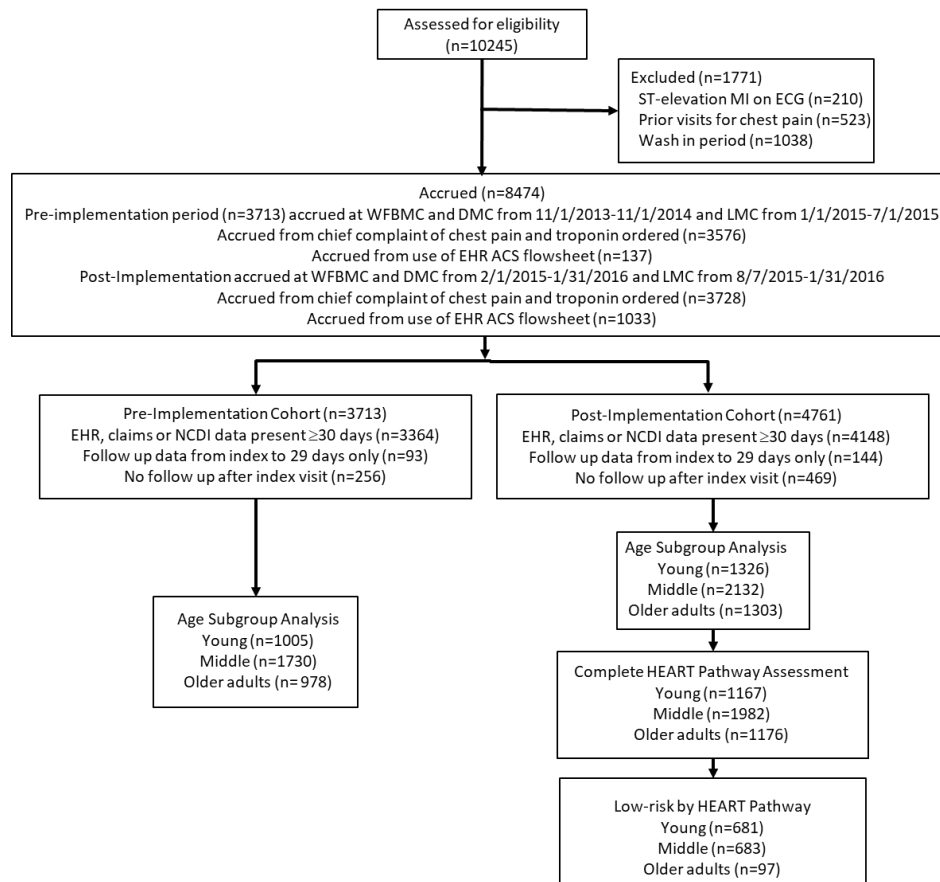**Supplemental Figure 1.** The HEART Pathway algorithm.

Supplemental Figure 2. The participant flow diagram.

Supplemental Table 1. Individual components of the HEART Pathway in the post-implementation cohort by age for patients with a complete HEART Pathway assessment.

HEART Pathway Components	Older adult (≥ 65 years) N=1176 n (%)	Middle-aged (46-64 years) N=1982 n (%)	Young (21-45 years) N=1167 n (%)	*p* value
Ischemic ECG	93 (7.9)	124 (6.3)	56(4.8)	0.008
CAD	349 (29.7)	273 (13.8)	42 (3.6)	<.001
History				<.001
0	321 (27.3)	600 (30.3)	505 (43.3)	
1	240 (20.4)	636 (32.1)	388 (33.2)	
2	122 (10.4)	320 (16.1)	161 (13.8)	
ECG				<.001
0	371 (31.5)	1067 (53.8)	775 (66.4)	
1	309 (26.3)	488 (24.6)	279 (23.9)	
Age				<.001
0	1 (0.1)	5 (0.3)	1040 (89.1)	
1	1 (0.1)	1545 (78.0)	9 (0.8)	
2	647 (55.0)	2 (0.1)	2 (0.2)	
Risk factors				<.001
0	65 (5.5)	1427.2)	167 (14.3)	
1	326 (27.7)	767 (38.7)	608 (52.1)	
2	274 (23.3)	622(31.4)	265 (22.7)	
Elevated Troponin (s)	332 (28.2)	308 (15.5)	98 (8.4)	<.001

ECG – electrocardiogram, CAD – coronary artery disease

Supplemental Table 2. Safety events at 30-days among low-risk patients by age group.

