

NATIONAL QUALITY FORUM

Measure Evaluation 4.1 December 2009

This form contains the measure information submitted by stewards. Blank fields indicate no information was provided. Attachments also may have been submitted and are provided to reviewers. The subcriteria and most of the footnotes from the [evaluation criteria](#) are provided in Word comments within the form and will appear if your cursor is over the highlighted area. Hyperlinks to the evaluation criteria and ratings are provided in each section.

TAP/Workgroup (if utilized): Complete all **yellow highlighted** areas of the form. Evaluate the extent to which each subcriterion is met. Based on your evaluation, summarize the strengths and weaknesses in each section.

Note: *If there is no TAP or workgroup, the SC also evaluates the subcriteria (yellow highlighted areas).*

Steering Committee: Complete all **pink** highlighted areas of the form. Review the workgroup/TAP assessment of the subcriteria, noting any areas of disagreement; then evaluate the extent to which each major criterion is met; and finally, indicate your recommendation for the endorsement. Provide the rationale for your ratings.

Evaluation ratings of the extent to which the criteria are met

C = Completely (unquestionably demonstrated to meet the criterion)

P = Partially (demonstrated to partially meet the criterion)

M = Minimally (addressed BUT demonstrated to only minimally meet the criterion)

N = Not at all (NOT addressed; OR incorrectly addressed; OR demonstrated to NOT meet the criterion)

NA = Not applicable (only an option for a few subcriteria as indicated)

(for NQF staff use) NQF Review #: 0127 NQF Project: Surgery Endorsement Maintenance 2010	
MEASURE DESCRIPTIVE INFORMATION	
De.1 Measure Title: Preoperative Beta Blockade	
De.2 Brief description of measure: Percent of patients aged 18 years and older undergoing isolated CABG who received beta blockers within 24 hours preceding surgery.	
1.1-2 Type of Measure: Process	
De.3 If included in a composite or paired with another measure, please identify composite or paired measure 0696 - The STS CABG Composite Score	
De.4 National Priority Partners Priority Area: Safety	
De.5 IOM Quality Domain: Effectiveness, Safety	
De.6 Consumer Care Need: Getting better	

CONDITIONS FOR CONSIDERATION BY NQF	
Four conditions must be met before proposed measures may be considered and evaluated for suitability as voluntary consensus standards:	NQF Staff
<p>A. The measure is in the public domain or an intellectual property (measure steward agreement) is signed. <i>Public domain only applies to governmental organizations. All non-government organizations must sign a measure steward agreement even if measures are made publicly and freely available.</i></p> <p>A.1 Do you attest that the measure steward holds intellectual property rights to the measure and the right to use aspects of the measure owned by another entity (e.g., risk model, code set)? Yes</p> <p>A.2 Indicate if Proprietary Measure (as defined in measure steward agreement): Proprietary measure</p> <p>A.3 Measure Steward Agreement: Agreement will be signed and submitted prior to or at the time of measure submission</p> <p>A.4 Measure Steward Agreement attached: STS Measure Steward Agreement. Fully Executed-634363186610794134.pdf</p>	<p>A</p> <p>Y <input type="checkbox"/></p> <p>N <input type="checkbox"/></p>

<p>B. The measure owner/steward verifies there is an identified responsible entity and process to maintain and update the measure on a schedule that is commensurate with the rate of clinical innovation, but at least every 3 years. Yes, information provided in contact section</p>	<p>B Y <input type="checkbox"/> N <input type="checkbox"/></p>
<p>C. The intended use of the measure includes <u>both</u> public reporting <u>and</u> quality improvement. ► Purpose: Public Reporting, Quality Improvement (Internal to the specific organization), Quality Improvement with Benchmarking (external benchmarking to multiple organizations)</p>	<p>C Y <input type="checkbox"/> N <input type="checkbox"/></p>
<p>D. The requested measure submission information is complete. Generally, measures should be fully developed and tested so that all the evaluation criteria have been addressed and information needed to evaluate the measure is provided. Measures that have not been tested are only potentially eligible for a time-limited endorsement and in that case, measure owners must verify that testing will be completed within 12 months of endorsement. D.1 Testing: Yes, fully developed and tested D.2 Have NQF-endorsed measures been reviewed to identify if there are similar or related measures? Yes</p>	<p>D Y <input type="checkbox"/> N <input type="checkbox"/></p>
<p>(for NQF staff use) Have all conditions for consideration been met? Staff Notes to Steward (if submission returned):</p>	<p>Met Y <input type="checkbox"/> N <input type="checkbox"/></p>
<p>Staff Notes to Reviewers (issues or questions regarding any criteria):</p>	
<p>Staff Reviewer Name(s):</p>	

<p>TAP/Workgroup Reviewer Name:</p>	
<p>Steering Committee Reviewer Name:</p>	
<p>1. IMPORTANCE TO MEASURE AND REPORT</p>	
<p>Extent to which the specific measure focus is important to making significant gains in health care quality (safety, timeliness, effectiveness, efficiency, equity, patient-centeredness) and improving health outcomes for a specific high impact aspect of healthcare where there is variation in or overall poor performance. Measures must be judged to be important to measure and report in order to be evaluated against the remaining criteria. (evaluation criteria) 1a. High Impact</p>	<p>Eval Rating</p>
<p>(for NQF staff use) Specific NPP goal:</p>	
<p>1a.1 Demonstrated High Impact Aspect of Healthcare: Affects large numbers, Frequently performed procedure, Leading cause of morbidity/mortality, High resource use, Severity of illness, Patient/societal consequences of poor quality 1a.2 1a.3 Summary of Evidence of High Impact: Beneficial pharmacological effects of beta blockers Beta blockers have pleiotropic effects, many of which are likely to reduce the incidence of adverse cardiac events following cardiac surgery {1-4}. These agents reduce sympathetic nervous system activity; they are anti-arrhythmic, and they decrease heart rate, systolic blood pressure, and myocardial contractility. These effects will in turn reduce myocardial oxygen consumption and mitigate supply-demand mismatch, one cause of perioperative ischemia, infarct and death. Beta blockers may reduce shear stress and stabilize vulnerable plaques, another mechanism by which they might reduce the likelihood of infarction, and they may increase the threshold for VF associated with ischemia {5}. Some have postulated that beta blockade may mitigate perioperative inflammatory processes and subsequent rapid progression of coronary plaque, which may explain why several studies have shown a long-term reduction in cardiac events with perioperative beta blockade {4;6;7} beyond the acute postoperative period.</p>	<p>1a C <input type="checkbox"/> P <input type="checkbox"/> M <input type="checkbox"/> N <input type="checkbox"/></p>

Preoperative beta blockade in cardiac surgery

The most compelling justification for preoperative beta blockade use, and its inclusion as a performance measure for cardiac surgery, is its impact on the development of postoperative atrial fibrillation. This common complication occurs in about 22% of patients undergoing isolated CABG surgery by STS Database participants, and it results in increased resource utilization (LOS). The Virginia Cardiac Surgery Quality Initiative (VCSQI) found that atrial fibrillation added an average 10.3% (\$2,744) and 2.2 days length of stay to a typical isolated CABG hospitalization {8}. Postoperative atrial fibrillation increases the risk of stroke {9-11}, an often devastating complication, as well as other thromboembolic complications. It may produce hemodynamic compromise in some patients and at the very least is symptomatically unpleasant. It is a common cause of hospital readmission {12}, and multiple studies show that the development of postoperative atrial fibrillation is an independent predictor of long-term survival following CABG surgery {13-17}.

Meta-analyses have identified almost thirty randomized trials demonstrating a significant reduction in the incidence of atrial fibrillation following cardiac surgery, usually CABG {18-20}. This complication occurs much more frequently following heart surgery than non-cardiac surgery because of features such as pre-existing conduction system disease, sympathetic activation and increased endogenous catecholamines, cannulation, cardiac manipulations, pericardial inflammation, cardiac fluid shifts, cooling and rewarming of the heart, cardioversion, cardioplegia, cardiopulmonary bypass, and the use of inotropic agents. These marked differences from non-cardiac surgery probably explain why the incidence of atrial fibrillation is greater in cardiac surgery, and why non-cardiac patients do not appear to have a reduction in their already low incidence of this complication with beta blockade {19}. These factors are not eliminated even if adequate revascularization is achieved. Because of the substantial reduction in the incidence of atrial fibrillation in almost all cardiac surgery trials, use of these agents for this indication is a longstanding ACCF/AHA Class 1 (A) recommended therapy for patients without complications, and a similar recommendation has been published by the American College of Chest Physicians {21}.

A second rationale for use of preoperative beta blockade in cardiac surgery was demonstrated by Ferguson and colleagues in a 2002 study {22}. This observational study included 629,877 patients in the STS Adult Cardiac Surgery Database between 1996 and 1999. Patients who received beta-blockers had decreased short-term mortality risk using both adjustment for patient risk and center effects (OR, 0.94; 95% CI, 0.91-0.97) and treatment propensity matching (OR, 0.97; 95% CI, 0.93-1.00). However, among patients with ejection fraction less than 30%, preoperative beta blockade was associated with a non-significant trend towards higher mortality (OR, 1.13; 95% CI, 0.96-1.33; P =.23). Interestingly, this study also showed a trend towards reduced stroke rate, which contrasts with findings previously noted for non-cardiac surgery. This is consistent with results from the study of Amory and colleagues {23} and may result from both the anti-arrhythmic effects of these drugs and direct neuroprotective effects. Finally, two smaller observational studies from Belgium and Australia have also demonstrated a reduction in CABG mortality with preoperative beta blockade {24;25}. For all these reasons, beta blockers may be useful to reduce mortality and ischemia in CABG patients with EF > 30%, but not patients with EF < 30%.

