



## 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 #:** 1790

**Corresponding Measures:**

**Measure Title:** Risk-Adjusted Morbidity and Mortality for Lung Resection for Lung Cancer

**Measure Steward:** The Society of Thoracic Surgeons

**sp.02. Brief Description of Measure:** Percentage of patients greater than or equal to 18 years of age undergoing elective lung resection (Open or VATS wedge resection, segmentectomy, lobectomy, bilobectomy, sleeve lobectomy, pneumonectomy) for lung cancer who developed any of the following postoperative complications: reintubation, need for tracheostomy, initial ventilator support > 48 hours, ARDS, pneumonia, pulmonary embolus, bronchopleural fistula, unexpected return to the operating room, myocardial infarction or operative mortality (death during the index hospitalization, regardless of timing, or within 30 days, regardless of location).

**1b.01. Developer Rationale:** Providing outcomes data to participating thoracic surgery sites allows benchmarking of practice group results against the STS national results and allows demonstration of improvement when QI efforts are undertaken. These outcomes data aid clinicians and patients in making informed clinical decisions and also enable them to compare risk-adjusted outcomes for quality improvement purposes.

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**sp.12. Numerator Statement:** Number of patients greater than or equal to 18 years of age undergoing elective lung resection (Open or VATS wedge resection, segmentectomy, lobectomy, bilobectomy, sleeve lobectomy, pneumonectomy) for lung cancer who developed any of the following postoperative complications: reintubation, need for tracheostomy, initial ventilator support > 48 hours, ARDS, pneumonia, pulmonary embolus, bronchopleural fistula, unexpected return to the operating room, myocardial infarction or operative mortality (death during the index hospitalization, regardless of timing, or within 30 days, regardless of location).

**sp.14. Denominator Statement:** Number of patients greater than or equal to 18 years of age undergoing elective lung resection (Open or VATS wedge resection, segmentectomy, lobectomy, bilobectomy, sleeve lobectomy, pneumonectomy) for lung cancer

**sp.16. Denominator Exclusions:** Patients were excluded if they had an extrapleural pneumonectomy, completion pneumonectomy, carinal pneumonectomy, occult carcinoma or benign disease on final pathology, or an urgent, emergent, or palliative operation. Furthermore, patients with missing age, sex, discharge mortality status, and predicted forced expiratory volume in 1 second were also excluded.

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**Measure Type:** Outcome

**sp.28. Data Source:**

Other

Registry Data

**sp.07. Level of Analysis:**

Facility

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**IF Endorsement Maintenance – Original Endorsement Date:** 2012-08-09 12:05 PM

**Most Recent Endorsement Date:** 6/6/2018 11:57:06 AM

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**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]

[Response Ends]

**1a.02. Provide evidence that the target population values the measured outcome, process, or structure and finds it meaningful.**

*Describe how and from whom input was obtained.*

[Response Begins]

[Response Ends]

**1a.03. Provide empirical data demonstrating the relationship between the outcome (or PRO) and at least one healthcare structure, process, intervention, or service.**

[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]**

Providing outcomes data to participating thoracic surgery sites allows benchmarking of practice group results against the STS national results and allows demonstration of improvement when QI efforts are undertaken. These outcomes data aid clinicians and patients in making informed clinical decisions and also enable them to compare risk-adjusted outcomes for quality improvement purposes.

**[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 endpoint of mortality or major morbidity occurred in 9.5% of eligible patients. There is no overlap in credible intervals for hospital-specific SIR between some of the best performing sites (3.5%; 8 of 231 sites with upper limit below 1) and worst performing sites (6.9%; 16 of 231 sites with lower limit above 1), indicating that this model provides meaningful discrimination between best and worst performers.

Dates: January 1, 2012 through December 31, 2014

Data/Sample: The population included 27,844 records from 231 hospitals. Hospital-specific sample sizes ranged from 1 to 852 records per hospital (mean=121, median=85, IQR=[36, 165]).

Distribution of hospital-specific estimates of standardized incidence ratio (SIR) for composite of mortality and morbidity:

Minimum 0.47  
1st quartile 0.90  
Median 1.00  
Mean 1.05  
3rd quartile 1.22  
Maximum 2.37

**[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 (see data reported in 1b2)

**[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]**

Data/Sample: The population included 27,844 records from 231 hospitals.