	Age (Years)	Sex	Race	Comorbidities	Site	HEAR Score	Event
Older adult (≥ 65 years)							
Patient #1	73	Male	White	COPD	WFBMC	2	Death on day 6 from subarachnoid hemorrhage
Patient #2	76	Female	Black	Hypertension, autoimmune hepatitis	WFBMC	3	Death on day 28 while admitted for acute encephalopathy
Middle-aged (46-64 years)							
Patient #1	50	Male	Black	Hypertension, tobacco, cocaine use	WFBMC	3	STEMI on day 12, angiography revealed 25% stenosis
Patient #2	57	Female	Black	Metastatic cancer, deep vein thrombosis	WFBMC	3	Death from cancer during index hospitalization; care withdrawn
Young (21-45 years)							
Patient #1	41	Female	White	Hypertension, Hyperlipidemia, Diabetes, Obesity, Family history of ACS	DMC	3	Index NSTEMI requiring CABG
Patient #2	43	Male	White	None	WFBMC	0	Death during index visit from respiratory failure

WFBMC – Wake Forest Baptist Medical Center, DMC – Davie Medical Center, ACS – acute coronary syndrome, CABG – coronary artery bypass graft, STEMI – ST-segment elevation myocardial infarction, COPD – chronic obstructive pulmonary disease

Supplemental Table 3. Absolute percentage difference in safety and effectiveness outcomes pre- vs. post-implementation by age group. MI – myocardial infarction, OCT – objective cardiac testing

Outcome	Older adult (≥ 65 years) % (95%CI)	Middle-aged (46-64 years) % (95%CI)	Young (21-45 years) % (95%CI)
SAFETY			
Index			
Death	0.3 (-0.4 to 1.0)	0.1 (-0.2 to 0.4)	0 (-0.2 to 0.3)
MI	2.1 (-0.5 to 4.6)	0.8 (-0.8 to 2.4)	-0.1 (-1.5 to 1.3)
Revascularization	1.0 (-0.8 to 2.9)	-0.6 (-1.9 to 0.7)	0.1 (-0.7 to 0.9)
Death + MI	2.3 (-0.3 to 4.9)	0.8 (-0.7 to 2.4)	-0.1 (-1.5 to 1.4)
MACE (Death + MI + Revasc)	2.4 (-0.4 to 5.1)	-0.1 (-1.8 to 1.6)	-0.2 (-1.7 to 1.3)
30-day Follow-up			
Death	-1.0 (-2.3 to 0.3)	-0.4 (-0.8 to 0.1)	-0.2 (-0.7 to 0.2)
MI	0.2 (-0.6 to 1.0)	-0.1 (-0.6 to 0.5)	0.4 (-0.1 to 0.9)
Revascularization	0.7 (-0.3 to 1.6)	-0.2 (-0.9 to 0.4)	0.2 (-0.3 to 0.7)
Death + MI	-0.6 (-2.0 to 0.9)	-0.4 (-1.1 to 0.2)	0.2 (-0.4 to 0.8)
MACE (Death + MI + Revasc)	-0.3 (-1.9 to 1.3)	-0.6 (-1.4 to 0.3)	0.3 (-0.5 to 1.0)
30-day (Index + Follow-up)			
Death	-0.7 (-2.2 to 0.7)	-0.3 (-0.8 to 0.3)	-0.3 (-0.8 to 0.3)
MI	2.1 (-0.5 to 4.6)	0.6 (-1.0 to 2.2)	-0.1 (-1.5 to 1.4)
Revascularization	1.6 (-0.4 to 3.6)	-0.8 (-2.2 to 0.6)	0.3 (-0.6 to 1.2)
Death + MI	1.5 (-1.3 to 4.3)	0.2 (-1.4 to 1.9)	-0.2 (-1.7 to 1.3)
MACE (Death + MI + Revasc)	1.8 (-1.1 to 4.7)	-0.6 (-2.4 to 1.1)	-0.3 (-1.9 to 1.2)
EFFECTIVENESS			
Index			
Hospitalization	2.3 (-1.3 to 5.9)	**-7.0** **(-10.2 to -3.9)**	**-11.7** **(-15.6 to -7.8)**
OCT	**4.4** **(0.5 to 8.4)**	**-4.1** **(-7.1 to -1.0)**	**-9.3** **(-12.5 to -6.1)**
Early Discharge	-1.9 (-5.4 to 1.6)	**6.8** **(3.7 to 9.9)**	**10.5** **(6.5 to 14.5)**
30-day (Index ± Follow-up)			
Hospitalization	2.5 (-1.0 to 6.1)	**-7.2** **(-10.3 to -4.1)**	**-12.1** **(-16.1 to -8.1)**
OCT	3.6 (-0.4 to 7.7)	**-4.2** **(-7.4 to -1.1)**	**-9.7** **(-13.1 to -6.3)**

Supplemental Table 4. Comparison of outcomes between age groups post-implementation at 30 days.

