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 #:** 0117 **NQF Project:** Surgery Endorsement Maintenance 2010
MEASURE DESCRIPTIVE INFORMATION
De.1 **Measure Title:** Beta Blockade at Discharge
De.2 **Brief description of measure:** Percent of patients aged 18 years and older undergoing isolated CABG who were discharged on beta blockers
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** OT1-013-09 – The STS CABG Composite Score
De.4 **National Priority Partners Priority Area:** Safety De.5 **IOM Quality Domain:** 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**
A. The measure is in the public domain or an intellectual property (measure steward agreement) is signed. *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.* 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 A.2 **Indicate if Proprietary Measure** (*as defined in measure steward agreement*)**:** A.3 **Measure Steward Agreement:** Agreement will be signed and submitted prior to or at the time of measure submission A.4 **Measure Steward Agreement attached:** STS Measure Steward Agreement. Fully Executed-634268013730650374.pdf	**A** Y☐ N☐

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	**B** Y☐ N☐
C. The intended use of the measure includes both public reporting and quality improvement. ►**Purpose:** Public reporting, Internal quality improvement	**C** Y☐ N☐
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	**D** Y☐ N☐
(for NQF staff use) **Have all conditions for consideration been met?** **Staff Notes to Steward** (*if submission returned*)**:**	**Met** Y☐ N☐
Staff Notes to Reviewers (*issues or questions regarding any criteria*)**:**	
Staff Reviewer Name(s):	

TAP/Workgroup Reviewer Name:	
Steering Committee Reviewer Name:	
1. IMPORTANCE TO MEASURE AND REPORT	
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**	**Eval Rating**
(for NQF staff use) **Specific NPP goal**:	
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:** The use of post-operative b-blockers is now known to protect patients both at one year and long term (greater than 5 years) from death following cardiac surgery. This effect is associated with a 46 % risk reduction in death at one -year and 35% risk reduction in mortality during long-term follow-up (see Chan below). 1a.4 **Citations for Evidence of High Impact:** - Crystal E, Connolly SJ, Sleik K, et al. Interventions on prevention of postoperative atrial fibrillation in patients undergoing heart surgery: a meta-analysis. Circulation. 2002;106(1):75-80. - Kim MH, Deeb GM, Morady F, et al. Effect of postoperative atrial fibrillation on length of stay after cardiac surgery (The Postoperative Atrial Fibrillation in Cardiac Surgery study [PACS(2)]). Am J Cardiol. 2001;87(7):881-885. - Maisel WH, Rawn JD, Stevenson WG. Atrial fibrillation after cardiac surgery. Ann Intern Med. 2001;135(12):1061-1073. - Villareal RP, Hariharan R, Liu BC, et al. Postoperative atrial fibrillation and mortality after coronary artery bypass surgery. J Am Coll Cardiol. 2004;43(5):742-748.	**1a** C☐ P☐ M☐ N☐

- Welke KF, Ferguson TB, Coombs LP, et al. Validity of the Society of Thoracic Surgeons National Adult Cardiac Surgery Database. Ann Thorac Surg. 2004;77:1137-1139.
- Charlson ME, Isom OW. Care after coronary-artery bypass surgey. N Engl J Med. 2003;348:1456-63.
- Chen J, Radford MJ, Wang Y, Marciniak TA, Krumholz HM. Are beta-blockers effective in elderly patients who undergo coronary revascularization after acute myocardial infarction? Arch Intern Med. 2000;160:947-52.
- Chan AYM, McAlister FA, Norris, CM, et al. Effect of B-Blocker use on outcomes after discharge in patients who underwent cardiac surgery. J Thorac Cardiovasc Surg. 2010;140:182-7.

1b. Opportunity for Improvement

1b.1 Benefits (improvements in quality) envisioned by use of this measure: The use of post-operative b-blockers is now known to protect patients both at one year and long term (greater than 5 years) from death following cardiac surgery. This effect is associated with a 46 % risk reduction in death at one -year and 35% risk reduction in mortality during long-term follow-up (see Chan above).

1b.2 Summary of data demonstrating performance gap (variation or overall poor performance) across providers:
Please see attachment and below

Measurement	Beta Blockade at Discharge
N	605
Mean	95.1%
1st	69.5%
5th	84.2%
10th	88.3%
25th	93.4%
Median	96.9%
75th	98.9%
90th	100.0%
95th	100.0%
99th	100.0%
Outlier	303 (50.1%)
High	190
Low	113

1b.3 Citations for data on performance gap:
Dates: January 1, 2009-December 31, 2009

Analysis includes 605 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.

1b.4 Summary of Data on disparities by population group:
please see attachment

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.

227560 Patients from 887 Participants were included in the Gender = Male sub-group.
73887 Patients from 626 Participants were included in the Gender = Female sub-group.
12229 Patients from 127 Participants were included in the Race = Black sub-group.
267078 Patients from 877 Participants were included in the Race = White sub-group.
12036 Patients from 114 Participants were included in the Race = Other sub-group.
8926 Patients from 86 Participants were included in the Ethnicity = Hispanic sub-group.
294662 Patients from 893 Participants were included in the Ethnicity = Non-Hispanic sub-group.

1b C☐ P☐ M☐ N☐

1c. Outcome or Evidence to Support Measure Focus — **1c**

1c.1 Relationship to Outcomes (*For non-outcome measures, briefly describe the relationship to desired outcome. For outcomes, describe why it is relevant to the target population*): There is now strong evidence that beta-blocker utilization at discharge after cardiac surgery confers a strong survival benefit

1c.2-3. Type of Evidence: Observational study, Expert opinion, Systematic synthesis of research, Other
Clinical results from approximately 90% of cardiac surgery centers in the US

1c.4 Summary of Evidence (*as described in the criteria; for outcomes, summarize any evidence that healthcare services/care processes influence the outcome*):
The summary of peer reviewed literature cited above supports that the utilization of beta-blocker at discharge confers strong risk reduction in mortality.

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

1c.6 Method for rating evidence: n/a

1c.7 Summary of Controversy/Contradictory Evidence: n/a

1c.8 Citations for Evidence (*other than guidelines*): - Crystal E, Connolly SJ, Sleik K, et al. Interventions on prevention of postoperative atrial fibrillation in patients undergoing heart surgery: a meta-analysis. Circulation. 2002;106(1):75-80.
- Kim MH, Deeb GM, Morady F, et al. Effect of postoperative atrial fibrillation on length of stay after cardiac surgery (The Postoperative Atrial Fibrillation in Cardiac Surgery study [PACS(2)]). Am J Cardiol. 2001;87(7):881-885.
- Maisel WH, Rawn JD, Stevenson WG. Atrial fibrillation after cardiac surgery. Ann Intern Med. 2001;135(12):1061-1073.
- Villareal RP, Hariharan R, Liu BC, et al. Postoperative atrial fibrillation and mortality after coronary artery bypass surgery. J Am Coll Cardiol. 2004;43(5):742-748.
- Welke KF, Ferguson TB, Coombs LP, et al. Validity of the Society of Thoracic Surgeons National Adult Cardiac Surgery Database. Ann Thorac Surg. 2004;77:1137-1139.
- Charlson ME, Isom OW. Care after coronary-artery bypass surgey. N Engl J Med. 2003;348:1456-63.
- Chen J, Radford MJ, Wang Y, Marciniak TA, Krumholz HM. Are beta-blockers effective in elderly patients who undergo coronary revascularization after acute myocardial infarction? Arch Intern Med. 2000;160:947-52.
- Chan AYM, McAlister FA, Norris, CM, et al. Effect of B-Blocker use on outcomes after discharge in patients who underwent cardiac surgery. J Thorac Cardiovasc Surg. 2010;140:182-7.

1c.9 Quote the Specific guideline recommendation (*including guideline number and/or page number*):
n/a

1c.10 Clinical Practice Guideline Citation: n/a
1c.11 National Guideline Clearinghouse or other URL: n/a

1c.12 Rating of strength of recommendation (*also provide narrative description of the rating and by whom*):
n/a

1c.13 Method for rating strength of recommendation (*If different from USPSTF system, also describe rating and how it relates to USPSTF)*:
n/a

1c.14 Rationale for using this guideline over others:
n/a

C☐ P☐ M☐ N☐

TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Importance to Measure and Report?*

1

Steering Committee: Was the threshold criterion, *Importance to Measure and Report*, met? **Rationale:**	**1** **Y☐** **N☐**
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. (evaluation criteria)	**Eval Rating**
2a. MEASURE SPECIFICATIONS	
S.1 Do you have a web page where current detailed measure specifications can be obtained? **S.2 If yes, provide web page URL:** **2a. Precisely Specified**	
2a.1 Numerator Statement (*Brief, text description of the numerator - what is being measured about the target population, e.g. target condition, event, or outcome*)**:** Number of patients undergoing isolated CABG who were discharged on beta blockers **2a.2 Numerator Time Window** (*The time period in which cases are eligible for inclusion in the numerator*)**:** **2a.3 Numerator Details** (*All information required to collect/calculate the numerator, including all codes, logic, and definitions*)**:** Number of isolated CABG procedures in which discharge beta blockers [DCBeta (STS Adult Cardiac Surgery Database Version 2.73)] is marked "yes"	
2a.4 Denominator Statement (*Brief, text description of the denominator - target population being measured*)**:** All patients undergoing isolated CABG **2a.5 Target population gender:** Female, Male **2a.6 Target population age range:** 18 and older **2a.7 Denominator Time Window** (*The time period in which cases are eligible for inclusion in the denominator*)**:** 12 months **2a.8 Denominator Details** (*All information required to collect/calculate the denominator - the target population being measured - including all codes, logic, and definitions*)**:** Number of isolated CABG procedures excluding cases with in-hospital mortality or cases for which discharge beta blocker use was contraindicated. 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 []): - 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 Type] is marked “PFO” or “missing” - OCarAFibAProc [Atrial Fibrillation Ablation Procedure] is marked “primarily epicardial” or “missing” and - 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 Thromboembolectomy],	**2a-specs** **C☐** **P☐** **M☐** **N☐**

OCarOthr [other cardiac procedure] are all marked "no" or "missing"

2a.9 Denominator Exclusions (*Brief text description of exclusions from the target population***):** Cases are removed from the denominator if there was an in-hospital mortality or if discharge beta blocker was contraindicated.

2a.10 Denominator Exclusion Details (*All information required to collect exclusions to the denominator, including all codes, logic, and definitions***):**
Mortality Discharge Status (MtDCStat), Mortality Date (MtDate), and Discharge Date (DischDt) indicate an in-hospital mortality; discharge beta blocker (DCBeta) marked as "Contraindicated"

2a.11 Stratification Details/Variables (*All information required to stratify the measure including the stratification variables, all codes, logic, and definitions***):**

2a.12-13 Risk Adjustment Type: No risk adjustment necessary

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

2a.15-17 Detailed risk model available Web page URL or attachment:

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***):**

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.

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)*:

2a.24 Data Source (*Check the source(s) for which the measure is specified and tested)*
Registry data

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

2a.26-28 Data source/data collection instrument reference web page URL or attachment: URL
http://www.sts.org/sites/default/files/documents/STSAdultCVDataCollectionForm2_73_Annotated.pdf

2a.29-31 Data dictionary/code table web page URL or attachment: URL
http://www.sts.org/sites/default/files/documents/STSAdultCVDataSpecificationsV2_73.pdf

2a.32-35 Level of Measurement/Analysis (*Check the level(s) for which the measure is specified and tested)*
Clinicians: Group, Facility/Agency, Population: national, Population: regional/network, Population: states, Population: counties or cities

2a.36-37 Care Settings (*Check the setting(s) for which the measure is specified and tested)*
Hospital

2a.38-41 Clinical Services (*Healthcare services being measured, check all that apply*)
Clinicians: Physicians (MD/DO)

TESTING/ANALYSIS

2b. Reliability testing

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 2009.

2b.2 Analytic Method *(type of reliability & rationale, method for testing)*:
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.

2b.3 Testing Results *(reliability statistics, assessment of adequacy in the context of norms for the test conducted)*:
Please see attachment

2b
C☐
P☐
M☐
N☐

2c. Validity testing

2c.1 Data/sample *(description of data/sample and size)*: STS Adult Cardiac Surgery Database

Audits conducted in 2010, all cases performed in 2009; N = 40 randomly selected sites participating in the STS Adult Cardiac Surgery Database

2c.2 Analytic Method *(type of validity & rationale, method for testing)*:
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.

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.

2c.3 Testing Results *(statistical results, assessment of adequacy in the context of norms for the test conducted)*:
Discharge Beta Blockers: 94.5% agreement rate

2c
C☐
P☐
M☐
N☐

2d. Exclusions Justified

2d.1 Summary of Evidence supporting exclusion(s):

2d.2 Citations for Evidence:

2d.3 Data/sample *(description of data/sample and size)*: Dates: January 1, 2009-December 31, 2009; 628 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.

2d
C☐
P☐
M☐
N☐
NA☐

2d.4 Analytic Method *(type analysis & rationale)*: please see attachment **2d.5 Testing Results** *(e.g., frequency, variability, sensitivity analyses)*: Please see attachment	
2e. Risk Adjustment for Outcomes/ Resource Use Measures **2e.1 Data/sample** *(description of data/sample and size)*: n/a **2e.2 Analytic Method** *(type of risk adjustment, analysis, & rationale)*: **2e.3 Testing Results** *(risk model performance metrics)*: **2e.4 If outcome or resource use measure is not risk adjusted, provide rationale:**	**2e** C☐ P☐ M☐ N☐ NA☐
2f. Identification of Meaningful Differences in Performance **2f.1 Data/sample from Testing or Current Use** *(description of data/sample and size)*: 605 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 **2f.2 Methods to identify statistically significant and practically/meaningfully differences in performance** *(type of analysis & rationale)*: 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. **2f.3 Provide Measure Scores from Testing or Current Use** *(description of scores, e.g., distribution by quartile, mean, median, SD, etc.; identification of statistically significant and meaningfully differences in performance)*: Please see attachment	**2f** C☐ P☐ M☐ N☐
2g. Comparability of Multiple Data Sources/Methods **2g.1 Data/sample** *(description of data/sample and size)*: n/a **2g.2 Analytic Method** *(type of analysis & rationale)*: **2g.3 Testing Results** *(e.g., correlation statistics, comparison of rankings)*:	**2g** C☐ P☐ M☐ N☐ NA☐
2h. Disparities in Care **2h.1 If measure is stratified, provide stratified results** *(scores by stratified categories/cohorts)*: n/a **2h.2 If disparities have been reported/identified, but measure is not specified to detect disparities, provide follow-up plans:**	**2h** C☐ P☐ M☐ N☐ NA☐
TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Scientific Acceptability of Measure Properties?*	**2**
Steering Committee: Overall, to what extent was the criterion, *Scientific Acceptability of Measure*	***2***

***Properties*, met?** **Rationale:**	C☐ P☐ M☐ N☐
3. USABILITY	
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)	**Eval Rating**
3a. Meaningful, Understandable, and Useful Information 3a.1 **Current Use:** In use 3a.2 **Use in a public reporting initiative (disclosure of performance results to the public at large)** (*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*)**:** 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. 3a.3 **If used in other programs/initiatives (***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***):** CMS Physician Quality Reporting Initiative (PQRI), www.cms.hhs.gov/pqri **Testing of Interpretability** (*Testing that demonstrates the results are understood by the potential users for public reporting and quality improvement*) 3a.4 **Data/sample** *(description of data/sample and size)***:** See 3a.6 below 3a.5 **Methods** *(e.g., focus group, survey, QI project)***:** 3a.6 **Results** *(qualitative and/or quantitative results and conclusions)***:** Please see attachment	**3a** C☐ P☐ M☐ N☐
3b/3c. Relation to other NQF-endorsed measures 3b.1 **NQF # and Title of similar or related measures:** OT1-013-09 – The STS CABG Composite Score; Component measures: 0114 Risk-Adjusted Post-Operative Renal Failure, 0115 Risk-Adjusted Surgical Re-exploration, 0116 Anti-Platelet Medication at Discharge, 0117 Beta Blockade at Discharge, 0118 Anti-Lipid Treatment at Discharge, 0119 Risk-Adjusted Operative Mortality for CABG, 0127 Pre-Operative Beta Blockade, 0129 Risk-Adjusted Prolonged Intubation (ventilation), 0130 Risk-Adjusted Deep Sternal Wound Infection Rate, 0131 Risk-Adjusted Stroke/Cerebrovascular Accident, 0134 Use of Internal Mammary Artery (IMA) in Coronary Artery Bypass Graft (CABG)	
(for NQF staff use) **Notes on similar/related endorsed or submitted measures:**	
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 or different topic but same target population): 3b.2 **Are the measure specifications harmonized? If not, why?** yes; 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: Agency for Healthcare Research and Quality American College of Cardiology	**3b** C☐ P☐ M☐ N☐ NA☐

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	
3c. Distinctive or Additive Value **3c.1 Describe the distinctive, improved, or additive value this measure provides to existing NQF-endorsed measures:** Rationale for Measures Included in the Composite: Until recently, quality assessment in cardiac surgery has focused primarily on the determination of risk-adjusted mortality. However, it is now increasingly recognized that this approach, which essentially separates patients into operative deaths or survivors, is too narrow. Specifically, it fails to take into account the fact that not all operative survivors have received equal quality care. For example, what about patients who survive surgery but have a debilitating complication, or who do not receive an IMA graft or a medication that may substantially impact long-term freedom from cardiac events? STS leadership recognized that a more comprehensive measure of overall quality was needed, and they commissioned an STS Task Force to develop a composite score that would achieve this goal. The report of this Task Force, including a detailed composite quality measurement methodology and provider rating system, was published as a special supplement to the April 2007 Annals of Thoracic Surgery (Ann Thorac Surg 2007;83:S1-26). This composite score is based upon 11 individual NQF-endorsed CABG measures of quality, grouped into four domains as described subsequently. **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:**	**3c** **C☐** **P☐** **M☐** **N☐** **NA☐**
TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Usability?*	**3**
Steering Committee: Overall, to what extent was the criterion, *Usability*, met? **Rationale:**	**3** **C☐** **P☐** **M☐** **N☐**
4. FEASIBILITY	
Extent to which the required data are readily available, retrievable without undue burden, and can be implemented for performance measurement. (evaluation criteria)	**Eval Rating**
4a. Data Generated as a Byproduct of Care Processes **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)	**4a** **C☐** **P☐** **M☐** **N☐**

4b. Electronic Sources **4b.1 Are all the data elements available electronically?** (*elements that are needed to compute measure scores are in defined, computer-readable fields, e.g., electronic health record, electronic claims*) Yes **4b.2 If not, specify the near-term path to achieve electronic capture by most providers.**	**4b** C☐ P☐ M☐ N☐
4c. Exclusions **4c.1 Do the specified exclusions require additional data sources beyond what is required for the numerator and denominator specifications?** No **4c.2 If yes, provide justification.**	**4c** C☐ P☐ M☐ N☐ NA☐
4d. Susceptibility to Inaccuracies, Errors, or Unintended Consequences **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.	**4d** C☐ P☐ M☐ N☐
4e. Data Collection Strategy/Implementation **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:** **4e.2 Costs to implement the measure** (*costs of data collection, fees associated with proprietary measures*)**:** Data Collection: There are no direct costs to collect the data for this measure. Costs to develop the measure included volunteer cardiothoracic surgeon time, STS staff time, and DCRI statistician and project management time.	**4e** C☐ P☐ M☐ N☐

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. 4e.3 **Evidence for costs:** 4e.4 **Business case documentation:**	
TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Feasibility?*	**4**
Steering Committee: Overall, to what extent was the criterion, *Feasibility*, met? **Rationale:**	**4** **C☐** **P☐** **M☐** **N☐**
RECOMMENDATION	
(for NQF staff use) **Check if measure is untested and only eligible for time-limited endorsement.**	**Time-limited ☐**
Steering Committee: Do you recommend for endorsement? **Comments:**	**Y☐** **N☐** **A☐**
CONTACT INFORMATION	
Co.1 **Measure Steward (Intellectual Property Owner)** Co.1 **Organization** Society of Thoracic Surgeons, 633 North Saint Clair Street, Suite 2320, Chicago, Illinois, 60611 Co.2 **Point of Contact** Jane, Han, MSW, jhan@sts.org, 312-202-5856-	
Measure Developer If different from Measure Steward Co.3 **Organization** Society of Thoracic Surgeons, 633 North Saint Clair Street, Suite 2320, Chicago, Illinois, 60611 Co.4 **Point of Contact** Jane, Han, MSW, jhan@sts.org, 312-202-5856-	
Co.5 **Submitter If different from Measure Steward POC** Jane, Han, MSW, jhan@sts.org, 312-202-5856-, Society of Thoracic Surgeons	
Co.6 **Additional organizations that sponsored/participated in measure development**	
ADDITIONAL INFORMATION	
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 clinical expertise as needed. The STS Workforce on National Databases meets at the STS Annual Meeting and reviews the measures on a yearly basis. Changes or updates to the measure will be at the recommendation of the Workforce.	
Ad.2 **If adapted, provide name of original measure:** Ad.3-5 **If adapted, provide original specifications URL or attachment**	
Measure Developer/Steward Updates and Ongoing Maintenance	

Ad.6 Year the measure was first released: 2004 **Ad.7 Month and Year of most recent revision:** 12, 2010 **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?** 2011
Ad.10 Copyright statement/disclaimers:
Ad.11 -13 Additional Information web page URL or attachment: Attachment 0117 Sections 1b.2, 1b.4, 2b.3, 2d.5, 2f.3, 3a.6.pdf
Date of Submission (*MM*/*DD*/*YY*)**:** 03/28/2011

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.)*

Measurement	*Beta Blockade at Discharge*
N	605
Mean	95.1%
1st	69.5%
5th	84.2%
10th	88.3%
25th	93.4%
Median	96.9%
75th	98.9%
90th	100.0%
95th	100.0%
99th	100.0%
Outlier	303 (50.1%)
High	190
Low	113

1b.4. Summary of Measure Results on Disparities by Population Group *(Descriptive statistics for performance results for this measure by population group)*

	Beta Blockage Therapy at Discharge	
	Population Group	
	Men	*Women*
Measurement		
N	887	626
Mean	94.7%	93.7%
1st	72.2%	70.3%
5th	83.3%	81.5%
10th	87.9%	86.3%
25th	92.7%	91.5%
Median	96.4%	95.5%
75th	98.6%	98.2%
90th	99.7%	100.0%
95th	100.0%	100.0%
99th	100.0%	100.0%
Outlier	443 (49.9%)	219 (35.0%)
High	270	122
Low	173	97

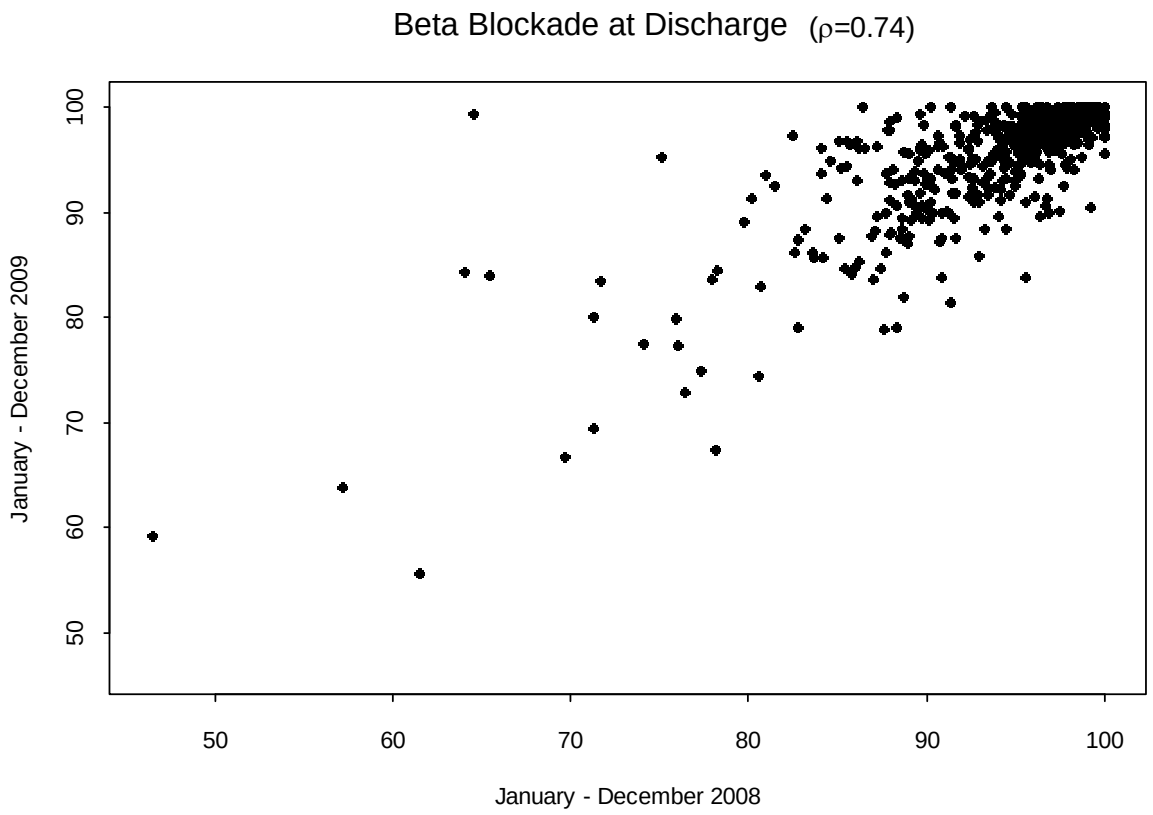
	Beta Blockage Therapy at Discharge		
	Population Group		
	Black	*White*	*Other*
Measurement			
N	127	877	114
Mean	94.4%	94.4%	93.6%
1st	75.4%	71.4%	67.1%
5th	81.5%	83.8%	81.2%
10th	85.9%	87.9%	84.0%
25th	92.7%	92.3%	91.3%
Median	95.9%	96.2%	96.4%
75th	98.5%	98.4%	98.5%
90th	100.0%	99.6%	100.0%
95th	100.0%	100.0%	100.0%
99th	100.0%	100.0%	100.0%

	Beta Blockage Therapy at Discharge		
	Population Group		
	Black	*White*	*Other*
Measurement			
Outlier	28 (22.0%)	473 (53.9%)	46 (40.4%)
High	11	285	28
Low	17	188	18

	Beta Blockage Therapy at Discharge	
	Population Group	
	Hispanic	*Non-Hispanic*
Measurement		
N	86	893
Mean	92.6%	94.4%
1st	70.2%	70.6%
5th	80.4%	83.3%
10th	84.2%	87.8%
25th	89.1%	92.3%
Median	94.0%	96.2%
75th	97.1%	98.4%
90th	100.0%	99.5%
95th	100.0%	100.0%
99th	100.0%	100.0%
Outlier	28 (32.6%)	489 (54.8%)
High	15	298
Low	13	191

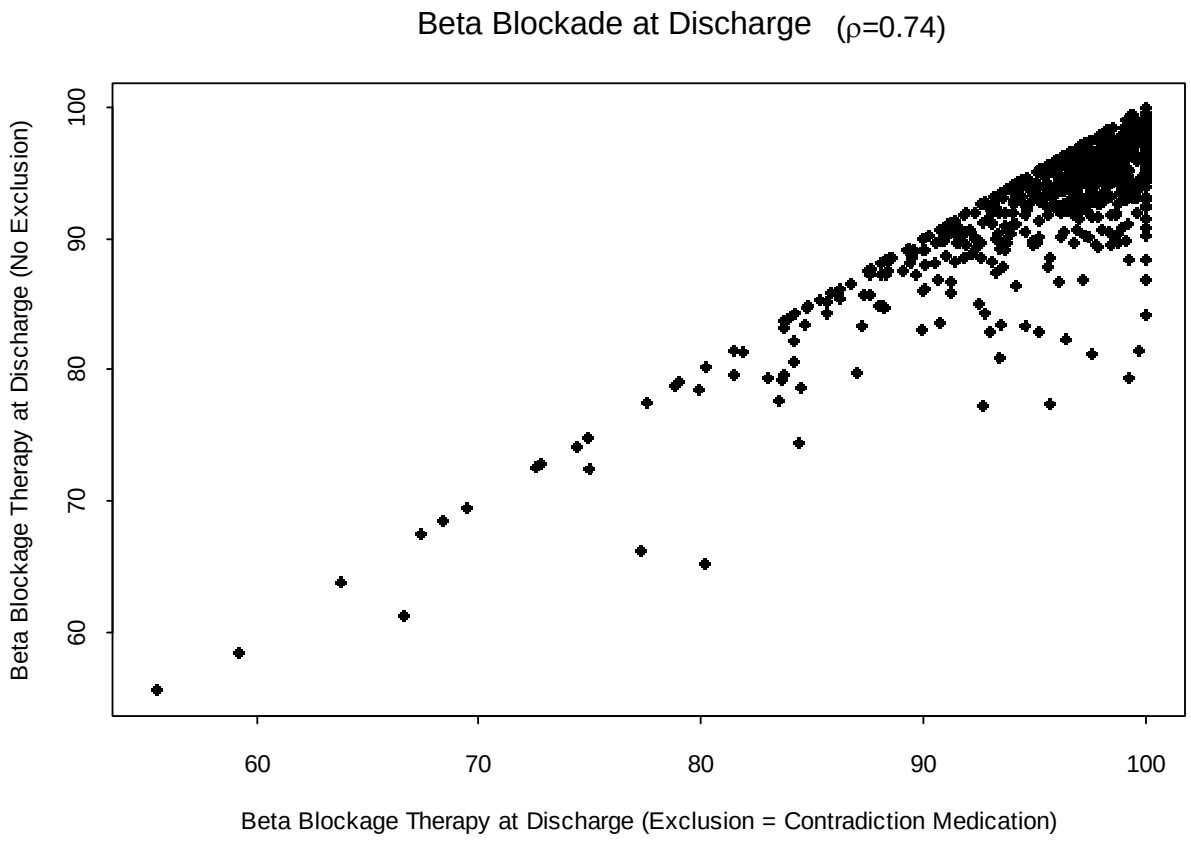
2b.3. Testing Results *(Reliability statistics, assessment of adequacy in the context of norms for the test conducted)*

Testing results: $\rho = 0.74$



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

Beta Blockade at Discharge	
# of Patients	140573
# excluded	4378
% excluded	0.03



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 meaningfully differences in performance)*

Results below are from January 1, 2009-December 31, 2009. Sample contains 605 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.

Measurement	*Beta Blockade Therapy at Discharge*
N	605
Mean	95.1%
1st	69.5%
5th	84.2%
10th	88.3%
25th	93.4%
Median	96.9%
75th	98.9%
90th	100.0%
95th	100.0%
99th	100.0%
Outlier†	303 (50.1%)
High	190
Low	113

†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 "X^{th}" 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."

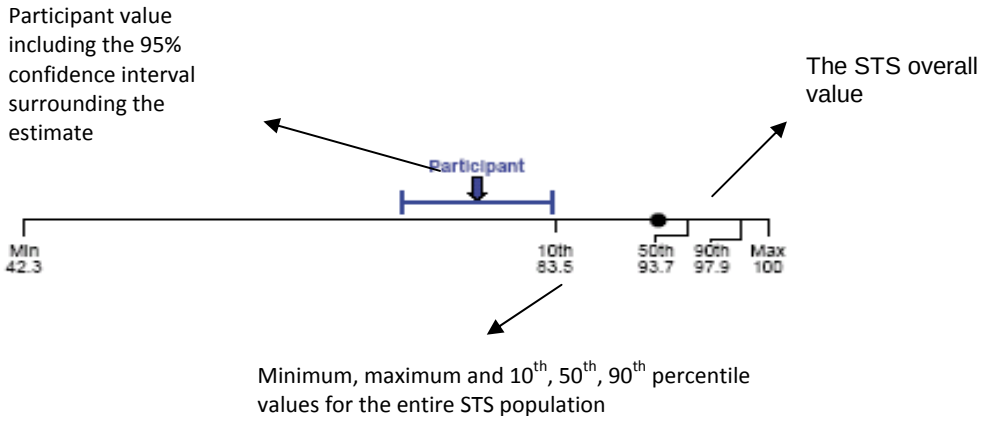
NQF/STS Results Comparison: Participants may see some differences between summaries of their data provided in the NQF section of the report and summaries of their data reported elsewhere in the STS report. These differences are due to subtle variations in variable definitions, patient inclusion and exclusion 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.

