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### Quality review and education as method of improving guideline adherence for medication prescription and outcomes among vascular interventionalists performing non-cardiac vascular surgeries

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## Background

- Medical management of patients undergoing non-cardiac vascular procedures often sub-optimally follow evidence based guidelines.
- Rates of statin and antiplatelet use in abdominal aortic aneurysm setting have been measured to be 63-75% (1).
- Rates of statin prescription have been estimated to be 75% and antiplatelet therapy 93% in setting of carotid artery disease related surgery (2).

### References

- (1) *Eur J Vasc Endovasc Surg.* 2017 Jul;54(1):116-122. doi: 10.1016/j.ejvs.2017.04.009. Epub 2017 May 26.  
 (2) *Stroke.* 2016 Sep;47(9):2339-46. doi: 10.1161/STROKEAHA.116.012981. Epub 2016 Aug 9.

## Hypothesis / Objective

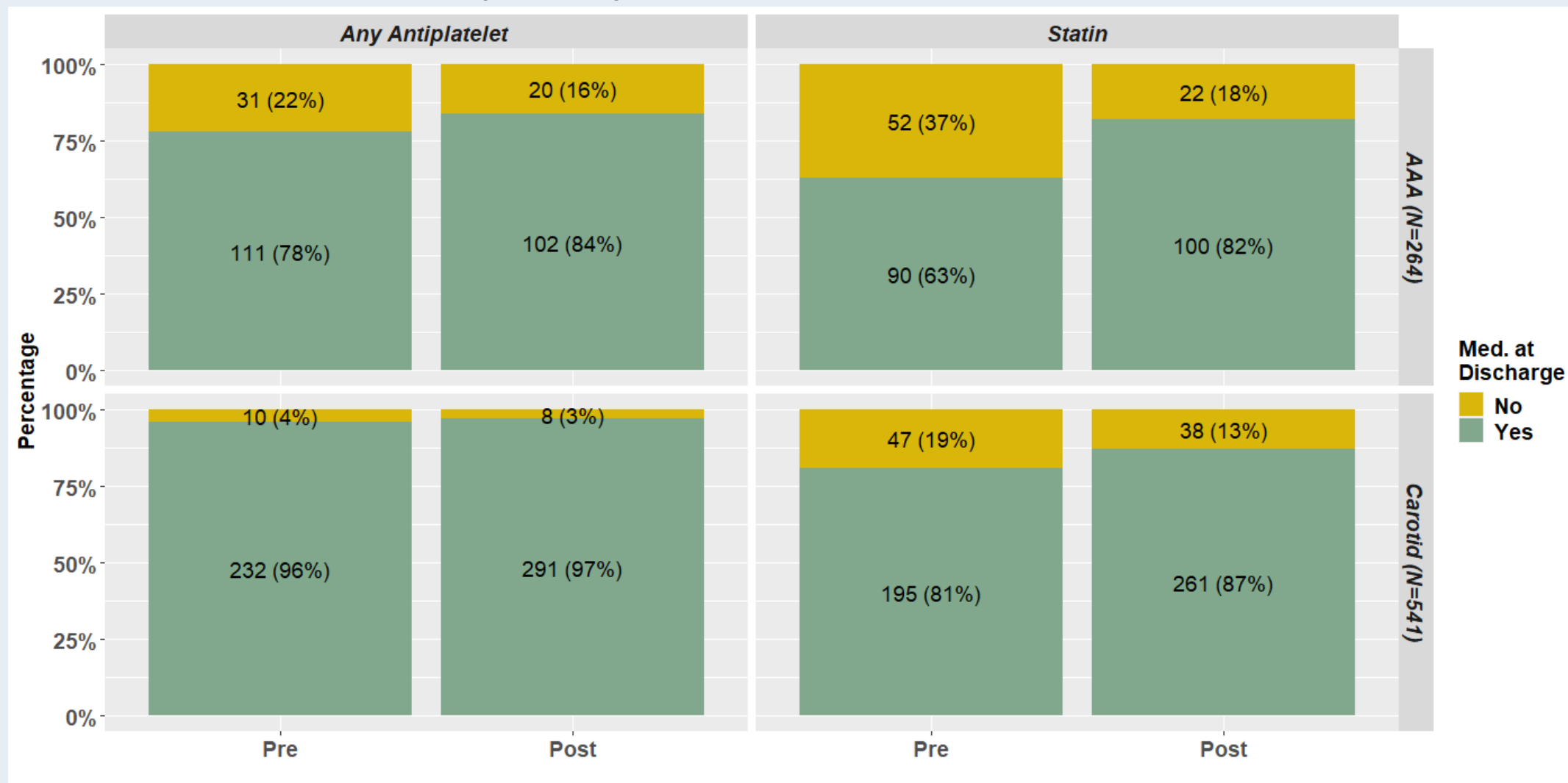
### Hypothesis:

We hypothesized that feedback to practitioners in regards to outcomes and medications prescribed would improve care and lead to improved clinical outcomes.

