

## S.12 Stratification Details/Variables

### The Society of Thoracic Surgeons - European Association for Cardio-Thoracic Surgery Congenital Heart Surgery Mortality Categories (STAT Mortality Categories)

Version 3.0 Procedure	Procedure	STAT Mortality Category
30	ASD repair, Patch	1
190	AVC (AVSD) repair, Partial (Incomplete) (PAVSD)	1
10	PFO, Primary closure	1
20	ASD repair, Primary closure	1
1470	ICD (AICD) implantation	1
1480	ICD (AICD) ([automatic] implantable cardioverter defibrillator) procedure	1
1360	Vascular ring repair	1
1210	Coarctation repair, End to end	1
2110	**ASD Repair, Patch + PAPCV Repair	1
110	VSD repair, Patch	1
780	Aortic stenosis, Subvalvar, Repair	1
570	DCRV repair	1
1460	Pacemaker procedure	1
260	PAPVC repair	1
100	VSD repair, Primary closure	1
2120	*PAPVC Repair, Baffle redirection to left atrium with systemic vein translocation (Warden) (SVC sewn to right atrial appendage)	1
180	AVC (AVSD) repair, Intermediate (Transitional)	1
1680	Glenn (Unidirectional cavopulmonary anastomosis) (Unidirectional Glenn)	1
600	Valve replacement, Pulmonic (PVR)	1
1250	Coarctation repair, Interposition graft	1
680	Valve replacement, Aortic (AVR), Mechanical	1
690	Valve replacement, Aortic (AVR), Bioprosthetic	1
810	Sinus of Valsalva, Aneurysm repair	1
360	TOF repair, Ventriculotomy, Nontransanular patch	1
580	Conduit reoperation	1
350	TOF repair, No ventriculotomy	1
970	Fontan, TCPC, Lateral tunnel, Fenestrated	1
1450	Pacemaker implantation, Permanent	2
1365	Aortopexy	2
1330	PDA closure, Surgical	2
530	PA, Reconstruction (Plasty), Main (Trunk)	2
520	1 1/2 ventricular repair	2
1690	Bilateral bidirectional cavopulmonary anastomosis (BBDCPA) (Bilateral bidirectional Glenn)	2
2130	***Superior Cavopulmonary anastomosis(es) + PA reconstruction	2
660	Valvuloplasty, Aortic	2
830	Valvuloplasty, Mitral	2
1500	Arrhythmia surgery - ventricular, Surgical Ablation	2
820	LV to aorta tunnel repair	2
950	Fontan, Atrio-pulmonary connection	2
740	Ross procedure	2
930	Pericardiectomy	2

2350	*Explantation of pacing system	2
590	Valvuloplasty, Pulmonic	2
210	AP window repair	2
510	RVOT procedure	2
1670	Bidirectional cavopulmonary anastomosis (BDCPA) (Bidirectional Glenn)	2
1220	Coarctation repair, End to end, Extended	2
790	Aortic stenosis, Supravalvar, Repair	2
620	Conduit placement, LV to PA	2
1772	Conduit placement, Other	2
370	TOF repair, Ventriculotomy, Transanular patch	2
1380	Aortic aneurysm repair	2
1070	Congenitally corrected TGA repair, VSD closure	2
1730	Aneurysm, Ventricular, Left, Repair	2
720	Aortic root replacement, Mechanical	2
1291	Anomalous origin of coronary artery from pulmonary artery repair	2
715	Aortic root replacement, Bioprosthetic	2
1790	Ligation, Pulmonary artery	2
1290	Coronary artery fistula ligation	2
50	ASD, Common atrium (Single atrium), Septation	2
2270	*Valvuloplasty converted to valve replacement in the same operation, Pulmonic	2
1305	*Anomalous aortic origin of coronary artery from aorta (AAOCA) repair	2
840	Mitral stenosis, Supravalvar mitral ring repair	2
2100	*Aortic stenosis, Subvalvar, Repair, With myectomy for IHSS	2
220	Pulmonary artery origin from ascending aorta (Hemitruncus) repair	2
270	PAPVC, Scimitar, Repair	2
1000	Fontan, TCPC, External conduit, Fenestrated	2
1010	Fontan, TCPC, External conduit, Nonfenestrated	2
735	Aortic root replacement, Valve sparing	2
1230	Coarctation repair, Subclavian flap	2
85	Atrial fenestration closure	2
250	Valve replacement, Truncal valve	2
340	Systemic venous stenosis repair	2
460	Valvuloplasty, Tricuspid	2
290	Cor triatriatum repair	2
470	Valve replacement, Tricuspid (TVR)	2
310	Atrial baffle procedure (Non-Mustard, Non-Senning)	2
550	PA, Reconstruction (Plasty), Branch, Peripheral (At or beyond the hilar bifurcation)	2
2240	*Valvuloplasty converted to valve replacement in the same operation, Aortic	2
380	TOF repair, RV-PA conduit	2
1490	Arrhythmia surgery - atrial, Surgical Ablation	2
980	Fontan, TCPC, Lateral tunnel, Nonfenestrated	2
130	VSD, Multiple, Repair	2
910	Partial left ventriculectomy (LV volume reduction surgery) (Batista)	2
1630	Shunt, Ligation and takedown	3
1240	Coarctation repair, Patch aortoplasty	3
150	Ventricular septal fenestration	3
450	Occlusion MAPCA(s)	3
1740	Aneurysm, Pulmonary artery, Repair	3
330	Anomalous systemic venous connection repair	3

