

**CBE ID**

3030

**Title**

STS Individual Surgeon Composite Measure for Adult Cardiac Surgery

**Endorsement Status**

Endorsed

**Is Under Review**

No

**Next Maintenance Cycle**

Fall 2026

**Previous Endorsement Cycle**

Fall 2020

**Initial Endorsement**

Wed, 01/25/2017 - 08:37

**Steward**

The Society of Thoracic Surgeons

**1.0 New or Maintenance**

Maintenance

**1.1 Measure Structure**

Composite Measure

**1.3 Electronic Clinical Quality Measure (eCQM)**

No

**1.6 Measure Description**

The STS Individual Surgeon Composite Measure for Adult Cardiac Surgery includes five major procedures (isolated CABG, isolated AVR, AVR+CABG, MVRR, MVRR+CABG) and comprises the following two domains:

**Domain 1 - Risk-Adjusted Operative Mortality**

Operative mortality is defined as death before hospital discharge or within 30 days of the operation.

**Domain 2 - Risk-Adjusted Major Morbidity**

Major morbidity is defined as the occurrence of any one or more of the following major complications:

1. Prolonged ventilation,

2. Deep sternal wound infection,
3. Permanent stroke,
4. Renal failure, and
5. Reoperations for bleeding, coronary graft occlusion, prosthetic or native valve dysfunction, and other cardiac reasons, but not for other non-cardiac reasons.

All measures are based on audited clinical data collected in the STS Adult Cardiac Surgery Database. Individual surgeons with at least 100 eligible cases during the 3-year measurement window will receive a score for each domain and an overall composite score. In addition to calculating composite score point estimates with credible intervals, surgeons will be assigned rating categories designated by the following:

- 1 star - lower-than-expected performance
- 2 stars - as-expected performance
- 3 stars - higher-than-expected performance

## 1.8 Level of Analysis

Clinician: Individual

### 1.14 Numerator

Due to the complex methodology used to construct the composite measure, it is impractical to separately discuss the numerator and denominator. The following discussion describes in detail this multiprocedural, multidimensional composite measure. The STS Individual Surgeon Composite Measure for Adult Cardiac Surgery includes five major procedures, i.e., isolated coronary artery bypass grafting (CABG), isolated aortic valve replacement (AVR), AVR+CABG, isolated mitral valve repair or replacement (MVR), and MVR+CABG, and comprises the following two domains: Domain 1 - Risk-Adjusted Operative Mortality Operative mortality is defined as death before hospital discharge or within 30 days of the operation. Domain 2 - Risk-Adjusted Major Morbidity Major morbidity is defined as the occurrence of any one or more of the following major complications: 1. Prolonged ventilation 2. Deep sternal wound infection 3. Permanent stroke 4. Renal failure and 5. Reoperations for bleeding, coronary graft occlusion, prosthetic or native valve dysfunction, and other cardiac reasons, but not for other non-cardiac reasons Individual surgeons with at least 100 eligible cases during the 3-year measurement window will receive a score for each domain and an overall composite score. In addition to calculating composite score point estimates with credible intervals, surgeons will be assigned rating categories designated by the following: 1 star - lower-than-expected performance 2 stars - as-expected performance 3 stars - higher-than-expected performance Patient Population: The analysis population consists of patients aged 18 years or older who undergo isolated CABG, isolated AVR, AVR+CABG, isolated MVR, and MVR+CABG. Time Window: 3 years By including composite performance scores for a portfolio of five procedures that account for nearly 80% of a typical STS Adult Cardiac Surgery Database participant surgeon's clinical activity, this metric provides a more balanced and comprehensive perspective than focusing on just one procedure or one end point. Recognizing that surgeons' practices vary, each surgeon's composite performance is implicitly "weighted" by the proportion of each type of procedure he or she performs. For instance, the results of surgeons who primarily perform mitral procedures are affected most by their mitral surgery results. This approach is especially relevant for surgeons with highly specialized practices who may do relatively few isolated CABG procedures and whose

performance would thus be difficult to assess using a CABG measure only. Finally, performance on each of these procedures is estimated using risk models specific to those procedures, in most cases the exact or slightly modified versions of previously published models (references provided below).

**Final Composite Score:** The overall composite score was calculated as a weighted sum of (1 minus risk-adjusted mortality rate) and (1 minus risk-adjusted major morbidity rate). Mortality and morbidity rates were weighted inversely by their respective standard deviations across surgeons. This procedure is equivalent to first rescaling mortality and morbidity rates by their respective standard deviations across surgeons and then assigning equal weighting to the rescaled mortality rate and rescaled morbidity rate. Standard deviations derived from the data were used to define the final composite measure as  $0.81 \times (1 \text{ minus risk-standardized mortality rate}) + 0.19 \times (1 \text{ minus risk-standardized complication rate})$ . Details regarding the current STS adult cardiac surgery risk models can be found in the following manuscripts:

- Shahian DM, O'Brien SM, Filardo G, Ferraris VA, et al. The Society of Thoracic Surgeons 2008 cardiac surgery risk models: part 1--coronary artery bypass grafting surgery. *Ann Thorac Surg.* 2009 Jul;88(1 Suppl):S2-22.
- O'Brien SM, Shahian DM, Filardo G, et al. The Society of Thoracic Surgeons 2008 cardiac surgery risk models: part 2—isolated valve surgery. *Ann Thorac Surg* 2009;88(1 Suppl):S23-42.
- Shahian DM, O'Brien SM, Filardo G, Ferraris VA, et al. The Society of Thoracic Surgeons 2008 cardiac surgery risk models: part 3--valve plus coronary artery bypass grafting surgery. *Ann Thorac Surg* 2009 Jul;88(1 Suppl):S43-62.

Additional details regarding the Individual Surgeon Composite Measure for Adult Cardiac Surgery are provided in the attached manuscript: Shahian DM, He X, Jacobs JP, Kurlansky PA, Badhwar V, Cleveland JC Jr, Fazzalari FL, Filardo G, Normand SL, Furnary AP, Magee MJ, Rankin JS, Welke KF, Han J, O'Brien SM. The Society of Thoracic Surgeons Composite Measure of Individual Surgeon Performance for Adult Cardiac Surgery: A Report of The Society of Thoracic Surgeons Quality Measurement Task Force. *Ann Thorac Surg.* 2015;100:1315-25.

### **1.15 Denominator**

See response in S.4. Numerator Statement Patient Population: The analysis population consists of patients aged 18 years or older who undergo isolated CABG, isolated AVR, AVR+CABG, isolated MVRR, and MVRR+CABG.

### **6.1.2 Current or Planned Use(s)**

Public Reporting, Quality Improvement with Benchmarking (external benchmarking to multiple organizations), Quality Improvement (Internal to the specific organization)

### **6.1.3 Current Use(s)**

Quality Improvement with Benchmarking (external benchmarking to multiple organizations), Quality Improvement (Internal to the specific organization)

### **Exclusions**

Measure exclusions: Individual surgeons who do not meet the minimum case requirement (i.e., at least 100 eligible cases during the 3-year measurement window) will not receive a score for each domain and an overall composite score.

### **Planned Use**

Public Reporting, Quality Improvement with Benchmarking (external benchmarking to multiple

organizations)

**Risk Adjustment**

Statistical risk model

**Target Population**

Elderly

**Steward Organization**

The Society of Thoracic Surgeons

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