



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 #: 0118

Corresponding Measures:

Measure Title: Anti-Lipid Treatment Discharge

Measure Steward: The Society of Thoracic Surgeons

sp.02. Brief Description of Measure: Percent of patients aged 18 years and older undergoing isolated CABG who were discharged on a lipid lowering statin

1b.01. Developer Rationale:

Statins reduce adverse cardiovascular events in patients with CAD in general and in particular in those patients who undergo CABG. In this latter group statins reduce the development of saphenous vein graft disease early after CABG (within 1 year) by reducing the degree of intimal hyperplasia and smooth muscle proliferation. Beyond 1 year, CABG patients treated with statins have reduced incidence of cardiovascular events in general and specifically reduced incidence of vein graft atherosclerosis. These benefits appear to be greater in those patients whose lipid levels were lowered aggressively compared to those who receive standard anti-lipid treatment. Recognizing the importance of statins, including their protein and lipid-lowering effects, patients who have undergone CABG clearly benefit from anti-lipid therapy.

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- Stone NJ, Robinson JG, Lichtenstein AH, et al. 2013 ACC/AHA guideline on the treatment of blood cholesterol to reduce atherosclerotic cardiovascular risk in adults: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. *J Am Coll Cardiol*. 2014;63:2889-934.
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sp.12. Numerator Statement: Number of patients undergoing isolated CABG who were discharged on a lipid lowering statin

sp.14. Denominator Statement: All patients undergoing isolated CABG

sp.16. Denominator Exclusions: Cases are removed from the denominator if there was an in-hospital mortality or if discharge anti-lipid treatment was contraindicated.

Measure Type: Process

sp.28. Data Source:

Registry Data

sp.07. Level of Analysis:

Facility

Clinician: Group/Practice

IF Endorsement Maintenance – Original Endorsement Date: 2007-05-09 12:00 AM

Most Recent Endorsement Date: 6/10/2019 12:41:00 PM

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

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

sp.03. IF PAIRED/GROUPED, what is the reason this measure must be reported with other measures to appropriately interpret results?:

1. 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

1ma.01. Indicate whether there is new evidence about the measure since the most recent maintenance evaluation. If yes, please briefly summarize the new evidence, and ensure you have updated entries in the Evidence section as needed.

[Response Begins]

No

[Response Ends]

Please separate added or updated information from the most recent measure evaluation within each question response in the Importance to Measure and Report: Evidence section. For example:

2021 Submission:

Updated evidence information here.

2018 Submission:

Evidence from the previous submission here.

1a.01. Provide a logic model.

Briefly describe the steps between the healthcare structures and processes (e.g., interventions, or services) and the patient's health outcome(s). The relationships in the diagram should be easily understood by general, non-technical audiences. Indicate the structure, process or outcome being measured.

[Response Begins]

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[Response Ends]

1a.02. Select the type of source for the systematic review of the body of evidence that supports the performance measure.

A systematic review is a scientific investigation that focuses on a specific question and uses explicit, prespecified scientific methods to identify, select, assess, and summarize the findings of similar but separate studies. It may include a quantitative synthesis (meta-analysis), depending on the available data.

[Response Begins]

Clinical Practice Guideline recommendation (with evidence review)

[Response Ends]

If the evidence is not based on a systematic review, skip to the end of the section and do not complete the repeatable question group below. If you wish to include more than one systematic review, add additional tables by clicking "Add" after the final question in the group.

Evidence - Systematic Reviews Table (Repeatable)

Group 1 - Evidence - Systematic Reviews Table

1a.03. Provide the title, author, date, citation (including page number) and URL for the systematic review.

[Response Begins]

Stone NJ, Robinson JG, Lichtenstein AH, et al. 2013 ACC/AHA guideline on the treatment of blood cholesterol to reduce atherosclerotic cardiovascular risk in adults: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol. 2014;63:2889-934.

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[Response Ends]

1a.04. Quote the guideline or recommendation verbatim about the process, structure or intermediate outcome being measured. If not a guideline, summarize the conclusions from the systematic review.

[Response Begins]

High-intensity statin therapy should be initiated or continued as first-line therapy in women and men ≤ 75 years of age who have clinical atherosclerotic cardiovascular disease, unless contraindicated.

(pg. 2900 of ACC/AHA guideline cited above)

[Response Ends]

1a.05. Provide the grade assigned to the evidence associated with the recommendation, and include the definition of the grade.

[Response Begins]

Level of Evidence A

See figure below for definitions

		SIZE OF TREATMENT EFFECT												
		CLASS I <i>Benefit >>> Risk</i> Procedure/Treatment SHOULD be performed/ administered	CLASS IIa <i>Benefit >> Risk</i> <i>Additional studies with focused objectives needed</i> IT IS REASONABLE to per- form procedure/administer treatment	CLASS IIb <i>Benefit ≥ Risk</i> <i>Additional studies with broad objectives needed; additional registry data would be helpful</i> Procedure/Treatment MAY BE CONSIDERED	CLASS III <i>No Benefit</i> or CLASS III <i>Harm</i> <table><tr><th></th><th>Procedure/ Test</th><th>Treatment</th></tr><tr><td>COR III: No benefit</td><td>Not Helpful</td><td>No Proven Benefit</td></tr><tr><td>COR III: Harm</td><td>Excess Cost w/o Benefit or Harmful</td><td>Harmful to Patients</td></tr></table>		Procedure/ Test	Treatment	COR III: No benefit	Not Helpful	No Proven Benefit	COR III: Harm	Excess Cost w/o Benefit or Harmful	Harmful to Patients
	Procedure/ Test	Treatment												
COR III: No benefit	Not Helpful	No Proven Benefit												
COR III: Harm	Excess Cost w/o Benefit or Harmful	Harmful to Patients												
ESTIMATE OF CERTAINTY (PRECISION) OF TREATMENT EFFECT	LEVEL A Multiple populations evaluated* Data derived from multiple randomized clinical trials or meta-analyses	■ Recommendation that procedure or treatment is useful/effective ■ Sufficient evidence from multiple randomized trials or meta-analyses	■ Recommendation in favor of treatment or procedure being useful/effective ■ Some conflicting evidence from multiple randomized trials or meta-analyses	■ Recommendation's usefulness/efficacy less well established ■ Greater conflicting evidence from multiple randomized trials or meta-analyses	■ Recommendation that procedure or treatment is not useful/effective and may be harmful ■ Sufficient evidence from multiple randomized trials or meta-analyses									
	LEVEL B Limited populations evaluated* Data derived from a single randomized trial or nonrandomized studies	■ Recommendation that procedure or treatment is useful/effective ■ Evidence from single randomized trial or nonrandomized studies	■ Recommendation in favor of treatment or procedure being useful/effective ■ Some conflicting evidence from single randomized trial or nonrandomized studies	■ Recommendation's usefulness/efficacy less well established ■ Greater conflicting evidence from single randomized trial or nonrandomized studies	■ Recommendation that procedure or treatment is not useful/effective and may be harmful ■ Evidence from single randomized trial or nonrandomized studies									
	LEVEL C Very limited populations evaluated* Only consensus opinion of experts, case studies, or standard of care	■ Recommendation that procedure or treatment is useful/effective ■ Only expert opinion, case studies, or standard of care	■ Recommendation in favor of treatment or procedure being useful/effective ■ Only diverging expert opinion, case studies, or standard of care	■ Recommendation's usefulness/efficacy less well established ■ Only diverging expert opinion, case studies, or standard of care	■ Recommendation that procedure or treatment is not useful/effective and may be harmful ■ Only expert opinion, case studies, or standard of care									

[Response Ends]

1a.06. Provide all other grades and definitions from the evidence grading system.

[Response Begins]

See figure in 1a.03

[Response Ends]

1a.07. Provide the grade assigned to the recommendation, with definition of the grade.

[Response Begins]

Class I Recommendation

See figure above in 1a.05

[Response Ends]

1a.08. Provide all other grades and definitions from the recommendation grading system.

[Response Begins]

See figure above in 1a.05

[Response Ends]

1a.09. Detail the quantity (how many studies) and quality (the type of studies) of the evidence.

[Response Begins]

Multiple studies including expert consensus guideline statements from multiple professional societies including The American College of Cardiology and The American Heart Association.

[Response Ends]

1a.10. Provide the estimates of benefit, and consistency across studies.

[Response Begins]

Class I Recommendation with Level of Evidence A endorsed by multiple professional societies, including The American College of Cardiology and The American Heart Association.

[Response Ends]

1a.11. Indicate what, if any, harms were identified in the study.

[Response Begins]

N/A

[Response Ends]

1a.12. Identify any new studies conducted since the systematic review, and indicate whether the new studies change the conclusions from the systematic review.

[Response Begins]

No studies have been published that contradict these SR

[Response Ends]

1a.13. If source of evidence is NOT from a clinical practice guideline, USPSTF, or systematic review, describe the evidence on which you are basing the performance measure.

[Response Begins]

[Response Ends]

1a.14. Briefly synthesize the evidence that supports the measure.

[Response Begins]

[Response Ends]

1a.15. Detail the process used to identify the evidence.

[Response Begins]

[Response Ends]

1a.16. Provide the citation(s) for the evidence.

[Response Begins]

[Response Ends]

1b.01. Briefly explain the rationale for this measure.

Explain how the measure will improve the quality of care, and list the benefits or improvements in quality envisioned by use of this measure.

[Response Begins]

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[Response Ends]**1b.02. Provide performance scores on the measure as specified (current and over time) at the specified level of analysis.**

Include mean, std dev, min, max, interquartile range, and 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 (4b) under Usability and Use.

[Response Begins]

The measure was calculated using STS data for patients undergoing isolated CABG in two consecutive time periods, July 2015 - June 2018 and July 2018 - June 2021. The summary statistic provided is the Participants' observed event rates. An exact 95% binomial confidence interval was calculated for each participant's observed rate. A higher rate indicates better 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.

Distribution of participant-specific observed rates in July 2015 – June 2018 and July 2018 - June 2021

Distribution	July 2015 - June 2018 Observed Rate	July 2018 - June 2021 Observed Rate
# Participant	1101	1045
# Operations	453473	418259
Mean	0.97	0.98
STD	0.048	0.033
IQR	0.031	0.021
0%	0.00	0.52
10%	0.94	0.96
20%	0.96	0.97
30%	0.97	0.98
40%	0.98	0.99
50%	0.99	0.99
60%	0.99	0.99
70%	0.99	1.00
80%	1.00	1.00
90%	1.00	1.00
100%	1.00	1.00
Midwest	309	278
Northeast	140	136
Other region	8	6
South	407	396
West	237	229
Low performance	195, 17.7%	135, 12.9%
Mid performance	600, 54.5%	661, 63.3%
High performance	306, 27.8%	249, 23.8%

Distribution of participant-specific observed rates in July 2015 – June 2018 and July 2018 - June 2021

[Response Ends]

1b.03. If no or limited performance data on the measure as specified is reported above, 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. Include citations.