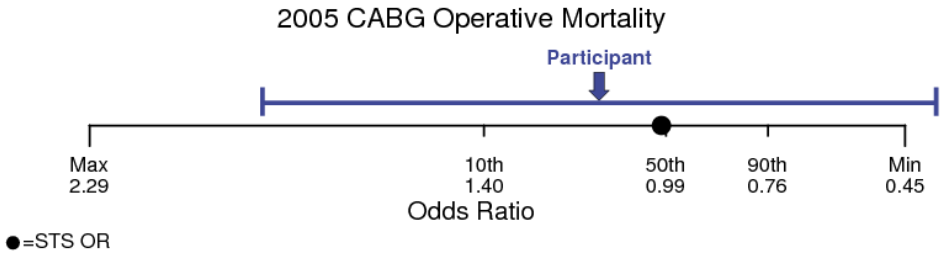
NQF Measure	Eligible Procedures	Participant Estimated OR	Participant Percentile	Participant Observed Rate
2005 CABG Operative Mortality	74	1.14	26.3	5.4%

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

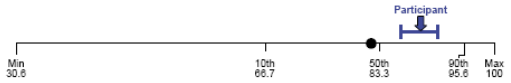
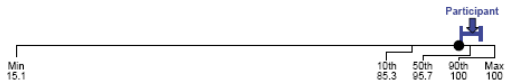
The 95% confidence interval for the participant's OR spans from <0.45 to ~1.90

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

Duke Clinical Research Institute
DUKE UNIVERSITY MEDICAL CENTER

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%	

[1]Excludes v2.61 contranindicated / not indicated records.
[2]Excludes patients with prior CABG surgery
[3]Anti-platelet use includes Aspirin and ADP Inhibitors, and excludes in-hospital mortalities. Excludes v2.61 contranindicated / not indicated records.
[4]Excludes in-hospital mortalities. Excludes v2.61 contranindicated / not indicated records.

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** OT1-013-09 – 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**
A. The measure is in the public domain or an intellectual property (measure steward agreement) is signed. *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.* 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 A.2 **Indicate if Proprietary Measure** (*as defined in measure steward agreement*)**:** Proprietary measure A.3 **Measure Steward Agreement:** Agreement will be signed and submitted prior to or at the time of measure submission A.4 **Measure Steward Agreement attached:** STS Measure Steward Agreement. Fully Executed-634363186610794134.pdf	**A** Y☐ N☐

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	**B** Y☐ N☐
C. The intended use of the measure includes both public reporting and quality improvement. ►**Purpose:** Public reporting, Internal quality improvement	**C** Y☐ N☐
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	**D** Y☐ N☐
(for NQF staff use) **Have all conditions for consideration been met?** **Staff Notes to Steward** (*if submission returned*)**:**	**Met** Y☐ N☐
Staff Notes to Reviewers (*issues or questions regarding any criteria*)**:**	
Staff Reviewer Name(s):	

TAP/Workgroup Reviewer Name:	
Steering Committee Reviewer Name:	
1. IMPORTANCE TO MEASURE AND REPORT	
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**	**Eval Rating**
(for NQF staff use) **Specific NPP goal**:	
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.	**1a** C☐ P☐ M☐ N☐

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, Hebeler 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):39S-47S.
(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

therapy before coronary artery surgery: nitrates are independent predictors of mortality and beta-adrenergic blockers predict survival. Anesth Analg 1999 Feb;88(2):286-91.

1b. Opportunity for Improvement

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

1b.2 Summary of data demonstrating performance gap (variation or overall poor performance) across providers:
Please see attachment.

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%
Outlier	388 (63.7%)
High	227
Low	161

1b.3 Citations for data on performance gap:
Dates: January 1, 2009-December 31, 2009

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.

1b.4 Summary of Data on disparities by population group:
Please see attachment

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.

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.

1b C☐ P☐ M☐ N☐

1c. Outcome or Evidence to Support Measure Focus

1c.1 Relationship to Outcomes (*For non-outcome measures, briefly describe the relationship to desired outcome. For outcomes, describe why it is relevant to the target population*)**:** See section 1a.3

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

1c C☐ P☐ M☐ N☐

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.

(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, Hebeler 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):39S-47S.
(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 therapy before coronary artery surgery: nitrates are independent predictors of mortality and beta-adrenergic blockers predict survival. Anesth Analg 1999 Feb;88(2):286-91.

1c.9 Quote the Specific guideline recommendation (*including guideline number and/or page number***):**
ACC/AHA Class I Recommendation for CABG

1c.10 Clinical Practice Guideline Citation:
1c.11 National Guideline Clearinghouse or other URL:

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

1c.13 Method for rating strength of recommendation (*If different from USPSTF system, also describe rating and how it relates to USPSTF)*:
ACC/AHA

1c.14 Rationale for using this guideline over others:

TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Importance to Measure and Report?*	**1**
Steering Committee: Was the threshold criterion, *Importance to Measure and Report*, met? **Rationale:**	**1** **Y☐** **N☐**
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. (evaluation criteria)	**Eval Rating**
2a. MEASURE SPECIFICATIONS	

S.1 Do you have a web page where current detailed measure specifications can be obtained?
S.2 If yes, provide web page URL:

2a. Precisely Specified

2a.1 Numerator Statement (*Brief, text description of the numerator - what is being measured about the target population, e.g. target condition, event, or outcome*):
Number of patients undergoing isolated CABG who received beta blockers within 24 hours preceding surgery

2a.2 Numerator Time Window (*The time period in which cases are eligible for inclusion in the numerator*):
24 hours preceding surgery

2a.3 Numerator Details (*All information required to collect/calculate the numerator, including all codes, logic, and definitions*):
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"

2a.4 Denominator Statement (*Brief, text description of the denominator - target population being measured*):
All patients undergoing isolated CABG

2a.5 Target population gender: Female, Male
2a.6 Target population age range: 18 and older

2a.7 Denominator Time Window (*The time period in which cases are eligible for inclusion in the denominator*):
12 months

2a.8 Denominator Details (*All information required to collect/calculate the denominator - the target population being measured - including all codes, logic, and definitions*):
Number of isolated CABG procedures excluding cases for which preoperative beta blockers were contraindicated.

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 []):
- 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” and
- 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 Thromboembolectomy], OCarOthr [other cardiac procedure] are all marked “no” or “missing”

2a.9 Denominator Exclusions (*Brief text description of exclusions from the target population*): Cases are removed from the denominator if preoperative beta blocker was contraindicated.

2a.10 Denominator Exclusion Details (*All information required to collect exclusions to the denominator, including all codes, logic, and definitions*):
Procedures with preoperative beta blockers [MedBeta (STS Adult Cardiac Surgery Database Version 2.73, Sequence number 1710)] marked as "Contraindicated"

2a.11 Stratification Details/Variables (*All information required to stratify the measure including the*

2a-specs
C☐
P☐
M☐
N☐

stratification variables, all codes, logic, and definitions):
n/a

2a.12-13 **Risk Adjustment Type:** No risk adjustment necessary

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

2a.15-17 **Detailed risk model available Web page URL or attachment:**

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

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.

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

2a.24 **Data Source** (*Check the source(s) for which the measure is specified and tested)*
Registry data

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

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/STSAdultCVDataCollectionForm2_73_Annotated.pdf

2a.29-31 **Data dictionary/code table web page URL or attachment:** URL
http://www.sts.org/sites/default/files/documents/STSAdultCVDataSpecificationsV2_73.pdf

2a.32-35 **Level of Measurement/Analysis** (*Check the level(s) for which the measure is specified and tested)*
Clinicians: Group, Facility/Agency, Population: national, Population: regional/network, Population: states, Population: counties or cities

2a.36-37 **Care Settings** (*Check the setting(s) for which the measure is specified and tested)*
Hospital

2a.38-41 **Clinical Services** (*Healthcare services being measured, check all that apply*)
Clinicians: Physicians (MD/DO)

TESTING/ANALYSIS

2b. Reliability testing

2b
C☐
P☐
M☐

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

2009. **2b.2 Analytic Method** *(type of reliability & rationale, method for testing)*: 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. **2b.3 Testing Results** *(reliability statistics, assessment of adequacy in the context of norms for the test conducted)*: Please see attachment	N☐
2c. Validity testing **2c.1 Data/sample** *(description of data/sample and size)*: STS Adult Cardiac Surgery Database Audits conducted in 2010, all cases performed in 2009; N = 40 randomly selected sites participating in the STS Adult Cardiac Surgery Database **2c.2 Analytic Method** *(type of validity & rationale, method for testing)*: 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. 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. **2c.3 Testing Results** *(statistical results, assessment of adequacy in the context of norms for the test conducted)*: Pre-operative Beta Blockers: 92.1% agreement rate	**2c** C☐ P☐ M☐ N☐
2d. Exclusions Justified **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. **2d.2 Citations for Evidence:** **2d.3 Data/sample** *(description of data/sample and size)*: 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. **2d.4 Analytic Method** *(type analysis & rationale)*: **2d.5 Testing Results** *(e.g., frequency, variability, sensitivity analyses)*: Please see attachment.	**2d** C☐ P☐ M☐ N☐ NA☐
2e. Risk Adjustment for Outcomes/ Resource Use Measures **2e.1 Data/sample** *(description of data/sample and size)*: n/a	**2e** C☐ P☐

2e.2 Analytic Method *(type of risk adjustment, analysis, & rationale)*:

2e.3 Testing Results *(risk model performance metrics)*:

2e.4 If outcome or resource use measure is not risk adjusted, provide rationale:

M☐ N☐ NA☐

2f. Identification of Meaningful Differences in Performance

2f.1 Data/sample from Testing or Current Use *(description of data/sample and size)*: 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

2f.2 Methods to identify statistically significant and practically/meaningfully differences in performance *(type of analysis & rationale)*:
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.

2f.3 Provide Measure Scores from Testing or Current Use *(description of scores, e.g., distribution by quartile, mean, median, SD, etc.; identification of statistically significant and meaningfully differences in performance)*:
Please see attachment

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.

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%

Outlier	388 (63.7%)
High	227
Low	161

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

2f C☐ P☐ M☐ N☐

2g. Comparability of Multiple Data Sources/Methods

2g.1 Data/sample *(description of data/sample and size)*: n/a

2g C☐ P☐ M☐

2g.2 Analytic Method *(type of analysis & rationale)*: **2g.3 Testing Results** *(e.g., correlation statistics, comparison of rankings)*:	**N☐ NA☐**
2h. Disparities in Care **2h.1 If measure is stratified, provide stratified results** *(scores by stratified categories/cohorts)*: n/a **2h.2 If disparities have been reported/identified, but measure is not specified to detect disparities, provide follow-up plans:**	**2h** **C☐ P☐ M☐ N☐ NA☐**
TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Scientific Acceptability of Measure Properties?*	**2**
Steering Committee: Overall, to what extent was the criterion, *Scientific Acceptability of Measure Properties*, met? **Rationale:**	***2*** **C☐ P☐ M☐ N☐**
3. USABILITY	
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)	**Eval Rating**
3a. Meaningful, Understandable, and Useful Information **3a.1 Current Use:** In use **3a.2 Use in a public reporting initiative (disclosure of performance results to the public at large)** (*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*): 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. **3a.3 If used in other programs/initiatives (***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***):** CMS Physician Quality Reporting Initiative (PQRI), www.cms.hhs.gov/pqri **Testing of Interpretability** (*Testing that demonstrates the results are understood by the potential users for public reporting and quality improvement*) **3a.4 Data/sample** *(description of data/sample and size)*: See 3a.6 below **3a.5 Methods** *(e.g., focus group, survey, QI project)*: **3a.6 Results** *(qualitative and/or quantitative results and conclusions)*: Please see attachment	**3a** **C☐ P☐ M☐ N☐**
3b/3c. Relation to other NQF-endorsed measures **3b.1 NQF # and Title of similar or related measures:** OT1-013-09 – The STS CABG Composite Score; Component measures: 0114 Risk-Adjusted Post-Operative Renal Failure, 0115 Risk-Adjusted Surgical Re-exploration, 0116 Anti-Platelet Medication at Discharge, 0117	

Beta Blockade at Discharge, 0118 Anti-Lipid Treatment at Discharge, 0119 Risk-Adjusted Operative Mortality for CABG, 0127 Pre-Operative Beta Blockade, 0129 Risk-Adjusted Prolonged Intubation (ventilation), 0130 Risk-Adjusted Deep Sternal Wound Infection Rate, 0131 Risk-Adjusted Stroke/Cerebrovascular Accident, 0134 Use of Internal Mammary Artery (IMA) in Coronary Artery Bypass Graft (CABG)	
(for NQF staff use) **Notes on similar/related endorsed or submitted measures:**	
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 or 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: 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	**3b** C☐ P☐ M☐ N☐ NA☐
3c. Distinctive or Additive Value **3c.1 Describe the distinctive, improved, or additive value this measure provides to existing NQF-endorsed measures:** n/a **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	**3c** C☐ P☐ M☐ N☐ NA☐
TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Usability?*	**3**
Steering Committee: Overall, to what extent was the criterion, *Usability*, met? **Rationale:**	**3** C☐ P☐ M☐ N☐
4. FEASIBILITY	
Extent to which the required data are readily available, retrievable without undue burden, and can be implemented for performance measurement. (evaluation criteria)	**Eval Rating**
4a. Data Generated as a Byproduct of Care Processes **4a.1-2 How are the data elements that are needed to compute measure scores generated?**	**4a** C☐ P☐

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)	M☐ N☐
4b. Electronic Sources 4b.1 **Are all the data elements available electronically?** (*elements that are needed to compute measure scores are in defined, computer-readable fields, e.g., electronic health record, electronic claims*) Yes 4b.2 **If not, specify the near-term path to achieve electronic capture by most providers.**	4b C☐ P☐ M☐ N☐
4c. Exclusions 4c.1 **Do the specified exclusions require additional data sources beyond what is required for the numerator and denominator specifications?** No 4c.2 **If yes, provide justification.**	4c C☐ P☐ M☐ N☐ NA☐
4d. Susceptibility to Inaccuracies, Errors, or Unintended Consequences 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.	4d C☐ P☐ M☐ N☐
4e. Data Collection Strategy/Implementation 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:** 4e.2 **Costs to implement the measure** (*costs of data collection, fees associated with proprietary*	4e C☐ P☐ M☐ N☐

measures): 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. 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. **4e.3 Evidence for costs:** **4e.4 Business case documentation:**	
TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Feasibility?*	**4**
Steering Committee: Overall, to what extent was the criterion, *Feasibility*, met? **Rationale:**	**4** **C☐** **P☐** **M☐** **N☐**
RECOMMENDATION	
(for NQF staff use) **Check if measure is untested and only eligible for time-limited endorsement.**	**Time-limited ☐**
Steering Committee: Do you recommend for endorsement? **Comments:**	**Y☐** **N☐** **A☐**
CONTACT INFORMATION	
Co.1 Measure Steward (Intellectual Property Owner) **Co.1 Organization** Society of Thoracic Surgeons, 633 North Saint Clair Street, Suite 2320, Chicago, Illinois, 60611 **Co.2 Point of Contact** Jane, Han, MSW, jhan@sts.org, 312-202-5856-	
Measure Developer If different from Measure Steward **Co.3 Organization** Society of Thoracic Surgeons, 633 North Saint Clair Street, Suite 2320, Chicago, Illinois, 60611 **Co.4 Point of Contact** Jane, Han, MSW, jhan@sts.org, 312-202-5856-	
Co.5 Submitter If different from Measure Steward POC Jane, Han, MSW, jhan@sts.org, 312-202-5856-, Society of Thoracic Surgeons	
Co.6 Additional organizations that sponsored/participated in measure development	
ADDITIONAL INFORMATION	
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.
Ad.2 If adapted, provide name of original measure: **Ad.3-5 If adapted, provide original specifications URL or attachment**
Measure Developer/Steward Updates and Ongoing Maintenance **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
Ad.10 Copyright statement/disclaimers:
Ad.11 -13 Additional Information web page URL or attachment: Attachment 0127 Sections 1b.2, 1b.4, 2b.3, 2d.5, 2f.3, 3a.6.pdf
Date of Submission (*MM*/*DD*/*YY*)**:** 03/28/2011

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.)*

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%
Outlier	388 (63.7%)
High	227
Low	161

1b.4. Summary of Measure Results on Disparities by Population Group *(Descriptive statistics for performance results for this measure by population group)*

	Preoperative Beta Blockade	
	Population Group	
	Men	*Women*
Measurement		
N	889	635
Mean	83.1%	84.6%
1st	54.8%	57.1%
5th	64.4%	65.6%
10th	69.8%	71.7%
25th	76.4%	77.9%
Median	84.3%	86.1%
75th	91.1%	92.0%
90th	95.4%	96.6%
95th	98.0%	98.5%
99th	100.0%	100.0%
Outlier	552 (62.1%)	298 (46.9%)
High	305	165
Low	247	133

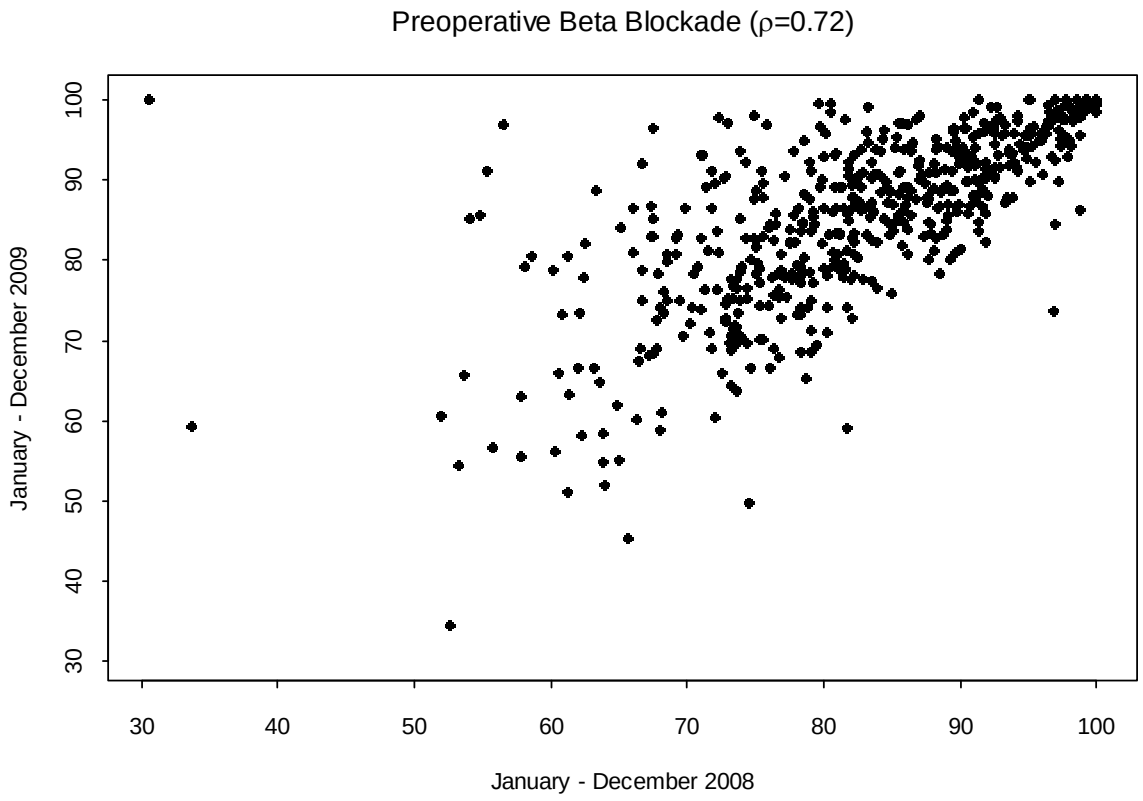
	Preoperative Beta Blockade		
	Population Group		
	Black	*White*	*Other*
Measurement			
N	131	882	116
Mean	83.9%	83.4%	80.4%
1st	54.2%	53.8%	43.5%
5th	63.5%	64.6%	58.9%
10th	67.7%	70.5%	62.9%
25th	78.6%	76.6%	73.7%
Median	85.7%	84.9%	82.2%
75th	91.8%	91.3%	88.8%
90th	96.2%	95.6%	94.3%
95th	98.1%	97.7%	97.6%
99th	100.0%	100.0%	100.0%

	Preoperative Beta Blockade		
	Population Group		
	Black	*White*	*Other*
Measurement			
Outlier	54 (41.2%)	570 (64.6%)	50 (43.1%)
High	27	317	33
Low	27	253	17

	Preoperative Beta Blockade	
	Population Group	
	Hispanic	*Non-Hispanic*
Measurement		
N	87	895
Mean	80.2%	83.5%
1st	45.9%	53.9%
5th	60.2%	64.5%
10th	65.5%	70.7%
25th	74.1%	77.0%
Median	81.2%	85.1%
75th	87.9%	91.3%
90th	93.0%	95.5%
95th	95.5%	97.7%
99th	98.7%	99.8%
Outlier	33 (37.9%)	584 (65.3%)
High	23	325
Low	10	259

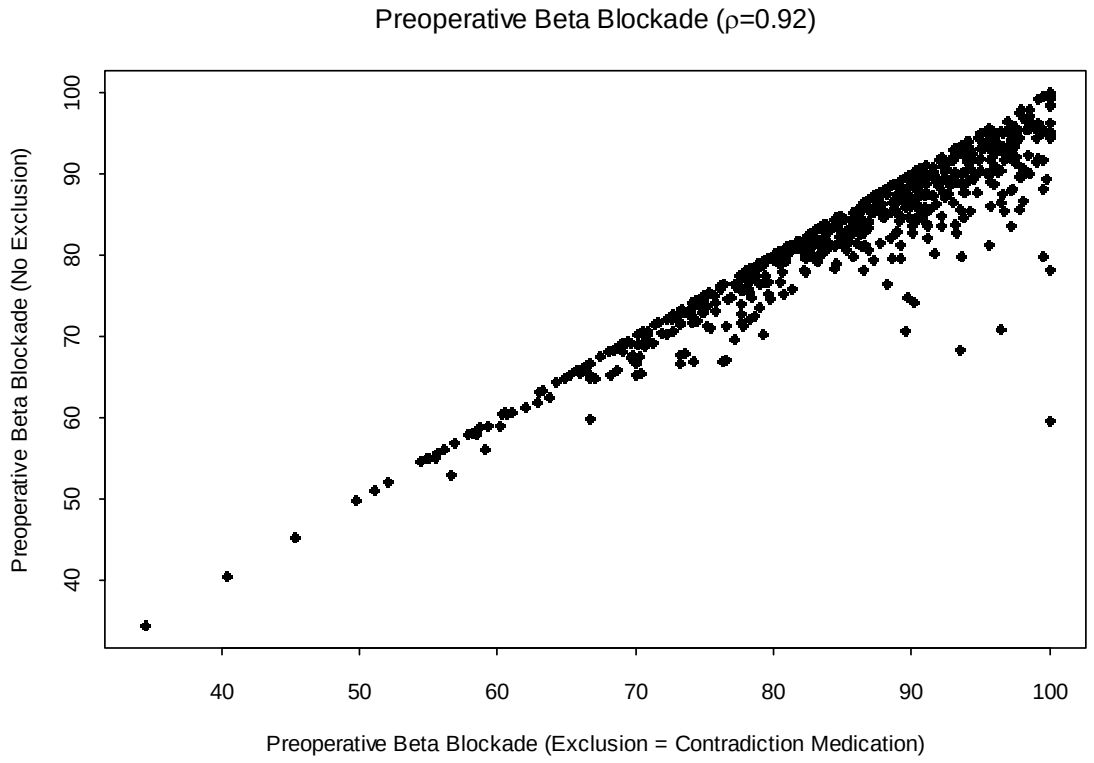
2b.3. Testing Results *(Reliability statistics, assessment of adequacy in the context of norms for the test conducted)*

Testing results: $\rho = 0.72$



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

Preoperative Beta Blockade	
# of Patients	144,060
# excluded	5,256
% excluded	3.65



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 meaningfully 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.

Measurement	*Preoperative Beta Blockade*
N	609
Mean	84.8%
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90th	97.3%
95th	98.9%
99th	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 "X^{th}" 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."

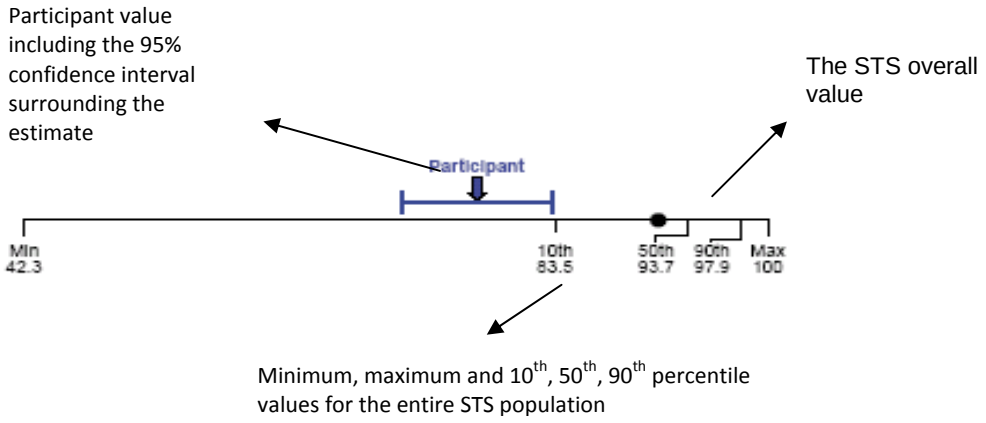
NQF/STS Results Comparison: Participants may see some differences between summaries of their data provided in the NQF section of the report and summaries of their data reported elsewhere in the STS report. These differences are due to subtle variations in variable definitions, patient inclusion and exclusion 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.

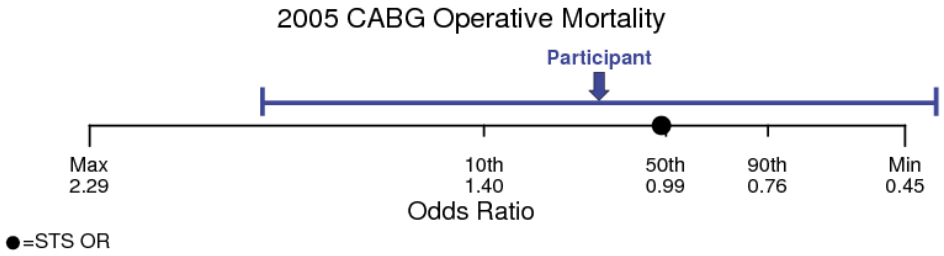
NQF Measure	Eligible Procedures	Participant Estimated OR	Participant Percentile	Participant Observed Rate
2005 CABG Operative Mortality	74	1.14	26.3	5.4%

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

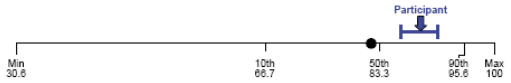
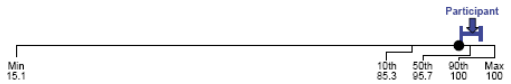
The 95% confidence interval for the participant's OR spans from <0.45 to ~1.90

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

Duke Clinical Research Institute
DUKE UNIVERSITY MEDICAL CENTER

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%	

[1]Excludes v2.61 contranindicated / not indicated records.
[2]Excludes patients with prior CABG surgery
[3]Anti-platelet use includes Aspirin and ADP Inhibitors, and excludes in-hospital mortalities. Excludes v2.61 contranindicated / not indicated records.
[4]Excludes in-hospital mortalities. Excludes v2.61 contranindicated / not indicated records.

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 #:** 0265 **NQF Project:** Surgery Endorsement Maintenance 2010
MEASURE DESCRIPTIVE INFORMATION
De.1 **Measure Title:** Hospital Transfer/Admission
De.2 **Brief description of measure:** Rate of ASC admissions requiring a hospital transfer or hospital admission upon discharge from the ASC
1.1-2 **Type of Measure:** Outcome De.3 **If included in a composite or paired with another measure, please identify composite or paired measure** This measure is not included in a composite or paired with another measure
De.4 **National Priority Partners Priority Area:** Safety De.5 **IOM Quality Domain:** Effectiveness De.6 **Consumer Care Need:** Staying healthy

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**
A. The measure is in the public domain or an intellectual property (measure steward agreement) is signed. *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.* 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 A.2 **Indicate if Proprietary Measure** (*as defined in measure steward agreement*)**:** Proprietary measure A.3 **Measure Steward Agreement:** Agreement will be signed and submitted prior to or at the time of measure submission A.4 **Measure Steward Agreement attached:** NQF Measure Steward Agreement with ASC QC-634279428602873330.pdf	**A** Y☐ N☐

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	**B** Y☐ N☐
C. The intended use of the measure includes both public reporting and quality improvement. ►**Purpose:** Public reporting, Internal quality improvement	**C** Y☐ N☐
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	**D** Y☐ N☐
(for NQF staff use) **Have all conditions for consideration been met?** **Staff Notes to Steward** (*if submission returned*)**:**	**Met** Y☐ N☐
Staff Notes to Reviewers (*issues or questions regarding any criteria*)**:**	
Staff Reviewer Name(s):	

TAP/Workgroup Reviewer Name:	
Steering Committee Reviewer Name:	
1. IMPORTANCE TO MEASURE AND REPORT	
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**	**Eval Rating**
(for NQF staff use) **Specific NPP goal**:	
1a.1 **Demonstrated High Impact Aspect of Healthcare:** Frequently performed procedure, High resource use, Patient/societal consequences of poor quality 1a.2 1a.3 **Summary of Evidence of High Impact:** As a result of advances in surgery and anesthesia, approximately 80 percent of surgeries in the United States are now performed on an outpatient basis. Ambulatory surgical centers perform approximately 40%, or more than 22 million, of those outpatient surgeries. 1 Patients selected for ambulatory surgery are not anticipated to require hospital care upon discharge. The need for a hospital transfer and/ or admission is an unanticipated outcome that can result in unplanned cost and other burdens. Mean charges for unanticipated admissions/readmissions due to pain have been estimated at $1896 +/- $4553 per visit; mean charges for unanticipated admissions/readmissions unrelated to pain have been estimated at $12,000 +/- $36,886 per visit. 2 While hospital transfers and admissions undoubtedly represent good patient care when necessary, high rates may be an indicator that practice patterns or patient selection guidelines are in need of review. Studies suggest providers can reduce rates of unplanned admissions through the use of strategies including: careful preoperative assessment and diligence in patient selection; screening for proper support at home; earlier operating time for certain surgical procedures; and the implementation of clinical pathways for early and	**1a** C☐ P☐ M☐ N☐

aggressive treatment of pain and postoperative nausea and vomiting. 3-10

1a.4 Citations for Evidence of High Impact: 1 U.S. Department of Health and Human Services. Centers for Medicare & Medicaid Services. http://www.cms.gov/.

2 Coley KC, Williams BA, DaPos SV, Chen C, Smith RB. Retrospective evaluation of unanticipated admissions and readmissions after same day surgery and associated costs. J Clin Anesth. 2002 Aug; 14(5):349-53.

3 Margovsky A. Unplanned admissions in day-case surgery as a clinical indicator for quality assurance. Aust N Z J Surg. 2000 Mar;70(3):216-20.

4 Tewfik MA, Frenkiel S, Gasparrini R, Zeitouni A, Daniel SJ, Dolev Y, Kost K, Samaha M, Sweet R, Tewfik TL. Factors affecting unanticipated hospital admission following otolaryngologic day surgery. J Otolaryngol. 2006 Aug;35(4):235-41.

5 Fortier J, Chung F, Su J. Unanticipated admission after ambulatory surgery--a prospective study. Can J Anaesth. 1998 Jul;45(7):612-9.

6. Lin D, Dalgorf D, Witterick IJ. Predictors of unexpected hospital admissions after outpatient endoscopic sinus surgery: retrospective review. J Otolaryngol Head Neck Surg. 2008 Jun;37(3):309-11.

7. Hofer RE, Kai T, Decker PA, Warner DO. Obesity as a risk factor for unanticipated admissions after ambulatory surgery. Mayo Clin Proc. 2008 Aug;83(8):908-16.

8. Lledó JB, Planells M, Espí A, Serralta A, García R, Sanahuja A. Predictive model of failure of outpatient laparoscopic cholecystectomy. Surg Laparosc Endosc Percutan Tech. 2008 Jun;18(3):248-53.

