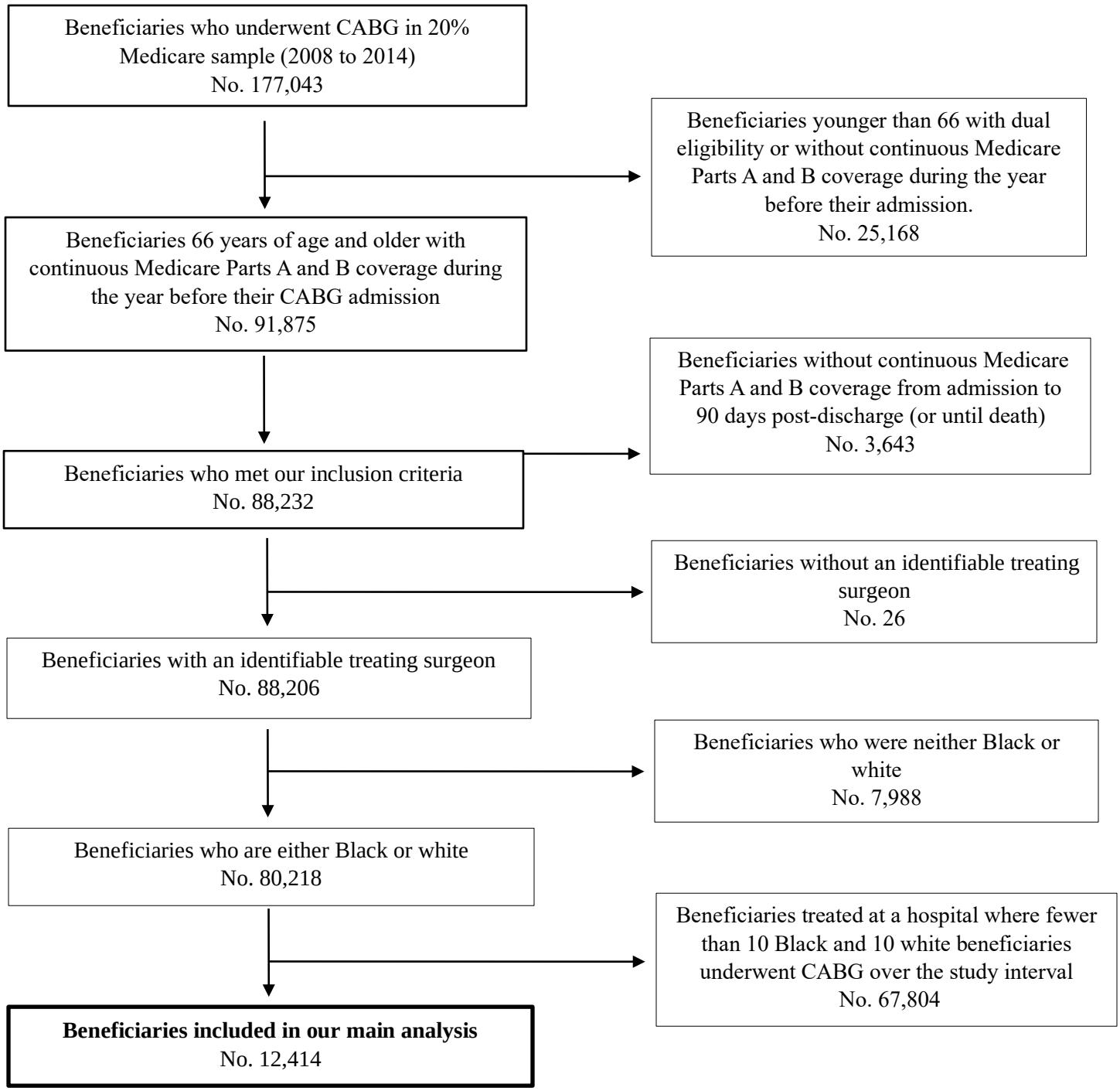
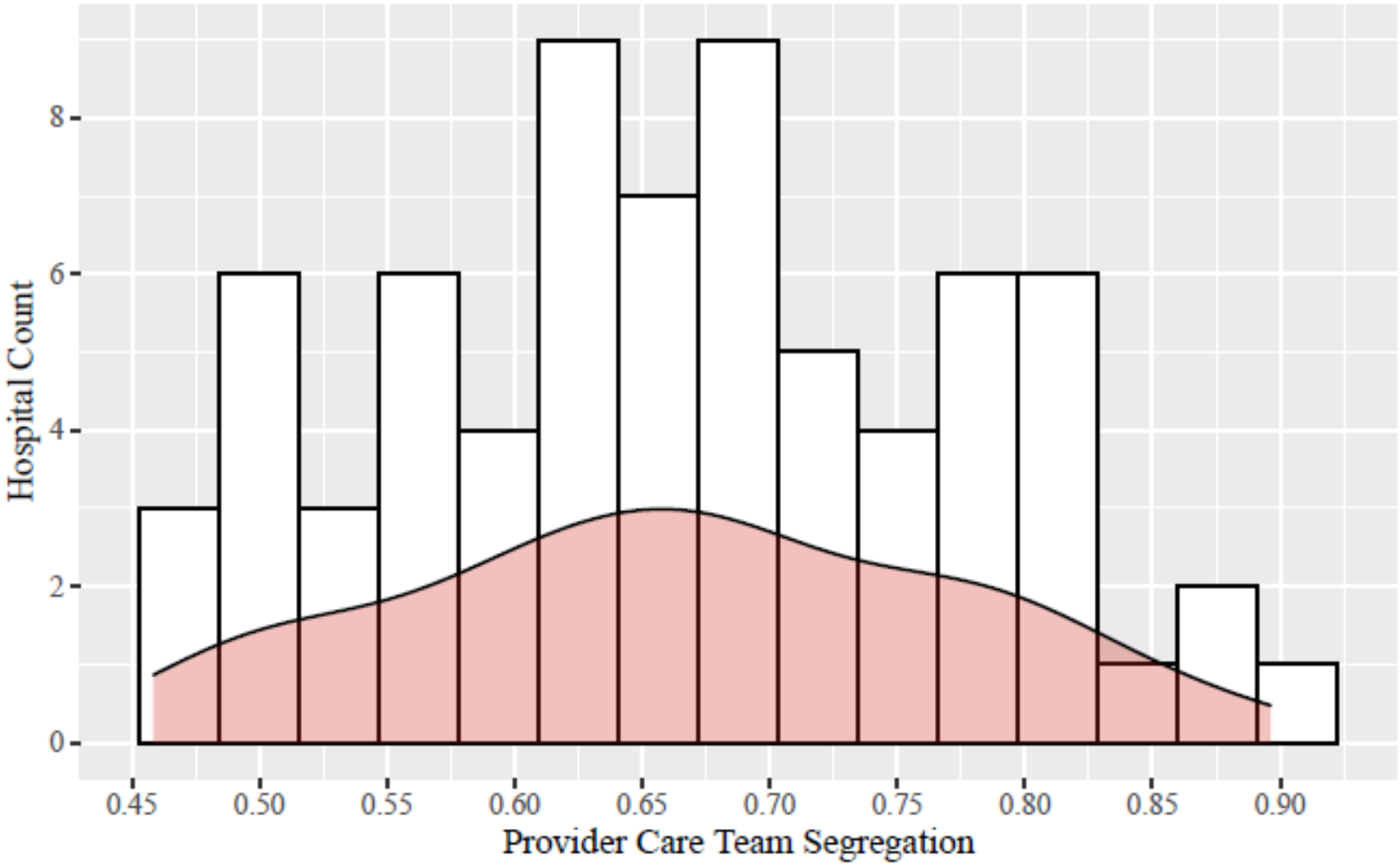
SUPPLEMENTAL MATERIAL