[Response Begins]

N/A

[Response Ends]

1b.04. 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.

Describe the data source including number of measured entities; number of patients; dates of data; if a sample, characteristics of the entities included. Include mean, std dev, min, max, interquartile range, and scores by decile. 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 (4b) under Usability and Use.

[Response Begins]

In the table below we provide trends over time of the measure at the patient level. Aggregate percentages of patients receiving the measure across four consecutive time periods are computed for relevant subgroups by age, gender, race, ethnicity and insurance status.

Patient Groups	Jul 17-Jun 18	Jul 18-Jun 19	Jul 19-Jun 20	Jul 20-Jun 21
<i>All</i>	98.06%	98.36%	98.54%	98.60%
Patient Gender	98.21%	98.46%	98.61%	98.65%
<i>Male</i>				
<i>Female</i>	97.59%	98.00%	98.31%	98.44%
Age Groups	98.15%	98.44%	98.59%	98.64%
<i>Age<75</i>				
<i>Age>=75</i>	97.71%	98.00%	98.33%	98.44%
Race Groups	98.04%	98.31%	98.46%	98.55%
<i>Caucasian</i>				
<i>Black</i>	98.34%	98.44%	98.74%	98.75%
<i>Hispanic</i>	98.04%	98.65%	98.91%	98.89%
<i>Asian</i>	98.69%	98.60%	98.86%	98.73%
<i>Other</i>	98.42%	98.34%	98.89%	99.11%
<i>Race not available</i>	96.81%	98.07%	98.48%	98.19%

<i>Patient Groups</i>	<i>Jul 17-Jun 18</i>	<i>Jul 18-Jun 19</i>	<i>Jul 19-Jun 20</i>	<i>Jul 20-Jun 21</i>
<i>Insurance, Age>= 65</i>	*	*	*	*
<i>Medicare+Medicaid</i>	98.05%	98.33%	98.77%	98.53%
<i>Medicare+Commercial without Medicaid</i>	97.90%	98.15%	98.33%	98.44%
<i>Medicare without Medicaid/Commercial</i>	97.95%	98.31%	98.52%	98.57%
<i>Insurance, Age<65</i>	*	*	*	*
<i>Medicare/Medicaid</i>	97.94%	98.22%	98.48%	98.60%
<i>Commercial/HMO</i>	98.26%	98.64%	98.72%	98.73%
<i>None/Self Paid</i>	98.86%	98.61%	98.89%	99.00%
<i>Other</i>	98.56%	98.65%	98.65%	98.90%

Aggregate percentages of patients receiving the measure across four consecutive time periods by different subgroups

* Indicates that the cell is left intentionally blank

[Response Ends]

1b.05. If no or limited data on disparities from the measure as specified is reported above, 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 above.

[Response Begins]

N/A

[Response Ends]

2. 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.

spma.01. Indicate whether there are changes to the specifications since the last updates/submission. If yes, update the specifications in the Measure Specifications section of the Measure Submission Form, and explain your reasoning for the changes below.

[Response Begins]

Yes

[Yes Please Explain]

Denominator time frame changed to 36 months from 12 months.

[Response Ends]

spma.02. Briefly describe any important changes to the measure specifications since the last measure update and provide a rationale.

For annual updates, please explain how the change in specifications affects the measure results. If a material change in specification is identified, data from re-testing of the measure with the new specifications is required for early maintenance review.

For example, specifications may have been updated based on suggestions from a previous NQF CDP review.

[Response Begins]

The STS has developed a methodological update to our original CABG composite measure, moving it from 1 to 3-year analytic windows. This modification was done to address the sample size concerns with the original approach in contemporary practice and to ensure consistency across all STS adult cardiac composite measures. The 3-year analytic window was applied to the component measures of the CABG composite in order to be consistent and to eliminate mismatches across various sections of the feedback reports we provide to our database participants.

[Response Ends]

sp.01. Provide the measure title.

Measure titles should be concise yet convey who and what is being measured (see [What Good Looks Like](#)).

[Response Begins]

Anti-Lipid Treatment Discharge

[Response Ends]

sp.02. Provide a brief description of the measure.

Including type of score, measure focus, target population, timeframe, (e.g., Percentage of adult patients aged 18-75 years receiving one or more HbA1c tests per year).

[Response Begins]

Percent of patients aged 18 years and older undergoing isolated CABG who were discharged on a lipid lowering statin

[Response Ends]

sp.04. Check all the clinical condition/topic areas that apply to your measure, below.

Please refrain from selecting the following answer option(s). We are in the process of phasing out these answer options and request that you instead select one of the other answer options as they apply to your measure.

Please do not select:

- *Surgery: General*

[Response Begins]

Cardiovascular

Surgery

Surgery: Cardiac Surgery

[Response Ends]

sp.05. Check all the non-condition specific measure domain areas that apply to your measure, below.

[Response Begins]

Safety

Safety: Medication

[Response Ends]

sp.06. Select one or more target population categories.

Select only those target populations which can be stratified in the reporting of the measure's result.

Please refrain from selecting the following answer option(s). We are in the process of phasing out these answer options and request that you instead select one of the other answer options as they apply to your measure.

Please do not select:

- *Populations at Risk: Populations at Risk*

[Response Begins]

Elderly (Age >= 65)

[Response Ends]

sp.07. Select the levels of analysis that apply to your measure.

Check ONLY the levels of analysis for which the measure is SPECIFIED and TESTED.

Please refrain from selecting the following answer option(s). We are in the process of phasing out these answer options and request that you instead select one of the other answer options as they apply to your measure.

Please do not select:

- *Clinician: Clinician*
- *Population: Population*

[Response Begins]

Clinician: Group/Practice

Facility

[Response Ends]

sp.08. Indicate the care settings that apply to your measure.

Check ONLY the settings for which the measure is SPECIFIED and TESTED.

[Response Begins]

Inpatient/Hospital

[Response Ends]

sp.09. 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. If no URL is available, indicate "none available".

[Response Begins]

https://www.sts.org/sites/default/files/documents/STSAAdultCVDDataCollectionFormV4_20_2_GOLDEN12212020%20Annotated.pdf

https://www.sts.org/sites/default/files/ACSD_DataSpecifications_V4_20_2.pdf

[Response Ends]

sp.11. Attach the data dictionary, code table, or value sets (and risk model codes and coefficients when applicable). Excel formats (.xlsx or .csv) are preferred.

Attach an excel or csv file; if this poses an issue, [contact staff](#). Provide descriptors for any codes. Use one file with multiple worksheets, if needed.

[Response Begins]

No data dictionary/code table – all information provided in the submission form

[Response Ends]

sp.12. State the numerator.

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.

[Response Begins]

Number of patients undergoing isolated CABG who were discharged on a lipid lowering statin

[Response Ends]

sp.13. Provide details needed to calculate the numerator.

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 sp.11.

[Response Begins]

Number of isolated CABG procedures in which: Discharge statin medication (DCLipLowStat) is marked “yes”

[Response Ends]

sp.14. State the denominator.

Brief, narrative description of the target population being measured.

[Response Begins]

All patients undergoing isolated CABG

[Response Ends]

sp.15. Provide details needed to calculate the denominator.

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 sp.11.

[Response Begins]

Number of isolated CABG procedures excluding cases with an in-hospital mortality or cases for which discharge anti-lipid treatment use was contraindicated. **The SQL code used to create the function used to identify cardiac procedures is provided in the Appendix.**

[Response Ends]

sp.16. Describe the denominator exclusions.

Brief narrative description of exclusions from the target population.

[Response Begins]

Cases are removed from the denominator if there was an in-hospital mortality or if discharge anti-lipid treatment was contraindicated.

[Response Ends]

sp.17. Provide details needed to calculate the denominator exclusions.

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 sp.11.

[Response Begins]

Mortality Discharge Status (MtDCStat/ DischMortStat), Mortality Date (MtDate), and Discharge Date (DischDt) indicate an in-hospital mortality; Discharge statin medication (DCLipLow Stat) is marked as “contraindicated”
Version 4.20.2

Cases are removed from the denominator if there was an in- hospital mortality or Lipid Lowering Statin (DCLipLowStat) is marked contraindicated or the patient was discharged to Hospice or the patients discharge location is Left AMA.

Expired In OR (ExpiredInOR), Mortality Discharge Status (DischMortStat), Mortality Date (MtDate), and Discharge Date (DischDt) indicate an in-hospital mortality.

Discharge Lipid Lower Statin (DCLipLowStat) is marked ‘contraindicated’ or Discharge location (DisLoctn) is ‘ Left AMA’ or Discharge Status (DischMortStat) is Discharged to Hospice.

[Response Ends]

sp.18. Provide all information required to stratify the measure results, if necessary.

Include 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 in the Data Dictionary field.

[Response Begins]

N/A

[Response Ends]

sp.19. Select the risk adjustment type.

Select type. Provide specifications for risk stratification and/or risk models in the Scientific Acceptability section.

[Response Begins]

No risk adjustment or risk stratification

[Response Ends]

sp.20. Select the most relevant type of score.

Attachment: If available, please provide a sample report.

[Response Begins]

Rate/proportion

[Response Ends]

sp.21. Select the appropriate interpretation of the measure score.

Classifies interpretation of score according to whether better quality or resource use is associated with a higher score, a lower score, a score falling within a defined interval, or a passing score

[Response Begins]

Better quality = Higher score

[Response Ends]

sp.22. Diagram or describe the calculation of the measure score as an ordered sequence of steps.

Identify the target population; exclusions; cases meeting the target process, condition, event, or outcome; time period of data, aggregating data; risk adjustment; etc.

[Response Begins]

Please refer to numerator and denominator sections for detailed information.

[Response Ends]

sp.25. If measure is based on a sample, provide instructions for obtaining the sample and guidance on minimum sample size.

[Response Begins]

N/A

[Response Ends]

sp.28. Select only the data sources for which the measure is specified.

[Response Begins]

Registry Data

[Response Ends]

sp.29. Identify the specific data source or data collection instrument.

For example, provide the name of the database, clinical registry, collection instrument, etc., and describe how data are collected.

[Response Begins]

STS Adult Cardiac Surgery Database Version 2.9 (effective July 1, 2017); and Version 4.20 (effective July 1, 2020).

[Response Ends]

sp.30. Provide the data collection instrument.

[Response Begins]

Available at measure-specific web page URL identified in sp.09

[Response Ends]

2ma.01. Indicate whether additional empirical reliability testing at the accountable entity level has been conducted. If yes, please provide results in the following section, Scientific Acceptability: Reliability - Testing. Include information on all testing conducted (prior testing as well as any new testing).

Please separate added or updated information from the most recent measure evaluation within each question response in the Scientific Acceptability sections. For example:

Current Submission:

Updated testing information here.

Previous Submission:

Testing from the previous submission here.

[Response Begins]

No

[Response Ends]

2ma.02. Indicate whether additional empirical validity testing at the accountable entity level has been conducted. If yes, please provide results in the following section, Scientific Acceptability: Validity - Testing. Include information on all testing conducted (prior testing as well as any new testing).