Dates: January 1, 2012 through December 31, 2014

Race: White 24,099; Black 2,369; Other 1,217

Incidence of mortality or major morbidity endpoints:

White: 9.8%, 95% CI [9.4,% 10.1%]

Black: 8.9%, 95% CI [7.8%, 10.1%]

Other: 6.9%, 95% CI [5.6, 8.5%]

**[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 (see data reported in 1b4)

**[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

**[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]**

Among postoperative complications included in the numerator statement, "bleeding requiring reoperation" was replaced by "unexpected return to the operating room." Bleeding is only one of many possible reasons for a reoperation; other reasons may include prolonged air leak and chylothorax. STS General Thoracic surgeon leaders felt that the new, expanded definition of reoperation ("unexpected return to the operating room") better reflects the scope of this category of postoperative complications.

**[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]**

Risk-Adjusted Morbidity and Mortality for Lung Resection for Lung Cancer

**[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]**

Percentage of patients greater than or equal to 18 years of age undergoing elective lung resection (Open or VATS wedge resection, segmentectomy, lobectomy, bilobectomy, sleeve lobectomy, pneumonectomy) for lung cancer who developed any of the following postoperative complications: reintubation, need for tracheostomy, initial ventilator support > 48 hours, ARDS, pneumonia, pulmonary embolus, bronchopleural fistula, unexpected return

to the operating room, myocardial infarction or operative mortality (death during the index hospitalization, regardless of timing, or within 30 days, regardless of location).

**[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]**

Cancer

Surgery

**[Response Ends]**

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

**[Response Begins]**

Safety

Safety: Complications

**[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]**

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]**

[http://www.sts.org/sites/default/files/documents/STSThoracicDataSpecsV2\\_3.pdf](http://www.sts.org/sites/default/files/documents/STSThoracicDataSpecsV2_3.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]**

For the question below: state the outcome being measured. Calculation of the risk-adjusted outcome should be described in sp.22.

**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 greater than or equal to 18 years of age undergoing elective lung resection (Open or VATS wedge resection, segmentectomy, lobectomy, bilobectomy, sleeve lobectomy, pneumonectomy) for lung cancer who developed any of the following postoperative complications: reintubation, need for tracheostomy, initial ventilator support > 48 hours, ARDS, pneumonia, pulmonary embolus, bronchopleural fistula, unexpected return



to the operating room, myocardial infarction or operative mortality (death during the index hospitalization, regardless of timing, or within 30 days, regardless of location).

**[Response Ends]**

For the question below: describe how the observed outcome is identified/counted. Calculation of the risk-adjusted outcome should be described in sp.22.

**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 patients undergoing elective lung resection for lung cancer for whom:

1. Postoperative events (POEvents - STS GTS Database, v 2.2, sequence number 1710) is marked "Yes" and one of the following items is marked:

- a. Reintubation (Reintube - STS GTS Database, v 2.2, sequence number 1850)
- b. Need for tracheostomy (Trach - STS GTS Database, v 2.2, sequence number 1860)
- c. Initial ventilator support > 48 hours (Vent- STS GTS Database, v 2.2, sequence number 1840)
- d. Acute Respiratory Distress Syndrome (ARDS - STS GTS Database, v 2.2, sequence number 1790)
- e. Pneumonia (Pneumonia - STS GTS Database, v 2.2, sequence number 1780)
- f. Pulmonary Embolus (PE - STS GTS Database, v 2.2, sequence number 1820)
- g. Bronchopleural Fistula (Bronchopleural - STS GTS Database, v 2.2, sequence number 1810)
- h. Myocardial infarction (MI - STS GTS Database, v 2.2, sequence number 1900)

Or

2. Unexpected return to the operating room (ReturnOR - STS GTS Database, Version 2.2, sequence number 1720) is marked "yes"

Or

3. One of the following fields is marked "dead"

- a. Discharge status (MtDCStat - STS GTS Database, Version 2.2, sequence number 2200);
- b. Status at 30 days after surgery (Mt30Stat - STS GTS Database, Version 2.2, sequence number 2240)

Please see STS General Thoracic Surgery Database Data Collection Form, Version 2.3-

[http://www.sts.org/sites/default/files/documents/STSThoracicDCF\\_V2\\_3\\_MajorProc\\_Annotated.pdf](http://www.sts.org/sites/default/files/documents/STSThoracicDCF_V2_3_MajorProc_Annotated.pdf)

**[Response Ends]**

For the question below: state the target population for the outcome. Calculation of the risk-adjusted outcome should be described in sp.22.

