

Descriptive Statistics based on the VQI TEVAR Dataset

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population of interest: the asymptomatic and symptomatics groups.

	Overall
	(N=15424)
PRESENTATION	
Asymptomatic	8915 (57.8%)
Symptomatic	6509 (42.2%)

Patient demographic and co-morbidities

Table: A comparison of the baseline demographic and co-morbidities characteristics for symptomatic versus asymptomatic patients who undergo the F-BEVAR procedure

	Asymptomatic (N=8915)	Symptomatic (N=6509)	Total (N=15424)
R_PREOP_AMBUL			
Amb	150 (1.7%)	142 (2.2%)	292 (1.9%)
Amb w/ Assistance	9 (0.1%)	3 (0.0%)	12 (0.1%)
Bedridden	0 (0%)	6 (0.1%)	6 (0.0%)
Missing	8756 (98.2%)	6358 (97.7%)	15114 (98.0%)
AGE			
Mean (SD)	70.8 (10.4)	63.7 (13.6)	67.8 (12.4)
Median [Min, Max]	72.0 [0, 90.0]	65.0 [0, 90.0]	70.0 [0, 90.0]
AGECAT			
<40	98 (1.1%)	287 (4.4%)	385 (2.5%)
>89	95 (1.1%)	71 (1.1%)	166 (1.1%)
40-49	254 (2.8%)	757 (11.6%)	1011 (6.6%)
50-59	799 (9.0%)	1366 (21.0%)	2165 (14.0%)
60-69	2368 (26.6%)	1723 (26.5%)	4091 (26.5%)
70-79	3702 (41.5%)	1526 (23.4%)	5228 (33.9%)
80-89	1599 (17.9%)	779 (12.0%)	2378 (15.4%)
GENDER			
female	2700 (30.3%)	2535 (38.9%)	5235 (33.9%)
male	6215 (69.7%)	3974 (61.1%)	10189 (66.1%)
ETHNICITY			
Hispanic or Latino	395 (4.4%)	487 (7.5%)	882 (5.7%)
None Hispanic or Latino	8507 (95.4%)	6013 (92.4%)	14520 (94.1%)
Missing	13 (0.1%)	9 (0.1%)	22 (0.1%)
RACE			
American Indian or Alaskan Native	19 (0.2%)	15 (0.2%)	34 (0.2%)
Asian	208 (2.3%)	171 (2.6%)	379 (2.5%)
Black or African American	1186 (13.3%)	1840 (28.3%)	3026 (19.6%)

	Asymptomatic	Symptomatic	Total
More than 1 race	27 (0.3%)	11 (0.2%)	38 (0.2%)
Native Hawaiian or other Pacific Islander	17 (0.2%)	21 (0.3%)	38 (0.2%)
Unknown/Other	548 (6.1%)	535 (8.2%)	1083 (7.0%)
White	6909 (77.5%)	3913 (60.1%)	10822 (70.2%)
Missing	1 (0.0%)	3 (0.0%)	4 (0.0%)
TRANSFER			
Hospital	318 (3.6%)	3651 (56.1%)	3969 (25.7%)
No	8574 (96.2%)	2844 (43.7%)	11418 (74.0%)
Rehab Unit	18 (0.2%)	13 (0.2%)	31 (0.2%)
Missing	5 (0.1%)	1 (0.0%)	6 (0.0%)
PRIMARYINSURER			
Commercial	2679 (30.1%)	2382 (36.6%)	5061 (32.8%)
Medicaid	374 (4.2%)	731 (11.2%)	1105 (7.2%)
Medicare	4762 (53.4%)	2437 (37.4%)	7199 (46.7%)
Military/VA	232 (2.6%)	133 (2.0%)	365 (2.4%)
Non US Insurance	391 (4.4%)	90 (1.4%)	481 (3.1%)
Self Pay	99 (1.1%)	506 (7.8%)	605 (3.9%)
Missing	378 (4.2%)	230 (3.5%)	608 (3.9%)
LIVINGSTATUS			
Home	8820 (98.9%)	6415 (98.6%)	15235 (98.8%)
Homeless	12 (0.1%)	27 (0.4%)	39 (0.3%)
Nursing home	81 (0.9%)	66 (1.0%)	147 (1.0%)
Missing	2 (0.0%)	1 (0.0%)	3 (0.0%)
PREOP_FUNCSTATUS			
Assisted care	177 (2.0%)	138 (2.1%)	315 (2.0%)
Bed bound	11 (0.1%)	22 (0.3%)	33 (0.2%)
Full	5866 (65.8%)	4586 (70.5%)	10452 (67.8%)
Light work	1792 (20.1%)	1060 (16.3%)	2852 (18.5%)
Self care	1030 (11.6%)	681 (10.5%)	1711 (11.1%)
Missing	39 (0.4%)	22 (0.3%)	61 (0.4%)
PRIOR_CVD			
No	7901 (88.6%)	5901 (90.7%)	13802 (89.5%)
Yes	1011 (11.3%)	607 (9.3%)	1618 (10.5%)
Missing	3 (0.0%)	1 (0.0%)	4 (0.0%)
PRIOR_CAD			
No	6809 (76.4%)	5469 (84.0%)	12278 (79.6%)
Yes	2102 (23.6%)	1037 (15.9%)	3139 (20.4%)
Missing	4 (0.0%)	3 (0.0%)	7 (0.0%)
PRIOR_CHF			
No	7659 (85.9%)	5806 (89.2%)	13465 (87.3%)
Yes	1256 (14.1%)	703 (10.8%)	1959 (12.7%)
COPD			
No	5879 (65.9%)	5081 (78.1%)	10960 (71.1%)
Yes	3035 (34.0%)	1428 (21.9%)	4463 (28.9%)
Missing	1 (0.0%)	0 (0%)	1 (0.0%)
DIABETES			
No	7386 (82.8%)	5565 (85.5%)	12951 (84.0%)
Yes	1529 (17.2%)	943 (14.5%)	2472 (16.0%)
Missing	0 (0%)	1 (0.0%)	1 (0.0%)
PREOP_DIALYSIS			
No	8689 (97.5%)	6237 (95.8%)	14926 (96.8%)
Yes	223 (2.5%)	271 (4.2%)	494 (3.2%)

	Asymptomatic	Symptomatic	Total
Missing	3 (0.0%)	1 (0.0%)	4 (0.0%)
HTN			
No	910 (10.2%)	653 (10.0%)	1563 (10.1%)
Yes	7955 (89.2%)	5757 (88.4%)	13712 (88.9%)
Missing	50 (0.6%)	99 (1.5%)	149 (1.0%)
PREOP_SMOKING			
No	1755 (19.7%)	2137 (32.8%)	3892 (25.2%)
Yes	7160 (80.3%)	4360 (67.0%)	11520 (74.7%)
Missing	0 (0%)	12 (0.2%)	12 (0.1%)
PRIOR_CABG			
No	7675 (86.1%)	6111 (93.9%)	13786 (89.4%)
Yes	1237 (13.9%)	397 (6.1%)	1634 (10.6%)
Missing	3 (0.0%)	1 (0.0%)	4 (0.0%)
PRIOR_PCI			
No	7237 (81.2%)	5926 (91.0%)	13163 (85.3%)
Yes	1671 (18.7%)	581 (8.9%)	2252 (14.6%)
Missing	7 (0.1%)	2 (0.0%)	9 (0.1%)
PRIOR_ANEURREP			
No	6573 (73.7%)	5414 (83.2%)	11987 (77.7%)
Yes	2341 (26.3%)	1094 (16.8%)	3435 (22.3%)
Missing	1 (0.0%)	1 (0.0%)	2 (0.0%)
STRESS			
No	5322 (59.7%)	5538 (85.1%)	10860 (70.4%)
Yes	3585 (40.2%)	967 (14.9%)	4552 (29.5%)
Missing	8 (0.1%)	4 (0.1%)	12 (0.1%)
PREOP_CREAT			
Mean (SD)	1.16 (0.718)	1.22 (0.818)	1.19 (0.762)
Median [Min, Max]	1.04 [0, 32.0]	1.01 [0.290, 19.8]	1.03 [0, 32.0]
Missing	247 (2.8%)	254 (3.9%)	501 (3.2%)
DC_ASA			
No	1396 (15.7%)	1388 (21.3%)	2784 (18.0%)
Yes	7241 (81.2%)	4789 (73.6%)	12030 (78.0%)
Missing	278 (3.1%)	332 (5.1%)	610 (4.0%)
DC_P2Y			
No	5616 (63.0%)	5166 (79.4%)	10782 (69.9%)
Yes	3020 (33.9%)	1010 (15.5%)	4030 (26.1%)
Missing	279 (3.1%)	333 (5.1%)	612 (4.0%)
DC_STATIN			
No	1995 (22.4%)	2375 (36.5%)	4370 (28.3%)
Yes	6642 (74.5%)	3802 (58.4%)	10444 (67.7%)
Missing	278 (3.1%)	332 (5.1%)	610 (4.0%)
R_CR_PRESENT			
Mean (SD)	1.33 (0.577)	2.03 (2.08)	2.01 (2.05)
Median [Min, Max]	1.00 [1.00, 2.00]	1.00 [1.00, 11.0]	1.00 [1.00, 11.0]
Missing	8912 (100.0%)	6415 (98.6%)	15327 (99.4%)

Operative Variables

Table: A comparison of the operative characteristics for symptomatic versus asymptomatic patients who undergo the F-BEVAR procedure

