Supplementary Online Content

Hirji S, McGurk S, Kiehm S, et al. Utility of 90-day mortality vs 30-day mortality as a quality metric for transcatheter and surgical aortic valve replacement outcomes. *JAMA Cardiol.* Published online December 18, 2019. doi:0.1001/jamacardio.2019.4657

This supplementary material has been provided by the authors to give readers additional information about their work.

eTable 1: International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes used to identify procedures and patient covariates for this study.

INCLUSION CRITERIA	
Surgical aortic valve replacement	ICD-9: 35.20, 35.21, 35.22; ICD-10: 02RF07Z, 02RF08Z, 02RF0JZ and 02RF0KZ
Transcatheter aortic valve replacement	ICD-9: 35.05, 35.06 ICD-10: 02RF37Z, 02RF38Z, 02RF3JZ, 02RF3KZ, 02RF37H, 02RF38H, 02RF3JH, 02RF3KH
COVARIATES	
Dyslipidemia	ICD-9: 272.4 ICD-10: E78.4, E78.5
Hypertension,	ICD-9: 401.x, 402.x ICD-10: I10, I11.0, I11.9
Diabetes mellitus	ICD-9: 250.0-250.3, 250.8, 250.9 ICD-10: E10.0, E10.l, E10.6, E10.8, E10.9,E11.0, E11.1, E11.6, E11.8, E11.9,E12.0, E12.1, E12.6, E12.8, E12.9,E13.0, E13.1, E13.6, E13.8, E13.9,E14.0, E14.1, E14.6, E14.8,E14.9
Diabetes mellitus with chronic complications	ICD-9: 250.4-250.7 ICD-10: E10.2-E10.5, E10.7, E11.2-E11.5,E11.7, E12.2-E12.5, E12.7,E13.2-E13.5, E13.7, E14.2-E14.5,E14.7
Peripheral vascular disease	ICD-9: 093.0, 437.3, 440.x, 441.x,443.1-443.9, 447.1, 557.1,557.9, V43.4 ICD-10: I70.x, I71.x, I73.1, I73.8, I73.9, I77.1,I79.0, I79.2, K55.1, K55.8, K55.9, Z95.8, Z95.9, 093.0, 437.3, 440.x, 441.x,443.1-443.9, 447.1, 557.1,557.9, V43.4
Cerebrovascular disease	ICD-9: 430.x-438.x ICD-10: G45.x, G46.x, H34
Stroke or Transient ischemic attack	ICD-9: 438.x, V17.1. ICD-10: I60.x, I61.x, I62.x, I63.x, I69.x
COPD	ICD-9: 416.8, 416.9, 490.x-505.x, 506.4, 508.1, 508.8 ICD-10: I27.8, I27.9, J40.x-J47.x, J60.x-J67.x, J68.4, J70.1, J70.3
Chronic kidney disease without dialysis	ICD-9: 403.01, 403.11, 403.91, 404.02,404.03, 404.12, 404.13, 404.92,404.93, 582.x, 583.0-583.7, 585.x,586.x, 588.0, V42.0, V45.1, V56.x ICD-10: I12.0, I13.1, N03.2-N03.7, N05.2-N05.7, N18.x, N19.x, N25.0, Z49.0-Z49.2, Z94.0, Z99.2
Coronary artery disease	ICD-9: 440, 440.1 ICD-10:I70.0, I70.1
Atrial fibrillation	ICD-9: 427.3x ICD-10: I48.91, I48.92

Previous myocardial infarction	ICD-9: 411, 411.1, 412 ICD-10:I24.1, I20.0, I25.2
Congestive heart failure	ICD-9: 398.91, 402.01, 402.11, 402.91,404.01, 404.03, 404.11, 404.13,404.91, 404.93, 425.4-425.9, 428.x ICD-10: I09.9,I11.0, I13.0, I13.2, I25.5, I42.0,I42.5-I42.9, I43.x, I50.x, P29.0
Dementia	ICD-9: 290.x, 294.1, 331.2 ICD-10: F00.x-F03.x,F05.1, G30.x, G31.1
Depression	ICD-9: 446.5, 710.0-710.4, 714.0-714.2, 714.8, 725.x ICD-10: M05.x, M06.x, M31.5, M32.x-M34.x,M35.1, M35.3, M36.0
Prior PCI	ICD-9: V4582 ICD-10: Z98.61
Prior CABG	ICD-9: V4581 ICD-10: Z951
POSTOPERATIVE OUTCOMES	
Stroke	ICD-9: 997.02, 431, 432.1, 434.91, 431.11, 434.01 ICD-10: I619, I97811, I97812
Renal failure	ICD-9: 584.x
Cardiac arrest	ICD-9: 4275 ICD-10: I469
Complete heart block	ICD-9: 4260, 42611 ICD-10: I440, I442
Bleeding	ICD-9: 998.1x, 999.8x, 99.01, 99.04, 997.02, 78630, 42989, 5781, 5789, 5780, 7847, 459, 2851, 28659 ICD-10:I97.41x, I97.42, I97.61x, R58, D62, D68311, D68312, D68318, K920, R040, K921, K922, I513, R042, R049
Transfusion with red blood cells	ICD-9: 9900, 9901, 9902, 9903, 9904 ICD-10: 30233N1, 30243N1, 30253N1, 30233H0, 30243H0, 30253H0

