



## Measure Information

This document contains the information submitted by measure developers/stewards, but is organized according to NQF's measure evaluation criteria and process. The item numbers refer to those in the submission form but may be in a slightly different order here. In general, the item numbers also reference the related criteria (e.g., item 1b.1 relates to sub criterion 1b).

### Brief Measure Information

**NQF #: 0733**

**Corresponding Measures:**

**De.2. Measure Title:** Operative Mortality Stratified by the 5 STAT Mortality Categories

**Co.1.1. Measure Steward:** The Society of Thoracic Surgeons

**De.3. Brief Description of Measure:** Percent of patients undergoing index pediatric and/or congenital heart surgery who die, including both 1) all deaths occurring during the hospitalization in which the procedure was performed, even if after 30 days (including patients transferred to other acute care facilities), and 2) those deaths occurring after discharge from the hospital, but within 30 days of the procedure, stratified by the five STAT Mortality Categories, a multi-institutional validated risk stratification tool

**1b.1. Developer Rationale:** Congenital heart disease is a common birth defect that affects approximately 1 in 125 live births [1]. Pediatric and congenital heart surgery is a subspecialty of high resource utilization that has the potential to repair or palliate the majority of patients with pediatric and congenital cardiac disease. Mortality is likely the single most important negative outcome that can be associated with a surgical procedure. Critical evaluation of Operative Mortality allows one to evaluate the risk associated with a given procedure for various patient characteristics, and more importantly, aggressively search for ways to minimize that risk. Over the past decade, mortality after pediatric cardiac surgery has been declining and currently stands at 2.9% [2]. By reporting outcomes stratified into different categories of risk, one can avoid risk averse behavior [3, 4, 5, 6, 7, 8].

Since 2015, STS has publicly reported risk adjusted Operative Mortality [9, 10, 11] stratified by the STAT Mortality Categories [12, 13, 14, 15, 16, 17].

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9. O'Brien SM, Jacobs JP, Pasquali SK, Gaynor JW, Karamlou T, Welke KF, Filardo G, Han JM, Kim S, Shahian DM, Jacobs ML. The Society of Thoracic Surgeons Congenital Heart Surgery Database Mortality Risk Model: Part 1-Statistical Methodology. *Ann Thorac Surg.* 2015 Sep;100(3):1054-62. doi: 10.1016/j.athoracsur.2015.07.014. Epub 2015 Aug 3. PMID: 26245502.
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  15. Shahian DM, Jacobs JP, Badhwar V, D'Agostino RS, Bavaria JE, Prager RL. Risk Aversion and Public Reporting. Part 1: Observations From Cardiac Surgery and Interventional Cardiology. *Ann Thorac Surg.* 2017 Dec;104(6):2093-2101. doi: 10.1016/j.athoracsur.2017.06.077. Epub 2017 Nov 1. PMID: 29100643.
  16. Shahian DM, Jacobs JP, Badhwar V, D'Agostino RS, Bavaria JE, Prager RL. Risk Aversion and Public Reporting. Part 2: Mitigation Strategies. *Ann Thorac Surg.* 2017 Dec;104(6):2102-2110. doi: 10.1016/j.athoracsur.2017.06.076. Epub 2017 Nov 1. PMID: 29100640.
  17. Jacobs JP, Shahian DM, Prager RL, Badhwar V, Jacobs ML. Invited Commentary. Parents' Preferences Regarding Public Reporting of Outcomes in Congenital Heart Surgery. *Ann Thorac Surg.* 2018 Feb;105(2):612-614. doi: 10.1016/j.athoracsur.2017.05.057. PMID: 29362174. Congenital heart disease is a common birth defect that affects approximately 1 in 125 live births [1]. Pediatric and congenital heart surgery is a subspecialty of high resource utilization that has the potential to repair or palliate the majority of patients with pediatric and congenital cardiac disease. Mortality is likely the single most important negative outcome that can be associated with a surgical procedure. Critical evaluation of Operative Mortality allows one to evaluate the risk associated with a given procedure for various patient characteristics, and more importantly, aggressively search for ways to minimize that risk. Over the past decade, mortality after pediatric cardiac surgery has been declining and currently stands at 2.9% [2]. By reporting outcomes stratified into different categories of risk, one can avoid risk averse behavior [3, 4, 5, 6, 7, 8]. Since 2015, STS has publicly reported risk adjusted Operative Mortality [9, 10, 11] stratified by the STAT Mortality Categories [12, 13, 14, 15, 16, 17].
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**S.4. Numerator Statement:** Number of patients undergoing index pediatric and/or congenital heart surgery who die, including both 1) all deaths occurring during the hospitalization in which the procedure was performed, even if after 30 days (including patients transferred to other acute care facilities), and 2) those deaths occurring after discharge from the hospital, but within 30 days of the procedure, stratified by the five STAT Mortality Levels, a multi-institutional validated complexity stratification tool

**S.6. Denominator Statement:** All patients undergoing index pediatric and/or congenital heart surgery

**S.8. Denominator Exclusions:** N/A

**De.1. Measure Type:** Outcome

**S.17. Data Source:** Registry Data

**S.20. Level of Analysis:** Clinician : Group/Practice

**IF Endorsement Maintenance – Original Endorsement Date:** Nov 18, 2011 **Most Recent Endorsement Date:** Oct 24, 2019

**IF this measure is included in a composite, NQF Composite#/title:**

**IF this measure is paired/grouped, NQF#/title:**

1815:Pediatric Cardiac Surgery Stratified Mortality and Volume Pair

**De.4. IF PAIRED/GROUPED, what is the reason this measure must be reported with other measures to appropriately interpret results?** 1815 Pediatric Cardiac Surgery Stratified Mortality and Volume (Paired Measure)

- 0733 Operative Mortality Stratified by the Five STS-EACTS Mortality Categories
- 0732 Surgical Volume for Pediatric and Congenital Heart Surgery: Total Programmatic Volume and Programmatic Volume Stratified by the Five STS-EACTS Mortality Categories

This measure was reviewed under the NQF Pediatric Cardiac Surgery Project which closed in 2011. During the review process, the

Pediatric Cardiac Surgery Steering Committee recommended that this measure be paired with the stratified volume measure. The reason for this was that while the committee felt the relationship between volume and outcome was unclear, there was likely a volume below which outcome suffers, making the combination of the mortality and volume measure results useful as a pair.

## 1. Evidence, Performance Gap, Priority – Importance to Measure and Report

Extent to which the specific measure focus is evidence-based, important to making significant gains in healthcare quality, and improving health outcomes for a specific high-priority (high-impact) aspect of healthcare where there is variation in or overall less-than-optimal performance. **Measures must be judged to meet all sub criteria to pass this criterion and be evaluated against the remaining criteria.**

### 1a. Evidence to Support the Measure Focus – See attached Evidence Submission Form

[0733\\_evid\\_attmt\\_Spring2019.docx](#)

#### 1a.1 For Maintenance of Endorsement: Is there new evidence about the measure since the last update/submission?

Do not remove any existing information. If there have been any changes to evidence, the Committee will consider the new evidence. Please use the most current version of the evidence attachment (v7.1). Please use red font to indicate updated evidence.