9. Lau H, Brooks DC. Predictive factors for unanticipated admissions after ambulatory laparoscopic cholecystectomy. Arch Surg. 2001 Oct;136(10):1150-3.

10. Junger A, Klasen J, Benson M, Sciuk G, Hartmann B, Sticher J, Hempelmann G. Factors determining length of stay of surgical day-case patients. Eur J Anaesthesiol. 2001 May;18(5):314-21.

1b. Opportunity for Improvement

1b.1 Benefits (improvements in quality) envisioned by use of this measure: The measure can be used to benchmark rates of hospital transfer and admission upon discharge from ASCs. Benchmarking may prompt providers to take steps to reduce rates of unplanned transfers and admissions. Fewer hospital transfers and admissions result in more satisfactory and less costly care for ASC patients.

1b.2 Summary of data demonstrating performance gap (variation or overall poor performance) across providers:
The rates for this measure were collected for 526 ambulatory surgery centers throughout the US for services provided during April to June 2010. The rate for unscheduled transfer or admission to a hospital ranged from a minimum of 0.0% to a maximum of 2.3%. The mean rate was 0.1 (SD: 0.2%), while the median rate was 0.1%. The maximum transfer rate of 2.3% and a third quartile value of 0.2% demonstrate that there is an opportunity for improvement in this measure.

1b.3 Citations for data on performance gap:
A convenience sample of 526 ambulatory surgery centers was selected to assess the opportunity for improvement for this measure. The centers were located throughout the US. Services from the second calendar quarter of 2010 were included in this portion of the study.

1b.4 Summary of Data on disparities by population group:
This measure is not intended to measure disparities by population group.

1b.5 Citations for data on Disparities:
No data available for disparities by population group. Please see 1b.4. above.

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N☐

1c. Outcome or Evidence to Support Measure Focus

1c.1 Relationship to Outcomes (*For non-outcome measures, briefly describe the relationship to desired outcome. For outcomes, describe why it is relevant to the target population*)**:** This measure describes hospital transfer and admission rates following admission to an ASC. The goal of measurement is to reduce preventable hospital transfers and admissions following care in an ASC.

The measure is currently used by ASCs to benchmark their performance. These comparisons may be helpful in performance improvement efforts seeking to minimize hospital transfers and admissions from the ASC setting.

1c.2-3. Type of Evidence: Expert opinion, Systematic synthesis of research

1c.4 Summary of Evidence (*as described in the criteria; for outcomes, summarize any evidence that healthcare services/care processes influence the outcome*)**:**
Prior research suggests there are many factors providers can use to both screen prospective patients to determine if they are appropriate candidates for ambulatory surgery, and to reduce the chances of an unanticipated hospital transfer or hospital admission. See citations provided in 1c.8. below as a sample of the available literature on this topic.

1c.5 Rating of strength/quality of evidence (*also provide narrative description of the rating and by whom***):**
Not applicable

1c.6 Method for rating evidence: Not applicable

1c.7 Summary of Controversy/Contradictory Evidence: Measurement is limited to those patients directly transferred or admitted to the hospital upon discharge from the ASC. This measure does not seek to capture later admissions to the hospital because, at the present time, there is no reliable means of consistently detecting later admissions and attributing them to a given ASC.

1c.8 Citations for Evidence (*other than guidelines***):** 1: Lin D, Dalgorf D, Witterick IJ. Predictors of unexpected hospital admissions
after outpatient endoscopic sinus surgery: retrospective review. J Otolaryngol
Head Neck Surg. 2008 Jun;37(3):309-11.

2: Hofer RE, Kai T, Decker PA, Warner DO. Obesity as a risk factor for
unanticipated admissions after ambulatory surgery. Mayo Clin Proc. 2008
Aug;83(8):908-16.

3: Lledó JB, Planells M, Espí A, Serralta A, García R, Sanahuja A. Predictive
model of failure of outpatient laparoscopic cholecystectomy. Surg Laparosc Endosc Percutan Tech. 2008
Jun;18(3):248-53.

4: Tewfik MA, Frenkiel S, Gasparrini R, Zeitouni A, Daniel SJ, Dolev Y, Kost K,
Samaha M, Sweet R, Tewfik TL. Factors affecting unanticipated hospital admission following otolaryngologic
day surgery. J Otolaryngol. 2006 Aug;35(4):235-41.

5: Shirakami G, Teratani Y, Namba T, Hirakata H, Tazuke-Nishimura M, Fukuda K.
Delayed discharge and acceptability of ambulatory surgery in adult outpatients
receiving general anesthesia. J Anesth. 2005;19(2):93-101.

6: Shaikh S, Chung F, Imarengiaye C, Yung D, Bernstein M. Pain, nausea, vomiting and ocular complications
delay discharge following ambulatory microdiscectomy. Can J Anaesth. 2003 May;50(5):514-8.

7: Coley KC, Williams BA, DaPos SV, Chen C, Smith RB. Retrospective evaluation of unanticipated admissions
and readmissions after same day surgery and associated costs. J Clin Anesth. 2002 Aug;14(5):349-53.

8: Lau H, Brooks DC. Predictive factors for unanticipated admissions after

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ambulatory laparoscopic cholecystectomy. Arch Surg. 2001 Oct;136(10):1150-3.

9: Junger A, Klasen J, Benson M, Sciuk G, Hartmann B, Sticher J, Hempelmann G. Factors determining length of stay of surgical day-case patients. Eur J Anaesthesiol. 2001 May;18(5):314-21.

10: Fortier J, Chung F, Su J. Unanticipated admission after ambulatory surgery--a prospective study. Can J Anaesth. 1998 Jul;45(7):612-9.

11: Osborne GA, Rudkin GE. Outcome after day-care surgery in a major teaching hospital. Anaesth Intensive Care. 1993 Dec;21(6):822-7.

12: Rudkin GE, Osborne GA, Doyle CE. Assessment and selection of patients for day surgery in a public hospital. Med J Aust. 1993 Mar 1;158(5):308-12.

1c.9 Quote the Specific guideline recommendation (*including guideline number and/or page number***):**
Not applicable

1c.10 Clinical Practice Guideline Citation: Not applicable
1c.11 National Guideline Clearinghouse or other URL: Not applicable

1c.12 Rating of strength of recommendation (*also provide narrative description of the rating and by whom***):**
Not applicable

1c.13 Method for rating strength of recommendation (*If different from USPSTF system, also describe rating and how it relates to USPSTF)*:
Not applicable

1c.14 Rationale for using this guideline over others:
Not applicable

TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Importance to Measure and Report?*	**1**
Steering Committee: Was the threshold criterion, *Importance to Measure and Report*, met? **Rationale:**	**1** **Y☐** **N☐**
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. (evaluation criteria)	**Eval Rating**
2a. MEASURE SPECIFICATIONS	
S.1 Do you have a web page where current detailed measure specifications can be obtained? **S.2 If yes, provide web page URL:** **2a. Precisely Specified**	
2a.1 Numerator Statement (*Brief, text description of the numerator - what is being measured about the target population, e.g. target condition, event, or outcome***):** Ambulatory surgical center (ASC) admissions requiring a hospital transfer or hospital admission upon discharge from the ASC. **2a.2 Numerator Time Window (***The time period in which cases are eligible for inclusion in the numerator***):** In-facility, upon discharge from the ASC	**2a-specs** **C☐** **P☐** **M☐** **N☐**

2a.3 Numerator Details (*All information required to collect/calculate the numerator, including all codes, logic, and definitions***):**
DEFINITIONS:

Admission: completion of registration upon entry into the facility

Hospital transfer or hospital admission: any transfer or admission from an ASC directly to an acute care hospital, including a hospital emergency room

Discharge: occurs when the patient leaves the confines of the ASC

2a.4 Denominator Statement (*Brief, text description of the denominator - target population being measured***):**
All ASC admissions

2a.5 Target population gender: Female, Male
2a.6 Target population age range: All ages

2a.7 Denominator Time Window (*The time period in which cases are eligible for inclusion in the denominator***):**
In-facility, upon discharge from the ASC

2a.8 Denominator Details (*All information required to collect/calculate the denominator - the target population being measured - including all codes, logic, and definitions***):**
DEFINITIONS:

Admission: completion of registration upon entry into the facility

2a.9 Denominator Exclusions (*Brief text description of exclusions from the target population***):** None

2a.10 Denominator Exclusion Details (*All information required to collect exclusions to the denominator, including all codes, logic, and definitions***):**
Not applicable

2a.11 Stratification Details/Variables (*All information required to stratify the measure including the stratification variables, all codes, logic, and definitions***):**
Not stratified

2a.12-13 Risk Adjustment Type: No risk adjustment necessary

2a.14 Risk Adjustment Methodology/Variables (*List risk adjustment variables and describe conceptual models, statistical models, or other aspects of model or method***):**
Not applicable

2a.15-17 Detailed risk model available Web page URL or attachment:

2a.18-19 Type of Score: Rate/proportion
2a.20 Interpretation of Score: Better quality = Lower score
2a.21 Calculation Algorithm (*Describe the calculation of the measure as a flowchart or series of steps***):**
The number of admissions experiencing a hospital transfer/admission upon discharge is divided by the number of ASC admissions during the reporting period, yielding the rate of hospital transfers/admissions upon discharge for the reporting period.

2a.22 Describe the method for discriminating performance *(e.g., significance testing)***:**
Facilities reporting data may compare their performance to the average performance. Alternatively, facilities may compare their performance to a percentile ranking (such as the 50th percentile (median)) to determine their relative performance.

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)*:
The measure is not based on a sample

2a.24 Data Source (*Check the source(s) for which the measure is specified and tested)*
Paper medical record/flow-sheet

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.***):**
ASC medical records, as well as incident/occurrence reports, and variance reports may serve as data sources. No specific collection instrument is required although the ASC Quality Collaboration has developed a sample data collection instrument that may be used as desired. Facilities may use any collection instrument that allows tracking of all hospital transfers/admissions upon discharge.

2a.26-28 Data source/data collection instrument reference web page URL or attachment: URL Not needed http://ascquality.org/documents/ASCQualityCollaborationImplementationGuide.pdf

2a.29-31 Data dictionary/code table web page URL or attachment: URL Not needed http://ascquality.org/documents/ASCQualityCollaborationImplementationGuide.pdf

2a.32-35 Level of Measurement/Analysis (*Check the level(s) for which the measure is specified and tested)*
Facility/Agency

2a.36-37 Care Settings (*Check the setting(s) for which the measure is specified and tested)*
Ambulatory Care: Amb Surgery Center

2a.38-41 Clinical Services (*Healthcare services being measured, check all that apply*)
Other Ambulatory surgical center

TESTING/ANALYSIS

2b. Reliability testing

2b.1 Data/sample *(description of data/sample and size)***:** A convenience sample of 16 ambulatory surgery centers was selected for a retrospective chart audit comparing the reported values for the measure versus the values identified from the medical record. The centers were located in eight different states throughout the US. Services from April 1, 2010 to June 30, 2010 were reviewed in the course of the reliability testing.

2b.2 Analytic Method *(type of reliability & rationale, method for testing)***:**
The numerator (number of Ambulatory Surgery Center (ASC) admissions requiring a hospital transfer or hospital admission upon discharge from the ASC) and denominator (number of ASC admissions) values were compared for all 16 centers in the sample.

2b.3 Testing Results *(reliability statistics, assessment of adequacy in the context of norms for the test conducted)***:**
The error rates at all 16 of the ASCs (100%) were zero for both the numerator and denominator. The results show an excellent level of reliability with an overall 100% accuracy rate.

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2c. Validity testing

2c.1 Data/sample *(description of data/sample and size)***:** Validity was measured via a formal consensus process. A questionnaire that included ratings of the various characteristics of the measure was distributed to 8 clinicians (RNs) who currently work in ambulatory surgery centers or have responsibility for multiple surgery centers. Two have credentials in quality and the others are involved in quality in their current positions. Responses were received from 7 of the panel members.

2c.2 Analytic Method *(type of validity & rationale, method for testing)***:**
Validity was measured via a formal consensus process. Six of the seven respondents responded with a 5/5 rating for the question most related to content validity for this measure. Due to the high level of consensus on the primary validity question, multiple rounds of Delphi-type evaluations were not necessary. These results demonstrate a high level of agreement around the validity of the measure.

2c.3 Testing Results *(statistical results, assessment of adequacy in the context of norms for the test*

2c
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conducted): Each attribute was measured on a 5 point Likert Scale. The attributes related to validity and average scores are listed below: 1. The measure appears to measure what it is intended to. (Median: 5/5; Mean: 4.3/5.0) 2. The measure is defined in a way that will allow for consistent interpretation of the inclusion and exclusion criteria from center to center. (Median: 5/5; Mean 3.9/5.0) 3. The data required for the measure are likely to be obtained with reasonable effort. (Median: 5/5; Mean: 4.9/5.0) 4. The data required for the measure are likely to be obtained with reasonable cost. (Median: 5/5; Mean: 4.9/5.0) 5. The data required for the measure can be generated during care delivery. (Median: 5/5; Mean: 4.9/5.0)	
2d. Exclusions Justified **2d.1 Summary of Evidence supporting exclusion(s):** No exclusions **2d.2 Citations for Evidence:** Not applicable **2d.3 Data/sample** *(description of data/sample and size)*: Not applicable **2d.4 Analytic Method** *(type analysis & rationale)*: Not applicable **2d.5 Testing Results** *(e.g., frequency, variability, sensitivity analyses)*: Not applicable	**2d** C☐ P☐ M☐ N☐ NA ☐
2e. Risk Adjustment for Outcomes/ Resource Use Measures **2e.1 Data/sample** *(description of data/sample and size)*: This measure is not risk adjusted **2e.2 Analytic Method** *(type of risk adjustment, analysis, & rationale)*: Not applicable **2e.3 Testing Results** *(risk model performance metrics)*: Not applicable **2e.4 If outcome or resource use measure is not risk adjusted, provide rationale:** Transfer or admission to a hospital should be a rare event if appropriate patient and procedure selection criteria are in place. Risk adjustment for patient characteristics would mask any measurement of performance difference. Thus we believe this measure should not be risk adjusted.	**2e** C☐ P☐ M☐ N☐ NA ☐
2f. Identification of Meaningful Differences in Performance **2f.1 Data/sample from Testing or Current Use** *(description of data/sample and size)*: The rates for this measure were collected for 526 ambulatory surgery centers throughout the US for services provided during April to June 2010. **2f.2 Methods to identify statistically significant and practically/meaningfully differences in performance** *(type of analysis & rationale)*: Using the ASC as the unit of analysis, a 95% confidence interval around the mean transfer rate of 0.11% is (0.09%, 0.12%). Transfer rates higher than 0.12% or 12 transfers per 1000 ASC admissions would be considered statistically different from the population rate. Since each transfer may represent increased risk exposure for the patient, a rate higher than the 12 per 1000 is also of practical significance. **2f.3 Provide Measure Scores from Testing or Current Use** *(description of scores, e.g., distribution by quartile, mean, median, SD, etc.; identification of statistically significant and meaningfully differences in performance)*: The rate for unscheduled transfer or admission to a hospital ranged from a minimum of 0.0% to a maximum	**2f** C☐ P☐ M☐ N☐

of 2.3%. The mean rate was 0.1 (SD: 0.2%), while the median rate was 0.1%. The maximum transfer rate of 2.3% and a third quartile value of 0.2% demonstrate that there is an opportunity for improvement in this measure.	
2g. Comparability of Multiple Data Sources/Methods **2g.1 Data/sample** *(description of data/sample and size)*: This measure is specified for a single data source (paper medical record/flow sheet) as noted in 2a.24 above **2g.2 Analytic Method** *(type of analysis & rationale)*: Not applicable **2g.3 Testing Results** *(e.g., correlation statistics, comparison of rankings)*: Not applicable	**2g** C☐ P☐ M☐ N☐ NA ☐
2h. Disparities in Care **2h.1 If measure is stratified, provide stratified results** *(scores by stratified categories/cohorts)*: This measure is not stratified **2h.2 If disparities have been reported/identified, but measure is not specified to detect disparities, provide follow-up plans:** At the present time, a federal quality reporting system has not yet been proposed or implemented for ambulatory surgical centers. We anticipate that CMS will issue its proposals for an ASC quality reporting system in the near future. When the system is implemented, we anticipate patient level demographic data will be collected in association with ASC data on hospital transfers/admissions, allowing for the detection of any disparities.	**2h** C☐ P☐ M☐ N☐ NA ☐
TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Scientific Acceptability of Measure Properties?*	**2**
Steering Committee: Overall, to what extent was the criterion, *Scientific Acceptability of Measure Properties*, met? **Rationale:**	***2*** C☐ P☐ M☐ N☐
3. USABILITY	
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)	**Eval Rating**
3a. Meaningful, Understandable, and Useful Information **3a.1 Current Use:** In use **3a.2 Use in a public reporting initiative (disclosure of performance results to the public at large)** (*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*): The ASC Quality Collaboration posts a public report of quality data on six ASC quality measures endorsed by the NQF on a quarterly basis. This quarterly report includes aggregated performance data on the Hospital Transfer/Admission measure. The report for the second quarter of 2010 is available at: http://www.ascquality.org/qualityreport.cfm. One thousand one hundred eighty-five (1,185) ASCs submitted hospital transfer/admission date for the second quarter 2010 report. **3a.3 If used in other programs/initiatives (***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*): This measure is in use in several other initiatives. For example, the ASC Association includes this metric in its Outcomes Monitoring Project, which is described at http://www.ascassociation.org/outcomes/. It is also in use in various state association quality data collection and reporting projects, including the Texas	**3a** C☐ P☐ M☐ N☐

Ambulatory Surgery Center Association, located at http://tascs.org/. In addition, the measure has been adopted by the Minnesota Department of Health (MDH) for state reporting by ASCs beginning July 2011. This is described at the MDH website at: http://www.health.state.mn.us/healthreform/measurement/adoptedrule/QualityMeasurementAppendices_101129.pdf **Testing of Interpretability** (*Testing that demonstrates the results are understood by the potential users for public reporting and quality improvement*) 3a.4 **Data/sample** *(description of data/sample and size)*: Interpretability was measured via a formal consensus process. A questionnaire that included ratings of the various characteristics of the measure was distributed to 8 clinicians (RNs) who currently work in ambulatory surgery centers or have responsibility for multiple surgery centers. Two have credentials in quality and the others are involved in quality in their current positions. Responses were received from 7 of the panel members. 3a.5 **Methods** *(e.g., focus group, survey, QI project)*: The survey was summarized to assess the panel's level of agreement with statements that measured the interpretability of the measure. 3a.6 **Results** *(qualitative and/or quantitative results and conclusions)*: Each attribute was measured on a 5 point Likert Scale. The attributes related to usability and average scores are listed below: 1. A provider can understand the results of the measure. (Median: 5/5; Mean: 4.3/5.0) 2. If necessary, a provider can use the results of the measure to take action. (Median: 5/5; Mean: 4.3/5.0) 3. This measure has a direct link to improving the outcome and/or process of care. (Median: 5/5; Mean: 4.0/5.0)	
3b/3c. Relation to other NQF-endorsed measures 3b.1 **NQF # and Title of similar or related measures:**	
(for NQF staff use) **Notes on similar/related endorsed or submitted measures:**	
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 or different topic but same target population): 3b.2 **Are the measure specifications harmonized? If not, why?**	**3b** C☐ P☐ M☐ N☐ NA ☐
3c. Distinctive or Additive Value 3c.1 **Describe the distinctive, improved, or additive value this measure provides to existing NQF-endorsed measures:** 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:** Not similar to another measure endorsed by NQF	**3c** C☐ P☐ M☐ N☐ NA ☐
TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Usability?*	**3**
Steering Committee: Overall, to what extent was the criterion, *Usability*, met? **Rationale:**	**3** C☐ P☐ M☐ N☐
4. FEASIBILITY	
Extent to which the required data are readily available, retrievable without undue burden, and can be	**Eval**

implemented for performance measurement. (evaluation criteria)	Rating
4a. Data Generated as a Byproduct of Care Processes 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)	**4a** C☐ P☐ M☐ N☐
4b. Electronic Sources 4b.1 **Are all the data elements available electronically?** (*elements that are needed to compute measure scores are in defined, computer-readable fields, e.g., electronic health record, electronic claims*) No 4b.2 **If not, specify the near-term path to achieve electronic capture by most providers.** Widespread adoption of electronic health records in ambulatory surgical centers would be needed to achieve electronic capture of data elements.	**4b** C☐ P☐ M☐ N☐
4c. Exclusions 4c.1 **Do the specified exclusions require additional data sources beyond what is required for the numerator and denominator specifications?** No 4c.2 **If yes, provide justification.**	**4c** C☐ P☐ M☐ N☐ **NA** ☐
4d. Susceptibility to Inaccuracies, Errors, or Unintended Consequences 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.** Experience with this measure and feedback from users indicates that it is easy to use and has limited susceptibility to inaccuracies and errors. Reliability is very high. The ASC Quality Collaboration is not aware of any unintended consequences as a result of the use of this measure.	**4d** C☐ P☐ M☐ N☐
4e. Data Collection Strategy/Implementation 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:** The ASC Quality Collaboration has included "Frequently Asked Questions" in the Implementation Guide for the measure to assist users in their implementation of data collection. 4e.2 **Costs to implement the measure** (*costs of data collection, fees associated with proprietary measures*)**:** Because the information needed to determine the numerator and denominator(admission, patient disposition at discharge) are routinely collected as part of the patient care process, there are no additional costs for data element collection for this measure. There are no fees associated with the use of this measure and benchmarking data is publicly available on the ASC Quality Collaboration´s website. 4e.3 **Evidence for costs:** The survey used for validity and interpretability also asked respondents about the feasibility and cost of collecting data. The following two questions support the premise that the cost to collect this information is reasonable for the ASC: The data required for the measure are likely to be obtained with reasonable effort. (Median: 5/5; Mean: 4.9/5.0) The data required for the measure are likely to be obtained with reasonable cost. (Median: 5/5; Mean: 4.9/5.0) 4e.4 **Business case documentation:** Not applicable	**4e** C☐ P☐ M☐ N☐

TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Feasibility?*	4
Steering Committee: Overall, to what extent was the criterion, *Feasibility*, met? **Rationale:**	**4** **C☐** **P☐** **M☐** **N☐**
RECOMMENDATION	
(for NQF staff use) **Check if measure is untested and only eligible for time-limited endorsement.**	**Time-limited ☐**
Steering Committee: Do you recommend for endorsement? **Comments:**	**Y☐** **N☐** **A☐**

CONTACT INFORMATION

Co.1 Measure Steward (Intellectual Property Owner)
Co.1 Organization
ASC Quality Collaboration, 5686 Escondida Blvd S, St. Petersburg, Florida, 33715

Co.2 Point of Contact
Donna, Slosburg, BSN, LHRM, CASC, donnaslosburg@ascquality.org, 727-867-0072-

Measure Developer If different from Measure Steward
Co.3 Organization
ASC Quality Collaboration, 5686 Escondida Blvd S, St. Petersburg, Florida, 33715

Co.4 Point of Contact
Donna, Slosburg, BSN, LHRM, CASC, donnaslosburg@ascquality.org, 727-867-0072-

Co.5 Submitter If different from Measure Steward POC
Donna, Slosburg, BSN, LHRM, CASC, donnaslosburg@ascquality.org, 727-867-0072-, ASC Quality Collaboration

Co.6 Additional organizations that sponsored/participated in measure development

ADDITIONAL INFORMATION

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.
The ASC Quality Collaboration workgroup members meet via teleconference to develop, critique, and modify candidate measures; to maintain existing measures; and to offer sites willing to participate in testing. No contractors are used.

The following is a list of the individuals (and their affiliation at the time of their participation) serving on the workgroup and contributing to this measure:

AAAHC: Naomi Kuznets, PhD
Ambulatory Surgery Foundation: Debra Stinchcomb, BSN, CASC, David Shapiro, MD,
Sarah Martin, RN, BS, CASC and Marian Lowe
AMSURG: Deby Samuels, Lorri Smith RN, BSN and Linda Brooks-Belli
AOA/HFAP: Monda Shaver, RN, BSN, CPHIT and Susan Lautner, RN, BSN, MSHL
AORN: Bev Kirchner BSN, CNOR, CASC and Bonnie Denholm, RN, MS, CNOR
ASCOA: Ann Geier RN, MS, CNOR, CASC
ASC Quality Collaboration: Donna Slosburg, BSN, LHRM, CASC
HCA: Kathy Wilson

The Joint Commission: Michael Kulczycki and Kathleen Domzalski NATIONAL: Rhonda Arnwine, MBA and Terry Hawes, RN, BHA Novamed: Cassandra Speier NUETERRA: Rachelle Babin RN, BSN Surgical Care Affiliates: Kim Wood, MD Symbion: Steve Whitmore and Gina Throneberry RN, MBA, CASC USPI: David Zarin, MD, Julie Gunderson RN, MM, CPHQ and Clint Chain, RN, BSN
Ad.2 If adapted, provide name of original measure: Not adapted **Ad.3-5 If adapted, provide original specifications URL or attachment**
Measure Developer/Steward Updates and Ongoing Maintenance **Ad.6 Year the measure was first released:** 2007 **Ad.7 Month and Year of most recent revision:** 12, 2010 **Ad.8 What is your frequency for review/update of this measure?** Annually or more frequently if indicated **Ad.9 When is the next scheduled review/update for this measure?** 12, 2011
Ad.10 Copyright statement/disclaimers: None
Ad.11 -13 Additional Information web page URL or attachment:
Date of Submission (*MM/DD/YY*)**:** 03/28/2011

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 #:** 0273 **NQF Project:** Surgery Endorsement Maintenance 2010
MEASURE DESCRIPTIVE INFORMATION
De.1 **Measure Title:** Perforated Appendix Admission Rate (PQI 2)
De.2 **Brief description of measure:** Percentage of admissions for appendicitis within county with perforated appendix.
1.1-2 **Type of Measure:** Outcome De.3 **If included in a composite or paired with another measure, please identify composite or paired measure** Not applicable
De.4 **National Priority Partners Priority Area:** Population health, Safety De.5 **IOM Quality Domain**: Effectiveness De.6 **Consumer Care Need:** Staying healthy

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**
A. The measure is in the public domain or an intellectual property (measure steward agreement) is signed. *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.* 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 A.2 **Indicate if Proprietary Measure** (*as defined in measure steward agreement*)**:** A.3 **Measure Steward Agreement:** Government entity and in the public domain - no agreement necessary A.4 **Measure Steward Agreement attached:**	**A** Y☐ N☐
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	**B** Y☐

every 3 years. Yes, information provided in contact section	N☐
C. The intended use of the measure includes both public reporting and quality improvement. ►**Purpose:** Public reporting, Internal quality improvement	C Y☐ N☐
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	D Y☐ N☐
(for NQF staff use) **Have all conditions for consideration been met?** **Staff Notes to Steward** (*if submission returned*)**:**	Met Y☐ N☐
Staff Notes to Reviewers (*issues or questions regarding any criteria*)**:**	
Staff Reviewer Name(s):	

TAP/Workgroup Reviewer Name:	
Steering Committee Reviewer Name:	
1. IMPORTANCE TO MEASURE AND REPORT	
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**	Eval Rating
(for NQF staff use) **Specific NPP goal**:	
1a.1 **Demonstrated High Impact Aspect of Healthcare:** High resource use, Patient/societal consequences of poor quality 1a.2 1a.3 **Summary of Evidence of High Impact:** Perforated appendix occurs in one-fourth to one-third of hospitalized acute appendicitis patients [1] Approximately 280,000 appendectomies are performed each year in the United States. [2] Most are performed as emergencies to avoid the complications of perforated appendicitis; an entity believed to result from delay in surgical removal of the appendix after the appendix has become inflamed. The fear of appendicitis complications results in more emergency general surgical operations than any other disease. [3] Negative exploration rates as high as 30% are considered acceptable for women presenting with lower abdominal pain. [4] A retrospective analysis for all patients 18 y of age and over with acute appendicitis between July 1, 2005 and December 31, 2008 at a teaching hospital identified 1003 patients with acute appendicitis of whom 239 (23.8%) had perforated appendix. Patients with public insurance were significantly more likely to have perforated disease ($P < 0.001$) as were patients in the older age groups (41-64 and =65) (35.8% and 38.24%, respectively, versus 19.2% for those 18-40; $P < 0.001$). The patients who presented with perforation had a greater length of stay (2.71 ± 2.14 versus 6.04 ± 3.91 d, $P < 0.001$). [5] 1a.4 **Citations for Evidence of High Impact:** Updated citations will be presented in the May Steering Committee meeting [1] Braveman P, Schaaf VM, Egerter S, et al. Insurance-related differences in the risk of ruptured appendix [see comments]. N Engl J Med 1994;331(7):444-9. PMID: 7880234.	1a C☐ P☐ M☐ N☐

[2] National Center for Health Statistics. Ambulatory and Inpatient Procedures in the United States, 1996. National Center for Health Statistics Series 13[No. 139]. 2004.
[3] Livingston EH, Woodward WA, Sarosi GA, Haley RW. Disconnect Between Incidence of Nonperforated and Perforated Appendicitis: Implications for Pathophysiology and Management. Ann Surg. 2007 June; 245(6): 886-892. doi: 10.1097/01.sla.0000256391.05233.aa.
[4] Larsson PG, Henriksson G, Olsson M, et al. Laparoscopy reduces unnecessary appendicectomies and improves diagnosis in fertile women. A randomized study. Surg Endosc. 2001;15:200-202. PMID: 11285968
[5] Boomer L, Freeman J, Landrito E, Feliz A. Perforation in adults with acute appendicitis linked to insurance status, not ethnicity. J Surg Res. 2010 Oct;163(2):221-4. Epub 2010 May 21. PMID: 20599222

1b. Opportunity for Improvement

1b.1 **Benefits (improvements in quality) envisioned by use of this measure:** Timely diagnosis and treatment may reduce the incidence of perforated appendix, and lower rates represent better quality care.

1b.2 **Summary of data demonstrating performance gap (variation or overall poor performance) across providers:**
Adjusted per 100,000 rates by patient and hospital characteristics, 2007

Mean	Standard error	Location	P-value: Relative to Northeast
246.285	4.719	Northeast	1.000
293.224	4.786	Midwest	0.000
289.007	3.677	South	0.000
286.872	4.341	West	0.000

1b.3 **Citations for data on performance gap:**
See the following report for a complete treatment of the methodology: "Methods: Applying AHRQ Quality Indicators to Healthcare Cost and Utilization Project (HCUP) Data for the National Healthcare Quality Report" [URL: http://hcupnet.ahrq.gov/QI%20Methods.pdf?JS=Y]

1b.4 **Summary of Data on disparities by population group:**
Adjusted per 100,000 rates by patient characteristics, 2007

Estimate	Standard error	Age: for conditions affecting any age
203.578	3.449	18-44
390.937	4.99	45-64
516.977	7.304	65 and over

Estimate	Standard error	Age: for conditions affecting elderly
483.585	11.929	65-69
494.937	14.249	70-74
535.493	15.712	75-79
546.261	18.545	80-84
593.997	22.816	85 and over

Estimate	Standard error	Gender
303.352	3.045	Male
249.47	2.982	Female

Estimate	Standard error	Median income of patient´s ZIP code
300.24	4.501	First quartile (lowest income)
283.229	4.24	Second quartile
283.319	4.064	Third quartile
257.117	3.938	Fourth quartile (highest income)

1b
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N☐

Estimate	Standard error	Location of patient residence (NCHS)
276.481	3.868	Large central metropolitan
269.158	4.195	Large fringe metropolitan
274.846	4.873	Medium metropolitan
296.272	7.384	Small metropolitan
299.424	6.613	Micropolitan
311.401	9.069	Not metropolitan or micropolitan

Estimate	Standard error	Expected payment source
Private insurancec	263.3063.241	Private insurance
Medicare	314.21214.617	Medicare
Medicaid	300.9859.005	Medicaid
Other insurance	310.40511.033	Other insurance
Uninsured / self-pay / no charge	296.9538.218	Uninsured / self-pay / no charge

Estimate	Standard error	Hospital Ownership/control
274.734	2.479	Private, not-for-profit
284.808	5.805	Private, for-profit
305.153	6.159	Public

Estimate	Standard error	Teaching status
274.783	4.014	Teaching
282.269	2.557	Nonteaching

Estimate	Standard error	Location of hospital
279.332	3.607	Large central metropolitan
264.164	4.666	Large fringe metropolitan
279.024	4.944	Medium metropolitan
298.37	6.997	Small metropolitan
292.701	6.42	Micropolitan
308.891	12.663	Not metropolitan or micropolitan

Estimate	Standard error	Bed size of hospital
287.66	5.775	Less than 100
276.441	3.181	100 - 299
279.597	4.164	300 - 499
285.324	5.751	500 or more

1b.5 Citations for data on Disparities:
See the following report for a complete treatment of the methodology: “Methods: Applying AHRQ Quality Indicators to Healthcare Cost and Utilization Project (HCUP) Data for the National Healthcare Quality Report” [URL: http://hcupnet.ahrq.gov/QI%20Methods.pdf?JS=Y]

1c. Outcome or Evidence to Support Measure Focus

1c.1 Relationship to Outcomes (*For non-outcome measures, briefly describe the relationship to desired outcome. For outcomes, describe why it is relevant to the target population*)**:** With prompt and appropriate care, acute appendicitis should not progress to perforation or rupture. However, rates of perforated appendix are higher in the uninsured or underinsured in both the adult and pediatric population. In addition, perforated appendix rates also vary by race. Potential reasons for differences by insurance status or race include patients failing to seek appropriate care, access to care difficulties, or misdiagnoses and poor quality care that result in delays in receiving surgery.