Please separate added or updated information from the most recent measure evaluation within each question response in the Scientific Acceptability sections. For example:

Current Submission:

Updated testing information here.

Previous Submission:

Testing from the previous submission here.

[Response Begins]

Yes

[Response Ends]

2ma.03. For outcome, patient-reported outcome, resource use, cost, and some process measures, risk adjustment/stratification may be conducted. Did you perform a risk adjustment or stratification analysis?

[Response Begins]

No

[Response Ends]

2ma.04. For maintenance measures in which risk adjustment/stratification has been performed, indicate whether additional risk adjustment testing has been conducted since the most recent maintenance evaluation. This may include updates to the risk adjustment analysis with additional clinical, demographic, and social risk factors.

Please update the Scientific Acceptability: Validity - Other Threats to Validity section.

Note: This section must be updated even if social risk factors are not included in the risk adjustment strategy.

[Response Begins]

No additional risk adjustment analysis included

[Response Ends]

Measure testing must demonstrate adequate reliability and validity in order to be recommended for endorsement. Testing may be conducted for data elements and/or the computed measure score. Testing information and results

should be entered in the appropriate fields in the Scientific Acceptability sections of the Measure Submission Form.

- Measures must be tested for all the data sources and levels of analyses that are specified. If there is more than one set of data specifications or more than one level of analysis, contact NQF staff about how to present all the testing information in one form.
- All required sections must be completed.
- For composites with outcome and resource use measures, Questions 2b.23-2b.37 (Risk Adjustment) also must be completed.
- If specified for multiple data sources/sets of specifications (e.g., claims and EHRs), Questions 2b.11-2b.13 also must be completed.
- An appendix for supplemental materials may be submitted (see Question 1 in the Additional section), but there is no guarantee it will be reviewed.
- Contact NQF staff with any questions. Check for resources at the [Submitting Standards webpage](#).
- For information on the most updated guidance on how to address social risk factors variables and testing in this form refer to the release notes for the [2021 Measure Evaluation Criteria and Guidance](#).

Note: The information provided in this form is intended to aid the Standing Committee and other stakeholders in understanding to what degree the testing results for this measure meet NQF's evaluation criteria for testing.

2a. Reliability testing demonstrates the measure data elements are repeatable, producing the same results a high proportion of the time when assessed in the same population in the same time period and/or that the measure score is precise. For instrument-based measures (including PRO-PMs) and composite performance measures, reliability should be demonstrated for the computed performance score.

2b1. Validity testing demonstrates that the measure data elements are correct and/or the measure score correctly reflects the quality of care provided, adequately identifying differences in quality. For instrument based measures (including PRO-PMs) and composite performance measures, validity should be demonstrated for the computed performance score.

2b2. Exclusions are supported by the clinical evidence and are of sufficient frequency to warrant inclusion in the specifications of the measure;

AND

If patient preference (e.g., informed decision-making) is a basis for exclusion, there must be evidence that the exclusion impacts performance on the measure; in such cases, the measure must be specified so that the information about patient preference and the effect on the measure is transparent (e.g., numerator category computed separately, denominator exclusion category computed separately).

2b3. For outcome measures and other measures when indicated (e.g., resource use):

- an evidence-based risk-adjustment strategy (e.g., risk models, risk stratification) is specified; is based on patient factors (including clinical and social risk factors) that influence the measured outcome and are present at start of care; 14,15 and has demonstrated adequate discrimination and calibration

OR

- rationale/data support no risk adjustment/ stratification.

2b4. Data analysis of computed measure scores demonstrates that methods for scoring and analysis of the specified measure allow for identification of statistically significant and practically/clinically meaningful 16 differences in performance;

OR

there is evidence of overall less-than-optimal performance.

2b5. If multiple data sources/methods are specified, there is demonstration they produce comparable results.

2b6. Analyses identify the extent and distribution of missing data (or nonresponse) and demonstrate that performance results are not biased due to systematic missing data (or differences between responders and non-responders) and how the specified handling of missing data minimizes bias.

2c. For composite performance measures, empirical analyses support the composite construction approach and demonstrate that:

2c1. the component measures fit the quality construct and add value to the overall composite while achieving the related objective of parsimony to the extent possible; and

2c2. the aggregation and weighting rules are consistent with the quality construct and rationale while achieving the related objective of simplicity to the extent possible.

(if not conducted or results not adequate, justification must be submitted and accepted)

Definitions

Reliability testing applies to both the data elements and computed measure score. Examples of reliability testing for data elements include, but are not limited to: inter-rater/abstractor or intra-rater/abstractor studies; internal consistency for multi-item scales; test-retest for survey items. Reliability testing of the measure score addresses precision of measurement (e.g., signal-to-noise).

Validity testing applies to both the data elements and computed measure score. Validity testing of data elements typically analyzes agreement with another authoritative source of the same information. Examples of validity testing of the measure score include, but are not limited to: testing hypotheses that the measures scores indicate quality of care, e.g., measure scores are different for groups known to have differences in quality assessed by another valid quality measure or method; correlation of measure scores with another valid indicator of quality for the specific topic; or relationship to conceptually related measures (e.g., scores on process measures to scores on outcome measures). Face validity of the measure score as a quality indicator may be adequate if accomplished through a systematic and transparent process, by identified experts, and explicitly addresses whether performance scores resulting from the measure as specified can be used to distinguish good from poor quality. The degree of consensus and any areas of disagreement must be provided/discussed.

Examples of evidence that an exclusion distorts measure results include, but are not limited to: frequency of occurrence, variability of exclusions across providers, and sensitivity analyses with and without the exclusion.

Patient preference is not a clinical exception to eligibility and can be influenced by provider interventions.

Risk factors that influence outcomes should not be specified as exclusions.

With large enough sample sizes, small differences that are statistically significant may or may not be practically or clinically meaningful. The substantive question may be, for example, whether a statistically significant difference of one percentage point in the percentage of patients who received smoking cessation counseling (e.g., 74 percent v. 75 percent) is clinically meaningful; or whether a statistically significant difference of \$25 in cost for an episode of care (e.g., \$5,000 v. \$5,025) is practically meaningful. Measures with overall less-than-optimal performance may not demonstrate much variability across providers.

Please separate added or updated information from the most recent measure evaluation within each question response in the Importance to Scientific Acceptability sections. For example:

2021 Submission:

Updated testing information here.

2018 Submission:

Testing from the previous submission here.

2a.01. Select only the data sources for which the measure is tested.

[Response Begins]

Registry Data

[Response Ends]

2a.02. If an existing dataset was used, identify the specific dataset.

The dataset used for testing must be consistent with the measure specifications for target population and healthcare entities being measured; e.g., Medicare Part A claims, Medicaid claims, other commercial insurance, nursing home MDS, home health OASIS, clinical registry).

[Response Begins]

STS Adult Cardiac Surgery Database version 2.9 (effective July 1, 2017), and Version 4.20 (effective July 1, 2020).

[Response Ends]

2a.03. Provide the dates of the data used in testing.

Use the following format: “MM-DD-YYYY - MM-DD-YYYY”

[Response Begins]

July 2018 – June 2021

[Response Ends]

2a.04. Select the levels of analysis for which the measure is tested.

Testing must be provided for all the levels specified and intended for measure implementation, e.g., individual clinician, hospital, health plan.

Please refrain from selecting the following answer option(s). We are in the process of phasing out these answer options and request that you instead select one of the other answer options as they apply to your measure.

Please do not select:

- Clinician: Clinician
- Population: Population

[Response Begins]

Clinician: Group/Practice

Facility

[Response Ends]

2a.05. List the measured entities included in the testing and analysis (by level of analysis and data source).

Identify the number and descriptive characteristics of measured entities included in the analysis (e.g., size, location, type); if a sample was used, describe how entities were selected for inclusion in the sample.

[Response Begins]

The calculation of the anti-lipid treatment at discharge measure using the 36 months from July 2018 to June 2021 included 418259 operations from 1045 STS participants.

Distribution of participant specific sample sizes (denominator) and event rates (numerator/denominator)

Stat	N	% anti-lipid treatment at discharge
N	1045.0	1045.0
Mean	400.2	98.1
STD	326.9	3.3
IQR	349.0	2.1
0%	1.0	51.7
10%	99.0	95.6
20%	154.8	97.2
30%	206.2	98.0
40%	254.0	98.6
50%	308.0	99.0
60%	377.0	99.4
70%	472.2	99.6
80%	595.2	99.9
90%	800.6	100.0
100%	2323.0	100.0

Distribution of participant specific sample sizes (denominator) and event rates (numerator/denominator)

Distribution of participants by geographic region

*	*
Region	
Midwest	278
Northeast	136
South	396
West	229
Other	6

Distribution of participants by geographic region

* Indicates that the cell is left intentionally

blank

[Response Ends]

2a.06. Identify the number and descriptive characteristics of patients included in the analysis (e.g., age, sex, race, diagnosis), separated by level of analysis and data source; if a sample was used, describe how patients were selected for inclusion in the sample.

If there is a minimum case count used for testing, that minimum must be reflected in the specifications.

[Response Begins]

All eligible isolated operations were included except cases if there was an in-hospital mortality, discharge to hospice, discharge AMA (against medical advice) or if anti-lipid treatment at discharge was contraindicated.

*	Effects	Overall N=418259
Age (years)	Median (IQR)	66.0 (59.0, 73.0)
*	Missing	0 (0.0%)
Sex	Male	322,003 (77.0%)
*	Female	96,160 (23.0%)
*	Missing	96 (0.0%)
Race - Asian	No	391,118 (93.5%)
*	Yes	15,445 (3.7%)
*	Missing	11,696 (2.8%)
Race - Black / African American	No	375,353 (89.7%)
*	Yes	31,208 (7.5%)
*	Missing	11,698 (2.8%)
Race - White	No	66,738 (16.0%)
*	Yes	340,383 (81.4%)
*	Missing	11,138 (2.7%)
Race - American Indian / Alaskan Native	No	403,594 (96.5%)
*	Yes	2,929 (0.7%)
*	Missing	11,736 (2.8%)
Race - Other	No	387,275 (92.6%)
*	Yes	18,732 (4.5%)
*	Missing	12,252 (2.9%)
Native Hawaiian / Pacific Islander	No	401,298 (95.9%)
*	Yes	1,781 (0.4%)
*	Missing	15,180 (3.6%)
Hispanic or Latino Ethnicity	No	366,352 (87.6%)
*	Yes	33,218 (7.9%)
*	Missing	18,689 (4.5%)
Body Surface Area (m)	<1.5	4,696 (1.1%)
*	>=1.5 and <1.75	47,786 (11.4%)
*	>=1.75 and <2	142,113 (34.0%)
*	>=2	223,513 (53.4%)
*	Missing	151 (0.0%)
Diabetes	No Diabetes	207,818 (49.7%)