	Asymptomatic	Symptomatic	Overall
	(N=8915)	(N=6509)	(N=15424)
PRIOR_AORSURG			
Both	220 (2.5%)	57 (0.9%)	277 (1.8%)
Endo	911 (10.2%)	486 (7.5%)	1397 (9.1%)
None	6353 (71.3%)	5255 (80.7%)	11608 (75.3%)
Open	1429 (16.0%)	709 (10.9%)	2138 (13.9%)
Missing	2 (0.0%)	2 (0.0%)	4 (0.0%)
PRIOR_AORSURG_OPENLOC1			
No	719 (8.1%)	235 (3.6%)	954 (6.2%)
Yes	928 (10.4%)	530 (8.1%)	1458 (9.5%)
Missing	7268 (81.5%)	5744 (88.2%)	13012 (84.4%)
PRIOR_AORSURG_OPENLOC2			
No	1395 (15.6%)	671 (10.3%)	2066 (13.4%)
Yes	252 (2.8%)	94 (1.4%)	346 (2.2%)
Missing	7268 (81.5%)	5744 (88.2%)	13012 (84.4%)
PRIOR_AORSURG_OPENLOC3			
No	1544 (17.3%)	723 (11.1%)	2267 (14.7%)
Yes	103 (1.2%)	42 (0.6%)	145 (0.9%)
Missing	7268 (81.5%)	5744 (88.2%)	13012 (84.4%)
PRIOR_AORSURG_OPENLOC4			
No	1075 (12.1%)	592 (9.1%)	1667 (10.8%)
Yes	572 (6.4%)	173 (2.7%)	745 (4.8%)
Missing	7268 (81.5%)	5744 (88.2%)	13012 (84.4%)
PRIOR_AORSURG_ENDOLOC1			
No	952 (10.7%)	446 (6.9%)	1398 (9.1%)
Yes	169 (1.9%)	95 (1.5%)	264 (1.7%)
Missing	7794 (87.4%)	5968 (91.7%)	13762 (89.2%)
PRIOR_AORSURG_ENDOLOC2			
No	689 (7.7%)	338 (5.2%)	1027 (6.7%)
Yes	432 (4.8%)	203 (3.1%)	635 (4.1%)
Missing	7794 (87.4%)	5968 (91.7%)	13762 (89.2%)
PRIOR_AORSURG_ENDOLOC3			
No	1029 (11.5%)	499 (7.7%)	1528 (9.9%)
Yes	92 (1.0%)	42 (0.6%)	134 (0.9%)
Missing	7794 (87.4%)	5968 (91.7%)	13762 (89.2%)
PRIOR_AORSURG_ENDOLOC4			
No	551 (6.2%)	271 (4.2%)	822 (5.3%)
Yes	570 (6.4%)	270 (4.1%)	840 (5.4%)
Missing	7794 (87.4%)	5968 (91.7%)	13762 (89.2%)
PATHOLOGY			
Aneurysm	6599 (74.0%)	1506 (23.1%)	8105 (52.5%)
Aneurysm from dissection	761 (8.5%)	461 (7.1%)	1222 (7.9%)
Dissection	1189 (13.3%)	3620 (55.6%)	4809 (31.2%)
IMH	48 (0.5%)	269 (4.1%)	317 (2.1%)
PAU	264 (3.0%)	386 (5.9%)	650 (4.2%)
PAU with IMH	54 (0.6%)	267 (4.1%)	321 (2.1%)
PREOP_MAXAAADIA			
Mean (SD)	58.4 (13.0)	48.6 (16.5)	54.4 (15.3)
Median [Min, Max]	58.0 [3.00, 410]	45.0 [0, 160]	55.0 [0, 410]
Missing	88 (1.0%)	359 (5.5%)	447 (2.9%)
URGENCY			
Elective	8692 (97.5%)	2979 (45.8%)	11671 (75.7%)

	Asymptomatic	Symptomatic	Overall
Emergent	22 (0.2%)	994 (15.3%)	1016 (6.6%)
Urgent	201 (2.3%)	2536 (39.0%)	2737 (17.7%)
PATHOLOGY_ANEURYSM_TYPE			
Anastomotic	84 (0.9%)	15 (0.2%)	99 (0.6%)
Degenerative, fusiform	5154 (57.8%)	1087 (16.7%)	6241 (40.5%)
Degenerative, saccular	1079 (12.1%)	336 (5.2%)	1415 (9.2%)
Intercostal or visceral patch	28 (0.3%)	2 (0.0%)	30 (0.2%)
Prior trauma	22 (0.2%)	14 (0.2%)	36 (0.2%)
Missing	2548 (28.6%)	5055 (77.7%)	7603 (49.3%)
PATHOLOGY_DISSECT_TYPE			
Acute, <= 30 days	188 (2.1%)	2929 (45.0%)	3117 (20.2%)
Chronic, >30 daysr	1762 (19.8%)	1150 (17.7%)	2912 (18.9%)
Missing	6965 (78.1%)	2430 (37.3%)	9395 (60.9%)
PATHOLOGY_DISSECT_ONSET_DAYS			
Mean (SD)	NA (NA)	-34.0 (6020)	-34.0 (6020)
Median [Min, Max]	NA [NA, NA]	-7.00 [-16500, 369000]	-7.00 [-16500, 369000]
Missing	8915 (100%)	2714 (41.7%)	11629 (75.4%)
GENHIST			
No	8591 (96.4%)	6216 (95.5%)	14807 (96.0%)
Yes	317 (3.6%)	287 (4.4%)	604 (3.9%)
Missing	7 (0.1%)	6 (0.1%)	13 (0.1%)
R_GENHIST			
No	127 (1.4%)	146 (2.2%)	273 (1.8%)
Yes	7 (0.1%)	0 (0%)	7 (0.0%)
Missing	8781 (98.5%)	6363 (97.8%)	15144 (98.2%)
PROXZONE_DISEASE			
Mean (SD)	5.00 (2.28)	3.28 (1.38)	4.27 (2.13)
Median [Min, Max]	4.00 [2.00, 9.00]	3.00 [2.00, 9.00]	3.00 [2.00, 9.00]
DISTZONE_DISEASE			
10B	1148 (12.9%)	573 (8.8%)	1721 (11.2%)
10L	353 (4.0%)	362 (5.6%)	715 (4.6%)
10R	442 (5.0%)	302 (4.6%)	744 (4.8%)
11B	184 (2.1%)	266 (4.1%)	450 (2.9%)
11L	130 (1.5%)	195 (3.0%)	325 (2.1%)
11R	151 (1.7%)	233 (3.6%)	384 (2.5%)
3	117 (1.3%)	77 (1.2%)	194 (1.3%)
4	719 (8.1%)	711 (10.9%)	1430 (9.3%)
5	1984 (22.3%)	1929 (29.6%)	3913 (25.4%)
6	253 (2.8%)	307 (4.7%)	560 (3.6%)
7	160 (1.8%)	213 (3.3%)	373 (2.4%)
8	342 (3.8%)	333 (5.1%)	675 (4.4%)
9	2932 (32.9%)	1008 (15.5%)	3940 (25.5%)
ANESTHESIA			
General	8719 (97.8%)	6346 (97.5%)	15065 (97.7%)
Local	146 (1.6%)	109 (1.7%)	255 (1.7%)
Regional	46 (0.5%)	53 (0.8%)	99 (0.6%)
Missing	4 (0.0%)	1 (0.0%)	5 (0.0%)
CONTRAST			
Mean (SD)	118 (75.0)	114 (79.8)	116 (77.1)
Median [Min, Max]	100 [0, 1200]	100 [0, 1900]	100 [0, 1900]

	Asymptomatic	Symptomatic	Overall
Missing	309 (3.5%)	258 (4.0%)	567 (3.7%)
EBL			
Mean (SD)	335 (616)	229 (520)	290 (580)
Median [Min, Max]	150 [0, 25000]	100 [0, 10000]	100 [0, 25000]
Missing	152 (1.7%)	167 (2.6%)	319 (2.1%)
FLUOROTIME			
Mean (SD)	47.0 (43.7)	23.7 (27.9)	37.2 (39.6)
Median [Min, Max]	35.5 [0, 999]	15.0 [0, 499]	22.0 [0, 999]
Missing	536 (6.0%)	438 (6.7%)	974 (6.3%)
INTRAOP_PRBC			
Mean (SD)	0.661 (9.54)	0.706 (9.76)	0.680 (9.63)
Median [Min, Max]	0 [0, 500]	0 [0, 600]	0 [0, 600]
Missing	16 (0.2%)	9 (0.1%)	25 (0.2%)
TOTALPROCTIME			
Mean (SD)	202 (121)	154 (109)	182 (118)
Median [Min, Max]	180 [3.33, 1040]	120 [20.0, 1040]	155 [3.33, 1040]
Missing	8 (0.1%)	6 (0.1%)	14 (0.1%)
IVUSTEE			
Both	252 (2.8%)	548 (8.4%)	800 (5.2%)
IVUS	2768 (31.0%)	3650 (56.1%)	6418 (41.6%)
No	5635 (63.2%)	1989 (30.6%)	7624 (49.4%)
TEE	209 (2.3%)	292 (4.5%)	501 (3.2%)
Missing	51 (0.6%)	30 (0.5%)	81 (0.5%)
ACCESS_R			
Iliac, via retroperitoneal	76 (0.9%)	40 (0.6%)	116 (0.8%)
None	30 (0.3%)	11 (0.2%)	41 (0.3%)
Open femoral, failed percutaneous	156 (1.7%)	64 (1.0%)	220 (1.4%)
Open femoral, transverse	1714 (19.2%)	1061 (16.3%)	2775 (18.0%)
Open femoral, vertical	608 (6.8%)	420 (6.5%)	1028 (6.7%)
Percutaneous femoral	5377 (60.3%)	3863 (59.3%)	9240 (59.9%)
Missing	954 (10.7%)	1050 (16.1%)	2004 (13.0%)
ACCESS_L			
Iliac, via retroperitoneal	50 (0.6%)	29 (0.4%)	79 (0.5%)
None	29 (0.3%)	24 (0.4%)	53 (0.3%)
Open femoral, failed percutaneous	99 (1.1%)	32 (0.5%)	131 (0.8%)
Open femoral, transverse	1087 (12.2%)	519 (8.0%)	1606 (10.4%)
Open femoral, vertical	428 (4.8%)	243 (3.7%)	671 (4.4%)
Percutaneous femoral	4834 (54.2%)	3033 (46.6%)	7867 (51.0%)
Missing	2388 (26.8%)	2629 (40.4%)	5017 (32.5%)
LRGST_SHEATH_SIZE_R			
Mean (SD)	18.6 (4.58)	18.6 (5.14)	18.6 (4.82)
Median [Min, Max]	20.0 [0, 26.0]	20.0 [5.00, 28.0]	20.0 [0, 28.0]
Missing	7376 (82.7%)	5454 (83.8%)	12830 (83.2%)
LRGST_SHEATH_SIZE_L			
Mean (SD)	16.5 (5.78)	15.6 (7.28)	16.2 (6.38)
Median [Min, Max]	18.0 [4.00, 26.0]	18.0 [5.00, 90.0]	18.0 [4.00, 90.0]
Missing	7750 (86.9%)	5831 (89.6%)	13581 (88.1%)
ARMNECK_ACCESS			
For both	512 (5.7%)	226 (3.5%)	738 (4.8%)
For branch treatment	1477 (16.6%)	930 (14.3%)	2407 (15.6%)
For femoral-brachial wire	508 (5.7%)	404 (6.2%)	912 (5.9%)