Perforated appendix is a potentially avoidable hospitalization / ambulatory care sensitive condition indicator. These indicators are not measures of hospital quality, but rather measures of access to high quality

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outpatient care, and as such are defined with area level denominators.

1c.2-3. **Type of Evidence:** Expert opinion, Systematic synthesis of research

1c.4 **Summary of Evidence** (*as described in the criteria; for outcomes, summarize any evidence that healthcare services/care processes influence the outcome*)**:**
Hospital admission for perforated appendix is a PQI that would be of most interest to comprehensive health care delivery systems. With prompt and appropriate care, acute appendicitis should not progress to perforation or rupture. Rates for perforated appendix are higher in the uninsured or underinsured in both adult and pediatric populations, which may be caused by patients failing to seek appropriate care, difficulty in accessing care, or misdiagnoses and poor quality care.
Perforated appendix rates vary systematically by race, although the cause is unknown. Areas with high rates of perforated appendix may want to target points of intervention by using chart reviews and other supplemental data to investigate the reasons for delay in receiving surgery. Hospital contributions to the overall area rate may be particularly useful for this indicator, because misdiagnoses and other delays in receiving surgery in an emergency room may contribute substantially to the rate.

1c.5 **Rating of strength/quality of evidence (***also provide narrative description of the rating and by whom***):**
17 Smoothing recommended Testing, rating, and review were conducted by the project team. A full report on the literature review and empirical evaluation can be found in Refinement of the HCUP Quality Indicators by the UCSF-Stanford EPC, Detailed coding information for each QI is provided in the document Prevention Quality Indicators Technical Specifications. Rating of performance on empirical evaluations, ranged from 0 to 26. The scores were intended as a guide for summarizing the performance of each indicator on four empirical tests of precision (signal variance, area-level share, signal ratio, and R-squared) and five tests of minimum bias (rank correlation, top and bottom decile movement, absolute change, and change over two deciles), as described in the previous section.

1c.6 **Method for rating evidence:** The project team conducted extensive empirical testing of all potential indicators using the 1995-97 HCUP State Inpatient Databases (SID) and Nationwide Inpatient Sample (NIS) to determine precision, bias, and construct validity. The 1997 SID contains uniform data on inpatient stays in community hospitals for 22 States covering approximately 60% of all U.S. hospital discharges. The NIS is designed to approximate a 20% of U.S. community hospitals and includes all stays in the sampled hospitals. Each year of the NIS contains between 6 million and 7 million records from about 1,000 hospitals. The NIS combines a subset of the SID data, hospital-level variables, and hospital and discharge weights for producing national estimates. The project team conducted tests to examine three things: precision, bias, and construct validity.
Precision. The first step in the analysis involved precision tests to determine the reliability of the indicator for distinguishing real differences in provider performance. For indicators that may be used for quality improvement, it is important to know with what precision, or surety, a measure can be attributed to an actual construct rather than random variation.
For each indicator, the variance can be broken down into three components: variation within a provider (actual differences in performance due to differing patient characteristics), variation among providers (actual differences in performance among providers), and random variation. An ideal indicator would have a substantial amount of the variance explained by between-provider variance, possibly resulting from differences in quality of care, and a minimum amount of random variation. The project team performed four tests of precision to estimate the magnitude of between-provider variance on each indicator:
• Signal standard deviation was used to measure the extent to which performance of the QI varies systematically across hospitals or areas.
• Provider/area variation share was used to calculate the percentage of signal (or true) variance relative to the total variance of the QI.
• Signal-to-noise ratio was used to measure the percentage of the apparent variation in QIs across providers that is truly related to systematic differences across providers and not random variations (noise) from year to year.
• In-sample R-squared was used to identify the incremental benefit of applying multivariate signal extraction methods for identifying additional signal on top of the signal-to-noise ratio.
In general, random variation is most problematic when there are relatively few observations per provider, when adverse outcome rates are relatively low, and when providers have little control over patient outcomes or variation in important processes of care is minimal. If a large number of patient factors that are difficult to

observe influence whether or not a patient has an adverse outcome, it may be difficult to separate the "quality signal" from the surrounding noise. Two signal extraction techniques were applied to improve the precision of an indicator:
• Univariate methods were used to estimate the "true" quality signal of an indicator based on information from the specific indicator and 1 year of data.
• Multivariate signal extraction (MSX) methods were used to estimate the "true" quality signal based on information from a set of indicators and multiple years of data. In most cases, MSX methods extracted additional signal, which provided much more precise estimates of true hospital or area quality.
Bias. To determine the sensitivity of potential QIs to bias from differences in patient severity, unadjusted performance measures for specific hospitals were compared with performance measures that had been adjusted for age and gender. All of the PQIs and some of the Inpatient Quality Indicators (IQIs) could only be risk-adjusted for age and sex. The 3M™ APR-DRG System Version 12 with Severity of Illness and Risk of Mortality subclasses was used for risk adjustment of the utilization indicators and the in-hospital mortality indicators, respectively. Five empirical tests were performed to investigate the degree of bias in an indicator:
• Rank correlation coefficient of the area or hospital with (and without) risk adjustment—gives the overall impact of risk adjustment on relative provider or area performance.
• Average absolute value of change relative to mean—highlights the amount of absolute change in performance, without reference to other providers' performance.
• Percentage of highly ranked hospitals that remain in high decile—reports the percentage of hospitals or areas that are in the highest deciles without risk adjustment that remain there after risk adjustment is performed.
• Percentage of lowly ranked hospitals that remain in low decile—reports the percentage of hospitals or areas that are in the lowest deciles without risk adjustment that remain there after risk adjustment is performed.
• Percentage that change more than two deciles—identifies the percentage of hospitals whose relative rank changes by a substantial percentage (more than 20%) with and without risk adjustment.
Construct validity. Construct validity analyses provided information regarding the relatedness or independence of the indicators. If quality indicators do indeed measure quality, then two measures of the same construct would be expected to yield similar results. The team used factor analysis to reveal underlying patterns among large numbers of variables—in this case, to measure the degree of relatedness between indicators. In addition, they analyzed correlation matrices for indicators.

1c.7 Summary of Controversy/Contradictory Evidence: See the following for a complete treatment of the topic: http://www.qualityindicators.ahrq.gov/downloads/pqi/pqi_guide_v31.pdf
Note: The Literature Review Findings column summarizes evidence specific to each potential concern on the link between the PQIs and quality of care, as described in step 3 above. A question mark (?) indicates that the concern is theoretical or suggested, but no specific evidence was found in the literature. A check mark indicates that the concern has been demonstrated in the literature.

1c.8 Citations for Evidence (*other than guidelines*): Updated citations will be presented in the May Steering Committee meeting

http://www.qualityindicators.ahrq.gov/downloads/pqi/pqi_guide_v31.pdf

1c.9 Quote the Specific guideline recommendation (*including guideline number and/or page number*):
Not applicable

1c.10 Clinical Practice Guideline Citation: Not applicable
1c.11 National Guideline Clearinghouse or other URL: Not applicable

1c.12 Rating of strength of recommendation (*also provide narrative description of the rating and by whom*):
Not applicable

1c.13 Method for rating strength of recommendation (*If different from USPSTF system, also describe rating and how it relates to USPSTF)*:
Not applicable

1c.14 Rationale for using this guideline over others:
Not applicable

TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Importance to Measure and Report?*	**1**
Steering Committee: Was the threshold criterion, *Importance to Measure and Report*, met? **Rationale:**	**1** **Y☐** **N☐**
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. (evaluation criteria)	**Eval Rating**
2a. MEASURE SPECIFICATIONS	
S.1 Do you have a web page where current detailed measure specifications can be obtained? **S.2 If yes, provide web page URL:** **2a. Precisely Specified**	
2a.1 Numerator Statement (*Brief, text description of the numerator - what is being measured about the target population, e.g. target condition, event, or outcome***):** All discharges with ICD-9-CM diagnosis code for perforations or abscesses of appendix in any field among cases meeting the inclusion rules for the denominator. **2a.2 Numerator Time Window (***The time period in which cases are eligible for inclusion in the numerator***):** Time window can be determined by user, but is generally a calendar year. **2a.3 Numerator Details (***All information required to collect/calculate the numerator, including all codes, logic, and definitions***):** All discharges with ICD-9-CM diagnosis code for perforations or abscesses of appendix in any field among cases meeting the inclusion rules for the denominator. Include ICD-9-CM diagnosis codes: 5400 AC APPEND W PERITONITIS 5401 ABSCESS OF APPENDIX Exclude cases: • transfer from a hospital (different facility) • transfer from a skilled Nursing Facility (SNF) or Intermediate Care Facility (ICF) • transfer from another health care facility • MDC 14 (pregnancy, childbirth, and puerperium)	
2a.4 Denominator Statement (*Brief, text description of the denominator - target population being measured***):** All non-maternal discharges of age 18 years and older in Metro Area1 or county with diagnosis code for appendicitis in any field. **2a.5 Target population gender:** Female, Male **2a.6 Target population age range:** 18 and older **2a.7 Denominator Time Window (***The time period in which cases are eligible for inclusion in the denominator***):** Calendar year **2a.8 Denominator Details (***All information required to collect/calculate the denominator - the target population being measured - including all codes, logic, and definitions***):** All non-maternal discharges of age 18 years and older in Metro Area1 or county with diagnosis code for appendicitis in any field.	**2a-specs** **C☐** **P☐** **M☐** **N☐**

Include ICD-9-CM diagnosis codes (population at risk):
5400
AC APPEND W PERITONITIS
5401
ABSCESS OF APPENDIX
5409
ACUTE APPENDICITIS NOS
541
APPENDICITIS NOS

2a.9 Denominator Exclusions (*Brief text description of exclusions from the target population***):** Not applicable.

2a.10 Denominator Exclusion Details (*All information required to collect exclusions to the denominator, including all codes, logic, and definitions***):**
Not applicable.

2a.11 Stratification Details/Variables (*All information required to stratify the measure including the stratification variables, all codes, logic, and definitions***):**
Observed rates may be stratified by gender, age (5-year age groups), race / ethnicity.

2a.12-13 Risk Adjustment Type: Risk adjustment method widely or commercially available

2a.14 Risk Adjustment Methodology/Variables (*List risk adjustment variables and describe conceptual models, statistical models, or other aspects of model or method***):**
The predicted value for each case is computed using a logistic regression model and covariates for gender and age in years (in 5-year age groups). The reference population used in the model is the universe of discharges for states that participate in the HCUP State Inpatient Databases (SID) for the year 2007 (updated annually), a database consisting of 43 states and approximately 30 million adult discharges. The expected rate is computed as the sum of the predicted value for each case divided by the number of cases for the unit of analysis of interest (i.e., county, state, and region). The risk adjusted rate is computed using indirect standardization as the observed rate divided by the expected rate, multiplied by the reference population rate

2a.15-17 Detailed risk model available Web page URL or attachment: URL
http://www.qualityindicators.ahrq.gov/downloads/pqi/PQI%20Risk%20Adjustment%20Tables%20(Version%204%202).pdf

2a.18-19 Type of Score: Rate/proportion
2a.20 Interpretation of Score: Better quality = Lower score
2a.21 Calculation Algorithm (*Describe the calculation of the measure as a flowchart or series of steps***):**
Each indicator is expressed as a rate, is defined as outcome of interest / population at risk or numerator / denominator. The AHRQ Quality Indicators (AHRQ QI) software performs five steps to produce the rates. 1) Discharge-level data is used to mark inpatient records containing the outcome of interest and 2) the population at risk. For provider indicators, the population at risk is also derived from hospital discharge records; for area indicators, the population at risk is derived from U.S. Census data. 3) Calculate observed rates. Using output from steps 1 and 2, rates are calculated for user-specified combinations of stratifiers. 4) Calculate expected rates. Regression coefficients from a reference population database are applied to the discharge records and aggregated to the provider or area level. 5) Calculate risk-adjusted rate. Use the indirect standardization to account for case-mix. 6) Calculate smoothed rate. A Univariate shrinkage factor is applied to the risk-adjusted rates. The shrinkage estimate reflects a reliability adjustment unique to each indicator. Full information on calculation algorithms and specifications can be found at http://qualityindicators.ahrq.gov/PQI_download.htm

2a.22 Describe the method for discriminating performance *(e.g., significance testing)***:**
Significance testing is not prescribed by the software. Users may calculate a confidence interval for the risk-adjusted rates and a posterior probability interval for the smoothed rates at a 95% or 99% level. Users may define the relevant benchmark and the methods of discriminating performance according to their application.

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)*:

Not applicable

2a.24 **Data Source (***Check the source(s) for which the measure is specified and tested)*
Electronic administrative data/claims

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.***):**
The data source is hospital discharge data such as the HCUP State Inpatient Databases (SID) or equivalent using UB-04 coding standards. The data collection instrument is public-use AHRQ QI software available in SAS or Windows versions.

2a.26-28 **Data source/data collection instrument reference web page URL or attachment:** URL None
http://www.qualityindicators.ahrq.gov/software.htm

2a.29-31 **Data dictionary/code table web page URL or attachment:** URL None
http://www.qualityindicators.ahrq.gov/downloads/winqi/AHRQ_QI_Windows_Software_Documentation_V41a.pdf

2a.32-35 **Level of Measurement/Analysis** (*Check the level(s) for which the measure is specified and tested)*
Population: states, Population: counties or cities

2a.36-37 **Care Settings (***Check the setting(s) for which the measure is specified and tested)*
Ambulatory Care: Office

2a.38-41 **Clinical Services** (*Healthcare services being measured, check all that apply*)
Clinicians: Physicians (MD/DO)

TESTING/ANALYSIS

2b. Reliability testing

2b.1 **Data/sample** *(description of data/sample and size)*: AHRQ 2007 State Inpatient Databases (SID) with 4,000 hospitals and 30 million adult discharges

2b.2 **Analytic Method** *(type of reliability & rationale, method for testing)*:
Expert panels and empirical analysis

2b.3 **Testing Results** *(reliability statistics, assessment of adequacy in the context of norms for the test conducted)*:
Perforated appendix occurs in one-fourth to one-third of hospitalized acute appendicitis patients.39 Based on empirical evidence, this indicator is precise, with a raw area level rate of 33.3% and a substantial standard deviation of 14.4%.
Relative to other indicators, a higher percentage of the variation occurs at the area level rather than the discharge level. However, the signal ratio (i.e., the proportion of the total variation across areas that is truly related to systematic differences in area performance rather than random variation) is low, at 26.5%, indicating that much of the observed differences in age-sex adjusted rates likely do not represent true differences across areas. Applying multivariate signal extraction methods can improve estimation of true differences in area performance.

2b C☐ P☐ M☐ N☐

2c. Validity testing

2c.1 **Data/sample** *(description of data/sample and size)*: AHRQ 2007 State Inpatient Databases (SID) with 4,000 hospitals and 30 million adult discharges

2c.2 **Analytic Method** *(type of validity & rationale, method for testing)*:
Expert panels and empirical analysis

2c.3 **Testing Results** *(statistical results, assessment of adequacy in the context of norms for the test conducted)*:
Braveman et al. found that the rate of perforated appendix was 50% higher for patients with no insurance or

2c C☐ P☐ M☐ N☐

Medicaid than HMO-covered patients, and 20% higher for patients with private fee-for-service insurance. A follow-up study by Blumberg et al. concluded that the high rate of perforated appendix in the black population at an HMO may be explained by delay in seeking care, rather than differences in the quality of health care.42 Weissman et al. found that uninsured (but not Medicaid) patients are at increased risk for ruptured appendix after adjusting for age and sex.43
Based on empirical results, areas with high rates of perforated appendix admissions tend to have lower rates of admissions for other ACSCs.

2d. Exclusions Justified

2d.1 Summary of Evidence supporting exclusion(s):
Exclusions remove cases where the outcome of interest is less likely to be preventable or with no or very low risk

2d.2 Citations for Evidence:
Updated citations will be presented in the May Steering Committee meeting

Refinement of the HCUP Quality Indicators (Technical Review), May 2001
http://qualityindicators.ahrq.gov/downloads/technical/qi_technical_review.zip

2d.3 Data/sample *(description of data/sample and size)*: AHRQ 2007 State Inpatient Databases (SID) with 4,000 hospitals and 30 million adult discharges

2d.4 Analytic Method *(type analysis & rationale)*:
Expert panel and descriptive analyses stratified by exclusion categories

2d.5 Testing Results *(e.g., frequency, variability, sensitivity analyses)*:
Refinement of the HCUP Quality Indicators (Technical Review), May 2001
http://qualityindicators.ahrq.gov/downloads/technical/qi_technical_review.zip

2d
C☐ P☐ M☐ N☐ NA☐

2e. Risk Adjustment for Outcomes/ Resource Use Measures

2e.1 Data/sample *(description of data/sample and size)*: AHRQ 2007 State Inpatient Databases (SID) with 4,000 hospitals and 30 million adult discharges

2e.2 Analytic Method *(type of risk adjustment, analysis, & rationale)*:
Expert panel and descriptive analyses stratified by exclusion categories

2e.3 Testing Results *(risk model performance metrics)*:
Risk-adjustment models use a standard set of categories based on readily available classification systems for demographics, severity of illness and comorbidities. Within each category, covariates are initially selected based on a minimum of 30 cases in the outcome of interest. Then a stepwise regression process on a development sample is used to select a parsimonious set of covariates where $p<.05$. Model is then tested on a validation sample

2e.4 If outcome or resource use measure is not risk adjusted, provide rationale: Not applicable

2e
C☐ P☐ M☐ N☐ NA☐

2f. Identification of Meaningful Differences in Performance

2f.1 Data/sample from Testing or Current Use *(description of data/sample and size)*: AHRQ 2007 State Inpatient Databases (SID) with 4,000 hospitals and 30 million adult discharges

2f.2 Methods to identify statistically significant and practically/meaningfully differences in performance *(type of analysis & rationale)*:
Posterior probability distribution parameterized using the Gamma distribution

2f.3 Provide Measure Scores from Testing or Current Use *(description of scores, e.g., distribution by quartile, mean, median, SD, etc.; identification of statistically significant and meaningfully differences in performance)*:
5th 25th Median 75th 95th

2f
C☐ P☐ M☐ N☐

0.211924 0.250104 0.279212 0.310497 0.359439	
2g. Comparability of Multiple Data Sources/Methods **2g.1 Data/sample** *(description of data/sample and size)*: Not applicable **2g.2 Analytic Method** *(type of analysis & rationale)*: Not applicable **2g.3 Testing Results** *(e.g., correlation statistics, comparison of rankings)*: Not applicable	**2g** C☐ P☐ M☐ N☐ NA ☐
2h. Disparities in Care **2h.1 If measure is stratified, provide stratified results** *(scores by stratified categories/cohorts)*: Median income of patient´s ZIP code: 1) Estimate 2) Standard error 3) P-value: Relative to marked group-c 4) P-value: 2007 relative to 2006 First quartile (lowest income) 300.240 4.501 0.000 0.097 Second quartile 283.229 4.240 0.000 0.119 Third quartile 283.319 4.064 0.000 0.857 Fourth quartile (highest income)c 257.117 3.938 0.148 **2h.2 If disparities have been reported/identified, but measure is not specified to detect disparities, provide follow-up plans:** Users may stratify based on gender and race/ethnicity	**2h** C☐ P☐ M☐ N☐ NA ☐
TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Scientific Acceptability of Measure Properties?*	**2**
Steering Committee: Overall, to what extent was the criterion, *Scientific Acceptability of Measure Properties*, met? **Rationale:**	***2*** **C** ☐ **P** ☐ **M** ☐ **N** ☐
3. USABILITY	
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)	Eval Rating
3a. Meaningful, Understandable, and Useful Information **3a.1 Current Use:** In use **3a.2 Use in a public reporting initiative (disclosure of performance results to the public at large)** (*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*): 1) State of California: http://www.oshpd.ca.gov/hid/products/preventable_hospitalizations/pdfs/PH_REPORT_WEB.pdf 2) State of New Jersey: Find and Compare Quality Care in New Jersey Hospitals, http://www.nj.gov/health/healthcarequality/ 3) Niagara Health Quality Coalition and Alliance for Quality Health Care: New York State Hospital Report Card, http://www.myhealthfinder.com/ 4) State of Texas: Reports on Hospital Performance, http://www.dshs.state.tx.us/thcic/ 5) Maine: Maine Health Data Organization: http://gateway.maine.gov/mhdo2008Monahrq/home.html 6) Hawaii: Hawaii Health Information Corporation: http://hhic.org/publicreports.asp 7) Nevada: Nevada Compare Care: http://www.nevadacomparecare.net/monahrq/home.html	**3a** C☐ P☐ M☐ N☐

In use as a part of the AHRQ Quality Indicators. They are reported in numerous forums including: http://hcupnet.ahrq.gov/HCUPnet.jsp?Id=EB57801381F71C41&Form=MAINSEL&JS=Y&Action=%3E%3ENext%3E%3E&_MAINSEL=AHRQ%20Quality%20Indicators This measure is used in the Monahrq system that is provide for public reporting and quality improvement throughout the United States: http://monahrq.ahrq.gov/ 3a.3 **If used in other programs/initiatives (***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***):** The software is publicly available free of charge (www.qualityindicators.ahrq.gov/). Users apply the software to their own administrative data (UB-04 or claims) that is readily available. Hundreds of users have downloaded AHRQ Quality Indicator software. This measure is used in the Monahrq system that is provide for public reporting and quality improvement throughout the United States: http://monahrq.ahrq.gov/ **Testing of Interpretability** (*Testing that demonstrates the results are understood by the potential users for public reporting and quality improvement*) 3a.4 **Data/sample** *(description of data/sample and size)***:** AHRQ 2007 State Inpatient Databases (SID) with 4,000 hospitals and 30 million adult discharges 3a.5 **Methods** *(e.g., focus group, survey, QI project)***:** AHRQ has developed the Quality Indicators Mapping Tool to facilitate use of the Prevention Quality Indicators and incorporated the tool into the MONAHRQ software, which has undergone user beta testing and is now available for download 3a.6 **Results** *(qualitative and/or quantitative results and conclusions)***:** Several states including Maine, Hawaii and Nevada have begun public reporting using the MONAHRQ tool. See http://monahrq.ahrq.gov/	
3b/3c. Relation to other NQF-endorsed measures 3b.1 **NQF # and Title of similar or related measures:** No related measures found.	
(for NQF staff use) **Notes on similar/related endorsed or submitted measures:**	
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 or different topic but same target population): 3b.2 **Are the measure specifications harmonized? If not, why?** No related measures found.	**3b** C☐ P☐ M☐ N☐ NA ☐
3c. Distinctive or Additive Value 3c.1 **Describe the distinctive, improved, or additive value this measure provides to existing NQF-endorsed measures:** No related measures found. 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:** No related measures found.	**3c** C☐ P☐ M☐ N☐ NA ☐
TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Usability?*	**3**
Steering Committee: Overall, to what extent was the criterion, *Usability*, met? **Rationale:**	**3** C☐ P☐

	M☐ N☐
4. FEASIBILITY	
Extent to which the required data are readily available, retrievable without undue burden, and can be implemented for performance measurement. (evaluation criteria)	Eval Rating
4a. Data Generated as a Byproduct of Care Processes 4a.1-2 **How are the data elements that are needed to compute measure scores generated?** 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)	4a C☐ P☐ M☐ N☐
4b. Electronic Sources 4b.1 **Are all the data elements available electronically?** (*elements that are needed to compute measure scores are in defined, computer-readable fields, e.g., electronic health record, electronic claims*) Yes 4b.2 **If not, specify the near-term path to achieve electronic capture by most providers.**	4b C☐ P☐ M☐ N☐
4c. Exclusions 4c.1 **Do the specified exclusions require additional data sources beyond what is required for the numerator and denominator specifications?** No 4c.2 **If yes, provide justification.**	4c C☐ P☐ M☐ N☐ NA☐
4d. Susceptibility to Inaccuracies, Errors, or Unintended Consequences 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.** Coding professionals follow detail guidelines, are subject to training and credentialing requirements, peer review and audit. Perforated appendix rates vary systematically by race, although the cause is unknown. Areas with high rates of perforated appendix may want to target points of intervention by using chart reviews and other supplemental data to investigate the reasons for delay in receiving surgery. Hospital contributions to the overall area rate may be particularly useful for this indicator, because misdiagnoses and other delays in receiving surgery in an emergency room may contribute substantially to the rate.	4d C☐ P☐ M☐ N☐
4e. Data Collection Strategy/Implementation 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:** As a PQI, admission for perforated appendix is not a measure of hospital quality, but rather one measure of outpatient and other health care. Relative to other indicators, a higher percentage of the variation occurs at the area level rather than the discharge level. However, the signal ratio (i.e., the proportion of the total variation across areas that is truly related to systematic differences in area performance rather than random variation) is low, at 26.5%, indicating that much of the observed differences in age-sex adjusted rates likely do not represent true differences across areas. Applying multivariate signal extraction methods can improve estimation of true differences in area performance. 4e.2 **Costs to implement the measure** (*costs of data collection, fees associated with proprietary measures*)**:**	4e C☐ P☐ M☐ N☐

All data necessary to calculate this measure are routinely collected for hospital administrative purposes. The software for calculating the measure is available for free at: http://www.qualityindicators.ahrq.gov/software.htm 4e.3 **Evidence for costs:** All data necessary to calculate this measure are routinely collected for hospital administrative purposes. The software for calculating the measure is available for free at: http://www.qualityindicators.ahrq.gov/software.htm 4e.4 **Business case documentation:** All data necessary to calculate this measure are routinely collected for hospital administrative purposes. The software for calculating the measure is available for free at: http://www.qualityindicators.ahrq.gov/software.htm	
TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Feasibility?*	**4**
Steering Committee: Overall, to what extent was the criterion, *Feasibility*, met? **Rationale:**	**4** **C☐** **P☐** **M☐** **N☐**
RECOMMENDATION	
(for NQF staff use) **Check if measure is untested and only eligible for time-limited endorsement.**	**Time-limited ☐**
Steering Committee: Do you recommend for endorsement? **Comments:**	**Y☐** **N☐** **A☐**
CONTACT INFORMATION	
Co.1 **Measure Steward (Intellectual Property Owner)** Co.1 **Organization** Agency for Healthcare Research and Quality, 540 Gaither Road, Rockville, Maryland, 20850 Co.2 **Point of Contact** John, Bott, MSSW, MBA, john.bott@ahrq.hhs.gov, 301-427-1317-	
Measure Developer If different from Measure Steward Co.3 **Organization** Agency for Healthcare Research and Quality, 540 Gaither Road, Rockville, Maryland, 20850 Co.4 **Point of Contact** John, Bott, MSSW, MBA, john.bott@ahrq.hhs.gov, 301-427-1317-	
Co.5 **Submitter If different from Measure Steward POC** John, Bott, MSSW, MBA, john.bott@ahrq.hhs.gov, 301-427-1317-, Agency for Healthcare Research and Quality	
Co.6 **Additional organizations that sponsored/participated in measure development** UC Davis, Stanford University, Battelle Memorial Institute	
ADDITIONAL INFORMATION	
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.** None	
Ad.2 **If adapted, provide name of original measure:** None	

Ad.3-5 If adapted, provide original specifications URL or attachment
Measure Developer/Steward Updates and Ongoing Maintenance **Ad.6 Year the measure was first released:** 2001 **Ad.7 Month and Year of most recent revision:** 10, 2010 **Ad.8 What is your frequency for review/update of this measure?** Annual **Ad.9 When is the next scheduled review/update for this measure?** 05, 2011
Ad.10 Copyright statement/disclaimers: The AHRQ QI software is publicly available; no copyright disclaimers
Ad.11 -13 Additional Information web page URL or attachment:
Date of Submission (*MM/DD/YY*)**:** 04/05/2011

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 #:** 0284 **NQF Project:** Surgery Endorsement Maintenance 2010
MEASURE DESCRIPTIVE INFORMATION
De.1 **Measure Title:** Surgery patients on beta blocker therapy prior to admission who received a beta blocker during the perioperative period
De.2 **Brief description of measure:** Percentage of patients on beta blocker therapy prior to admission who received a beta blocker during the perioperative period
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** NA
De.4 **National Priority Partners Priority Area:** Safety De.5 **IOM Quality Domain:** Safety De.6 **Consumer Care Need:** Staying healthy

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
A. The measure is in the public domain or an intellectual property (measure steward agreement) is signed. *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.* 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 A.2 **Indicate if Proprietary Measure** (*as defined in measure steward agreement*)**:** A.3 **Measure Steward Agreement:** Government entity and in the public domain - no agreement necessary A.4 **Measure Steward Agreement attached:**	**A** Y☐ N☐
B. The measure owner/steward verifies there is an identified responsible entity and process to maintain and	**B**

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	Y☐ N☐
C. The intended use of the measure includes both public reporting and quality improvement. ►**Purpose:** Public reporting, Internal quality improvement Accountability, Payment incentive, Accreditation	**C** Y☐ N☐
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	**D** Y☐ N☐
(for NQF staff use) **Have all conditions for consideration been met?** **Staff Notes to Steward** (*if submission returned*)**:**	**Met** Y☐ N☐
Staff Notes to Reviewers (*issues or questions regarding any criteria*)**:**	
Staff Reviewer Name(s):	

TAP/Workgroup Reviewer Name:	
Steering Committee Reviewer Name:	
1. IMPORTANCE TO MEASURE AND REPORT	
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**	**Eval Rating**
(for NQF staff use) **Specific NPP goal**:	
1a.1 **Demonstrated High Impact Aspect of Healthcare:** Affects large numbers 1a.2 1a.3 **Summary of Evidence of High Impact:** Concerns regarding the discontinuation of beta-blocker therapy in the perioperative period have existed for several decades. Shammash and colleagues studied a total of 140 patients who received beta-blockers preoperatively. Mortality in the 8 patients who had beta-blockers discontinued postoperatively (50%) was significantly greater than in the 132 patients in whom beta-blockers were continued. Hoeks and colleagues studied 711 consecutive peripheral vascular surgery patients. After adjustment for potential confounders and the propensity of its use, continuous beta-blocker use remained significantly associated with a lower 1-year mortality than among nonusers. In contrast, beta-blocker withdrawal was associated with an increased risk of 1-year mortality compared with nonusers. 1a.4 **Citations for Evidence of High Impact:** -Hoeks SE, Scholte Op Reimer WJ, van Urk H, et al. Increase of 1-year mortality after perioperative beta-blocker withdrawal in endovascular and vascular surgery patients. Eur J Vasc Endovasc Surg 2007;33:13-9. -Shammash JB, Trost JC, Gold JM, et al. Perioperative beta-blocker withdrawal and mortality in vascular surgical patients. Am Heart J. 2001;141:148-153. PMID: 11136500.	**1a** C☐ P☐ M☐ N☐
1b. Opportunity for Improvement 1b.1 **Benefits (improvements in quality) envisioned by use of this measure:** Mortality in patients who have	**1b** C☐ P☐

their routine beta-blockers discontinued postoperatively is greater than in patients in whom beta-blockers are continued. Beta-blocker withdrawal has been associated with an increased risk of mortality compared with nonusers.