240	Valvuloplasty, Truncal valve	3
540	PA, reconstruction (plasty), Branch, Central (within the hilar bifurcation)	3
2280	*Valvuloplasty converted to valve replacement in same operation, Tricuspid	3
1700	Hemifontan	3
1720	Aneurysm, Ventricular, Right, Repair	3
170	AVC (AVSD) repair, Complete (CAVSD)	3
1275	**Coarctation repair + VSD repair	3
1110	Arterial switch operation (ASO)	3
1410	Transplant, Lung(s)	3
750	Konno procedure	3
70	ASD partial closure	3
1802	Pulmonary embolectomy, Acute pulmonary embolus	3
1774	Conduit placement, Ventricle to aorta	3
960	Fontan, Atrio-ventricular connection	3
1150	Rastelli	3
2290	*Valvuloplasty converted to valve replacement in the same operation, Truncal valve	3
700	Valve replacement, Aortic (AVR), Homograft	3
420	Pulmonary atresia - VSD (including TOF, PA) repair	3
1140	Mustard	3
1370	Pulmonary artery sling repair	3
1160	REV	3
1800	Pulmonary embolectomy	3
610	Conduit placement, RV to PA	3
2340	*Fontan + Atrioventricular valvuloplasty	3
2310	*Valvuloplasty converted to valve replacement in the same operation, Aortic - with Ross procedure	3
920	Pericardial drainage procedure	4
850	Valve replacement, Mitral (MVR)	4
2260	*Valvuloplasty converted to valve replacement in the same operation, Mitral	4
2300	*Valvuloplasty, Common atrioventricular valve	4
1650	PA debanding	4
1280	Aortic arch repair	4
2330	*Superior cavopulmonary anastomosis(es) (Glenn or HemiFontan) + Atrioventricular valvuloplasty	4
1760	Cardiac tumor resection	4
890	Transplant, Heart	4
1200	DOLV repair	4
1180	DORV, Intraventricular tunnel repair	4
1123	**Arterial switch procedure + Aortic arch repair	4
1120	**Arterial switch operation (ASO) and VSD repair	4
1025	Fontan revision or conversion (Re-do Fontan)	4
490	Valve excision, Tricuspid (Without replacement)	4
1590	Shunt, Systemic to pulmonary, Modified Blalock-Taussig shunt (MBTS)	4
1300	Coronary artery bypass	4
400	TOF - Absent pulmonary valve repair	4
1130	Senning	4
390	TOF - AVC (AVSD) repair	4
465	Ebstein's repair	4
760	Ross-Konno procedure	4
1640	PA banding (PAB)	4
440	Unifocalization MAPCA(s)	4

730	Aortic root replacement, Homograft	4
1285	**Aortic arch repair + VSD repair	4
1390	Aortic dissection repair	4
1080	Congenitally corrected TGA repair, VSD closure and LV to PA conduit	4
430	Pulmonary atresia - VSD - MAPCA (pseudotruncus) repair	4
140	VSD creation/enlargement	4
2230	*Valve replacement, Common atrioventricular valve	4
2250	*Valvuloplasty converted to valve replacement in the same operation, Common atrioventricular	4
280	TAPVC repair	4
880	HLHS biventricular repair	4
2320	*Valvuloplasty converted to valve replacement in the same operation, Aortic - with Ross-Konno procedure	4
300	Pulmonary venous stenosis repair	4
1600	Shunt, Systemic to pulmonary, Central (From aorta or to main pulmonary artery)	4
1320	Interrupted aortic arch repair	4
2210	*TGA, Other procedures (Kawashima, LV-PA conduit, other)	4
230	Truncus arteriosus repair	4
2190	*Aortic root translocation over left ventricle (Including Nikaidoh procedure)	4
1125	**Arterial switch procedure and VSD repair + Aortic arch repair	4
60	ASD creation/enlargement	4
2170	*Hybrid Approach "Stage 1", Stent placement in arterial duct (PDA)	4
80	Atrial septal fenestration	4
480	Valve closure, Tricuspid (Exclusion, Univentricular approach)	4
2160	*Hybrid Approach "Stage 1", Application of RPA and LPA bands	4
1660	Damus-Kaye-Stansel procedure (DKS) (Creation of AP anastomosis without arch reconstruction)	5
2200	*TAPVC repair + Shunt - Systemic to pulmonary	5
2180	*Hybrid Approach "Stage 1", Stent placement in arterial duct (PDA) + application of RPA and	5
1060	Congenitally corrected TGA repair, Atrial switch and Rastelli	5
900	Transplant, Heart and lung	5
1050	Congenitally corrected TGA repair, Atrial switch and ASO (Double switch)	5
2150	*Hybrid approach "Stage 2", Aortopulmonary amalgamation + Superior Cavopulmonary anastomosis(es) + PA Debanding + Without aortic arch repair	5
870	Norwood procedure	5
2140	*Hybrid approach "Stage 2", Aortopulmonary amalgamation + Superior Cavopulmonary anastomosis(es) + PA Debanding + Aortic arch repair (Norwood [Stage 1] + Superior Cavopulmonary anastomosis(es) + PA Debanding)	5
2220	**Truncus + IAA Repair	5

\* Indicates that the Score and Category for this procedure were not part of the original JTCVS publication but were imputed. These additional procedures are the new procedures that were added to The STS Congenital Heart Surgery Database, The EACTS Congenital Heart Surgery Database, and The Japan Congenital Cardiovascular Surgery Database (JCCVSD), as part of the upgrade to version 3.0. Ten representative experienced congenital surgeons from programs representing a variety of programmatic volume categories were surveyed and asked to provide an STS-EACTS Mortality Score for 26 procedures new to version 3.0, using the scores in the Table of the JTCVS article [5] as a guide. The mean score from these 10 surgeons was then used to impute the new STS- EACTS Mortality Score and STS-EACTS Mortality Category for these 26 procedures new to version 3.0. (When the high and low scores were discarded, the scores were essentially the same. [9/23 scores did not change, 13/13 scores change by only 0.1, and 1/23 scores change by 0.2]).