	Asymptomatic	Symptomatic	Overall
No	6410 (71.9%)	4939 (75.9%)	11349 (73.6%)
Missing	8 (0.1%)	10 (0.2%)	18 (0.1%)
ARMNECK_ACCESS_LOC			
Left arm	1224 (13.7%)	822 (12.6%)	2046 (13.3%)
Left axillary	600 (6.7%)	199 (3.1%)	799 (5.2%)
Left carotid	148 (1.7%)	234 (3.6%)	382 (2.5%)
Multiple	86 (1.0%)	62 (1.0%)	148 (1.0%)
Right arm	256 (2.9%)	176 (2.7%)	432 (2.8%)
Right axillary	170 (1.9%)	51 (0.8%)	221 (1.4%)
Right carotid	5 (0.1%)	13 (0.2%)	18 (0.1%)
Missing	6426 (72.1%)	4952 (76.1%)	11378 (73.8%)
AORDEV_NUM			
Mean (SD)	2.05 (0.960)	1.86 (0.895)	1.97 (0.937)
Median [Min, Max]	2.00 [1.00, 6.00]	2.00 [1.00, 6.00]	2.00 [1.00, 6.00]
Missing	59 (0.7%)	31 (0.5%)	90 (0.6%)
AORDEV_CMOT			
No	5936 (66.6%)	5989 (92.0%)	11925 (77.3%)
Yes	2913 (32.7%)	485 (7.5%)	3398 (22.0%)
Missing	66 (0.7%)	35 (0.5%)	101 (0.7%)
STAGEDAORTRT			
No	7786 (87.3%)	5819 (89.4%)	13605 (88.2%)
Yes	479 (5.4%)	253 (3.9%)	732 (4.7%)
Missing	650 (7.3%)	437 (6.7%)	1087 (7.0%)
DEV1_GTYPE			
Custom	1874 (21.0%)	131 (2.0%)	2005 (13.0%)
Physician modified	580 (6.5%)	164 (2.5%)	744 (4.8%)
Standard	451 (5.1%)	186 (2.9%)	637 (4.1%)
Missing	6010 (67.4%)	6028 (92.6%)	12038 (78.0%)
DEV2_GTYPE			
Custom	1078 (12.1%)	77 (1.2%)	1155 (7.5%)
Physician modified	176 (2.0%)	65 (1.0%)	241 (1.6%)
Standard	1224 (13.7%)	238 (3.7%)	1462 (9.5%)
Missing	6437 (72.2%)	6129 (94.2%)	12566 (81.5%)
DEV3_GTYPE			
Custom	144 (1.6%)	25 (0.4%)	169 (1.1%)
Physician modified	55 (0.6%)	25 (0.4%)	80 (0.5%)
Standard	469 (5.3%)	118 (1.8%)	587 (3.8%)
Missing	8247 (92.5%)	6341 (97.4%)	14588 (94.6%)
DEV1_PROXZONE			
Mean (SD)	4.68 (2.23)	3.08 (1.52)	4.00 (2.11)
Median [Min, Max]	4.00 [0, 9.00]	3.00 [0, 9.00]	3.00 [0, 9.00]
Missing	180 (2.0%)	81 (1.2%)	261 (1.7%)
DEV2_PROXZONE			
Mean (SD)	6.27 (2.53)	4.22 (1.58)	5.49 (2.43)
Median [Min, Max]	5.00 [0, 9.00]	4.00 [0, 9.00]	4.00 [0, 9.00]
Missing	2653 (29.8%)	2624 (40.3%)	5277 (34.2%)
DEV3_PROXZONE			
Mean (SD)	6.01 (2.36)	4.89 (1.90)	5.57 (2.26)
Median [Min, Max]	5.00 [0, 9.00]	5.00 [0, 9.00]	5.00 [0, 9.00]
Missing	7039 (79.0%)	5321 (81.7%)	12360 (80.1%)
DEV4_PROXZONE			

	Asymptomatic	Symptomatic	Overall
Mean (SD)	6.62 (2.38)	5.92 (2.42)	6.42 (2.41)
Median [Min, Max]	7.00 [0, 9.00]	5.00 [0, 9.00]	6.00 [0, 9.00]
Missing	8230 (92.3%)	6241 (95.9%)	14471 (93.8%)
DEV5_PROXZONE			
Mean (SD)	6.84 (2.14)	6.36 (2.94)	6.70 (2.41)
Median [Min, Max]	7.00 [1.00, 9.00]	7.00 [0, 9.00]	7.00 [0, 9.00]
Missing	8707 (97.7%)	6423 (98.7%)	15130 (98.1%)
DEV6_PROXZONE			
Mean (SD)	6.69 (2.17)	6.94 (2.23)	6.77 (2.18)
Median [Min, Max]	7.00 [1.00, 9.00]	7.50 [2.00, 9.00]	7.00 [1.00, 9.00]
Missing	8835 (99.1%)	6473 (99.4%)	15308 (99.2%)
DEV1_DISTZONE			
0	1 (0.0%)	3 (0.0%)	4 (0.0%)
1	2 (0.0%)	3 (0.0%)	5 (0.0%)
10B	385 (4.3%)	99 (1.5%)	484 (3.1%)
10L	55 (0.6%)	25 (0.4%)	80 (0.5%)
10R	82 (0.9%)	33 (0.5%)	115 (0.7%)
11B	15 (0.2%)	2 (0.0%)	17 (0.1%)
11L	10 (0.1%)	7 (0.1%)	17 (0.1%)
11R	17 (0.2%)	2 (0.0%)	19 (0.1%)
2	32 (0.4%)	45 (0.7%)	77 (0.5%)
3	246 (2.8%)	301 (4.6%)	547 (3.5%)
4	2298 (25.8%)	3199 (49.1%)	5497 (35.6%)
5	1903 (21.3%)	1998 (30.7%)	3901 (25.3%)
6	191 (2.1%)	127 (2.0%)	318 (2.1%)
7	106 (1.2%)	84 (1.3%)	190 (1.2%)
8	396 (4.4%)	91 (1.4%)	487 (3.2%)
9	2967 (33.3%)	344 (5.3%)	3311 (21.5%)
Missing	209 (2.3%)	146 (2.2%)	355 (2.3%)
DEV2_DISTZONE			
0	2 (0.0%)	0 (0%)	2 (0.0%)
1	2 (0.0%)	0 (0%)	2 (0.0%)
10B	1259 (14.1%)	99 (1.5%)	1358 (8.8%)
10L	326 (3.7%)	38 (0.6%)	364 (2.4%)
10R	387 (4.3%)	52 (0.8%)	439 (2.8%)
11B	20 (0.2%)	8 (0.1%)	28 (0.2%)
11L	16 (0.2%)	3 (0.0%)	19 (0.1%)
11R	28 (0.3%)	2 (0.0%)	30 (0.2%)
2	13 (0.1%)	12 (0.2%)	25 (0.2%)
3	61 (0.7%)	52 (0.8%)	113 (0.7%)
4	506 (5.7%)	651 (10.0%)	1157 (7.5%)
5	1976 (22.2%)	2384 (36.6%)	4360 (28.3%)
6	200 (2.2%)	175 (2.7%)	375 (2.4%)
7	100 (1.1%)	85 (1.3%)	185 (1.2%)
8	151 (1.7%)	58 (0.9%)	209 (1.4%)
9	1225 (13.7%)	292 (4.5%)	1517 (9.8%)
Missing	2643 (29.6%)	2598 (39.9%)	5241 (34.0%)
DEV3_DISTZONE			
0	7 (0.1%)	1 (0.0%)	8 (0.1%)
1	4 (0.0%)	0 (0%)	4 (0.0%)