Finally, a recent meta-analysis of ten cardiac surgery trials demonstrated an 82% reduction of postoperative VT/VF with the use of beta blockers {19}.

1a.4 Citations for Evidence of High Impact: Reference List

- (1) Poldermans D, Devereaux PJ. The experts debate: perioperative beta-blockade for noncardiac surgery--proven safe or not? *Cleve Clin J Med* 2009 Nov;76 Suppl 4:S84-S92.
- (2) Schouten O, Bax JJ, Dunkelgrun M, Feringa HH, Poldermans D. Pro: Beta-blockers are indicated for patients at risk for cardiac complications undergoing noncardiac surgery. *Anesth Analg* 2007 Jan;104(1):8-10.
- (3) Mangano DT. Perioperative cardiac morbidity. *Anesthesiology* 1990 Jan;72(1):153-84.
- (4) Yeager MP, Fillinger MP, Hettleman BD, Hartman GS. Perioperative beta-blockade and late

- cardiac outcomes: a complementary hypothesis. *J Cardiothorac Vasc Anesth* 2005 Apr;19(2):237-41.
- (5) Poldermans D, Boersma E, Bax JJ, Thomson IR, van d, V, Blankensteijn JD, et al. The effect of bisoprolol on perioperative mortality and myocardial infarction in high-risk patients undergoing vascular surgery. Dutch Echocardiographic Cardiac Risk Evaluation Applying Stress Echocardiography Study Group. *N Engl J Med* 1999 Dec 9;341(24):1789-94.
- (6) Mangano DT, Layug EL, Wallace A, Tateo I. Effect of atenolol on mortality and cardiovascular morbidity after noncardiac surgery. Multicenter Study of Perioperative Ischemia Research Group. *N Engl J Med* 1996 Dec 5;335(23):1713-20.
- (7) Poldermans D, Boersma E, Bax JJ, Thomson IR, Paelinck B, van de Ven LLM, et al. Bisoprolol reduces cardiac death and myocardial infarction in high-risk patients as long as 2 years after successful major vascular surgery. *European Heart Journal* 2001 Aug 1;22(15):1353-8.
- (8) Speir AM, Kasirajan V, Barnett SD, Fonner E Jr. Additive costs of postoperative complications for isolated coronary artery bypass grafting patients in Virginia. *Ann Thorac Surg* 2009 Jul;88(1):40-5.
- (9) D'Agostino RS, Svensson LG, Neumann DJ, Balkhy HH, Williamson WA, Shahian DM. Screening carotid ultrasonography and risk factors for stroke in coronary artery surgery patients. *Ann Thorac Surg* 1996 Dec;62(6):1714-23.
- (10) Likosky DS, Leavitt BJ, Marrin CA, Malenka DJ, Reeves AG, Weintraub RM, et al. Intra- and postoperative predictors of stroke after coronary artery bypass grafting. *Ann Thorac Surg* 2003 Aug;76(2):428-34.
- (11) Stamou SC, Hill PC, Dangas G, Pfister AJ, Boyce SW, Dullum MK, et al. Stroke after coronary artery bypass: incidence, predictors, and clinical outcome. *Stroke* 2001 Jul;32(7):1508-13.
- (12) D'Agostino RS, Jacobson J, Clarkson M, Svensson LG, Williamson C, Shahian DM. Readmission after cardiac operations: prevalence, patterns, and predisposing factors. *J Thorac Cardiovasc Surg* 1999 Nov;118(5):823-32.
- (13) Villareal RP, Hariharan R, Liu BC, Kar B, Lee VV, Elayda M, et al. Postoperative atrial fibrillation and mortality after coronary artery bypass surgery. *J Am Coll Cardiol* 2004 Mar 3;43(5):742-8.
- (14) Mariscalco G, Klersy C, Zanobini M, Banach M, Ferrarese S, Borsani P, et al. Atrial fibrillation after isolated coronary surgery affects late survival. *Circulation* 2008 Oct 14;118(16):1612-8.
- (15) El-Chami MF, Kilgo P, Thourani V, Lattouf OM, Delurgio DB, Guyton RA, et al. New-onset atrial fibrillation predicts long-term mortality after coronary artery bypass graft. *J Am Coll Cardiol* 2010 Mar 30;55(13):1370-6.
- (16) Filardo G, Hamilton C, Hebel RF, Jr., Hamman B, Grayburn P. New-onset postoperative atrial fibrillation after isolated coronary artery bypass graft surgery and long-term survival. *Circ Cardiovasc Qual Outcomes* 2009 May;2(3):164-9.
- (17) Bramer S, van Straten AH, Soliman Hamad MA, Berreklouw E, Martens EJ, Maessen JG. The impact of new-onset postoperative atrial fibrillation on mortality after coronary artery bypass grafting. *Ann Thorac Surg* 2010 Aug;90(2):443-9.
- (18) Crystal E, Connolly SJ, Sleik K, Ginger TJ, Yusuf S. Interventions on prevention of postoperative atrial fibrillation in patients undergoing heart surgery: a meta-analysis. *Circulation* 2002 Jul 2;106(1):75-80.
- (19) Wiesbauer F, Schlager O, Domanovits H, Wildner B, Maurer G, Muellner M, et al. Perioperative beta-blockers for preventing surgery-related mortality and morbidity: a systematic review and meta-analysis. *Anesth Analg* 2007 Jan;104(1):27-41.
- (20) Burgess DC, Kilborn MJ, Keech AC. Interventions for prevention of post-operative atrial fibrillation and its complications after cardiac surgery: a meta-analysis. *European Heart Journal* 2006 Dec 1;27(23):2846-57.
- (21) Bradley D, Creswell LL, Hogue CW, Jr., Epstein AE, Prystowsky EN, Daoud EG. Pharmacologic prophylaxis: American College of Chest Physicians guidelines for the prevention and management of postoperative atrial fibrillation after cardiac surgery. *Chest* 2005 Aug;128(2 Suppl):395-475.
- (22) Ferguson TB, Jr., Coombs LP, Peterson ED. Preoperative beta-blocker use and mortality and morbidity following CABG surgery in North America. *JAMA* 2002 May 1;287(17):2221-7.
- (23) Amory DW, Grigore A, Amory JK, Gerhardt MA, White WD, Smith PK, et al. Neuroprotection is associated with beta-adrenergic receptor antagonists during cardiac surgery: evidence from 2,575 patients. *J Cardiothorac Vasc Anesth* 2002 Jun;16(3):270-7.
- (24) ten Broecke PW, De Hert SG, Mertens E, Adriaensen HF. Effect of preoperative beta-blockade on perioperative mortality in coronary surgery. *Br J Anaesth* 2003 Jan;90(1):27-31.
- (25) Weightman WM, Gibbs NM, Sheminant MR, Whitford EG, Mahon BD, Newman MA. Drug

<p>therapy before coronary artery surgery: nitrates are independent predictors of mortality and beta-adrenergic blockers predict survival. <i>Anesth Analg</i> 1999 Feb;88(2):286-91.</p>	
<p>1b. Opportunity for Improvement</p> <p>1b.1 Benefits (improvements in quality) envisioned by use of this measure: Current median national utilization is only 86.6%, demonstrating an opportunity for improvement</p> <p>1b.2 Summary of data demonstrating performance gap (variation or overall poor performance) across providers: Please see attachment.</p> <p>Measurement Preoperative Beta Blockade</p> <p>N 609</p> <p>Mean 84.8%</p> <p>1st 54.5%</p> <p>5th 64.3%</p> <p>10th 70.0%</p> <p>25th 78.4%</p> <p>Median 86.6%</p> <p>75th 93.3%</p> <p>90th 97.3%</p> <p>95th 98.9%</p> <p>99th 100.0%</p> <p>Outlier 388 (63.7%)</p> <p>High 227</p> <p>Low 161</p> <p>1b.3 Citations for data on performance gap: Dates: January 1, 2009-December 31, 2009</p> <p>Analysis includes 609 STS Adult Cardiac Surgery Database Participants who had at least 100 eligible cases for the measure and reported data to STS for all 12 months.</p> <p>1b.4 Summary of Data on disparities by population group: Please see attachment</p> <p>1b.5 Citations for data on Disparities: Analysis includes STS Adult Cardiac Surgery Database Participants that had more than 50 eligible cases in 2008 and 2009, and reported data for at least 15 months.</p> <p>229822 Patients from 889 Participants were included in the Gender = Male sub-group. 76278 Patients from 635 Participants were included in the Gender = Female sub-group. 12678 Patients from 131 Participants were included in the Race = Black sub-group. 270774 Patients from 882 Participants were included in the Race = White sub-group. 12292 Patients from 116 Participants were included in the Race = Other sub-group. 9068 Patients from 87 Participants were included in the Ethnicity = Hispanic sub-group. 298640 Patients from 895 Participants were included in the Ethnicity = Non-Hispanic sub-group.</p>	<p>1b</p> <p>C <input type="checkbox"/></p> <p>P <input type="checkbox"/></p> <p>M <input type="checkbox"/></p> <p>N <input type="checkbox"/></p>
<p>1c. Outcome or Evidence to Support Measure Focus</p> <p>1c.1 Relationship to Outcomes (<i>For non-outcome measures, briefly describe the relationship to desired outcome. For outcomes, describe why it is relevant to the target population</i>): See section 1a.3</p> <p>1c.2-3. Type of Evidence: Observational study, Randomized controlled trial, Expert opinion, Systematic synthesis of research, Meta-analysis, Other Clinical results from approximately 90% of cardiac surgery centers in the US</p>	<p>1c</p> <p>C <input type="checkbox"/></p> <p>P <input type="checkbox"/></p> <p>M <input type="checkbox"/></p> <p>N <input type="checkbox"/></p>