**sp.14. State the denominator.**

*Brief, narrative description of the target population being measured.*

**[Response Begins]**

Number of patients greater than or equal to 18 years of age undergoing elective lung resection (Open or VATS wedge resection, segmentectomy, lobectomy, bilobectomy, sleeve lobectomy, pneumonectomy) for lung cancer

**[Response Ends]**

For the question below: describe how the target population is identified. Calculation of the risk-adjusted outcome should be described in sp.22.

**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]**

1. Lung cancer (LungCancer - STS GTS Database, v 2.2, sequence number 830) is marked “yes” and Category of Disease – Primary (CategoryPrim - STS GTS Database, v 2.2, sequence number 1300) is marked as one of the following:

(ICD-9, ICD-10)

Lung cancer, main bronchus, carina (162.2, C34.00)

Lung cancer, upper lobe (162.3, C34.10)

Lung cancer, middle lobe (162.4, C34.2)

Lung cancer, lower lobe (162.5, C34.30)

Lung cancer, location unspecified (162.9, C34.90)

2. Patient has lung cancer (as defined in #1 above) and primary procedure is one of the following CPT codes:

Thoracoscopy, surgical; with lobectomy (32663)

Thoracoscopy with therapeutic wedge resection (eg mass or nodule) initial, unilateral (32666)

Thoracoscopy with removal of a single lung segment (segmentectomy) (32669)

Thoracoscopy with removal of two lobes (bilobectomy) (32670)

Thoracoscopy with removal of lung, pneumonectomy (32671)

Thoracotomy with therapeutic wedge resection (eg mass nodule) initial (32505)

Removal of lung, total pneumonectomy; (32440)

Removal of lung, single lobe (lobectomy) (32480)

Removal of lung, two lobes (bilobectomy) (32482)

Removal of lung, single segment (segmentectomy) (32484)

Removal of lung, sleeve lobectomy (32486)

3. Status of Operation (Status - STS General Thoracic Surgery Database, Version 2.2, sequence number 1420) is marked as "Elective"

4. Only analyze the first operation of the hospitalization meeting criteria 1-3

**[Response Ends]**

**sp.16. Describe the denominator exclusions.**

*Brief narrative description of exclusions from the target population.*

**[Response Begins]**

Patients were excluded if they had an extrapleural pneumonectomy, completion pneumonectomy, carinal pneumonectomy, occult carcinoma or benign disease on final pathology, or an urgent, emergent, or palliative operation. Furthermore, patients with missing age, sex, discharge mortality status, and predicted forced expiratory volume in 1 second were also excluded.

**[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]**

Cases removed from calculations if any of following fields are checked on the data collection form:

Removal of lung, sleeve (carinal) pneumonectomy (32442)  
Removal of lung, total pneumonectomy; extrapleural (32445)  
Removal of lung, completion pneumonectomy (32488)

OR if either of the following fields are checked:

Carcinoid tumor of bronchus and lung; benign, typical (209.61., D34.090)  
Lung tumor, benign (212.3, D14.30)

OR if Emergent, Urgent, or Palliative is checked under "Status of Operation"

Only general thoracic procedures coded as primary lung or primary esophageal cancer are included in measure calculations, so occult carcinoma is effectively excluded.

**[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]**

Statistical risk model

**[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 = Lower 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]**

Target population is patients undergoing elective lung resection for lung cancer. Emergency procedures were excluded. Outcome is operative mortality (death during the index hospitalization, regardless of timing, or within 30 days, regardless of location) or occurrence of any of the following postoperative complications: reintubation, need for tracheostomy, initial ventilator support > 48 hours, ARDS, pneumonia, pulmonary embolus, bronchopleural fistula, unexpected return to the operating room, or myocardial infarction. Analysis considered 27,844 patients with procedures between 01/01/2012 and 12/31/2014 (36 months). Risk adjustment was achieved with a Bayesian hierarchical model with composite of the above postoperative complications as the outcome. The measure score was estimated with this model.

