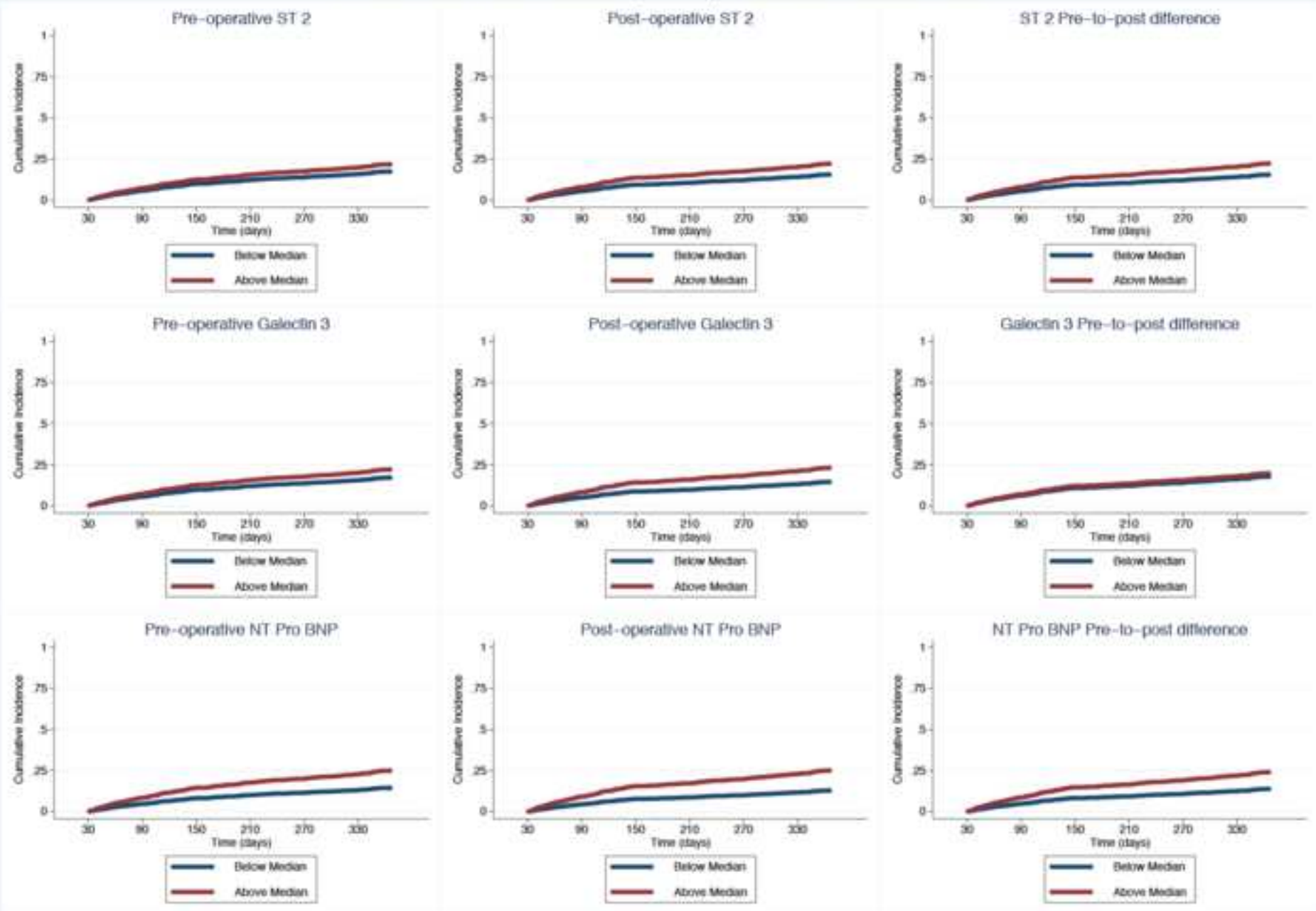