## Methods

- With conversion to new database in 2015 that allowed for more comprehensive tracking of vascular surgery outcomes, a decision was made to share these data with vascular interventionalists on regular basis as well as relay medications prescribed at discharge of index non-cardiac vascular surgery.
- Carotid and abdominal aortic surgeries were evaluated.
- The most frequent format for presentation of data to vascular interventionalists was vascular morbidity and mortality conference which is scheduled as monthly forum.
- Medications included in presentations were antiplatelet and statin therapies. Comparisons were made between adherence to guideline based therapies 2 years before and 2 years after new database implementation.
- ACE inhibitor/aldosterone receptor blocker (ARB) therapy prescribing data were not included in these presentations.
- SAS Enterprise Guide 7.1 and R 3.6.1 software used for analysis.

Figure 1. Medications at discharge by procedures. We used logistic regression to detect the significant variance with both Pre/Post cohorts, and different procedure in a model. P-values for grouping and procedure effects were 0.1494, and <.0001, respectively for Antiplatelet; and were 0.0002, and 0.0002, respectively for Statin.



## Results

- 826 patients were evaluated. 400 patients were in pre new database implementation and 426 were included after implementation. 21 open abdominal aortic surgeries were excluded from the comparisons because they did not have all historical and post-op comorbidities coded the same as the other procedures in the database.
- Clinical outcomes evaluated: In-Hospital/Thirty-days/One-year Mortality, Length of Stay, Access Site Complication, Stroke, TIA, MI, Bleed, HTN, Infection, Re-operation, Any antiplatelet at discharge, Statin at Discharge, ASA at Discharge, Beta Blockers at Discharge, and ACE-Inhibitor at Discharge
- Table demonstrates baseline demographic information.

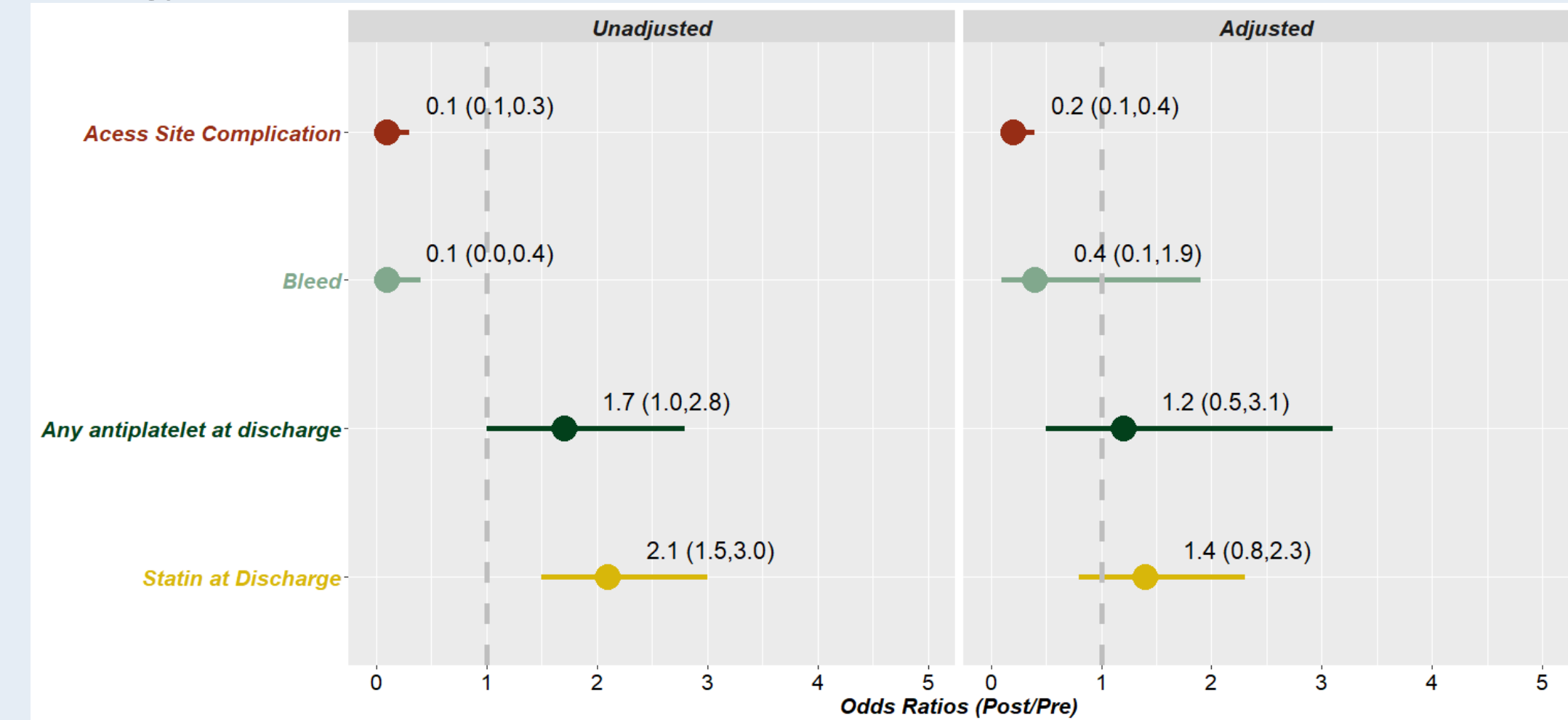
Table. Patient Demographics (Significant differences detected between cohorts were colored)