For additional information, please review the risk model in the attachment. (Fernandez, et. al. 2016.)

**[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 General Thoracic Surgery Database, Version 2.3

**[Response Ends]**

**sp.30. Provide the data collection instrument.**

**[Response Begins]**

**[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]**

Yes

**[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]**

**[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]**

**[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 measure 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]**

**[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]**

**[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]

[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]

[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]

[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]

[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]

[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]

[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]**

**[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]**

**[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]**

**[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]**

**[Response Ends]**

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

**[Response Begins]**

**[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]

[Response Ends]

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

*Examples may include correlations or t-test results.*

[Response Begins]

[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]

[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]

[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]

[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]

[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]

[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]

[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]

[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]

[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]

[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]

[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]

[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]

[Response Ends]

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

[Response Begins]

[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]

[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]

[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]**

Coded by someone other than person obtaining original information (e.g., DRG, ICD-10 codes on claims)

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]**

ALL data elements are in defined fields in a combination of 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]**

n/a

**[Response Ends]**

**3.04. Describe any efforts to develop an eCQM.**

**[Response Begins]**

**[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]**

**[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]**

See 3c.1

**[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

Quality Improvement with Benchmarking (external benchmarking to multiple organizations)

Quality Improvement (Internal to the specific organization)

[Response Ends]

### 4a.02. Check all planned uses.

[Response Begins]

Public reporting

[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]

STS is actively promoting public reporting of the STS adult cardiac, congenital heart, and general thoracic surgery performance measures. This is consistent with the explicitly stated STS philosophy that "As a national leader in health care transparency and accountability, The Society of Thoracic Surgeons believes that the public has a right to know the quality of surgical outcomes." (<http://www.sts.org/registries-research-center/sts-public-reporting>) In our efforts to operationalize public reporting, the STS Public Reporting Task Force has and will continue to develop public report cards that are consumer centric. Public reporting remains a top priority for the Society, and STS is striving for even stronger involvement among Database participants.

Currently, more than 650 Adult Cardiac Surgery Database (ACSD) participants voluntarily consent to be a part of

the STS Public Reporting and more than 550 ACSD participants have consented to report publicly via the Consumer Reports public reporting initiative. Additionally, more than 100 Congenital Heart Surgery Database (CHSD) participants are currently enrolled in STS Public Reporting.

As of July 2017, General Thoracic Surgery Database (GTSD) participants were included in the Public Reporting initiative and more than 250 participants currently consent to report outcomes publicly on the STS website. This includes discharge mortality rate and median postoperative length of stay for lobectomy procedures for lung cancer, including scores and star ratings for the Lobectomy for Lung Cancer Composite Measure in addition to its domains of 1) absence of mortality, and 2) absence of major complication. Participant outcomes are published alongside GTSD overall outcomes and National Inpatient Sample (NIS) outcomes.

-ACSD public reporting online may be found here: <http://publicreporting.sts.org/acsd>

-CHSD public reporting online may be found here: <http://publicreporting.sts.org/chsd>

-GHSD public reporting online may be found here: <http://publicreporting.sts.org/gtsd>

**[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]**

See 4a1.2

**[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]**

STS's combined mortality and morbidity model for pulmonary resection for lung cancer is important and appropriate for public reporting for the following reasons:

- 1.) lung cancer resection is the most common category of surgical procedures that a thoracic surgeon performs;
- 2.) these procedures are therefore useful and appropriate to use as a benchmark for performance by general thoracic surgery programs. By providing surgeons and teams with risk-adjusted results, they can identify how they are performing compared with other programs in the STS General Thoracic Database, which generally includes the top thoracic programs in the nation. This will assist them in focusing performance improvement efforts. Also, when publicly reported, the outcomes for these common procedures provide patients and their families with comparative performance information to aid in selection of a provider;
- 3.) major morbidity is relatively common after lung resection; however, although mortality is rare, it should be captured as well in an outcome measure, thereby identifying ALL adverse events after lung resection;
- 4.) this measure is reported in an easy to understand format which summarizes the results of all participants who were included in the analysis. The participant's score is illustrated graphically in relation to the 25th, 50th and 75th percentiles of the distribution across participants, and is accompanied by the 95% Bayesian credible interval. Surgeons easily grasp this result and the visual display powerfully shows them just where they perform compared

to their peers on a bi-annual basis. In addition, these risk-adjusted results allow surgeons to compare their patients' outcomes with national benchmarks and to initiate QI 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]**