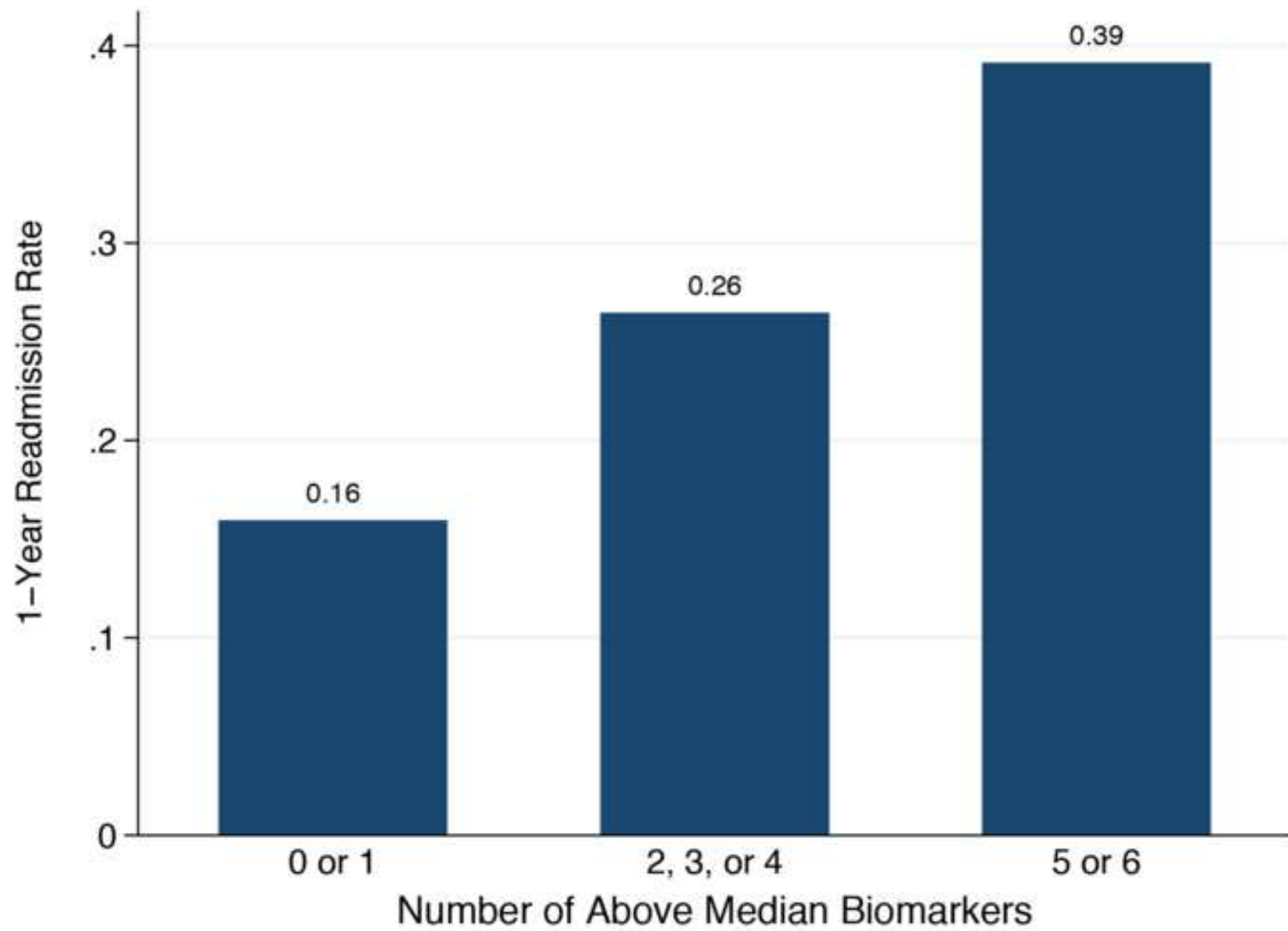