	Asymptomatic	Symptomatic	Overall
10B	108 (1.2%)	38 (0.6%)	146 (0.9%)
10L	149 (1.7%)	20 (0.3%)	169 (1.1%)
10R	173 (1.9%)	23 (0.4%)	196 (1.3%)
11B	7 (0.1%)	0 (0%)	7 (0.0%)
11L	5 (0.1%)	1 (0.0%)	6 (0.0%)
11R	26 (0.3%)	2 (0.0%)	28 (0.2%)
2	10 (0.1%)	7 (0.1%)	17 (0.1%)
3	28 (0.3%)	20 (0.3%)	48 (0.3%)
4	121 (1.4%)	121 (1.9%)	242 (1.6%)
5	586 (6.6%)	542 (8.3%)	1128 (7.3%)
6	125 (1.4%)	77 (1.2%)	202 (1.3%)
7	63 (0.7%)	46 (0.7%)	109 (0.7%)
8	80 (0.9%)	51 (0.8%)	131 (0.8%)
9	393 (4.4%)	240 (3.7%)	633 (4.1%)
Missing	7030 (78.9%)	5320 (81.7%)	12350 (80.1%)
DEV4_DISTZONE			
10B	49 (0.5%)	17 (0.3%)	66 (0.4%)
10L	103 (1.2%)	8 (0.1%)	111 (0.7%)
10R	84 (0.9%)	13 (0.2%)	97 (0.6%)
11B	2 (0.0%)	0 (0%)	2 (0.0%)
11L	16 (0.2%)	0 (0%)	16 (0.1%)
11R	6 (0.1%)	3 (0.0%)	9 (0.1%)
2	3 (0.0%)	3 (0.0%)	6 (0.0%)
3	11 (0.1%)	11 (0.2%)	22 (0.1%)
4	42 (0.5%)	13 (0.2%)	55 (0.4%)
5	131 (1.5%)	62 (1.0%)	193 (1.3%)
6	21 (0.2%)	16 (0.2%)	37 (0.2%)
7	20 (0.2%)	14 (0.2%)	34 (0.2%)
8	43 (0.5%)	17 (0.3%)	60 (0.4%)
9	154 (1.7%)	90 (1.4%)	244 (1.6%)
0	0 (0%)	1 (0.0%)	1 (0.0%)
Missing	8230 (92.3%)	6241 (95.9%)	14471 (93.8%)
DEV5_DISTZONE			
10B	14 (0.2%)	11 (0.2%)	25 (0.2%)
10L	19 (0.2%)	7 (0.1%)	26 (0.2%)
10R	15 (0.2%)	6 (0.1%)	21 (0.1%)
11L	2 (0.0%)	0 (0%)	2 (0.0%)
11R	6 (0.1%)	2 (0.0%)	8 (0.1%)
3	1 (0.0%)	0 (0%)	1 (0.0%)
4	9 (0.1%)	2 (0.0%)	11 (0.1%)
5	32 (0.4%)	13 (0.2%)	45 (0.3%)
6	8 (0.1%)	1 (0.0%)	9 (0.1%)
7	12 (0.1%)	8 (0.1%)	20 (0.1%)
8	17 (0.2%)	5 (0.1%)	22 (0.1%)
9	72 (0.8%)	23 (0.4%)	95 (0.6%)
2	0 (0%)	8 (0.1%)	8 (0.1%)
Missing	8708 (97.7%)	6423 (98.7%)	15131 (98.1%)
DEV6_DISTZONE			
10B	6 (0.1%)	3 (0.0%)	9 (0.1%)
10L	5 (0.1%)	5 (0.1%)	10 (0.1%)
10R	1 (0.0%)	6 (0.1%)	7 (0.0%)
11L	3 (0.0%)	1 (0.0%)	4 (0.0%)

	Asymptomatic	Symptomatic	Overall
11R	1 (0.0%)	0 (0%)	1 (0.0%)
4	4 (0.0%)	0 (0%)	4 (0.0%)
5	6 (0.1%)	7 (0.1%)	13 (0.1%)
6	11 (0.1%)	0 (0%)	11 (0.1%)
7	5 (0.1%)	1 (0.0%)	6 (0.0%)
8	7 (0.1%)	7 (0.1%)	14 (0.1%)
9	30 (0.3%)	6 (0.1%)	36 (0.2%)
3	0 (0%)	1 (0.0%)	1 (0.0%)
Missing	8836 (99.1%)	6472 (99.4%)	15308 (99.2%)
ILIACDEV_END_R			
Common	2468 (27.7%)	393 (6.0%)	2861 (18.5%)
External, Unintended	29 (0.3%)	5 (0.1%)	34 (0.2%)
External,Intended	352 (3.9%)	100 (1.5%)	452 (2.9%)
None	44 (0.5%)	14 (0.2%)	58 (0.4%)
Missing	6022 (67.5%)	5997 (92.1%)	12019 (77.9%)
ILIACDEV_END_L			
Common	2542 (28.5%)	386 (5.9%)	2928 (19.0%)
External, Unintended	16 (0.2%)	3 (0.0%)	19 (0.1%)
External,Intended	284 (3.2%)	68 (1.0%)	352 (2.3%)
None	40 (0.4%)	19 (0.3%)	59 (0.4%)
Missing	6033 (67.7%)	6033 (92.7%)	12066 (78.2%)
BRANCH_STAGED			
No	6231 (69.9%)	4175 (64.1%)	10406 (67.5%)
Yes	1016 (11.4%)	758 (11.6%)	1774 (11.5%)
Missing	1668 (18.7%)	1576 (24.2%)	3244 (21.0%)
BRANCH_LSUB			
No	5385 (60.4%)	2051 (31.5%)	7436 (48.2%)
Yes	1885 (21.1%)	2890 (44.4%)	4775 (31.0%)
Missing	1645 (18.5%)	1568 (24.1%)	3213 (20.8%)
BRANCH_CELIAC			
No	3375 (37.9%)	1355 (20.8%)	4730 (30.7%)
Yes	3895 (43.7%)	3586 (55.1%)	7481 (48.5%)
Missing	1645 (18.5%)	1568 (24.1%)	3213 (20.8%)
BRANCH_SMA			
No	2394 (26.9%)	1590 (24.4%)	3984 (25.8%)
Yes	4876 (54.7%)	3351 (51.5%)	8227 (53.3%)
Missing	1645 (18.5%)	1568 (24.1%)	3213 (20.8%)
BRANCH_RRENAL			
No	1664 (18.7%)	1681 (25.8%)	3345 (21.7%)
Yes	5606 (62.9%)	3260 (50.1%)	8866 (57.5%)
Missing	1645 (18.5%)	1568 (24.1%)	3213 (20.8%)
BRANCH_LRENAL			
No	1664 (18.7%)	1681 (25.8%)	3345 (21.7%)
Yes	5606 (62.9%)	3260 (50.1%)	8866 (57.5%)
Missing	1645 (18.5%)	1568 (24.1%)	3213 (20.8%)
BRANCH_INNO_POST			
Occluded	1 (0.0%)	2 (0.0%)	3 (0.0%)
Patent	89 (1.0%)	65 (1.0%)	154 (1.0%)
Stenosis/Partial Coverage > 50%	3 (0.0%)	0 (0%)	3 (0.0%)
Missing	8822 (99.0%)	6442 (99.0%)	15264 (99.0%)
BRANCH_LSUB_VERTPAT			
Not imaged	708 (7.9%)	1193 (18.3%)	1901 (12.3%)

	Asymptomatic	Symptomatic	Overall
Occluded bilat	2 (0.0%)	1 (0.0%)	3 (0.0%)
Occluded L, patent R	27 (0.3%)	39 (0.6%)	66 (0.4%)
Occluded R, patent L	8 (0.1%)	3 (0.0%)	11 (0.1%)
Patent bilat	1023 (11.5%)	1495 (23.0%)	2518 (16.3%)
Patent bilat, L dominant	50 (0.6%)	82 (1.3%)	132 (0.9%)
Patent bilat, R dominant	36 (0.4%)	39 (0.6%)	75 (0.5%)
Missing	7061 (79.2%)	3657 (56.2%)	10718 (69.5%)
ANESTHESIA_GEN_TIMEEXT			
<12 hrs	542 (6.1%)	607 (9.3%)	1149 (7.4%)
>24 hrs	235 (2.6%)	680 (10.4%)	915 (5.9%)
12-24 hrs	286 (3.2%)	475 (7.3%)	761 (4.9%)
In OR	7627 (85.6%)	4545 (69.8%)	12172 (78.9%)
Missing	225 (2.5%)	202 (3.1%)	427 (2.8%)
POSTOP_SPINALDRAIN			
None	5642 (63.3%)	3301 (50.7%)	8943 (58.0%)
Post-op for spinal ischemia	64 (0.7%)	139 (2.1%)	203 (1.3%)
Post-op, prophylactic	135 (1.5%)	180 (2.8%)	315 (2.0%)
Pre-op	3071 (34.4%)	2885 (44.3%)	5956 (38.6%)
Missing	3 (0.0%)	4 (0.1%)	7 (0.0%)
R_CELIAC			
Chimney	1 (0.0%)	1 (0.0%)	2 (0.0%)
Fen/scallop Only	7 (0.1%)	0 (0%)	7 (0.0%)
Fenestrated Stentgraft Branch (Branched TEVAR)	12 (0.1%)	2 (0.0%)	14 (0.1%)
Patent, no intervention	107 (1.2%)	139 (2.1%)	246 (1.6%)
Purposely Occluded	1 (0.0%)	0 (0%)	1 (0.0%)
Stented-fen	3 (0.0%)	0 (0%)	3 (0.0%)
Chronically Occluded	0 (0%)	2 (0.0%)	2 (0.0%)
De-branch	0 (0%)	4 (0.1%)	4 (0.0%)
Missing	8784 (98.5%)	6361 (97.7%)	15145 (98.2%)
R_DISTATTZONE			
Mean (SD)	6.68 (3.29)	5.17 (1.55)	5.86 (2.61)
Median [Min, Max]	5.00 [1.00, 11.0]	5.00 [4.00, 9.00]	5.00 [1.00, 11.0]
Missing	8798 (98.7%)	6370 (97.9%)	15168 (98.3%)
R_GDPROXIMAL			
Mean (SD)	33.1 (4.72)	33.8 (3.63)	33.5 (4.18)
Median [Min, Max]	34.0 [20.0, 45.0]	34.0 [22.0, 45.0]	34.0 [20.0, 45.0]
Missing	8784 (98.5%)	6361 (97.7%)	15145 (98.2%)
R_GRFTCONFIG			
Branched/fenestrated	72 (0.8%)	4 (0.1%)	76 (0.5%)
Plus Bare Stent	1 (0.0%)	15 (0.2%)	16 (0.1%)
Standard	57 (0.6%)	120 (1.8%)	177 (1.1%)
Missing	8785 (98.5%)	6370 (97.9%)	15155 (98.3%)
R_LT_RENAL			
Chimney	1 (0.0%)	0 (0%)	1 (0.0%)
Fenestrated Stentgraft Branch (Branched TEVAR)	19 (0.2%)	2 (0.0%)	21 (0.1%)
Patent, no intervention	58 (0.7%)	136 (2.1%)	194 (1.3%)
Purposely Occluded	4 (0.0%)	0 (0%)	4 (0.0%)
Stent Only	2 (0.0%)	9 (0.1%)	11 (0.1%)