CABG – coronary artery bypass graft; CAD – coronary artery disease; CKD – chronic kidney disease; COPD – chronic obstructive pulmonary disease; PCI – percutaneous coronary intervention

-Most covariates captured by the chronic conditions file; date of onset before date of index admission.

-The following covariates were used for the Charlson score: malignancies, metastatic solid tumor, acquired immune deficiency syndrome, hemi or paraplegia, rheumatic disease, dementia, peptic ulcer disease, Alzheimer's' disease, congestive heart failure, history of myocardial infarction, moderate/severe liver disease, chronic kidney disease, chronic obstructive pulmonary disease, cerebrovascular disease, peripheral vascular disease, diabetes

eTable 2. Characteristics and outcomes of surgical AVR Patients stratified by 30-day mortality hospital performance ranking

	Top Performing Group (Lowest 10% Mortality)		Middle Performing Group (Middle 80% Mortality)		Bottom Performing Group (Highest 10% Mortality)		P-Value (Top vs Bottom Group)
Total number of institutions	N=48		N=109		N=34		
Total number of cases	N=2845		N=20478		N=2698		
Characteristics							
Age, (mean, SD)	75.3	(6.6)	76.2	(6.7)	75.9	(6.6)	0.001
≥85yo, (%)	289	(10.2)	2552	(12.5)	308	(11.4)	0.140
Women, (%)	1119	(39.3)	8801	(43.0)	1092	(40.5)	0.395
Dyslipidemia, (%)	2303	(80.9)	16682	(81.5)	2221	(82.3)	0.199
Hypertension, (%)	2430	(85.4)	17957	(87.7)	2407	(89.2)	0.001
Diabetes, (%)	956	(33.6)	7552	(36.9)	1050	(38.9)	0.001
PVD, (%)	22	(0.8)	140	(0.7)	20	(0.7)	1.000
Stroke or TIA, (%)	151	(5.3)	1182	(5.8)	189	(7.0)	0.010
Anemia, (%)	1487	(52.3)	11937	(58.3)	1468	(54.4)	0.112
COPD, (%)	492	(17.3)	3688	(18.0)	600	(22.2)	0.001
Chronic kidney disease, (%)	672	(0.8)	5175	(0.7)	713	(0.7)	0.017
Chronic liver disease, (%)	35	(1.2)	249	(1.2)	27	(1.0)	0.445
Atrial fibrillation, (%)	690	(24.3)	5249	(25.6)	678	(25.1)	0.455
Ischemic heart disease, (%)	2246	(78.9)	16791	(82.0)	2238	(83.0)	0.001
AMI, (%)	56	(2.0)	507	(2.5)	71	(2.6)	0.106
Congestive heart failure, (%)	1346	(47.3)	10853	(53.0)	1313	(48.7)	0.320
Previous PCI, (%)	257	(9.0)	1985	(9.7)	216	(8.0)	0.178
Previous CABG surgery, (%)	177	(6.2)	1464	(7.1)	192	(7.1)	0.196
Charlson score, (Median, IQR)	5	(5-6)	5	(5-6)	5	(5-6)	0.001
Social history							
Alzheimer's, (%)	32	(1.1)	241	(1.2)	38	(1.4)	0.400
Depression, (%)	444	(15.6)	3067	(15.0)	444	(16.5)	0.400
Post-procedure complications							
Bleeding complications, (%)	812	(28.5)	5475	(26.7)	635	(23.5)	0.001
Transfusion, (%)	686	(24.1)	5531	(27.0)	539	(20.0)	0.001