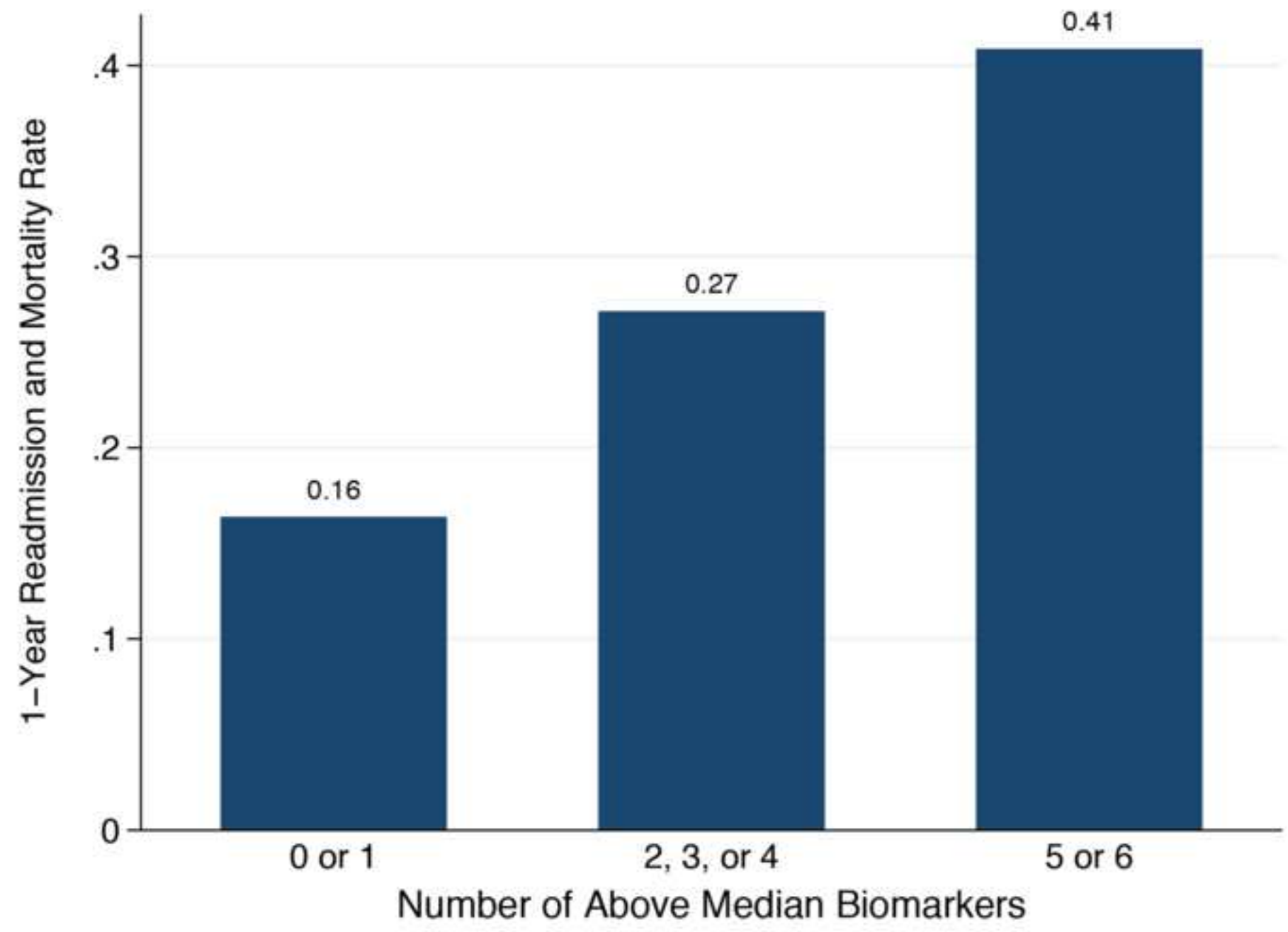