No

### 1b. Performance Gap

Demonstration of quality problems and opportunity for improvement, i.e., data demonstrating:

- considerable variation, or overall less-than-optimal performance, in the quality of care across providers; and/or
- Disparities in care across population groups.

**1b.1. Briefly explain the rationale for this measure** (e.g., how the measure will improve the quality of care, the benefits or improvements in quality envisioned by use of this measure)

If a COMPOSITE (e.g., combination of component measure scores, all-or-none, any-or-none), SKIP this question and answer the composite questions.

Congenital heart disease is a common birth defect that affects approximately 1 in 125 live births [1]. Pediatric and congenital heart surgery is a subspecialty of high resource utilization that has the potential to repair or palliate the majority of patients with pediatric and congenital cardiac disease. Mortality is likely the single most important negative outcome that can be associated with a surgical procedure. Critical evaluation of Operative Mortality allows one to evaluate the risk associated with a given procedure for various patient characteristics, and more importantly, aggressively search for ways to minimize that risk. Over the past decade, mortality after pediatric cardiac surgery has been declining and currently stands at 2.9% [2]. By reporting outcomes stratified into different categories of risk, one can avoid risk averse behavior [3, 4, 5, 6, 7, 8].

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**1b.2. Provide performance scores on the measure as specified (current and over time) at the specified level of analysis.** (*This is required for maintenance of endorsement. Include mean, std dev, min, max, interquartile range, scores by decile. 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 sub-criterion on improvement (4b1) under Usability and Use.

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

#0733 Operative Mortality Stratified by the 5 STAT Mortality Categories, Last Updated: Oct 24, 2019

	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%
Northeast		16, 14.7%		16, 14.5%		16, 14.7%
Puerto Rico/Canada			2, 1.8%	2, 1.8%	2, 1.8%	2, 1.9%
South	43, 39.4%		43, 39.1%		43, 39.4%	40, 38.8%
West	24, 22.0%		25, 22.7%		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%
Northeast		16, 15.0%		16, 14.8%		16, 15.1%
Puerto Rico/Canada			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%
West	24, 22.4%		25, 23.1%		24, 22.6%	20, 20.8%

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

#0733 Operative Mortality Stratified by the 5 STAT Mortality Categories, Last Updated: Oct 24, 2019

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

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

STS-EACTS Mortality Category					
	1	2	3	4	5
# Participant	108	108	104	106	91
# Operations	6937	7413	2803	5160	946
Mean	0.0037	0.017	0.026	0.069	0.20
STD	0.0085	0.022	0.049	0.064	0.28
IQR	0.00	0.026	0.037	0.077	0.25
0%	0.0000	0.0000	0.000	0.000	0.000
10%	0.0000	0.0000	0.000	0.000	0.000
20%	0.0000	0.0000	0.000	0.000	0.000
30%	0.0000	0.0000	0.000	0.030	0.000
40%	0.0000	0.0000	0.000	0.046	0.071
50%	0.0000	0.0089	0.000	0.060	0.100
60%	0.0000	0.0152	0.000	0.073	0.129
70%	0.0000	0.0178	0.030	0.083	0.188
80%	0.0022	0.0294	0.050	0.108	0.300
90%	0.0175	0.0480	0.081	0.167	0.500
100%	0.0385	0.1000	0.250	0.250	1.000
Midwest	24, 22.2%		24, 22.2%	24, 23.1%	23, 21.7%
Northeast		16, 14.8%		16, 14.8%	14, 13.5%
Puerto Rico/Canada			2, 1.9%	2, 1.9%	2, 2.2%
South	42, 38.9%		42, 38.9%	42, 40.4%	42, 39.6%
West	24, 22.2%		24, 22.2%	22, 21.2%	24, 22.6%

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
# Participant	107	107	106	104	85
# Operations	6571	7271	2620	4764	850
Mean	0.0063	0.017	0.017	0.056	0.13
STD	0.013	0.021	0.035	0.047	0.18
IQR	0.0078	0.028	0.024	0.055	0.20
0%	0.000	0.000	0.000	0.000	0.00
10%	0.000	0.000	0.000	0.000	0.00
20%	0.000	0.000	0.000	0.000	0.00
30%	0.000	0.000	0.000	0.032	0.00
40%	0.000	0.000	0.000	0.043	0.00
50%	0.000	0.011	0.000	0.048	0.10
60%	0.000	0.016	0.000	0.059	0.11
70%	0.000	0.021	0.022	0.071	0.18
80%	0.012	0.034	0.028	0.089	0.24
90%	0.020	0.042	0.061	0.125	0.36
100%	0.077	0.125	0.250	0.235	1.00
Midwest	24, 22.4%		24, 22.4%		24, 22.6%
Northeast	16, 15.0%		16, 15.0%		16, 15.1%
Puerto Rico/Canada			2, 1.9%		2, 2.4%
South	42, 39.3%		42, 39.3%		42, 40.4%
West	23, 21.5%		23, 21.5%		22, 20.8%

If tables do not display clearly in this field, please see AppendixThe 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

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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%
Northeast	16, 14.7%		16, 14.5%	16, 14.7%	16, 14.7%
Puerto Rico/Canada		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%
West	24, 22.0%		25, 22.7%	24, 22.0%	24, 22.0%

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%
Northeast	16, 15.0%		16, 14.8%	16, 15.1%	16, 15.2%
Puerto Rico/Canada		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%
West	24, 22.4%		25, 23.1%	24, 22.6%	24, 22.9%

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
STD	0.011	0.026	0.063	0.071	0.19
IQR	0.0087	0.021	0.039	0.072	0.22
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	0.029	0.054
40%	0.0000	0.000	0.000	0.043	0.098
50%	0.0000	0.010	0.000	0.059	0.125
60%	0.0000	0.014	0.012	0.074	0.167

#0733 Operative Mortality Stratified by the 5 STAT Mortality Categories, Last Updated: Oct 24, 2019

70%	0.0049	0.018	0.029	0.085	0.200
80%	0.0130	0.024	0.056	0.097	0.281
90%	0.0243	0.040	0.083	0.141	0.333
100%	0.0385	0.179	0.500	0.500	1.000
Midwest	24, 22.4%	24, 22.4%	24, 23.3%	24, 22.6%	23, 24.7%
Northeast	16, 15.0%	16, 15.0%	16, 15.5%	16, 15.1%	13, 14.0%
Puerto Rico/Canada	2, 1.9%	2, 1.9%	2, 1.9%	2, 1.9%	2, 2.2%
South	41, 38.3%	41, 38.3%	39, 37.9%	41, 38.7%	35, 37.6%
West	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