1b.2 Summary of data demonstrating performance gap (variation or overall poor performance) across providers:
Measure is reported as a rate. Measure has been collected since Q1 2009 with rates as followed:
1Q09- 89.2%
2Q09- 90.5%
3Q09- 91.5%
4Q09- 92.5%
1Q10- 93.1%

1b.3 Citations for data on performance gap:
1Q2010 data, from 3252 reporting hospitals:
Numerator: 106,625
Denominator: 114,496

1b.4 Summary of Data on disparities by population group:
A disparities report is attached to this submission.

1b.5 Citations for data on Disparities:
The attached disparities report uses 2009 data from the clinical data warehouse.

M☐ N☐

1c. Outcome or Evidence to Support Measure Focus

1c.1 Relationship to Outcomes (*For non-outcome measures, briefly describe the relationship to desired outcome. For outcomes, describe why it is relevant to the target population*)**:** Monitoring whether routine beta-blocker are continued postoperatively can affect adverse cardiac events.

1c.2-3. Type of Evidence: Randomized controlled trial, Expert opinion, Systematic synthesis of research, Meta-analysis

1c.4 Summary of Evidence (*as described in the criteria; for outcomes, summarize any evidence that healthcare services/care processes influence the outcome*)**:**
The American College of Cardiology/American Heart Association site continuation of beta-blocker therapy in the perioperative period as a class I indication, and accumulating evidence suggests that titration to maintain tight heart rate control should be the goal.

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

1c.6 Method for rating evidence: Rating is based upon the estimate of certainty (Precision) of treatment effect
*Data available from clinical trials or registries about the usefulness/efficacy in different subpopulations, such as gender, age, history of diabetes, history of prior myocardial infarction, history of heart failure, and prior aspirin use. A recommendation with Level of Evidence B or C does not imply that the recommendation is weak. Many important clinical questions addressed in the guidelines do not lend themselves to clinical trials. Even though randomized trials are not available, there may be a very clear clinical consensus that a particular test or therapy is useful or effective

1c.7 Summary of Controversy/Contradictory Evidence: No contradictory evidence.

1c.8 Citations for Evidence (*other than guidelines***):** Selected References:
-Manual of Medical Therapeutics. Department of Medicine Washington University, School of Medicine, St. Louis, MO, GA Ewald and CR McKenzie editors. 28th Edition, 1995. PMID: 0000000.
-Belzberg H, Rivkind AI. Preoperative cardiac preparation. Chest. 1999;115:82S-95S. PMID: 10331339.

Poldermans D, Boersma E, Bax JJ, et al, for the DECREASE Study Group. The effect of bisoprolol on

1c C☐ P☐ M☐ N☐

perioperative mortality and myocardial infarction in high-risk patients undergoing vascular surgery. N Engl J Med. 1999;24:1789-1794. PMID: 10588963.

Shammash JB, Trost JC, Gold JM, et al. Perioperative beta-blocker withdrawal and mortality in vascular surgical patients. Am Heart J. 2001;141:148-153. PMID: 11136500.

Boersma E, Poldermans D, Bax JJ, et al, for the Dutch Echocardiographic Cardiac Risk Evaluation Applying Stress Echocardiography (DECREASE) Study Group. Predictors of cardiac events after major vascular surgery: role of clinical characteristics, dobutamine echocardiography.JAMA 2001 Apr 11;285(14):1865-73. PMID:11308400.

Pasternack PF, Imparato AM, Baumann FG, et al. The hemodynamics of beta-blockade in patients undergoing abdominal aortic aneurysm repair. Circulation. 1987;76(suppl 3, pt 2):III-1-7. PMID:3621532.

Yaeger RA, Moneta GL, Edwards JM, et al. Reducing perioperative myocardial infarction following vascular surgery. The potential role of beta-blockade. Arch Surg 1995;130(8):869. PMID:7632148.

Yusuf S, Peto R, Lewis J, Collins R, et al. Beta Blockade during and after myocardial infarction: an overview of the randomized trials. Prog Cardiovasc Dis 1985; 27: 335-371. PMID: 2858114.

McGory ML, Maggard MA, Ko CY. A meta-analysis of perioperative beta blockade: What is the actual risk reduction? Surgery. 2005 Aug;138(2):171-179. PMID: 16153424.

Goldman L. Noncardiac surgery in patients receiving propranolol. Case reports and recommended approach. Arch Intern Med 1981;141:193-6.

Hoeks SE, Scholte Op Reimer WJ, van Urk H, et al. Increase of 1-year mortality after perioperative beta-blocker withdrawal in endovascular and vascular surgery patients. Eur J Vasc Endovasc Surg 2007;33:13–9.

Lindenauer PK, Pekow P, Wang K, Mamidi DK, Gutierrez B, Benjamin EM. Perioperative beta-blocker therapy and mortality after major noncardiac surgery. N Engl J Med 2005; 353:349-361.

1c.9 Quote the Specific guideline recommendation (*including guideline number and/or page number***):**
Beta blockers should be continued in patients undergoing surgery who are receiving beta blockers to treat angina, symptomatic arrhythmias, hypertension, or other ACC/AHA Class I guideline indications. (Level of Evidence: C)

1c.10 Clinical Practice Guideline Citation: Fleisher LA, Beckman JA, Brown KA, Calkins H, et al. ACC/AHA 2007
Specifications Manual for National Hospital Inpatient Quality Measures
Discharges 10-01-10 (4Q10) through 03-31-11 (1Q11) SCIP-Card-2-3
Guidelines on perioperative cardiovascular evaluation and care for noncardiac surgery: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Writing Committee to Revise the 2002 Guidelines on Perioperative Cardiovascular Evaluation for Noncardiac Surgery). J Am Coll Cardiol 2007; 50: e159-241.
1c.11 National Guideline Clearinghouse or other URL: http://www.guideline.gov/content.aspx?id=11510

1c.12 Rating of strength of recommendation (*also provide narrative description of the rating and by whom***):**
Class I

1c.13 Method for rating strength of recommendation (*If different from USPSTF system, also describe rating and how it relates to USPSTF)*:
CLASS I

Benefit >>> Risk
Procedure/Treatment SHOULD be performed/ administered
CLASS IIa

Benefit >> Risk Additional studies with focused objectives needed IT IS REASONABLE to perform procedure/ administer treatment CLASS IIb Benefit > Risk Additional studies with broad objectives needed; additional registry data would be helpful Procedure/Treatment MAY BE CONSIDERED CLASS III Risk > Benefit No additional studies needed Procedure/Treatment should NOT be performed/ administered SINCE IT IS NOT HELPFUL AND MAY BE HARMFUL The American College of Cardiology/American Heart Association (ACC/AHA) classification of the recommendations for patient evaluation and treatment (classes I-III) and the levels of evidence (A-C) are defined 1c.14 **Rationale for using this guideline over others:** Experts in the subject under consideration have been selected from the American College of Cardiology (ACC) Foundation and the American Heart Association (AHA) to examine subject-specific data and write guidelines. The process includes additional representatives from other medical practitioner and specialty groups when appropriate. Writing groups are specifically charged to perform a formal literature review, weigh the strength of evidence for or against a particular treatment or procedure, and include estimates of expected health outcomes where data exist. Patient-specific modifiers, comorbidities, and issues of patient preference that may influence the choice of particular tests or therapies are considered, as well as frequency of follow-up and cost-effectiveness.	
TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Importance to Measure and Report?*	**1**
Steering Committee: Was the threshold criterion, *Importance to Measure and Report*, met? **Rationale:**	**1** **Y☐** **N☐**
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. (evaluation criteria)	**Eval Rating**
2a. MEASURE SPECIFICATIONS	
S.1 **Do you have a web page where current detailed measure specifications can be obtained?** S.2 **If yes, provide web page URL:** **2a. Precisely Specified**	
2a.1 **Numerator Statement (***Brief, text description of the numerator - what is being measured about the target population, e.g. target condition, event, or outcome***):** Surgery patients on beta blocker therapy prior to admission who receive a beta blocker during the perioperative period 2a.2 **Numerator Time Window (***The time period in which cases are eligible for inclusion in the numerator***):** The perioperative period = 24 hours prior to surgical incision through discharge from post-anesthesia care/recovery area. NOTE: After input from the TEP, there are changes proposed to this measure. The perioperative timeframe will be expanded and the hourly parameters removed. The perioperative timeframe will use calendar days around the day of surgery. All changes are explained in the Release Notes section of this online submission. 2a.3 **Numerator Details (***All information required to collect/calculate the numerator, including all codes,*	**2a-specs** **C☐** **P☐** **M☐** **N☐**

logic, and definitions):
Data element:
Beta-Blocker Perioperative

2a.4 **Denominator Statement** (*Brief, text description of the denominator - target population being measured*):
All surgery patients on beta blocker therapy prior to arrival

2a.5 **Target population gender:** Female, Male
2a.6 **Target population age range:** Patients >/= 18 years of age

2a.7 **Denominator Time Window** (*The time period in which cases are eligible for inclusion in the denominator*):
Entire inpatient acute admission

2a.8 **Denominator Details** (*All information required to collect/calculate the denominator - the target population being measured - including all codes, logic, and definitions*):
Data Elements:
Admission Date
Anesthesia Start Date
Beta-Blocker Current Medication
Beta-Blocker During Pregnancy
Birthdate
Clinical Trial
Discharge Date
ICD-9-CM Principal Procedure Code
Laparoscope
Perioperative Death
Reason for Not Administering Beta-Blocker-Perioperative
Sex

2a.9 **Denominator Exclusions** (*Brief text description of exclusions from the target population*): •
Patients less than 18 years of age
- Patients who have a Length of Stay greater than 120 days
- Patients enrolled in clinical trials
- Patients whose ICD-9-CM principal procedure occurred prior to the date of admission
- Patients who expired during the perioperative period
- Pregnant patients taking a beta-blocker prior to arrival
- Patients with a documented Reason for Not Administering Beta-Blocker-Perioperative
- Patients with Ventriular Assist Devices or Heart Transplantation

2a.10 **Denominator Exclusion Details** (*All information required to collect exclusions to the denominator, including all codes, logic, and definitions*):
Data Elements:
Beta-Blocker During Pregnancy
Clinical Trial

Perioperative Death
Reason for Not Administering Beta-Blocker-Perioperative

2a.11 **Stratification Details/Variables** (*All information required to stratify the measure including the stratification variables, all codes, logic, and definitions*):
No stratification

2a.12-13 **Risk Adjustment Type:** No risk adjustment necessary

2a.14 **Risk Adjustment Methodology/Variables** (*List risk adjustment variables and describe conceptual models, statistical models, or other aspects of model or method*):

2a.15-17 Detailed risk model available Web page URL or attachment:

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***):**
Variable Key: Patient Age, Surgery Days
1.Start processing. Run cases that are included in the Surgical Care Improvement Project (SCIP) Initial Patient Population and pass the edits defined in the Transmission Data Processing Flow: Clinical through this measure.
2.Calculate Patient Age. The Patient Age, in years, is equal to the Admission Date minus the Birthdate. Use the month and day portion of admission date and birthdate to yield the most accurate age.
3.Check Patient Age
a.If Patient Age is less than 18 years, the case will proceed to a Measure Category Assignment of B and will not be in the Measure Population. Stop processing.
b.If Patient Age is greater than or equal to 18 years, continue processing and proceed to Laparoscope.
4.Check Laparoscope
a.If Laparoscope is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
b.If Laparoscope equals 1 or 3, the case will proceed to a Measure Category Assignment of B and will not be in the Measure Population. Stop processing.
c.If Laparoscope equals 2, continue processing and proceed to Clinical Trial.
5.Check Clinical Trial
a.If Clinical Trial is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
b.If Clinical Trial equals Yes, the case will proceed to a Measure Category Assignment of B and will not be in the Measure Population. Stop processing.
c.If Clinical Trial equals No, continue processing and proceed to Anesthesia Start Date.
6.Check Anesthesia Start Date
a.If the Anesthesia Start Date is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
b.If the Anesthesia Start Date equals Unable To Determine, the case will proceed to a Measure Category Assignment of D and will be in the Measure Population. Stop processing.
c.If Anesthesia Start Date equals a Non Unable To Determine Value, continue processing and proceed to the Surgery Days calculation.
7.Calculate Surgery Days. Surgery Days, in days, is equal to the Anesthesia Start Date minus the Admission Date.
8.Check Surgery Days
a.If the Surgery Days is less than zero, the case will proceed to a Measure Category Assignment of B and will not be in the Measure Population. Stop processing.
b.If the Surgery Days is greater than or equal to zero, continue processing and proceed to Perioperative Death.
9.Check Perioperative Death
a.If Perioperative Death is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
b.If Perioperative Death equals Yes, the case will proceed to a Measure Category Assignment of B and will not be in the Measure Population. Stop processing.
c.If Perioperative Death equals No, continue processing and proceed to Beta-Blocker Current Medication.
10.Check Beta-Blocker Current Medication
a.If the Beta-Blocker Current Medication is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
b.If the Beta-Blocker Current Medication equals No, the case will proceed to a Measure Category Assignment of B and will not be in the Measure Population. Stop processing.
c.If the Beta-Blocker Current Medication equals Yes, continue processing and proceed to Sex.
11.Check Sex
a.If Sex is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
b.If Sex equals Female, continue processing and check Beta-Blocker During Pregnancy.
1.If Beta-Blocker During Pregnancy is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.

2.If Beta-Blocker During Pregnancy equals 1 or 3, the case will proceed to a Measure Category Assignment of B and will not be in the Measure Population. Stop processing.
3.If Beta-Blocker During Pregnancy equals 2, continue processing and proceed to Beta-Blocker Preoperative.
c.If Sex equals Male or Unknown, continue processing and proceed to Beta-Blocker Perioperative.
12.Check Beta-Blocker Perioperative
a.If Beta-Blocker Perioperative is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
b.If Beta-Blocker Perioperative equals Yes, the case will proceed to a Measure Category Assignment of E and will be in the Numerator Population. Stop processing.
c.If Beta-Blocker Perioperative equals No, continue processing and check Reason for Not Administering Beta-Blocker Perioperative.
13.Check Reason for Not Administering Beta-Blocker Perioperative
a.If Reason for Not Administering Beta-Blocker Perioperative is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
b.If Reason for Not Administering Beta-Blocker Perioperative equals Yes, the case will proceed to a Measure Category Assignment of B and will not be in the Measure Population. Stop processing.
c.If Reason for Not Administering Beta-Blocker Perioperative equals No, the case will proceed to a Measure Category Assignment of D and will be in the Measure Population. Stop processing.

2a.22 Describe the method for discriminating performance *(e.g., significance testing)*:
Benchmarks are established using the ABC methodology, based on the actual performance of the top facilities. ABC benchmarks identify superior performance and encourage poorer performers to improve. It is data-driven, peer-group performance feedback.
Achievable Benchmarks of Care TM: developed at the University of Alabama at Birmingham for AHRQ. This methodology identifies benchmark care levels already achieved by "best-in-class" care givers. Development of benchmarks that are realistic and achievable may help to motivate providers that are having difficulty improving care. The benchmarks represent a measureable level of excellence that always exceeds average performance. It ensures that all superior providers contribute to the benchmark but also ensures that providers with high performance but very low numbers of cases do not unduly influence benchmark levels. Additional information can be found at http://main.uab.edu/show.asp?durki=14527

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)*:
The SCIP Topic Population (common to all SCIP measures) is defined as patients admitted to the hospital for inpatient acute care with an ICD-9-CM Principal Procedure Code for SCIP as defined in Appendix A, Table 5.10 and a Length of Stay (Discharge Date - Admission Date) <= 120 days. There are eight distinct strata or sub-populations within the SCIP Topic Population, each identified by a specific group of procedure codes. The patients in each stratum are counted in the Initial Patient Population of multiple measures.

The following sample size tables for each option automatically build in the number of cases needed to obtain the required sample sizes.

Quarterly Sampling
For hospitals selecting sample cases for SCIP, a modified sampling procedure is required. Hospitals selecting sample cases for this set must ensure that each individual stratum's population and quarterly sample size meets the following conditions:
• Select within each of the seven individual measure stratum (e.g., colorectal surgery, hip arthroplasty, etc.) and the 8th SCIP stratum (Table 5.25 in Appendix A).

Quarterly Sample Size
Based on Initial Patient Population Size for the SCIP Measure Set

Hospital's Measure
Average Quarterly
Stratum Initial Patient Population Size
"N" Minimum Required
Stratum Sample Size
"n"
>/= 481 49

171-480 10% of Initial Patient Population size
17-170 17
< 17 No sampling; 100% Initial Patient Population required

Monthly Sampling
For hospitals selecting sample cases for SCIP, a modified sampling procedure is required. Hospitals selecting sample cases for this set must ensure that each individual strata population and monthly sample size meets the following conditions:
• Select within each of the seven individual measure stratum (e.g., colorectal surgery, hip arthroplasty, etc.) and the 8th SCIP stratum (Table 5.25 in Appendix A).

Monthly Sample Size
Based on Initial Patient Population Size for the SCIP Measure Set

Hospital's Measure
Average Monthly
Stratum Initial Patient Population Size
"N" Minimum Required
Stratum Sample Size
"n"
>/= 151 16
61-150 10% of Initial Patient Population size
6-60 6
<6 No sampling; 100% Initial Patient Population required

All of the SCIP measures´ specific exclusion criteria are used to filter out cases that do not belong in the measure denominator. Using SCIP-Inf-4 as an example, include cases covering all sampled strata, although the measure-specific exclusion criteria would only allow cases in the cardiac surgery stratum to be included in the denominator.

2a.24 Data Source (*Check the source(s) for which the measure is specified and tested)*
Paper medical record/flow-sheet, Electronic administrative data/claims

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.***):**
Vendor tools (electronic) or CART. CART is available for download free at http://www.qualitynet.org/dcs/ContentServer?c=Page&pagename=QnetPublic%2FPage%2FQnetTier2&cid=1138900279093

2a.26-28 Data source/data collection instrument reference web page URL or attachment: URL
http://www.qualitynet.org/dcs/ContentServer?c=Page&pagename=QnetPublic%2FPage%2FQnetTier2&cid=1138900279093

2a.29-31 Data dictionary/code table web page URL or attachment: URL
http://www.qualitynet.org/dcs/ContentServer?c=Page&pagename=QnetPublic%2FPage%2FQnetTier4&cid=1228754600169

2a.32-35 Level of Measurement/Analysis (*Check the level(s) for which the measure is specified and tested)*
Facility/Agency, Population: national, Program: QIO

2a.36-37 Care Settings (*Check the setting(s) for which the measure is specified and tested)*
Hospital

2a.38-41 Clinical Services (*Healthcare services being measured, check all that apply*)

TESTING/ANALYSIS

2b. Reliability testing

2b.1 **Data/sample** *(description of data/sample and size)*: Pilot tested during 3-state Pilot in 2004-2005. Also collected as an optional SIP data element since 2001. Pilot QIOs performed interrater reliability testing on a minimum of 5% of the cases collected for each of the 4 quarters.OH/OK:The overall percentage of agreement for the # charts was 87.49%. Ohio had an 84.61% agreement rate for 60 charts and Oklahoma had a 89.94% agreement for 51charts. KY: The average validation rate for the first period was 90%, and the third period was 95%. Our overall IRR validation rate for all hospitals combined is 93%
Has been continuously collected for the pay-for-reporting program for CMS since first quarter 2009 and is independently tested for IRR with the CDAC contractor.

2b.2 **Analytic Method** *(type of reliability & rationale, method for testing)*:
Reports on mismatches between national abstractors and the independent abstraction/validation contractor are reviewed quarterly. Because this is use in the pay for reporting program, those rates are monitored by the CMS contractor responsible for validation.

2b.3 **Testing Results** *(reliability statistics, assessment of adequacy in the context of norms for the test conducted)*:
Feedback from the hospital abstractors and the independent validation contractor is collected and incorporated.

2b
C☐
P☐
M☐
N☐

2c. Validity testing

2c.1 **Data/sample** *(description of data/sample and size)*: The measure is reviewed by a Technical Expert Panel quarterly for validity. Specifications (including codes and data elements) are modified every six months according to feedback provided by clinicians and hospital staff collecting data for the measure. National performance of the measure is monitored by the measure steward with quarterly benchmarks of hospital submitted data developed for distribuation by QIOs.

2c.2 **Analytic Method** *(type of validity & rationale, method for testing)*:
Face validity is systematically assessed by the Technical Expert Panels and the measure is judged to assess the provision of appropriate care for the target population.

2c.3 **Testing Results** *(statistical results, assessment of adequacy in the context of norms for the test conducted)*:
NA

2c
C☐
P☐
M☐
N☐

2d. Exclusions Justified

2d.1 **Summary of Evidence supporting exclusion(s):**
The exclusions to this measure were suggested by the TEP or are routine exclusions used by the SCIP measure set.

2d.2 **Citations for Evidence:**
NA

2d.3 **Data/sample** *(description of data/sample and size)*: NA

2d.4 **Analytic Method** *(type analysis & rationale)*:
NA

2d.5 **Testing Results** *(e.g., frequency, variability, sensitivity analyses)*:
NA

2d
C☐
P☐
M☐
N☐
NA☐

2e. Risk Adjustment for Outcomes/ Resource Use Measures

2e.1 **Data/sample** *(description of data/sample and size)*: No risk adjustment performed.

2e.2 **Analytic Method** *(type of risk adjustment, analysis, & rationale)*:
NA

2e
C☐
P☐
M☐
N☐
NA

2e.3 Testing Results *(risk model performance metrics)*: NA **2e.4 If outcome or resource use measure is not risk adjusted, provide rationale:** NA	☐
2f. Identification of Meaningful Differences in Performance **2f.1 Data/sample from Testing or Current Use** *(description of data/sample and size)*: All submitted data to the clinical warehouse is reviewed each quarter. **2f.2 Methods to identify statistically significant and practically/meaningfully differences in performance** *(type of analysis & rationale)*: Analysts review quarterly benchmarks and trends to identify differences in performance scores and investigate the possible causes. If measure specifications (algorithms, data elements) are causing the variation in performance, they are reviewed for possible updates. **2f.3 Provide Measure Scores from Testing or Current Use** *(description of scores, e.g., distribution by quartile, mean, median, SD, etc.; identification of statistically significant and meaningfully differences in performance)*: Current measure rate is 93.1%. The benchmark is 99.8%.	**2f** C☐ P☐ M☐ N☐
2g. Comparability of Multiple Data Sources/Methods **2g.1 Data/sample** *(description of data/sample and size)*: At this time, the data source is the inpatient medical record only. **2g.2 Analytic Method** *(type of analysis & rationale)*: NA **2g.3 Testing Results** *(e.g., correlation statistics, comparison of rankings)*: NA	**2g** C☐ P☐ M☐ N☐ NA ☐
2h. Disparities in Care **2h.1 If measure is stratified, provide stratified results** *(scores by stratified categories/cohorts)*: An updated disparities report has been submitted to NQF for review. Data on the range of performance values by decile for the hospital process measures was provided also. **2h.2 If disparities have been reported/identified, but measure is not specified to detect disparities, provide follow-up plans:** All of the inpatient quality reporting measures collect this information: Birthdate, Hispanic Ethnicity, Payment Source, Race and Sex. Additional analysis was performed to determine disparities in US region and urban vs rural.	**2h** C☐ P☐ M☐ N☐ NA ☐
TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Scientific Acceptability of Measure Properties?*	**2**
Steering Committee: Overall, to what extent was the criterion, *Scientific Acceptability of Measure Properties*, met? **Rationale:**	***2*** C☐ P☐ M☐ N☐
3. USABILITY	
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)	**Eval Rating**
3a. Meaningful, Understandable, and Useful Information **3a.1 Current Use:** In use	**3a** C☐ P☐

3a.2 Use in a public reporting initiative (disclosure of performance results to the public at large) (*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*)**:** Measure is used in Hospital Inpatient Quality Reporting Program (formerly RHQDAPU) **3a.3 If used in other programs/initiatives (***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***):** Measure is also used for accreditation by the Joint Commission. **Testing of Interpretability** (*Testing that demonstrates the results are understood by the potential users for public reporting and quality improvement*) **3a.4 Data/sample** *(description of data/sample and size)***:** Measure is reported on a public website (Hospital Compare). Feedback on this website is collected through another contractor. **3a.5 Methods** *(e.g., focus group, survey, QI project)***:** NA **3a.6 Results** *(qualitative and/or quantitative results and conclusions)***:** NA	**M☐** **N☐**
3b/3c. Relation to other NQF-endorsed measures **3b.1 NQF # and Title of similar or related measures:**	
(for NQF staff use) **Notes on similar/related endorsed or submitted measures:**	
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 or different topic but same target population): **3b.2 Are the measure specifications harmonized? If not, why?**	**3b** **C☐** **P☐** **M☐** **N☐** **NA** **☐**
3c. Distinctive or Additive Value **3c.1 Describe the distinctive, improved, or additive value this measure provides to existing NQF-endorsed measures:** **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:** There are measures on the same topic: beta-blocker administration, but not to continue beta-blocker after surgery.	**3c** **C☐** **P☐** **M☐** **N☐** **NA** **☐**
TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Usability?*	**3**
Steering Committee: Overall, to what extent was the criterion, *Usability*, met? **Rationale:**	**3** **C☐** **P☐** **M☐** **N☐**
4. FEASIBILITY	
Extent to which the required data are readily available, retrievable without undue burden, and can be implemented for performance measurement. (evaluation criteria)	**Eval Rating**
4a. Data Generated as a Byproduct of Care Processes	**4a** **C☐**

4a.1-2 **How are the data elements that are needed to compute measure scores generated?** 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☐ M☐ N☐
4b. Electronic Sources 4b.1 **Are all the data elements available electronically?** (*elements that are needed to compute measure scores are in defined, computer-readable fields, e.g., electronic health record, electronic claims*) No 4b.2 **If not, specify the near-term path to achieve electronic capture by most providers.** There are several inpatient measures being retooled for EHR use. This measure is not included in that list for near future retooling.	**4b** C☐ P☐ M☐ N☐
4c. Exclusions 4c.1 **Do the specified exclusions require additional data sources beyond what is required for the numerator and denominator specifications?** No 4c.2 **If yes, provide justification.**	**4c** C☐ P☐ M☐ N☐ NA ☐
4d. Susceptibility to Inaccuracies, Errors, or Unintended Consequences 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.** No unintended consequences reported with this measure.	**4d** C☐ P☐ M☐ N☐
4e. Data Collection Strategy/Implementation 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:** There have been no implementation issues identified. 4e.2 **Costs to implement the measure** (*costs of data collection, fees associated with proprietary measures*)**:** No information has been collected or reported related to costs to implement the measure. 4e.3 **Evidence for costs:** Data abstraction is usually performed by nurses in the Quality Improvement department of the facility. 4e.4 **Business case documentation:** There have been no additions to the business case to support this measure since its implementation.	**4e** C☐ P☐ M☐ N☐
TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Feasibility?*	**4**
Steering Committee: Overall, to what extent was the criterion, *Feasibility*, met? **Rationale:**	**4** C☐ P☐ M☐ N☐
RECOMMENDATION	
(for NQF staff use) **Check if measure is untested and only eligible for time-limited endorsement.**	**Time-limited** ☐
Steering Committee: Do you recommend for endorsement? **Comments:**	Y☐ N☐

A☐

CONTACT INFORMATION

Co.1 Measure Steward (Intellectual Property Owner)
Co.1 Organization
Centers for Medicare & Medicaid Services, 7500 Security Boulevard , Mail Stop S3-01-02, Baltimore, Maryland, 21244-1850

Co.2 Point of Contact
Kristie, Baus, RN, MSN, kristie.baus@cms.hhs.gov, 410-786-8161-

Measure Developer If different from Measure Steward
Co.3 Organization
Centers for Medicare & Medicaid Services, 7500 Security Boulevard, Mail Stop S3-01-02, Baltimore, Maryland, 21244-1850

Co.4 Point of Contact
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Co.5 Submitter If different from Measure Steward POC
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Co.6 Additional organizations that sponsored/participated in measure development
The measure was developed by Oklahoma Foundation for Medical Quality under contract to the Centers for Medicare & Medicaid Services.

ADDITIONAL INFORMATION

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.
The Surgical Care Improvement Project´s TEP is facilitated by OFMQ for CMS and a list is available. The leading guideline author (Lee Fleisher, MD) from the ACC/AHA was instrumental in the development and maintenance of this measure.

Ad.2 If adapted, provide name of original measure: Revisions have been suggested by the TEP. The timeframe for evaluating the administration of the beta-blocker in the perioperative period is being updated. The link to the original specifications was provided under Specifications. NOTE: The modified specifications are attached below. The original specifications are posted on QualityNet, but the revisions have not been posted to the QualityNet website.
This is the change proposed:
Surgery patients on beta-blocker therapy prior to arrival who received a beta-blocker during the perioperative period. The perioperative period for the SCIP Cardiac measures is defined as the day prior to surgery through postoperative day two (POD 2) with day of surgery being day zero.

If the postoperative length of stay = 2 days, the measure evaluates the administration of more than one dose of a beta-blocker: the day prior to or the day of surgery and on postoperative day one (POD 1) or postoperative day two (POD 2) unless reasons for not administering the medication were documented. If the postoperative length of stay was < 2 days, the measure will evaluate the administration of the beta-blocker on the day prior to or the day of surgery only, unless reasons for not administering the medication were documented.
Ad.3-5 If adapted, provide original specifications URL or attachment Attachment SCIP Card2_MIFplusDEs 12.13.10-634279208250341226.doc

Measure Developer/Steward Updates and Ongoing Maintenance
Ad.6 Year the measure was first released: 2006
Ad.7 Month and Year of most recent revision: 10, 2010
Ad.8 What is your frequency for review/update of this measure? Every 6 months
Ad.9 When is the next scheduled review/update for this measure? 04, 2011

Ad.10 Copyright statement/disclaimers: Trend Report (BM= Benchmark, rate = national score)
Q209

BM: 99.7 Rate: 90.5 Q309 BM: 99.7 Rate 91.5 Q409 BM: 99.8 Rate 92.5 Q110 BM: 99.8 Rate 93.1 Q210 BM: 99.7 Rate 93.8
Ad.11 -13 Additional Information web page URL or attachment: Attachment IP Measures Disp_2009-634369262845786441.xls
Date of Submission (*MM/DD/YY*)**:** 03/28/2011

Disparities analysis for 26 performance measures using 2009 Clinical Data Warehouse

By Race/Ethnicity (3% of cases were excluded due to missing data on race/ethnicity)

Measures and Race/ethnicity group	Num	Den	Percent	Unadjusted OR (95%CI)	p-value
AMI1: Aspirin at arrival					
Caucasian	247,145	251,158	98.4	ref.	ref.
African-American	36,868	37,747	97.7	0.68 (0.63-0.73)	<0.001
Hispanic	26,561	27,316	97.2	0.57 (0.53-0.62)	<0.001
Asian/Pacific Islander	7,346	7,472	98.3	0.95 (0.79-1.13)	0.548
Native American	1,074	1,087	98.8	1.34 (0.78-2.32)	0.293
AMI2: Aspirin at discharge					
Caucasian	305,754	310,489	98.5	ref.	ref.
African-American	39,545	40,591	97.4	0.59 (0.55-0.63)	<0.001
Hispanic	27,791	28,805	96.5	0.42 (0.40-0.45)	<0.001
Asian/Pacific Islander	7,694	7,854	98.0	0.74 (0.64-0.87)	<0.001
Native American	1,908	1,935	98.6	1.09 (0.75-1.60)	0.643
AMI3: ACEI or ARB for LVSD					
Caucasian	54,767	57,482	95.3	ref.	ref.
African-American	8,642	9,024	95.8	1.12 (1.01-1.25)	0.040
Hispanic	5,591	5,896	94.8	0.91 (0.80-1.03)	0.123
Asian/Pacific Islander	1,302	1,372	94.9	0.92 (0.72-1.18)	0.514
Native American	371	393	94.4	0.84 (0.54-1.29)	0.416
AMI4: Smoking cessation counseling					
Caucasian	103,977	104,611	99.4	ref.	ref.
African-American	16,611	16,741	99.2	0.78 (0.64-0.94)	0.010
Hispanic	7,671	7,757	98.9	0.54 (0.43-0.68)	<0.001
Asian/Pacific Islander	1,720	1,747	98.5	0.39 (0.26-0.57)	<0.001
Native American	753	767	98.2	0.33 (0.19-0.56)	<0.001
AMI5: Beta-blocker at discharge					
Caucasian	298,954	304,013	98.3	ref.	ref.
African-American	39,112	40,008	97.8	0.74 (0.69-0.79)	<0.001
Hispanic	27,331	28,382	96.3	0.44 (0.41-0.47)	<0.001

Asian/Pacific Islander	7,602	7,738	98.2	0.95 (0.80-1.12)	0.526
Native American	1,841	1,882	97.8	0.76 (0.56-1.04)	0.083
AMI7a: Fibrinolytic within 30 minutes					
Caucasian	651	1,169	55.7	ref.	ref.
African-American	73	157	46.5	0.69 (0.50-0.97)	0.030
Hispanic	190	417	45.6	0.67 (0.53-0.83)	<0.001
Asian/Pacific Islander	36	61	59.0	1.15 (0.68-1.93)	0.610
Native American	1	3	33.3	0.40 (0.04-4.40)	0.452
AMI8a: PCI within 90 minutes					
Caucasian	38,044	43,171	88.1	ref.	ref.
African-American	3,448	4,234	81.4	0.59 (0.54-0.64)	<0.001
Hispanic	3,297	3,936	83.8	0.70 (0.64-0.76)	<0.001
Asian/Pacific Islander	1,079	1,237	87.2	0.92 (0.78-1.09)	0.337
Native American	160	189	84.7	0.74 (0.50-1.11)	0.143
HF1: Discharge instructions					
Caucasian	357,746	414,742	86.3	ref.	ref.
African-American	124,070	143,689	86.3	1.01 (0.99-1.03)	0.400
Hispanic	44,786	51,690	86.6	1.03 (1.01-1.06)	0.016
Asian/Pacific Islander	9,895	11,375	87.0	1.07 (1.01-1.13)	0.025
Native American	2,351	3,083	76.3	0.51 (0.47-0.56)	<0.001
HF2: Evaluation of LV function					
Caucasian	521,142	535,940	97.2	ref.	ref.
African-American	159,661	163,219	97.8	1.27 (1.23-1.32)	<0.001
Hispanic	55,388	57,714	96.0	0.68 (0.65-0.71)	<0.001
Asian/Pacific Islander	12,720	13,004	97.8	1.27 (1.13-1.43)	<0.001
Native American	3,201	3,416	93.7	0.42 (0.37-0.49)	<0.001
HF3: ACEI or ARB for LVSD					
Caucasian	145,067	155,808	93.1	ref.	ref.
African-American	66,217	69,597	95.1	1.45 (1.39-1.51)	<0.001
Hispanic	18,769	20,068	93.5	1.07 (1.01-1.14)	0.026
Asian/Pacific Islander	3,777	3,962	95.3	1.51 (1.30-1.75)	<0.001
Native American	1,173	1,278	91.8	0.83 (0.68-1.01)	0.064
HF4: Smoking cessation counseling					
Caucasian	76,177	77,858	97.8	ref.	ref.