SUPPLEMENTAL FIGURES

Appendix Figure I. Flow Diagram



Appendix Figure II. Histogram Depicting the Variability in the Level of Provider Care Team Segregation across Hospitals in the Simulated Dataset



SUPPLEMENTAL TABLES

Appendix Table I. Provider Care Team Size and Composition in Primary Analysis

	Overall Episode	90 Days Prior to Admission	Hospitalization	90 Days after Discharge
No. of providers in care team, median (IQR)	29 (21 to 40)	8 (5 to 12)	16 (11 to 22)	7 (4 to 13)
Provider specialties in care team, median percentage (IQR)				
Diagnostic radiology	24 (20 to 30)	15 (7 to 22)	29 (23 to 36)	14 (0 to 25)
Cardiology	19 (14 to 25)	24 (13 to 33)	20 (13 to 29)	20 (13 to 33)
Internal medicine	6 (3 to 10)	8 (0 to 17)	2 (0 to 8)	9 (0 to 18)
Anesthesiology	5 (3 to 6)	0 (0 to 0)	8 (5 to 11)	0 (0 to 0)
Clinical laboratory	3 (0 to 5)	0 (0 to 11)	0 (0 to 0)	0 (0 to 13)
Emergency medicine	2 (0 to 4)	0 (0 to 7)	0 (0 to 0)	0 (0 to 5)
Physician assistant	2 (0 to 4)	0 (0 to 0)	0 (0 to 6)	0 (0 to 0)
Cardiac surgery	2 (0 to 4)	0 (0 to 0)	4 (0 to 8)	0 (0 to 0)
Pulmonary disease	0 (0 to 5)	0 (0 to 0)	0 (0 to 6)	0 (0 to 0)
Nurse practitioner	0 (0 to 4)	0 (0 to 0)	0 (0 to 0)	0 (0 to 0)
Other	26 (20 to 33)	30 (19 to 43)	21 (14 to 29)	32 (19 to 44)

Abbreviations: IQR, interquartile range; No., number.