Permanent stroke, (%)	126	(4.4)	776	(3.8)	121	(4.5)	0.948
Acute kidney injury, (%)	318	(11.2)	2358	(11.5)	374	(13.9)	0.003
Permanent pacemaker, (%)	108	(3.8)	1043	(5.1)	140	(5.2)	0.013
Cardiac arrest, (%)	36	(1.3)	348	(1.7)	72	(2.7)	0.001
Hospital Disposition							
Length of stay, days (Median, IQR)	7	(6-8)	7	(6-8)	7	(6-8)	0.001
Discharge to skilled nursing, (%)	659	(23.2)	6866	(33.5)	879	(32.6)	0.001
30-day mortality, (%)	6	(0.2)	393	(1.9)	145	(5.4)	0.001
Readmission within 30-days, (%)	410	(14.4)	3045	(14.9)	470	(17.4)	0.002
90-day mortality, (%)	31	(1.1)	637	(3.1)	183	(6.8)	0.001
1-year mortality, (%)	121	(4.3)	1254	(6.1)	285	(10.6)	0.001

SD-standard deviation; AVR-aortic valve replacement; PVD-peripheral valvular disease; TIA-transient ischemic attack; COPD-chronic obstructive pulmonary disease; AMI-acute myocardial infarction; PCI-percutaneous coronary intervention; CABG-coronary artery bypass grafting; IQR-interquartile range.

eTable 3. Characteristics and outcomes of transcatheter AVR patients at hospitals which changed mortality performance rankings from 30-days to 90-days

	Ranking Improved		Ranking Maintained		Ranking Declined	
Total number of institutions	N=19		N=144		N=21	
Total number of cases	N=2257		N=26286		N=1686	
Characteristics						
Age, (mean, SD)	82.9	(7.5)	82.8	(7.5)	83.4	(7.4)
≥85yo, (%)	1334	(48.9)	11716	(47.7)	1540	(51.0)
Women, (%)	1269	(46.6)	11700	(47.6)	1410	(46.7)
Dyslipidemia, (%)	2375	(87.1)	21625	(88.0)	2662	(88.2)
Hypertension, (%)	2615	(95.9)	23770	(96.7)	2933	(97.2)
Diabetes, (%)	1185	(43.5)	11349	(46.2)	1356	(44.9)
PVD, (%)	19	(0.7)	205	(0.8)	26	(0.9)
Stroke or TIA, (%)	245	(9.0)	2209	(9.0)	306	(10.1)
Anemia, (%)	1916	(70.3)	17642	(71.8)	2178	(72.2)
COPD, (%)	943	(34.6)	8985	(36.5)	1209	(40.1)
Chronic kidney disease, (%)	1417	(0.7)	12632	(0.8)	1587	(0.9)
Chronic liver disease, (%)	54	(2.0)	455	(1.9)	58	(1.9)
Atrial fibrillation, (%)	1008	(37.0)	9452	(38.4)	1226	(40.6)
Ischemic heart disease, (%)	2579	(94.6)	23509	(95.6)	2893	(95.9)
AMI, (%)	166	(6.1)	1446	(5.9)	219	(7.3)
Congestive heart failure, (%)	2316	(85.0)	21420	(87.1)	2617	(86.7)
Previous PCI, (%)	527	(19.3)	4904	(19.9)	568	(18.8)
Previous CABG surgery, (%)	544	(20.0)	4934	(20.1)	607	(20.1)
Charlson score, (Median, IQR)	6	(6-7)	6	(6-7)	6	(6-6.8)
Social history						
Alzheimer's, (%)	73	(2.7)	821	(3.3)	113	(3.7)
Depression, (%)	528	(19.4)	4898	(19.9)	677	(22.4)
Post-procedure complications						
Bleeding complications, (%)	386	(14.9)	4656	(16.9)	265	(15.1)
Transfusion, (%)	337	(14.8)	4600	(15.9)	268	(12.5)
Permanent stroke, (%)	76	(3.6)	810	(3.2)	54	(3.3)
Acute kidney injury, (%)	226	(8.0)	2914	(10.5)	155	(8.4)
Permanent pacemaker, (%)	119	(3.8)	1896	(6.8)	140	(7.8)

Heart block, (%)	12	(0.4)	140	(0.5)	9	(0.7)
Cardiac arrest, (%)	71	(3.0)	650	(2.7)	37	(2.1)
Hospital Disposition						
Length of stay, days (Median, IQR)	5	(4-5)	5	(4-6)	5	(4-5)
Discharge to skilled nursing, (%)	560	(24.0)	7361	(28.3)	466	(25.1)
30-day mortality, (%)	107	(4.8)	1095	(4.5)	61	(2.3)
Readmission within 30-days, (%)	393	(17.4)	4770	(17.9)	302	(19.9)
90-day mortality, (%)	149	(6.0)	2070	(8.0)	160	(11.5)
1-year mortality, (%)	393	(16.7)	4702	(18.4)	329	(20.9)

SD-standard deviation; AVR-aortic valve replacement; PVD-peripheral valvular disease; TIA-transient ischemic attack; COPD-chronic obstructive pulmonary disease; CAD-coronary artery disease; AMI-acute myocardial infarction; PCI-percutaneous coronary intervention; CABG-coronary artery bypass grafting; IQR-interquartile range.

