Supplemental Material

Pandey A, Golwala H, Sheng S, et al. Factors associated with and prognostic implications of cardiac troponin elevation in decompensated heart failure with preserved ejection fraction: findings from the American Heart Association Get With The Guidelines–Heart Failure program. *JAMA Cardiol*. Published online December 28, 2016.
doi: 10.1001/jamacardio.2016.4726

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This supplementary material has been provided by the authors to give readers additional information about their work.

eMethods: Candidate factors for adjustment in the logistic regression model evaluating the significant clinical factors associated with abnormal troponin elevation:

- Demographics: age (linear spline with knot at 70) , sex, race, smoking, BMI
- Medical history: CAD, diabetes, hypertension, ischemic history (history of MI, CAD, PCI, CABG or prior PCI/CABG undetermined)
- Exams/labs at admission: BNP level, systolic blood pressure(linear splines with knot at 150), heart rate, creatinine, QRS duration in EKG (linear splines with knot at 120)

eTable 1: Comparison of baseline demographic, clinical characteristics and in-hospital outcomes among HFpEF patients with vs. without troponin assessment during the study period

Participant Characteristics	HFpEF patients with troponin assessment (N = 34,233)	HFpEF patients without troponin assessment (N = 62,536)	Absolute standardized difference
Demographic Characteristics			
Age, years	79 (68 – 86)	79 (68 – 86)	1.82
Women	66.6	63.9	5.62
Blacks	12.2	13.8	4.83
Medical History			
Coronary artery disease	44.4	42.6	3.74
Diabetes	44.1	41.2	5.83
Hypertension	85.3	79.5	15.5
Prior Myocardial infarction	15.2	12.8	7.11
Presentation Characteristics			
Systolic Blood Pressure	145 (126 – 166)	142 (124 – 163)	7.51
Heart Rate	81 (70 – 95)	80 (69 – 93)	7.41
BNP levels	519 (265 – 944)	447 (224 – 864)	10.75
EGFR on admission	53.9 (40.3 – 73.5)	54.3 (40.3 – 74.4)	1.62
In-Hospital Management & Procedures			
Mechanical Ventilation	3.36	2.14	7.45
Right Heart Cath	1.73	2.34	4.34
Vasodilator use	9.83	5.22	17.6
In-hospital Outcomes			
In-hospital mortality	2.32	2.46	0.95
Length of stay (days)	4 (3 - 6)	4 (3 - 6)	1.68
Discharge home (yes)	70.52	71.42	1.99

Data presented as median & interquartile range or %. EGFR: Estimated glomerular filtration rate; BNP: Brain natriuretic peptide
Absolute standardized differences greater than 10 were considered as significant

eTable 2: Baseline characteristics of study participants with available Troponin-I levels measurements according to quartiles of Troponin-I

	Troponin-I Quartile 1	Troponin-I Quartile 2	Troponin-I Quartile 3	Troponin-I Quartile 4	P-value
Age	76 (65 – 85)	78 (67 – 86)	80 (69 – 87)	81 (71 – 87)	<0.0001
Women	68.99	66.91	65.41	65.71	0.0002
Ethnicity Whites Blacks Hispanics Asian	 75.60 9.83 11.16 1.05	 75.16 12.21 7.75 1.44	 76.50 12.73 6.98 1.40	 77.90 10.81 7.58 1.35	<0.0001
Coronary artery disease	41.06	42.33	46.14	47.30	<.0001
Hypertension	86.10	85.04	84.57	85.60	0.1011
Diabetes	45.88	45.45	43.85	41.32	< .0001
Renal Insufficiency	7.92	9.62	13.25	10.19	< .0001
Smoking	12.98	12.34	11.77	12.19	0.2793
Previous MI	13.19	13.69	15.33	17.70	< .0001
BMI	30.02 (25.4 – 38.0)	29.38 (24.9 – 36.6)	28.90 (24.2 – 34.9)	28.65 (23.7 – 33.5)	< .0001
Systolic BP	144.00 (126 – 163)	146.00 (127 – 166)	145.00 (126 – 165)	144.00 (124 – 168)	0.008
BNP	387.00 (193 – 708)	486.00 (267 – 819)	593.00 (331 -1040)	685.00 (386 – 1220)	< .0001
LVEF	60 (55 – 64)	60 (55 – 63)	58 (55 – 63)	58 (55 – 63)	
QRS on admission	93.00 (84 – 110)	94.00 (84 – 116)	96.00 (85 –124)	97.00 (86 – 124)	< .0001
EGFR	59.13 (43.9 – 79.6)	55.07 (41.2 – 74.7)	51.19 (38.8 – 68.1)	49.78 (37.9 – 66.8)	< .0001