1c.4 Summary of Evidence (as described in the criteria; for outcomes, summarize any evidence that healthcare services/care processes influence the outcome):

See section 1a.3

1c.5 Rating of strength/quality of evidence (also provide narrative description of the rating and by whom):

Nearly thirty randomized controlled trials showing reduction in cardiac surgery postop AF with periop beta blockade—see section 1a.3

1c.6 Method for rating evidence: ACC/AHA

1c.7 Summary of Controversy/Contradictory Evidence: None in cardiac surgery except for Ferguson et al (patients with EF < 30%)

1c.8 Citations for Evidence (other than guidelines): Reference List

- (1) Poldermans D, Devereaux PJ. The experts debate: perioperative beta-blockade for noncardiac surgery--proven safe or not? *Cleve Clin J Med* 2009 Nov;76 Suppl 4:S84-S92.
- (2) Schouten O, Bax JJ, Dunkelgrun M, Feringa HH, Poldermans D. Pro: Beta-blockers are indicated for patients at risk for cardiac complications undergoing noncardiac surgery. *Anesth Analg* 2007 Jan;104(1):8-10.
- (3) Mangano DT. Perioperative cardiac morbidity. *Anesthesiology* 1990 Jan;72(1):153-84.
- (4) Yeager MP, Fillinger MP, Hettleman BD, Hartman GS. Perioperative beta-blockade and late cardiac outcomes: a complementary hypothesis. *J Cardiothorac Vasc Anesth* 2005 Apr;19(2):237-41.
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- (6) Mangano DT, Layug EL, Wallace A, Tateo I. Effect of atenolol on mortality and cardiovascular morbidity after noncardiac surgery. Multicenter Study of Perioperative Ischemia Research Group. *N Engl J Med* 1996 Dec 5;335(23):1713-20.
- (7) Poldermans D, Boersma E, Bax JJ, Thomson IR, Paelinck B, van de Ven LLM, et al. Bisoprolol reduces cardiac death and myocardial infarction in high-risk patients as long as 2 years after successful major vascular surgery. *European Heart Journal* 2001 Aug 1;22(15):1353-8.
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- (11) Stamou SC, Hill PC, Dangas G, Pfister AJ, Boyce SW, Dullum MK, et al. Stroke after coronary artery bypass: incidence, predictors, and clinical outcome. *Stroke* 2001 Jul;32(7):1508-13.
- (12) D'Agostino RS, Jacobson J, Clarkson M, Svensson LG, Williamson C, Shahian DM. Readmission after cardiac operations: prevalence, patterns, and predisposing factors. *J Thorac Cardiovasc Surg* 1999 Nov;118(5):823-32.
- (13) Villareal RP, Hariharan R, Liu BC, Kar B, Lee VV, Elayda M, et al. Postoperative atrial fibrillation and mortality after coronary artery bypass surgery. *J Am Coll Cardiol* 2004 Mar 3;43(5):742-8.
- (14) Mariscalco G, Klersy C, Zanobini M, Banach M, Ferrarese S, Borsani P, et al. Atrial fibrillation after isolated coronary surgery affects late survival. *Circulation* 2008 Oct 14;118(16):1612-8.
- (15) El-Chami MF, Kilgo P, Thourani V, Lattouf OM, Delurgio DB, Guyton RA, et al. New-onset atrial fibrillation predicts long-term mortality after coronary artery bypass graft. *J Am Coll Cardiol* 2010 Mar 30;55(13):1370-6.
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<p>(17) Bramer S, van Straten AH, Soliman Hamad MA, Berreklouw E, Martens EJ, Maessen JG. The impact of new-onset postoperative atrial fibrillation on mortality after coronary artery bypass grafting. <i>Ann Thorac Surg</i> 2010 Aug;90(2):443-9.</p> <p>(18) Crystal E, Connolly SJ, Sleik K, Ginger TJ, Yusuf S. Interventions on prevention of postoperative atrial fibrillation in patients undergoing heart surgery: a meta-analysis. <i>Circulation</i> 2002 Jul 2;106(1):75-80.</p> <p>(19) Wiesbauer F, Schlager O, Domanovits H, Wildner B, Maurer G, Muellner M, et al. Perioperative beta-blockers for preventing surgery-related mortality and morbidity: a systematic review and meta-analysis. <i>Anesth Analg</i> 2007 Jan;104(1):27-41.</p> <p>(20) Burgess DC, Kilborn MJ, Keech AC. Interventions for prevention of post-operative atrial fibrillation and its complications after cardiac surgery: a meta-analysis. <i>European Heart Journal</i> 2006 Dec 1;27(23):2846-57.</p> <p>(21) Bradley D, Creswell LL, Hogue CW, Jr., Epstein AE, Prystowsky EN, Daoud EG. Pharmacologic prophylaxis: American College of Chest Physicians guidelines for the prevention and management of postoperative atrial fibrillation after cardiac surgery. <i>Chest</i> 2005 Aug;128(2 Suppl):395-475.</p> <p>(22) Ferguson TB, Jr., Coombs LP, Peterson ED. Preoperative beta-blocker use and mortality and morbidity following CABG surgery in North America. <i>JAMA</i> 2002 May 1;287(17):2221-7.</p> <p>(23) Amory DW, Grigore A, Amory JK, Gerhardt MA, White WD, Smith PK, et al. Neuroprotection is associated with beta-adrenergic receptor antagonists during cardiac surgery: evidence from 2,575 patients. <i>J Cardiothorac Vasc Anesth</i> 2002 Jun;16(3):270-7.</p> <p>(24) ten Broecke PW, De Hert SG, Mertens E, Adriaensen HF. Effect of preoperative beta-blockade on perioperative mortality in coronary surgery. <i>Br J Anaesth</i> 2003 Jan;90(1):27-31.</p> <p>(25) Weightman WM, Gibbs NM, Sheminant MR, Whitford EG, Mahon BD, Newman MA. Drug therapy before coronary artery surgery: nitrates are independent predictors of mortality and beta-adrenergic blockers predict survival. <i>Anesth Analg</i> 1999 Feb;88(2):286-91.</p> <p>1c.9 Quote the Specific guideline recommendation (including guideline number and/or page number): ACC/AHA Class I Recommendation for CABG</p> <p>1c.10 Clinical Practice Guideline Citation:</p> <p>1c.11 National Guideline Clearinghouse or other URL:</p> <p>1c.12 Rating of strength of recommendation (also provide narrative description of the rating and by whom): High strength of evidence, high consistency in direction and magnitude</p> <p>1c.13 Method for rating strength of recommendation (If different from USPSTF system, also describe rating and how it relates to USPSTF): ACC/AHA</p> <p>1c.14 Rationale for using this guideline over others:</p>	
<p>TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for <i>Importance to Measure and Report</i>?</p>	<p>1</p>
<p>Steering Committee: Was the threshold criterion, <i>Importance to Measure and Report</i>, met? Rationale:</p>	<p>1 Y <input type="checkbox"/> N <input type="checkbox"/></p>
<p>2. SCIENTIFIC ACCEPTABILITY OF MEASURE PROPERTIES</p>	
<p>Extent to which the measure, <u>as specified</u>, produces consistent (reliable) and credible (valid) results about the quality of care when implemented. (evaluation criteria)</p>	<p>Eval Rating</p>
<p>2a. MEASURE SPECIFICATIONS</p>	