Appendix Table II. Provider Care Team Size and Composition in Sensitivity Analysis, Excluding Those Billing Providers Who Would Not Influence Operative Mortality or Are Not Involved in Face-to-Face Patient Care

	Overall Episode	90 Days Prior to Admission	Hospitalization	90 Days after Discharge
No. of providers in care team, median (IQR)	18 (13 to 26)	6 (3 to 8)	10 (7 to 14)	5 (3 to 9)
Provider specialties in care team, median percentage (IQR)				
Cardiology	31 (23 to 40)	33 (20 to 50)	33 (22 to 44)	33 (20 to 50)
Internal medicine	10 (5 to 16)	11 (0 to 25)	3 (0 to 13)	14 (0 to 25)
Anesthesiology	8 (5 to 11)	0 (0 to 0)	13 (8 to 20)	0 (0 to 0)
Emergency medicine	4 (0 to 7)	0 (0 to 10)	0 (0 to 0)	0 (0 to 7)
Cardiac surgery	4 (0 to 7)	0 (0 to 0)	6 (0 to 13)	0 (0 to 0)
Physician assistant	2 (0 to 7)	0 (0 to 0)	0 (0 to 10)	0 (0 to 0)
Thoracic surgery	2 (0 to 6)	0 (0 to 0)	0 (0 to 10)	0 (0 to 0)
Pulmonary disease	0 (0 to 8)	0 (0 to 0)	0 (0 to 8)	0 (0 to 0)
Nurse practitioner	0 (0 to 6)	0 (0 to 0)	0 (0 to 0)	0 (0 to 0)
Family practice	0 (0 to 6)	0 (0 to 13)	0 (0 to 0)	0 (0 to 14)
Other	20 (13 to 29)	20 (0 to 33)	13 (0 to 24)	22 (0 to 38)

Abbreviations: IQR, interquartile range; No., number.

Appendix Table III. Comparisons between Black and White Patients within Hospital Segregation Levels.

Characteristic	All Hospitals (Median = 0.89)			Low Segregation (Median = 0.84)			Medium Segregation (Median = 0.89)			High Segregation (Median = 0.92)		
	Black	White	*P*-Value	Black	White	*P*-Value	Black	White	*P*-Value	Black	White	*P*-Value
No. of patients	1210	11,204		423	2928		446	3743		341	4533	
Age, mean (SD)	73.4 (5.4)	74.9 (5.9)	<0.01	73.3 (5.5)	74.9 (5.8)	<0.01	73.2 (5.1)	74.7 (5.8)	<0.01	73.8 (5.8)	75.0 (5.9)	<0.01
Male (%)	677 (56)	7803 (70)	<0.01	238 (56)	1990 (68)	<0.01	253 (57)	2655 (71)	<0.01	186 (55)	3158 (70)	<0.01
Charlson score (%)			<0.01			0.02			<0.01			<0.01
0	221 (18)	2668 (24)		88 (21)	757 (26)		78 (17)	892 (24)		55 (16)	1019 (22)	
1	259 (21)	2931 (26)		103 (24)	770 (26)		93 (21)	1001 (27)		63 (18)	1160 (26)	
≥2	730 (60)	5605 (50)		232 (55)	1401 (48)		275 (62)	1850 (49)		223 (65)	2354 (52)	
Socioeconomic status (%)			<0.01			<0.01			<0.01			<0.01
Low	603 (50)	3441 (31)		247 (58)	1120 (38)		197 (44)	1037 (28)		159 (47)	1284 (28)	
Medium	330 (27)	3711 (33)		98 (23)	846 (29)		122 (27)	1301 (35)		110 (32)	1564 (35)	
High	235 (19)	3748 (33)		63 (15)	872 (30)		111 (25)	1316 (35)		61 (18)	1560 (34)	
Missing	42 (3)	304 (3)		15 (4)	90 (3)		16 (4)	89 (2)		11 (3)	125 (3)	
Elective procedure (%)	583 (48)	6207 (55)	<0.01	179 (42)	1504 (51)	<0.01	242 (54)	2231 (60)	0.03	162 (48)	2472 (55)	0.01

Abbreviations: HSA, hospital service area; No., number; PCP, primary care physician; PTCA, percutaneous transluminal coronary angioplasty; SD, standard deviation.