See 4a2.1.1

**[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 general thoracic surgeons from across the U.S. who comprise the STS General Thoracic Surgery Task Force meet periodically to discuss the participant reports and to consider potential enhancements to the GTSD. Additions/clarifications to the data collection form and to the content/format of the participant reports are discussed and implemented as appropriate.

Most recently, STS surgeon members have expressed interest in real-time, online data updates, which has led to the development of dashboard-type reporting on STS.org. The general thoracic dashboard is scheduled for launch in 2018.

Also, general thoracic public reporting was initiated in the summer of 2017 (<http://publicreporting.sts.org/gtsd>), 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]**

See 4a2.2.1

**[Response Ends]**

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

**[Response Begins]**

Given the very recent launch of general thoracic public reporting, the STS has not yet received sufficient feedback from non-participants to be able to assess the impact of the public reporting initiative.

**[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]**

See Specifications section, S.3.2, regarding modification in postoperative complications included in numerator since most recent NQF review of this measure.

**[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]**

Operative mortality in the STS General Thoracic Surgery Database has decreased from 2.2% in the years 2002 to 2008 to 1.4% from 2012 to 2014. These data represent the highest quality lung cancer surgery in the United States. It is important to recognize that a large proportion of the general thoracic surgery in the US is not performed by general thoracic surgeons certified by the American Board of Thoracic Surgery. Results by STS General Thoracic Database participants, who are almost all ABTS certified, are generally superior to those of surgeons performing these procedures who do not participate in the GTSD, and who are often not ABTS certified.

Kozower and colleagues (Ann Thorac Surg 2010) have previously demonstrated that compared with the Nationwide Inpatient Sample database, from 2002 to 2008, patients in the GTSD had lower unadjusted discharge mortality rates, median length of stay, and pulmonary complication rates for lobectomy.

The major morbidity rate has increased from 8.6% to 9.1% during the same time. A potential explanation for this observation is more complete coding of complications by data abstractors as the result of education efforts from STS, as well as inclusion of unexpected return to the operating room for any reason instead of only for bleeding.

Fernandez FG, Kosinski AS, Burfeind W, Park B, DeCamp MM, Seder C, Marshall B, Magee MJ, Wright CD, Kozower BD. The Society of Thoracic Surgeons Lung Cancer Resection Risk Model: Higher Quality Data and Superior Outcomes. Ann Thorac Surg. 2016 Aug;102(2):370-7.

Kozower BD, Sheng S, O'Brien SM, et al. STS database risk models: predictors of mortality and major morbidity for lung cancer resection. Ann Thorac Surg 2010;90:875-83.

**[Response Ends]**

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

**[Response Begins]**

We are not aware of any unexpected findings associated with implementation of this measure.

**[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]

[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]

This measure is related conceptually to the STS Lobectomy for Lung Cancer Composite Score measure, which we are submitting for initial NQF review in the fall 2017 Surgery endorsement cycle. The numerators for both measures include the same list of postoperative complications, but the outcomes for the Lobectomy Composite measure are grouped into two domains (operative mortality and major complications) and the measure is structured to provide general thoracic surgeons with a "star rating." Please also see 5a.2 below.

[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]

Measure #1790 includes a broader range of lung resection procedures than the Lobectomy Composite, and therefore includes a larger number of cases and potentially provides performance data to more general thoracic surgeons. Of the two measures, only the Lobectomy Composite is currently publicly reported.

[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.:

## 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]

[Response Ends]

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

*Describe the members' role in measure development.*

[Response Begins]

Members of the STS Task Force on Quality Initiatives provide surgical 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.

[Response Ends]

**3. Indicate the year the measure was first released.**

[Response Begins]

[Response Ends]

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

[Response Begins]

[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]

[Response Ends]

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

[Response Begins]

[Response Ends]

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

[Response Begins]

[Response Ends]

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

**[Response Begins]**

**[Response Ends]**