<p>S.1 Do you have a web page where current detailed measure specifications can be obtained? S.2 If yes, provide web page URL:</p> <p>2a. Precisely Specified</p>	<p>2a- specs</p> <p>C <input type="checkbox"/></p> <p>P <input type="checkbox"/></p> <p>M <input type="checkbox"/></p> <p>N <input type="checkbox"/></p>
<p>2a.1 Numerator Statement (<i>Brief, text description of the numerator - what is being measured about the target population, e.g. target condition, event, or outcome</i>): Number of patients undergoing isolated CABG who received beta blockers within 24 hours preceding surgery</p> <p>2a.2 Numerator Time Window (<i>The time period in which cases are eligible for inclusion in the numerator</i>): 24 hours preceding surgery</p> <p>2a.3 Numerator Details (<i>All information required to collect/calculate the numerator, including all codes, logic, and definitions</i>): Number of isolated CABG procedures in which preoperative beta blockers [MedBeta (STS Adult Cardiac Surgery Database Version 2.73, Sequence number 1710)] is marked "yes"</p>	
<p>2a.4 Denominator Statement (<i>Brief, text description of the denominator - target population being measured</i>): All patients undergoing isolated CABG</p> <p>2a.5 Target population gender: Female, Male</p> <p>2a.6 Target population age range: 18 and older</p>	
<p>2a.7 Denominator Time Window (<i>The time period in which cases are eligible for inclusion in the denominator</i>): 12 months</p> <p>2a.8 Denominator Details (<i>All information required to collect/calculate the denominator - the target population being measured - including all codes, logic, and definitions</i>): Number of isolated CABG procedures excluding cases for which preoperative beta blockers were contraindicated.</p> <p>Isolated CABG is determined as a procedure for which all of the following apply (note: full terms for STS field names are provided in brackets []):</p> <ul style="list-style-type: none"> - OpCAB [Coronary Artery Bypass] is marked "Yes" - (VADProc [VAD Implanted or Removed] is marked "No" or "Missing") or (VADProc is marked "Yes, Implanted" and UnplVAD [Unplanned VAD Insertion] is marked "yes") - OCarASDTy [Atrial Septal Defect Repair] is marked "PFO" or "missing" - OCarAFibAProc [Atrial Fibrillation Ablation Procedure] is marked "primarily epicardial" or "missing" <p>and</p> <ul style="list-style-type: none"> - OpValve [Valve Surgery], VSAV [Aortic Valve Procedure], VSAVPr [Aortic Valve Procedure Performed], ResectSubA [Resection of sub-aortic stenosis], VSMV [Mitral Valve Procedure], VSMVPr [Mitral Valve Procedure Performed], OpTricus [Tricuspid Valve Procedure Performed], OpPulm [Pulmonic Valve Procedure Performed], OpONCard [Other Non-Cardiac Procedure], OCarLVA [Left Ventricular Aneurysm Repair], OCarVSD [Ventricular Septal Defect Repair], OCarSVR [Surgical Ventricular Restoration], OCarCong [Congenital Defect Repair], OCarTrma [surgical procedure for an injury due to Cardiac Trauma], OCarCrTx [Cardiac Transplant], OCAoProcType [Aortic Procedure Type], EndoProc [Endovascular Procedure (TEVAR)], OCTumor [resection of an intracardiac tumor], OCPulThromDis [Pulmonary Thromboembolctomy], OCarOthr [other cardiac procedure] are all marked "no" or "missing" 	
<p>2a.9 Denominator Exclusions (<i>Brief text description of exclusions from the target population</i>): Cases are removed from the denominator if preoperative beta blocker was contraindicated.</p>	
<p>2a.10 Denominator Exclusion Details (<i>All information required to collect exclusions to the denominator, including all codes, logic, and definitions</i>): Procedures with preoperative beta blockers [MedBeta (STS Adult Cardiac Surgery Database Version 2.73, Sequence number 1710)] marked as "Contraindicated"</p>	
<p>2a.11 Stratification Details/Variables (<i>All information required to stratify the measure including the</i></p>	

<p>stratification variables, all codes, logic, and definitions): n/a</p>	
<p>2a.12-13 Risk Adjustment Type: No risk adjustment necessary</p>	
<p>2a.14 Risk Adjustment Methodology/Variables (List risk adjustment variables and describe conceptual models, statistical models, or other aspects of model or method): n/a</p>	
<p>2a.15-17 Detailed risk model available Web page URL or attachment:</p>	
<p>2a.18-19 Type of Score: Rate/proportion 2a.20 Interpretation of Score: Better quality = Higher score 2a.21 Calculation Algorithm (Describe the calculation of the measure as a flowchart or series of steps): n/a</p>	
<p>2a.22 Describe the method for discriminating performance (e.g., significance testing): Two-sided 95% binomial confidence intervals; a confidence interval is calculated for each database participant. If the overall STS database result falls within the participant's 95% binomial confidence interval, the participant's performance is considered not significantly different from the overall database result. If the overall STS database result falls to the right of the participant's 95% binomial confidence interval, then the participant's performance is considered significantly lower than the overall database results. If the overall STS database result falls to the left of the participant's 95% binomial confidence interval, then the participant's performance is considered significantly higher than the overall database results.</p>	
<p>2a.23 Sampling (Survey) Methodology If measure is based on a sample (or survey), provide instructions for obtaining the sample, conducting the survey and guidance on minimum sample size (response rate): n/a</p>	
<p>2a.24 Data Source (Check the source(s) for which the measure is specified and tested) Electronic Clinical Data : Registry</p>	
<p>2a.25 Data source/data collection instrument (Identify the specific data source/data collection instrument, e.g. name of database, clinical registry, collection instrument, etc.): STS Adult Cardiac Surgery Database - Version 2.73</p>	
<p>2a.26-28 Data source/data collection instrument reference web page URL or attachment: URL Data Collection Form --- http://www.sts.org/sites/default/files/documents/STSAAdultCVDataCollectionForm2_73_Annotated.pdf</p>	
<p>2a.29-31 Data dictionary/code table web page URL or attachment: URL http://www.sts.org/sites/default/files/documents/STSAAdultCVDataSpecificationsV2_73.pdf</p>	
<p>2a.32-35 Level of Measurement/Analysis (Check the level(s) for which the measure is specified and tested) Clinician : Group/Practice, Clinician : Individual, Facility, Population : Community, Population : County or City, Population : National, Population : Regional, Population : State</p>	
<p>2a.36-37 Care Settings (Check the setting(s) for which the measure is specified and tested) Hospital/Acute Care Facility</p>	
<p>2a.38-41 Clinical Services (Healthcare services being measured, check all that apply) Clinicians: Physicians (MD/DO)</p>	
TESTING/ANALYSIS	
<p>2b. Reliability testing</p> <p>2b.1 Data/sample (description of data/sample and size): STS Adult Cardiac Surgery Database - Compared results between two proximate time periods: January 2008-December 2008 and January 2009-December</p>	<p>2b C <input type="checkbox"/> P <input type="checkbox"/> M <input type="checkbox"/></p>

<p>2009.</p> <p>2b.2 Analytic Method (<i>type of reliability & rationale, method for testing</i>): Compared results between two proximate time periods: January 2008-December 2008 and January 2009-December 2009. Excluded from analysis are participants that did not submit results for both time periods. As database participants can change their underlying care processes at any time, we would not expect perfect correlation between two sets of results from even proximate time periods.</p> <p>2b.3 Testing Results (<i>reliability statistics, assessment of adequacy in the context of norms for the test conducted</i>): Please see attachment</p>	<p>N <input type="checkbox"/></p>
<p>2c. Validity testing</p> <p>2c.1 Data/sample (<i>description of data/sample and size</i>): STS Adult Cardiac Surgery Database</p> <p>Audits conducted in 2010, all cases performed in 2009; N = 40 randomly selected sites participating in the STS Adult Cardiac Surgery Database</p> <p>2c.2 Analytic Method (<i>type of validity & rationale, method for testing</i>): 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. The Iowa Foundation for Medical Care (IFMC), the quality improvement organization for Iowa and Illinois, has conducted audits on behalf of STS since 2006.</p> <p>Each year, the IFMC conducts audits at randomly selected sites throughout the country and tracks the individual agreement rates by variable and by year. More specifically, for each site, agreement rates are calculated for 73 individual elements. In addition, aggregate agreement rates for each element, variable category (e.g., pre-operative risk factors, previous interventions, etc), and overall for all categories are calculated for all sites. While this is not region specific, it is data point specific and comparison agreement rates confirm the improvement over time as well as the consistency.</p> <p>2c.3 Testing Results (<i>statistical results, assessment of adequacy in the context of norms for the test conducted</i>): Pre-operative Beta Blockers: 92.1% agreement rate</p>	<p>2c C <input type="checkbox"/> P <input type="checkbox"/> M <input type="checkbox"/> N <input type="checkbox"/></p>
<p>2d. Exclusions Justified</p> <p>2d.1 Summary of Evidence supporting exclusion(s): There are a number of valid reasons for preoperative beta blockade contraindication. This measure requires that the care providers document the specific reason in the patient chart.</p> <p>2d.2 Citations for Evidence:</p> <p>2d.3 Data/sample (<i>description of data/sample and size</i>): Dates: January 1, 2009-December 31, 2009; 640 STS Adult Cardiac Surgery Database Participants who had at least 100 eligible cases for the measure and reported data to STS for all 12 months. Patients with contraindications to the medication are excluded from this NQF measure.</p> <p>2d.4 Analytic Method (<i>type analysis & rationale</i>):</p> <p>2d.5 Testing Results (<i>e.g., frequency, variability, sensitivity analyses</i>): Please see attachment.</p>	<p>2d C <input type="checkbox"/> P <input type="checkbox"/> M <input type="checkbox"/> N <input type="checkbox"/> NA <input type="checkbox"/></p>
<p>2e. Risk Adjustment for Outcomes/ Resource Use Measures</p> <p>2e.1 Data/sample (<i>description of data/sample and size</i>): n/a</p>	<p>2e C <input type="checkbox"/> P <input type="checkbox"/></p>