STS-EACTS Mortality Category					
	1	2	3	4	5
# Participant	108	108	104	106	91
# Operations	6937	7413	2803	5160	946
Mean	0.0037	0.017	0.026	0.069	0.20
STD	0.0085	0.022	0.049	0.064	0.28
IQR	0.00	0.026	0.037	0.077	0.25
0%	0.0000	0.0000	0.000	0.000	0.000
10%	0.0000	0.0000	0.000	0.000	0.000
20%	0.0000	0.0000	0.000	0.000	0.000
30%	0.0000	0.0000	0.000	0.030	0.000
40%	0.0000	0.0000	0.000	0.046	0.071
50%	0.0000	0.0089	0.000	0.060	0.100
60%	0.0000	0.0152	0.000	0.073	0.129
70%	0.0000	0.0178	0.030	0.083	0.188
80%	0.0022	0.0294	0.050	0.108	0.300
90%	0.0175	0.0480	0.081	0.167	0.500
100%	0.0385	0.1000	0.250	0.250	1.000
Midwest	24, 22.2%	24, 22.2%	24, 23.1%	23, 21.7%	22, 24.2%
Northeast	16, 14.8%	16, 14.8%	14, 13.5%	15, 14.2%	12, 13.2%
Puerto Rico/Canada	2, 1.9%	2, 1.9%	2, 1.9%	2, 2.2%	
South	42, 38.9%	42, 38.9%	42, 40.4%	42, 39.6%	37, 40.7%
West	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
# Participant	107	107	106	104	85
# Operations	6571	7271	2620	4764	850
Mean	0.0063	0.017	0.017	0.056	0.13
STD	0.013	0.021	0.035	0.047	0.18
IQR	0.0078	0.028	0.024	0.055	0.20
0%	0.000	0.000	0.000	0.000	0.00
10%	0.000	0.000	0.000	0.000	0.00
20%	0.000	0.000	0.000	0.000	0.00
30%	0.000	0.000	0.000	0.032	0.00
40%	0.000	0.000	0.000	0.043	0.00
50%	0.000	0.011	0.000	0.048	0.10

60%	0.000	0.016	0.000	0.059	0.11
70%	0.000	0.021	0.022	0.071	0.18
80%	0.012	0.034	0.028	0.089	0.24
90%	0.020	0.042	0.061	0.125	0.36
100%	0.077	0.125	0.250	0.235	1.00
Midwest	24, 22.4%	24, 22.4%	24, 22.6%	23, 22.1%	19, 22.4%
Northeast	16, 15.0%	16, 15.0%	16, 15.1%	15, 14.4%	10, 11.8%
Puerto Rico/Canada	2, 1.9%	2, 1.9%	2, 1.9%	2, 1.9%	2, 2.4%
South	42, 39.3%	42, 39.3%	42, 39.6%	42, 40.4%	37, 43.5%
West	23, 21.5%	23, 21.5%	22, 20.8%	22, 21.2%	17, 20.0%

If tables do not display clearly in this field, please see Appendix

**1b.3. If no or limited performance data on the measure as specified is reported in 1b2, then provide a summary of data from the literature that indicates opportunity for improvement or overall less than optimal performance on the specific focus of measurement.**

N/A

**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 maintenance of endorsement. Describe the data source including number of measured entities; number of patients; dates of data; if a sample, characteristics of the entities included.*) For measures that show high levels of performance, i.e., "topped out", disparities data may demonstrate an opportunity for improvement/gap in care for certain sub-populations. This information also will be used to address the sub-criterion on improvement (4b1) under Usability and Use.**

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

Sex = Male

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

## #0733 Operative Mortality Stratified by the 5 STAT Mortality Categories, Last Updated: Oct 24, 2019

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%
Northeast		16, 14.7%		16, 14.5%	16, 14.8%
Puerto Rico/Canada			2, 1.8%	2, 1.8%	2, 2.0%
South	43, 39.4%		43, 39.1%	43, 39.8%	43, 39.4%
West	24, 22.0%		25, 22.7%	24, 22.2%	24, 22.0%

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

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

Race = Black

	STS-EACTS Mortality Category				
	1	2	3	4	5
# Participant	106	106	102	102	79
# Operations	3631	4020	1474	2727	533
Mean	0.0083	0.029	0.024	0.06	0.21
STD	0.024	0.062	0.05	0.064	0.27
IQR	0.00	0.032	0.026	0.10	0.33
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	0.000	0.000
30%	0.000	0.000	0.000	0.000	0.000
40%	0.000	0.000	0.000	0.026	0.048
50%	0.000	0.012	0.000	0.049	0.111
60%	0.000	0.020	0.000	0.071	0.181
70%	0.000	0.028	0.000	0.084	0.250
80%	0.010	0.036	0.045	0.114	0.333
90%	0.025	0.065	0.091	0.150	0.500
100%	0.167	0.500	0.250	0.300	1.000
Midwest	24, 22.6%		24, 22.6%		24, 23.5%
Northeast	16, 15.1%		16, 15.1%		16, 15.7%
Puerto Rico/Canada	0, 0.0%		0, 0.0%		0, 0.0%
South	43, 40.6%		42, 39.6%		35, 44.3%
West	23, 21.7%		24, 22.6%		20, 19.6%

## 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
# Participant	106	107	103	104	83
# Operations	6809	6417	2218	4595	732
Mean	0.0059	0.018	0.018	0.085	0.19
STD	0.014	0.028	0.036	0.13	0.27
IQR	0.00	0.027	0.019	0.12	0.25
0%	0.0000	0.000	0.000	0.000	0.00
10%	0.0000	0.000	0.000	0.000	0.00
20%	0.0000	0.000	0.000	0.000	0.00
30%	0.0000	0.000	0.000	0.000	0.00
40%	0.0000	0.000	0.000	0.027	0.00
50%	0.0000	0.000	0.000	0.055	0.11
60%	0.0000	0.013	0.000	0.077	0.17
70%	0.0000	0.021	0.000	0.101	0.25
80%	0.0074	0.032	0.036	0.134	0.33
90%	0.0210	0.054	0.082	0.186	0.50
100%	0.0833	0.167	0.167	1.000	1.00
Midwest	24, 22.6%		24, 22.4%		24, 23.3%
Northeast	15, 14.2%		15, 14.0%		15, 14.6%
					14, 13.5%
					11, 13.3%



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Puerto Rico/Canada	2, 1.9%	2, 1.9%	2, 1.9%	2, 1.9%	2, 2.4%
South	41, 38.7%	41, 38.3%	40, 38.8%	41, 39.4%	32, 38.6%
West	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%
Northeast		14, 14.7%		16, 15.1%	14, 13.9%
Puerto Rico/Canada			2, 2.1%	2, 1.9%	2, 2.0%
South	37, 38.9%		41, 38.7%	40, 39.6%	42, 39.3%
West	20, 21.1%		23, 21.7%	22, 21.8%	23, 21.5%