\*\* Indicates a combined procedure.

\*\*\* Indicates a combined procedure and also a procedure where the Score and Category for this procedure were not part of the original JTCVS publication but were imputed as described above.

**1b.2. Provide performance scores on the measure as specified (current and over time ) at the specified level of analysis.**

The measure was calculated using STS data for index cardiac operations that are classifiable by the STAT Mortality Categories from July 2010 to June 2014. The results were summarized either using the four-year time window, or using individual 12 month periods: 07/2014-06/2015, 07/2015-06/2016, 07/2016-06/2017, and 07/2017-06/2018. The results were also stratified by the STAT Mortality Categories as the measure specified. The summary statistic provided is the Participants' observed event rates. An exact 95% exact binomial confidence interval was calculated for each participant's observed rate. A higher rate indicates lower performance. The percentiles were calculated after ordering the participants' measures from the smallest to the largest. The 10th percentile value, for example, is the value that is larger than 10% of all participants.

**Four-year time window**

***Distribution of participant-specific operative mortality rates (proportion) stratified by STS-EACTS Mortality Categories in July 2014 - June 2018***

	STS-EACTS Mortality Category				
	1	2	3	4	5
# Participant	109	110	109	109	103
# Operations	27508	29977	10765	19899	3742
Mean	0.0049	0.017	0.023	0.065	0.20
STD	0.0063	0.013	0.023	0.037	0.20
IQR	0.0074	0.013	0.034	0.043	0.14
0%	0.0000	0.0000	0.0000	0.000	0.000
10%	0.0000	0.0000	0.0000	0.020	0.044
20%	0.0000	0.0083	0.0000	0.039	0.080
30%	0.0000	0.0104	0.0052	0.049	0.103
40%	0.0000	0.0120	0.0130	0.055	0.129
50%	0.0032	0.0139	0.0181	0.062	0.143
60%	0.0049	0.0164	0.0229	0.069	0.169
70%	0.0068	0.0201	0.0291	0.081	0.219
80%	0.0086	0.0238	0.0393	0.088	0.250
90%	0.0130	0.0317	0.0526	0.117	0.396
100%	0.0319	0.0833	0.1429	0.200	1.000
Midwest	24, 22.0%	24, 21.8%	24, 22.0%	24, 22.0%	24, 23.3%
Northeast	16, 14.7%	16, 14.5%	16, 14.7%	16, 14.7%	15, 14.6%
Puerto Rico/Canada	2, 1.8%	2, 1.8%	2, 1.8%	2, 1.8%	2, 1.9%
South	43, 39.4%	43, 39.1%	43, 39.4%	43, 39.4%	40, 38.8%
West	24, 22.0%	25, 22.7%	24, 22.0%	24, 22.0%	22, 21.4%

## 1-year time window

### Distribution of participant-specific operative mortality rates (proportion) stratified by STAT Mortality Categories in July 2014 - June 2015

	STS-EACTS Mortality Category				
	1	2	3	4	5
# Participant	107	108	106	105	96
# Operations	6970	7694	2660	4886	955
Mean	0.0036	0.017	0.027	0.068	0.20
STD	0.0077	0.023	0.10	0.064	0.23
IQR	0.00	0.026	0.028	0.086	0.33
0%	0.0000	0.000	0.000	0.000	0.000
10%	0.0000	0.000	0.000	0.000	0.000
20%	0.0000	0.000	0.000	0.000	0.000
30%	0.0000	0.000	0.000	0.026	0.000
40%	0.0000	0.000	0.000	0.045	0.091
50%	0.0000	0.011	0.000	0.061	0.134
60%	0.0000	0.016	0.000	0.069	0.188
70%	0.0000	0.025	0.019	0.084	0.261
80%	0.0071	0.028	0.036	0.120	0.350
90%	0.0147	0.043	0.066	0.154	0.500
100%	0.0345	0.119	1.000	0.294	1.000
Midwest	24, 22.4%	24, 22.2%	23, 21.7%	23, 21.9%	22, 22.9%
Northeast	16, 15.0%	16, 14.8%	16, 15.1%	16, 15.2%	15, 15.6%
Puerto Rico/Canada	2, 1.9%	2, 1.9%	2, 1.9%	2, 1.9%	2, 2.1%
South	41, 38.3%	41, 38.0%	41, 38.7%	40, 38.1%	37, 38.5%
West	24, 22.4%	25, 23.1%	24, 22.6%	24, 22.9%	20, 20.8%

### Distribution of participant-specific operative mortality rates (proportion) stratified by STAT Mortality Categories in July 2015 - June 2016

	STS-EACTS Mortality Category				
	1	2	3	4	5
# Participant	107	107	103	106	93
# Operations	7030	7599	2682	5089	991
Mean	0.0061	0.016	0.03	0.068	0.17