<p>2e.2 Analytic Method (<i>type of risk adjustment, analysis, & rationale</i>):</p> <p>2e.3 Testing Results (<i>risk model performance metrics</i>):</p> <p>2e.4 If outcome or resource use measure is not risk adjusted, provide rationale:</p>	<p>M <input type="checkbox"/></p> <p>N <input type="checkbox"/></p> <p>NA <input type="checkbox"/></p>																								
<p>2f. Identification of Meaningful Differences in Performance</p> <p>2f.1 Data/sample from Testing or Current Use (<i>description of data/sample and size</i>): 609 STS Adult Cardiac Surgery Database Participants who had at least 100 eligible cases for the measure and reported data to STS for all 12 months; January 1, 2009-December 31, 2009</p> <p>2f.2 Methods to identify statistically significant and practically/meaningfully differences in performance (<i>type of analysis & rationale</i>): Two-sided 95% binomial confidence intervals; a confidence interval is calculated for each database participant. If the overall STS database result falls within the participant’s 95% binomial confidence interval, the participant’s performance is considered not significantly different from the overall database result. If the overall STS database result falls to the right of the participant’s 95% binomial confidence interval, then the participant’s performance is considered significantly lower than the overall database results. If the overall STS database result falls to the left of the participant’s 95% binomial confidence interval, then the participant’s performance is considered significantly higher than the overall database results.</p> <p>2f.3 Provide Measure Scores from Testing or Current Use (<i>description of scores, e.g., distribution by quartile, mean, median, SD, etc.; identification of statistically significant and meaningfully differences in performance</i>): Please see attachment</p> <p>Results below are from January 1, 2009-December 31, 2009. The sample contains 609 STS Adult Cardiac Surgery Database Participants who had at least 100 eligible cases for the measure and reported data to STS for all 12 months.</p> <table border="0"> <tr> <td>Measurement</td> <td>Preoperative Beta Blockade</td> </tr> <tr> <td>N</td> <td>609</td> </tr> <tr> <td>Mean</td> <td>84.8%</td> </tr> <tr> <td>1st</td> <td>54.5%</td> </tr> <tr> <td>5th</td> <td>64.3%</td> </tr> <tr> <td>10th</td> <td>70.0%</td> </tr> <tr> <td>25th</td> <td>78.4%</td> </tr> <tr> <td>Median</td> <td>86.6%</td> </tr> <tr> <td>75th</td> <td>93.3%</td> </tr> <tr> <td>90th</td> <td>97.3%</td> </tr> <tr> <td>95th</td> <td>98.9%</td> </tr> <tr> <td>99th</td> <td>100.0%</td> </tr> </table> <p>Outlier 388 (63.7%) High 227 Low 161</p> <p>†Represents the number of participants that are outliers according to two-sided 95% binomial confidence interval.</p>	Measurement	Preoperative Beta Blockade	N	609	Mean	84.8%	1st	54.5%	5th	64.3%	10th	70.0%	25th	78.4%	Median	86.6%	75th	93.3%	90th	97.3%	95th	98.9%	99th	100.0%	<p>2f</p> <p>C <input type="checkbox"/></p> <p>P <input type="checkbox"/></p> <p>M <input type="checkbox"/></p> <p>N <input type="checkbox"/></p>
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<p>2g. Comparability of Multiple Data Sources/Methods</p> <p>2g.1 Data/sample (<i>description of data/sample and size</i>): n/a</p>	<p>2g</p> <p>C <input type="checkbox"/></p> <p>P <input type="checkbox"/></p> <p>M <input type="checkbox"/></p>																								

<p>2g.2 Analytic Method (<i>type of analysis & rationale</i>):</p> <p>2g.3 Testing Results (<i>e.g., correlation statistics, comparison of rankings</i>):</p>	<p>N <input type="checkbox"/> NA <input type="checkbox"/></p>
<p>2h. Disparities in Care</p> <p>2h.1 If measure is stratified, provide stratified results (<i>scores by stratified categories/cohorts</i>): n/a</p> <p>2h.2 If disparities have been reported/identified, but measure is not specified to detect disparities, provide follow-up plans:</p>	<p>2h C <input type="checkbox"/> P <input type="checkbox"/> M <input type="checkbox"/> N <input type="checkbox"/> NA <input type="checkbox"/></p>
<p>TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for <i>Scientific Acceptability of Measure Properties</i>?</p>	<p>2</p>
<p>Steering Committee: Overall, to what extent was the criterion, <i>Scientific Acceptability of Measure Properties</i>, met? Rationale:</p>	<p>2 C <input type="checkbox"/> P <input type="checkbox"/> M <input type="checkbox"/> N <input type="checkbox"/></p>
<p>3. USABILITY</p>	
<p>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. (evaluation criteria)</p>	<p>Eval Rating</p>
<p>3a. Meaningful, Understandable, and Useful Information</p> <p>3a.1 Current Use: In use</p> <p>3a.2 Use in a public reporting initiative (disclosure of performance results to the public at large) (<i>If used in a public reporting initiative, provide name of initiative(s), locations, Web page URL(s). If not publicly reported, state the plans to achieve public reporting within 3 years</i>): This measure is one of eleven component measures of the STS CABG Composite Score. Composite star ratings are presented on the STS website, www.sts.org/publicreporting and in the health section of the Consumers Union website, www.ConsumerReportsHealth.org. There are approximately 330 STS Adult Cardiac Surgery Database Participants who voluntarily participate in the Consumer’s Union public reporting initiative. In addition, approximately 352 STS Adult Cardiac Surgery Database Participants voluntarily take part in STS Public Reporting Online.</p> <p>3a.3 If used in other programs/initiatives (<i>If used in quality improvement or other programs/initiatives, name of initiative(s), locations, Web page URL(s). If not used for QI, state the plans to achieve use for QI within 3 years</i>): CMS Physician Quality Reporting Initiative (PQRI), www.cms.hhs.gov/pqri</p> <p>Testing of Interpretability (<i>Testing that demonstrates the results are understood by the potential users for public reporting and quality improvement</i>)</p> <p>3a.4 Data/sample (<i>description of data/sample and size</i>): See 3a.6 below</p> <p>3a.5 Methods (<i>e.g., focus group, survey, QI project</i>):</p> <p>3a.6 Results (<i>qualitative and/or quantitative results and conclusions</i>): Please see attachment</p>	<p>3a C <input type="checkbox"/> P <input type="checkbox"/> M <input type="checkbox"/> N <input type="checkbox"/></p>
<p>3b/3c. Relation to other NQF-endorsed measures</p> <p>3b.1 NQF # and Title of similar or related measures:</p>	

<p>(for NQF staff use) Notes on similar/related endorsed or submitted measures:</p>	
<p>3b. Harmonization If this measure is related to measure(s) already endorsed by NQF (e.g., same topic, but different target population/setting/data source <u>or</u> different topic but same target population): 3b.2 Are the measure specifications harmonized? If not, why? N/A; however, data definitions and key elements have been established by a multi-societal writing committee called the “ACCF/AHA Writing Committee to Develop Acute Coronary Syndromes and Coronary Artery Disease Clinical Data Standards” with representatives from each of the following organizations:</p> <p>Agency for Healthcare Research and Quality American College of Cardiology American College of Chest Physicians American College of Emergency Physicians American College of Physicians American College of Preventative Medicine American Heart Association American Medical Association Centers for Disease Control and Prevention Emergency Nurses Association Food and Drug Administration Joint Commission on Accreditation of Healthcare Organizations National Association of Emergency Medical Technicians National Association of EMS Physicians National Heart, Lung, and Blood Institute Preventive Cardiovascular Nurses Association Society for Academic Emergency Medicine Society of Chest Pain Centers and Providers Society of General Internal Medicine Society of Thoracic Surgeons</p>	<p>3b C <input type="checkbox"/> P <input type="checkbox"/> M <input type="checkbox"/> N <input type="checkbox"/> NA <input type="checkbox"/></p>
<p>3c. Distinctive or Additive Value 3c.1 Describe the distinctive, improved, or additive value this measure provides to existing NQF-endorsed measures: n/a</p> <p>5.1 If this measure is similar to measure(s) already endorsed by NQF (i.e., on the same topic and the same target population), Describe why it is a more valid or efficient way to measure quality: n/a</p>	<p>3c C <input type="checkbox"/> P <input type="checkbox"/> M <input type="checkbox"/> N <input type="checkbox"/> NA <input type="checkbox"/></p>
<p>TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for <i>Usability</i>?</p>	<p>3</p>
<p>Steering Committee: Overall, to what extent was the criterion, <i>Usability</i>, met? Rationale:</p>	<p>3 C <input type="checkbox"/> P <input type="checkbox"/> M <input type="checkbox"/> N <input type="checkbox"/></p>
<p>4. FEASIBILITY</p>	
<p>Extent to which the required data are readily available, retrievable without undue burden, and can be implemented for performance measurement. (evaluation criteria)</p>	<p>Eval Rating</p>
<p>4a. Data Generated as a Byproduct of Care Processes</p> <p>4a.1-2 How are the data elements that are needed to compute measure scores generated? Data generated as byproduct of care processes during care delivery (Data are generated and used by healthcare personnel during the provision of care, e.g., blood pressure, lab value, medical condition), Coding/abstraction performed by someone other than person obtaining original information (E.g., DRG, ICD-9 codes on claims, chart abstraction for quality measure or registry)</p>	<p>4a C <input type="checkbox"/> P <input type="checkbox"/> M <input type="checkbox"/> N <input type="checkbox"/></p>