eTable 4. Characteristics and outcomes of surgical AVR patients at hospitals which changed mortality performance rankings from 30-days to 90-days

	Ranking Improved		Ranking Maintained		Ranking Declined	
Total number of institutions	N=16		N=158		N=17	
Total number of cases	N=1261		N=23495		N=1265	
Characteristics						
Age, (mean, SD)	74.8	(6.2)	75.6	(6.4)	74.9	(6.4)
≥85yo, (%)	130	(9.1)	2886	(10.6)	133	(8.1)
Women, (%)	511	(39.0)	9973	(41.9)	528	(39.4)
Dyslipidemia, (%)	1015	(77.9)	19194	(79.9)	997	(78.1)
Hypertension, (%)	1110	(87.4)	20602	(86.9)	1082	(85.2)
Diabetes, (%)	463	(34.2)	8629	(36.5)	466	(34.0)
Stroke or TIA, (%)	67	(4.9)	1381	(5.3)	74	(5.5)
Anemia, (%)	697	(51.7)	13506	(54.5)	689	(51.9)
COPD, (%)	243	(19.9)	4317	(19.0)	220	(16.1)
Chronic kidney disease, (%)	293	(0.5)	5942	(0.7)	325	(0.8)
Chronic liver disease, (%)	18	(1.1)	270	(1.2)	23	(1.8)
Atrial fibrillation, (%)	298	(24.1)	6001	(22.9)	318	(24.2)
Ischemic heart disease, (%)	987	(76.5)	19263	(79.7)	1025	(76.2)
AMI, (%)	20	(1.4)	583	(2.6)	31	(2.1)
Congestive heart failure, (%)	569	(44.8)	12357	(50.2)	586	(43.7)
Previous PCI, (%)	101	(8.4)	2263	(8.6)	94	(5.7)
Previous CABG surgery, (%)	89	(6.9)	1669	(6.0)	75	(5.1)
Charlson score, (Median, IQR)	5	(5-5)	5	(5.5)	5	(5-5.3)
Social history						
Alzheimer's, (%)	13	(0.8)	286	(1.1)	12	(0.9)
Depression, (%)	196	(16.3)	3562	(15.3)	197	(15.0)
Post-procedure complications						
Bleeding complications, (%)	418	(28.5)	6234	(22.9)	270	(25.3)
Transfusion, (%)	396	(33.0)	5964	(23.7)	396	(24.8)
Permanent stroke, (%)	58	(5.1)	915	(4.5)	50	(5.6)
Acute kidney injury, (%)	197	(15.0)	2734	(11.7)	119	(10.8)
Permanent pacemaker, (%)	74	(5.2)	1173	(4.7)	44	(4.4)
Heart block, (%)	5	(0.4)	72	(0.3)	1	(0.0)

Cardiac arrest, (%)	35	(2.2)	395	(1.7)	26	(1.8)
Hospital Disposition						
Length of stay, days (Median, IQR)	6.8	(6-8)	7.0	(6-8)	7.0	(6-7.5)
Discharge to skilled nursing, (%)	347	(26.9)	7667	(31.7)	390	(28.3)
30-day mortality, (%)	43	(4.2)	477	(2.4)	24	(1.3)
Readmission within 30-days, (%)	200	(15.9)	3498	(14.4)	227	(15.8)
90-day mortality, (%)	46	(4.4)	743	(3.4)	62	(4.8)
1-year mortality, (%)	97	(7.6)	1458	(6.8)	105	(7.2)

SD-standard deviation; AVR-aortic valve replacement; PVD-peripheral valvular disease; TIA-transient ischemic attack; COPD-chronic obstructive pulmonary disease; CAD-coronary artery disease; AMI-acute myocardial infarction; PCI-percutaneous coronary intervention; CABG-coronary artery bypass grafting; IQR-interquartile range.

eTable 5: Changes in percentile ranking from 30-day mortality to 90-day mortality through median shift in continuous rank

