Interaction

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Explore interactions between milestone ratings and whether had assistant surgeon in the case.

1. Summary table for all ratings and had_assist_surgeon interactions model results

- interaction term for ratings and assistant surgeon

outcome	term	coef	OR	OR_lower	OR_upper	p_value
severe_cmp	IntResponseValue_mean:had_assist_surg	0.37	1.45	0.85	2.47	0.17
	mean_ge_8:had_assist_surg	1.03	2.80	0.97	8.06	0.06
	prof_rating_mean:had_assist_surg	0.32	1.38	0.91	2.09	0.13
	prof_rating_ge8:had_assist_surg	0.75	2.12	0.84	5.37	0.11
	operative_rating_mean:had_assist_surg	0.39	1.48	0.91	2.39	0.11
	operative_rating_ge8:had_assist_surg	1.10	3.01	1.05	8.66	0.04
	leadership_rating_mean:had_assist_surg	0.21	1.24	0.73	2.08	0.42
	leadership_rating_ge8:had_assist_surg	0.36	1.44	0.47	4.35	0.52
any_cmp	IntResponseValue_mean:had_assist_surg	0.22	1.25	0.83	1.89	0.29
	mean_ge_8:had_assist_surg	0.55	1.74	0.80	3.77	0.16
	prof_rating_mean:had_assist_surg	0.11	1.11	0.82	1.51	0.50
	prof_rating_ge8:had_assist_surg	0.26	1.30	0.62	2.70	0.49
	operative_rating_mean:had_assist_surg	0.26	1.30	0.87	1.92	0.20
	operative_rating_ge8:had_assist_surg	0.69	1.99	0.91	4.34	0.08
	leadership_rating_mean:had_assist_surg	0.36	1.43	0.94	2.18	0.10
	leadership_rating_ge8:had_assist_surg	0.84	2.32	0.93	5.80	0.07
readmit	IntResponseValue_mean:had_assist_surg	0.10	1.10	0.76	1.58	0.61
	mean_ge_8:had_assist_surg	0.38	1.45	0.75	2.84	0.27
	prof_rating_mean:had_assist_surg	0.13	1.14	0.87	1.50	0.33
	prof_rating_ge8:had_assist_surg	0.54	1.72	0.90	3.27	0.10
	operative_rating_mean:had_assist_surg	0.04	1.04	0.74	1.47	0.81
	operative_rating_ge8:had_assist_surg	0.22	1.24	0.64	2.43	0.52
	leadership_rating_mean:had_assist_surg	0.04	1.04	0.73	1.51	0.81
	leadership_rating_ge8:had_assist_surg	0.38	1.46	0.67	3.18	0.34
death	IntResponseValue_mean:had_assist_surg	-0.43	0.65	0.37	1.16	0.14
	mean_ge_8:had_assist_surg	-0.79	0.45	0.15	1.35	0.15
	prof_rating_mean:had_assist_surg	-0.25	0.78	0.50	1.21	0.27
	prof_rating_ge8:had_assist_surg	-0.62	0.54	0.18	1.60	0.27
	operative_rating_mean:had_assist_surg	-0.31	0.73	0.42	1.27	0.27
	operative_rating_ge8:had_assist_surg	-0.67	0.51	0.18	1.49	0.22
	leadership_rating_mean:had_assist_surg	-0.33	0.72	0.41	1.26	0.25
	leadership_rating_ge8:had_assist_surg	-1.00	0.37	0.10	1.30	0.12

2. Example model: overall rating binary vs. severe complication model

32 models were used for the table summary above. We explore one example from all the models above.

Model summary

- binary milestone ratings for severe complications

term	value	se	z	p_value	lower_2.5	upper_97.5
Intercept	-1.98	1.31	-1.51	0.13	-4.55	0.60
mean_ge_8	-0.26	0.24	-1.07	0.28	-0.73	0.21
had_assist_surg	-0.95	0.50	-1.89	0.06	-1.93	0.04
flg_male	-0.05	0.16	-0.28	0.78	-0.36	0.27
age_at_admit_scale	-0.05	0.08	-0.64	0.52	-0.20	0.10
race_white	-0.54	0.24	-2.28	0.02	-1.00	-0.08
flg_admit_emerg	0.93	0.22	4.23	0.00	0.50	1.36
AHRQ_score_scale	0.72	0.08	8.73	0.00	0.56	0.88
ses_2grp	-0.26	0.17	-1.50	0.13	-0.60	0.08
facility_clm_yr	-0.05	0.13	-0.41	0.68	-0.31	0.20
hosp_beds_2grp	0.47	0.17	2.69	0.01	0.13	0.81
val_hosp_mcday2inptday_ratio	0.61	0.89	0.69	0.49	-1.13	2.35
val_hosp_rn2bed_ratio	0.20	0.12	1.68	0.09	-0.03	0.42
mean_ge_8:had_assist_surg	1.03	0.54	1.90	0.06	-0.03	2.09

group	effect	variance	sd	sd_2.5	sd_97.5	var_prop
id_physician_npi	Intercept	0.15	0.39	0.12	1.19	0.36
cpt_cd	Intercept	0.27	0.52	0.26	1.00	0.64

interaction interpretations

1. table of effects by category

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$emmeans
 mean_ge_8 had_assist_surg   prob     SE   df lower.CL upper.CL
         0               0 0.1657 0.0410 1454   0.0998    0.262
         1               0 0.1331 0.0272 1454   0.0881    0.196
         0               1 0.0715 0.0336 1454   0.0277    0.172
         1               1 0.1426 0.0313 1454   0.0915    0.216

Results are averaged over the levels of: flg_male, race_white, flg_admit_emerg, ses_2grp, hosp_beds_2grp
Confidence level used: 0.95
Intervals are back-transformed from the logit scale

$contrasts
 contrast  odds.ratio    SE   df t.ratio p.value
 0,0 / 1,0      1.294 0.311 1454   1.072  0.7070
 0,0 / 0,1      2.580 1.296 1454   1.887  0.2341
 0,0 / 1,1      1.193 0.320 1454   0.659  0.9124
 1,0 / 0,1      1.994 0.943 1454   1.460  0.4624
 1,0 / 1,1      0.923 0.182 1454  -0.409  0.9768
 0,1 / 1,1      0.463 0.226 1454  -1.577  0.3920

Results are averaged over the levels of: flg_male, race_white, flg_admit_emerg, ses_2grp, hosp_beds_2grp
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- when a sugeon had <8 overall rating and didn't have assistant surgeon in the case, the probability of the patient having severe complication is 16.57%, fixing all covariates at average level.

2. plot

predicted prob by had vs didn't have assistant surgeon in the case.