Readmission at 30 to 365 days CIF plots – Cardiac Biomarkers

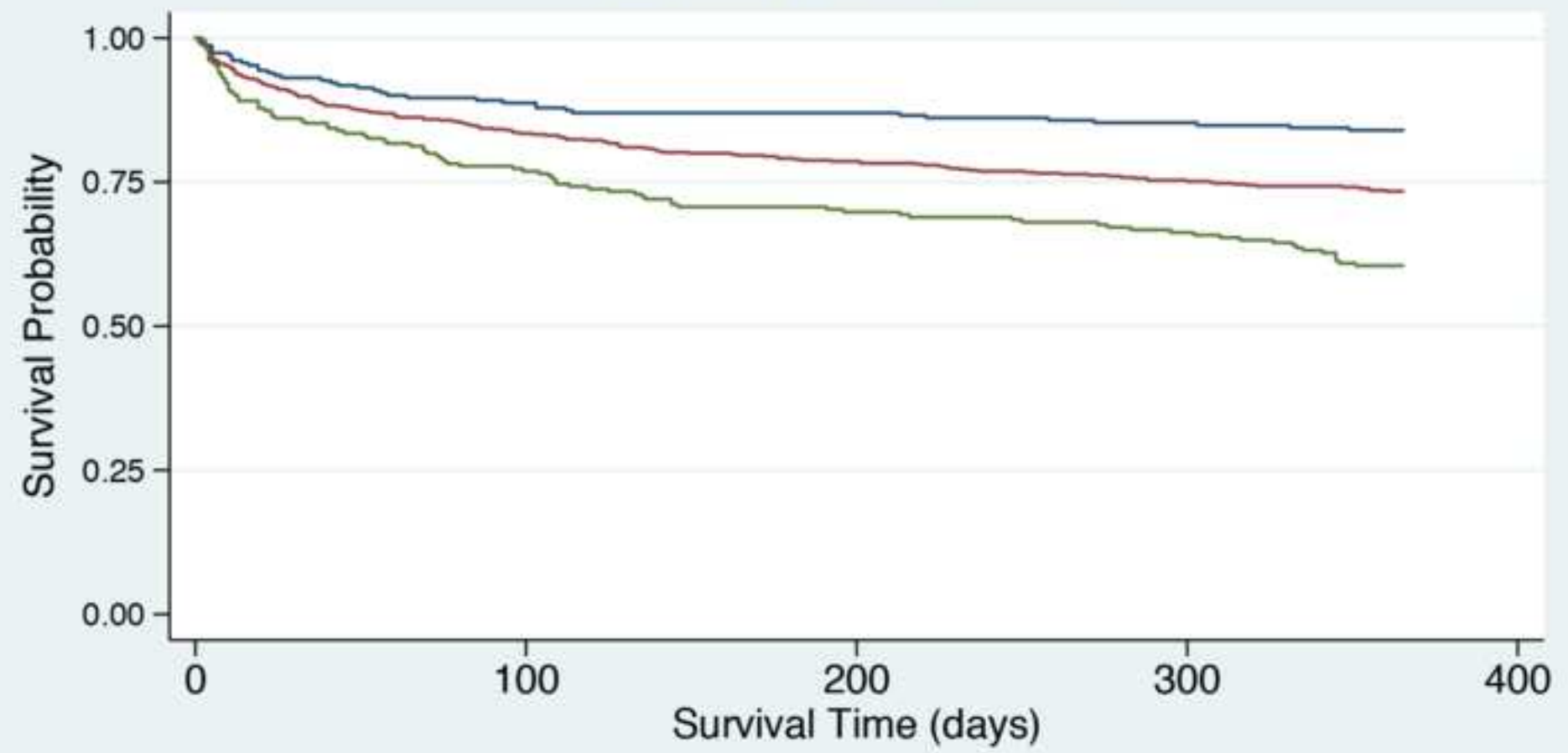








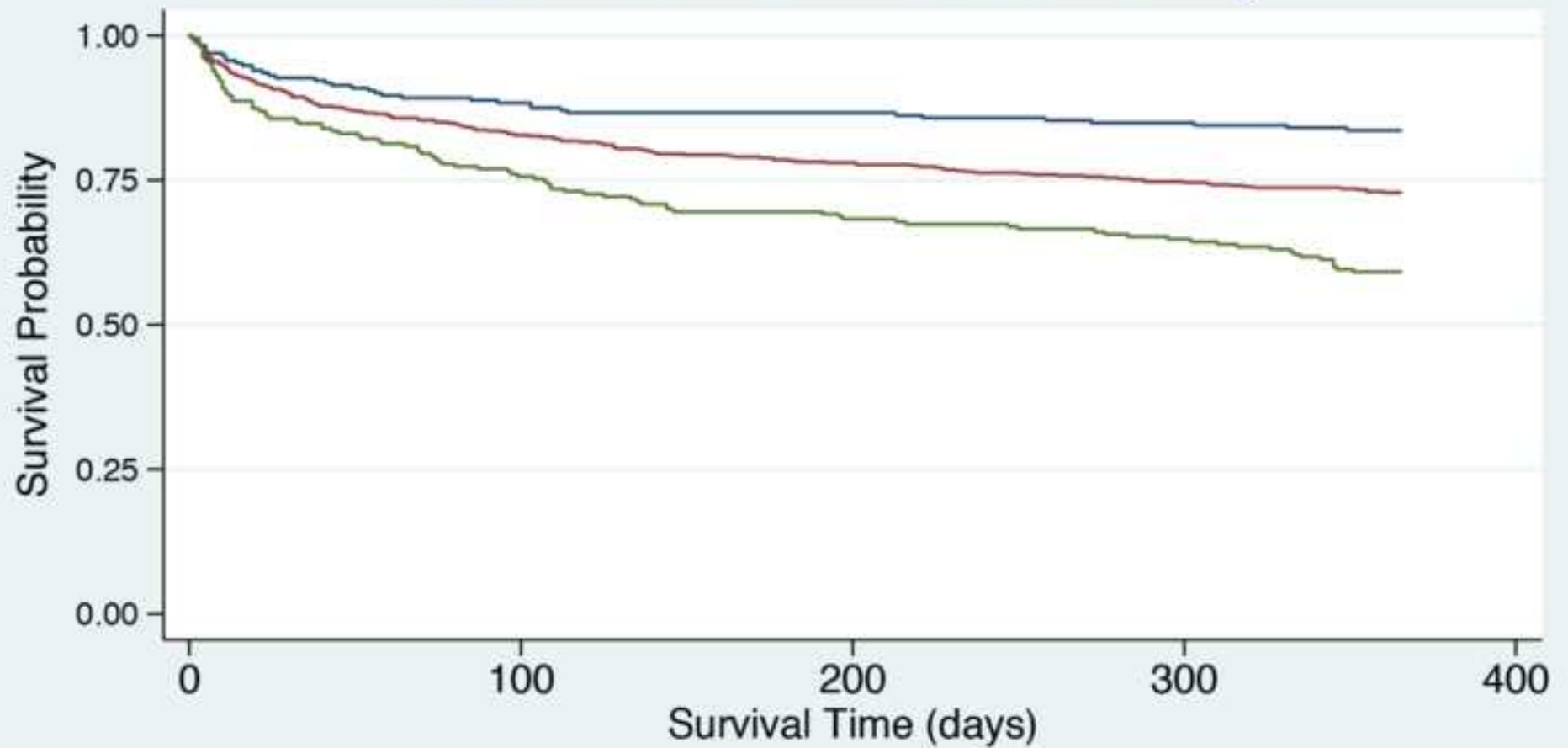
1-Year Readmission



Number of Above Median Biomarkers

- 0 or 1
- 2, 3, or 4
- 5 or 6

1-Year Readmission or Mortality



Number of Above Median Biomarkers

— 0 or 1

— 2, 3, or 4

— 5 or 6

Table S1. List of pre-operative factors in STS 30-day Readmission Model and ASCERT mortality model