<b>STD</b>	0.011	0.026	0.063	0.071	0.19
<b>IQR</b>	0.0087	0.021	0.039	0.072	0.22
<b>0%</b>	0.0000	0.000	0.000	0.000	0.000
<b>10%</b>	0.0000	0.000	0.000	0.000	0.000
<b>20%</b>	0.0000	0.000	0.000	0.000	0.000
<b>30%</b>	0.0000	0.000	0.000	0.029	0.054
<b>40%</b>	0.0000	0.000	0.000	0.043	0.098
<b>50%</b>	0.0000	0.010	0.000	0.059	0.125
<b>60%</b>	0.0000	0.014	0.012	0.074	0.167
<b>70%</b>	0.0049	0.018	0.029	0.085	0.200
<b>80%</b>	0.0130	0.024	0.056	0.097	0.281
<b>90%</b>	0.0243	0.040	0.083	0.141	0.333
<b>100%</b>	0.0385	0.179	0.500	0.500	1.000
<b>Midwest</b>	24, 22.4%	24, 22.4%	24, 23.3%	24, 22.6%	23, 24.7%
<b>Northeast</b>	16, 15.0%	16, 15.0%	16, 15.5%	16, 15.1%	13, 14.0%
<b>Puerto Rico/Canada</b>	2, 1.9%	2, 1.9%	2, 1.9%	2, 1.9%	2, 2.2%
<b>South</b>	41, 38.3%	41, 38.3%	39, 37.9%	41, 38.7%	35, 37.6%
<b>West</b>	24, 22.4%	24, 22.4%	22, 21.4%	23, 21.7%	20, 21.5%

**Distribution of participant-specific operative mortality rates (proportion) stratified by STAT Mortality Categories in July 2016 - June 2017**

	<b>STS-EACTS Mortality Category</b>				
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b># Participant</b>	108	108	104	106	91
<b># Operations</b>	6937	7413	2803	5160	946
<b>Mean</b>	0.0037	0.017	0.026	0.069	0.20
<b>STD</b>	0.0085	0.022	0.049	0.064	0.28
<b>IQR</b>	0.00	0.026	0.037	0.077	0.25
<b>0%</b>	0.0000	0.0000	0.000	0.000	0.000
<b>10%</b>	0.0000	0.0000	0.000	0.000	0.000
<b>20%</b>	0.0000	0.0000	0.000	0.000	0.000
<b>30%</b>	0.0000	0.0000	0.000	0.030	0.000
<b>40%</b>	0.0000	0.0000	0.000	0.046	0.071
<b>50%</b>	0.0000	0.0089	0.000	0.060	0.100
<b>60%</b>	0.0000	0.0152	0.000	0.073	0.129

<b>70%</b>	0.0000	0.0178	0.030	0.083	0.188
<b>80%</b>	0.0022	0.0294	0.050	0.108	0.300
<b>90%</b>	0.0175	0.0480	0.081	0.167	0.500
<b>100%</b>	0.0385	0.1000	0.250	0.250	1.000
<b>Midwest</b>	24, 22.2%	24, 22.2%	24, 23.1%	23, 21.7%	22, 24.2%
<b>Northeast</b>	16, 14.8%	16, 14.8%	14, 13.5%	15, 14.2%	12, 13.2%
<b>Puerto Rico/Canada</b>	2, 1.9%	2, 1.9%	2, 1.9%	2, 1.9%	2, 2.2%
<b>South</b>	42, 38.9%	42, 38.9%	42, 40.4%	42, 39.6%	37, 40.7%
<b>West</b>	24, 22.2%	24, 22.2%	22, 21.2%	24, 22.6%	18, 19.8%

**Distribution of participant-specific operative mortality rates (proportion) stratified by STAT Mortality Categories in July 2017 - June 2018**

	STS-EACTS Mortality Category				
	1	2	3	4	5
<b># Participant</b>	107	107	106	104	85
<b># Operations</b>	6571	7271	2620	4764	850
<b>Mean</b>	0.0063	0.017	0.017	0.056	0.13
<b>STD</b>	0.013	0.021	0.035	0.047	0.18
<b>IQR</b>	0.0078	0.028	0.024	0.055	0.20
<b>0%</b>	0.000	0.000	0.000	0.000	0.00
<b>10%</b>	0.000	0.000	0.000	0.000	0.00
<b>20%</b>	0.000	0.000	0.000	0.000	0.00
<b>30%</b>	0.000	0.000	0.000	0.032	0.00
<b>40%</b>	0.000	0.000	0.000	0.043	0.00
<b>50%</b>	0.000	0.011	0.000	0.048	0.10
<b>60%</b>	0.000	0.016	0.000	0.059	0.11
<b>70%</b>	0.000	0.021	0.022	0.071	0.18
<b>80%</b>	0.012	0.034	0.028	0.089	0.24
<b>90%</b>	0.020	0.042	0.061	0.125	0.36
<b>100%</b>	0.077	0.125	0.250	0.235	1.00
<b>Midwest</b>	24, 22.4%	24, 22.4%	24, 22.6%	23, 22.1%	19, 22.4%
<b>Northeast</b>	16, 15.0%	16, 15.0%	16, 15.1%	15, 14.4%	10, 11.8%
<b>Puerto Rico/Canada</b>	2, 1.9%	2, 1.9%	2, 1.9%	2, 1.9%	2, 2.4%
<b>South</b>	42, 39.3%	42, 39.3%	42, 39.6%	42, 40.4%	37, 43.5%
<b>West</b>	23, 21.5%	23, 21.5%	22, 20.8%	22, 21.2%	17, 20.0%



**1b.4. Provide disparities data from the measure as specified (current and over time) by population group,** e.g., by race/ethnicity, gender, age, insurance status, socioeconomic status, and/or disability. (This is required for endorsement maintenance. Describe the data source including number of measured entities; number of patients; dates of data; if a sample, characteristics of the entities include.) This information also will be used to address the subcriterion on improvement (4b.1) under Usability and Use.

Please see Appendix.