African-American	44,071	44,760	98.5	1.41 (1.29-1.54)	<0.001
Hispanic	7,273	7,423	98.0	1.07 (0.90-1.27)	0.432
Asian/Pacific Islander	1,375	1,413	97.3	0.80 (0.58-1.11)	0.176
Native American	692	732	94.5	0.38 (0.28-0.53)	<0.001
PN2: Pnemococal vaccination given or screened for					
Caucasian	378,259	408,034	92.7	ref.	ref.
African-American	34,705	39,186	88.6	0.61 (0.59-0.63)	<0.001
Hispanic	24,135	28,528	84.6	0.43 (0.42-0.45)	<0.001
Asian/Pacific Islander	8,804	9,900	88.9	0.63 (0.59-0.67)	<0.001
Native American	2,310	2,640	87.5	0.55 (0.49-0.62)	<0.001
PN3a: Initial blood culture within 24 hours - ICU only					
Caucasian	78,108	82,387	94.8	ref.	ref.
African-American	12,551	13,078	96.0	1.30 (1.19-1.43)	<0.001
Hispanic	7,338	7,863	93.3	0.77 (0.70-0.84)	<0.001
Asian/Pacific Islander	2,199	2,271	96.8	1.67 (1.32-2.12)	<0.001
Native American	776	846	91.7	0.61 (0.47-0.78)	<0.001
PN3b: Initial blood culture before first antibiotic dose - ED only					
Caucasian	361,802	380,083	95.2	ref.	ref.
African-American	56,541	60,416	93.6	0.74 (0.71-0.76)	<0.001
Hispanic	34,169	37,132	92.0	0.58 (0.56-0.61)	<0.001
Asian/Pacific Islander	9,388	9,889	94.9	0.95 (0.86-1.04)	0.240
Native American	3,058	3,402	89.9	0.45 (0.40-0.50)	<0.001
PN4: Smoking cessation counseling					
Caucasian	153,759	158,876	96.8	ref.	ref.
African-American	30,859	31,710	97.3	1.21 (1.12-1.30)	<0.001
Hispanic	9,885	10,230	96.6	0.95 (0.85-1.07)	0.400
Asian/Pacific Islander	1,689	1,759	96.0	0.80 (0.63-1.02)	0.074
Native American	1,722	1,940	88.8	0.26 (0.23-0.30)	<0.001
PN5c: First antibiotic dose within 6 hours					
Caucasian	402,180	421,893	95.3	ref.	ref.
African-American	60,989	66,036	92.4	0.59 (0.57-0.61)	<0.001
Hispanic	35,145	39,094	89.9	0.44 (0.42-0.45)	<0.001
Asian/Pacific Islander	9,399	9,865	95.3	0.99 (0.90-1.09)	0.812
Native American	3,430	3,752	91.4	0.52 (0.47-0.59)	<0.001

PN6: Antibioti selection consistent with guidelines					
Caucasian	254,116	279,291	91.0	ref.	ref.
African-American	35,023	38,201	91.7	1.09 (1.05-1.13)	<0.001
Hispanic	25,350	28,361	89.4	0.83 (0.80-0.87)	<0.001
Asian/Pacific Islander	6,093	6,689	91.1	1.01 (0.93-1.10)	0.770
Native American	2,570	2,922	88.0	0.72 (0.65-0.81)	<0.001
PN7: Influenza vaccination given or screened for					
Caucasian	266,920	293,208	91.0	ref.	ref.
African-American	31,910	37,007	86.2	0.62 (0.60-0.64)	<0.001
Hispanic	18,854	22,505	83.8	0.51 (0.49-0.53)	<0.001
Asian/Pacific Islander	5,702	6,539	87.2	0.67 (0.62-0.72)	<0.001
Native American	1,927	2,405	80.1	0.40 (0.36-0.44)	<0.001
SCIP1: Antibiotic within 1 hour before incision or 2 hours for vancomycin or quinolone					
Caucasian	827,536	860,067	96.2	ref.	ref.
African-American	95,484	99,527	95.9	0.93 (0.90-0.96)	<0.001
Hispanic	60,439	64,806	93.3	0.54 (0.53-0.56)	<0.001
Asian/Pacific Islander	14,743	15,282	96.5	1.08 (0.99-1.17)	0.101
Native American	4,037	4,325	93.3	0.55 (0.49-0.62)	<0.001
SCIP2: Prophylactic antibiotic consistent with guidelines					
Caucasian	848,411	868,974	97.6	ref.	ref.
African-American	97,576	100,464	97.1	0.82 (0.79-0.85)	<0.001
Hispanic	62,778	64,991	96.6	0.69 (0.66-0.72)	<0.001
Asian/Pacific Islander	15,171	15,547	97.6	0.98 (0.88-1.08)	0.672
Native American	4,230	4,360	97.0	0.79 (0.66-0.94)	0.008
SCIP3: Prophylactic ABX discontinued within 24 h. of surgery end time or 48 h. for cardiac surgery					
Caucasian	766,551	819,715	93.5	ref.	ref.
African-American	87,315	94,468	92.4	0.85 (0.83-0.87)	<0.001
Hispanic	54,461	61,420	88.7	0.54 (0.53-0.56)	<0.001
Asian/Pacific Islander	13,218	14,358	92.1	0.80 (0.76-0.85)	<0.001
Native American	3,812	4,103	92.9	0.91 (0.81-1.02)	0.116
SCIP4: Controlled 6 AM postoperative serum glucose - cardiac surgery					
Caucasian	134,822	144,908	93.0	ref.	ref.
African-American	10,742	11,722	91.6	0.82 (0.77-0.88)	<0.001
Hispanic	11,031	12,520	88.1	0.55 (0.52-0.59)	<0.001

Asian/Pacific Islander	3,437	3,773	91.1	0.77 (0.68-0.86)	<0.001
Native American	706	766	92.2	0.88 (0.68-1.15)	0.344
SCIP6: appropriate hair removal					
Caucasian	1,222,603	1,232,305	99.2	ref.	ref.
African-American	149,984	151,395	99.1	0.84 (0.80-0.89)	<0.001
Hispanic	95,326	97,273	98.0	0.39 (0.37-0.41)	<0.001
Asian/Pacific Islander	23,368	23,575	99.1	0.90 (0.78-1.03)	0.119
Native American	6,390	6,543	97.7	0.33 (0.28-0.39)	<0.001
SCIPCARD2: Perioperative period beta blocker					
Caucasian	327,860	359,462	91.2	ref.	ref.
African-American	34,505	38,004	90.8	0.95 (0.92-0.99)	0.007
Hispanic	17,805	20,128	88.5	0.74 (0.71-0.77)	<0.001
Asian/Pacific Islander	5,128	5,770	88.9	0.77 (0.71-0.84)	<0.001
Native American	1,312	1,493	87.9	0.70 (0.60-0.82)	<0.001
SCIPVTE1: Recommended VTE prophylaxis ordered during admission					
Caucasian	343,547	367,129	93.6	ref.	ref.
African-American	49,075	52,658	93.2	0.94 (0.91-0.98)	<0.001
Hispanic	27,199	30,224	90.0	0.62 (0.59-0.64)	<0.001
Asian/Pacific Islander	7,406	8,195	90.4	0.64 (0.60-0.69)	<0.001
Native American	1,999	2,208	90.5	0.66 (0.57-0.76)	<0.001
SCIPVTE2: Received VTE prophylaxis within 24 hours prior to or after surgery					
Caucasian	334,443	365,471	91.5	ref.	ref.
African-American	47,804	52,220	91.5	1.00 (0.97-1.04)	0.798
Hispanic	26,376	29,811	88.5	0.71 (0.69-0.74)	<0.001
Asian/Pacific Islander	7,241	8,126	89.1	0.76 (0.71-0.81)	<0.001
Native American	1,942	2,183	89.0	0.75 (0.65-0.86)	<0.001

Disparities analysis for 26 performance measures using 2009 Clinical Data Warehouse

By Gender (less than 0.1% of cases were excluded due to missing data on gender)

Measures and gender	Num	Den	Percent	Unadjusted OR (95%CI)	p-value
AMI1: Aspirin at arrival					
Female	132,222	135,450	97.6	ref.	ref.
Male	197,136	199,829	98.7	1.79 (1.70-1.88)	<0.001
AMI2: Aspirin at discharge					
Female	150,930	154,577	97.6	ref.	ref.
Male	247,653	251,152	98.6	1.71 (1.63-1.79)	<0.001
AMI3: ACEI or ARB for LVSD					
Female	26,127	27,376	95.4	ref.	ref.
Male	47,156	49,502	95.3	0.96 (0.90-1.03)	0.269
AMI4: Smoking cessation counseling					
Female	42,885	43,241	99.2	ref.	ref.
Male	93,180	93,741	99.4	1.38 (1.21-1.58)	<0.001
AMI5: Beta-blocker at discharge					
Female	149,171	152,804	97.6	ref.	ref.
Male	240,965	244,715	98.5	1.56 (1.49-1.64)	<0.001
AMI7a: Fibrinolytic within 30 minutes					
Female	254	523	48.6	ref.	ref.
Male	730	1,347	54.2	1.25 (1.02-1.53)	0.029
AMI8a: PCI within 90 minutes					
Female	12,629	15,029	84.0	ref.	ref.
Male	35,545	40,118	88.6	1.48 (1.40-1.56)	<0.001
HF1: Discharge instructions					
Female	264,674	308,679	85.7	ref.	ref.
Male	286,692	330,544	86.7	1.09 (1.07-1.10)	<0.001
HF2: Evaluation of LV function					
Female	391,232	403,675	96.9	ref.	ref.
Male	378,142	387,472	97.6	1.29 (1.25-1.32)	<0.001
HF3: ACEI or ARB for LVSD					
Female	92,111	98,257	93.7	ref.	ref.
Male	148,513	158,409	93.8	1.00 (0.97-1.03)	0.936
HF4: Smoking cessation counseling					

Female	51,445	52,630	97.7	ref.	ref.
Male	80,801	82,294	98.2	1.25 (1.15-1.35)	<0.001
PN2: Pnemococal vaccination given or screened for					
Female	247,221	269,382	91.8	ref.	ref.
Male	212,145	231,563	91.6	0.98 (0.96-1.00)	0.042
PN3a: Initial blood culture within 24 hours - ICU only					
Female	50,079	52,932	94.6	ref.	ref.
Male	53,544	56,305	95.1	1.10 (1.05-1.17)	<0.001
PN3b: Initial blood culture before first antibiotic dose - ED only					
Female	246,104	260,181	94.6	ref.	ref.
Male	230,916	243,503	94.8	1.05 (1.02-1.08)	<0.001
PN4: Smoking cessation counseling					
Female	103,237	106,615	96.8	ref.	ref.
Male	99,296	102,754	96.6	0.94 (0.90-0.99)	0.011
PN5c: First antibiotic dose within 6 hours					
Female	272,016	288,698	94.2	ref.	ref.
Male	252,643	266,222	94.9	1.14 (1.11-1.17)	<0.001
PN6: Antibioti selection consistent with guidelines					
Female	175,954	193,373	91.0	ref.	ref.
Male	156,410	172,235	90.8	0.98 (0.96-1.00)	0.059
PN7: Influenza vaccination given or screened for					
Female	180,348	200,180	90.1	ref.	ref.
Male	153,242	170,972	89.6	0.95 (0.93-0.97)	<0.001
SCIP1: Antibiotic within 1 hour before incision or 2 hours for vancomycin or quinolone					
Female	660,133	687,675	96.0	ref.	ref.
Male	383,816	399,901	96.0	1.00 (0.98-1.02)	0.660
SCIP2: Prophylactic antibiotic consistent with guidelines					
Female	672,428	691,674	97.2	ref.	ref.
Male	398,658	406,588	98.0	1.44 (1.40-1.48)	<0.001
SCIP3: Prophylactic ABX discontinued within 24 h. of surgery end time or 48 h. for cardiac surgery					
Female	613,378	657,129	93.3	ref.	ref.
Male	351,165	378,744	92.7	0.91 (0.89-0.92)	<0.001
SCIP4: Controlled 6 AM postoperative serum glucose - cardiac surgery					
Female	52,328	56,457	92.7	ref.	ref.
Male	114,589	124,004	92.4	0.96 (0.92-1.00)	0.038

SCIP6: appropriate hair removal					
Female	944,375	951,265	99.3	ref.	ref.
Male	613,124	620,263	98.8	0.63 (0.61-0.65)	<0.001
SCIPCARD2: Perioperative period beta blocker					
Female	210,810	232,468	90.7	ref.	ref.
Male	189,354	207,438	91.3	1.08 (1.05-1.10)	<0.001
SCIPVTE1: Recommended VTE prophylaxis ordered during admission					
Female	266,908	284,212	93.9	ref.	ref.
Male	177,139	192,153	92.2	0.76 (0.75-0.78)	<0.001
SCIPVTE2: Received VTE prophylaxis within 24 hours prior to or after surgery					
Female	260,379	282,821	92.1	ref.	ref.
Male	171,935	190,847	90.1	0.78 (0.77-0.80)	<0.001

Disparities analysis for 26 performance measures using 2009 Clinical Data Warehouse

By Age-Group

Measures and age group	Num	Den	Percent	Unadjusted OR (95%CI)	p-value
AMI1: Aspirin at arrival					
under 65 years	141,150	142,677	98.9	ref.	ref.
65 to 74 years	69,462	70,636	98.3	0.64 (0.59-0.69)	<0.001
75 to 84 years	68,661	70,270	97.7	0.46 (0.43-0.50)	<0.001
85 or older	50,094	51,705	96.9	0.34 (0.31-0.36)	<0.001
AMI2: Aspirin at discharge					
under 65 years	188,910	191,432	98.7	ref.	ref.
65 to 74 years	86,865	88,378	98.3	0.77 (0.72-0.82)	<0.001
75 to 84 years	76,528	78,185	97.9	0.62 (0.58-0.66)	<0.001
85 or older	46,290	47,744	97.0	0.42 (0.40-0.45)	<0.001
AMI3: ACEI or ARB for LVSD					
under 65 years	30,729	31,955	96.2	ref.	ref.
65 to 74 years	16,782	17,608	95.3	0.81 (0.74-0.89)	<0.001
75 to 84 years	16,144	17,053	94.7	0.71 (0.65-0.77)	<0.001
85 or older	9,631	10,265	93.8	0.61 (0.55-0.67)	<0.001
AMI4: Smoking cessation counseling					
under 65 years	101,819	102,305	99.5	ref.	ref.
65 to 74 years	23,569	23,794	99.1	0.50 (0.43-0.59)	<0.001
75 to 84 years	8,919	9,074	98.3	0.27 (0.23-0.33)	<0.001
85 or older	1,762	1,813	97.2	0.16 (0.12-0.22)	<0.001
AMI5: Beta-blocker at discharge					
under 65 years	181,451	184,294	98.5	ref.	ref.
65 to 74 years	85,291	86,894	98.2	0.83 (0.78-0.89)	<0.001
75 to 84 years	76,749	78,361	97.9	0.75 (0.70-0.79)	<0.001
85 or older	46,654	47,979	97.2	0.55 (0.52-0.59)	<0.001
AMI7a: Fibrinolytic within 30 minutes					
under 65 years	648	1,212	53.5	ref.	ref.
65 to 74 years	194	358	54.2	1.03 (0.81-1.30)	0.810
75 to 84 years	93	202	46.0	0.74 (0.55-1.00)	0.051
85 or older	49	98	50.0	0.87 (0.58-1.31)	0.508
AMI8a: PCI within 90 minutes					
under 65 years	31,621	35,686	88.6	ref.	ref.
65 to 74 years	9,116	10,546	86.4	0.82 (0.77-0.87)	<0.001
75 to 84 years	5,398	6,466	83.5	0.65 (0.60-0.70)	<0.001
85 or older	2,040	2,451	83.2	0.64 (0.57-0.71)	<0.001
HF1: Discharge instructions					
under 65 years	178,658	207,594	86.1	ref.	ref.
65 to 74 years	123,528	143,712	86.0	0.99 (0.97-1.01)	0.373
75 to 84 years	151,451	175,244	86.4	1.03 (1.01-1.05)	0.001
85 or older	97,755	112,707	86.7	1.06 (1.04-1.08)	<0.001
HF2: Evaluation of LV function					

under 65 years	216,443	221,533	97.7	ref.	ref.
65 to 74 years	162,507	166,888	97.4	0.87 (0.84-0.91)	<0.001
75 to 84 years	220,926	227,028	97.3	0.85 (0.82-0.88)	<0.001
85 or older	169,548	175,750	96.5	0.64 (0.62-0.67)	<0.001
HF3: ACEI or ARB for LVSD					
under 65 years	95,238	99,651	95.6	ref.	ref.
65 to 74 years	52,803	56,622	93.3	0.64 (0.61-0.67)	<0.001
75 to 84 years	58,917	63,666	92.5	0.57 (0.55-0.60)	<0.001
85 or older	33,681	36,742	91.7	0.51 (0.49-0.53)	<0.001
HF4: Smoking cessation counseling					
under 65 years	78,879	80,061	98.5	ref.	ref.
65 to 74 years	31,278	32,007	97.7	0.64 (0.59-0.71)	<0.001
75 to 84 years	17,689	18,260	96.9	0.46 (0.42-0.51)	<0.001
85 or older	4,402	4,599	95.7	0.33 (0.29-0.39)	<0.001
PN2: Pnemococal vaccination given or screened for					
under 65 years	--	--	--	--	--
65 to 74 years	154,049	168,347	91.5	ref.	ref.
75 to 84 years	180,579	195,787	92.2	1.10 (1.08-1.13)	<0.001
85 or older	124,772	136,849	91.2	0.96 (0.93-0.98)	0.001
PN3a: Initial blood culture within 24 hours - ICU only					
under 65 years	43,154	45,370	95.1	ref.	ref.
65 to 74 years	23,165	24,488	94.6	0.90 (0.84-0.96)	0.003
75 to 84 years	23,777	25,070	94.8	0.94 (0.88-1.01)	0.111
85 or older	13,530	14,312	94.5	0.89 (0.82-0.97)	0.006
PN3b: Initial blood culture before first antibiotic dose - ED only					
under 65 years	180,506	192,602	93.7	ref.	ref.
65 to 74 years	92,223	97,052	95.0	1.28 (1.24-1.32)	<0.001
75 to 84 years	116,268	121,901	95.4	1.38 (1.34-1.43)	<0.001
85 or older	88,051	92,159	95.5	1.44 (1.39-1.49)	<0.001
PN4: Smoking cessation counseling					
under 65 years	138,481	142,258	97.3	ref.	ref.
65 to 74 years	39,066	40,713	96.0	0.65 (0.61-0.69)	<0.001
75 to 84 years	20,330	21,389	95.0	0.52 (0.49-0.56)	<0.001
85 or older	4,673	5,027	93.0	0.36 (0.32-0.40)	<0.001
PN5c: First antibiotic dose within 6 hours					
under 65 years	196,974	210,170	93.7	ref.	ref.
65 to 74 years	103,529	109,243	94.8	1.21 (1.18-1.25)	<0.001
75 to 84 years	128,404	134,912	95.2	1.32 (1.28-1.36)	<0.001
85 or older	95,798	100,641	95.2	1.33 (1.28-1.37)	<0.001
PN6: Antibioti selection consistent with guidelines					
under 65 years	145,078	158,844	91.3	ref.	ref.
65 to 74 years	60,719	67,599	89.8	0.84 (0.81-0.86)	<0.001
75 to 84 years	74,042	81,558	90.8	0.93 (0.91-0.96)	<0.001
85 or older	52,553	57,638	91.2	0.98 (0.95-1.01)	0.255
PN7: Influenza vaccination given or screened for					
under 65 years	92,150	105,920	87.0	ref.	ref.
65 to 74 years	80,824	89,267	90.5	1.43 (1.39-1.47)	<0.001

75 to 84 years	94,637	103,395	91.5	1.61 (1.57-1.66)	<0.001
85 or older	65,988	72,586	90.9	1.49 (1.45-1.54)	<0.001
SCIP1: Antibiotic within 1 hour before incision or 2 hours for vancomycin or quinolone					
under 65 years	543,747	565,392	96.2	ref.	ref.
65 to 74 years	264,596	275,189	96.2	0.99 (0.97-1.02)	0.637
75 to 84 years	185,731	194,018	95.7	0.89 (0.87-0.92)	<0.001
85 or older	49,930	53,035	94.1	0.64 (0.62-0.67)	<0.001
SCIP2: Prophylactic antibiotic consistent with guidelines					
under 65 years	554,132	569,841	97.2	ref.	ref.
65 to 74 years	272,719	278,267	98.0	1.39 (1.35-1.44)	<0.001
75 to 84 years	192,365	196,738	97.8	1.25 (1.21-1.29)	<0.001
85 or older	51,927	53,474	97.1	0.95 (0.90-1.00)	0.066
SCIP3: Prophylactic ABX discontinued within 24 h. of surgery end time or 48 h. for cardiac surgery					
under 65 years	509,115	543,621	93.7	ref.	ref.
65 to 74 years	243,668	262,144	93.0	0.89 (0.88-0.91)	<0.001
75 to 84 years	168,265	182,048	92.4	0.83 (0.81-0.84)	<0.001
85 or older	43,548	48,116	90.5	0.65 (0.63-0.67)	<0.001
SCIP4: Controlled 6 AM postoperative serum glucose - cardiac surgery					
under 65 years	72,979	79,327	92.0	ref.	ref.
65 to 74 years	52,359	56,792	92.2	1.03 (0.99-1.07)	0.185
75 to 84 years	36,879	39,404	93.6	1.27 (1.21-1.33)	<0.001
85 or older	4,704	4,942	95.2	1.72 (1.51-1.96)	<0.001
SCIP6: appropriate hair removal					
under 65 years	810,303	818,220	99.0	ref.	ref.
65 to 74 years	380,445	383,750	99.1	1.12 (1.08-1.17)	<0.001
75 to 84 years	279,516	281,752	99.2	1.22 (1.17-1.28)	<0.001
85 or older	87,319	87,891	99.3	1.49 (1.37-1.62)	<0.001
SCIPCARD2: Perioperative period beta blocker					
under 65 years	143,202	157,742	90.8	ref.	ref.
65 to 74 years	125,183	136,865	91.5	1.09 (1.06-1.12)	<0.001
75 to 84 years	101,842	111,827	91.1	1.04 (1.01-1.06)	0.010
85 or older	29,959	33,499	89.4	0.86 (0.83-0.89)	<0.001
SCIPVTE1: Recommended VTE prophylaxis ordered during admission					
under 65 years	204,866	222,992	91.9	ref.	ref.
65 to 74 years	111,168	117,886	94.3	1.46 (1.42-1.51)	<0.001
75 to 84 years	92,459	97,769	94.6	1.54 (1.49-1.59)	<0.001
85 or older	35,581	37,747	94.3	1.45 (1.39-1.52)	<0.001
SCIPVTE2: Received VTE prophylaxis within 24 hours prior to or after surgery					
under 65 years	199,284	221,436	90.0	ref.	ref.
65 to 74 years	108,467	117,367	92.4	1.35 (1.32-1.39)	<0.001
75 to 84 years	90,083	97,336	92.5	1.38 (1.34-1.42)	<0.001
85 or older	34,507	37,557	91.9	1.26 (1.21-1.31)	<0.001

Disparities analysis for 26 performance measures using 2009 Clinical Data Warehouse

By Census Region

Measures and census region	Num	Den	Percent	Unadjusted OR (95%CI)	p-value
AMI1: Aspirin at arrival					
South	126,608	129,145	98.0	ref.	ref.
Midwest	75,072	76,242	98.5	1.29 (1.20-1.38)	<0.001
Northeast	62,335	63,302	98.5	1.29 (1.20-1.39)	<0.001
West	61,600	62,432	98.7	1.48 (1.37-1.61)	<0.001
US Territories	3,752	4,167	90.0	0.18 (0.16-0.20)	<0.001
AMI2: Aspirin at discharge					
South	154,361	157,475	98.0	ref.	ref.
Midwest	96,702	98,082	98.6	1.41 (1.33-1.51)	<0.001
Northeast	72,945	73,951	98.6	1.46 (1.36-1.57)	<0.001
West	71,443	72,548	98.5	1.30 (1.22-1.40)	<0.001
US Territories	3,142	3,683	85.3	0.12 (0.11-0.13)	<0.001
AMI3: ACEI or ARB for LVSD					
South	30,162	31,629	95.4	ref.	ref.
Midwest	17,573	18,369	95.7	1.07 (0.98-1.17)	0.114
Northeast	13,443	14,124	95.2	0.96 (0.87-1.05)	0.392
West	11,325	11,875	95.4	1.00 (0.91-1.11)	0.977
US Territories	783	884	88.6	0.38 (0.30-0.47)	<0.001
AMI4: Smoking cessation counseling					
South	59,052	59,326	99.5	ref.	ref.
Midwest	34,282	34,529	99.3	0.64 (0.54-0.77)	<0.001
Northeast	21,314	21,497	99.1	0.54 (0.45-0.65)	<0.001
West	20,782	20,940	99.2	0.61 (0.50-0.74)	<0.001
US Territories	639	694	92.1	0.05 (0.04-0.07)	<0.001
AMI5: Beta-blocker at discharge					
South	150,602	153,698	98.0	ref.	ref.
Midwest	94,600	96,058	98.5	1.33 (1.25-1.42)	<0.001
Northeast	72,919	73,919	98.6	1.50 (1.40-1.61)	<0.001
West	68,776	70,048	98.2	1.11 (1.04-1.19)	0.002
US Territories	3,248	3,805	85.4	0.12 (0.11-0.13)	<0.001
AMI7a: Fibrinolytic within 30 minutes					
South	386	691	55.9	ref.	ref.
Midwest	71	157	45.2	0.65 (0.46-0.92)	0.016
Northeast	114	221	51.6	0.84 (0.62-1.14)	0.266
West	325	577	56.3	1.02 (0.82-1.27)	0.868
US Territories	88	224	39.3	0.51 (0.38-0.70)	<0.001
AMI8a: PCI within 90 minutes					
South	18,249	21,033	86.8	ref.	ref.
Midwest	12,047	13,530	89.0	1.24 (1.16-1.33)	<0.001
Northeast	7,776	8,945	86.9	1.01 (0.94-1.09)	0.695
West	10,077	11,545	87.3	1.05 (0.98-1.12)	0.182

US Territories	26	96	27.1	0.06 (0.04-0.09)	<0.001
HF1: Discharge instructions					
South	230,620	268,753	85.8	ref.	ref.
Midwest	123,214	142,800	86.3	1.04 (1.02-1.06)	<0.001
Northeast	104,441	118,681	88.0	1.21 (1.19-1.24)	<0.001
West	87,789	101,987	86.1	1.02 (1.00-1.04)	0.037
US Territories	5,328	7,036	75.7	0.52 (0.49-0.55)	<0.001
HF2: Evaluation of LV function					
South	313,881	323,530	97.0	ref.	ref.
Midwest	177,519	182,711	97.2	1.05 (1.02-1.09)	0.004
Northeast	154,546	157,057	98.4	1.89 (1.81-1.98)	<0.001
West	117,503	120,882	97.2	1.07 (1.03-1.11)	0.001
US Territories	5,975	7,019	85.1	0.18 (0.16-0.19)	<0.001
HF3: ACEI or ARB for LVSD					
South	102,341	109,272	93.7	ref.	ref.
Midwest	54,335	57,985	93.7	1.01 (0.97-1.05)	0.700
Northeast	44,314	47,239	93.8	1.03 (0.98-1.07)	0.259
West	37,449	39,660	94.4	1.15 (1.09-1.21)	<0.001
US Territories	2,200	2,525	87.1	0.46 (0.41-0.52)	<0.001
HF4: Smoking cessation counseling					
South	60,779	61,825	98.3	ref.	ref.
Midwest	30,645	31,366	97.7	0.73 (0.66-0.81)	<0.001
Northeast	20,880	21,315	98.0	0.83 (0.74-0.92)	<0.001
West	19,359	19,792	97.8	0.77 (0.69-0.86)	<0.001
US Territories	585	629	93.0	0.23 (0.17-0.31)	<0.001
PN2: Pnemococal vaccination given or screened for					
South	179,960	194,612	92.5	ref.	ref.
Midwest	114,202	124,453	91.8	0.91 (0.88-0.93)	<0.001
Northeast	88,746	95,893	92.5	1.01 (0.98-1.04)	0.466
West	75,360	83,017	90.8	0.80 (0.78-0.82)	<0.001
US Territories	1,132	3,008	37.6	0.05 (0.05-0.05)	<0.001
PN3a: Initial blood culture within 24 hours - ICU only					
South	41,731	43,940	95.0	ref.	ref.
Midwest	24,196	25,563	94.7	0.94 (0.87-1.00)	0.065
Northeast	16,787	17,632	95.2	1.05 (0.97-1.14)	0.225
West	20,703	21,725	95.3	1.07 (0.99-1.16)	0.072
US Territories	209	380	55.0	0.06 (0.05-0.08)	<0.001
PN3b: Initial blood culture before first antibiotic dose - ED only					
South	187,438	197,520	94.9	ref.	ref.
Midwest	110,172	115,477	95.4	1.12 (1.08-1.16)	<0.001
Northeast	93,600	98,873	94.7	0.95 (0.92-0.99)	0.008
West	83,935	89,171	94.1	0.86 (0.83-0.89)	<0.001
US Territories	1,903	2,673	71.2	0.13 (0.12-0.14)	<0.001
PN4: Smoking cessation counseling					
South	91,072	93,604	97.3	ref.	ref.
Midwest	48,987	51,087	95.9	0.65 (0.61-0.69)	<0.001
Northeast	32,410	33,325	97.3	0.98 (0.91-1.06)	0.695