	Asymptomatic	Symptomatic	Overall
Stented-fen	47 (0.5%)	1 (0.0%)	48 (0.3%)
Missing	8784 (98.5%)	6361 (97.7%)	15145 (98.2%)
R_PRATTZONE			
Mean (SD)	4.14 (2.47)	2.43 (1.07)	3.20 (2.03)
Median [Min, Max]	4.00 [0, 8.00]	2.00 [0, 6.00]	3.00 [0, 8.00]
Missing	8795 (98.7%)	6364 (97.8%)	15159 (98.3%)
R_RT_RENAL			
Chimney	1 (0.0%)	0 (0%)	1 (0.0%)
Chronically Occluded	5 (0.1%)	1 (0.0%)	6 (0.0%)
Fenestrated Stentgraft Branch (Branched	18 (0.2%)	2 (0.0%)	20 (0.1%)
TEVAR)			
Patent, no intervention	60 (0.7%)	144 (2.2%)	204 (1.3%)
Stent Only	2 (0.0%)	0 (0%)	2 (0.0%)
Stented-fen	45 (0.5%)	1 (0.0%)	46 (0.3%)
Missing	8784 (98.5%)	6361 (97.7%)	15145 (98.2%)
R_SMA			
Chimney	1 (0.0%)	1 (0.0%)	2 (0.0%)
Fen/scallop Only	34 (0.4%)	0 (0%)	34 (0.2%)
Fenestrated Stentgraft Branch (Branched	12 (0.1%)	2 (0.0%)	14 (0.1%)
TEVAR)			
Patent, no intervention	72 (0.8%)	133 (2.0%)	205 (1.3%)
Stented-fen	12 (0.1%)	0 (0%)	12 (0.1%)
Stent Only	0 (0%)	12 (0.2%)	12 (0.1%)
Missing	8784 (98.5%)	6361 (97.7%)	15145 (98.2%)
R_SPINAL_DRAIN			
No Drain	89 (1.0%)	69 (1.1%)	158 (1.0%)
Post-op Drain	4 (0.0%)	7 (0.1%)	11 (0.1%)
Pre-op Drain	28 (0.3%)	57 (0.9%)	85 (0.6%)
Missing	8794 (98.6%)	6376 (98.0%)	15170 (98.4%)
BRANCH_CELIAC_TRT			
Occluded - open	1 (0.0%)	2 (0.0%)	3 (0.0%)
Chimney	131 (1.5%)	58 (0.9%)	189 (1.2%)
Fen branch	564 (6.3%)	137 (2.1%)	701 (4.5%)
Fenestration	81 (0.9%)	37 (0.6%)	118 (0.8%)
None	1973 (22.1%)	2891 (44.4%)	4864 (31.5%)
Occluded - coil	29 (0.3%)	7 (0.1%)	36 (0.2%)
Occluded - plug	44 (0.5%)	37 (0.6%)	81 (0.5%)
Purposely covered	195 (2.2%)	146 (2.2%)	341 (2.2%)
Scallop	166 (1.9%)	10 (0.2%)	176 (1.1%)
Side-arm branch	202 (2.3%)	34 (0.5%)	236 (1.5%)
Stent	140 (1.6%)	69 (1.1%)	209 (1.4%)
Stent-graft	117 (1.3%)	58 (0.9%)	175 (1.1%)
Stented Scallop	11 (0.1%)	1 (0.0%)	12 (0.1%)
Stented-fen	139 (1.6%)	15 (0.2%)	154 (1.0%)
Surgical bypass	65 (0.7%)	41 (0.6%)	106 (0.7%)
Unintentionally covered	9 (0.1%)	4 (0.1%)	13 (0.1%)
Iliac Device	0 (0%)	2 (0.0%)	2 (0.0%)
Missing	5048 (56.6%)	2960 (45.5%)	8008 (51.9%)
BRANCH_SMA_TRT			
Chimney	241 (2.7%)	95 (1.5%)	336 (2.2%)
Fen branch	847 (9.5%)	174 (2.7%)	1021 (6.6%)

	Asymptomatic	Symptomatic	Overall
Fenestration	283 (3.2%)	40 (0.6%)	323 (2.1%)
None	1733 (19.4%)	2570 (39.5%)	4303 (27.9%)
Occluded - coil	3 (0.0%)	0 (0%)	3 (0.0%)
Occluded - plug	1 (0.0%)	0 (0%)	1 (0.0%)
Purposely covered	22 (0.2%)	33 (0.5%)	55 (0.4%)
Scallop	543 (6.1%)	20 (0.3%)	563 (3.7%)
Side-arm branch	214 (2.4%)	43 (0.7%)	257 (1.7%)
Stent	290 (3.3%)	150 (2.3%)	440 (2.9%)
Stent-graft	223 (2.5%)	89 (1.4%)	312 (2.0%)
Stented Scallop	35 (0.4%)	2 (0.0%)	37 (0.2%)
Stented-fen	321 (3.6%)	40 (0.6%)	361 (2.3%)
Surgical bypass	89 (1.0%)	53 (0.8%)	142 (0.9%)
Thromboembolectomy	1 (0.0%)	6 (0.1%)	7 (0.0%)
Unintentionally covered	3 (0.0%)	0 (0%)	3 (0.0%)
Occluded - open	0 (0%)	1 (0.0%)	1 (0.0%)
Iliac Device	0 (0%)	2 (0.0%)	2 (0.0%)
Missing	4066 (45.6%)	3191 (49.0%)	7257 (47.1%)
BRANCH_RRENAL_TRT			
Chimney	290 (3.3%)	88 (1.4%)	378 (2.5%)
Fen branch	1446 (16.2%)	164 (2.5%)	1610 (10.4%)
Fenestration	91 (1.0%)	22 (0.3%)	113 (0.7%)
Iliac Device	3 (0.0%)	2 (0.0%)	5 (0.0%)
None	1490 (16.7%)	2485 (38.2%)	3975 (25.8%)
Occluded - coil	8 (0.1%)	5 (0.1%)	13 (0.1%)
Occluded - plug	3 (0.0%)	0 (0%)	3 (0.0%)
Purposely covered	84 (0.9%)	51 (0.8%)	135 (0.9%)
Scallop	21 (0.2%)	0 (0%)	21 (0.1%)
Side-arm branch	145 (1.6%)	35 (0.5%)	180 (1.2%)
Stent	595 (6.7%)	158 (2.4%)	753 (4.9%)
Stent-graft	485 (5.4%)	98 (1.5%)	583 (3.8%)
Stented Scallop	33 (0.4%)	5 (0.1%)	38 (0.2%)
Stented-fen	801 (9.0%)	69 (1.1%)	870 (5.6%)
Surgical bypass	77 (0.9%)	42 (0.6%)	119 (0.8%)
Unintentionally covered	6 (0.1%)	2 (0.0%)	8 (0.1%)
Missing	3337 (37.4%)	3283 (50.4%)	6620 (42.9%)
BRANCH_LRENAL_TRT			
Occluded - open	1 (0.0%)	0 (0%)	1 (0.0%)
Chimney	306 (3.4%)	82 (1.3%)	388 (2.5%)
Fen branch	1414 (15.9%)	163 (2.5%)	1577 (10.2%)
Fenestration	75 (0.8%)	29 (0.4%)	104 (0.7%)
Iliac Device	2 (0.0%)	3 (0.0%)	5 (0.0%)
None	1441 (16.2%)	2419 (37.2%)	3860 (25.0%)
Occluded - coil	18 (0.2%)	3 (0.0%)	21 (0.1%)
Occluded - plug	13 (0.1%)	9 (0.1%)	22 (0.1%)
Purposely covered	125 (1.4%)	72 (1.1%)	197 (1.3%)
Scallop	8 (0.1%)	0 (0%)	8 (0.1%)
Side-arm branch	142 (1.6%)	35 (0.5%)	177 (1.1%)
Stent	618 (6.9%)	188 (2.9%)	806 (5.2%)
Stent-graft	499 (5.6%)	116 (1.8%)	615 (4.0%)
Stented Scallop	17 (0.2%)	1 (0.0%)	18 (0.1%)