1. Ejection fraction (EF)
2. Pre-operative atrial fibrillation
3. Prior myocardial infarction (MI)
4. Age
5. Unstable angina
6. Congestive heart failure (CHF)
7. Renal function
8. Status
9. Gender
10. Whether or not the surgery is a re-operation
11. Chronic lung disease
12. Diabetes
13. Pre-operative intra-aortic balloon pump (IABP) or inotropes
14. Immunosuppressive treatment
15. Peripheral vascular disease (PVD)
16. Body surface area (BSA)
17. Cerebro-vascular disease (CVD)
18. Hypertension
19. Percutaneous coronary intervention (PCI) less than or equal to six hours prior to surgery
20. Left main disease
21. Surgery date

Additional ASCERT factors

22. Height
23. Body mass index (BMI)
24. Creatinine
25. Mean aortic insufficiency
26. History of cerebrovascular disease
27. Number of prior cardiovascular operations
28. Number of diseased vessels
29. Moderate/severe tricuspid, aortic, or mitral insufficiency

Table S2. Pre-operative and Post-operative Biomarker Summary Statistics

	Minimum	Maximum	25th percentile	Median	75th percentile	Tertile 1 Minimum	Tertile 1 Maximum	Tertile 2 Minimum	Tertile 2 Maximum	Tertile 3 Minimum	Tertile 3 Maximum	N
Pre-operative IL 10 (pg/mL)	0.05	27.90	0.24	0.33	0.50	0.05	0.27	0.27	0.43	0.43	27.90	1393
Post-operative IL 10 (pg/mL)	0.10	140.00	0.59	0.92	1.58	0.10	0.66	0.66	1.25	1.26	140.00	1047
Pre-operative IL 6 (pg/mL)	0.19	179.00	0.89	1.50	2.93	0.19	1.06	1.07	2.25	2.26	179.00	1393
Post-operative IL 6 (pg/mL)	0.33	1548.00	16.80	28.40	47.90	0.33	20.10	20.30	37.50	37.60	1548.00	1047

Table S3. Cox Regression Model Results for Postoperative Cytokine Biomarker Levels and Readmission or Mortality*

Biomarker		Readmission within 365 days			Death within 365 days		
		HR (95% CI) unadjusted	HR (95% CI) adjusted Model 1	HR (95% CI) adjusted Model 2	HR (95% CI) unadjusted	HR (95% CI) adjusted Model 1	HR (95% CI) adjusted Model 2
IL-6	Log-transformed	1.26 (1.08-1.48)	1.24 (1.04-1.48)	1.22 (1.02-1.46)	1.70 (1.25-2.32)	1.62 (1.08-2.43)	1.76 (1.12-2.77)
	Below Median	1.00 (referent)	1.00 (referent)	1.00 (referent)	1.00 (referent)	1.00 (referent)	1.00 (referent)
	Above Median	1.31 (1.03-1.66)	1.22 (0.95-1.56)	1.15 (0.89-1.48)	2.33 (0.97-5.63)	1.88 (0.71-4.95)	1.91 (0.71-5.15)
	Tertile 1	1.00 (referent)	1.00 (referent)	1.00 (referent)	1.00 (referent)	1.00 (referent)	1.00 (referent)
	Tertile 2	0.84 (0.61-1.14)	0.79 (0.57-1.09)	0.78 (0.56-1.08)	2.30 (0.59-8.88)	2.63 (0.57-12.20)	2.66 (0.51-13.71)
	Tertile 3	1.45 (1.10-1.91)	1.36 (1.01-1.82)	1.29 (0.95-1.74)	4.58 (1.32-15.93)	4.88 (1.23-19.30)	5.93 (1.29-27.31)
IL-10	Log-transformed	1.27 (1.10-1.46)	1.18 (1.01-1.38)	1.23 (1.05-1.44)	1.47 (0.96-2.27)	1.09 (0.58-2.03)	1.05 (0.58-1.91)
	Below Median	1.00 (referent)	1.00 (referent)	1.00 (referent)	1.00 (referent)	1.00 (referent)	1.00 (referent)
	Above Median	1.31 (1.04-1.66)	1.20 (0.93-1.53)	1.25 (0.97-1.61)	1.37 (0.61-3.09)	0.81 (0.34-1.97)	0.78 (0.31-1.91)
	Tertile 1	1.00 (referent)	1.00 (referent)	1.00 (referent)	1.00 (referent)	1.00 (referent)	1.00 (referent)
	Tertile 2	1.26 (0.93-1.70)	1.09 (0.80-1.49)	1.13 (0.80-1.55)	1.12 (0.41-3.09)	0.56 (0.17-1.79)	0.61 (0.19 – 1.95)
	Tertile 3	1.52 (1.14-2.04)	1.32 (0.97-1.80)	1.40 (1.03-1.91)	1.25 (0.47-3.36)	0.53 (0.15-1.87)	0.57 (0.16 – 2.05)