Delta in Percentile Ranking from 30d Mortality to 90d Mortality

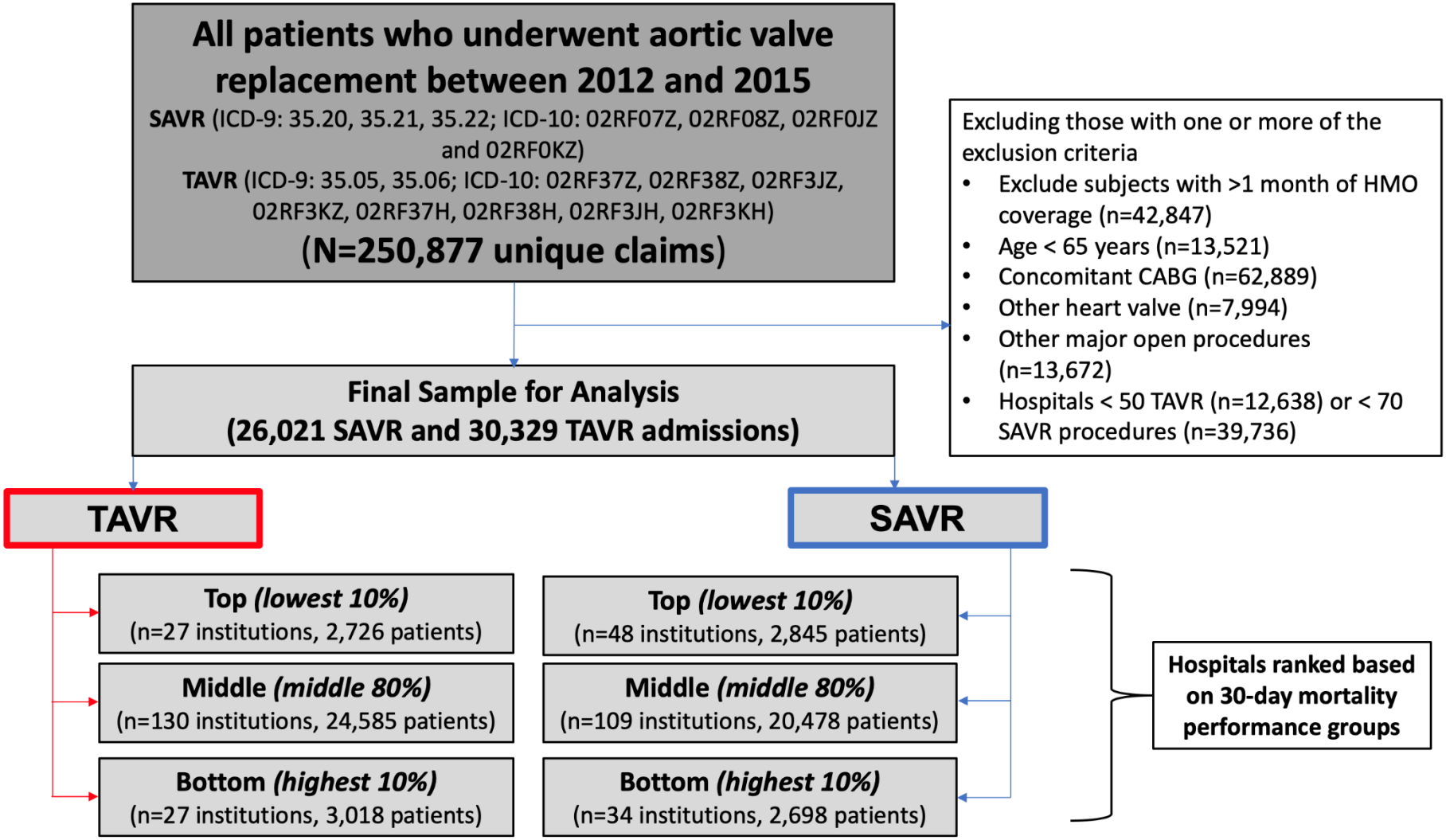
	30 day mortality percentile group*	90 day mortality percentile group 1	2	3	4	5	6	7	8	9
SAVR	1	46	6	4	3	3	0	1		
		73.0%	9.5%	6.3%	4.8%	4.8%	0.0%	1.6%		
	2	5	5	7	2	2	0	0		
		23.8%	23.8%	33.3%	9.5%	9.5%	0.0%	0.0%		
	3	1	9	5	7	5	1	1		
		3.4%	31.0%	17.2%	24.1%	17.2%	3.4%	3.4%		
	4	0	1	6	6	2	6	0		
		0.0%	4.8%	28.6%	28.6%	9.5%	28.6%	0.0%		
	5	0	0	3	6	7	5	3		
		0.0%	0.0%	12.5%	25.0%	29.2%	20.8%	12.5%		
	6	0	0	0	0	7	11	6		
		0.0%	0.0%	0.0%	0.0%	29.2%	45.8%	25.0%		
	7	0	0	0	0	0	1	8		
		0.0%	0.0%	0.0%	0.0%	0.0%	11.1%	88.9%		
TAVR	1	13	7	6	1	1	1	0	0	2
		41.9%	22.6%	19.4%	3.2%	3.2%	3.2%	0.0%	0.0%	6.5%
	2	6	5	4	2	2	0	0	0	0
		31.6%	26.3%	21.1%	10.5%	10.5%	0.0%	0.0%	0.0%	0.0%
	3	2	2	6	4	2	2	0	2	0
		10.0%	10.0%	30.0%	20.0%	10.0%	10.0%	0.0%	10.0%	0.0%
	4	0	3	3	5	6	5	2	0	0
		0.0%	12.5%	12.5%	20.8%	25.0%	20.8%	8.3%	0.0%	0.0%
	5	1	3	5	7	5	1	5	0	0
		3.7%	11.1%	18.5%	25.9%	18.5%	3.7%	18.5%	0.0%	0.0%