West	29,466	30,694	96.0	0.67 (0.62-0.72)	<0.001
US Territories	615	677	90.8	0.28 (0.21-0.36)	<0.001
PN5c: First antibiotic dose within 6 hours					
South	208,883	220,861	94.6	ref.	ref.
Midwest	128,036	134,173	95.4	1.20 (1.16-1.23)	<0.001
Northeast	96,895	102,680	94.4	0.96 (0.93-0.99)	0.014
West	88,422	93,297	94.8	1.04 (1.01-1.08)	0.024
US Territories	2,469	3,955	62.4	0.10 (0.09-0.10)	<0.001
PN6: Antibioti selection consistent with guidelines					
South	134,164	147,904	90.7	ref.	ref.
Midwest	78,294	86,405	90.6	0.99 (0.96-1.02)	0.434
Northeast	59,152	63,980	92.5	1.25 (1.21-1.30)	<0.001
West	58,295	63,887	91.2	1.07 (1.03-1.10)	<0.001
US Territories	2,487	3,463	71.8	0.26 (0.24-0.28)	<0.001
PN7: Influenza vaccination given or screened for					
South	136,798	151,103	90.5	ref.	ref.
Midwest	82,023	90,887	90.2	0.97 (0.94-0.99)	0.021
Northeast	60,341	66,389	90.9	1.04 (1.01-1.08)	0.008
West	53,674	60,817	88.3	0.79 (0.76-0.81)	<0.001
US Territories	763	1,972	38.7	0.07 (0.06-0.07)	<0.001
SCIP1: Antibiotic within 1 hour before incision or 2 hours for vancomycin or quinolone					
South	394,545	409,842	96.3	ref.	ref.
Midwest	266,459	276,954	96.2	0.98 (0.96-1.01)	0.223
Northeast	193,461	200,392	96.5	1.08 (1.05-1.11)	<0.001
West	183,368	192,227	95.4	0.80 (0.78-0.82)	<0.001
US Territories	6,171	8,219	75.1	0.12 (0.11-0.12)	<0.001
SCIP2: Prophylactic antibiotic consistent with guidelines					
South	403,132	414,194	97.3	ref.	ref.
Midwest	273,589	279,578	97.9	1.25 (1.21-1.29)	<0.001
Northeast	197,917	202,575	97.7	1.17 (1.13-1.21)	<0.001
West	189,102	194,077	97.4	1.04 (1.01-1.08)	0.015
US Territories	7,403	7,896	93.8	0.41 (0.38-0.45)	<0.001
SCIP3: Prophylactic ABX discontinued within 24 h. of surgery end time or 48 h. for cardiac surgery					
South	361,060	388,513	92.9	ref.	ref.
Midwest	248,442	264,681	93.9	1.16 (1.14-1.19)	<0.001
Northeast	180,683	191,769	94.2	1.24 (1.21-1.27)	<0.001
West	169,118	183,133	92.3	0.92 (0.90-0.94)	<0.001
US Territories	5,293	7,833	67.6	0.16 (0.15-0.17)	<0.001
SCIP4: Controlled 6 AM postoperative serum glucose - cardiac surgery					
South	66,018	71,829	91.9	ref.	ref.
Midwest	40,808	44,136	92.5	1.08 (1.03-1.13)	<0.001
Northeast	29,288	30,993	94.5	1.51 (1.43-1.60)	<0.001
West	29,005	31,251	92.8	1.14 (1.08-1.20)	<0.001
US Territories	1,802	2,256	79.9	0.35 (0.31-0.39)	<0.001
SCIP6: appropriate hair removal					
South	587,629	592,145	99.2	ref.	ref.
Midwest	385,646	388,859	99.2	0.92 (0.88-0.97)	<0.001

Northeast	297,284	299,532	99.2	1.02 (0.97-1.07)	0.532
West	279,180	282,116	99.0	0.73 (0.70-0.77)	<0.001
US Territories	7,844	8,961	87.5	0.05 (0.05-0.06)	<0.001
SCIPCARD2: Perioperative period beta blocker					
South	147,784	162,051	91.2	ref.	ref.
Midwest	106,546	117,054	91.0	0.98 (0.95-1.01)	0.113
Northeast	85,381	92,184	92.6	1.21 (1.18-1.25)	<0.001
West	59,482	67,099	88.6	0.75 (0.73-0.78)	<0.001
US Territories	993	1,545	64.3	0.17 (0.16-0.19)	<0.001
SCIPVTE1: Recommended VTE prophylaxis ordered during admission					
South	169,988	182,774	93.0	ref.	ref.
Midwest	99,327	106,377	93.4	1.06 (1.03-1.09)	<0.001
Northeast	96,401	100,803	95.6	1.65 (1.59-1.71)	<0.001
West	76,837	84,597	90.8	0.74 (0.72-0.77)	<0.001
US Territories	1,521	1,843	82.5	0.36 (0.31-0.40)	<0.001
SCIPVTE2: Received VTE prophylaxis within 24 hours prior to or after surgery					
South	164,922	181,622	90.8	ref.	ref.
Midwest	96,639	105,893	91.3	1.06 (1.03-1.09)	<0.001
Northeast	94,639	100,532	94.1	1.63 (1.58-1.68)	<0.001
West	74,698	83,964	89.0	0.82 (0.79-0.84)	<0.001
US Territories	1,443	1,685	85.6	0.60 (0.53-0.69)	<0.001

Disparities analysis for 26 performance measures using 2009 Clinical Data Warehouse

By Hospital Rural/Urban Location (less than 0.1 of cases were excluded due to missing data on hospital rural/urban location)

Measures and hospital rural/urban location	Num	Den	Percent	Unadjusted OR (95%CI)	p-value
AMI1: Aspirin at arrival					
Urban	291,143	295,802	98.4	ref.	ref.
Rural	38,206	39,467	96.8	0.48 (0.46-0.52)	<0.001
AMI2: Aspirin at discharge					
Urban	358,943	364,751	98.4	ref.	ref.
Rural	39,639	40,973	96.7	0.48 (0.45-0.51)	<0.001
AMI3: ACEI or ARB for LVSD					
Urban	65,715	68,816	95.5	ref.	ref.
Rural	7,570	8,064	93.9	0.72 (0.66-0.80)	<0.001
AMI4: Smoking cessation counseling					
Urban	122,296	123,021	99.4	ref.	ref.
Rural	13,772	13,964	98.6	0.43 (0.36-0.50)	<0.001
AMI5: Beta-blocker at discharge					
Urban	350,908	356,917	98.3	ref.	ref.
Rural	39,223	40,596	96.6	0.49 (0.46-0.52)	<0.001
AMI7a: Fibrinolytic within 30 minutes					
Urban	743	1,378	53.9	ref.	ref.
Rural	241	491	49.1	0.82 (0.67-1.01)	0.066
AMI8a: PCI within 90 minutes					
Urban	44,330	50,581	87.6	ref.	ref.
Rural	3,845	4,568	84.2	0.75 (0.69-0.82)	<0.001
HF1: Discharge instructions					
Urban	462,198	530,366	87.1	ref.	ref.
Rural	89,161	108,850	81.9	0.67 (0.66-0.68)	<0.001
HF2: Evaluation of LV function					
Urban	640,201	651,626	98.2	ref.	ref.
Rural	129,180	139,524	92.6	0.22 (0.22-0.23)	<0.001
HF3: ACEI or ARB for LVSD					
Urban	204,835	216,883	94.4	ref.	ref.
Rural	35,794	39,788	90.0	0.53 (0.51-0.55)	<0.001

HF4: Smoking cessation counseling					
Urban	109,946	111,420	98.7	ref.	ref.
Rural	22,294	23,495	94.9	0.25 (0.23-0.27)	<0.001
PN2: Pnemococal vaccination given or screened for					
Urban	343,445	372,029	92.3	ref.	ref.
Rural	115,907	128,899	89.9	0.74 (0.73-0.76)	<0.001
PN3a: Initial blood culture within 24 hours - ICU only					
Urban	82,609	86,195	95.8	ref.	ref.
Rural	21,017	23,045	91.2	0.45 (0.43-0.48)	<0.001
PN3b: Initial blood culture before first antibiotic dose - ED only					
Urban	370,713	390,752	94.9	ref.	ref.
Rural	106,285	112,910	94.1	0.87 (0.84-0.89)	<0.001
PN4: Smoking cessation counseling					
Urban	153,343	157,007	97.7	ref.	ref.
Rural	49,195	52,364	93.9	0.37 (0.35-0.39)	<0.001
PN5c: First antibiotic dose within 6 hours					
Urban	391,112	414,535	94.3	ref.	ref.
Rural	133,539	140,375	95.1	1.17 (1.14-1.20)	<0.001
PN6: Antibioti selection consistent with guidelines					
Urban	244,813	267,228	91.6	ref.	ref.
Rural	87,548	98,376	89.0	0.74 (0.72-0.76)	<0.001
PN7: Influenza vaccination given or screened for					
Urban	250,927	277,437	90.4	ref.	ref.
Rural	82,639	93,694	88.2	0.79 (0.77-0.81)	<0.001
SCIP1: Antibiotic within 1 hour before incision or 2 hours for vancomycin or quinolone					
Urban	873,006	907,766	96.2	ref.	ref.
Rural	170,887	179,749	95.1	0.77 (0.75-0.79)	<0.001
SCIP2: Prophylactic antibiotic consistent with guidelines					
Urban	895,997	917,696	97.6	ref.	ref.
Rural	175,035	180,505	97.0	0.77 (0.75-0.80)	<0.001
SCIP3: Prophylactic ABX discontinued within 24 h. of surgery end time or 48 h. for cardiac surgery					
Urban	805,137	863,438	93.2	ref.	ref.
Rural	159,351	172,373	92.4	0.89 (0.87-0.90)	<0.001
SCIP4: Controlled 6 AM postoperative serum glucose - cardiac surgery					
Urban	155,675	168,209	92.5	ref.	ref.
Rural	11,246	12,256	91.8	0.90 (0.84-0.96)	0.001

SCIP6: appropriate hair removal					
Urban	1,304,767	1,316,311	99.1	ref.	ref.
Rural	252,581	255,064	99.0	0.90 (0.86-0.94)	<0.001
SCIPCARD2: Perioperative period beta blocker					
Urban	341,816	374,870	91.2	ref.	ref.
Rural	58,327	65,020	89.7	0.84 (0.82-0.87)	<0.001
SCIPVTE1: Recommended VTE prophylaxis ordered during admission					
Urban	368,551	393,488	93.7	ref.	ref.
Rural	75,501	82,880	91.1	0.69 (0.67-0.71)	<0.001
SCIPVTE2: Received VTE prophylaxis within 24 hours prior to or after surgery					
Urban	358,864	391,436	91.7	ref.	ref.
Rural	73,455	82,235	89.3	0.76 (0.74-0.78)	<0.001

NQF-ENDORSED VOLUNTARY CONSENSUS STANDARDS FOR HOSPITAL CARE

Measure Information Form

Measure Set: Surgical Care Improvement Project (SCIP)

Set Measure ID#: SCIP-Card-2

Performance Measure Name: Surgery Patients on Beta-Blocker Therapy Prior to Arrival Who Received a Beta-Blocker During the Perioperative Period

Description: Surgery patients on beta-blocker therapy prior to arrival who received a beta-blocker during the perioperative period. The perioperative period for the SCIP Cardiac measure~~s~~ is defined as the day prior to surgery through postoperative day two (POD 2) with day of surgery being day zero.

If the postoperative length of stay ≥ 2 days, the measure evaluates the administration of more than one dose of a beta-blocker: the day prior to or the day of surgery **and** on postoperative day one (POD 1) or postoperative day two (POD 2) unless reasons for not administering the medication were documented. If the postoperative length of stay was < 2 days, the measure will evaluate the administration of the beta-blocker on the day prior to or the day of surgery only, unless reasons for not administering the medication were documented.

Rationale: Concerns regarding the discontinuation of beta-blocker therapy in the perioperative period have existed for several decades. Shammash and colleagues studied a total of 140 patients who received beta-blockers preoperatively. Mortality in the 8 patients who had beta-blockers discontinued postoperatively (50%) was significantly greater than in the 132 patients in whom beta-blockers were continued. Hoeks and colleagues studied 711 consecutive peripheral vascular surgery patients. After adjustment for potential confounders and the propensity of its use, continuous beta-blocker use remained significantly associated with a lower 1-year mortality than among nonusers. In contrast, beta-blocker withdrawal was associated with an increased risk of 1-year mortality compared with nonusers. The American College of Cardiology/American Heart Association site continuation of beta-blocker therapy in the perioperative period as a class I indication. They also recommend the use of beta blockers for titrated heart rate control during the intraoperative and postoperative periods to maintain a rate of 60 to 80 bpm in the absence of hypotension.~~, and accumulating evidence suggests that titration to maintain tight heart rate control should be the goal.~~

Type of Measure: Process
Improvement Noted As: An increase in the rate.

Numerator Statement: Surgery patients on beta-blocker therapy prior to arrival who receive a beta-blocker during the perioperative period.
Included Populations: Not applicable
Excluded Populations: None

Data Elements:

- *Beta-Blocker Perioperative*

Denominator Statement: All surgery patients on beta-blocker therapy prior to arrival.

Included Populations:

- *ICD-9-CM Principal Procedure Code* of selected surgeries (as defined in Appendix A, Table 5.10 for ICD-9-CM codes).

Excluded Populations:

- Patients less than 18 years of age
- Patients who have a Length of Stay greater than 120 days
- Patients whose ICD-9-CM principal procedure was performed entirely by *Laparoscope*
- Patients enrolled in clinical trials
- Patients whose ICD-9-CM principal procedure occurred prior to the date of admission
- Patients who expired during the perioperative period
- Pregnant patients taking a beta-blocker prior to arrival
- Patients with a documented *Reason for Not Administering Beta-Blocker-Perioperative*

Data Elements:

- *Admission Date*
- *Anesthesia Start Date*
- *Beta-Blocker Current Medication*
- *Beta-Blocker During Pregnancy*
- *Birthdate*
- *Clinical Trial*
- *Discharge Date*
- *ICD-9-CM Principal Procedure Code*
- *Laparoscope*
- *Perioperative Death*
- *Reason for Not Administering Beta-Blocker-Perioperative*
- *Sex*

Risk Adjustment: No

Data Collection Approach: Retrospective data sources for required data elements include administrative data and medical records.

Data Accuracy: Variation may exist in the assignment of ICD-9-CM codes; therefore, coding practices may require evaluation to ensure consistency.

Measure Analysis Suggestions: This measure seeks to identify surgery patients who were on beta-blocker therapy prior to arrival that received a perioperative beta-blocker. Health care organizations can identify patients who were on beta-blocker therapy for an extended period of time and compare them to those who received beta-blockers perioperatively, or those who did not receive the medication due to other reasons, i.e., complications or early discharges. An additional step would be to correlate the post hospital stay period to the beta-blocker administration during the pre/perioperative period. This will allow health care organization to take appropriate steps to ensure that patients receive the necessary care to reduce the risk of cardiovascular complications in the postoperative period.

Sampling: Yes, please refer to the measure set specific sampling requirements and for additional information see the Population and Sampling Specifications Section.

Data Reported As: Aggregate rate generated from count data reported as a proportion.

Selected References:

- Manual of Medical Therapeutics. Department of Medicine Washington University, School of Medicine, St. Louis, MO, GA Ewald and CR McKenzie editors. 28th Edition, 1995. PMID: 0000000.
- Belzberg H, Rivkind AI. Preoperative cardiac preparation. *Chest*. 1999;115:82S-95S. PMID: 10331339.
- Poldermans D, Boersma E, Bax JJ, et al, for the DECREASE Study Group. The effect of bisoprolol on perioperative mortality and myocardial infarction in high-risk patients undergoing vascular surgery. *N Engl J Med*. 1999;24:1789-1794. PMID: 10588963.
- Shammash JB, Trost JC, Gold JM, et al. Perioperative beta-blocker withdrawal and mortality in vascular surgical patients. *Am Heart J*. 2001;141:148-153. PMID: 11136500.
- Boersma E, Poldermans D, Bax JJ, et al, for the Dutch Echocardiographic Cardiac Risk Evaluation Applying Stress Echocardiography (DECREASE) Study Group. Predictors of cardiac events after major vascular surgery: role of clinical characteristics, dobutamine echocardiography. PMID:11308400.
- Pasternack PF, Imparato AM, Baumann FG, et al. The hemodynamics of beta-blockade in patients undergoing abdominal aortic aneurysm repair. *Circulation*. 1987;76(suppl 3, pt 2):III-1-7. PMID:3621532.
- Yaeger RA, Moneta GL, Edwards JM, et al. Reducing perioperative myocardial infarction following vascular surgery. The potential role of beta-blockade. *Arch Surg* 1995;130(8):869. PMID:7632148.
- Yusuf S, Peto R, Lewis J, Collins R, et al. Beta Blockade during and after myocardial infarction: an overview of the randomized trials. *Prog Cardiovasc Dis* 1985; 27: 335-371. PMID: 2858114.
- McGory ML, Maggard MA, Ko CY. A meta-analysis of perioperative beta blockade: What is the actual risk reduction? *Surgery*. 2005 Aug;138(2):171-179. PMID: 16153424.
- Fleischmann JA, Beckman JA, Buller CE, Calkins H, Fleisher LA, et al. 2009 ACCF/AHA Focused update on perioperative beta blockade. *J Am Coll Cardiol* 2009; 54: 2102-2128. PMID: 19926021.

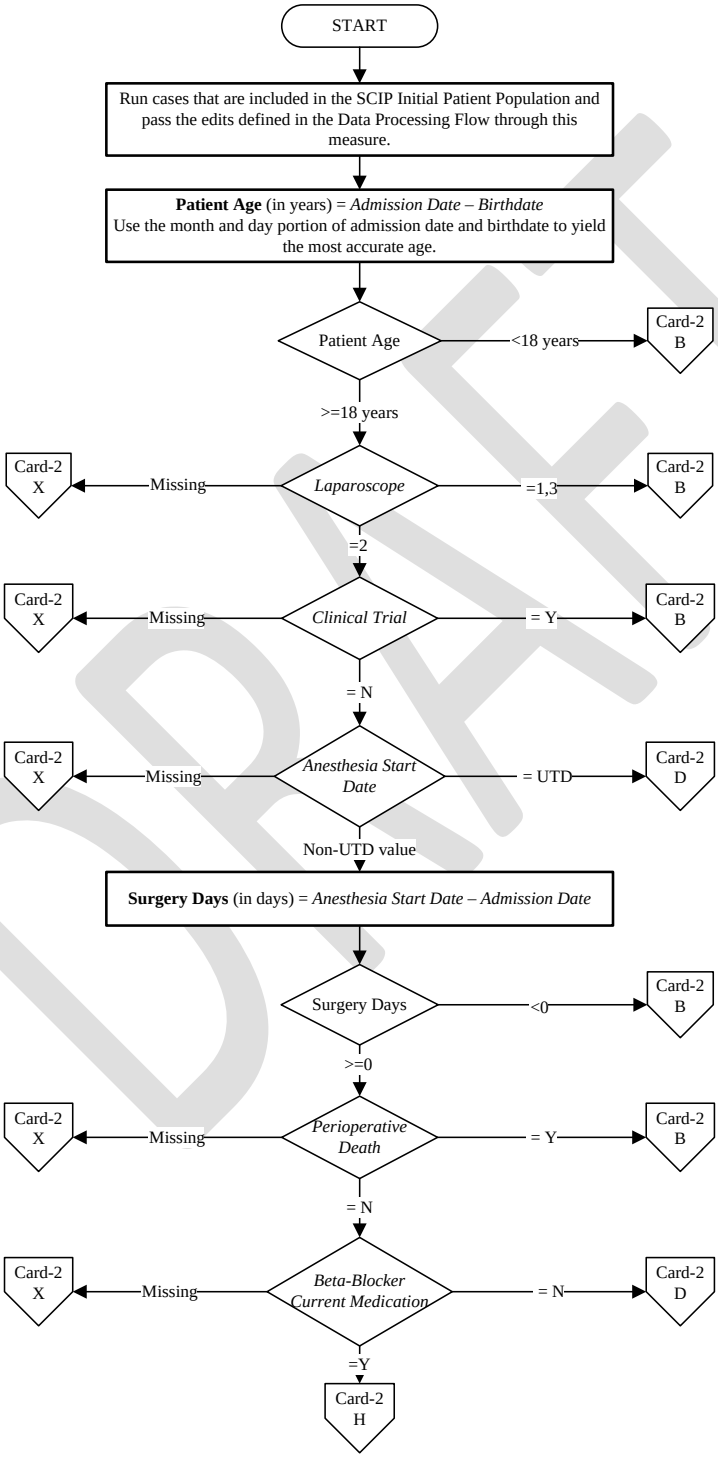
- Goldman L. Noncardiac surgery in patients receiving propranolol. Case reports and recommended approach. *Arch Intern Med* 1981;141:193-6.
- Hoeks SE, Scholte Op Reimer WJ, van Urk H, et al. Increase of 1-year mortality after perioperative beta-blocker withdrawal in endovascular and vascular surgery patients. *Eur J Vasc Endovasc Surg* 2007;33:13–9.
- Poldermans D, Bax JJ, Boersma J, De Hert S, Eeckhout E, Fowkes G, et al. The Task Force for Preoperative Cardiac Risk Assessment and Perioperative Cardiac Management in Non-cardiac Surgery of the European society of Cardiology (ESC) and endorsed by the European Society of Anaesthesiology (ESA). Guidelines for pre-operative cardiac risk assessment and perioperative cardiac management in non-cardiac surgery. Eur Heart J 2009 Nov; 30(22): 2769-2812. PMID: 19713421.
- van Klei WA, Bryson GL, Yang H, Forster AJ. Effect of beta-blocker prescription on the incidence of postoperative myocardial infarction after hip and knee arthroplasty. *Anesthesiology* 2009;111:717-24.
- Dunkelgrun M, Boersma E, Schouten O, Koopman-van Gemert AWMM, van Poorten F, Bax J, Thomson IR, Poldermans D. Bisoprolol and fluvastatin for the reduction of perioperative cardiac mortality and myocardial infarction in intermediate-risk patients undergoing non-cardiovascular surgery: a randomized controlled trial (DECREASE-IV). *Ann Surg* 2009 Jun; 249(6):921-926.

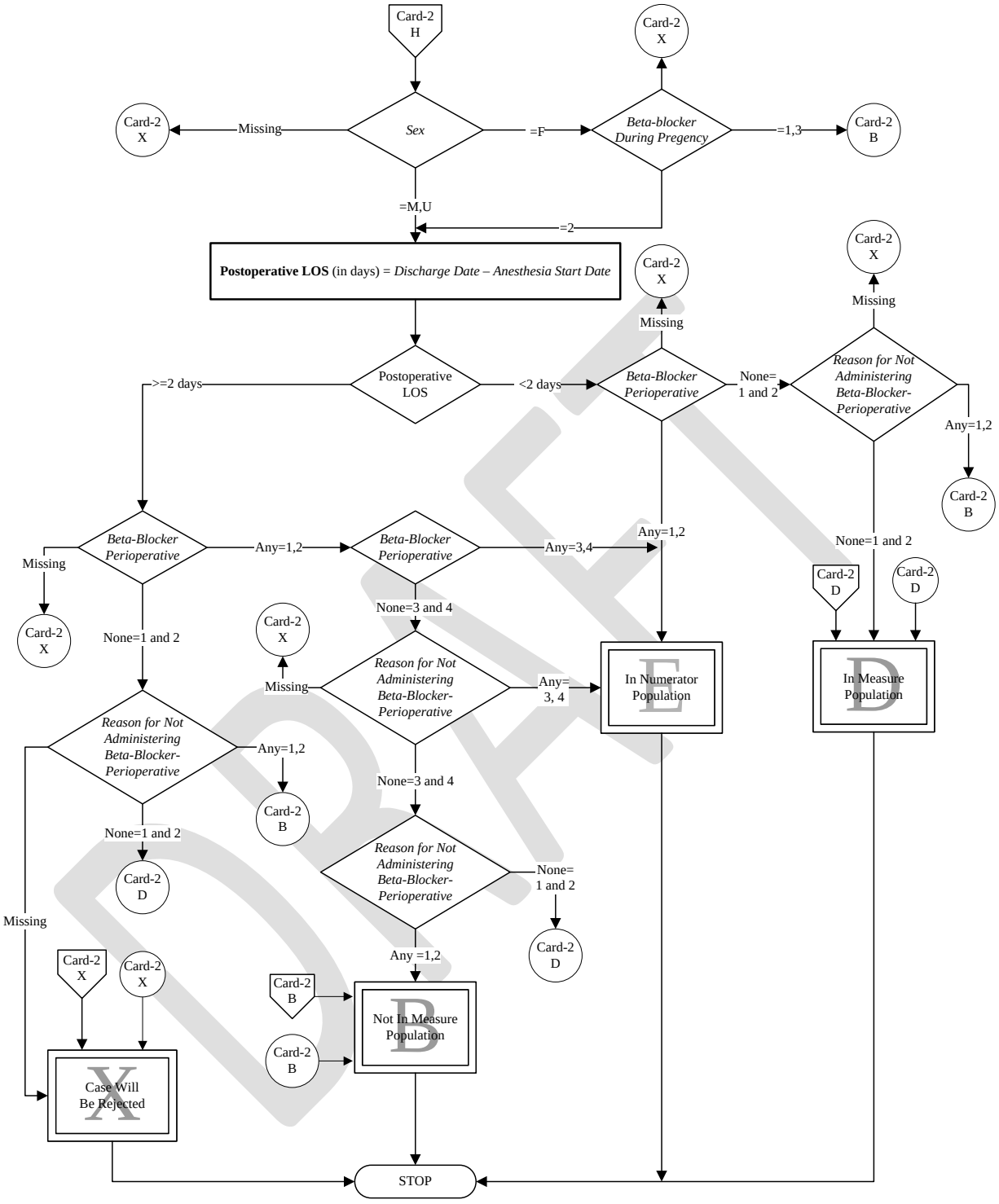
SCIP-Card-2: Surgery Patients on Beta-Blocker Therapy Prior to Arrival Who Received a Beta-Blocker During the Perioperative Period

Numerator: Surgery patients on beta-blocker therapy prior to arrival who receive a beta-blocker during the perioperative period.

Denominator: All surgery patients on beta-blocker therapy prior to arrival.

Variable Key:
Patient Age
Surgery Days
Postoperative LOS




Card-2 H
Card-2 X
Sex
Missing
=F
Beta-blocker During Pregency
=1,3
Card-2 B
=M,U
=2
Postoperative LOS Date – Anesthesia Start Date
Card-2 X
Missing
Card-2 X
Missing
Postoperative LOS
>=2 days
<2 days
Beta-Blocker Perioperative
None= 1 and 2
Reason for Not Administering Beta-Blocker-Perioperative
Any=1,2
Card-2 B
Beta-Blocker Perioperative
Missing
Any=1,2
Beta-Blocker Perioperative
Any=3,4
Any=1,2
None=1 and 2
Card-2 D
Card-2 D
Card-2 X
None=1 and 2
None=3 and 4
Card-2 X
Missing
Reason for Not Administering Beta-Blocker-Perioperative
Any= 3, 4
In Numerator Population
E
In Measure Population
D
Reason for Not Administering Beta-Blocker-Perioperative
Any=1,2
None=3 and 4
Card-2 B
None=1 and 2
Card-2 D
Reason for Not Administering Beta-Blocker-Perioperative
None= 1 and 2
Card-2 D
Missing
Any =1,2
Card-2 X
Card-2 X
Card-2 B
Card-2 B
Not In Measure Population
B
Case Will Be Rejected
X
STOP

Last Updated: Version X.X

Data Element Name: *Beta-Blocker Perioperative*

Collected For: CMS/The Joint Commission: SCIP-Card-2

Definition: Beta-blocker was received during the perioperative period. Beta-blockers are agents which block beta-adrenergic receptors, thereby decreasing the rate and force of heart contractions, and reducing blood pressure. Beta-blockers given perioperatively reduce the risk of cardiovascular complications.

Suggested Data Collection Question: Is there documentation that a beta-blocker was received during the perioperative period?

Format:

Length: 1
Type: Alphanumeric
Occurs: 1-4

Allowable Values: Select all that apply

1. There is documentation that a beta-blocker was received on the day prior to surgery.
2. There is documentation that the beta-blocker was received on the day of surgery.
3. There is documentation that a beta-blocker was received on POD 1 with day of surgery being day zero.
4. There is documentation that a beta-blocker was received on POD 2 with day of surgery being day zero.
5. There is NO documentation that a beta-blocker was received during the perioperative period (the day prior to surgery through POD 2 with day of surgery being day zero) or unable to determine from medical record documentation.

.

Notes for Abstraction:

- The perioperative period for the SCIP cardiac measure is defined as the day prior to surgery through postoperative day two (POD 2) with the day of surgery being day zero.
- There must be documentation that reflects that the beta-blocker was taken on the days specified in each allowable value to select that specific value.
- If the patient received a beta-blocker on the day prior to surgery or the day of surgery **and also** received a beta-blocker on POD 1 or POD 2, select the

appropriate values. Abstractors have the opportunity to select one or more of the allowable values. No value should be recorded more than once.

- To select Value 5, there must be **NO** documentation that a beta-blocker was received during the perioperative period (the day prior to surgery through POD 2 with day of surgery being day zero). If Value 5 is selected, no other selections should be recorded.

Suggested Data Sources:

- Anesthesia record
- Consultation notes
- History and physical
- Medication administration record
- Medication reconciliation record
- Nursing admission assessment
- Operative report
- Preoperative record
- Procedure notes
- Progress notes

Inclusion Guidelines for Abstraction:

Refer to Appendix C, Table 1.3 for a comprehensive list of Beta-Blocker medications.

Exclusion Guidelines for Abstraction:

Eye drops containing beta-blocker (e.g., Cosopt)

Last Updated: Version 3.1

Data Element name: *Beta-Blocker Current Medication*

Collected For: CMS/The Joint Commission: SCIP-Card-2

Definition: Documentation in the medical record that the patient was on daily beta-blocker therapy prior to arrival. Beta-blockers are agents which block beta-adrenergic receptors, thereby decreasing the rate and force of heart contractions, and reducing blood pressure.

Suggested Data Collection Question: Is there documentation that the patient was on daily beta-blocker therapy prior to arrival?

Format:

Length: 1
Type: Alphanumeric
Occurs: 1

Allowable Values:

Y (Yes)	There is documentation that the patient was on daily beta-blocker therapy prior to arrival.
N (No)	There is no documentation that the patient was on daily beta-blocker therapy prior to arrival or unable to determine from medical record documentation.

Notes for Abstraction:

- If there is documentation that the beta-blocker was taken daily at “home” or is a “current” medication, select “Yes.”
- If a beta-blocker is listed as a home medication without designation of how often or when it is taken, select “Yes.”
- If there is documentation that the beta-blocker is a home/current medication and additional documentation indicates the beta-blocker was not taken daily, e.g., the medication reconciliation form lists a beta-blocker as a home/current medication, but documentation in the nurses notes state “patient denies taking beta-blocker every day," select “No.”
- If there is documentation that the beta-blocker is on a schedule other than daily, select “No.”
- If there is documentation that the beta-blocker was given on a “prn” basis for cardiac or non-cardiac reasons, select “No.”
- If there is documentation that the patient is taking a daily beta-blocker and it is specified as taken for non-cardiac reasons (migraine, benign essential tremor, pheochromocytoma), select “No.”

- If a beta-blocker is listed as a daily “home” or “current” medication, but the physician writes an order to hold or discontinue the beta-blocker before surgery because of a contraindication (reasons for not administering), select “No.”
- If the patient stopped taking the beta-blocker prior to arrival but was started on one in the hospital prior to surgery, select “No.” If a beta-blocker is not listed as a daily “home” medication upon admission prior to surgery, but a beta-blocker is added during the hospitalization, select “No.”
- If there is documentation that the patient is not taking the beta-blocker prior to arrival, select “No.” Example: On the patient’s list of medications from home, Atenolol is listed, but the nurse notes that the patient is not taking the medication. Select “No.”

Suggested Data Sources:

- Admitting record
- Anesthesia records
- Consultation notes
- Medication reconciliation form
- History and physical
- Nursing admission assessment
- Preoperative record
- Progress notes

Inclusion Guidelines for Abstraction:

Refer to Appendix C, Table 1.3 for a comprehensive list of Beta-Blocker medications.

