



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 #: 0734

Corresponding Measures:

De.2. Measure Title: Participation in a National Database for Pediatric and Congenital Heart Surgery

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

De.3. Brief Description of Measure: Participation in at least one multi-center, standardized data collection and feedback program for pediatric and congenital heart surgery that provides benchmarking of the physician's data relative to national and regional programs and uses process and outcome measures.

1b.1. Developer Rationale: The very act of participation in a multi-institutional database will also facilitate quality improvement. 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. The evidence connecting improved quality with participation in a systematic national database is inferred from published accounts of improved quality following participation in the STS Adult Cardiac Surgery and other national databases. "It appears that the routine feedback of risk-adjusted data on local performance provided by these programs heightens awareness and leads to self-examination and self-assessment, which in turn improves quality and outcomes [2,3]. This general quality improvement template should be considered for application in other settings beyond cardiac surgery." Indeed, with the growth and increased participation in the STS Congenital Heart Surgery Database, in the United States, mortality after pediatric and congenital heart surgery has decreased for all levels of operative risk and complexity [4]. Furthermore, STS has recently developed a composite metric to assist physicians and teams with assessing mortality and morbidity following congenital heart surgery [5, 6].

1. Tchervenkov CI, Jacobs JP, Bernier P-L, Stellin G, Kurosawa H, Mavroudis C, Jonas RA, Cicek SM, Al-Halees Z, J. Elliott MJ, Jatene MB, Kinsley RH, Kreutzer C, Leon-Wyss J, Liu J, Maruszewski B, Nunn GR, Ramirez-Marroquin S, Sandoval N, Sano S, Sarris GE, Sharma R, Shoeb A, Spray TL, Ungerleider RM, Yangni-Angate H, Ziemer G. The improvement of care for paediatric and congenital cardiac disease across the World: a challenge for the World Society for Pediatric and Congenital Heart Surgery. 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, Volume 18, Issue S2 (Suppl. 2), pp 63–69, December 9, 2008.

2. Grover FL, Shroyer AL, Hammermeister K, Edwards FH, Ferguson TB, Jr., Dziuban SW, Jr., Cleveland JC, Jr., Clark RE, McDonald G. A decade's experience with quality improvement in cardiac surgery using the Veterans Affairs and Society of Thoracic Surgeons national databases. Ann Surg. 2001 Oct; 234 (4): 464-472; discussion 472-464.

3. Likosky DS, Harrington SD, Cabrera L, DeLucia A 3rd, Chenoweth CE, Krein SL, Thibault D, Zhang M, Matsouaka RA, Strobel RJ, Prager RL. Collaborative Quality Improvement Reduces Postoperative Pneumonia After Isolated Coronary Artery Bypass Grafting Surgery. Circ Cardiovasc Qual Outcomes. 2018 Nov;11(11):e004756.

4. Jacobs JP, He X, Mayer JE Jr, Austin EH 3rd, Quintessenza JA, Karl TR, Vricella L, Mavroudis C, O'Brien SM, Pasquali SK, Hill KD, Husain SA, Overman DM, St Louis JD, Han JM, Shahian DM, Cameron D, Jacobs ML. Mortality Trends in Pediatric and Congenital Heart Surgery: An Analysis of The Society of Thoracic Surgeons Congenital Heart Surgery Database. Ann Thorac Surg. 2016 Oct;102(4):1345-52. doi: 10.1016/j.athoracsur.2016.01.071. Epub 2016 Aug 31. PMID: 27590683.

5. Pasquali SK, Shahian DM, O'Brien SM, Jacobs ML, Gaynor JW, Romano JC, Gaies MG, Hill KD, Mayer JE, Jacobs JP. Development of a Congenital Heart Surgery Composite Quality Metric: Part 1-Conceptual Framework. Ann Thorac Surg. 2019 Feb;107(2):583-589.

6. O'Brien SM, Jacobs JP, Shahian DM, Jacobs ML, Gaynor JW, Romano JC, Gaies MG, Hill KD, Mayer JE, Pasquali SK. Development of a Congenital Heart Surgery Composite Quality Metric: Part 2-Analytic Methods. Ann Thorac Surg. 2019 Feb;107(2):590-596.