Data presented as median & interquartile range or %
BP: Blood pressure; BNP: Brain Natriuretic Peptide; BMI: Body mass index; EGFR: Estimated glomerular filtration rate; MI: Myocardial infarction; LVEF: Left ventricular ejection fraction

eTable 3: Adjusted association between troponin levels and length of stay measured as a continuous variable

	Adjusted Parameter estimate (95%CI)
Troponin (T or I) Categories	
Elevated vs. normal	0.56 (0.43 – 0.70)
P-value	< .0001
Troponin I Quartiles	
Q 2 vs. Q1	0.28 (0.12 – 0.43)
Q 3 vs. Q1	0.48 (0.33 – 0.64)
Q 4 vs. Q1	0.76 (0.60 – 0.93)
P-value	< .0001
Troponin-T Quartiles	
Q 2 vs. Q1	0.50 (0.16 – 0.84)
Q 3 vs. Q1	0.55 (0.32 – 0.78)
Q 4 vs. Q1	0.95 (0.51 – 1.39)
P-value	< .0001
Adjusted multivariable linear regression models were constructed with generalized estimating equations to account for in-hospital clustering is performed to examine associations of troponin elevation for each outcome. Factors for adjustment included year, demographic characteristics (age, sex, race, insurance status, cigarette smoking in the past year), medical history (systolic blood pressure on admission, anemia, ischemic heart disease, diabetes, hyperlipidemia, hypertension, atrial fibrillation), estimated glomerular filtration rate at presentation, BNP levels at presentation, and hospital characteristics: region, hospital type, number of beds, rural versus urban) Q: Quartiles	

eTable 4: Association between presence of elevated troponin levels with outcomes among participants without a history of myocardial infarction or coronary revascularization

	Multivariable adjusted Odds Ratio (95% CI)		
	In-hospital mortality	**Length of Stay (> 4 vs. ≤4 days)**	**Discharge home***
Troponin (T or I) Categories			
Elevated vs. normal	2.46 (2.07 – 2.91)	1.32 (1.21 – 1.42)	0.64 (0.59 - 0.69)
P-value	< .0001	< .0001	< .0001
Troponin I Quartiles			
Q 2 vs. Q1	1.61 (1.01- 2.54)	1.20 (1.07- 1.35)	0.80 (0.71- 0.89)
Q 3 vs. Q1	2.31 (1.46 - 3.67)	1.29 (1.14 - 1.45)	0.65 (0.57 - 0.73)
Q 4 vs. Q1	3.88 (2.55 - 5.91)	1.54 (1.38 - 1.71)	0.52 (0.46 - 0.6)
P-value	< .0001	< .0001	< .0001