	6	0	1	0	3	3	6	5	2	1
		0.0%	4.8%	0.0%	14.3%	14.3%	28.6%	23.8%	9.5%	4.8%
	7	0	1	0	3	1	4	4	7	0
		0.0%	5.0%	0.0%	15.0%	5.0%	20.0%	20.0%	35.0%	0.0%
	8	0	0	0	0	1	0	4	8	6
		0.0%	0.0%	0.0%	0.0%	5.3%	0.0%	21.1%	42.1%	31.6%
	9	0	0	0	0	0	0	0	1	2
		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	33.3%	66.7%
Total	1	59	13	10	4	4	1	1	0	2
		62.8%	13.8%	10.6%	4.3%	4.3%	1.1%	1.1%	0.0%	2.1%
	2	11	10	11	4	4	0	0	0	0
		27.5%	25.0%	27.5%	10.0%	10.0%	0.0%	0.0%	0.0%	0.0%
	3	3	11	11	11	7	3	1	2	0
		6.1%	22.4%	22.4%	22.4%	14.3%	6.1%	2.0%	4.1%	0.0%
	4	0	4	9	11	8	11	2	0	0
		0.0%	8.9%	20.0%	24.4%	17.8%	24.4%	4.4%	0.0%	0.0%
	5	1	3	8	13	12	6	8	0	0
		2.0%	5.9%	15.7%	25.5%	23.5%	11.8%	15.7%	0.0%	0.0%
	6	0	1	0	3	10	17	11	2	1
		0.0%	2.2%	0.0%	6.7%	22.2%	37.8%	24.4%	4.4%	2.2%
	7	0	1	0	3	1	5	12	7	0
		0.0%	3.4%	0.0%	10.3%	3.4%	17.2%	41.4%	24.1%	0.0%
	8	0	0	0	0	1	0	4	8	6
		0.0%	0.0%	0.0%	0.0%	5.3%	0.0%	21.1%	42.1%	31.6%
	9	0	0	0	0	0	0	0	1	2
		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	33.3%	66.7%