<p>4b. Electronic Sources</p> <p>4b.1 Are all the data elements available electronically? (<i>elements that are needed to compute measure scores are in defined, computer-readable fields, e.g., electronic health record, electronic claims</i>) Yes</p> <p>4b.2 If not, specify the near-term path to achieve electronic capture by most providers.</p>	<p>4b C <input type="checkbox"/> P <input type="checkbox"/> M <input type="checkbox"/> N <input type="checkbox"/></p>
<p>4c. Exclusions</p> <p>4c.1 Do the specified exclusions require additional data sources beyond what is required for the numerator and denominator specifications? No</p> <p>4c.2 If yes, provide justification.</p>	<p>4c C <input type="checkbox"/> P <input type="checkbox"/> M <input type="checkbox"/> N <input type="checkbox"/> NA <input type="checkbox"/></p>
<p>4d. Susceptibility to Inaccuracies, Errors, or Unintended Consequences</p> <p>4d.1 Identify susceptibility to inaccuracies, errors, or unintended consequences of the measure and describe how these potential problems could be audited. If audited, provide results. This measure may be susceptible to human error (i.e., recording the measure inaccurately or not at all). When data collection on this measure is done through participation in the STS Adult Cardiac Surgery Database, an auditing strategy is in place. Both STS and the Duke Clinical Research Institute have a list of database participants making participation in the STS Adult Cardiac Surgery Database easy to track. Each participant is responsible for the quality and accuracy of the data they submit to the database. The participant agrees to the following quality control measures in the participation agreement: i) Participant hereby warrants that all data submitted for inclusion in the STS National Database will be accurate and complete, and acknowledges that such data may be subject to independent audit. Participant will use its best efforts to address any data or related deficiencies identified by the independent data warehouse service provider and agrees to cooperate with and assist STS and its designees in connection with the performance of any independent audit. ii) Participant warrants that it will take all reasonable steps to avoid the submission of duplicative data for inclusion in the STS National Database, including but not limited to apprising the Director of the STS National Database and the independent data warehouse service provider about any other Participation Agreements in which an individual cardiothoracic surgeon named above or on Schedule A attached hereto (as amended from time to time) is also named. STS audited for these potential problems during testing. Please see IFMC audit results.</p>	<p>4d C <input type="checkbox"/> P <input type="checkbox"/> M <input type="checkbox"/> N <input type="checkbox"/></p>
<p>4e. Data Collection Strategy/Implementation</p> <p>4e.1 Describe what you have learned/modified as a result of testing and/or operational use of the measure regarding data collection, availability of data/missing data, timing/frequency of data collection, patient confidentiality, time/cost of data collection, other feasibility/ implementation issues:</p> <p>4e.2 Costs to implement the measure (<i>costs of data collection, fees associated with proprietary measures</i>): Data Collection: There are no direct costs to collect the data for this measure. Costs to develop the measure included volunteer cardiothoracic time, STS staff time, and DCRI statistician and project management time.</p>	<p>4e C <input type="checkbox"/> P <input type="checkbox"/> M <input type="checkbox"/> N <input type="checkbox"/></p>

<p>Other fees: STS Adult Cardiac Surgery Database participants (single cardiothoracic surgeons or a group of surgeons) pay annual participant fees of \$2,950 or \$3,700, depending on whether participants are STS members (or whether the majority of surgeons in a group are STS members). As a benefit of STS membership, STS members are charged the lesser of the two fees.</p> <p>4e.3 Evidence for costs:</p> <p>4e.4 Business case documentation:</p>	
<p>TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for <i>Feasibility</i>?</p>	<p>4</p>
<p>Steering Committee: Overall, to what extent was the criterion, <i>Feasibility</i>, met? Rationale:</p>	<p>4 C <input type="checkbox"/> P <input type="checkbox"/> M <input type="checkbox"/> N <input type="checkbox"/></p>
<p>RECOMMENDATION</p>	
<p><i>(for NQF staff use)</i> Check if measure is untested and only eligible for time-limited endorsement.</p>	<p>Time-limited <input type="checkbox"/></p>
<p>Steering Committee: Do you recommend for endorsement? Comments:</p>	<p>Y <input type="checkbox"/> N <input type="checkbox"/> A <input type="checkbox"/></p>
<p>CONTACT INFORMATION</p>	
<p>Co.1 Measure Steward (Intellectual Property Owner) Co.1 <u>Organization</u> Society of Thoracic Surgeons, 633 North Saint Clair Street, Suite 2320, Chicago, Illinois, 60611</p> <p>Co.2 <u>Point of Contact</u> Jane, Han, MSW, jhan@sts.org, 312-202-5856-</p>	
<p>Measure Developer If different from Measure Steward Co.3 <u>Organization</u> Society of Thoracic Surgeons, 633 North Saint Clair Street, Suite 2320, Chicago, Illinois, 60611</p> <p>Co.4 <u>Point of Contact</u> Jane, Han, MSW, jhan@sts.org, 312-202-5856-</p>	
<p>Co.5 Submitter If different from Measure Steward POC Jane, Han, MSW, jhan@sts.org, 312-202-5856-, Society of Thoracic Surgeons</p>	
<p>Co.6 Additional organizations that sponsored/participated in measure development</p>	
<p>ADDITIONAL INFORMATION</p>	
<p>Workgroup/Expert Panel involved in measure development Ad.1 Provide a list of sponsoring organizations and workgroup/panel members' names and organizations. Describe the members' role in measure development. 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.</p>	
<p>Ad.2 If adapted, provide name of original measure: Ad.3-5 If adapted, provide original specifications URL or attachment</p>	
<p>Measure Developer/Steward Updates and Ongoing Maintenance</p>	

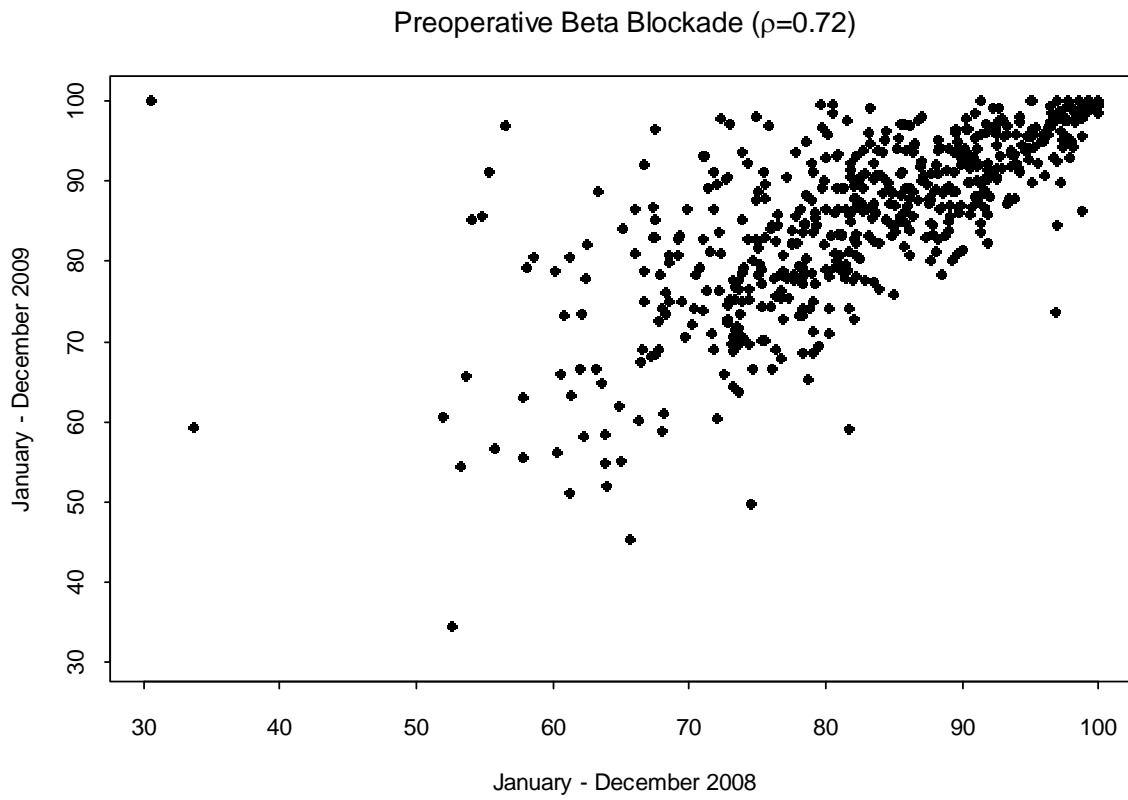
<p>Ad.6 Year the measure was first released: 2004 Ad.7 Month and Year of most recent revision: 01, 2011 Ad.8 What is your frequency for review/update of this measure? annually Ad.9 When is the next scheduled review/update for this measure? 2012</p>
<p>Ad.10 Copyright statement:</p>
<p>Ad.11 Disclaimers:</p>
<p>Ad.12 -14 Additional Information web page URL or attachment: Attachment 0127 Sections 1b.2, 1b.4, 2b.3, 2d.5, 2f.3, 3a.6.pdf</p>
<p>Date of Submission (MM/DD/YY): 10/28/2010</p>