	Asymptomatic	Symptomatic	Overall
Stented-fen	824 (9.2%)	62 (1.0%)	886 (5.7%)
Surgical bypass	69 (0.8%)	43 (0.7%)	112 (0.7%)
Unintentionally covered	6 (0.1%)	2 (0.0%)	8 (0.1%)
Missing	3337 (37.4%)	3282 (50.4%)	6619 (42.9%)

Outcomes

Table 3: A comparison of the long term follow-up outcomes for symptomatic versus asymptomatic patients who undergo the F-BEVAR procedure

	Asymptomatic	Symptomatic	Overall
	(N=8915)	(N=6509)	(N=15424)
DEAD			
Mean (SD)	0.131 (0.337)	0.159 (0.365)	0.143 (0.350)
Median [Min, Max]	0 [0, 1.00]	0 [0, 1.00]	0 [0, 1.00]
Missing	1 (0.0%)	1 (0.0%)	2 (0.0%)
PROC_SURVIVALDAYS			
Mean (SD)	824 (778)	933 (868)	870 (819)
Median [Min, Max]	536 [-355, 3450]	613 [0, 3290]	566 [-355, 3450]

Table 3: A comparison of the procedure outcomes for symptomatic versus asymptomatic patients who undergo the F-BEVAR procedure

	Asymptomatic	Symptomatic	Overall
	(N=8915)	(N=6509)	(N=15424)
TOTAL_LOS			
Mean (SD)	7.62 (30.7)	12.5 (21.6)	9.68 (27.4)
Median [Min, Max]	4.00 [0, 1100]	9.00 [0, 1120]	6.00 [0, 1120]
POSTOP_LOS			
Mean (SD)	6.20 (24.8)	8.87 (17.8)	7.32 (22.2)
Median [Min, Max]	3.00 [0, 1100]	6.00 [0, 1100]	4.00 [0, 1100]
AORDEV_TECHSUCC			
No	315 (3.5%)	196 (3.0%)	511 (3.3%)
Yes	7415 (83.2%)	4586 (70.5%)	12001 (77.8%)
Missing	1185 (13.3%)	1727 (26.5%)	2912 (18.9%)
CONVTOOPEN			
No	8876 (99.6%)	6464 (99.3%)	15340 (99.5%)
Yes	37 (0.4%)	43 (0.7%)	80 (0.5%)
Missing	2 (0.0%)	2 (0.0%)	4 (0.0%)
R_ENDOLEAK_AT_COMPLETION			
Attachment Site (type I)	12 (0.1%)	2 (0.0%)	14 (0.1%)
Branch (type II)	1 (0.0%)	0 (0%)	1 (0.0%)
Indeterminate	1 (0.0%)	0 (0%)	1 (0.0%)
No	117 (1.3%)	145 (2.2%)	262 (1.7%)
Mid Graft (type III)	0 (0%)	1 (0.0%)	1 (0.0%)
Missing	8784 (98.5%)	6361 (97.7%)	15145 (98.2%)
BRANCH_LSUB_POST			
Occluded	481 (5.4%)	889 (13.7%)	1370 (8.9%)
Patent	1310 (14.7%)	1733 (26.6%)	3043 (19.7%)
Stenosis/Partial Coverage > 50%	76 (0.9%)	235 (3.6%)	311 (2.0%)

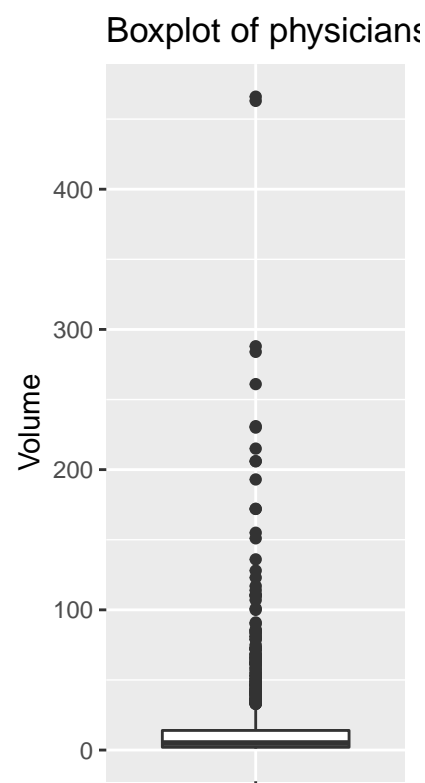
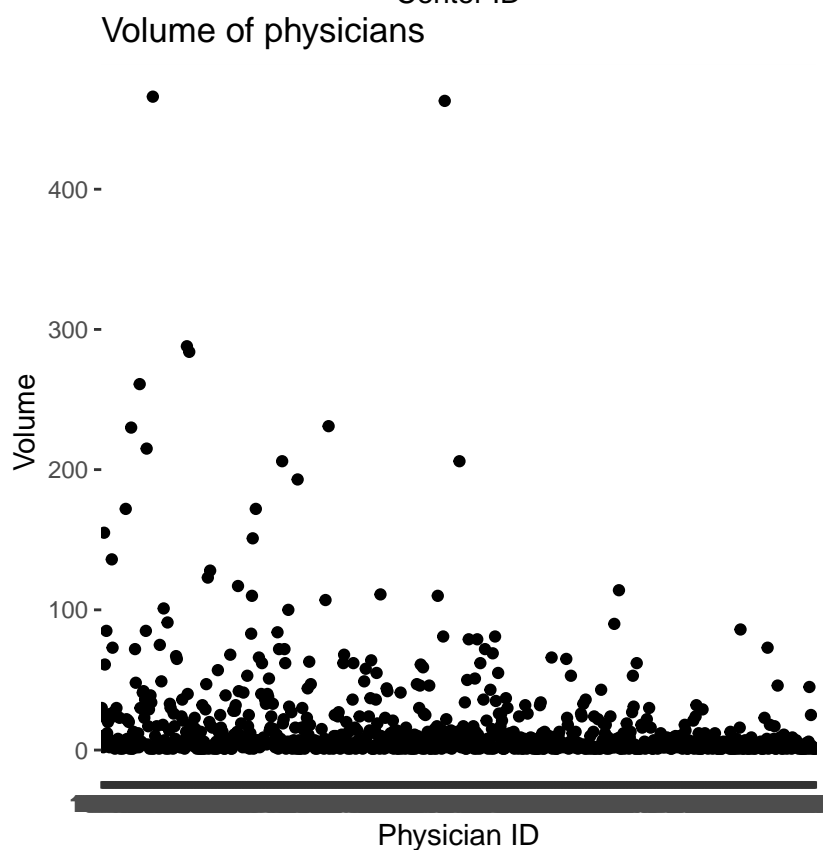
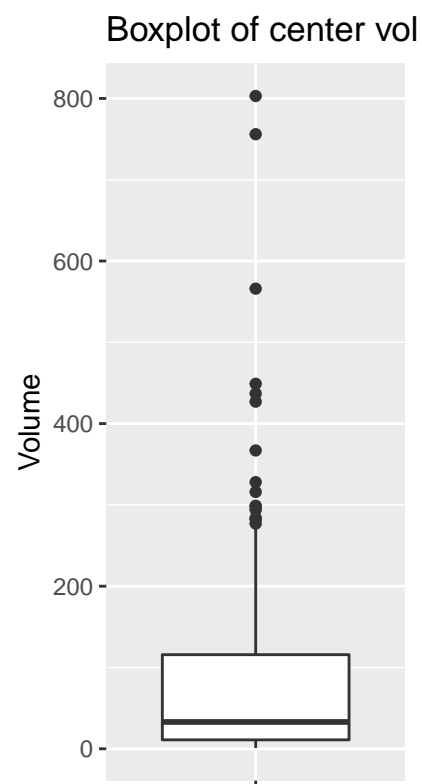
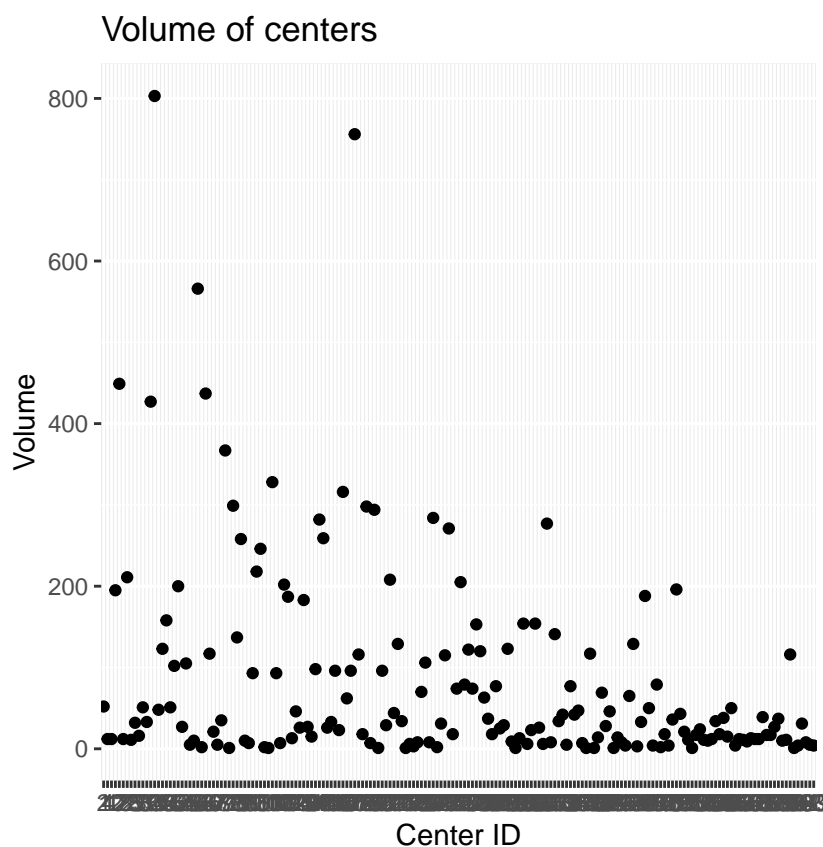
	Asymptomatic	Symptomatic	Overall
Missing	7048 (79.1%)	3652 (56.1%)	10700 (69.4%)
BRANCH_CELIAC_POST			
Occluded	325 (3.6%)	187 (2.9%)	512 (3.3%)
Patent	3449 (38.7%)	3306 (50.8%)	6755 (43.8%)
Stenosis/Partial Coverage > 50%	63 (0.7%)	48 (0.7%)	111 (0.7%)
Missing	5078 (57.0%)	2968 (45.6%)	8046 (52.2%)
BRANCH_SMA_POST			
Occluded	27 (0.3%)	18 (0.3%)	45 (0.3%)
Patent	4768 (53.5%)	3277 (50.3%)	8045 (52.2%)
Stenosis/Partial Coverage > 50%	25 (0.3%)	17 (0.3%)	42 (0.3%)
Missing	4095 (45.9%)	3197 (49.1%)	7292 (47.3%)
BRANCH_RRENAL_POST			
Occluded	194 (2.2%)	105 (1.6%)	299 (1.9%)
Patent	5322 (59.7%)	3086 (47.4%)	8408 (54.5%)
Stenosis/Partial Coverage > 50%	38 (0.4%)	28 (0.4%)	66 (0.4%)
Missing	3361 (37.7%)	3290 (50.5%)	6651 (43.1%)
BRANCH_LRENAL_POST			
Occluded	274 (3.1%)	124 (1.9%)	398 (2.6%)
Patent	5230 (58.7%)	3062 (47.0%)	8292 (53.8%)
Stenosis/Partial Coverage > 50%	46 (0.5%)	34 (0.5%)	80 (0.5%)
Missing	3365 (37.7%)	3289 (50.5%)	6654 (43.1%)
BRANCH_RCOMILI_POST			
Occluded	37 (0.4%)	14 (0.2%)	51 (0.3%)
Patent	3733 (41.9%)	2035 (31.3%)	5768 (37.4%)
Stenosis/Partial Coverage > 50%	10 (0.1%)	8 (0.1%)	18 (0.1%)
Missing	5135 (57.6%)	4452 (68.4%)	9587 (62.2%)
BRANCH_LCOMILI_POST			
Occluded	31 (0.3%)	44 (0.7%)	75 (0.5%)
Patent	3248 (36.4%)	1677 (25.8%)	4925 (31.9%)
Stenosis/Partial Coverage > 50%	12 (0.1%)	14 (0.2%)	26 (0.2%)
Missing	5624 (63.1%)	4774 (73.3%)	10398 (67.4%)
ICUSTAY			
Mean (SD)	2.67 (4.58)	5.10 (6.56)	3.69 (5.63)
Median [Min, Max]	2.00 [0, 96.0]	3.00 [0, 90.0]	2.00 [0, 96.0]
Missing	14 (0.2%)	14 (0.2%)	28 (0.2%)
POSTOP_PRBC			
Mean (SD)	1.05 (3.32)	1.34 (3.37)	1.17 (3.34)
Median [Min, Max]	0 [0, 77.0]	0 [0, 49.0]	0 [0, 77.0]
Missing	19 (0.2%)	11 (0.2%)	30 (0.2%)
POSTOP_VASO			
No	6937 (77.8%)	4470 (68.7%)	11407 (74.0%)
Yes	1968 (22.1%)	2025 (31.1%)	3993 (25.9%)
Missing	10 (0.1%)	14 (0.2%)	24 (0.2%)
POSTOP_HIGHCREAT			
Mean (SD)	1.47 (1.87)	1.90 (4.38)	1.65 (3.19)
Median [Min, Max]	1.10 [0.0100, 127]	1.17 [0, 132]	1.12 [0, 132]
Missing	61 (0.7%)	34 (0.5%)	95 (0.6%)
POSTOP_COMPLICATIONS			
No	7218 (81.0%)	4791 (73.6%)	12009 (77.9%)
Yes	1694 (19.0%)	1715 (26.3%)	3409 (22.1%)
Missing	3 (0.0%)	3 (0.0%)	6 (0.0%)
R_POSTOP_HEMATOMA			