Table S4. Variables dropped from combined STS 30-day readmission and STS ASCERT long-term mortality models

Variable list from STS ASCERT study (Shahian et al 2012)	NNE Dataset
Aortic insufficiency - moderate to severe	Aortic regurgitation seemed to be the closest available variable to aortic insufficiency
Past smoker	STS long-term model breaks this into never/past/current; NNE data only has a binary variable for current smoking status
Hispanic	Not in NNE dataset
Asian	Not in NNE dataset
Black	Not in NNE dataset
Immunosuppressive treatment	Not in NNE dataset
Prior carotid surgery	Not in NNE dataset
Re-operation - 2+ previous operations	Not in NNE dataset
Shock	Only two non-missing observations for this in the NNE dataset

Table S5. Additional Characteristics by Levels of Preoperative IL-6

	Below median	Above median	P-value	Tertile 1	Tertile 2	Tertile 3	P-value
	Percentage or Mean±SD	Percentage or Mean±SD		Percentage or Mean±SD	Percentage or Mean±SD	Percentage or Mean±SD	
Length of stay from admission to discharge (days)	7.94±6.66	10.44±6.92	<0.001	7.90±7.68	8.57±4.08	11.08±7.84	<0.001
Post-operative stroke	*	*	0.023	*	*	*	0.011
Post-operative transient ischemic attack	*	*	0.622	*	*	*	0.828
Return to OR for bleeding	*	*	0.415	*	*	*	0.656
Mediastinitis/Sternal dehiscence requiring re-op			0.286				0.390
No	*	*		*	*	*	
Yes, in-hospital	*	*		*	*	*	
Yes, after discharge	*	*		*	*	*	
Post-op leg wound infection	*	*	0.363	*	*	*	0.911
Post-op pneumonia	*	*	0.117	*	*	2.63%	0.133
Post-op atrial fibrillation	20.59%	21.73%	0.603	20.72%	22.83%	19.91%	0.536
Low cardiac output intra- or post-operatively	3.31%	6.42%	0.008	2.81%	3.75%	8.02%	<0.001
Congestive heart failure	5.22%	14.10%	<0.001	4.65%	7.39%	16.85%	<0.001

OR=operating room; * = Indicates a suppressed or counter-suppressed value due to CMS policy.