1b.2. Summary of Measure Results Demonstrating Performance Gap (*Descriptive statistics for performance results for this measure - distribution of scores for measured entities by quartile/decile, mean, median, SD, min, max, etc.*)

<i>Measurement</i>	<i>Preoperative Beta Blockade</i>
N	609
Mean	84.8%
1 st	54.5%
5 th	64.3%
10 th	70.0%
25 th	78.4%
Median	86.6%
75 th	93.3%
90 th	97.3%
95 th	98.9%
99 th	100.0%
Outlier	388 (63.7%)
High	227
Low	161

2b.3. Testing Results (*Reliability statistics, assessment of adequacy in the context of norms for the test conducted*)

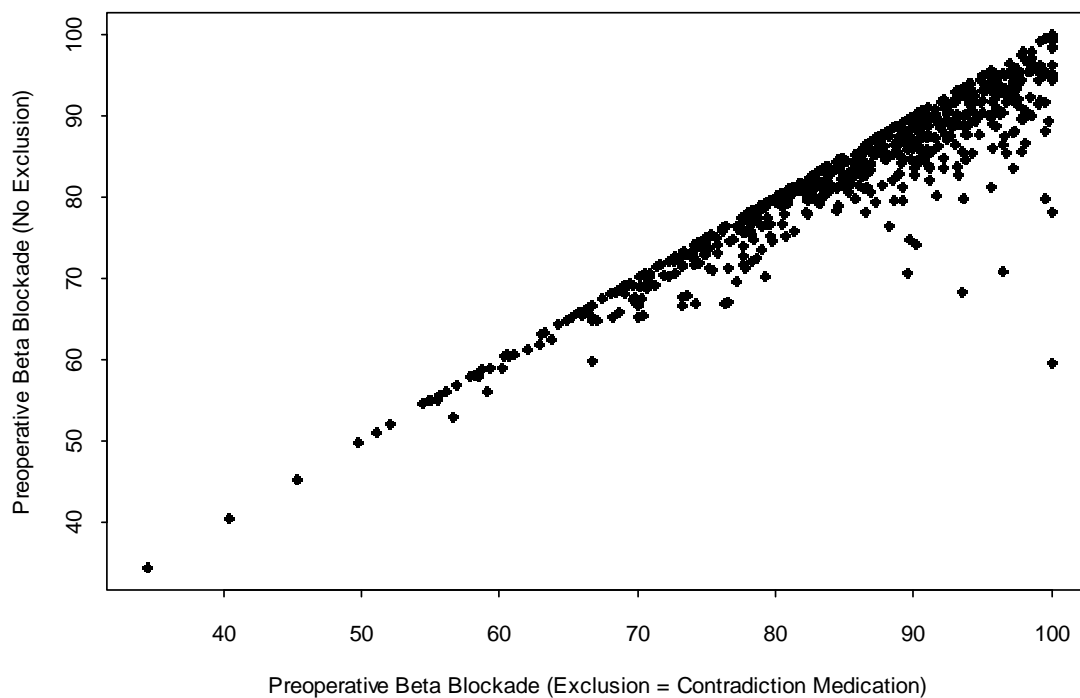
Testing results: $\rho = 0.72$



2d.5. Testing Results (E.g., frequency, variability, sensitivity analyses)

<i>Preoperative Beta Blockade</i>	
# of Patients	144,060
# excluded	5,256
% excluded	3.65

Preoperative Beta Blockade ($\rho=0.92$)



2f.3. Measure Scores from Testing or Current Use (*Description of scores, e.g., distribution by quartile, mean, median, SD, etc.; identification of statistically significant and meaningful differences in performance*)

Results below are from January 1, 2009-December 31, 2009. The sample contains 609 STS Adult Cardiac Surgery Database Participants who had at least 100 eligible cases for the measure and reported data to STS for all 12 months.

<i>Measurement</i>	<i>Preoperative Beta Blockade</i>
N	609
Mean	84.8%
1 st	54.5%
5 th	64.3%
10 th	70.0%
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Median	86.6%
75 th	93.3%
90 th	97.3%
95 th	98.9%
99 th	100.0%
Outlier	388 (63.7%)
High	227
Low	161

†Represents the number of participants that are outliers according to two-sided 95% binomial confidence interval.

3a.6. Results (Qualitative or quantitative results and conclusions)

Although formal testing of interpretability has not been performed, this measure has been used and reported for STS Adult Cardiac Surgery database participants since 2007. Current report presentation and interpretation manuals are presented below. These materials are updated as needed based upon feedback from database participants.

1) Report Overview and Interpretation Manual:

The NQF Measures Report

a. Organization

This report section is separated into three areas corresponding to: 1) NQF volume measures, 2) NQF process measures, and 3) NQF outcomes measures, in that order. The header at the top of each page references the report section for that page. Each NQF measure is presented on a single row in the section. Tabular data are on the left-hand side of each page and a standard graphic representation is shown on the right-hand side.

b. Statistical Calculation and Details – NQF Measures

Time period: This report section contains information on the individual STS participant and overall STS performance for the most recent 12 months for volume, process and CABG outcomes measures and the most recent 60 months for Valve and Valve + CABG outcomes. The 5 years (60 months) of performance for outcomes involving Valve procedures is necessary due to smaller sample sizes.

Volume Measures: The NQF report provides average annual case volumes data for three surgery categories: i) Isolated CABG, ii) Valve without CABG, and iii) combined CABG + Valve. Definitions of the three surgery categories are provided in Table 2 of this NQF Report Overview. For each type of surgery, the participant's annualized volume is calculated as:

$$\text{Participant Annualized Volume} = 12 \times (\# \text{ of surgeries}) / (\# \text{ of months})$$

where (# of surgeries) denotes the number of surgeries of the specified type performed by the participant during the specified time period, and (# of months) is the number of months during the specified time period for which the participant submitted at least one cardiac surgery of any type. The intent of calculating “annualized” volumes is to adjust for participants who participated in the database for fewer months than the time period specified. For participants who participated in the database and submitted cases every month during 2006, the annualized volume for 2006 is simply the total number of cases.

The STS Average Annualized Volume is the average value of all of the participant annualized volumes across the entire population of STS participants. The Participant Percentile indicates the percent of STS participants whose annualized volumes are less than, or equal to, your own. Higher percentiles indicate higher volumes in relation to other STS participant sites. The Distribution of Participant Values shows the range and percentiles of the distribution of participant annualized volumes across all database participants. For example, 90% of participants have annualized volumes less than or equal to the value marked “90th percentile.” Confidence intervals are not provided for volume measures, as volume is known with certainty and is not estimated.

Process Measures: The NQF process measures provide data on the frequency of usage of five therapies among subsets of Isolated CABG patients. The therapies are: i) preoperative beta blockade therapy, ii) use of IMA, iii) discharge anti-platelet medication, iv) discharge beta blockade therapy, and v) discharge anti-lipid medication. The patient population for each measure differs, in accordance with the NQF specifications (see Table 2 of this NQF Report Overview for details). The number of Eligible

Procedures is the number of cases performed by the participant during the specified time period who meet the eligibility requirements to be included in the calculations when summarizing the participant's data. ***Beginning with the 2008 Harvest 3 report (covering the procedure time period through 6/30/2008), STS implementation of NQF medication process measures using data version 2.61 excludes records for which the medication was contraindicated/not indicated from the eligible population.*** The main summary statistic, Participant Usage, is the percent of eligible Isolated CABG cases during the specified time period for which the patient received the specified therapy. The Overall STS Usage is the percent of all eligible patients in the entire STS population during the specified time period who received the specified therapy. ***In calculating these percentages, missing data are treated as a "No", emphasizing the importance of having complete data in these fields.***

The Participant Percentile indicates the percent of STS participants who applied the therapy in their respective populations less frequently than or as frequently as did your institution. The Distribution of Participant Values shows the range and percentiles of the distribution of participant usage across all participants in the database. For example, 90% of participants use the therapy less frequently than the amount indicated by the "90th percentile". A bar identified as "Participant" indicates the point estimate and limits of a 95% Confidence Interval (CI) for the participant's usage of therapy. The underlying parameter being estimated is the long-run usage rate that would be observed in a large sample of patients. The 95% CI indicates the range of usage rates that are consistent with the data in light of sampling variability.

Outcomes Measures: The NQF outcomes data provide risk-adjusted analyses of mortality and morbidity for Isolated CABG surgery as well as risk-adjusted operative mortality for Isolated AVR, Isolated MVR, AVR+CABG, and MVR+CABG. The main summary statistic provided is the Participant's Estimated Odds Ratio (OR) based on a hierarchical logistic regression analysis. The OR measures the impact that a participant's performance level has on a patient's probability of experiencing an adverse outcome. The interpretation is similar to that of an O/E ratio (see the Risk-Adjusted Results: Overview portion of the General Report Overview for details on STS risk adjustment). An OR greater than 1.0 implies that the participant increases a patient's risk of experiencing the outcome, relative to an "average" STS participant. An OR less than 1.0 implies that the participant decreases a patient's risk of experiencing the outcome, relative to an "average" STS participant. Each measure is calculated among patients undergoing surgery of the type specified during the time period specified who additionally meet certain eligibility requirements. The column labeled Eligible Procedures indicates the number of patients who met the inclusion criteria to be included in the analysis for the indicated measure. The Participant Percentile is the percent of STS participants who have an estimated OR that is greater than or equal to your estimated OR. Note that this is different than performance percentiles for process measures, where the percentile indicates the percentage of STS participants with performance that is *less than* the specified number. This simply reflects the fact that high process compliance is desirable, whereas a high OR is undesirable.