	Asymptomatic	Symptomatic	Overall
Minor	117 (1.3%)	48 (0.7%)	165 (1.1%)
No	5878 (65.9%)	4574 (70.3%)	10452 (67.8%)
Surgical Rx	55 (0.6%)	32 (0.5%)	87 (0.6%)
Thrombin injection	10 (0.1%)	5 (0.1%)	15 (0.1%)
Transfusion	35 (0.4%)	11 (0.2%)	46 (0.3%)
Missing	2820 (31.6%)	1839 (28.3%)	4659 (30.2%)
R_POSTOP_SITEOCC			
Interventional Rx	8 (0.1%)	9 (0.1%)	17 (0.1%)
Medical Rx	2 (0.0%)	10 (0.2%)	12 (0.1%)
No	7205 (80.8%)	5332 (81.9%)	12537 (81.3%)
Surgical Rx	40 (0.4%)	22 (0.3%)	62 (0.4%)
Missing	1660 (18.6%)	1136 (17.5%)	2796 (18.1%)
POSTOP_MI			
EKG or clinical	100 (1.1%)	89 (1.4%)	189 (1.2%)
No	8682 (97.4%)	6352 (97.6%)	15034 (97.5%)
Troponin only	131 (1.5%)	64 (1.0%)	195 (1.3%)
Missing	2 (0.0%)	4 (0.1%)	6 (0.0%)
POSTOP_DYSRHYTHMIA			
No	8348 (93.6%)	6028 (92.6%)	14376 (93.2%)
Yes	565 (6.3%)	478 (7.3%)	1043 (6.8%)
Missing	2 (0.0%)	3 (0.0%)	5 (0.0%)
POSTOP_CHF			
No	8793 (98.6%)	6397 (98.3%)	15190 (98.5%)
Yes	119 (1.3%)	109 (1.7%)	228 (1.5%)
Missing	3 (0.0%)	3 (0.0%)	6 (0.0%)
POSTOP_CEREBROX			
Mean (SD)	0.105 (0.757)	0.215 (1.07)	0.152 (0.902)
Median [Min, Max]	0 [0, 7.00]	0 [0, 7.00]	0 [0, 7.00]
Missing	3 (0.0%)	6 (0.1%)	9 (0.1%)
POSTOP_RESPIRATORY			
No	8502 (95.4%)	5899 (90.6%)	14401 (93.4%)
Yes	411 (4.6%)	606 (9.3%)	1017 (6.6%)
Missing	2 (0.0%)	4 (0.1%)	6 (0.0%)
POSTOP_DIALYSIS			
No	8562 (96.0%)	6030 (92.6%)	14592 (94.6%)
Yes	146 (1.6%)	233 (3.6%)	379 (2.5%)
Missing	207 (2.3%)	246 (3.8%)	453 (2.9%)
POSTOP_ARMEMBO			
No	8870 (99.5%)	6439 (98.9%)	15309 (99.3%)
Yes	43 (0.5%)	67 (1.0%)	110 (0.7%)
Missing	2 (0.0%)	3 (0.0%)	5 (0.0%)
POSTOP_LEGEMBO			
No	8785 (98.5%)	6373 (97.9%)	15158 (98.3%)
Yes	127 (1.4%)	133 (2.0%)	260 (1.7%)
Missing	3 (0.0%)	3 (0.0%)	6 (0.0%)
POSTOP_LEGCOMPART			
No	8867 (99.5%)	6437 (98.9%)	15304 (99.2%)
Yes	46 (0.5%)	69 (1.1%)	115 (0.7%)
Missing	2 (0.0%)	3 (0.0%)	5 (0.0%)
POSTOP_INTISCH			
Mean (SD)	0.0316 (0.311)	0.0647 (0.457)	0.0456 (0.380)
Median [Min, Max]	0 [0, 4.00]	0 [0, 4.00]	0 [0, 4.00]

	Asymptomatic	Symptomatic	Overall
Missing	2 (0.0%)	4 (0.1%)	6 (0.0%)
R_POSTOP_BOWELISCH			
No	117 (1.3%)	129 (2.0%)	246 (1.6%)
Yes	5 (0.1%)	4 (0.1%)	9 (0.1%)
Missing	8793 (98.6%)	6376 (98.0%)	15169 (98.3%)
POSTOP_RENALISCH			
No	8735 (98.0%)	6316 (97.0%)	15051 (97.6%)
Yes	178 (2.0%)	189 (2.9%)	367 (2.4%)
Missing	2 (0.0%)	4 (0.1%)	6 (0.0%)
R_POSTOP_SSI			
No	7232 (81.1%)	5354 (82.3%)	12586 (81.6%)
Yes	24 (0.3%)	26 (0.4%)	50 (0.3%)
Missing	1659 (18.6%)	1129 (17.3%)	2788 (18.1%)
POSTOP_SPINAL_ISCHEMIA			
No	8658 (97.1%)	6207 (95.4%)	14865 (96.4%)
Yes	255 (2.9%)	297 (4.6%)	552 (3.6%)
Missing	2 (0.0%)	5 (0.1%)	7 (0.0%)
RETX			
No	8292 (93.0%)	5759 (88.5%)	14051 (91.1%)
Yes	556 (6.2%)	712 (10.9%)	1268 (8.2%)
Missing	67 (0.8%)	38 (0.6%)	105 (0.7%)
DC_STATUS			
Dead	217 (2.4%)	298 (4.6%)	515 (3.3%)
Home	7549 (84.7%)	4874 (74.9%)	12423 (80.5%)
Homeless	2 (0.0%)	8 (0.1%)	10 (0.1%)
Nursing Home	361 (4.0%)	417 (6.4%)	778 (5.0%)
Other Hospital	95 (1.1%)	166 (2.6%)	261 (1.7%)
Rehab Unit	689 (7.7%)	744 (11.4%)	1433 (9.3%)
Missing	2 (0.0%)	2 (0.0%)	4 (0.0%)
R_LE_ISCH			
No	39 (0.4%)	105 (1.6%)	144 (0.9%)
Yes	0 (0%)	8 (0.1%)	8 (0.1%)
Missing	8876 (99.6%)	6396 (98.3%)	15272 (99.0%)
R_POSTOP_RENAL			
No	108 (1.2%)	123 (1.9%)	231 (1.5%)
Yes	12 (0.1%)	10 (0.2%)	22 (0.1%)
Missing	8795 (98.7%)	6376 (98.0%)	15171 (98.4%)
R_RTOR			
No	118 (1.3%)	123 (1.9%)	241 (1.6%)
Yes	5 (0.1%)	10 (0.2%)	15 (0.1%)
Missing	8792 (98.6%)	6376 (98.0%)	15168 (98.3%)