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
0%	0.0000	0.000	0.000	0.000	0.00
10%	0.0000	0.000	0.000	0.000	0.00
20%	0.0000	0.000	0.000	0.000	0.00
30%	0.0000	0.011	0.000	0.032	0.00
40%	0.0000	0.019	0.000	0.056	0.00
50%	0.0000	0.022	0.016	0.067	0.00
60%	0.0000	0.026	0.025	0.077	0.00
70%	0.0076	0.031	0.045	0.092	0.10
80%	0.0132	0.038	0.053	0.112	0.20
90%	0.0198	0.054	0.078	0.156	0.32

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100%	0.0667	0.250	0.182	0.500	1.00		
Midwest	24, 22.0%		24, 21.8%		24, 22.2%	24, 22.0%	20, 23.8%
Northeast		16, 14.7%		16, 14.5%		16, 14.8%	16, 14.7%
Puerto Rico/Canada			2, 1.8%	2, 1.8%	2, 1.9%	2, 1.8%	2, 2.4%
South	43, 39.4%		43, 39.1%		43, 39.8%	43, 39.4%	33, 39.3%
West	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	
# Participant		109	109	106	108	51
# Operations		14424	13881	3642	4851	206
Mean	0.0018	0.0077	0.0075	0.03	0.046	
STD	0.0045	0.013	0.017	0.054	0.17	
IQR	0.00	0.012	0.00	0.044	0.00	
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	0.000	0.00	
30%	0.0000	0.0000	0.000	0.000	0.00	
40%	0.0000	0.0000	0.000	0.000	0.00	
50%	0.0000	0.0041	0.000	0.019	0.00	
60%	0.0000	0.0059	0.000	0.031	0.00	
70%	0.0000	0.0093	0.000	0.037	0.00	
80%	0.0000	0.0140	0.014	0.053	0.00	
90%	0.0085	0.0198	0.027	0.073	0.04	
100%	0.0220	0.1087	0.091	0.500	1.00	
Midwest	24, 22.0%		24, 22.0%		24, 22.6%	24, 22.2% 16, 31.4%
Northeast	16, 14.7%		16, 14.7%		16, 15.1%	16, 14.8% 7, 13.7%
Puerto Rico/Canada			2, 1.8%	2, 1.8%	2, 1.9%	2, 1.9% 1, 2.0%
South	43, 39.4%		43, 39.4%		41, 38.7%	42, 38.9% 19, 37.3%
West	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
# Participant	107	108	90	96	9
# Operations	3236	3682	723	1351	12
Mean	0.0033	0.0067	0.017	0.033	0.00
STD	0.02	0.016	0.053	0.055	0.00
IQR	0.00	0.00	0.00	0.059	0.00
0%	0.00	0.000	0.000	0.000	0.00
10%	0.00	0.000	0.000	0.000	0.00
20%	0.00	0.000	0.000	0.000	0.00
30%	0.00	0.000	0.000	0.000	0.00
40%	0.00	0.000	0.000	0.000	0.00
50%	0.00	0.000	0.000	0.000	0.00
60%	0.00	0.000	0.000	0.000	0.00

70%	0.00	0.000	0.000	0.032	0.00
80%	0.00	0.000	0.000	0.068	0.00
90%	0.00	0.034	0.057	0.125	0.00
100%	0.20	0.091	0.333	0.200	0.00
Midwest	24, 22.4%	24, 22.2%	21, 23.3%	24, 25.0%	3, 33.3%
Northeast	16, 15.0%	16, 14.8%	13, 14.4%	16, 16.7%	3, 33.3%
Puerto Rico/Canada	1, 0.9%	1, 0.9%	0, 0.0%	1, 1.0%	0, 0.0%
South	43, 40.2%	43, 39.8%	35, 38.9%	35, 36.5%	1, 11.1%
West	23, 21.5%	24, 22.2%	21, 23.3%	20, 20.8%	2, 22.2%

If tables do not display clearly in this field, please see Appendix

**1b.5. If no or limited data on disparities from the measure as specified is reported in 1b.4, then provide a summary of data from the literature that addresses disparities in care on the specific focus of measurement. Include citations. Not necessary if performance data provided in 1b.4**

N/A

## 2. Reliability and Validity—Scientific Acceptability of Measure Properties

Extent to which the measure, as specified, produces consistent (reliable) and credible (valid) results about the quality of care when implemented. **Measures must be judged to meet the sub criteria for both reliability and validity to pass this criterion and be evaluated against the remaining criteria.**

**2a.1. Specifications** The measure is well defined and precisely specified so it can be implemented consistently within and across organizations and allows for comparability. eMeasures should be specified in the Health Quality Measures Format (HQMF) and the Quality Data Model (QDM).

**De.5. Subject/Topic Area** (check all the areas that apply):

Cardiovascular, Surgery, Surgery : Cardiac Surgery

**De.6. Non-Condition Specific**(check all the areas that apply):

Safety, Safety : Complications

**De.7. Target Population Category** (Check all the populations for which the measure is specified and tested if any):

Children, Populations at Risk : Individuals with multiple chronic conditions

**S.1. Measure-specific Web Page** (Provide a URL link to a web page specific for this measure that contains current detailed specifications including code lists, risk model details, and supplemental materials. Do not enter a URL linking to a home page or to general information.)

[http://www.sts.org/sites/default/files/documents/pdf/ndb/CongenitalDataCollectionForm3\\_0\\_Annotated\\_20090916.pdf](http://www.sts.org/sites/default/files/documents/pdf/ndb/CongenitalDataCollectionForm3_0_Annotated_20090916.pdf);

[http://www.sts.org/sites/default/files/documents/pdf/CongenitalDataSpecificationsV3\\_0\\_20090904.pdf](http://www.sts.org/sites/default/files/documents/pdf/CongenitalDataSpecificationsV3_0_20090904.pdf)

**S.2a. If this is an eMeasure**, HQMF specifications must be attached. Attach the zipped output from the eMeasure authoring tool (MAT) - if the MAT was not used, contact staff. (Use the specification fields in this online form for the plain-language description of the specifications)

**This is not an eMeasure Attachment:**

**S.2b. Data Dictionary, Code Table, or Value Sets** (and risk model codes and coefficients when applicable) must be attached. (Excel or csv file in the suggested format preferred - if not, contact staff)

**No data dictionary Attachment:**

**S.2c. Is this an instrument-based measure** (i.e., data collected via instruments, surveys, tools, questionnaires, scales, etc.)? Attach copy of instrument if available.

**No, this is not an instrument-based measure Attachment:**

**S.2d.** Is this an instrument-based measure (i.e., data collected via instruments, surveys, tools, questionnaires, scales, etc.)? Attach copy of instrument if available.

Not an instrument-based measure

**S.3.1. For maintenance of endorsement:** Are there changes to the specifications since the last updates/submission. If yes, update the specifications for S1-2 and S4-22 and explain reasons for the changes in S3.2.