Appendix Table IV. Full Multivariable Model Results from Primary Analysis

Variable	Estimates for Each Variable		Estimates for the Interaction of Each Variable with Black Status	
	Odds Ratio	95% CI	Odds Ratio	9% CI
Study year (referent: 2008)				
2009	0.95	(0.74 to 1.23)	0.96	(0.43 to 2.17)
2010	0.91	(0.70 to 1.20)	0.59	(0.26 to 1.35)
2011	1.15	(0.92 to 1.44)	1.02	(0.52 to 2.00)
2012	0.95	(0.75 to 1.20)	1.16	(0.51 to 2.63)
2013	0.94	(0.73 to 1.21)	0.97	(0.42 to 2.19)
2014	0.98	(0.69 to 1.38)	0.48	(0.15 to 1.48)
Patient-level				
Black	6.23	(0.09 to 420.1)	-	-
Age	1.08	(1.07 to 1.09)	1.00	(0.96 to 1.04)
Female	1.37	(1.18 to 1.59)	0.81	(0.51 to 1.29)
Charlson score (referent: 0)				
1	1.12	(0.89 to 1.40)	0.88	(0.34 to 2.26)
≥2	1.98	(1.61 to 2.45)	1.06	(0.47 to 2.39)
Socioeconomic status (referent: low)				
Medium	1.01	(0.84 to 1.21)	0.43	(0.25 to 0.74)
High	0.85	(0.69 to 1.05)	0.56	(0.29 to 1.09)
Elective procedure	0.60	(0.52 to 0.70)	0.75	(0.45 to 1.26)
Hospital-level				
Provider care team segregation (referent: low)				
Medium segregation	1.14	(0.90 to 1.46)	1.3	(0.62 to 2.72)
High segregation	0.92	(0.69 to 1.24)	2.88	(1.20 to 6.93)
No. of patients undergoing CABG	1.00	(1.00 to 1.00)	1.00	(0.99 to 1.00)
No. of Black patients undergoing CABG	1.01	(1.00 to 1.02)	1.02	(0.99 to 1.05)
No. of providers in a hospital's care team network	1.00	(1.00 to 1.00)	1.00	(1.00 to 1.00)
Proportion of patients from outside the CBSA	1.17	(0.76 to 1.78)	2.27	(0.38 to 13.67)
Ownership (referent: for-profit)				
Non-profit	0.95	(0.50 to 1.79)	0.76	(0.20 to 2.84)
Other	0.99	(0.50 to 1.98)	0.63	(0.14 to 2.90)
Bed size (referent: <250 beds)				
251 – 500 beds	0.74	(0.49 to 1.12)	0.88	(0.27 to 2.91)
>500 beds	0.60	(0.38 to 0.96)	0.78	(0.22 to 2.73)
Geographic region (referent: South)				
Northeast	0.88	(0.61 to 1.27)	1.21	(0.34 to 4.28)
Midwest	0.98	(0.73 to 1.31)	0.90	(0.32 to 2.54)
Teaching hospital	1.14	(0.74 to 1.76)	1.37	(0.47 to 3.98)
HSA-level				
No. of acute care hospital beds per 1000 residents	1.18	(0.91 to 1.51)	0.56	(0.30 to 1.06)
No. of PCPs, per 100,000 residents	0.99	(0.98 to 1.00)	1.01	(0.97 to 1.05)
No. of medical specialists per 100,000 residents	0.99	(0.97 to 1.01)	0.99	(0.93 to 1.05)
No. of surgeons per 100,000 residents	1.02	(1.00 to 1.04)	1.01	(0.94 to 1.09)
Total resident population, in thousands	1.00	(1.00 to 1.00)	1.00	(1.00 to 1.00)
Total Black population, in thousands	1.00	(1.00 to 1.00)	1.00	(1.00 to 1.00)
Total Hispanic population, in thousands	1.00	(1.00 to 1.00)	1.00	(1.00 to 1.00)
Proportion of residents living below federal poverty line	0.10	(0.01 to 1.11)	0.03	(0.00 to 1366)
Proportion of residents that obtained a graduate or professional degree, among residents that are 25 years or older	0.61	(0.10 to 3.63)	0.17	(0.00 to 434.9)
Proportion of residents living in a rural area	0.75	(0.34 to 1.69)	2.65	(0.15 to 47.65)

Abbreviations: CBSA, core-based statistical area; CABG, coronary artery bypass grafting; CI, confidence interval; HAS, hospital service area; No., number; PCP, primary care provider.