (3.6)	7 (7.9)	19 (4.1)
Malignancy	50 (6.7)	12 (6.2)	2 (2.2)	36 (7.8)
Depression	163 (21.9)	51 (26.2)	22 (24.7)	90 (19.6)
NYHA classification				
I - II	28 (4.0)	5 (2.8)	1 (1.2)	22 (5.1)
III	442 (63.6)	111 (61.7)	51 (60.7)	280 (65.0)
IV	225 (32.4)	64 (35.6)	32 (38.1)	129 (29.9)
Medications				
ACE inhibitor or ARB	400 (53.8)	79 (40.5)	43 (48.3)	278 (60.4)
Hydralazine	136 (18.3)	32 (16.4)	18 (20.2)	86 (18.7)
Nitrates	208 (28.0)	50 (25.6)	33 (37.1)	125 (27.2)
Beta-blocker	617 (82.9)	148 (75.9)	79 (88.8)	390 (84.8)
Aldosterone antagonist	208 (28.0)	54 (27.7)	33 (37.1)	121 (26.3)
Digoxin	187 (25.1)	56 (28.7)	25 (28.1)	106 (23.0)
Aspirin	497 (66.8)	129 (66.2)	58 (65.2)	310 (67.4)
Warfarin	320 (43.0)	78 (40.0)	42 (47.2)	200 (43.5)

Clinical Assessment				
Body mass index, kg/m ²	31.3 (26.8, 37.7)	30.6 (26.2, 36.6)	30.5 (25.9, 37.3)	31.7 (27.2, 38.0)
Weight, kg	92 (79, 114)	91 (78, 113)	91 (77, 112)	93 (79, 114)
Systolic blood pressure, mmHg	114 (104, 127)	113 (102, 124)	112 (100, 128)	116 (106, 130)
Diastolic blood pressure, mmHg	66 (59, 74)	63 (58, 72)	65 (58, 71)	67 (59, 76)
Heart rate, beats/min	75 (66, 84)	77 (69, 88)	74 (63, 79)	74 (65, 84)
Edema ≥ 2+	572 (77.1)	156 (80.0)	76 (85.4)	340 (74.2)
JVP ≥ 8 cm water	668 (94.2)	177 (95.2)	79 (92.9)	412 (94.1)
Orthopnea	645 (90.6)	175 (92.6)	74 (90.2)	396 (89.8)
Rales	408 (55.1)	104 (53.3)	45 (51.1)	259 (56.7)
S3 auscultation	160 (21.9)	41 (21.2)	22 (25.0)	97 (21.6)
SpO ₂	96 (94, 98)	97 (94, 98)	97 (94, 98)	96 (94, 98)
Self-assessment				
Global VAS	50 (30, 67)	50 (30, 65)	52 (40, 63)	50 (30, 69)
Dyspnea VAS	54 (33, 77)	53 (32, 75)	50 (38, 71)	55 (34, 78)
Laboratories				
Sodium, mg/L	138 (136, 141)	137 (135, 140)	139 (136, 140)	139 (136, 141)
Potassium, mEq/L	4 (3.7, 4.3)	4.0 (3.6, 4.4)	4.0 (3.6, 4.3)	4.0 (3.7, 4.3)
Bicarbonate, mEq/L	28 (25, 30)	28 (25, 31)	27 (24, 30)	28 (25, 30)
Hemoglobin, g/dL	11.3 (10.2, 12.7)	11.1 (10.0, 12.4)	10.9 (10.0, 12.4)	11.6 (10.3, 12.9)
Blood urea nitrogen, mg/dl	38 (26, 53)	45 (29, 56)	42 (30, 55)	34 (25, 48)
GFR, mL/min/1.73m ²	41.3 (31.1, 55.2)	38.4 (29.9, 52.5)	40.7 (29.4, 54.5)	43.7 (32.7, 57.2)
Serum creatinine, mg/dl	1.7 (1.36, 2.15)	1.81 (1.43, 2.25)	1.76 (1.47, 2.15)	1.65 (1.31, 2.09)
NT-proBNP, pg/ml	4503 (2315, 10150)	5073 (2587, 11397)	5773 (2331, 10120)	4209 (2069, 9750)
Serum aldosterone, pg/ml	200 (108, 356)	253 (117, 401)	200 (117, 309)	169 (102, 325)
Cystatin C, mg/L	1.7 (1.36, 2.18)	1.86 (1.41, 2.30)	1.80 (1.43, 2.26)	1.63 (1.33, 2.11)
Uric acid, mg/dL	9.9 (8.1, 11.8)	10.1 (8.6, 11.8)	10.4 (8.7, 12.0)	9.7 (8.0, 11.5)
Plasma renin activity	4.9 (0.9, 15.9)	9.6 (1.5, 26.0)	3.47 (0.78, 9.18)	3.4 (0.9, 13.1)

Values are presented as median (25th percentile, 75th percentile) for continuous variables and number (%) for frequencies.