No

**S.3.2. For maintenance of endorsement,** please briefly describe any important changes to the measure specifications since last measure update and explain the reasons.

STS now refers to "STS-EACTS mortality categories" as "STAT Mortality Categories"

**S.4. Numerator Statement** (Brief, narrative description of the measure focus or what is being measured about the target population, i.e., cases from the target population with the target process, condition, event, or outcome) DO NOT include the rationale for the measure.

IF an OUTCOME MEASURE, state the outcome being measured. Calculation of the risk-adjusted outcome should be described in the calculation algorithm (S.14).

Number of patients undergoing index pediatric and/or congenital heart surgery who die, including both 1) all deaths occurring during the hospitalization in which the procedure was performed, even if after 30 days (including patients transferred to other acute care facilities), and 2) those deaths occurring after discharge from the hospital, but within 30 days of the procedure, stratified by the five STAT Mortality Levels, a multi-institutional validated complexity stratification tool

**S.5. Numerator Details** (All information required to identify and calculate the cases from the target population with the target process, condition, event, or outcome such as definitions, time period for data collection, specific data collection items/responses, code/value sets – Note: lists of individual codes with descriptors that exceed 1 page should be provided in an Excel or csv file in required format at S.2b)

IF an OUTCOME MEASURE, describe how the observed outcome is identified/counted. Calculation of the risk-adjusted outcome should be described in the calculation algorithm (S.14).

Number of index pediatric and/or congenital heart surgery operations with an operative mortality;

Operative mortality is determined by a combination of the following two data elements (STS Congenital Heart Surgery Database Version 3.0):

1. Mortality status at database discharge (MtDBDisStat)
2. Status at 30 days after surgery (Mt30Stat)

**S.6. Denominator Statement** (Brief, narrative description of the target population being measured)

All patients undergoing index pediatric and/or congenital heart surgery

**S.7. Denominator Details** (All information required to identify and calculate the target population/denominator such as definitions, time period for data collection, specific data collection items/responses, code/value sets – Note: lists of individual codes with descriptors that exceed 1 page should be provided in an Excel or csv file in required format at S.2b.)

IF an OUTCOME MEASURE, describe how the target population is identified. Calculation of the risk-adjusted outcome should be described in the calculation algorithm (S.14).

Number of index cardiac operations in each level of complexity stratification using the 5 STAT Mortality Categories, a multi-institutional validated complexity stratification tool. Index operation is defined as the first cardiac operation of a hospitalization. For a complete list of operations and their respective STAT category, please see the Appendix.

**S.8. Denominator Exclusions** (Brief narrative description of exclusions from the target population)

N/A

**S.9. Denominator Exclusion Details** (All information required to identify and calculate exclusions from the denominator such as definitions, time period for data collection, specific data collection items/responses, code/value sets – Note: lists of individual codes with descriptors that exceed 1 page should be provided in an Excel or csv file in required format at S.2b.)

N/A

**S.10. Stratification Information** *(Provide all information required to stratify the measure results, if necessary, including the stratification variables, definitions, specific data collection items/responses, code/value sets, and the risk-model covariates and coefficients for the clinically-adjusted version of the measure when appropriate – Note: lists of individual codes with descriptors that exceed 1 page should be provided in an Excel or csv file in required format with at S.2b.)*

Please see [Appendix](#)

**S.11. Risk Adjustment Type** (Select type. Provide specifications for risk stratification in measure testing attachment)

[Stratification by risk category/subgroup](#)

If other:

**S.12. Type of score:**

[Rate/proportion](#)

If other:

**S.13. Interpretation of Score** *(Classifies interpretation of score according to whether better quality is associated with a higher score, a lower score, a score falling within a defined interval, or a passing score)*

[Better quality = Lower score](#)

**S.14. Calculation Algorithm/Measure Logic** *(Diagram or describe the calculation of the measure score as an ordered sequence of steps including identifying the target population; exclusions; cases meeting the target process, condition, event, or outcome; time period for data, aggregating data; risk adjustment; etc.)*

[Please refer to numerator and denominator sections as well as the attachments for detailed information.](#)

**S.15. Sampling** *(If measure is based on a sample, provide instructions for obtaining the sample and guidance on minimum sample size.)*

[IF an instrument-based](#) performance measure (e.g., PRO-PM), identify whether (and how) proxy responses are allowed.

[N/A](#)

**S.16. Survey/Patient-reported data** *(If measure is based on a survey or instrument, provide instructions for data collection and guidance on minimum response rate.)*

Specify calculation of response rates to be reported with performance measure results.

[N/A](#)

**S.17. Data Source** *(Check ONLY the sources for which the measure is SPECIFIED AND TESTED).*

*If other, please describe in S.18.*

[Registry Data](#)

**S.18. Data Source or Collection Instrument** *(Identify the specific data source/data collection instrument (e.g. name of database, clinical registry, collection instrument, etc., and describe how data are collected.)*

[IF instrument-based](#), identify the specific instrument(s) and standard methods, modes, and languages of administration.

[STS Congenital Heart Surgery Database Version 3.0; STS Congenital Heart Surgery Database Version 3.22 went live on January 1, 2014.](#)

**S.19. Data Source or Collection Instrument** *(available at measure-specific Web page URL identified in S.1 OR in attached appendix at A.1)*

[Available at measure-specific web page URL identified in S.1](#)

**S.20. Level of Analysis** *(Check ONLY the levels of analysis for which the measure is SPECIFIED AND TESTED)*

[Clinician : Group/Practice](#)

**S.21. Care Setting** *(Check ONLY the settings for which the measure is SPECIFIED AND TESTED)*

[Inpatient/Hospital](#)

If other:

**S.22. COMPOSITE Performance Measure** - Additional Specifications *(Use this section as needed for aggregation and weighting rules, or calculation of individual performance measures if not individually endorsed.)*

[N/A](#)

## 2. Validity – See attached Measure Testing Submission Form

[testing\\_v7.1\\_-\\_0733\\_Op-Mortality-Stratif-636910396392821530.docx](#)

### 2.1 For maintenance of endorsement

*Reliability testing: If testing of reliability of the measure score was not presented in prior submission(s), has reliability testing of the measure score been conducted? If yes, please provide results in the Testing attachment. Please use the most current version of the testing attachment (v7.1). Include information on all testing conducted (prior testing as well as any new testing); use red font to indicate updated testing.*

No

### 2.2 For maintenance of endorsement

*Has additional empirical validity testing of the measure score been conducted? If yes, please provide results in the Testing attachment. Please use the most current version of the testing attachment (v7.1). Include information on all testing conducted (prior testing as well as any new testing); use red font to indicate updated testing.*

Yes

### 2.3 For maintenance of endorsement

*Risk adjustment: For outcome, resource use, cost, and some process measures, risk-adjustment that includes social risk factors is not prohibited at present. Please update sections 1.8, 2a2, 2b1,2b4.3 and 2b5 in the Testing attachment and S.140 and S.11 in the online submission form. NOTE: These sections must be updated even if social risk factors are not included in the risk-adjustment strategy. You MUST use the most current version of the Testing Attachment (v7.1) -- older versions of the form will not have all required questions.*

No - This measure is not risk-adjusted

## 3. Feasibility

Extent to which the specifications including measure logic, require data that are readily available or could be captured without undue burden and can be implemented for performance measurement.