*	Effects	Overall N=418259
*	Diabetes - Noninsulin	127,706 (30.5%)
*	Diabetes - Insulin	76,139 (18.2%)
*	Diabetes - Other	423 (0.1%)
*	Diabetes - Missing Treatment	1,702 (0.4%)
*	Diabetes - Other	3,807 (0.9%)
*	Missing	664 (0.2%)
Hypertension	No	39,755 (9.5%)
*	Yes	377,713 (90.3%)
*	Missing	791 (0.2%)
Renal Function	Creatinine <1 mg/dL	206,364 (49.3%)
*	Creatinine 1-1.5 mg/dL	165,416 (39.5%)
*	Creatinine 1.5-2 mg/dL	23,794 (5.7%)
*	Creatinine 2-2.5 mg/dL	5,132 (1.2%)
*	Creatinine >2.5 mg/dL	3,925 (0.9%)
*	Dialysis	12,838 (3.1%)
*	Missing	790 (0.2%)
Chronic Lung Disease (CLD)	None	299,374 (71.6%)
*	Mild	47,765 (11.4%)
*	Moderate	19,706 (4.7%)
*	Severe	17,761 (4.2%)
*	Severity Unknown	24,637 (5.9%)
*	Missing	9,016 (2.2%)
Peripheral Vascular Disease (PVD)	No	362,648 (86.7%)
*	Yes	54,040 (12.9%)
*	Missing	1,571 (0.4%)
Cerebrovascular Disease (CVD)	No	321,775 (76.9%)
*	Yes	93,798 (22.4%)
*	Missing	2,686 (0.6%)
Cerebrovascular Accident (CVA)	Remote CVA (> 30 days)	413,560 (98.9%)
*	Recent CVA (<= 30 days)	1,481 (0.4%)
*	CVA - Missing Timing	52 (0.0%)
*	Missing	3,166 (0.8%)
Endocarditis	No Endocarditis	417,122 (99.7%)
*	Treated Endocarditis	280 (0.1%)
*	Active Endocarditis	25 (0.0%)
*	Endocarditis - Missing Type	6 (0.0%)

*	Effects	Overall N=418259
*	Missing	826 (0.2%)
Acuity Status	Elective	157,115 (37.6%)
*	Urgent	247,543 (59.2%)
*	Emergent	13,114 (3.1%)
*	Emergent Salvage	398 (0.1%)
*	Missing	89 (0.0%)
Myocardial Infarction	No Prior MI	193,911 (46.4%)
*	MI >21 days	72,265 (17.3%)
*	MI 8-21 days	22,676 (5.4%)
*	MI 1-7 days	115,576 (27.6%)
*	MI 6-24 hrs	7,602 (1.8%)
*	MI <= 6 hrs	3,640 (0.9%)
*	MI - Missing Timing	121 (0.0%)
*	Missing	2,468 (0.6%)
Cardiogenic Shock	No	412,275 (98.6%)
*	Yes	5,606 (1.3%)
*	Missing	378 (0.1%)
Preop IABP	No	391,449 (93.6%)
*	Yes	26,162 (6.3%)
*	Missing	648 (0.2%)
Congestive Heart Failure	No CHF	352,345 (84.2%)
*	CHF NYHA-I	3,038 (0.7%)
*	CHF NYHA-II	9,961 (2.4%)
*	CHF NYHA-III	14,270 (3.4%)
*	CHF NYHA-IV	8,051 (1.9%)
*	CHF Missing NYHA	25,136 (6.0%)
*	Missing	5,458 (1.3%)
Number of Diseased Coronary Vessels	None	376 (0.1%)
*	One	15,722 (3.8%)
*	Two	78,625 (18.8%)
*	Three	320,531 (76.6%)
*	Missing	3,005 (0.7%)
Left Main Disease > 50%	No	157,732 (37.7%)
*	Yes	132,986 (31.8%)
*	Missing	127,541 (30.5%)
Ejection Fraction (%)	Median (IQR)	55.0 (45.0, 60.0)

*	Effects	Overall N=418259
*	Missing	8,260 (2.0%)
Aortic Stenosis	No	395,180 (94.5%)
*	Yes	17,131 (4.1%)
*	Missing	5,948 (1.4%)
Mitral Stenosis	No	409,216 (97.8%)
*	Yes	3,033 (0.7%)
*	Missing	6,010 (1.4%)
Tricuspid Stenosis	No	410,670 (98.2%)
*	Yes	486 (0.1%)
*	Missing	7,103 (1.7%)
Pulmonic Stenosis	No	406,911 (97.3%)
*	Yes	241 (0.1%)
*	Missing	11,107 (2.7%)
Aortic Insufficiency	None	287,573 (68.8%)
*	Trivial	51,550 (12.3%)
*	Mild	37,694 (9.0%)
*	Moderate	6,697 (1.6%)
*	Severe	181 (0.0%)
*	Missing	34,564 (8.3%)
Mitral Insufficiency	None	113,875 (27.2%)
*	Trivial	137,555 (32.9%)
*	Mild	111,078 (26.6%)
*	Moderate	27,999 (6.7%)
*	Severe	1,545 (0.4%)
*	Missing	26,207 (6.3%)
Tricuspid Insufficiency	None	119,067 (28.5%)
*	Trivial	164,131 (39.2%)
*	Mild	89,263 (21.3%)
*	Moderate	12,314 (2.9%)
*	Severe	714 (0.2%)
*	Missing	32,770 (7.8%)
Pulmonic Insufficiency	None	223,459 (53.4%)
*	Trivial	92,597 (22.1%)
*	Mild	23,594 (5.6%)
*	Moderate	1,662 (0.4%)
*	Severe	127 (0.0%)

*	Effects	Overall N=418259
*	Missing	76,820 (18.4%)

Patient Characteristics included in the Analysis

* Indicates that the cell is left intentionally blank

[Response Ends]

2a.07. If there are differences in the data or sample used for different aspects of testing (e.g., reliability, validity, exclusions, risk adjustment), identify how the data or sample are different for each aspect of testing.

[Response Begins]

We used the same dataset of eligible isolated CABG operations from July 2018 to June 2021 for the entire report. The exceptions are:

1. For comparisons across time periods, and for the empirical validity testing, we used the participants in STS during both July 2015- June 2018 and July 2018 - June 2021 time periods.

For the analysis on the impact of the exclusion, we also included cases with an in-hospital mortality or contraindication of discharge anti-lipid treatment.

[Response Ends]

2a.08. List the social risk factors that were available and analyzed.

For example, patient-reported data (e.g., income, education, language), proxy variables when social risk data are not collected from each patient (e.g. census tract), or patient community characteristics (e.g. percent vacant housing, crime rate) which do not have to be a proxy for patient-level data.

[Response Begins]

N/A (process measure)

[Response Ends]

Note: If accuracy/correctness (validity) of data elements was empirically tested, separate reliability testing of data elements is not required – in 2a.07 check patient or encounter-level data; in 2a.08 enter “see validity testing section of data elements”; and enter “N/A” for 2a.09 and 2a.10.

2a.09. Select the level of reliability testing conducted.

Choose one or both levels.

[Response Begins]

Patient or Encounter-Level (e.g., inter-abstractor reliability; data element reliability must address ALL critical data elements)

[Response Ends]

2a.10. For each level of reliability testing checked above, describe the method of reliability testing and what it tests.

Describe the steps—do not just name a method; what type of error does it test; what statistical analysis was used.

[Response Begins]

See section 2b.02 for validity testing of data elements

[Response Ends]

2a.11. For each level of reliability testing checked above, what were the statistical results from reliability testing?

For example, provide the percent agreement and kappa for the critical data elements, or distribution of reliability statistics from a signal-to-noise analysis. For score-level reliability testing, when using a signal-to-noise analysis, more than just one overall statistic should be reported (i.e., to demonstrate variation in reliability across providers). If a particular method yields only one statistic, this should be explained. In addition, reporting of results stratified by sample size is preferred (pg. 18, [NQF Measure Evaluation Criteria](#)).

[Response Begins]

N/A

[Response Ends]

2a.12. Interpret the results, in terms of how they demonstrate reliability.

(In other words, what do the results mean and what are the norms for the test conducted?)

[Response Begins]

N/A

[Response Ends]

2b.01. Select the level of validity testing that was conducted.

[Response Begins]

Empirical validity testing

[Response Ends]

2b.02. For each level of testing checked above, describe the method of validity testing and what it tests.

Describe the steps—do not just name a method; what was tested, e.g., accuracy of data elements compared to authoritative source, relationship to another measure as expected; what statistical analysis was used.

[Response Begins]

Critical Data Elements

Participating sites are randomly selected for participation in STS Adult Cardiac Surgery Database Audit, which is designed to evaluate the accuracy, consistency, and comprehensiveness of data collection and ultimately validate the integrity of the data contained in the database. Healthcare Management Solutions LLC (HMS) was awarded to contract to perform the 2021 audit.

In 2021, 10% of STS Adult Cardiac Surgery Database participants (N=115, an increase from 86 in 2020) were audited. The audit process involves re-abstraction of data for 20 cases and comparison of 130 individual data elements with those submitted to the data warehouse. Agreement rates are calculated for each of the 130 variables, each variable category and overall. In 2021, the overall aggregate agreement rate was 96.9%, demonstrating that the data contained in the STS Adult Cardiac Surgery Database is both comprehensive and highly accurate.

Performance measure score

Empirical validity testing

We tested the predictive validity of the measure. Predictive validity means that the results of this measure are predictive of future performance. We assessed the extent to which performance on this STS measure remains stable over time. In other words, does the measure at one point in time accurately predict performance at some later time?

The tests on validity used the concept of performance outliers to be more formally introduced in 2b5: Participants were labeled as "low performance" if the 95% exact binomial confidence interval of its event rate lies entirely below the population average (in other words, the upper bound of the 95% CI < population average). Participants were labeled as "high performance" if the 95% confidence interval lies entirely above 1. The remaining participants were labeled mid performance.

For each of the performance groups from the earlier period, we calculated the group specific measure rates.

Face validity

We calculated and compared the observed rates in the three performance groups. The measure has good face value if the three groups have different rates as expected.

Face validity also implies that the measure is regarded as useful and valid by its intended users, including providers, consumers, payers, and regulators. The measure was developed by a panel of surgeon experts and statisticians. We have had near-universal acceptance of this measure by all stakeholders, and the STS CABG composite has been used by a highly respected consumer publication, *Consumer Reports*, for nearly 5 years.

[Response Ends]

2b.03. Provide the statistical results from validity testing.

Examples may include correlations or t-test results.

[Response Begins]

Critical Data Elements

Database validity was evaluated by re-abstraction of 130 individual data elements (variables) from the medical records and comparison to submitted data. Agreement rates were calculated at the individual variable level, category level and overall. In the table of audit results below, "Form Section/Data Element" represents the variable name and contains all the individual variables evaluated in the audit. The "Total Variables" column displays the total number of times the variable was abstracted and the "All Sites Mismatch Count" represents the number of mismatches between the abstractors' findings and the responses submitted. The last column "All Sites Agreement Rate" contains the percentage agreement rates.