S.4. Numerator Statement: Whether or not there is participation in at least one multi-center data collection and feedback program

<p>for pediatric and congenital heart surgery.</p> <p>S.6. Denominator Statement: N/A</p> <p>S.8. Denominator Exclusions: N/A</p>
<p>De.1. Measure Type: Structure</p> <p>S.17. Data Source: Registry Data</p> <p>S.20. Level of Analysis: Clinician : Group/Practice, Other</p>
<p>IF Endorsement Maintenance – Original Endorsement Date: Dec 01, 2011 Most Recent Endorsement Date: Oct 24, 2019</p>
<p>IF this measure is included in a composite, NQF Composite#/title:</p> <p>IF this measure is paired/grouped, NQF#/title:</p> <p>De.4. IF PAIRED/GROUPED, what is the reason this measure must be reported with other measures to appropriately interpret results?</p>

<p>1. Evidence, Performance Gap, Priority – Importance to Measure and Report</p>
<p>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.</p>
<p>1a. Evidence to Support the Measure Focus – See attached Evidence Submission Form 0734_evid_attmt_Spring2019.docx</p> <p>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</p>
<p>1b. Performance Gap Demonstration of quality problems and opportunity for improvement, i.e., data demonstrating:</p> <ul style="list-style-type: none"> considerable variation, or overall less-than-optimal performance, in the quality of care across providers; and/or Disparities in care across population groups. <p>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) <i>If a COMPOSITE (e.g., combination of component measure scores, all-or-none, any-or-none), SKIP this question and answer the composite questions.</i></p> <p>The very act of participation in a multi-institutional database will also facilitate quality improvement. 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. The evidence connecting improved quality with participation in a systematic national database is inferred from published accounts of improved quality following participation in the STS Adult Cardiac Surgery and other national databases. “It appears that the routine feedback of risk-adjusted data on local performance provided by these programs heightens awareness and leads to self-examination and self-assessment, which in turn improves quality and outcomes [2,3]. This general quality improvement template should be considered for application in other settings beyond cardiac surgery.” Indeed, with the growth and increased participation in the STS Congenital Heart Surgery Database, in the United States, mortality after pediatric and congenital heart surgery has decreased for all levels of operative risk and complexity [4]. Furthermore, STS has recently developed a composite metric to assist physicians and teams with assessing mortality and morbidity following congenital heart surgery [5, 6].</p> <p>1. Tchervenkov CI, Jacobs JP, Bernier P-L, Stellin G, Kurosawa H, Mavroudis C, Jonas RA, Cicek SM, Al-Halees Z, J. Elliott MJ, Jatene MB, Kinsley RH, Kreutzer C, Leon-Wyss J, Liu J, Maruszewski B, Nunn GR, Ramirez-Marroquin S, Sandoval N, Sano S, Sarris GE, Sharma R, Shoeb A, Spray TL, Ungerleider RM, Yangni-Angate H, Ziemer G. The improvement of care for paediatric and congenital cardiac disease across the World: a challenge for the World Society for Pediatric and Congenital Heart Surgery. In: 2008 Supplement to Cardiology in the Young: Databases and The Assessment of Complications associated with The Treatment of Patients with</p>

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, Volume 18, Issue S2 (Suppl. 2), pp 63–69, December 9, 2008.

2. Grover FL, Shroyer AL, Hammermeister K, Edwards FH, Ferguson TB, Jr., Dziuban SW, Jr., Cleveland JC, Jr., Clark RE, McDonald G. A decade's experience with quality improvement in cardiac surgery using the Veterans Affairs and Society of Thoracic Surgeons national databases. Ann Surg. 2001 Oct; 234 (4): 464-472; discussion 472-464.

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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 Report of the 2010 STS Congenital Heart Surgery Practice and Manpower Survey, undertaken by the STS Workforce on Congenital Heart Surgery, documented that 125 hospitals in the US and 8 hospitals in Canada perform pediatric and congenital heart surgery [1]. The spring 2013 STS Congenital Heart Surgery Database Report contains data from 108 of the 125 hospitals (86.4% penetrance by hospital) in the US and 3 of the 8 centers in Canada. The number of centers that are involved in a systematic multi-institutional database continues to improve, however over 13% of institutions performing congenital heart surgery do not participate in the STS Congenital Heart Surgery Database, the largest database in North America dealing with congenital cardiac malformations. Therefore, there remains significant variability in this structure measurement.

The fall 2018 STS Congenital Heart Surgery Database Report includes data pertaining to 157,394 operations performed in the 4-year period of July 1, 2014 – June 30, 2018. As of April 2019, the STS Congenital Heart Surgery Database contains more than 475,000 congenital heart surgery procedure records.

1. Jacobs ML, Daniel M, Mavroudis C, Morales DLS, Jacobs JP, Fraser CD, Turek JW, Mayer JE, Tchervenkov C, Conte JV. Report of the 2010 Society of Thoracic Surgeons Congenital Heart Surgery Practice and Manpower Survey. The Annals of Thoracic Surgery. 2011 Aug; 92:762–9.

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.

N/A

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):

Surgery, Surgery : Cardiac Surgery

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

Safety

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

Children

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/CongenitalDCFv3_22_Annotated.pdf;

http://www.sts.org/sites/default/files/documents/CongenitalDataSpecsV3_22.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.

None

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).

Whether or not there is participation in at least one multi-center data collection and feedback program for pediatric and congenital heart surgery.

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).

Participation is defined as submission of all congenital and pediatric operations performed to the database.

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

N/A

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).

N/A

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.)