		Pre-cohort (2013 Q4 N=384)	~2015 Q3	Post-cohort (2015 Q3 N=421)	~2017 Q3	Overall N=805	%
Procedures	CAS	20	5	70	17	90	11
	CEA	222	58	229	54	451	56
	EVAR	142	37	122	29	264	33
Urgency	Elective	348	91	347	82	695	86
	Urgent/Emergent	36	9	74	18	110	14
Age	Mean (SD)	73	9	72	9	72	9
Gender	Female	113	30	139	33	252	31
	Male	270	71	282	67	552	69
Race	Caucasian	377	98	399	95	776	96
	Non-Caucasian or Unknown	7	2	22	5	29	4
BMI	Mean (SD)	28	8	29	6	29	7
Smoking	Never	85	22	86	20	171	21
	Prior	193	51	222	53	415	52
Hypertension	Current	101	27	113	27	214	27
	No	61	16	62	15	123	15
Diabetes	Yes (>=140/90 or history)	323	84	358	85	681	85
	No	289	75	282	67	571	71
CAD	Yes	95	25	138	33	233	29
	No	231	60	315	75	546	68
Prior CABG	Yes	153	40	106	25	259	32
	No	314	82	349	83	663	83
Prior CHF	Yes	68	18	72	17	140	17
	No	361	94	396	94	757	94
COPD	Yes	23	6	25	6	48	6
	No	316	82	300	71	616	77
Dialysis	Yes	68	18	121	29	189	23
	No	382	99	418	99	800	99
Living status	Home	380	99	415	99	795	99
	Nursing home/SNF/Assisted	2	1	6	1	8	1
ASA Class	Other	1	0	0	0	1	0
	1	1	0	0	0	1	0
	2	17	4	23	8	40	6
	3	273	72	198	67	471	70
Prior PVI/Bypass	4	85	22	75	25	160	24
	Emergency	4	1	0	0	4	1
	No	325	85	319	76	644	80
	Yes	57	15	101	24	158	20
Prior CEA/CAS	No	335	88	374	89	709	88
	Yes	47	12	47	11	94	12
Pre-op Beta Blockers	No	180	47	197	47	377	47
	Yes	194	51	199	47	393	49
Pre-op ACE-Inhibitor/ARB	Op Day only	9	2	25	6	34	4
	No	165	43	179	43	344	43
Prior TIA/Stroke	Yes	219	57	242	57	461	57
	No	225	59	217	52	442	55
	Yes	159	41	204	48	363	45

## Results

- No significant difference found with prescribing of ACE inhibitors/ARB, changing only from 47 to 48%.
- Use of antiplatelet and statin therapies have higher adherence both before and after intervention in carotid surgery vs. abdominal aortic surgery. See Figure 1.
- There was difference with univariate analysis of antiplatelet and statin prescribing for all surgeries. Antiplatelet prescribing improved from 89 to 93%, Odds Ratio (OR) = 1.7 (95% confidence interval, 1-2.8) and statin prescribing improved from 74 to 86%, OR= 2.1 (1.5-3). See Figure 2.
- Access site and bleeding complications also demonstrated improvement.
- Remainder of clinical outcomes without demonstrate difference after intervention of education and new database implementation
- Multivariate analysis demonstrated continued reduced incidence of access site complications, OR = 0.2 (0.1-0.4).
- Bleeding, antiplatelet prescription at discharge and statin prescription at discharge with intervention of education with new database implementation no longer statistically significant with multivariate analysis.

Figure 2. Odds Ratio (95% Confidence interval) of Prescribing antiplatelet and statin therapies, access site complications and bleeding in patients undergoing open carotid and abdominal aortic procedures with implementation of new quality reporting database and education strategy



## Discussion

- Potentially larger sample size and duration of follow up would have shown larger effect on outcomes.
- Antiplatelet therapy already had high usage rate for patients studied undergoing non-cardiac vascular surgeries, but statin therapy usage lagged behind as has been shown in prior literature. Statin therapies need more strategies to ensure more widespread use.
- This study demonstrates how frequent education can improve adherence to evidence based treatment strategies with perhaps most impact on statin use in abdominal aortic surgeries.

## Conclusions

- Regular feedback to vascular practitioners improves adherence to guideline based therapies and can improve surgical outcomes.