There were 299,000 total variables abstracted and of those 9,294 variables were mismatches. This resulted in an overall agreement rate of 96.9%.

Critical data elements and agreement rates relevant to Anti-Lipid Treatment Discharge are shown in **bold** in the table below.

Table 3. Summary of Results by Variable

Form Section/Data Element	Total Variables	All Sites Mismatch Count	All Sites Agreement Rate
DEMOGRAPHICS	16,100	670	95.8%
65-Date of Birth:	2,300	109	95.3%
70-Patient Age:	2,300	52	97.7%
75-Sex:	2,300	18	99.2%
160-Race - Black / African American:	2,300	112	95.1%
165-Race - Asian:	2,300	108	95.3%
180-Race - Other:	2,300	120	94.8%
185-Hispanic, Latino, or Spanish Ethnicity:	2,300	151	93.4%
HOSPITALIZATION	9,200	406	95.6%
291-Primary Payor:	2,300	128	94.4%
293-Secondary (Supplemental) Payor:	2,300	176	92.3%
305-Admit Date:	2,300	59	97.4%
310-Date of Surgery:	2,300	43	98.1%
RISK FACTORS	78,200	2265	97.1%
330-Height (cm):	2,300	249	89.2%
335-Weight (kg):	2,300	284	87.7%
360-Diabetes:	2,300	37	98.4%
365-Diabetes Control:	2,300	51	97.8%
375-Dialysis:	2,300	20	99.1%
380-Hypertension:	2,300	50	97.8%
385-Endocarditis Type:	2,300	14	99.4%
390-Endocarditis:	2,300	14	99.4%
405-Chronic Lung Disease:	2,300	93	96.0%
450-Home Oxygen:	2,300	20	99.1%
460-Sleep Apnea:	2,300	46	98.0%
465-Pneumonia:	2,300	33	98.6%
470-Illicit Drug Use within One Year:	2,300	43	98.1%
480-Alcohol Use:	2,300	132	94.3%
485-Liver Disease:	2,300	23	99.0%
490-Immunocompromise Present:	2,300	21	99.1%
495-Mediastinal Radiation:	2,300	19	99.2%
500-Cancer Within 5 Years:	2,300	25	98.9%
505-Peripheral Arterial Disease:	2,300	53	97.7%
515-Syncope:	2,300	26	98.9%
520-Unresponsive State:	2,300	18	99.2%
525-Cerebrovascular Disease:	2,300	39	98.3%

Form Section/Data Element	Total Variables	All Sites Mismatch Count	All Sites Agreement Rate
530-Prior CVA:	2,300	35	98.5%
535-Prior CVA-When:	2,300	35	98.5%
540-CVD TIA:	2,300	35	98.5%
550-Carotid Stenosis - Right:	2,300	18	99.2%
555-Carotid Stenosis - Left:	2,300	12	99.5%
560-Prior Carotid Surgery:	2,300	32	98.6%
565-Last WBC Count:	2,300	170	92.6%
575-Last Hematocrit:	2,300	190	91.7%
580-Platelet Count:	2,300	159	93.1%
585-Last Creatinine Level:	2,300	176	92.3%
7225-Date of Positive Covid-19 Test:	2,300	46	98.0%
7230-Did the patient have a laboratory confirmed diagnosis of Covid 19:	2,300	47	98.0%
PREVIOUS CARDIAC INTERVENTION	13,800	62	99.6%
670-Previous Coronary Bypass Graft:	2,300	5	99.8%
675-Previous Valve:	2,300	7	99.7%
775-Previous PCI:	2,300	14	99.4%
780-Previous PCI-When:	2,300	10	99.6%
800-Previous PCI - Interval:	2,300	14	99.4%
805-Previous Other Cardiac:	2,300	12	99.5%
PREOPERATIVE CARDIAC STATUS	29,900	488	98.4%
885-Prior Myocardial Infarction:	2,300	52	97.7%
890-Myocardial Infarction - When:	2,300	62	97.3%
895-Primary Coronary Symptom for Surgery:	2,300	70	97.0%
911-Heart Failure:	2,300	77	96.7%
915-Classification - NYHA:	2,300	142	93.8%
930-Cardiogenic Shock:	2,300	20	99.1%
935-Resuscitation:	2,300	18	99.2%
950-Arrhythmia - VTach / Vfi:	2,300	7	99.7%
955-Arrhythmia - Sick Sinus Syndrome:	2,300	7	99.7%
960-Arrhythmia - Aflutter:	2,300	9	99.6%
961-Arrhythmia - Atrial Fibrillation:	2,300	13	99.4%
965-Arrhythmia - Second Degree Heart Block:	2,300	6	99.7%
970-Arrhythmia - Third Degree Heart Block:	2,300	5	99.8%
PREOPERATIVE MEDICATIONS	16,100	468	97.1%
1020-ACE Inhibitors or ARB Within 48 Hours:	2,300	90	96.1%
1030-Beta Blockers Within 24 Hours:	2,300	98	95.7%

Form Section/Data Element	Total Variables	All Sites Mismatch Count	All Sites Agreement Rate
1060-ADP Inhibitors Within Five Days:	2,300	59	97.4%
1065-ADP Inhibitors Discontinuation:	2,300	59	97.4%
1073-Glycoprotein IIb/IIIa Inhibitor Within 24 Hours:	2,300	53	97.7%
1130-Inotropes Within 48 Hours:	2,300	52	97.7%
1143-Steroids Within 24 Hours:	2,300	57	97.5%
HEMODYNAMICS/CATH/ECHO	25,300	1738	93.1%
1170-Number of Diseased Vessels:	2,300	71	96.9%
1195-Percent Stenosis - Left Main:	2,300	99	95.7%
1545-Hemo Data - EF:	2,300	378	83.6%
1595-Aortic Valve Disease:	2,300	103	95.5%
1600-Aortic Stenosis:	2,300	98	95.7%
1615-Aortic Gradient - Mean:	2,300	81	96.5%
1685-Mitral Valve Disease:	2,300	209	90.9%
1690-Valve Disease Stenosis - Mitral:	2,300	187	91.9%
1731-Mitral Valve Disease Primary Etiology:	2,300	190	91.7%
1780-Tricuspid Valve Disease:	2,300	168	92.7%
1785-Tricuspid Valve Stenosis:	2,300	154	93.3%
OPERATIVE	6,900	421	93.9%
1966-STS Risk Calculator Score Discussed:	2,300	301	86.9%
1975-Status:	2,300	59	97.4%
2290-Appropriate Antibiotic Discontinuation:	2,300	61	97.3%
CORONARY BYPASS	4,600	39	99.2%
2626-Internal Mammary Artery Used:	2,300	19	99.2%
2627-Reason for No IMA:	2,300	20	99.1%
VALVE SURGERY	20,700	57	99.7%
3395-Aortic Valve Procedure:	2,300	12	99.5%
3408-Aortic Surgical Valve Replacement Device Type:	2,300	17	99.3%
3460-Aortic Proc-Aortic Annular Enlargement:	2,300	10	99.6%
3500-Mitral Valve Procedure:	2,300	7	99.7%
3505-Mitral Valve Repair – Annuloplasty:	2,300	0	100.0%
3515-Mitral Leaflet Resection Type:	2,300	0	100.0%
3539-Mitral Valve Repair – Posterior Neochords:	2,300	1	100.0%
3565-Mitral Valve Repair – Folding Plasty:	2,300	0	100.0%
3620-Mitral Implant – Type:	2,300	10	99.6%
MECHANICAL CARDIAC ASSIST DEVICES	2,300	3	99.9%

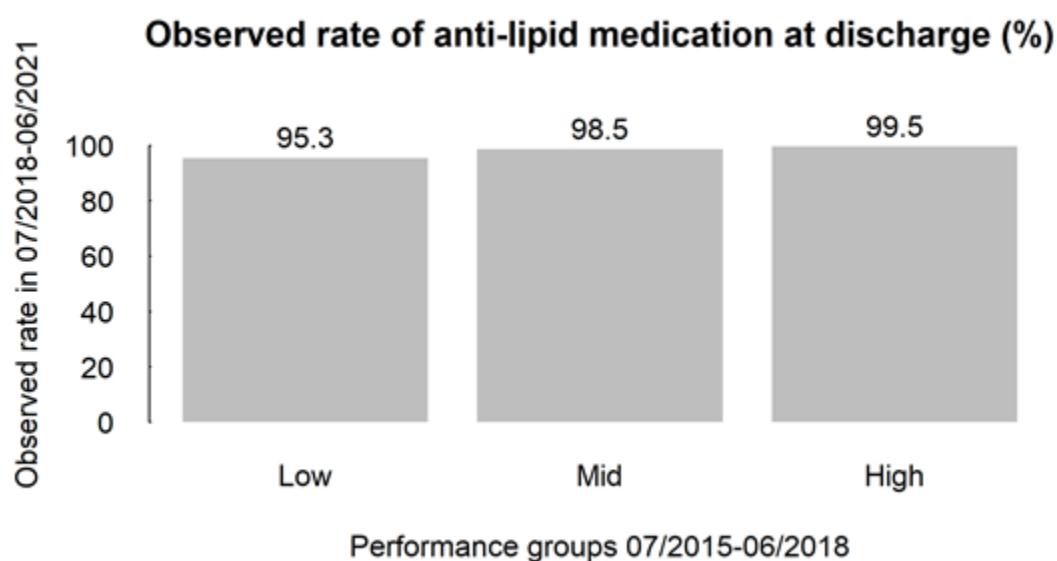
Form Section/Data Element	Total Variables	All Sites Mismatch Count	All Sites Agreement Rate
3730-IABP - When Inserted:	2,300	3	99.9%
ATRIAL FRIBILLATION PROCEDURES	2,300	4	99.8%
4250-AFib Lesion Location - Bilateral Pulmonary Vein Iso:	2,300	4	99.8%
POST-OPERATIVE	9,200	310	96.6%
6555-Peak Postop Creatinine Lvl Prior To Discharge:	2,300	225	90.2%
6591-Postop Intubation/Reintubation During Hospital Stay:	2,300	26	98.9%
6595-Additional Hours Ventilated:	2,300	35	98.5%
6615-Readmission to ICU:	2,300	24	99.0%
POST-OPERATIVE EVENTS	29,900	636	97.9%
6690-Post-Op-Surgical Site Infection:	2,300	27	98.8%
6700-Post-Op-Deep Sternal:	2,300	26	98.9%
6750-In Hospital Post-Op Events:	2,300	66	97.1%
6755-Post-Op-ReOp Bleeding/Tamponade:	2,300	51	97.8%
6765-Post-Op-ReOp for Valvular Dysfunction:	2,300	49	97.9%
6771-Post-Op-Reintervention-Myocardial Ischemia:	2,300	48	97.9%
6774-Post-Op-Aortic Re-intervention:	2,300	48	97.9%
6778-Post-Op-ReOp Other Cardiac Reasons:	2,300	59	97.4%
6780-Post-Op-Return To OR For Other Non-cardiac Reason:	2,300	53	97.7%
6810-Post-Op-Neuro-Stroke Perm:	2,300	47	98.0%
6835-Post-Op-Pulm-Vent Prolonged:	2,300	55	97.6%
6870-Post-Op-Renal-Renal Failure:	2,300	50	97.8%
6930-Post-Op-Other-A Fib:	2,300	57	97.5%
DISCHARGE/MORTALITY	20,700	630	97.0%
7001-Mort-Status at 30 Days After Surgery:	2,300	254	89.0%
7005-Discharge Mortality Status:	2,300	21	99.1%
7008-Hospital Discharge Date:	2,300	59	97.4%
7060-Aspirin - Discharge:	2,300	61	97.3%
7070-ADP Inhibitors - Discharge:	2,300	58	97.5%
7105-Beta Blockers - Discharge:	2,300	59	97.4%
7115-Lipid Lowering Statin - Discharge:	2,300	72	96.9%
7121-Mortality-Date:	2,300	25	98.9%
7124-Operative Mortality:	2,300	21	99.1%
READMISSION	6,900	423	93.9%