N/A

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

No risk adjustment or risk stratification

If other:

S.12. Type of score:

Categorical, e.g., yes/no

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)

Passing score defines better quality

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.)

See S.4 - S.5

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.

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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, Other

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_-_0734_Ped-Congen-DB-Partic-636911809591140951.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 has 117 participants, 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 required for this measure have been standard in the STS Congenital Heart Surgery Database for many years, 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 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)
	<p>Public Reporting</p> <p>Congenital Heart Surgery Public Reporting https://publicreporting.sts.org/chsd</p> <p>Quality Improvement (Internal to the specific organization) STS Congenital Heart Surgery Database https://www.sts.org/registries-research-center/sts-national-database/sts-congenital-heart-surgery-database</p>

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 and accountability 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. Launch of the congenital heart surgery dashboard is planned for 2020.

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.

In addition to the data reported in 1b, it is again worth noting that participation in voluntary CHSD public reporting has grown steadily since 23% of CHSD participants enrolled upon introduction of the initiative in 2015, with the participation rate now exceeding 83% as of April 2019.

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)

0113 : Participation in a Systematic Database for Cardiac Surgery

0456 : Participation in a Systematic National Database for General Thoracic Surgery

0493 : Participation by a physician or other clinician in systematic clinical database registry that includes consensus endorsed quality measures

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

0493 (CMS) - not currently endorsed

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

<p>measure(s): Are the measure specifications harmonized to the extent possible? No</p> <p>5a.2. If the measure specifications are not completely harmonized, identify the differences, rationale, and impact on interpretability and data collection burden. 0113 and 0456 (both STS) are for different patient and surgical case populations</p>
<p>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.</p> <p>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.)</p>

<p>Appendix</p> <p>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. Available at measure-specific web page URL identified in S.1 Attachment:</p>
<p>Contact Information</p> <p>Co.1 Measure Steward (Intellectual Property Owner): The Society of Thoracic Surgeons Co.2 Point of Contact: Mark, Antman, 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, 312-202-5856-</p>
<p>Additional Information</p> <p>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.</p> <p>Quality Measurement Task Force David M. Shahian, MD, Chair; Massachusetts General Hospital & Harvard Medical School, Boston, MA Diane Alejo; Johns Hopkins Univ., Baltimore, MD Vinay Badhwar, MD; West Virginia University Hospitals, Morgantown, WV Jordan Bloom, MD; Massachusetts General Hospital, Boston, MA Michael Bowdish, MD; Torrance Memorial Medical Center, Los Angeles, CA Joseph Cleveland, Jr., MD; University of Colorado Anschutz Medical Campus, Aurora, Co Nimesh Desai, MD; Hospital of the University of Pennsylvania, Philadelphia, PA James Edgerton, MD; Cardiac Surgery Specialists, Plano, TX Fred Edwards, MD; University of Florida College of Medicine, Jacksonville, FL Melanie Edwards, MD; Saint Joseph Mercy Health System, Ypsilanti, MI Vic Ferraris, MD; University of Kentucky Medical Center, Lexington, KY</p>

<p>Anthony Furnary, MD; Providence Alaska Medical Center, Anchorage, AK Joshua Goldberg, MD; Westchester Medical Center, Valhalla, NY Jeffrey P. Jacobs, MD; All Children's Hospital/John Hopkins University, Saint Petersburg, FL Marshall Jacobs, MD; Johns Hopkins Cardiac Surgery, Baltimore, MD Karen Kim, MD; Univ. of Michigan Hospitals & Health Centers, Ann Arbor, MI Benjamin Kozower, MD; Washington University School of Medicine, St. Louis, MO Paul Kurlansky, MD; Columbia HeartSource/Columbia University Medical Center, New York, NY Kevin Lobdell, MD; Atrium Health, Charlotte, NC Mitchell Magee, MD; Southwest Cardiothoracic Surgeons, Dallas, TX Gaetano Paone, MD; Henry Ford Hospital, Detroit, MI J. Scott Rankin, MD; WVU Heart & Vascular Institute, West Virginia University, Morgantown, WV Charles Schwartz, MD; St. Joseph Mercy Hospital, Pontiac, MI Vinod Thourani, MD; MedStar Washington Hospital Center, Washington, DC Christina Vassileva, MD; U Mass Memorial Medical Center, Worcester, MA Moritz Wyler von Ballmoos, MD; Houston Methodist DeBakey Heart & Vascular Center, Houston, TX Sean M. O'Brien, PhD; Duke Clinical Research Institute, Durham, NC</p>
<p>Measure Developer/Steward Updates and Ongoing Maintenance Ad.2 Year the measure was first released: 2011 Ad.3 Month and Year of most recent revision: 2014 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? 2020</p>
<p>Ad.6 Copyright statement: Ad.7 Disclaimers:</p>
<p>Ad.8 Additional Information/Comments:</p>