Volume Variables

Volume Variables: REGIONID, CENTERID, PHYSICIANID



19 regions, 182 centers, 923 physicians.

Quantiles of centers' volume: 1, 11, 33, 115.75, 803

Quantiles of physicians' volume: 1, 2, 5, 14, 466

how to do cluster on centers and physicians

Define high volume center/physician based on the quantile from violin plot and account for that in a multivariable model.

mean and median: based on outliers?

Code Appendix

```
knitr::opts_chunk$set(echo = FALSE,message = FALSE,warning = FALSE)
library(tidyverse)
library(table1)
library(Hmisc)
library(ggplot2)
library(ggpubr)

## ----- working directories for Lily -----
wd_lily = '/Users/hanyiwang/Desktop/Comparative-analysis-of-treatments-of-CAA'
path_lily = c("../data/FBVAR.csv")

## ----- working directories for Jenn -----
#wd_jenn = '/Users/jennifercci/Desktop/Comparative-analysis-of-treatments-of-CAA'
#path_jenn = c(
#  "/Users/jennifercci/Desktop/Comparative-analysis-of-treatments-of-CAA/TEVAR_International_20210712/TE
#  "/Users/jennifercci/Desktop/Comparative-analysis-of-treatments-of-CAA/TEVAR_International_20210712/TE
#  "/Users/jennifercci/Desktop/Comparative-analysis-of-treatments-of-CAA/TEVAR_International_20210901/TE
#  "/Users/jennifercci/Desktop/Comparative-analysis-of-treatments-of-CAA/TEVAR_International_20210901/TE

## ----- read data -----
setwd(wd_lily)
FBVAR = read.csv(path_lily)

#setwd(wd_jenn)
#TEVAR_LTF_07 = read.csv(path_jenn[1])
#TEVAR_PROC_07 = read.csv(path_jenn[2])
#TEVAR_LTF_09 = read.csv(path_jenn[3])
#TEVAR_PROC_09 = read.csv(path_jenn[4])
## ----- population of interest -----
table1(~ PRESENTATION, data = FBVAR)
## ----- table: Patient demographic and co-morbidities-----

table1(~ R_PREOP_AMBUL+AGE+AGECAT+GENDER+ETHNICITY+ RACE+TRANSFER+PRIMARYINSURER+
  LIVINGSTATUS+ PREOP_FUNCSTATUS+PRIOR_CVD +PRIOR_CAD+PRIOR_CHF+COPD+
  DIABETES+PREOP_DIALYSIS+HTN+ PREOP_SMOKING+PRIOR_CABG+PRIOR_PCI+PRIOR_ANEURREP+
  STRESS+PREOP_CREAT+DC_ASA+DC_P2Y+DC_STATIN+R_CR_PRESENT
  | PRESENTATION, data = FBVAR,overall="Total")
## ----- table: Operative Variables-----
table1(~ PRIOR_AORSURG+
  PRIOR_AORSURG_OPENLOC1+PRIOR_AORSURG_OPENLOC2+PRIOR_AORSURG_OPENLOC3+PRIOR_AORSURG_OPENLOC4+
  PRIOR_AORSURG_ENDOLOC1+PRIOR_AORSURG_ENDOLOC2+PRIOR_AORSURG_ENDOLOC3+PRIOR_AORSURG_ENDOLOC4+
  PATHOLOGY+PREOP_MAXAAADIA+URGENCY+
  PATHOLOGY_ANEURYSM_TYPE+PATHOLOGY_DISSECT_TYPE+PATHOLOGY_DISSECT_ONSET_DAYS+
  GENHIST+R_GENHIST+
  PROXZONE_DISEASE+DISTZONE_DISEASE+
  ANESTHESIA+CONTRAST+EBL+FLUOROTIME+INTRAOP_PRBC+TOTALPROCTIME+IVUSTEE+ACCESS_R+ACCESS_L+
  LRGST_SHEATH_SIZE_R+LRGST_SHEATH_SIZE_L+ARMNECK_ACCESS+ARMNECK_ACCESS_LOC+
  AORDEV_NUM+AORDEV_CMED+STAGEDAORTRT+DEV1_GTYPE+DEV2_GTYPE+DEV3_GTYPE+
  DEV1_PROXZONE+DEV2_PROXZONE+DEV3_PROXZONE+DEV4_PROXZONE+DEV5_PROXZONE+DEV6_PROXZONE+
  DEV1_DISTZONE+DEV2_DISTZONE+DEV3_DISTZONE+DEV4_DISTZONE+DEV5_DISTZONE+DEV6_DISTZONE+
  ILIACDEV_END_R+ILIACDEV_END_L+
  BRANCH_STAGED+BRANCH_LSUB+BRANCH_CELIAC+BRANCH_SMA+BRANCH_RRENAL+BRANCH_LRENAL+
```

```

    BRANCH_INNO_POST+
    BRANCH_LSUB_VERTPAT+ANESTHESIA_GEN_TIMEEXT+POSTOP_SPINALDRAIN+
    R_CELIAC+R_DISTATTZONE+R_GDPROXIMAL+R_GRFTCONFIG+
    R_LT_RENAL+R_PRATTZONE+R_RT_RENAL+R_SMA+R_SPINAL_DRAIN+
    BRANCH_CELIAC_TRT+BRANCH_SMA_TRT+BRANCH_RRENAL_TRT+BRANCH_LRENAL_TRT
  | PRESENTATION, data = FBVAR)

## ----- table: primary outcomes-----
table1(~ DEAD+PROC_SURVIVALDAYS | PRESENTATION, data = FBVAR)
## ----- table: secondary outcomes-----
table1(~ TOTAL_LOS+POSTOP_LOS+
    AORDEV_TECHSUCC+CONVTOOPEN+R_ENDOLEAK_AT_COMPLETION+
    BRANCH_LSUB_POST+BRANCH_CELIAC_POST+BRANCH_SMA_POST+BRANCH_RRENAL_POST+
    BRANCH_LRENAL_POST+BRANCH_RCOMILI_POST+BRANCH_LCOMILI_POST+ICUSTAY+
    POSTOP_PRBC+POSTOP_VASO+POSTOP_HIGHCREAT+POSTOP_COMPLICATIONS+
    R_POSTOP_HEMATOMA+R_POSTOP_SITEOCC+
    POSTOP_MI+POSTOP_DYSRHYTHMIA+POSTOP_CHF+POSTOP_CEREBROSX+POSTOP_RESPIRATORY+
    POSTOP_DIALYSIS+POSTOP_ARMEMBO+POSTOP_LEGEMBO+POSTOP_LEGCOMPART+POSTOP_INTISCH+
    R_POSTOP_BOWELISCH+POSTOP_RENALISCH+R_POSTOP_SSI+POSTOP_SPINAL_ISCHEMIA+
    RETX+DC_STATUS+R_LE_ISCH+R_POSTOP_RENAL+R_RTOR
  | PRESENTATION, data = FBVAR)

## ----- Survival curves-----

## ----- clustering variables-----

#FBVAR %>% select(REGIONID) %>% table()
#FBVAR %>% select(CENTERID) %>% table()
#FBVAR %>% select(PHYSICIANID) %>% table()

## ----- plots of volume-----
center_vol = as.data.frame(FBVAR %>% select(CENTERID) %>% table())
phys_vol = as.data.frame(FBVAR %>% select(PHYSICIANID) %>% table())

p1 = ggplot(data = center_vol, aes(x=CENTERID, y=Freq)) +
  geom_point() +
  labs(title = 'Volume of centers',x='Center ID',y='Volume')

p2 = ggplot(data = center_vol, aes(x='', y=Freq)) +
  geom_boxplot() +
  labs(title = 'Boxplot of center volumes',x='',y='Volume')

print(ggarrange(p1, p2, widths = c(20,10),ncol = 2, nrow = 1, align = "h"))

p3 = ggplot(data = phys_vol, aes(x=PHYSICIANID, y=Freq)) +
  geom_point() +
  labs(title = 'Volume of physicians',x='Physician ID',y='Volume')

p4 = ggplot(data = phys_vol, aes(x='', y=Freq)) +
  geom_boxplot() +
  labs(title = 'Boxplot of physicians volumes',x='',y='Volume')

print(ggarrange(p3, p4, widths = c(20,10),ncol = 2, nrow = 1, align = "h"))

```