**Distribution of participant-specific operative mortality rates (proportion) stratified by STAT Mortality Categories in July 2014 - June 2018**

**Sex = Male**

	<b>STS-EACTS Mortality Category</b>				
	1	2	3	4	5
<b># Participant</b>	109	110	108	109	97
<b># Operations</b>	14305	17074	5853	11033	2258
<b>Mean</b>	0.0048	0.016	0.018	0.064	0.15
<b>STD</b>	0.0095	0.017	0.024	0.051	0.19
<b>IQR</b>	0.0069	0.016	0.029	0.045	0.13
<b>0%</b>	0.0000	0.0000	0.0000	0.000	0.000
<b>10%</b>	0.0000	0.0000	0.0000	0.000	0.000
<b>20%</b>	0.0000	0.0000	0.0000	0.030	0.000
<b>30%</b>	0.0000	0.0077	0.0000	0.045	0.053
<b>40%</b>	0.0000	0.0100	0.0000	0.050	0.089
<b>50%</b>	0.0000	0.0120	0.0093	0.058	0.118
<b>60%</b>	0.0000	0.0158	0.0174	0.068	0.142
<b>70%</b>	0.0047	0.0191	0.0262	0.078	0.155
<b>80%</b>	0.0092	0.0236	0.0331	0.088	0.208
<b>90%</b>	0.0158	0.0288	0.0611	0.111	0.333
<b>100%</b>	0.0566	0.1176	0.0909	0.333	1.000
<b>Midwest</b>	24, 22.0%	24, 21.8%	24, 22.2%	24, 22.0%	21, 21.6%
<b>Northeast</b>	16, 14.7%	16, 14.5%	16, 14.8%	16, 14.7%	15, 15.5%
<b>Puerto Rico/Canada</b>	2, 1.8%	2, 1.8%	2, 1.9%	2, 1.8%	2, 2.1%
<b>South</b>	43, 39.4%	43, 39.1%	42, 38.9%	43, 39.4%	38, 39.2%
<b>West</b>	24, 22.0%	25, 22.7%	24, 22.2%	24, 22.0%	21, 21.6%

**Distribution of participant-specific operative mortality rates (proportion) stratified by STAT Mortality Categories in July 2014 - June 2018**

**Sex = Female**

	STS-EACTS Mortality Category				
	1	2	3	4	5
# Participant	109	110	108	109	101
# Operations	13183	12890	4910	8861	1481
Mean	0.0049	0.018	0.029	0.066	0.21
STD	0.0082	0.02	0.039	0.048	0.22
IQR	0.0082	0.027	0.045	0.056	0.21
0%	0.0000	0.0000	0.000	0.000	0.00
10%	0.0000	0.0000	0.000	0.000	0.00
20%	0.0000	0.0000	0.000	0.026	0.04
30%	0.0000	0.0053	0.000	0.042	0.10
40%	0.0000	0.0089	0.000	0.054	0.14
50%	0.0000	0.0148	0.021	0.063	0.17
60%	0.0021	0.0183	0.030	0.071	0.20
70%	0.0070	0.0227	0.042	0.082	0.25
80%	0.0096	0.0296	0.051	0.098	0.33
90%	0.0128	0.0364	0.071	0.131	0.41
100%	0.0390	0.0968	0.250	0.250	1.00
Midwest	24, 22.0%	24, 21.8%	23, 21.3%	24, 22.0%	24, 23.8%
Northeast	16, 14.7%	16, 14.5%	16, 14.8%	16, 14.7%	15, 14.9%
Puerto Rico/Canada	2, 1.8%	2, 1.8%	2, 1.9%	2, 1.8%	2, 2.0%
South	43, 39.4%	43, 39.1%	43, 39.8%	43, 39.4%	39, 38.6%
West	24, 22.0%	25, 22.7%	24, 22.2%	24, 22.0%	21, 20.8%

Distribution of participant-specific operative mortality rates (proportion) stratified by STAT Mortality Categories in July 2014 - June 2018

Race = White

	STS-EACTS Mortality Category				
	1	2	3	4	5
# Participant	108	108	105	107	96
# Operations	17068	19540	7073	12577	2477
Mean	0.0038	0.014	0.022	0.061	0.17
STD	0.0073	0.014	0.038	0.049	0.19
IQR	0.0055	0.017	0.034	0.048	0.18
0%	0.0000	0.0000	0.000	0.000	0.000

<b>10%</b>	0.0000	0.0000	0.000	0.000	0.000
<b>20%</b>	0.0000	0.0000	0.000	0.031	0.036
<b>30%</b>	0.0000	0.0058	0.000	0.036	0.073
<b>40%</b>	0.0000	0.0090	0.000	0.047	0.093
<b>50%</b>	0.0000	0.0113	0.015	0.054	0.118
<b>60%</b>	0.0000	0.0139	0.020	0.061	0.143
<b>70%</b>	0.0039	0.0172	0.028	0.076	0.186
<b>80%</b>	0.0073	0.0236	0.036	0.088	0.262
<b>90%</b>	0.0118	0.0323	0.047	0.107	0.348
<b>100%</b>	0.0435	0.0606	0.333	0.333	1.000
<b>Midwest</b>	24, 22.2%	24, 22.2%	24, 22.9%	24, 22.4%	22, 22.9%
<b>Northeast</b>	16, 14.8%	16, 14.8%	16, 15.2%	16, 15.0%	14, 14.6%
<b>Puerto Rico/Canada</b>	1, 0.9%	0, 0.0%	0, 0.0%	0, 0.0%	0, 0.0%
<b>South</b>	43, 39.8%	43, 39.8%	42, 40.0%	43, 40.2%	39, 40.6%
<b>West</b>	24, 22.2%	25, 23.1%	23, 21.9%	24, 22.4%	21, 21.9%