Form Section/Data Element	Total Variables	All Sites Mismatch Count	All Sites Agreement Rate
7140-Readmission:	2,300	137	94.0%
7145-Date of Readmission:	2,300	144	93.7%
7160-Readmit Reason:	2,300	142	93.8%
ADULT CARDIAC ANESTHESIOLOGY	6,900	674	90.2%
7500-Regurgitation - Mitral:	2,300	259	88.7%
7510-Aortic Valve Regurgitation Degree:	2,300	168	92.7%
7530-Tricuspid Regurgitation:	2,300	247	89.3%
GRAND TOTAL/OVERALL AGREEMENT RATE	299,000	9,294	96.9%

Summary of Results by Variable

Empirical Validity

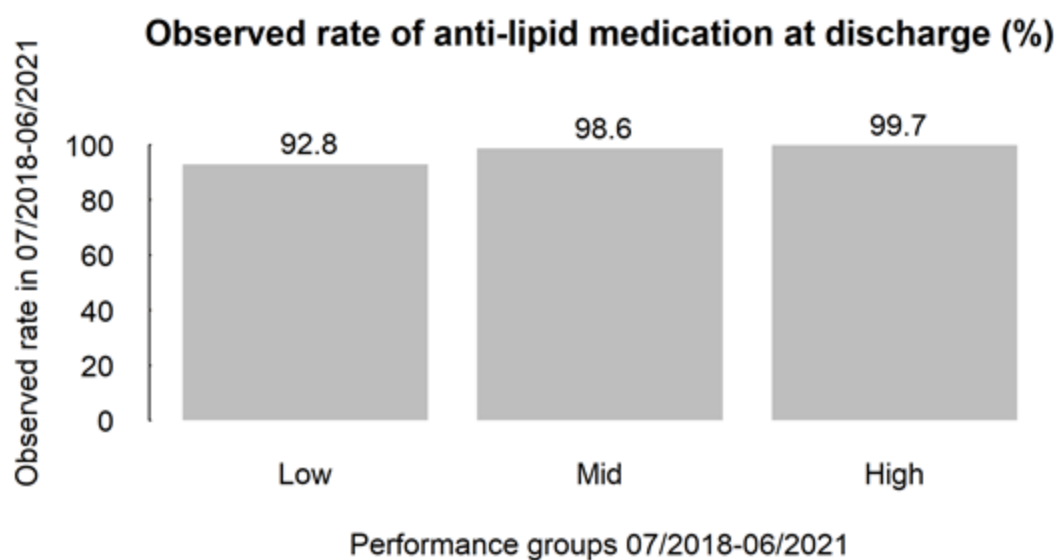
For each of the performance groups in the earlier period, we also calculated its aggregated rate in the later period. The aggregated rates in the later periods were 99.5%, 98.5%, and 95.3% for the high, mid and low performance groups from the earlier period.



Observed rates in later period by performance groups in the earlier period; low performance = rates statistically significantly lower than average in the earlier period.

Face Validity

STS participants deemed high performers by this measure have (on average) high rates of anti-lipid medication at discharge. Thus, differences in performance were clinically meaningful as well as statistically significant. This is illustrated in the figure below using data from July 2018 to June 2021. Compared to participants who were deemed as having lower than average performance, those with better-than-average performance had higher rate of anti-lipid medication at discharge (99.7% vs. 92.8%).



[Response Ends]

2b.04. Provide your interpretation of the results in terms of demonstrating validity. (i.e., what do the results mean and what are the norms for the test conducted?)

[Response Begins]

The test results show that the measure assesses the performance as designed, and that the past measure can be used to predict future performance. Together with face value, they support the validity of the measure.

[Response Ends]

2b.05. Describe the method for determining if statistically significant and clinically/practically meaningful differences in performance measure scores among the measured entities can be identified.

Describe the steps—do not just name a method; what statistical analysis was used? Do not just repeat the information provided in Importance to Measure and Report: Gap in Care/Disparities.

[Response Begins]

The summary statistic provided is the participant's observed event rate.

The degree of uncertainty surrounding an STS participant's anti-lipid treatment at discharge measure estimate is indicated by the 95% exact binomial confidence interval (CI) of its observed rate. Point estimates and CI's of the observed rate for an individual STS participant are reported along with a comparison to the STS average rate of the study time period. A performance category interpretation is also given to STS participants. Since higher value indicates better performance, an STS participant is designated as having higher/lower than average performance for the measure if the 95% CI lies entirely above/below the STS average. The remaining participants are labeled as not distinguishable from the STS average performance. For the simplicity of this report, we call the three groups 'high performance', 'low performance' and 'mid performance', respectively.

The method is equivalent to performing an exact binomial test with the null hypothesis that the participant has the same event rate as the population average. Those with a test p-value smaller than 0.05 are the low and high performance groups.

[Response Ends]

2b.06. Describe the statistical results from testing the ability to identify statistically significant and/or clinically/practically meaningful differences in performance measure scores across measured entities.

Examples may include number and percentage of entities with scores that were statistically significantly different from mean or some benchmark, different from expected; how was meaningful difference defined.

[Response Begins]

As shown in the table below, the proportion of STS participants that performed better and worse than STS average has remained similar over the last two 36-month periods. On average, around 60% of the participants have performance indistinguishable from the STS average, and the remaining participants have performed differently.

Distribution	July 2015- June 2018	July 2018 - June 2021
# Participant	1101	1045
# Operations	453473	418259
Low performance	195, 17.7%	135, 12.9%
Mid performance	600, 54.5%	661, 63.3%
High performance	306, 27.8%	249, 23.8%

The distribution of participant performance over the last two 36-month periods

[Response Ends]

2b.07. Provide your interpretation of the results in terms of demonstrating the ability to identify statistically significant and/or clinically/practically meaningful differences in performance across measured entities.

In other words, what do the results mean in terms of statistical and meaningful differences?

[Response Begins]

The statistical test and the construction of confidence intervals are widely used and accepted. The participants identified as having performed differently from the average likely have true performance characteristics that are different. The identified differences in performance are both statistically significant and clinically meaningful. The surgeon panel and users are satisfied with the amount of outliers the measure detects.

[Response Ends]

2b.08. Describe the method of testing conducted to identify the extent and distribution of missing data (or non-response) and demonstrate that performance results are not biased due to systematic missing data (or differences between responders and non-responders). Include how the specified handling of missing data minimizes bias.

Describe the steps—do not just name a method; what statistical analysis was used.

[Response Begins]

Due to the great data quality, the source fields required by anti-lipid treatment at discharge had only 0.13 % missing in the 2018-2021 measure time window. We calculated the overall rate of missing as well as missing rates across all participants. In the implementation, missing data are imputed to "no". We also implement a rule to remove participants with 5% or more missing data from the measure calculation.

[Response Ends]

2b.09. Provide the overall frequency of missing data, the distribution of missing data across providers, and the results from testing related to missing data.

For example, provide results of sensitivity analysis of the effect of various rules for missing data/non-response. If no empirical sensitivity analysis was conducted, identify the approaches for handling missing data that were considered and benefits and drawbacks of each).

[Response Begins]

Overall 0.13% of data were missing. 99.7% of participants had missing rate of 4% or lower. 3 out of 1048 participants were not included because of having missing rates higher than 5%.

[Response Ends]

2b.10. Provide your interpretation of the results, in terms of demonstrating that performance results are not biased due to systematic missing data (or differences between responders and non-responders), and how the specified handling of missing data minimizes bias.

In other words, what do the results mean in terms of supporting the selected approach for missing data and what are the norms for the test conducted; if no empirical analysis was conducted, justify the selected approach for missing data.

[Response Begins]

The rates of missing data in the STS Adult Cardiac Database were very low and are getting lower. Therefore, we conclude that systematic missing data did not lead to bias in our measure.

[Response Ends]

Note: This item is directed to measures that are risk-adjusted (with or without social risk factors) OR to measures with more than one set of specifications/instructions (e.g., one set of specifications for how to identify and compute the measure from medical record abstraction and a different set of specifications for claims or eQMs). It does not apply to measures that use more than one source of data in one set of specifications/instructions (e.g., claims data to identify the denominator and medical record abstraction for the numerator). Comparability is not required when comparing performance scores with and without social risk factors in the risk adjustment model. However, if comparability is not demonstrated for measures with more than one set of specifications/instructions, the different specifications (e.g., for medical records vs. claims) should be submitted as separate measures.

2b.11. Indicate whether there is more than one set of specifications for this measure.

[Response Begins]

No, there is only one set of specifications for this measure

[Response Ends]

2b.12. Describe the method of testing conducted to compare performance scores for the same entities across the different data sources/specifications.

Describe the steps—do not just name a method. Indicate what statistical analysis was used.

[Response Begins]

[Response Ends]

2b.13. Provide the statistical results from testing comparability of performance scores for the same entities when using different data sources/specifications.

Examples may include correlation, and/or rank order.

[Response Begins]

[Response Ends]

2b.14. Provide your interpretation of the results in terms of the differences in performance measure scores for the same entities across the different data sources/specifications.

In other words, what do the results mean and what are the norms for the test conducted.

[Response Begins]

[Response Ends]

2b.15. Indicate whether the measure uses exclusions.

[Response Begins]

Yes, the measure uses exclusions.

[Response Ends]

2b.16. Describe the method of testing exclusions and what was tested.

Describe the steps—do not just name a method; what was tested, e.g., whether exclusions affect overall performance scores; what statistical analysis was used?

[Response Begins]

We excluded from the analysis cases if there was an in-hospital mortality, discharge to Hospice, discharge AMA or if discharge anti-lipid treatment was contraindicated. We believe this is a clinically appropriate exclusion and is necessary to make the measure a consistent performance measure for the comparison across participants. The exclusion is precisely defined and specified.

To show the impact of this exclusion, and how the measure would be distributed without it, we calculated and compared the distributions of the measure with and without the current exclusion criteria.

[Response Ends]

2b.17. Provide the statistical results from testing exclusions.