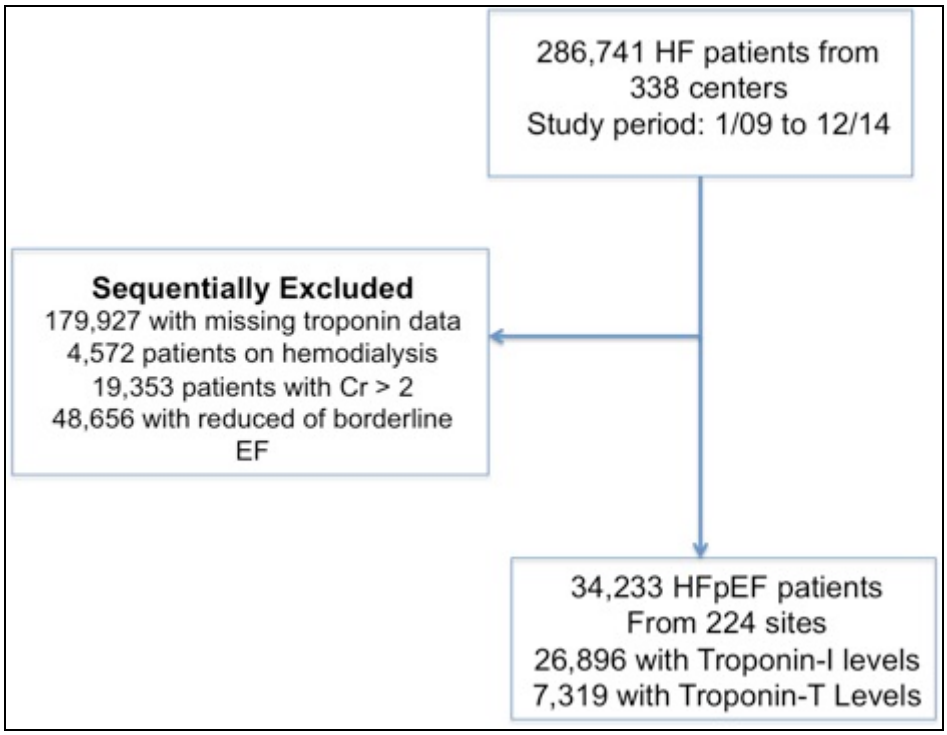
Adjusted multivariable logistic (for categorical outcomes) or linear (for continuous outcomes) regression models were constructed with generalized estimating equations to account for in-hospital clustering is performed to examine associations of troponin elevation for each outcome.
Adjusted multivariable logistic regression model with generalized estimating equations to account for in-hospital clustering is performed to examine associations of troponin elevation for each outcome.
Factors for adjustment included year, demographic characteristics (age, sex, race, insurance status, cigarette smoking in the past year), medical history (systolic blood pressure on admission, anemia, ischemic heart disease, diabetes, hyperlipidemia, hypertension, atrial fibrillation), hospital characteristics: region, hospital type, number of beds, rural versus urban)
*Defined as discharged to 'home' vs 'hospice-home', 'hospice-health care facility', 'other health care facility' and 'expired'.

eTable 5: Clinical characteristics, in-hospital management, and in-hospital outcomes among patients with heart failure with reduced ejection fraction stratified by the troponin levels (normal vs. abnormal)

Participant Characteristics	Elevated Troponin (N = 12,325)	Normal Troponin (N = 23,938)	Absolute Standardized difference
Troponin Level (ng/ml) Tn-I Tn-T	 0.12 (0.06 – 0.32) 0.08 (0.05 – 0.20)	 0.04 (0.02 – 0.07) 0.02 (0.01 – 0.03)	 25.35 4.00
Demographic Characteristics			
Age, years	71 (58 – 82)	70 (57 – 81)	7.33
Women	36.0	39.7	7.75
Medical History			
Coronary artery disease	53.0	52.0	2.05
Diabetes	41.1	41.5	0.84
Hypertension	79.9	78.1	4.40
Prior Myocardial infarction	29.7	26.1	8.11
In-hospital procedures			
CABG	0.92	0.41	6.18
PCI	0.58	0.36	3.20
Right heart Cath	4.53	4.25	1.55
Mechanical Ventilation	5.47	2.77	14.24
In-hospital outcomes			
In-hospital mortality	3.45	1.58	12.01
Length of stay	4 (3 – 7)	4 (3 – 6)	6.83
Discharge home	75.9	82.2	15.36

Data presented as median & interquartile range or %. EGFR: Estimated glomerular filtration rate; ACEi/ARB: Angiotensin converting enzyme inhibitor/Angiotensin receptor blocker; CABG: coronary artery bypass graft; PCI: Percutaneous coronary intervention

eFigure 1: Derivation of the study cohort. HFpEF: Heart failure with preserved ejection Fraction, LVEF: Left ventricular ejection fraction



eFigure 2: Adherence to GWTG-HF process of care measure applicable to patients with Heart Failure and preserved ejection fraction among study participants stratified by baseline troponin levels (normal vs. abnormal). BP: Blood pressure, HFpEF: Heart failure with preserved ejection fraction