**Distribution of participant-specific operative mortality rates (proportion) stratified by STAT Mortality Categories in July 2014 - June 2018**

Race = Black

	<b>STS-EACTS Mortality Category</b>				
	1	2	3	4	5
<b># Participant</b>	106	106	102	102	79
<b># Operations</b>	3631	4020	1474	2727	533
<b>Mean</b>	0.0083	0.029	0.024	0.06	0.21
<b>STD</b>	0.024	0.062	0.05	0.064	0.27
<b>IQR</b>	0.00	0.032	0.026	0.10	0.33
<b>0%</b>	0.000	0.000	0.000	0.000	0.000
<b>10%</b>	0.000	0.000	0.000	0.000	0.000
<b>20%</b>	0.000	0.000	0.000	0.000	0.000
<b>30%</b>	0.000	0.000	0.000	0.000	0.000
<b>40%</b>	0.000	0.000	0.000	0.026	0.048
<b>50%</b>	0.000	0.012	0.000	0.049	0.111
<b>60%</b>	0.000	0.020	0.000	0.071	0.181
<b>70%</b>	0.000	0.028	0.000	0.084	0.250
<b>80%</b>	0.010	0.036	0.045	0.114	0.333
<b>90%</b>	0.025	0.065	0.091	0.150	0.500

<b>100%</b>	0.167	0.500	0.250	0.300	1.000
<b>Midwest</b>	24, 22.6%	24, 22.6%	24, 23.5%	24, 23.5%	20, 25.3%
<b>Northeast</b>	16, 15.1%	16, 15.1%	16, 15.7%	16, 15.7%	11, 13.9%
<b>Puerto Rico/Canada</b>	0, 0.0%	0, 0.0%	0, 0.0%	0, 0.0%	0, 0.0%
<b>South</b>	43, 40.6%	42, 39.6%	42, 41.2%	42, 41.2%	35, 44.3%
<b>West</b>	23, 21.7%	24, 22.6%	20, 19.6%	20, 19.6%	13, 16.5%

Distribution of participant-specific operative mortality rates (proportion) stratified by STAT Mortality Categories in July 2014 - June 2018

Race = Other

	STS-EACTS Mortality Category				
	1	2	3	4	5
<b># Participant</b>	106	107	103	104	83
<b># Operations</b>	6809	6417	2218	4595	732
<b>Mean</b>	0.0059	0.018	0.018	0.085	0.19
<b>STD</b>	0.014	0.028	0.036	0.13	0.27
<b>IQR</b>	0.00	0.027	0.019	0.12	0.25
<b>0%</b>	0.0000	0.000	0.000	0.000	0.00
<b>10%</b>	0.0000	0.000	0.000	0.000	0.00
<b>20%</b>	0.0000	0.000	0.000	0.000	0.00
<b>30%</b>	0.0000	0.000	0.000	0.000	0.00
<b>40%</b>	0.0000	0.000	0.000	0.027	0.00
<b>50%</b>	0.0000	0.000	0.000	0.055	0.11
<b>60%</b>	0.0000	0.013	0.000	0.077	0.17
<b>70%</b>	0.0000	0.021	0.000	0.101	0.25
<b>80%</b>	0.0074	0.032	0.036	0.134	0.33
<b>90%</b>	0.0210	0.054	0.082	0.186	0.50
<b>100%</b>	0.0833	0.167	0.167	1.000	1.00
<b>Midwest</b>	24, 22.6%	24, 22.4%	24, 23.3%	24, 23.1%	20, 24.1%
<b>Northeast</b>	15, 14.2%	15, 14.0%	15, 14.6%	14, 13.5%	11, 13.3%
<b>Puerto Rico/Canada</b>	2, 1.9%	2, 1.9%	2, 1.9%	2, 1.9%	2, 2.4%
<b>South</b>	41, 38.7%	41, 38.3%	40, 38.8%	41, 39.4%	32, 38.6%
<b>West</b>	24, 22.6%	25, 23.4%	22, 21.4%	23, 22.1%	18, 21.7%

Distribution of participant-specific operative mortality rates (proportion) stratified by STAT Mortality Categories in July 2014 - June 2018

Age group = neonates (age at surgery 0-30 days)

	STS-EACTS Mortality Category				
	1	2	3	4	5
# Participant	95	106	101	107	102
# Operations	630	2470	2213	8354	3029
Mean	0.086	0.037	0.037	0.087	0.22
STD	0.19	0.056	0.067	0.059	0.22
IQR	0.12	0.056	0.05	0.059	0.16
0%	0.000	0.000	0.000	0.000	0.000
10%	0.000	0.000	0.000	0.000	0.000
20%	0.000	0.000	0.000	0.042	0.082
30%	0.000	0.000	0.000	0.065	0.107
40%	0.000	0.000	0.000	0.073	0.126
50%	0.000	0.006	0.000	0.085	0.165
60%	0.000	0.034	0.026	0.096	0.193
70%	0.077	0.052	0.042	0.107	0.227
80%	0.125	0.061	0.071	0.119	0.284
90%	0.280	0.095	0.111	0.143	0.496
100%	1.000	0.333	0.500	0.400	1.000
Midwest	22, 23.2%	24, 22.6%	23, 22.8%	24, 22.4%	24, 23.5%
Northeast	14, 14.7%	16, 15.1%	14, 13.9%	16, 15.0%	15, 14.7%
Puerto Rico/Canada	2, 2.1%	2, 1.9%	2, 2.0%	2, 1.9%	2, 2.0%
South	37, 38.9%	41, 38.7%	40, 39.6%	42, 39.3%	39, 38.2%
West	20, 21.1%	23, 21.7%	22, 21.8%	23, 21.5%	22, 21.6%