Notes: Each box is not one percentile but rather a range of percentiles that does not coincide exactly with deciles due to the large number of ties in observed mortality percentages across the institutions in this study. Thus, we did not wind up with 10 groups each containing 10% of institutions but 7 percentile categories for TAVR and 9 for SAVR and 9 for overall. **This means that 38% of programs were within +/-6 percentiles of their 30d rankings at 90 days, 36% were within +/-18 percentiles (i.e. institutions at the 50th percentile at 30 days fell between the 32th – 68th percentile at 90 days), 16% decreased rank by >18 percentile, and 10% increased rank by >18 percentiles. Thus, not only were over a quarter of institutions in a clinically meaningful different rank at 90 days from their 30 day baseline, their mortality rankings were more likely to be substantially worse at 90 days, than improved by a ratio of 3:2.**

eTable 6. Mean postoperative hospital mortality at 90-days and 1-year for transcatheter and surgical AVR stratified by 30-day mortality performance groups

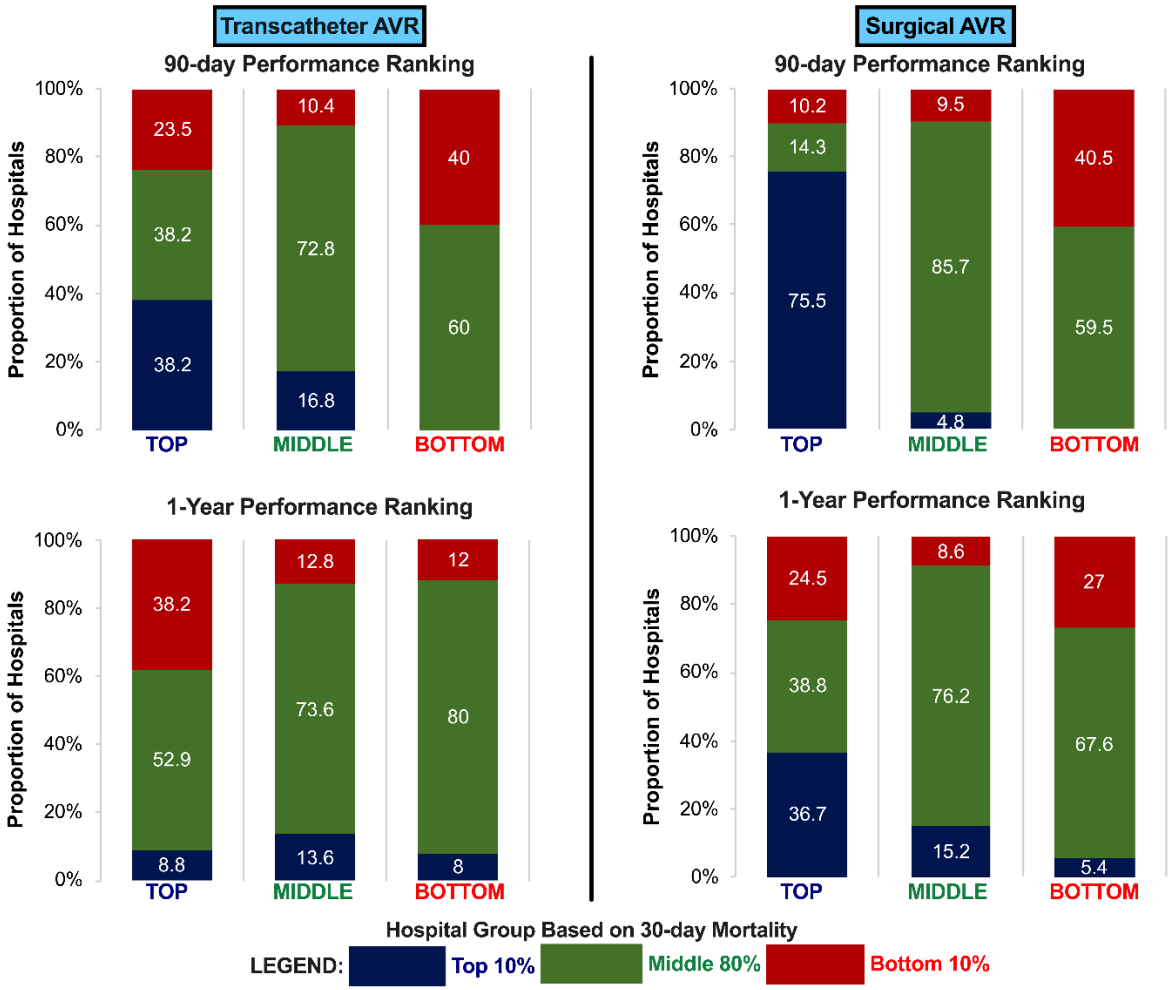
			Baseline 30-day Mortality			90-day Mortality			1-year Mortality		
	N hospitals	N patients	Mean	95% Confidence Interval		Mean	95% Confidence Interval		Mean	95% Confidence Interval	
				Lower	Upper		Lower	Upper		Lower	Upper
30-day Mortality ranking (TAVR Procedure)	184	30329									
Top Performing Group *(Lowest 10% Mortality)*	27	2726	0.83	0.80	1.0	5.7	4.3	7.2	14.8	12.5	17.0
Middle Performing Group *(Middle 80% Mortality)*	130	24585	3.9	3.7	4.1	7.4	7.0	7.8	17.3	16.6	17.9
Bottom Performing Group *(Highest 10% Mortality)*	27	3018	9.0	7.9	10.1	13.4	11.8	15.0	24.1	21.6	26.7
30-day Mortality ranking (SAVR Procedure)	191	26021									
Top Performing Group *(Lowest 10% Mortality)*	48	2845	0.04	0.009	0.08	0.7	0.3	1.3	4.5	3.3	5.8
Middle Performing Group *(Middle 80% Mortality)*	109	20478	2.1	1.9	2.3	3.3	3.1	3.6	6.3	5.9	6.7
Bottom Performing Group *(Highest 10% Mortality)*	34	2698	5.4	4.9	5.9	6.3	5.5	7.2	10.2	8.9	11.2

eFigure 1. Study consort diagram. For each procedure (transcatheter AVR and surgical AVR), hospitals are ranked based on the mean 30-day mortality rate during the 4-year period into 3 groups: (1) Top (lowest 10% mortality rate), (2) Middle (Middle 80% mortality rate), or (3) Bottom (highest 10% mortality) performing groups.