The Observed Participant Rate is the percent of eligible patients who experienced the specified outcome. Unlike the participant estimated OR, the observed participant rate is not risk-adjusted. The estimated OR is the main summary statistic for summarizing the NQF measure in this report.

The Distribution of Participant Values shows the range and percentiles of the distribution of estimated Odds Ratios across all STS participants. For example, 90% of STS participants have an OR greater than the value indicated by the "90th percentile." The line that extends to the left and right of the Participant Value indicates the lower and upper limits of a 95% Confidence Interval (CI) surrounding the participant's estimated OR.

c. Technical Notes

Calculation of Percentiles for the Distribution of Participant Values: The graph provided for each measure contains information about the distribution of the value of the measure across all STS

participants, namely the minimum, maximum, 10th percentile, 50th percentile, and 90th percentile. The “Xth” percentile, denoted P_x , is loosely defined as the number having the property that X% of the participant values are less than P_x , and (100 – X)% of the participant values are greater than P_x . **For process measures, participants with greater than 5% missing data were excluded when calculating percentiles of the STS distribution and do not have a calculated participant percentile.** For participants having less than 5% missing data on a process measure, the missing values on the process measure were converted to “No” before calculating percentiles. For outcomes measures, all participants submitting at least one eligible case were included when calculating percentiles of the STS distribution. Missing data on outcomes variables were treated as “No.”

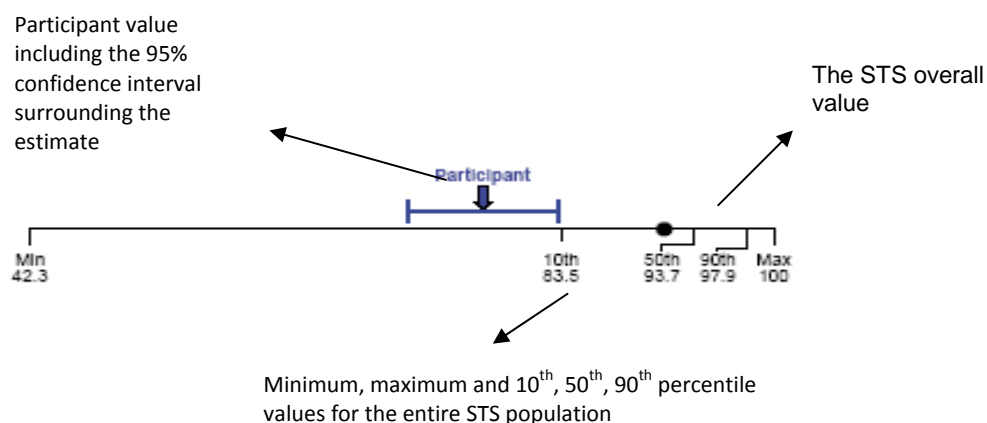
NQF/STS Results Comparison: Participants may see some differences between summaries of their data provided in the NQF section of the report and summaries of their data reported elsewhere in the STS report. These differences are due to subtle variations in variable definitions, patient inclusion and exclusion criteria, and rules for handling missing data in the NQF section versus the rest of the report. Definitions used in the NQF report were designed to match current NQF specifications as closely as possible. It is expected that these differences will eventually disappear as the NQF measures are refined. Some important differences are:

Case Volumes – The NQF report section presents “annualized” volumes. These are case volumes that have been adjusted for the number of months that a participant was an active contributor to the database. Elsewhere in the STS report, total case volumes are presented without adjustment for the length of participation.

Eligible Cases - The NQF report also presents the number of “eligible cases” for each measure. Separate inclusion criteria are applied to each measure, and these inclusion criteria do not always match the definitions used elsewhere in the STS report. Please refer to the footnotes in each section for specific details.

Interpretation Manual

In addition to the statistics provided for each of the STS Composite Quality Domains and NQF measures, a figure representing the distribution of values for the entire STS population is provided.



The figure allows participants to quickly judge their performance relative to the overall STS. The scale of the figure is set up such that the right side of the distribution represents the most favorable performance and the left side represents the least favorable performance (Note that in some cases smaller numbers will be on the left; in other instances, smaller numbers will be on the right. For example, for the Pre-operative Beta Blockade Therapy measure, the far left side of the distribution will contain the *lowest* percentage Beta Blockade Therapy for an STS participant – this corresponds to least

favorable performance. Alternatively, for the Operative Mortality Measure, the far left side of the distribution will contain the *highest* Estimated Odds Ratio – this also corresponds to least favorable performance). If a participant’s value for a given measure is to the left of the STS overall value, the participant is performing worse on that measure than the overall STS. Conversely, if the participant’s value for a given measure is located to the right of the overall STS value, the participant is performing better than the overall STS.

NOTE! Care should be given to reading these figures. In some instances, the various percentiles presented cluster very close together in the data. In such cases, the label for the percentile is not necessarily located immediately at the point on the distribution where the percentile occurs. An example of this is apparent in the figure above: The 50th percentile corresponds to a value of 93.7 and looks to align fairly closely with the STS overall value as represented by the large black dot. However, the expandable figure marking actually points to a place somewhere to the right of the STS overall value for the 50th percentile marking. So the STS overall value would be some amount less than 93.7.

Also, please note that in some cases, small sample sizes preclude valid comparisons between the participant and the STS overall. Such instances are clearly noted in the report output.

a. NQF Measures Interpretation Example

Sample CABG Operative Mortality results – tabular and figure representation.

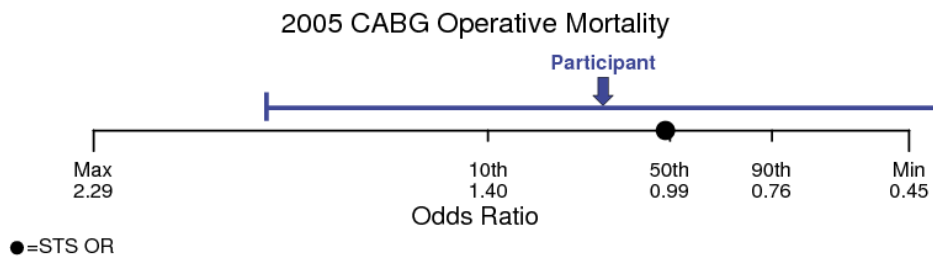
NQF Measure	Eligible Procedures	Participant Estimated OR	Participant Percentile	Participant Observed Rate
2005 CABG Operative Mortality	74	1.14	26.3	5.4%

Eligible Procedures: 74 patients met the inclusion criteria for the indicated measure.

Participant Estimated OR (Odds Ratio): The main summary statistic measuring the impact that a participant’s performance has on a patient’s probability of experiencing an adverse outcome has a value of 1.14 indicating worse than expected performance.

Participant Percentile: 26.3% of STS participants had an estimated OR greater than or equal to your estimated OR. In other words, 26.3% had the same or worse performance.

Participant Observed Rate: 5.4% of the 74 eligible patients experienced the specified outcome.



The highest OR among all STS participants = 2.29
 The lowest OR among all STS participants = 0.45
 The STS average OR is 1.00

The 95% confidence interval for the participant's OR spans from <0.45 to ~1.90

2) Sample page from section of the report that contains NQF measure results:



**NQF Measures
Process Measures
Participant 99999
STS Period Ending 12/31/2008**



NQF Measure	Eligible Procedures	Participant Usage (95% CI)	Participant Percentile	Overall STS Usage	Distribution of Participant Values ● = Overall STS Usage
Jan 2008 - Dec 2008 Preoperative Beta Blockade Therapy ¹	541	89.3% (86.4 , 91.8)	69.9	82.1%	
Jan 2008 - Dec 2008 Use of IMA ²	536	96.5% (94.5 , 97.9)	63.3	94.2%	
Jan 2008 - Dec 2008 Discharge Anti-Platelet Medication ³	536	98.7% (97.3 , 99.5)	68.7	96.1%	
Jan 2008 - Dec 2008 Discharge Beta Blockade Therapy ⁴	538	96.1% (94.1 , 97.6)	53.4	93.7%	
Jan 2008 - Dec 2008 Discharge Anti-Lipid Treatment ⁴	535	91.8% (89.1 , 94.0)	40.7	91.4%	

¹Excludes v2.61 contraindicated / not indicated records.

²Excludes patients with prior CABG surgery

³Anti-platelet use includes Aspirin and ADP Inhibitors, and excludes in-hospital mortalities. Excludes v2.61 contraindicated / not indicated records.

⁴Excludes in-hospital mortalities. Excludes v2.61 contraindicated / not indicated records.