Include overall number and percentage of individuals excluded, frequency distribution of exclusions across measured entities, and impact on performance measure scores.

[Response Begins]

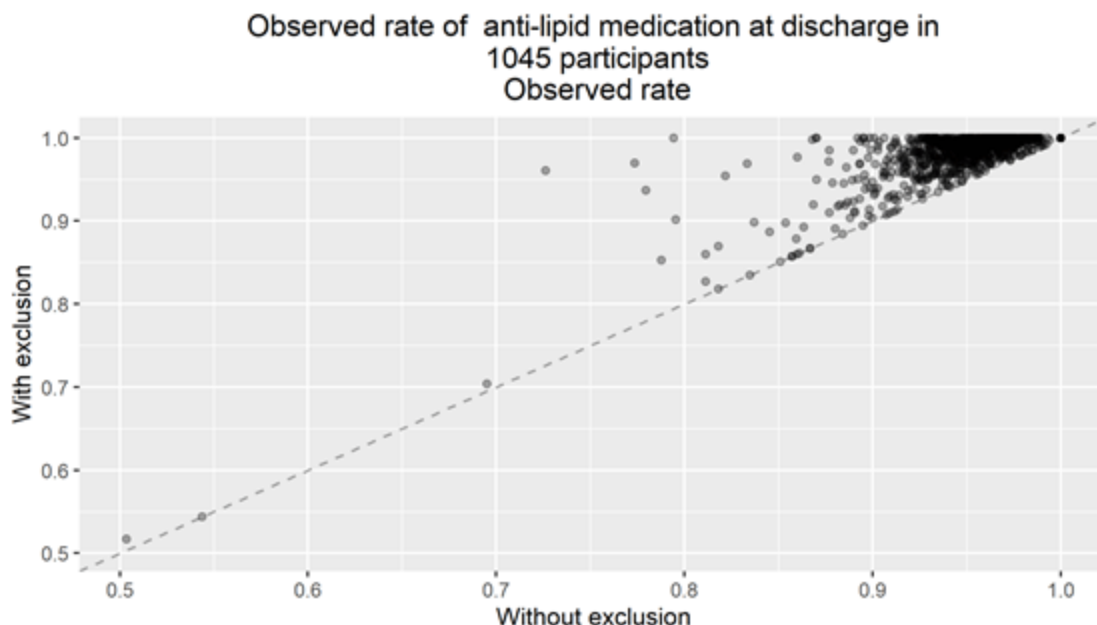
Distribution of participant-specific observed rates in July 2018 - June 2021 with and without the exclusion

Distribution	July 2018 - June 2021 Observed rate with exclusion	July 2018 - June 2021 Observed rate without exclusion
# Participant	1045	1045
# Operations	418259	434825
Mean	0.98	0.95
STD	0.033	0.037
IQR	0.021	0.031
0%	0.52	0.50
10%	0.96	0.91
20%	0.97	0.93
30%	0.98	0.94
40%	0.99	0.95
50%	0.99	0.95
60%	0.99	0.96
70%	1.00	0.96
80%	1.00	0.97
90%	1.00	0.98
100%	1.00	1.00
Midwest	278	278
Northeast	136	136
South	396	396
West	229	229
Other region	6	6
Low performance	135, 12.9%	111, 10.6%
Mid performance	661, 63.3%	763, 73.0%
High performance	249, 23.8%	171, 16.4%

Distribution of participant-specific observed rates in July 2018 - June 2021 with and without the exclusion

The figure below shows the changes in participant specific observed rates with and without the exclusion criterion.

Comparison of measure scores with and without the exclusion



The Spearman rank correlation of the measures with and without the exclusion is 0.54. The Pearson correlation is 0.78.

[Response Ends]

2b.18. Provide your interpretation of the results, in terms of demonstrating that exclusions are needed to prevent unfair distortion of performance results.

In other words, the value outweighs the burden of increased data collection and analysis. Note: If patient preference is an exclusion, the measure must be specified so that the effect on the performance score is transparent, e.g., scores with and without exclusion.

[Response Begins]

For the measure to consistently quantify quality per its definition, it is necessary to exclude cases if there was an in-hospital mortality or if discharge anti-lipid treatment was contraindicated. It has an impact on the results for many participants, and the results are distorted without it.

[Response Ends]

2b.19. Check all methods used to address risk factors.

[Response Begins]

No risk adjustment or stratification

[Response Ends]

2b.20. If using statistical risk models, provide detailed risk model specifications, including the risk model method, risk factors, risk factor data sources, coefficients, equations, codes with descriptors, and definitions.

[Response Begins]

[Response Ends]

2b.21. If an outcome or resource use measure is not risk-adjusted or stratified, provide rationale and analyses to demonstrate that controlling for differences in patient characteristics (i.e., case mix) is not needed to achieve fair comparisons across measured entities.

[Response Begins]

N/A

[Response Ends]

2b.22. Select all applicable resources and methods used to develop the conceptual model of how social risk impacts this outcome.

[Response Begins]

[Response Ends]

2b.23. Describe the conceptual and statistical methods and criteria used to test and select patient-level risk factors (e.g., clinical factors, social risk factors) used in the statistical risk model or for stratification by risk.

Please be sure to address the following: potential factors identified in the literature and/or expert panel; regression analysis; statistical significance of $p < 0.10$ or other statistical tests; correlation of x or higher. Patient factors should be present at the start of care, if applicable. Also discuss any “ordering” of risk factor inclusion; note whether social risk factors are added after all clinical factors. Discuss any considerations regarding data sources (e.g., availability, specificity).

[Response Begins]

[Response Ends]

2b.24. Detail the statistical results of the analyses used to test and select risk factors for inclusion in or exclusion from the risk model/stratification.

[Response Begins]

[Response Ends]

2b.25. Describe the analyses and interpretation resulting in the decision to select or not select social risk factors.

Examples may include prevalence of the factor across measured entities, availability of the data source, empirical association with the outcome, contribution of unique variation in the outcome, or assessment of between-unit effects and within-unit effects. Also describe the impact of adjusting for risk (or making no adjustment) on providers at high or low extremes of risk.

[Response Begins]

[Response Ends]

2b.26. Describe the method of testing/analysis used to develop and validate the adequacy of the statistical model or stratification approach (describe the steps—do not just name a method; what statistical analysis was used). Provide the statistical results from testing the approach to control for differences in patient characteristics (i.e., case mix) below. If stratified ONLY, enter “N/A” for questions about the statistical risk model discrimination and calibration statistics.

Validation testing should be conducted in a data set that is separate from the one used to develop the model.

[Response Begins]

[Response Ends]

2b.27. Provide risk model discrimination statistics.

For example, provide c-statistics or R-squared values.

[Response Begins]

[Response Ends]

2b.28. Provide the statistical risk model calibration statistics (e.g., Hosmer-Lemeshow statistic).

[Response Begins]

N/A

[Response Ends]

2b.29. Provide the risk decile plots or calibration curves used in calibrating the statistical risk model.

The preferred file format is .png, but most image formats are acceptable.

[Response Begins]

[Response Ends]

2b.30. Provide the results of the risk stratification analysis.

[Response Begins]

[Response Ends]

2b.31. Provide your interpretation of the results, in terms of demonstrating adequacy of controlling for differences in patient characteristics (i.e., case mix).

In other words, what do the results mean and what are the norms for the test conducted?

[Response Begins]

[Response Ends]

2b.32. Describe any additional testing conducted to justify the risk adjustment approach used in specifying the measure.

Not required but would provide additional support of adequacy of the risk model, e.g., testing of risk model in another data set; sensitivity analysis for missing data; other methods that were assessed.

[Response Begins]

[Response Ends]

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.

3.01. Check all methods below that are used to generate the data elements needed to compute the measure score.

[Response Begins]

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)

[Response Ends]

3.02. Detail to what extent the specified data elements are available electronically in defined fields.

In other words, indicate whether data elements that are needed to compute the performance measure score are in defined, computer-readable fields.

[Response Begins]

Some data elements are in defined fields in electronic sources

[Response Ends]

3.03. 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 data elements not from electronic sources.

[Response Begins]

All data elements from STS Adult Cardiac Surgery Database (ACSD) participating institutions are submitted in electronic format following a standard set of data specifications.

[Response Ends]

3.04. Describe any efforts to develop an eCQM.

[Response Begins]

N/A

[Response Ends]

3.06. 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.

[Response Begins]

There are no known major difficulties. The data elements included in this measure have been standard in the STS ACSD for at least 3 years and some of them have been part of the database for more than 20 years. The variables are considered to be data elements that are readily available and collected as part of the process of providing care.

The STS ACSD has four lock dates (i.e., data harvest) a year, in which a snapshot of the data are sent from the data warehouse to the analytic center for analyses. Between lock dates, database participants are able to access reports updated in near real time through a number of dashboard reports and tools available in the database platform.

Using these reports, database participants are able to address data quality and completeness. Data harvest results are provided to participants via the database platform. Due to COVID-19 and the 2020 STS National Database data warehouse transition, STS experienced some harvest delays, which have been addressed.

[Response Ends]

Consider implications for both individuals providing data (patients, service recipients, respondents) and those whose performance is being measured.

3.07. Detail 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),

Attach the fee schedule here, if applicable.

[Response Begins]

Data Collection:

STS ACSD participants have on-staff data managers or use third party abstraction companies to collect these data. Costs to develop the measure included volunteer cardiothoracic surgeons' time, STS staff time, and analytic center statistician and project management time.

Other fees:

STS ACSD participants (single cardiothoracic surgeons or a group of surgeons) pay annual participant fees of \$ 4,250 or \$ 6,375 and per surgeon fees of \$ 150 for STS members or \$ 350 for non members, depending on whether the majority of surgeons in the program are STS members. As a benefit of STS membership, the member-majority participants are charged the lesser of the two fees.

[Response Ends]

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.

Extent to which intended audiences (e.g., consumers, purchasers, providers, policy makers) can understand the results of the measure and are likely to find them useful for decision making.

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 demonstrating performance improvement.

4a.01. Check all current uses. For each current use checked, please provide:

Name of program and sponsor

URL

Purpose

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

Level of measurement and setting

[Response Begins]

Public Reporting

[Public Reporting Please Explain]

Voluntary public reporting – approximately 83% of STS Adult Cardiac Surgery Database participants are enrolled as of January 2022.

This measure is publicly reported as a component of the Use of All Evidence-Based Perioperative Medications domain of the isolated CABG composite.

(<https://publicreporting.sts.org/acsd>)

Quality Improvement (Internal to the specific organization)

[Quality Improvement (Internal to the specific organization) Please Explain]

STS Adult Cardiac Surgery Database (ACSD) Participant Feedback Reports provide performance results for this measure to participants. ACSD Participants are encouraged to use their feedback report results for internal assessment and quality improvement. (see details in 4a.05 below)

[Response Ends]

4a.02. Check all planned uses.