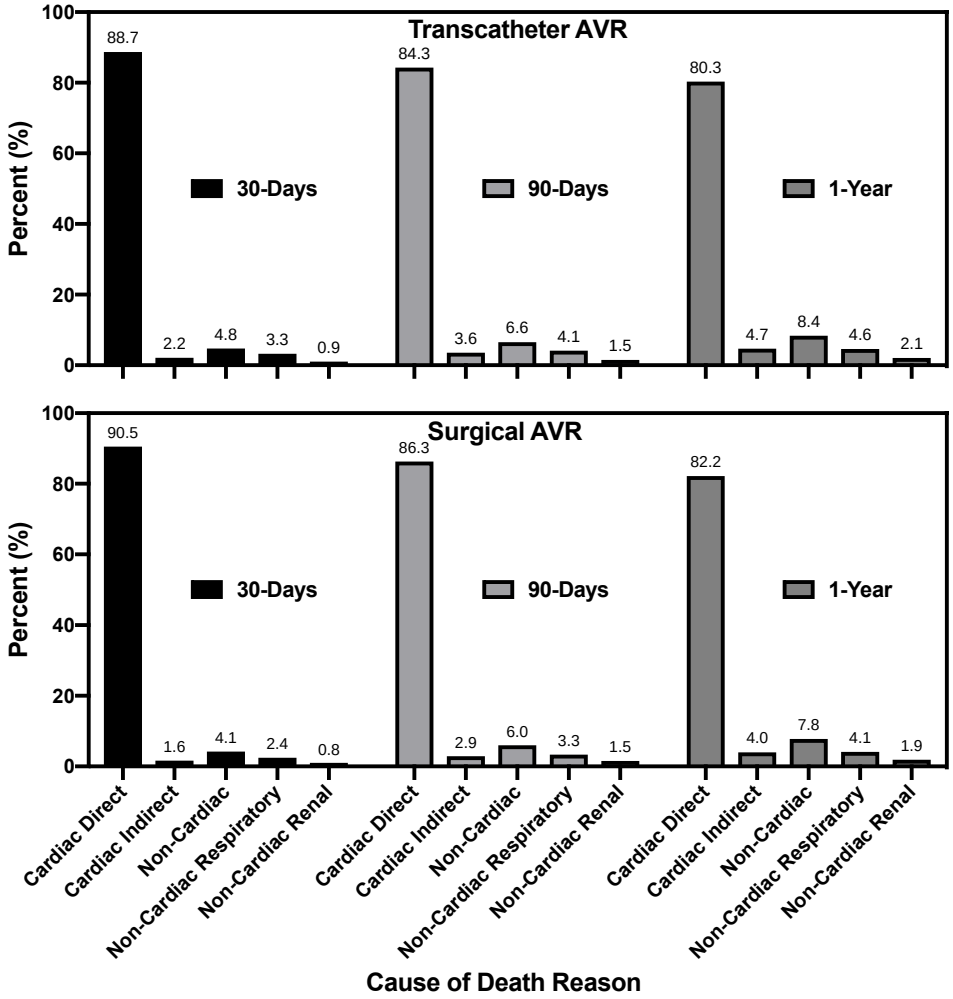


eFigure 2: Changes in hospital performance rankings at 90-days and 1-year stratified by risk-adjusted 30-day mortality for transcatheter AVR and surgical AVR. We examine changes in hospital performance ranking at 90-days and 1-year for each of the hospitals originally classified into 3 groups according to their risk-adjusted 30-day mortality rate during the 4-year period: (1) Top (lowest 10% mortality rate), (2) Middle (Middle 80% mortality rate), or (3) Bottom (highest 10% mortality) performing groups.

Figure: (Adjusted Analysis) Changes in Hospital Performance Rankings at 90-days and 1-year for Transcatheter and Surgical Aortic Valve Replacement



eFigure 3: Distribution of causes of death for transcatheter AVR and surgical AVR patients at 30-days, 90-days and 1-year. Cardiac procedure-related death are defined as heart failure, myocardial infarction, cardiac arrest, death as direct result of cardiac surgery or malfunction of the valve. Cardiac non-procedure related death are defined as a postoperative complication: renal or multi-system organ failure deaths in person w/o preexisting diagnoses of major organ disease, stroke/coma/thromboembolic events, sepsis/postop surgery-related infections, unexpected bleeding/coagulopathy. Non-cardiac causes of death include all other causes such as trauma, accidental death, gunshot wound, suicide, death attributable to pre-existing non-cardiac disease, death after non-cardiac procedure.



eFigure 4: The hazard (risk of mortality) after both transcatheter AVR and surgical AVR. Time zero is the day of the procedure. The hazard (risk of mortality) after both procedures continues to decline well after 30 days postoperatively. The constant phase of the hazard seems to start after ~90 days for transcatheter AVR and ~60 days for surgical AVR.