Outcome	Older adult (≥ 65 years) N %	Middle-aged (46-64 years) N %	Young (21-45 years) N %	Difference by Age[1] % (95%CI)	Difference by Age[2] % (95%CI)
Low-risk Assessment	97/1303 7.4	683/2132 32.0	681/1326 51.4	**-44.0** **(-47.0 to -40.8)**	**-24.6** **(-27.1 to -22.1)**
Hospitalizations	1035/1303 79.4	1235/2132 57.9	379/1326 28.6	**50.9** **(47.5 to 54.2)**	**21.5** **(18.4 to 24.6)**
Early Discharge	268/1303 20.6	860/2132 40.3	918/1326 69.2	**-48.7** **(-52.1 to -45.3)**	**-19.8** **(-22.9 to -16.7)**
OCT	487/1303 37.4	771/2132 36.2	204/1326 15.4	**22.0** **(18.7 to 25.3)**	1.2 (-2.1 to 4.6)

OCT – objective cardiac testing
Bold font denotes findings of statistical significance

1. Difference = Older adult – Young
2. Difference = Older adult – Middle-aged

Supplemental Table 5. Adjusted odds ratios comparing pre vs. post outcomes in older adults

	Older adult 65-75 years			Older adult ≥ 75 years			Interaction Age X Implementation Cohort
	Pre N= 525 (%)	Post N= 740 (%)	Adjusted OR	Pre N= 453 (%)	Post N= 563 (%)	Adjusted OR	
SAFETY							
Index							
Death[2]	1 (0.2)	4 (0.5)	2.85 (0.32-25.5)	3 (0.7)	5 (0.9)	1.34 (0.32-5.65)	0.58
MI[1]	42 (8.0)	73 (9.9)	1.44 (0.96-2.16)	43 (9.5)	67 (11.9)	1.45 (0.95-2.21)	0.89
Revascularization[1]	19 (3.6)	38 (5.1)	1.62 (0.91-2.88)	22 (4.9)	30 (5.3)	1.33 (0.74-2.39)	0.57
Death + MI[1]	42 (8.0)	77 (10.4)	**1.54 (1.03-2.30)**	46 (10.2)	70 (12.4)	1.42 (0.94-2.14)	0.21
MACE (Death + MI + Revasc[1])	48 (9.1)	85 (11.5)	**1.48 (1.01-2.17)**	52 (11.5)	79 (14.0)	1.46 (0.99-2.16)	0.98
30-day (Index ± Follow-up)							
Death[3]	11 (2.1)	12 (1.6)	0.78 (0.34-1.79)	18 (4.0)	17 (3.0)	0.76 (0.39-1.50)	0.98
MI[1]	42 (8.0)	76 (10.3)	**1.51 (1.00-2.26)**	46 (10.2)	68 (12.1)	1.37 (0.91-2.07)	0.80
Revascularization[1]	23 (4.4)	48 (6.5)	**1.73 (1.03-2.92)**	25 (5.5)	37 (6.6)	1.49 (0.87-2.55)	0.59
Death + MI[1]	51 (9.7)	86 (11.6)	1.39 (0.96-2.03)	59 (13.0)	80 (14.2)	1.26 (0.86-1.83)	0.72
MACE (Death + MI + Revasc[1])	59 (11.2)	99 (13.4)	1.39 (0.97-1.98)	65 (14.3)	90 (16.0)	1.32 (0.92-1.90)	0.80
EFFECTIVENESS							
Index							
Hospitalization[4]	395 (75.2)	551 (74.5)	0.99 (0.74-1.32)	342 (75.5)	461 (81.9)	**1.57 (1.12-2.21)**	0.06
Objective Cardiac Testing[4]	171 (32.6)	283 (38.2)	**1.30 (1.01-1.68)**	119 (26.3)	161 (28.6)	1.22 (0.91-1.65)	0.41
Early Discharge[4]	119 (22.7)	170 (23.0)	0.97 (0.72-1.30)	101 (22.3)	98 (17.4)	**0.68 (0.48-0.97)**	0.17
30-day (Index ± Follow-up)							
Hospitalization[4]	402 (76.6)	563 (76.1)	1.03 (0.77-1.38)	350 (77.3)	472 (83.8)	**1.63 (1.14-2.32)**	0.06

Objective Cardiac Testing[4]	197 (37.5)	315 (42.6)	1.27 (1.00-1.64)	133 (29.4)	172 (30.6)	1.16 (0.87-1.55)	0.37

1. Adjusted for sex, race, ED location and presence of chest pain
2. Index death is unadjusted due to small number of events
3. 30 day death is adjusted for sex
4. Effectiveness outcomes adjusted for sex, race, ethnicity, BMI, ED location, insurance status, smoking, history of CAD, diabetes, hyperlipidemia, hypertension, and the presence of chest pain versus other symptoms concerning for acute coronary syndrome.

Supplementary Table 6. HEART Pathway test characteristics with the outcome of 30-day all-cause death or MI among older adults.

Age Group	Sensitivity (95% CI)	Specificity (95% CI)	PPV (95% CI)	NPV (95% CI)	+LR (95% CI)	-LR (95% CI)
Older adult ≥ 75 years	98.7 (96.2-100)	82.7 (79.1-86.3)	44.6 (36.1-53.2)	97.7 (93.2-100)	4.30 (3.36-5.50)	0.13 (0.02-0.92)
Older adult 65-75 years	98.8 (96.6-100)	87.4 (84.6-90.1)	48.6 (40.3-56.9)	98.2 (94.6-100)	6.26 (4.92-7.97)	0.13 (0.02-0.92)

PPV – positive predictive value, NPV – negative predictive value, LR – likelihood ratio