Supplemental Table 3: Discharge / Day 7 Characteristics – Overall and by timing of readmission/death

	Overall	Readmission / death ≤ 30d of discharge (N=195)	Readmission / death 31-60d of discharge (N=89)	No readmission / death (N=460)
Days from Randomization to Discharge	6 (4,9)	7 (4, 11)	6 (4, 9)	6 (4, 8)
Clinical Assessment (Discharge / Day 7)				
Edema ≥2	168 (23.7)	48 (25.9)	21 (24.4)	99 (22.6)
JVP ≥ 8 cm water	330 (51.9)	90 (52.9)	46 (60.5)	194 (49.7)
Heart rate	72.5 (65, 83)	75.0 (65.5, 87.0)	72 (66, 80)	72 (65, 82)
SBP (mmHg)	110 (100, 125)	108 (98, 123)	109 (98, 123)	112 (100, 128)
DBP (mmHg)	61 (56, 70)	60.0 (56.0, 68.5)	60 (54, 69)	62 (56, 70)
Weight (kg)	86 (74, 109)	85 (73, 105)	86 (72, 106)	87 (74, 109)
BMI (kg/m ²)	29.5 (24.8, 36.1)	28.9 (25.1, 34.2)	29.0 (24.0, 35.6)	29.8 (24.9, 36.5)
Orthopnea	417 (66.1)	113 (66.5)	48 (60.8)	256 (67.0)
Orthoedema score				
0	405 (56.8)	102 (54.5)	48 (55.8)	255 (58.0)
1	70 (9.8)	18 (9.6)	7 (8.1)	45 (10.2)
2	148 (20.8)	39 (20.9)	17 (19.8)	92 (20.9)
3	63 (8.8)	19 (10.2)	9 (10.5)	35 (8.0)
4	27 (3.8)	9 (4.8)	5 (5.8)	13 (3.0)
SpO ₂ , %	96 (95, 98)	96 (95, 98)	97 (95, 99)	96 (95, 98)
Medications (Discharge)				
ACE inhibitor or ARB	334 (49.0)	67 (37.6)	34 (41.0)	233 (55.3)
Hydralazine	146 (21.4)	37 (20.8)	23 (27.7)	86 (20.4)
Nitrates	215 (31.5)	46 (25.8)	34 (41.0)	135 (32.1)
Beta-blocker	549 (80.5)	135 (75.8)	67 (80.7)	347 (82.4)
Aldosterone antagonist	218 (32.0)	50 (28.1)	31 (37.3)	137 (32.5)
Digoxin	189 (27.7)	49 (27.5)	24 (28.9)	116 (27.6)
Aspirin	491 (72.0)	125 (70.2)	59 (71.1)	307 (72.9)
Warfarin	302 (44.3)	77 (43.3)	34 (41.0)	191 (45.4)
Laboraties (Discharge / Day 7)				
Sodium, mg/L	137 (135, 140)	137 (134, 139)	137 (135, 140)	137 (135, 140)
Potassium mEq/L	4 (3.8, 4.4)	4.1 (3.7, 4.4)	4.1 (3.8, 4.3)	4.0 (3.8, 4.4)
Blood urea nitrogen, mg/dl	44 (30, 63)	47.5 (31.0, 64.5)	51 (34, 68)	41 (29, 59)
Bicarbonate, mEq/L	29 (27, 32)	30 (27, 32)	29.0 (26.5, 32.0)	29 (27, 32)
Serum creatinine, mg/dl	1.72 (1.38, 2.17)	1.70 (1.40, 2.30)	1.77 (1.47, 2.20)	1.70 (1.33, 2.10)
GFR, mL/min/1.73m ²	40.6 (31.4, 53.7)	41.4 (29.0, 52.0)	38.9 (31.4, 49.2)	40.6 (32.1, 55.5)

Values are presented as median (25th percentile, 75th percentile) for continuous variables and number (%) for frequencies.