Table S6. Additional Characteristics by Postoperative IL-6

	Below median	Above median	P-value	Tertile 1	Tertile 2	Tertile 3	P-value
	Percentage or Mean±SD	Percentage or Mean±SD		Percentage or Mean±SD	Percentage or Mean±SD	Percentage or Mean±SD	
Length of stay from admission to discharge	8.48±6.64	10.01±7.72	<0.001	8.41±7.20	8.89±5.31	10.46±8.69	<0.001
Post-operative stroke	*	*	0.509	*	*	*	0.751
Post-operative transient ischemic attack	*	*	0.963	*	*	*	0.358
Return to OR for bleeding	*	*	0.039	*	*	*	0.178
Mediastinitis/Sternal dehiscence requiring re-op							
No	*	*	0.463	*	*	*	0.205
Yes, in-hospital	*	*		*	*	*	
Yes, after discharge	*	*		*	*	*	
Post-op leg wound infection	*	*	0.067	*	*	*	0.049
Post-op pneumonia	*	*	0.360	*	*	*	0.174
Post-op atrial fibrillation	20.00%	24.34%	0.091	17.84%	24.36%	24.36%	0.059
Low cardiac output intra- or post-operatively	5.18%	5.16%	0.990	4.76%	5.87%	4.89%	0.776
Congestive heart failure	9.61%	10.67%	0.569	10.82%	10.03%	9.63%	0.871

OR=operating room; * = Indicates a suppressed or counter-suppressed value due to CMS policy.

Table S7. Additional Characteristics by Preoperative IL-10

	Below median	Above median	P-value	Tertile 1	Tertile 2	Tertile 3	P-value
	Percentage or Mean±SD	Percentage or Mean±SD		Percentage or Mean±SD	Percentage or Mean±SD	Percentage or Mean±SD	
Length of stay from admission to discharge	8.27±5.90	10.08±7.69	<0.001	8.13±5.18	9.16±7.99	10.21±7.09	<0.001
Post-operative stroke	*	*	0.775	*	*	*	0.225
Post-operative transient ischemic attack	*	*	0.172	*	*	*	0.074
Return to OR for bleeding	*	*	0.840	*	*	*	0.077
Mediastinitis/Sternal dehiscence requiring re-op							
No	*	*	0.273	*	*	*	0.287
Yes, in-hospital	*	*		*	*	*	
Yes, after discharge	*	*		*	*	*	
Post-op leg wound infection	*	*	0.424	*	*	*	0.022
Post-op pneumonia	*	*	0.018	*	2.38%	*	0.101
Post-op atrial fibrillation	20.80%	21.51%	0.745	20.09%	22.68%	20.69%	0.600
Low cardiac output intra- or post-operatively	4.36%	5.33%	0.406	4.65%	5.07%	4.80%	0.957
Congestive heart failure	6.13%	13.08%	<0.001	6.26%	7.99%	14.44%	<0.001

OR=operating room; * = Indicates a suppressed or counter-suppressed value due to CMS policy.

Table S8. Additional Characteristics by Postoperative IL-10

	Below median	Above median	P-value	Tertile 1	Tertile 2	Tertile 3	P-value
	Percentage or Mean±SD	Percentage or Mean±SD		Percentage or Mean±SD	Percentage or Mean±SD	Percentage or Mean±SD	
Length of stay from admission to discharge	8.27±5.90	10.08±7.69	<0.001	8.13±5.18	9.16±7.99	10.21±7.09	<0.001
Post-operative stroke	*	*	0.775	*	*	*	0.225
Post-operative transient ischemic attack	*	*	0.172	*	*	*	0.074
Return to OR for bleeding	*	*	0.840	*	*	*	0.077
Mediastinitis/Sternal dehiscence requiring re-op							
No	*	*	0.273	*	*	*	0.287
Yes, in-hospital	*	*		*	*	*	
Yes, after discharge	*	*		*	*	*	
Post-op leg wound infection	*	*	0.424	*	*	*	0.022
Post-op pneumonia	*	*	0.018	*	2.38%	*	0.101
Post-op atrial fibrillation	20.80%	21.51%	0.745	20.09%	22.68%	20.69%	0.600
Low cardiac output intra- or post-operatively	4.36%	5.33%	0.406	4.65%	5.07%	4.80%	0.957
Congestive heart failure	6.13%	13.08%	<0.001	6.26%	7.99%	14.44%	<0.001

OR=operating room; * = Indicates a suppressed or counter-suppressed value due to CMS policy.