### 3a. Byproduct of Care Processes

For clinical measures, the required data elements are routinely generated and used during care delivery (e.g., blood pressure, lab test, diagnosis, medication order).

#### 3a.1. Data Elements Generated as Byproduct of Care Processes.

Generated or collected by and used by healthcare personnel during the provision of care (e.g., blood pressure, lab value, diagnosis, depression score), Abstracted from a record by someone other than person obtaining original information (e.g., chart abstraction for quality measure or registry)

If other:

### 3b. Electronic Sources

The required data elements are available in electronic health records or other electronic sources. If the required data are not in electronic health records or existing electronic sources, a credible, near-term path to electronic collection is specified.

**3b.1. To what extent are the specified data elements available electronically in defined fields (i.e., data elements that are needed to compute the performance measure score are in defined, computer-readable fields)** Update this field for **maintenance of endorsement**.

Some data elements are in defined fields in electronic sources

**3b.2. If ALL the data elements needed to compute the performance measure score are not from electronic sources, specify a credible, near-term path to electronic capture, OR provide a rationale for using other than electronic sources. For maintenance of endorsement**, if this measure is not an eMeasure (eCQM), please describe any efforts to develop an eMeasure (eCQM).

The STS Congenital Heart Surgery Database currently represents >90% of all US centers performing congenital heart surgery, and local availability of data elements in electronic format will vary across institutions. Some institutions may have full EHR capability while others may have partial, or no availability. However, all data elements from participating institutions are submitted to the STS Congenital Heart Surgery Database in electronic format following a standard set of data specifications. The majority of participating



institutions obtain data entry software products that are certified for the purposes of collecting STS Congenital Heart Surgery Database data elements.

**3b.3. If this is an eMeasure, provide a summary of the feasibility assessment in an attached file or make available at a measure-specific URL. Please also complete and attach the NQF Feasibility Score Card.**

**Attachment:**

### 3c. Data Collection Strategy

Demonstration that the data collection strategy (e.g., source, timing, frequency, sampling, patient confidentiality, costs associated with fees/licensing of proprietary measures) can be implemented (e.g., already in operational use, or testing demonstrates that it is ready to put into operational use). For eMeasures, a feasibility assessment addresses the data elements and measure logic and demonstrates the eMeasure can be implemented or feasibility concerns can be adequately addressed.

**3c.1. Required for maintenance of endorsement.** Describe difficulties (as a result of testing and/or operational use of the measure) regarding data collection, availability of data, missing data, timing and frequency of data collection, sampling, patient confidentiality, time and cost of data collection, other feasibility/implementation issues.

**IF instrument-based,** consider implications for both individuals providing data (patients, service recipients, respondents) and those whose performance is being measured.

The data elements included in this measure have been standard in the STS Congenital Heart Surgery Database for at least 8 years and some of them have been part of the database for more than 15 years. The variables are considered to be data elements that are readily available and already collected as part of the process of providing care.

**3c.2. Describe any fees, licensing, or other requirements to use any aspect of the measure as specified (e.g., value/code set, risk model, programming code, algorithm).**

**Data Collection:**

There are no direct costs to collect the data for this measure. Costs to develop and maintain the measure included volunteer cardiothoracic surgeon time, STS staff time, and Duke Clinical Research Institute statistician and project management time.

**Other fees:**

The participation fee for the STS Congenital Heart Surgery Database is \$4,000 per year if a majority of participating physicians at an institution or practice are STS members and \$5,000 per year if a majority of participating physicians at an institution or practice are not STS members. In addition, there is a volume-based fee of \$3.00 per patient record submitted as part of any data harvest to the data warehouse.

## 4. Usability and Use

Extent to which potential audiences (e.g., consumers, purchasers, providers, policy makers) are using or could use performance results for both accountability and performance improvement to achieve the goal of high-quality, efficient healthcare for individuals or populations.

### 4a. Accountability and Transparency

Performance results are used in at least one accountability application within three years after initial endorsement and are publicly reported within six years after initial endorsement (or the data on performance results are available). If not in use at the time of initial endorsement, then a credible plan for implementation within the specified timeframes is provided.

#### 4.1. Current and Planned Use

*NQF-endorsed measures are expected to be used in at least one accountability application within 3 years and publicly reported within 6 years of initial endorsement in addition to performance improvement.*

Specific Plan for Use	Current Use (for current use provide URL)
	Public Reporting Please see 4a.1 <a href="https://publicreporting.sts.org/chsd">https://publicreporting.sts.org/chsd</a> Please see 4a.1 <a href="https://publicreporting.sts.org/chsd">https://publicreporting.sts.org/chsd</a>

<p>Quality Improvement (Internal to the specific organization)  STS Congenital Heart Surgery Database  <a href="https://www.sts.org/registries-research-center/sts-national-database/sts-congenital-heart-surgery-database">https://www.sts.org/registries-research-center/sts-national-database/sts-congenital-heart-surgery-database</a></p>
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**4a1.1 For each CURRENT use, checked above (update for maintenance of endorsement), provide:**

- Name of program and sponsor
- Purpose
- Geographic area and number and percentage of accountable entities and patients included
- Level of measurement and setting

Participants in the STS Congenital Heart Surgery Database (CHSD) receive periodic feedback reports on their data (an internal quality improvement initiative), and data (as listed below) from the CHSD has been publicly reported since January 2015. Approximately 23% of CHSD participants were enrolled in the first round of voluntary public reporting in 2015; participation in this initiative has grown to over 83% as of April 2019. For all participants that consent to participate in voluntary public reporting, STS reports:

- Overall volume and volume by STAT category
- The overall operative mortality rate for each participant over a four-year period for all ages
- The operative mortality rate for each participant over a four-year period for each of the 5 Society of Thoracic Surgeons - European Association for Cardio-Thoracic Surgery Congenital Heart Surgery Mortality Categories (STAT Mortality Categories).

**4a1.2. If not currently publicly reported OR used in at least one other accountability application (e.g., payment program, certification, licensing) what are the reasons?** (e.g., Do policies or actions of the developer/steward or accountable entities restrict access to performance results or impede implementation?)

N/A

**4a1.3. If not currently publicly reported OR used in at least one other accountability application, provide a credible plan for implementation within the expected timeframes -- any accountability application within 3 years and publicly reported within 6 years of initial endorsement.** (Credible plan includes the specific program, purpose, intended audience, and timeline for implementing the measure within the specified timeframes. A plan for accountability applications addresses mechanisms for data aggregation and reporting.)