Distribution of participant-specific operative mortality rates (proportion) stratified by STAT Mortality Categories in July 2014 - June 2018

Age group = infants (age at surgery 31 days -1 year)

	STS-EACTS Mortality Category				
	1	2	3	4	5
# Participant	109	110	108	109	84
# Operations	9217	9943	4186	5341	494
Mean	0.0059	0.027	0.03	0.076	0.12
STD	0.01	0.032	0.038	0.076	0.23
IQR	0.0097	0.029	0.05	0.084	0.14

<b>0%</b>	0.0000	0.000	0.000	0.000	0.00
<b>10%</b>	0.0000	0.000	0.000	0.000	0.00
<b>20%</b>	0.0000	0.000	0.000	0.000	0.00
<b>30%</b>	0.0000	0.011	0.000	0.032	0.00
<b>40%</b>	0.0000	0.019	0.000	0.056	0.00
<b>50%</b>	0.0000	0.022	0.016	0.067	0.00
<b>60%</b>	0.0000	0.026	0.025	0.077	0.00
<b>70%</b>	0.0076	0.031	0.045	0.092	0.10
<b>80%</b>	0.0132	0.038	0.053	0.112	0.20
<b>90%</b>	0.0198	0.054	0.078	0.156	0.32
<b>100%</b>	0.0667	0.250	0.182	0.500	1.00
<b>Midwest</b>	24, 22.0%	24, 21.8%	24, 22.2%	24, 22.0%	20, 23.8%
<b>Northeast</b>	16, 14.7%	16, 14.5%	16, 14.8%	16, 14.7%	11, 13.1%
<b>Puerto Rico/Canada</b>	2, 1.8%	2, 1.8%	2, 1.9%	2, 1.8%	2, 2.4%
<b>South</b>	43, 39.4%	43, 39.1%	43, 39.8%	43, 39.4%	33, 39.3%
<b>West</b>	24, 22.0%	25, 22.7%	23, 21.3%	24, 22.0%	18, 21.4%

**Distribution of participant-specific operative mortality rates (proportion) stratified by STAT Mortality Categories in July 2014 - June 2018**  
**Age group = Children (age at surgery > 1 year, < 18 years)**

	STS-EACTS Mortality Category				
	1	2	3	4	5
<b># Participant</b>	109	109	106	108	51
<b># Operations</b>	14424	13881	3642	4851	206
<b>Mean</b>	0.0018	0.0077	0.0075	0.03	0.046
<b>STD</b>	0.0045	0.013	0.017	0.054	0.17
<b>IQR</b>	0.00	0.012	0.00	0.044	0.00
<b>0%</b>	0.0000	0.0000	0.000	0.000	0.00
<b>10%</b>	0.0000	0.0000	0.000	0.000	0.00
<b>20%</b>	0.0000	0.0000	0.000	0.000	0.00
<b>30%</b>	0.0000	0.0000	0.000	0.000	0.00
<b>40%</b>	0.0000	0.0000	0.000	0.000	0.00
<b>50%</b>	0.0000	0.0041	0.000	0.019	0.00
<b>60%</b>	0.0000	0.0059	0.000	0.031	0.00
<b>70%</b>	0.0000	0.0093	0.000	0.037	0.00
<b>80%</b>	0.0000	0.0140	0.014	0.053	0.00

<b>90%</b>	0.0085	0.0198	0.027	0.073	0.04
<b>100%</b>	0.0220	0.1087	0.091	0.500	1.00
<b>Midwest</b>	24, 22.0%	24, 22.0%	24, 22.6%	24, 22.2%	16, 31.4%
<b>Northeast</b>	16, 14.7%	16, 14.7%	16, 15.1%	16, 14.8%	7, 13.7%
<b>Puerto Rico/Canada</b>	2, 1.8%	2, 1.8%	2, 1.9%	2, 1.9%	1, 2.0%
<b>South</b>	43, 39.4%	43, 39.4%	41, 38.7%	42, 38.9%	19, 37.3%
<b>West</b>	24, 22.0%	24, 22.0%	23, 21.7%	24, 22.2%	8, 15.7%

**Distribution of participant-specific operative mortality rates (proportion) stratified by STAT Mortality Categories in July 2014 - June 2018**

Age group = adults (age at surgery >= 18 years (congenital heart surgeries))

	STS-EACTS Mortality Category				
	1	2	3	4	5
<b># Participant</b>	107	108	90	96	9
<b># Operations</b>	3236	3682	723	1351	12
<b>Mean</b>	0.0033	0.0067	0.017	0.033	0.00
<b>STD</b>	0.02	0.016	0.053	0.055	0.00
<b>IQR</b>	0.00	0.00	0.00	0.059	0.00
<b>0%</b>	0.00	0.000	0.000	0.000	0.00
<b>10%</b>	0.00	0.000	0.000	0.000	0.00
<b>20%</b>	0.00	0.000	0.000	0.000	0.00
<b>30%</b>	0.00	0.000	0.000	0.000	0.00
<b>40%</b>	0.00	0.000	0.000	0.000	0.00
<b>50%</b>	0.00	0.000	0.000	0.000	0.00
<b>60%</b>	0.00	0.000	0.000	0.000	0.00
<b>70%</b>	0.00	0.000	0.000	0.032	0.00
<b>80%</b>	0.00	0.000	0.000	0.068	0.00
<b>90%</b>	0.00	0.034	0.057	0.125	0.00
<b>100%</b>	0.20	0.091	0.333	0.200	0.00
<b>Midwest</b>	24, 22.4%	24, 22.2%	21, 23.3%	24, 25.0%	3, 33.3%
<b>Northeast</b>	16, 15.0%	16, 14.8%	13, 14.4%	16, 16.7%	3, 33.3%
<b>Puerto Rico/Canada</b>	1, 0.9%	1, 0.9%	0, 0.0%	1, 1.0%	0, 0.0%
<b>South</b>	43, 40.2%	43, 39.8%	35, 38.9%	35, 36.5%	1, 11.1%
<b>West</b>	23, 21.5%	24, 22.2%	21, 23.3%	20, 20.8%	2, 22.2%