[Response Begins]

Public reporting

Payment Program

Quality Improvement (internal to the specific organization)

Measure Currently in Use

[Response Ends]

4a.03. If not currently publicly reported OR used in at least one other accountability application (e.g., payment program, certification, licensing), explain why the measure is not in use.

For example, do policies or actions of the developer/steward or accountable entities restrict access to performance results or block implementation?

[Response Begins]

N/A

[Response Ends]

4a.04. If not currently publicly reported OR used in at least one other accountability application, provide a credible plan for implementation within the expected timeframes: used in any accountability application within 3 years, and publicly reported within 6 years of initial endorsement.

A 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.

[Response Begins]

N/A

[Response Ends]

4a.05. Describe how performance results, data, and assistance with interpretation have been provided to those being measured or other users during development or implementation.

Detail 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.

[Response Begins]

As of November 2022, there are 1,009 active U.S. and Canadian participants in the STS Adult Cardiac Surgery Database (ACSD). A "participant" is a cardiothoracic surgeon or group of cardiothoracic surgeons who agree to submit case records for analysis and comparison with benchmarking data for quality improvement initiatives. At the option of the surgeon or surgical group, the ACSD participant can include a hospital and/or associated anesthesiologists. For this reason, the measure is specified/tested for both the "clinician: group/practice" and "facility" levels of analysis.

All ACSD participants receive quarterly data reports with their performance results, reported in an easy-to-understand format. The participant's score is illustrated graphically in relation to the 25th, 50th and 75th percentiles of the distribution across all participants who were eligible for inclusion in that quarter's analysis, and is also accompanied by the 95% Bayesian credible interval. Surgeons easily grasp this result and the visual display clearly illustrates how they perform compared to their peers on a quarterly basis. In addition, these risk-adjusted results allow surgeons to compare their patients' outcomes with national benchmarks and to initiate quality improvement efforts as needed.

[Response Ends]

4a.06. Describe the process for providing measure results, including when/how often results were provided, what data were provided, what educational/explanatory efforts were made, etc.

[Response Begins]

Please see response under 4a.05

[Response Ends]

4a.07. Summarize the feedback on measure performance and implementation from the measured entities and others. Describe how feedback was obtained.

[Response Begins]

The adult cardiac surgeons who comprise the STS Adult Cardiac Surgery Task Force meet periodically to discuss the participant reports and to consider potential enhancements to the ACSD. Additions/clarifications to the data collection form and to the content/format of the participant reports are discussed and implemented as appropriate.

The data warehousing functions for ACSD, GTSD, and CHSD moved from STS's previous vendor to IQVIA in late 2019. With IQVIA as its warehouse, the Database offers its participants access to their data in a secure cloud environment with interactive reports updated in near real time and the ability to drill down to the patient level.

Also, adult cardiac public reporting has been available since 2010 (<http://publicreporting.sts.org/acsd>), making star ratings for consenting participant groups available to participants as well as the public.

[Response Ends]

4a.08. Summarize the feedback obtained from those being measured.

[Response Begins]

Please see our response in 4a.07 above.

[Response Ends]

4a.09. Summarize the feedback obtained from other users.

[Response Begins]

Voluntary participation in ACSD public reporting has continually increased over the years that the initiative has been available, from 38% of ACSD participants in 2014, to 68% as of 2019 and 83% as of January 2022. This trend suggests that feedback from ACSD participants and others who access the performance data available on STS.org is sufficiently positive to promote ever-increasing participation in public reporting.

[Response Ends]

4a.10. Describe how the feedback described has been considered when developing or revising the measure specifications or implementation, including whether the measure was modified and why or why not.

[Response Begins]

N/A

[Response Ends]

4b.01. You may refer to data provided in Importance to Measure and Report: Gap in Care/Disparities, 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, provide an explanation. 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.

[Response Begins]

Looking at the overall temporal trend, the failure of using appropriate medication has been steadily declining. The overall usage rates in the last 2 36-month periods were 97%, and 98% (July 2015-June 2018, July 2018-June 2021, respectively).

Number of participants and operations by geographic regions, from July 2015 to June 2018 and from July 2018 to June 2021

Period July 2015 - June 2018						Period July 2018 - June 2021					
*	Midwest	Northeast	Other Region	South	West	*	Midwest	Northeast	Other Region	South	West
# Participant	309	140	8	407	237	# Participant	278	136	6	396	229
% Participant	28.1%	12.7%	0.7%	37.0%	21.5%	% Participant	26.6%	13.0%	0.6%	37.9%	21.9%
# Operation	103249	72933	7920	191005	78366	# Operation	93842	68367	2530	179870	73650
% Operation	22.8%	16.1%	1.7%	42.1%	17.3%	% Operation	22.4%	16.3%	0.6%	43.0%	17.6%

Number of participants and operations by geographic regions, from July 2015 to June 2018 and from July 2018 to June 2021

* Indicates that the cell is left intentionally blank

[Response Ends]

4b.02. Explain any unexpected findings (positive or negative) during implementation of this measure, including unintended impacts on patients.

[Response Begins]

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; 10% of STS Adult Cardiac Surgery Database participants were audited in 2021, as in each year since 2014. We control for risk aversion by having a robust methodology that appropriately adjusts the expected risk for providers who care for sicker patients.

[Response Ends]

4b.03. Explain any unexpected benefits realized from implementation of this measure.

[Response Begins]

N/A

[Response Ends]

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.

If you are updating a maintenance measure submission for the first time in MIMS, please note that the previous related and competing data appearing in question 5.03 may need to be entered in to 5.01 and 5.02, if the measures are NQF endorsed. Please review and update questions 5.01, 5.02, and 5.03 accordingly.

5.01. Search and select all NQF-endorsed related measures (conceptually, either same measure focus or target population).

(Can search and select measures.)

[Response Begins]

0127: Preoperative Beta Blockade

0117: Beta Blockade at Discharge

0696: STS CABG Composite Score

0115: Risk-Adjusted Surgical Re-exploration

0114: Risk-Adjusted Postoperative Renal Failure

0134: Use of Internal Mammary Artery (IMA) in Coronary Artery Bypass Graft (CABG)

0116: Anti-Platelet Medication at Discharge

0116: Anti-Platelet Medication at Discharge

0117: Beta Blockade at Discharge

0114: Risk-Adjusted Postoperative Renal Failure

0127: Preoperative Beta Blockade

0130: Risk-Adjusted Deep Sternal Wound Infection

0134: Use of Internal Mammary Artery (IMA) in Coronary Artery Bypass Graft (CABG)

0696: STS CABG Composite Score

0115: Risk-Adjusted Surgical Re-exploration

0119: Risk-Adjusted Operative Mortality for CABG

0131: Risk-Adjusted Stroke/Cerebrovascular Accident

0129: Risk-Adjusted Postoperative Prolonged Intubation (Ventilation)

0130: Risk-Adjusted Deep Sternal Wound Infection

0131: Risk-Adjusted Stroke/Cerebrovascular Accident

0119: Risk-Adjusted Operative Mortality for CABG

0129: Risk-Adjusted Postoperative Prolonged Intubation (Ventilation)

[Response Ends]

5.02. Search and select all NQF-endorsed competing measures (conceptually, the measures have both the same measure focus or target population).

(Can search and select measures.)

[Response Begins]

[Response Ends]

5.03. If there are related or competing measures to this measure, but they are not NQF-endorsed, please indicate the measure title and steward.

[Response Begins]

N/A

[Response Ends]

5.04. If this measure conceptually addresses EITHER the same measure focus OR the same target population as NQF-endorsed measure(s), indicate whether the measure specifications are harmonized to the extent possible.

[Response Begins]

Yes

[Response Ends]

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

[Response Begins]

N/A

[Response Ends]

5.06. Describe why this measure is superior to competing measures (e.g., a more valid or efficient way to measure quality). Alternatively, justify endorsing an additional measure.

Provide analyses when possible.

[Response Begins]

N/A

[Response Ends]

Appendix

Supplemental materials may be provided in an appendix.:

Available in attached file

Attachment: 0118_0118_Appendix-SQL-DCRI-Guideline-Spring2022_(3).pdf

Contact Information

Measure Steward (Intellectual Property Owner): The Society of Thoracic Surgeons

Measure Steward Point of Contact: Yagci, Banu, byagci@sts.org

Measure Developer if different from Measure Steward: The Society of Thoracic Surgeons

Measure Developer Point(s) of Contact: Yagci, Banu, byagci@sts.org

Additional Information

1. Provide any supplemental materials, if needed, as an appendix. All supplemental materials (such as data collection instrument or methodology reports) should be collated one file with a table of contents or bookmarks. If material pertains to a specific criterion, that should be indicated.

[Response Begins]

Available in attached file

[Response Ends]

Attachment: 0118_0118_Appendix-SQL-DCRI-Guideline-Spring2022_(3).pdf

2. List the workgroup/panel members' names and organizations.

Describe the members' role in measure development.

[Response Begins]

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

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

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/Johns 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
Moritz Wyler von Ballmoos, MD; Houston Methodist DeBakey Heart & Vascular Center, Houston, TX
Sean M. O'Brien, PhD; Duke Clinical Research Institute, Durham, NC
Task Force on Quality Initiatives
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William Caine, MD; Intermountain Heart Institute, Murray, UT
Fred Edwards, MD; University of Florida, Jacksonville, FL
Chris Feindel, MD; Cardiovascular Surgery Associates, Toronto, Ontario
Felix Fernandez, MD; Emory University School of Medicine, Atlanta, GA
Kristopher George, MD; Cardiac Surgical Associates of Fresno, Fresno, CA
Fred Grover, MD; University of Colorado School of Medicine, Aurora, CO
Jeffrey P. Jacobs, MD; University of Florida, Gainesville, FL
Kevin Lobdell, MD; Atrium Health, Charlotte, NC
John Mayer, MD; Boston Childrens Hospital, Boston, MA
Jim McClurken, MD; Doylestown Hospital, Doylestown, PA
Edward Savage, MD; Cleveland Clinic/Martin Health, Stuart, FL
David M. Shahian, MD; Massachusetts General Hospital & Harvard Medical School, Boston, MA
Frank Shannon, MD; Johns Hopkins All Children's Hospital, St. Petersburg, FL
Robert Welsh, MD; Beaumont Health, Royal Oak, MI

[Response Ends]

3. Indicate the year the measure was first released.

[Response Begins]

2004

[Response Ends]

4. Indicate the month and year of the most recent revision.

[Response Begins]

March 2022

[Response Ends]

5. Indicate the frequency of review, or an update schedule, for this measure.

[Response Begins]

annually

[Response Ends]

6. Indicate the next scheduled update or review of this measure.

[Response Begins]

2023

[Response Ends]

7. Provide a copyright statement, if applicable. Otherwise, indicate "N/A".

[Response Begins]

N/A

[Response Ends]

8. State any disclaimers, if applicable. Otherwise, indicate "N/A".

[Response Begins]

N/A

[Response Ends]

9. Provide any additional information or comments, if applicable. Otherwise, indicate "N/A".

[Response Begins]

N/A

[Response Ends]