N/A

**4a2.1.1. Describe how performance results, data, and assistance with interpretation have been provided to those being measured or other users during development or implementation.**

**How many and which types of measured entities and/or others were included? If only a sample of measured entities were included, describe the full population and how the sample was selected.**

As of April 2019, 117 surgical participant groups in the U.S. and Canada (plus other international participants) submit surgical quality data to the STS Congenital Heart Surgery Database (CHSD). The CHSD contains more than 475,000 congenital heart surgery procedure records and currently has more than 1,000 participating physicians (surgeons and anesthesiologists).

CHSD participants submit their data to the STS data warehouse during two submission periods ("harvests") each year, through a secure website. Participants receive an initial report on their data quality within a few days of data submission; after review and resubmission of the data file, participants are provided with secure access to their final performance report within three months of the harvest close date. Performance results for each measure include a summary of the results of all participants who were included in the analysis. The participant's score is illustrated graphically in relation to the 25th, 50th and 75th percentiles of the distribution across participants, and is accompanied by the 95% Bayesian credible interval. In addition, these risk-adjusted results allow surgeons to compare their patients' outcomes with national benchmarks and to initiate QI efforts as needed. Resources are available on the STS website and through contact with STS Database staff to assist participants with interpretation of their performance results.

Additionally, all U.S. and Canadian participants in the CHSD have the opportunity to consent to the public reporting of a subset of their performance results on the STS website, making "star ratings" available to consenting participants as well as the public.

**4a2.1.2. Describe the process(es) involved, including when/how often results were provided, what data were provided, what**

educational/explanatory efforts were made, etc.

See 4a2.1.1

**4a2.2.1. Summarize the feedback on measure performance and implementation from the measured entities and others described in 4d.1.**

**Describe how feedback was obtained.**

The congenital heart surgeons from across the U.S. who comprise the STS Congenital Heart Surgery Task Force meet periodically to discuss the participant reports and to consider potential enhancements to the CHSD. Additions/clarifications to the data collection form and to the content/format of the participant reports are discussed and implemented as appropriate.

Most recently, STS surgeon members have expressed interest in real-time, online data updates, which has led to the development of dashboard-type reporting on STS.org. The congenital heart surgery dashboard launched in 2018.

The STS also convenes a Public Reporting Task Force to review feedback on STS public reporting, to promote greater participation among STS members, and to review and enhance the usability of the format of public reporting on the STS website.

**4a2.2.2. Summarize the feedback obtained from those being measured.**

Feedback from CHSD participant groups is positive, as evidenced by the fact that 95% of all hospitals performing congenital heart surgery in the U.S. and Canada participate in the CHSD, and by the continual expansion of CHSD public reporting – from 33% of participants in mid-2015 to over 83% as of April 2019. The STS also receives and, to a limited extent, accommodates requests from third parties for access to STS public reporting data and “star ratings” for independent public reporting initiatives.

**4a2.2.3. Summarize the feedback obtained from other users**

See 4a2.2.2

**4a2.3. Describe how the feedback described in 4a2.2.1 has been considered when developing or revising the measure specifications or implementation, including whether the measure was modified and why or why not.**

The STS Congenital Heart Surgery Task Force did not identify a need to modify this measure in 2018.

**Improvement**

Progress toward achieving the goal of high-quality, efficient healthcare for individuals or populations is demonstrated. If not in use for performance improvement at the time of initial endorsement, then a credible rationale describes how the performance results could be used to further the goal of high-quality, efficient healthcare for individuals or populations.

**4b1. Refer to data provided in 1b but do not repeat here. Discuss any progress on improvement (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.)**

If no improvement was demonstrated, what are the reasons? If not in use for performance improvement at the time of initial endorsement, provide a credible rationale that describes how the performance results could be used to further the goal of high-quality, efficient healthcare for individuals or populations.

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

		July 2014 – June 2016		July 2016 – June 2018d							
STS-EACTS Category	Performance group	# Participant	% Participant	# Participant	% Participant	# Operation	% Operation	# Participant	% Participant	# Operation	% 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		

#0733 Operative Mortality Stratified by the 5 STS Mortality Categories, Last Updated: Oct 24, 2019

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

1	0.46	0.61	0.39	0.59
2	1.65	1.61	1.50	1.51
3	2.29	2.54	2.50	1.79
4	6.53	6.68	6.41	5.79
5	16.75	16.35	12.47	11.41

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

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

If tables do not display clearly in this field, please see Appendix

**4b2. Unintended Consequences**

The benefits of the performance measure in facilitating progress toward achieving high-quality, efficient healthcare for individuals or populations outweigh evidence of unintended negative consequences to individuals or populations (if such

evidence exists).

**4b2.1. Please explain any unexpected findings (positive or negative) during implementation of this measure including unintended impacts on patients.**

We are not aware of any negative unintended consequences. All public reporting initiatives have the potential for unintended consequences, including gaming and risk aversion. We attempt to control the former through a careful audit process (in 2018, 10% of participants were audited) and the latter by having a robust methodology that appropriately adjusts the expected risk for providers who care for sicker patients.

**4b2.2. Please explain any unexpected benefits from implementation of this measure.**

## 5. Comparison to Related or Competing Measures

If a measure meets the above criteria and there are endorsed or new related measures (either the same measure focus or the same target population) or competing measures (both the same measure focus and the same target population), the measures are compared to address harmonization and/or selection of the best measure.

### 5. Relation to Other NQF-endorsed Measures

Are there related measures (conceptually, either same measure focus or target population) or competing measures (conceptually both the same measure focus and same target population)? If yes, list the NQF # and title of all related and/or competing measures.

Yes

**5.1a. List of related or competing measures (selected from NQF-endorsed measures)**

0339 : RACHS-1 Pediatric Heart Surgery Mortality Rate (PDI 06)

**5.1b. If related or competing measures are not NQF endorsed please indicate measure title and steward.**

### 5a. Harmonization of Related Measures

The measure specifications are harmonized with related measures;

**OR**

The differences in specifications are justified

**5a.1. If this measure conceptually addresses EITHER the same measure focus OR the same target population as NQF-endorsed measure(s):**

**Are the measure specifications harmonized to the extent possible?**

No

**5a.2. If the measure specifications are not completely harmonized, identify the differences, rationale, and impact on interpretability and data collection burden.**

Measure 0339 is based on administrative data while the STS measure is based on clinical registry data.

### 5b. Competing Measures

The measure is superior to competing measures (e.g., is a more valid or efficient way to measure);

**OR**

Multiple measures are justified.

**5b.1. If this measure conceptually addresses both the same measure focus and the same target population as NQF-endorsed measure(s):**

**Describe why this measure is superior to competing measures (e.g., a more valid or efficient way to measure quality); OR provide a rationale for the additive value of endorsing an additional measure. (Provide analyses when possible.)**

Differences between Clinical and Administrative Nomenclature –

Several studies have examined the relative utility of clinical and administrative nomenclature for the evaluation of quality of care for patients undergoing treatment for pediatric and congenital cardiac disease. Evidence from four recent investigations suggests that the validity of coding of lesions seen in the congenitally malformed heart via ICD-9 as used currently in administrative databases in

the United States is poor [1, 2, 3, 4].