**4b.1. Progress on Improvement. (Not required for initial endorsement unless available) – Performance results on this measure (current and over time) should be provided in 1b.2 and 1b.4. Discuss:**

- Progress (trends in performance results, number and percentage of people receiving high-quality healthcare)
- Geographic area and number and percentage of accountable entities and patients included

Number of participants and operations by performance groups (see 2b.5), in July 2014 to June 2016, and in July 2016 to June 2018

STS-EACTS Category	Performance group	July 2014 – June 2016				July 2016 – June 2018d			
		# Participant	# Operation	% Participant	% Operation	# Participant	# Operation	% Participant	% Operation
1	Mid performance	102	13267	94.4	94.8	100	12748	92.6	94.4
1	Low performance	6	733	5.6	5.2	8	760	7.4	5.6
2	Mid performance	102	14827	93.6	97.0	99	13775	91.7	93.8
2	Low performance	7	466	6.4	3.0	9	909	8.3	6.2
3	Mid performance	100	4771	93.5	89.3	102	5226	94.4	96.4
3	Low performance	7	571	6.5	10.7	6	197	5.6	3.6
4	High performance	4	840	3.7	8.4	2	614	1.9	6.2
4	Mid performance	95	8482	88.0	85.0	96	8406	90.6	84.7
4	Low performance	9	653	8.3	6.5	8	904	7.5	9.1
5	High performance	2	52	2.0	2.7	-	-	-	-
5	Mid performance	90	1710	89.1	87.9	87	1732	93.5	96.4
5	Low performance	9	184	8.9	9.5	6	64	6.5	3.6

The performance designation is reassigned each time the measure is calculated and reported. The performance is compared to the average STS performance to that time period.



The overall rates in the last four 12-month periods were summarized in the table below.

STS-EACTS Mortality Category	Operative Mortality Rates by 12-month Time Period, %			
	07/2014-06/2015	07/2015-06/2016	07/2016-06/2017	07/2017-06/2018
<b>1</b>	0.46	0.61	0.39	0.59
<b>2</b>	1.65	1.61	1.50	1.51
<b>3</b>	2.29	2.54	2.50	1.79
<b>4</b>	6.53	6.68	6.41	5.79
<b>5</b>	16.75	16.35	12.47	11.41

Geographic area and number and percentage of accountable entities and patients included

STS-EACTS Category	Geographic region	July 2014 – June 2016				July 2016 – June 2018			
		# Participa nt	# Operatio n	% Participa nt	% Operatio n	# Participa nt	# Operatio n	% Participa nt	% Operatio n
<b>1</b>	Midwest	24	3051	22.2	21.8	24	2895	22.2	21.4
<b>1</b>	Northeast	16	2475	14.8	17.7	16	2275	14.8	16.8
<b>1</b>	Puerto Rico/Cana da	2	516	1.9	3.7	2	461	1.9	3.4
<b>1</b>	South	42	4872	38.9	34.8	42	4854	38.9	35.9
<b>1</b>	West	24	3086	22.2	22.0	24	3023	22.2	22.4
<b>2</b>	Midwest	24	3591	22.0	23.5	24	3561	22.2	24.3
<b>2</b>	Northeast	16	2320	14.7	15.2	16	2243	14.8	15.3
<b>2</b>	Puerto Rico/Cana da	2	413	1.8	2.7	2	408	1.9	2.8
<b>2</b>	South	42	5592	38.5	36.6	42	5350	38.9	36.4
<b>2</b>	West	25	3377	22.9	22.1	24	3122	22.2	21.3
<b>3</b>	Midwest	24	1348	22.4	25.2	24	1419	22.2	26.2
<b>3</b>	Northeast	16	905	15.0	16.9	16	839	14.8	15.5
<b>3</b>	Puerto Rico/Cana da	2	152	1.9	2.8	2	138	1.9	2.5
<b>3</b>	South	41	1866	38.3	34.9	42	1845	38.9	34.0
<b>3</b>	West	24	1071	22.4	20.0	24	1182	22.2	21.8
<b>4</b>	Midwest	24	2297	22.2	23.0	23	2337	21.7	23.5
<b>4</b>	Northeast	16	1490	14.8	14.9	15	1425	14.2	14.4

4	Puerto Rico/Cana da	2	257	1.9	2.6	2	226	1.9	2.3
4	South	42	3552	38.9	35.6	42	3550	39.6	35.8
4	West	24	2379	22.2	23.8	24	2386	22.6	24.0
5	Midwest	24	495	23.8	25.4	22	457	23.7	25.4
5	Northeast	15	300	14.9	15.4	13	286	14.0	15.9
5	Puerto Rico/Cana da	2	48	2.0	2.5	2	41	2.2	2.3
5	South	39	651	38.6	33.5	38	619	40.9	34.5
5	West	21	452	20.8	23.2	18	393	19.4	21.9