First, in a series of 373 infants with congenital cardiac defects at Children's Hospital of Wisconsin, investigators reported that only 52% of the cardiac diagnoses in the medical records had a corresponding code from the ICD-9 in the hospital discharge database [1]. Second, the Hennepin County Medical Center discharge database in Minnesota identified all infants born during 2001 with a code for congenital cardiac disease using ICD-9. A review of these 66 medical records by physicians was able to confirm only 41% of the codes contained in the administrative database from ICD-9 [2]. Third, the Metropolitan Atlanta Congenital Defect Program of the Birth Defect Branch of the Centers for Disease Control and Prevention of the United States government carried out surveillance of infants and fetuses with cardiac defects delivered to mothers residing in Atlanta during the years 1988 through 2003 [3]. These records were reviewed and classified using both administrative coding and the clinical nomenclature used in The Society of Thoracic Surgeons Congenital Heart Surgery Database. This study concluded that analyses based on the codes available in ICD-9 are likely to "have substantial misclassification" of congenital cardiac disease. Fourth, a study was performed using linked patient data (2004-2010) from The Society of Thoracic Surgeons Congenital Heart Surgery (STS-CHS) Database (clinical registry) and the Pediatric Health Information Systems (PHIS) database (administrative database) from hospitals participating in both in order to evaluate differential coding/classification of operations between datasets and subsequent impact on outcomes assessment [4]. The cohort included 59,820 patients from 33 centers. There was a greater than 10% difference in the number of cases identified between data sources for half of the benchmark operations. The negative predictive value (NPV) of the administrative (versus clinical) data was high (98.8%-99.9%); the positive predictive value (PPV) was lower (56.7%-88.0%). Overall agreement between data sources in RACHS-1 category assignment was 68.4%. These differences translated into significant differences in outcomes assessment, ranging from an underestimation of mortality associated with truncus arteriosus repair by 25.7% in the administrative versus clinical data (7.01% versus 9.43%;  $p = 0.001$ ) to an overestimation of mortality associated with ventricular septal defect (VSD) repair by 31.0% (0.78% versus 0.60%;  $p = 0.1$ ). For the RACHS-1 categories, these ranged from an underestimation of category 5 mortality by 40.5% to an overestimation of category 2 mortality by 12.1%; these differences were not statistically significant. This study demonstrates differences in case ascertainment between administrative and clinical registry data for children undergoing cardiac operations, which translated into important differences in outcomes assessment.

Several potential reasons can explain the poor diagnostic accuracy of administrative databases and codes from ICD-9:

- accidental miscoding
- coding performed by medical records clerks who have never seen the actual patient
- contradictory or poorly described information in the medical record
- lack of diagnostic specificity for congenital cardiac disease in the codes of ICD-9
- inadequately trained medical coders.

Although one might anticipate some improvement in diagnostic specificity with the planned adoption of ICD-10 by the US, it is likely to still be far short from that currently achieved with clinical registries. (ICD-9 has only 29 congenital cardiac codes and ICD-10 has 73 possible congenital cardiac terms.)

#### References

1. Cronk CE, Malloy ME, Pelech AN, et al. Completeness of state administrative databases for surveillance of congenital heart disease. *Birth Defects Res A Clin Mol Teratol* 2003;67:597-603.
2. Frohnert BK, Lussky RC, Alms MA, Mendelsohn NJ, Symonik DM, Falken MC. Validity of hospital discharge data for identifying infants with cardiac defects. *J Perinatol* 2005;25:737-42.
3. Strickland MJ, Riehle-Colarusso TJ, Jacobs JP, Reller MD, Mahle WT, Botto LD, Tolbert PE, Jacobs ML, Lacour-Gayet FG, Tchervenkov CI, Mavroudis C, Correa A. The importance of nomenclature for congenital cardiac disease: implications for research and evaluation. In: 2008 Supplement to Cardiology in the Young: Databases and The Assessment of Complications associated with The Treatment of Patients with Congenital Cardiac Disease, Prepared by: The Multi-Societal Database Committee for Pediatric and Congenital Heart Disease, Jeffrey P. Jacobs, MD (editor). *Cardiology in the Young*. 2008 Dec 9; 18(Suppl 2):92-100.
4. Pasquali SK, Peterson ED, Jacobs JP, He X, Li JS, Jacobs ML, Gaynor JW, Hirsch JC, Shah SS, Mayer JE. Differential case ascertainment in clinical registry versus administrative data and impact on outcomes assessment for pediatric cardiac operations. *Ann Thorac Surg*. 2013 Jan;95(1):197-203. doi: 10.1016/j.athoracsur.2012.08.074. Epub 2012 Nov 7. PMID: 23141907.

## Appendix

**A.1 Supplemental materials may be provided in an appendix.** All supplemental materials (such as data collection instrument or



methodology reports) should be organized in one file with a table of contents or bookmarks. If material pertains to a specific submission form number, that should be indicated. Requested information should be provided in the submission form and required attachments. There is no guarantee that supplemental materials will be reviewed.

[Attachment](#) **Attachment:** [0733\\_Appendix-2019.pdf](#)

### Contact Information

**Co.1 Measure Steward (Intellectual Property Owner):** The Society of Thoracic Surgeons

**Co.2 Point of Contact:** Mark, Antman, [mantman@sts.org](mailto:mantman@sts.org), 312-202-5856-

**Co.3 Measure Developer if different from Measure Steward:** The Society of Thoracic Surgeons

**Co.4 Point of Contact:** Mark, Antman, [mantman@sts.org](mailto:mantman@sts.org), 312-202-5856-

### Additional Information

#### Ad.1 Workgroup/Expert Panel involved in measure development

**Provide a list of sponsoring organizations and workgroup/panel members' names and organizations. Describe the members' role in measure development.**

The STS Quality Measurement Task Force (chaired by David Shahian, MD) is responsible for measure development. Members of the STS Task Force on Quality Initiatives provide clinical expertise as needed. The STS Workforce on National Databases meets at the STS Annual Meeting and reviews the measures on a yearly basis. Changes or updates to the measure will be at the recommendation of the Workforce.

#### Quality Measurement Task Force

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Sean M. O'Brien, PhD; Duke Clinical Research Institute, Durham, NC

#### Measure Developer/Steward Updates and Ongoing Maintenance

**Ad.2 Year the measure was first released:** 2009

**Ad.3 Month and Year of most recent revision:** 01, 2015

**Ad.4 What is your frequency for review/update of this measure?** Annually

**Ad.5 When is the next scheduled review/update for this measure?** 01, 2020

<b>Ad.6 Copyright statement:</b> <b>Ad.7 Disclaimers:</b>
<b>Ad.8 Additional Information/Comments:</b>