Exclusion Guidelines for Abstraction:

- Eye drops containing beta-blocker (e.g., Cosopt)
- “PRN” beta-blocker
- Beta-blockers taken daily for non-cardiac reasons

Last Updated: Version 3.1

Data Element Name: *Reason for Not Administering Beta-Blocker - Perioperative*

Collected For: CMS/The Joint Commission: SCIP-Card-2

Definition: Reasons for not administering a beta-blocker during the perioperative period:Bradycardia (heart rate less than 50 bpm)

- Hypotension (systolic ≤ 100 mm/Hg)
- Concurrent use of intravenous inotropic medications during the perioperative period
- Other reasons documented by physician/APN/PA or pharmacist

Beta-blockers are agents which block beta-adrenergic receptors, thereby decreasing the rate and force of heart contractions, and reducing blood pressure. Over time beta-blockers improve the heart's pumping ability.

Suggested Data Collection Question: Was there physician/ APN/PA or pharmacist documentation of reasons for not administering a beta-blocker during the perioperative period?

Format:

Length: 1
Type: Alphanumeric
Occurs: 1-4

Allowable Values: Select all that apply.

1. There is documentation of a reason for not administering a beta- blocker on the day prior to surgery.
2. There is documentation of a reason for not administering a beta- blocker on the day of surgery.
3. There is documentation of a reason for not administering a beta-blocker on postoperative day 1 (POD 1).
4. There is documentation of a reason for not administering a beta-blocker on postoperative day 2 (POD 2).
5. There is **NO** documentation of a reason for not administering a beta-blocker during the perioperative period (day prior to surgery through POD 2 with day of surgery being day zero) or unable to determine from medical record documentation.

Notes for Abstraction:

- The perioperative period for the SCIP cardiac measure is defined as the day prior to surgery through postoperative day two (POD 2) with the day of surgery being day zero.

- Documentation of reasons for not administering a beta-blocker must be found during the period defined in the allowable value to select that value. If the physician writes a specific reason for not administering beta- blockers during the defined period, select the appropriate value. Example: The physician documents on POD 1: Will hold beta-blockers today since the patient is hemodynamically unstable. Select value 3. The documentation must be made on the day corresponding to the value.
- Preoperative documentation that the patient is NPO or due to NPO status alone is not acceptable to select value 1 or 2. Documentation to hold all meds or to hold all PO meds, alone, is not acceptable to select allowable values 1-4. Documentation to hold the beta-blocker must include the reason it is being held. Example: Hold beta-blocker until cardiac consult.
- Bradycardia must be substantiated by documentation of a heart rate of less than 50 bpm during the perioperative period. Vital signs obtained while patient is on cardiopulmonary bypass machine cannot be used to determine bradycardia.
- Hypotension must be substantiated by documentation of a systolic pressure ≤ 100 mm/Hg during the perioperative period.
- If the physician writes an order to hold the beta-blocker when the patient's vital signs are outside certain parameters and there is documentation that the beta-blocker was held because the vital signs were outside the parameters during one of the periods specified in the allowable values, select the appropriate value. The vital signs to support this documentation are required. Example: The physician writes the order, "Hold atenolol for SBP less than 100" and the nurse documents that the atenolol was held for a blood pressure of 90/50 on POD 2. Select value 4. If it is apparent on the MAR that the medication was held during the perioperative period, a notation on the MAR or in the nursing narrative is acceptable to select the appropriate value.
- If intravenous use of inotropic medication (Appendix C, Table 3.14) is initiated at any time during the time period represented in an allowable value, select the value that represents that timeframe in the perioperative period.
- Abstractors have the opportunity to select one or more of the allowable values. No value should be recorded more than once. If value 5 is selected, no other selections should be recorded.

Suggested Data Sources:

- Anesthesia record
- Consultation notes
- Discharge summary
- ECG reports
- Emergency department record
- History and physical
- Medication administration record
- Nursing notes
- Physician orders

- Progress notes
- Vital signs/graphic record

Inclusion Guidelines for Abstraction:
Refer to Appendix C, Table 1.3 for a comprehensive list of Beta-Blockers.
Refer to Appendix C, Table 3.14 for a comprehensive list of inotropic medications.

Exclusion Guidelines for Abstraction:
None

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 #:** 0364 **NQF Project:** Surgery Endorsement Maintenance 2010
MEASURE DESCRIPTIVE INFORMATION
De.1 **Measure Title:** Incidental Appendectomy in the Elderly Rate (IQI 24)
De.2 **Brief description of measure:** Percent of elderly cases with intra-abdominal procedure with an incidental appendectomy.
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** Not applicable
De.4 **National Priority Partners Priority Area:** Population health, Safety, Overuse De.5 **IOM Quality Domain**: Effectiveness, Efficiency, 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**
A. The measure is in the public domain or an intellectual property (measure steward agreement) is signed. *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.* 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 A.2 **Indicate if Proprietary Measure** (*as defined in measure steward agreement*)**:** A.3 **Measure Steward Agreement:** Government entity and in the public domain - no agreement necessary A.4 **Measure Steward Agreement attached:**	**A** Y☐ N☐
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	**B** Y☐

every 3 years. Yes, information provided in contact section	N☐
C. The intended use of the measure includes both public reporting and quality improvement. ►**Purpose:** Public reporting, Internal quality improvement	C Y☐ N☐
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	D Y☐ N☐
(for NQF staff use) **Have all conditions for consideration been met?** **Staff Notes to Steward** (*if submission returned*)**:**	Met Y☐ N☐
Staff Notes to Reviewers (*issues or questions regarding any criteria*)**:**	
Staff Reviewer Name(s):	

TAP/Workgroup Reviewer Name:	
Steering Committee Reviewer Name:	
1. IMPORTANCE TO MEASURE AND REPORT	
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**	Eval Rating
(for NQF staff use) **Specific NPP goal**:	
1a.1 **Demonstrated High Impact Aspect of Healthcare:** Patient/societal consequences of poor quality 1a.2 1a.3 **Summary of Evidence of High Impact:** Andrew and Roty showed that incidental appendectomy was associated with a higher risk of wound infection (5.9% versus 0.9%) among cholecystectomy patients who were at least 50 years of age, but not among younger patients.189 Based on this finding and the findings of Warren and colleagues, the risk of incidental appendectomy is believed to outweigh the benefits for elderly patients. [1] [2] [3] [4] [5] 1a.4 **Citations for Evidence of High Impact:** Updated citations will be presented in the May Steering Committee meeting [1] Warren JL, Penberthy LT, Addiss DG, et al. Appendectomy incidental to cholecystectomy among elderly Medicare beneficiaries. Surg Gynecol Obstet 1993;177(3):288-94. [2] Fisher KS, Ross DS. Guidelines for therapeutic decision in incidental appendectomy. Surg Gynecol Obstet 1990;171(1):95-8. [3] Synder TE, Selanders JR. Incidental appendectomy—yes or no? A retrospective case study and review of the literature. Infect Dis Obstet Gynecol 1998;6(1)30-7. [4] Wolff BG. Current status of incidental surgery. Dis Colon Rectum 1995;38(4):435-41. [5] Nockerts SR, Detmer DE, Fryback, DG. Incidental appendectomy in the elderly? No. Surgery 1980;88(2):301-6.	1a C☐ P☐ M☐ N☐

1b. Opportunity for Improvement

1b.1 Benefits (improvements in quality) envisioned by use of this measure: Removal of the appendix incidental to other abdominal surgery—such as urological, gynecological, or gastrointestinal surgeries—is intended to eliminate the risk of future appendicitis and to simplify any future differential diagnoses of abdominal pain. Incidental appendectomy among the elderly is contraindicated. As such, lower rates represent better quality.

1b.2 Summary of data demonstrating performance gap (variation or overall poor performance) across providers:
Adjusted per 1,000 rates by patient and hospital characteristics, 2007

Mean	Standard error	Location	P-value: Relative to Northeast
14.511	0.512	Northeast	1.000
21.482	0.474	Midwest	0.000
20.145	0.393	South	0.000
21.716	0.534	West	0.000

1b.3 Citations for data on performance gap:
See the following report for a complete treatment of the methodology: "Methods: Applying AHRQ Quality Indicators to Healthcare Cost and Utilization Project (HCUP) Data for the National Healthcare Quality Report" [URL: http://hcupnet.ahrq.gov/QI%20Methods.pdf?JS=Y]

1b.4 Summary of Data on disparities by population group:
Adjusted per 1,000 rates by patient/hospital characteristics, 2007

Estimate	Standard error	Age: for conditions affecting elderly
22.788	0.501	65-69
21.897	0.501	70-74
18.630	0.497	75-79
16.791	0.546	80-84
15.218	0.579	85 and over

Estimate	Standard error	Gender
23.991	0.454	Male
17.531	0.270	Female

Estimate	Standard error	Median income of patient´s ZIP code
20.383	0.472	First quartile (lowest income)
20.801	0.460	Second quartile
19.020	0.471	Third quartile
18.142	0.468	Fourth quartile (highest income)

Estimate	Standard error	Location of patient residence (NCHS)
18.608	0.457	Large central metropolitan
17.801	0.476	Large fringe metropolitan
18.848	0.525	Medium metropolitan
23.178	0.734	Small metropolitan
20.819	0.678	Micropolitan
23.873	0.840	Not metropolitan or micropolitan

Estimate	Standard error	Expected payment source
20.582	0.721	Private insurance
19.384	0.250	Medicare
26.535	2.421	Medicaid
21.177	2.811	Other insurance

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20.580	3.200	Uninsured / self-pay / no charge
Estimate	Standard error	Hospital Ownership/control
18.867	0.268	Private, not-for-profit
22.948	0.684	Private, for-profit
20.994	0.682	Public
Estimate	Standard error	Teaching status
15.686	0.396	Teaching
21.699	0.290	Nonteaching
Estimate	Standard error	Location of hospital
19.750	0.402	Large central metropolitan
15.924	0.535	Large fringe metropolitan
18.790	0.500	Medium metropolitan
20.089	0.671	Small metropolitan
24.711	0.728	Micropolitan
28.949	1.467	Not metropolitan or micropolitan
Estimate	Standard error	Bed size of hospital
21.239	0.730	Less than 100
20.602	0.373	100 - 299
18.849	0.425	300 - 499
17.902	0.523	500 or more

1b.5 Citations for data on Disparities:
See the following report for a complete treatment of the methodology: "Methods: Applying AHRQ Quality Indicators to Healthcare Cost and Utilization Project (HCUP) Data for the National Healthcare Quality Report" [URL: http://hcupnet.ahrq.gov/QI%20Methods.pdf?JS=Y]

1c. Outcome or Evidence to Support Measure Focus

1c.1 Relationship to Outcomes (*For non-outcome measures, briefly describe the relationship to desired outcome. For outcomes, describe why it is relevant to the target population*)**:** Andrew and Roty showed that incidental appendectomy was associated with a higher risk of wound infection (5.9% versus 0.9%) among cholecystectomy patients who were at least 50 years of age, but not among younger patients.189 Based on this finding and the findings of Warren and colleagues, the risk of incidental appendectomy is believed to outweigh the benefits for elderly patients. [1] [2] [3] [4] [5]

References:
[1] Warren JL, Penberthy LT, Addiss DG, et al. Appendectomy incidental to cholecystectomy among elderly Medicare beneficiaries. Surg Gynecol Obstet 1993;177(3):288-94.
[2] Fisher KS, Ross DS. Guidelines for therapeutic decision in incidental appendectomy. Surg Gynecol Obstet 1990;171(1):95-8.
[3] Synder TE, Selanders JR. Incidental appendectomy—yes or no? A retrospective case study and review of the literature. Infect Dis Obstet Gynecol 1998;6(1)30-7.
[4] Wolff BG. Current status of incidental surgery. Dis Colon Rectum 1995;38(4):435-41.
[5] Nockerts SR, Detmer DE, Fryback, DG. Incidental appendectomy in the elderly? No. Surgery 1980;88(2):301-6.

1c.2-3. Type of Evidence: Expert opinion, Systematic synthesis of research

1c.4 Summary of Evidence (*as described in the criteria; for outcomes, summarize any evidence that healthcare services/care processes influence the outcome*)**:**
Andrew and Roty showed that incidental appendectomy was associated with a higher risk of wound infection

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(5.9% versus 0.9%) among cholecystectomy patients who were at least 50 years of age, but not among younger patients.189 Based on this finding and the findings of Warren and colleagues, the risk of incidental appendectomy is believed to outweigh the benefits for elderly patients. [1] [2] [3] [4] [5]

References:
[1] Warren JL, Penberthy LT, Addiss DG, et al. Appendectomy incidental to cholecystectomy among elderly Medicare beneficiaries. Surg Gynecol Obstet 1993;177(3):288-94.
[2] Fisher KS, Ross DS. Guidelines for therapeutic decision in incidental appendectomy. Surg Gynecol Obstet 1990;171(1):95-8.
[3] Synder TE, Selanders JR. Incidental appendectomy—yes or no? A retrospective case study and review of the literature. Infect Dis Obstet Gynecol 1998;6(1)30-7.
[4] Wolff BG. Current status of incidental surgery. Dis Colon Rectum 1995;38(4):435-41.
[5] Nockerts SR, Detmer DE, Fryback, DG. Incidental appendectomy in the elderly? No. Surgery 1980;88(2):301-6.

1c.5 **Rating of strength/quality of evidence (***also provide narrative description of the rating and by whom***):** 13 Smoothing recommended Testing, rating, and review were conducted by the project team. A full report on the literature review and empirical evaluation can be found in Refinement of the HCUP Quality Indicators by the UCSF-Stanford EPC, Detailed coding information for each QI is provided in the document Prevention Quality Indicators Technical Specifications. Rating of performance on empirical evaluations, ranged from 0 to 26. The scores were intended as a guide for summarizing the performance of each indicator on four empirical tests of precision (signal variance, area-level share, signal ratio, and R-squared) and five tests of minimum bias (rank correlation, top and bottom decile movement, absolute change, and change over two deciles), as described in the previous section.

1c.6 **Method for rating evidence:** The project team conducted extensive empirical testing of all potential indicators using the 1995-97 HCUP State Inpatient Databases (SID) and Nationwide Inpatient Sample (NIS) to determine precision, bias, and construct validity. The 1997 SID contains uniform data on inpatient stays in community hospitals for 22 States covering approximately 60% of all U.S. hospital discharges. The NIS is designed to approximate a 20% of U.S. community hospitals and includes all stays in the sampled hospitals. Each year of the NIS contains between 6 million and 7 million records from about 1,000 hospitals. The NIS combines a subset of the SID data, hospital-level variables, and hospital and discharge weights for producing national estimates. The project team conducted tests to examine three things: precision, bias, and construct validity.
Precision. The first step in the analysis involved precision tests to determine the reliability of the indicator for distinguishing real differences in provider performance. For indicators that may be used for quality improvement, it is important to know with what precision, or surety, a measure can be attributed to an actual construct rather than random variation.
For each indicator, the variance can be broken down into three components: variation within a provider (actual differences in performance due to differing patient characteristics), variation among providers (actual differences in performance among providers), and random variation. An ideal indicator would have a substantial amount of the variance explained by between-provider variance, possibly resulting from differences in quality of care, and a minimum amount of random variation. The project team performed four tests of precision to estimate the magnitude of between-provider variance on each indicator:
• Signal standard deviation was used to measure the extent to which performance of the QI varies systematically across hospitals or areas.
• Provider/area variation share was used to calculate the percentage of signal (or true) variance relative to the total variance of the QI.
• Signal-to-noise ratio was used to measure the percentage of the apparent variation in QIs across providers that is truly related to systematic differences across providers and not random variations (noise) from year to year.
• In-sample R-squared was used to identify the incremental benefit of applying multivariate signal extraction methods for identifying additional signal on top of the signal-to-noise ratio.
In general, random variation is most problematic when there are relatively few observations per provider, when adverse outcome rates are relatively low, and when providers have little control over patient outcomes or variation in important processes of care is minimal. If a large number of patient factors that are difficult to observe influence whether or not a patient has an adverse outcome, it may be difficult to separate the "quality signal" from the surrounding noise. Two signal extraction techniques were applied to improve the

precision of an indicator:
• Univariate methods were used to estimate the "true" quality signal of an indicator based on information from the specific indicator and 1 year of data.
• Multivariate signal extraction (MSX) methods were used to estimate the "true" quality signal based on information from a set of indicators and multiple years of data. In most cases, MSX methods extracted additional signal, which provided much more precise estimates of true hospital or area quality.
Bias. To determine the sensitivity of potential QIs to bias from differences in patient severity, unadjusted performance measures for specific hospitals were compared with performance measures that had been adjusted for age and gender. All of the PQIs and some of the Inpatient Quality Indicators (IQIs) could only be risk-adjusted for age and sex. The 3M™ APR-DRG System Version 12 with Severity of Illness and Risk of Mortality subclasses was used for risk adjustment of the utilization indicators and the in-hospital mortality indicators, respectively. Five empirical tests were performed to investigate the degree of bias in an indicator:
• Rank correlation coefficient of the area or hospital with (and without) risk adjustment—gives the overall impact of risk adjustment on relative provider or area performance.
• Average absolute value of change relative to mean—highlights the amount of absolute change in performance, without reference to other providers' performance.
• Percentage of highly ranked hospitals that remain in high decile—reports the percentage of hospitals or areas that are in the highest deciles without risk adjustment that remain there after risk adjustment is performed.
• Percentage of lowly ranked hospitals that remain in low decile—reports the percentage of hospitals or areas that are in the lowest deciles without risk adjustment that remain there after risk adjustment is performed.
• Percentage that change more than two deciles—identifies the percentage of hospitals whose relative rank changes by a substantial percentage (more than 20%) with and without risk adjustment.
Construct validity. Construct validity analyses provided information regarding the relatedness or independence of the indicators. If quality indicators do indeed measure quality, then two measures of the same construct would be expected to yield similar results. The team used factor analysis to reveal underlying patterns among large numbers of variables—in this case, to measure the degree of relatedness between indicators. In addition, they analyzed correlation matrices for indicators.

1c.7 Summary of Controversy/Contradictory Evidence: See the following for a complete treatment of the topic:
http://www.qualityindicators.ahrq.gov/downloads/iqi/iqi_guide_v31.pdf
Note: The Literature Review Caveats column summarizes evidence specific to each potential concern on the link between the PQIs and quality of care, as described in step 3 above. A question mark (?) indicates that the concern is theoretical or suggested, but no specific evidence was found in the literature. A check mark indicates that the concern has been demonstrated in the literature.

1c.8 Citations for Evidence (*other than guidelines*): Updated citations will be presented in the May Steering Committee meeting

http://www.qualityindicators.ahrq.gov/downloads/iqi/iqi_guide_v31.pdf

1c.9 Quote the Specific guideline recommendation (*including guideline number and/or page number*):
Not Applicable.

1c.10 Clinical Practice Guideline Citation: Not Applicable.
1c.11 National Guideline Clearinghouse or other URL: Not Applicable.

1c.12 Rating of strength of recommendation (*also provide narrative description of the rating and by whom*):
Not Applicable.

1c.13 Method for rating strength of recommendation (*If different from USPSTF system, also describe rating and how it relates to USPSTF)*:
Not Applicable.

1c.14 Rationale for using this guideline over others:
Not Applicable.

TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Importance to*	**1**

Measure and Report?	
Steering Committee: Was the threshold criterion, *Importance to Measure and Report*, met? **Rationale:**	**1** **Y☐** **N☐**
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. (evaluation criteria)	**Eval Rating**
2a. MEASURE SPECIFICATIONS	
S.1 Do you have a web page where current detailed measure specifications can be obtained? **S.2 If yes, provide web page URL:** **2a. Precisely Specified**	
2a.1 Numerator Statement (*Brief, text description of the numerator - what is being measured about the target population, e.g. target condition, event, or outcome*)**:** Number of incidental appendectomy procedures among cases meeting the inclusion and exclusion rules for the denominator.	
2a.2 Numerator Time Window (*The time period in which cases are eligible for inclusion in the numerator*)**:** Time period is user defined. Users of the measure typically use a 12 month time period.	
2a.3 Numerator Details (*All information required to collect/calculate the numerator, including all codes, logic, and definitions*)**:** Number of incidental appendectomy procedures among cases meeting the inclusion and exclusion rules for the denominator. ICD-9-CM incidental appendectomy procedure codes: 471 INCIDENTAL APPENDECTOMY OCT96- 4711 LAPAROSCOP INCID APPEND OCT96- 4719 OTH INCID APPEND OCT96-	
2a.4 Denominator Statement (*Brief, text description of the denominator - target population being measured*)**:** All discharges, age 65 years and older, with ICD-9-CM codes for abdominal and pelvic surgery. **2a.5 Target population gender:** Female, Male **2a.6 Target population age range:** 65 and older **2a.7 Denominator Time Window** (*The time period in which cases are eligible for inclusion in the denominator*)**:** Time period is user defined. Users of the measure typically use a 12 month time period. **2a.8 Denominator Details** (*All information required to collect/calculate the denominator - the target population being measured - including all codes, logic, and definitions*)**:** 1711 LAPAROSCOPIC REPAIR OF DIRECT INGUINAL HERNIA WITH GRAFT OR PROSTHESIS OCT08- 1712 LAPAROSCOPIC REPAIR OF INDIRECT INGUINAL HERNIA WITH GRAFT OR PROSTHESIS OCT08- 1713 LAPAROSCOPIC REPAIR OF INGUINAL HERNIA WITH GRAFT OR PROSTHESIS, NOS OCT08- 1721	**2a-specs** **C☐** **P☐** **M☐** **N☐**

LAPAROSCOPIC BILATERAL REPAIR OF DIRECT INGUINAL HERNIA WITH GRAFT OR PROSTHESIS OCT08-
1722
LAPAROSCOPIC BILATERAL REPAIR OF INDIRECT INGUINAL HERNIA WITH GRAFT OR PROSTHESIS OCT08-
1723
LAPAROSCOPIC BILATERAL REPAIR OF INGUINAL HERNIA, ONE DIRECT AND ONE INDIRECT, WITH GRAFT OR PROSTHESIS OCT08-
1724
LAPAROSCOPIC BILATERAL REPAIR OF INGUINAL HERNIA WITH GRAFT OR PROSTHESIS, NOS OCT08-
412
SPLENOTOMY
4133
OPEN BIOPSY OF SPLEEN
4141
MARSUPIALIZATION OF SPLENIC CYST
4142
EXCISION OF LESION OR TISSUE OF SPLEEN
4143
PARTIAL SPLENECTOMY
415
TOTAL SPLENECTOMY
4193
EXCISION OF ACCESSORY SPLEEN
4194
TRANSPLANTATION OF SPLEEN
4195
REPAIR AND PLASTIC OPERATIONS ON SPLEEN
4199
OTHER OPERATIONS ON SPLEEN
4240
ESOPHAGECTOMY, NOS
4241
PARTIAL ESOPHAGECTOMY (HAS 1 CASE_
4242
TOTAL ESOPHAGECTOMY (HASE 1 CASE)
4253
INTRATHORACIC ESOPHAGEAL ANASTOMOSIS W/ INTERPOSITION OF SMALL BOWEL
4254
OTHER INTRATHORACIC ESOPHAGOENTEROSTOMY
4255
INTRATHORACIC ESOPHAGEAL ANASTOMOSIS W/ INTERPOSITION OF COLON
4256
OTHER INTRATHORACIC ESOPHAGOCOLOSTOMY
4263
ANTESTERNAL ESOPHAGEAL ANASTOMOSIS W/ INTERPOSITION OF SMALL BOWEL
4264
OTHER ANTESTERNAL ESOPHAGOENTEROSTOMY
4265
ANTESTERNAL ESOPHAGEAL ANASTOMOSIS W/ INTERPOSITION OF COLON
1711
LAPAROSCOPIC REPAIR OF DIRECT INGUINAL HERNIA WITH GRAFT OR PROSTHESIS OCT08-
1712
LAPAROSCOPIC REPAIR OF INDIRECT INGUINAL HERNIA WITH GRAFT OR PROSTHESIS OCT08-
1713
LAPAROSCOPIC REPAIR OF INGUINAL HERNIA WITH GRAFT OR PROSTHESIS, NOS OCT08-
1721
LAPAROSCOPIC BILATERAL REPAIR OF DIRECT INGUINAL HERNIA WITH GRAFT OR PROSTHESIS OCT08-
1722
LAPAROSCOPIC BILATERAL REPAIR OF INDIRECT INGUINAL HERNIA WITH GRAFT OR PROSTHESIS OCT08-

1723
LAPAROSCOPIC BILATERAL REPAIR OF INGUINAL HERNIA, ONE DIRECT AND ONE INDIRECT, WITH GRAFT OR PROSTHESIS OCT08-
1724
LAPAROSCOPIC BILATERAL REPAIR OF INGUINAL HERNIA WITH GRAFT OR PROSTHESIS, NOS OCT08-
412
SPLENOTOMY
4133
OPEN BIOPSY OF SPLEEN
4141
MARSUPIALIZATION OF SPLENIC CYST
4142
EXCISION OF LESION OR TISSUE OF SPLEEN
4143
PARTIAL SPLENECTOMY
415
TOTAL SPLENECTOMY
4193
EXCISION OF ACCESSORY SPLEEN
4194
TRANSPLANTATION OF SPLEEN
4195
REPAIR AND PLASTIC OPERATIONS ON SPLEEN
4199
OTHER OPERATIONS ON SPLEEN
4240
ESOPHAGECTOMY, NOS
4241
PARTIAL ESOPHAGECTOMY (HAS 1 CASE_
4242
TOTAL ESOPHAGECTOMY (HASE 1 CASE)
4253
INTRATHORACIC ESOPHAGEAL ANASTOMOSIS W/ INTERPOSITION OF SMALL BOWEL
4254
OTHER INTRATHORACIC ESOPHAGOENTEROSTOMY
4255
INTRATHORACIC ESOPHAGEAL ANASTOMOSIS W/ INTERPOSITION OF COLON
4256
OTHER INTRATHORACIC ESOPHAGOCOLOSTOMY
4263
ANTESTERNAL ESOPHAGEAL ANASTOMOSIS W/ INTERPOSITION OF SMALL BOWEL
4264
OTHER ANTESTERNAL ESOPHAGOENTEROSTOMY
4265
ANTESTERNAL ESOPHAGEAL ANASTOMOSIS W/ INTERPOSITION OF COLON
4266
OTHER ANTESTERNAL ESOPHAGOCOLOSTOMY
4291
LIGATION OF ESOPHAGEAL VARICES
430
GASTROTOMY
433
PYLOROMYOTOMY
4342
LOCAL EXCISION OF OTHER LESION OR TISSUE OF STOMACH (HAS 10 CASES)
4349
OTHER DESTRUCTION OF LESION OR TISSUE OF STOMACH (HAS 1 CASE)
435

PARTIAL GASTRECTOMY W/ ANASTOMOSIS TO ESOPHAGUS
436
PARTIAL GASTRECTOMY W/ ANASTOMOSIS TO DUODENUM
437
PARTIAL GASTRECTOMY W/ ANASTOMOSIS TO JEJUNUM
4381
PARTIAL GASTRECTOMY W/ JEJUNA TRANSPOSITION
4389
OTHER PARTIAL GASTRECTOMY
4391
TOTAL GASTRECTOMY W/ INTESTINAL INTERPOSITION
4399
OTHER TOTAL GASTRECTOMY
4400
VAGOTOMY, NOS
4401
TRUNCAL VAGOTOMY (HAS ONE CASE)
4402
HIGHLY SELECTIVE VAGOTOMY
4403
OTHER SELECTIVE VAGOTOMY
4411
TRANSABDOMINAL GASTROSCOPY
4415
OPEN BIOPSY OF STOMACH (HAS ONE CASE)
4421
DILATION OF PYLORUS BY INCISION
4429
OTHER PYLOROPLASTY HAS 6 CASES
4431
HIGH GASTRIC BYPASS HAS 1 CASE
4438
LAPAROSCOPIC GASTROENTEROSTOMY
4439
OTHER GASTROENTEROSTOMY
4440
SUTURE OF PEPTIC ULCER, NOS
4441
SUTURE OF GASTRIC ULCER SITE
4442
SUTURE OF DUODENAL ULCER SITE
445
REVISION OF GASTRIC ANASTOMOSIS
4461
SUTURE OF LACERATION OF STOMACH
4463
CLOSURE OF OTHER GASTRIC FISTULA HAS 14 CASES
4464
GASTROPEXY
4465
ESOPHAGOGASTROPLASTY
4466
OTHER PROCEDURES FOR CREATION OF ESOPHAGOGASTRIC SPHINCTERIC COMPETENCE
4467
LAPAROSCOPIC PROCEDURES FOR CREATION OF ESOPHAGOGASTRIC SPHINCTERIC COMPETENCE
4468
LAPAROSCOPIC GASTROPLASTY
4469

OTHER REPAIR OF STOMACH
4491
LIGATION OF GASTRIC VARICES
4492
INTRAOPERATIVE MANIPULATION OF STOMACH
4495
LAPAROSCOPIC GASTRIC RESTRICTIVE PROCEDURE
4496
LAPAROSCOPIC REVISION OF GASTRIC RESTRICTIVE PROCEDURE
4497
LAPAROSCOPIC REVISION OF GASTRIC RESTRICTIVE DEVICES
4499
GASTRIC OPERATION NEC (OCT 04)
4500
INCISION OF INTESTINE, NOS
4501
INCISION OF DUODENUM
4502
OTHER INCISION OF SMALL INTESTINE
4503
INCISION OF LARGE INTESTINE
4511
TRANSABDOMINAL ENDOSCOPY
4515
OPEN BIOPSY OF SMALL INTESTINE
4521
TRANSABDOMINAL ENDOSCOPY OF LARGE INTESTINE
4526
OPEN BIOPSY OF LARGE INTESTINE
4531
OTHER LOCAL EXCISION OF LESION OF DUODENUM
4532
OTHER DESTRUCTION OF LESION OF DUODENUM
4533
LOCAL EXCISION OF LESION OR TISSUE OF SMALL INTESTINE, EXCEPT DUODENUM
4534
OTHER DESTRUCTION OF LESION OF SMALL INTESTINE, EXCEPT DUODENUM
4541
EXCISION OF LESION OR TISSUE OF LARGE INTESTINE
4549
OTHER DESTRUCTION OF LESION OF LARGE INTESTINE
4550
ISOLATION OF INTESTINAL SEGMENT, NOS
4551
ISOLATION OF SEGMENT OF SMALL INTESTINE
4552
ISOLATION OF SEGMENT OF LARGE INTESTINE
4561
MULTIPLE SEGMENTAL RESECTION OF SMALL INTESTINE
4562
OTHER PARTIAL RESECTION OF SMALL INTESTINE
4563
TOTAL REMOVAL OF SMALL INTESTINE
458
TOTAL INTRA-ABDOMINAL COLECTOMY
4590
INTESTINAL ANASTOMOSIS, NOS
4591

SMALL-TO-SMALL INTESTINAL ANASTOMOSIS
4592
ANASTOMOSIS OF SMALL INTESTINE TO RECTAL STUMP
4593
OTHER SMALL-TO-LARGE INTESTINAL ANASTOMOSIS
4594
LARGE-TO-LARGE INTESTINAL ANASTOMOSIS
4595
ANASTOMOSIS TO ANUS
4601
EXTERIORIZATION OF SMALL INTESTINE
4603
EXTERIORIZATION OF LARGE INTESTINE
4610
COLOSTOMY, NOS
4611
TEMPORARY COLOSTOMY
4613
PERMANENT COLOSTOMY
4614
DELAYED OPENING OF COLOSTOMY
4620
ILEOSTOMY, NOS
4621
TEMPORARY ILESOSTOMY
4622
CONTINENT ILEOSTOMY
4623
OTHER PERMANENT ILEOSTOMY
4640
REVISION OF INTESTINA STOMA, NOS
4641
REVISION OF STOMA OF SMALL INTESTINE
4642
REPAIR OF PERICOLOSTOMY HERNIA
4643
OTHER REVISION OF STOMA OF LARGE INTESTINE
4650
CLOSURE OF INTESTINAL STOMA, NOT OTHERWISE SPECIFIED
4651
CLOSURE OF STOMA OF SMALL INTESTINE
4652
CLOSURE OF STOMA OF LARGE INTESTINE
4660
FIXATION OF INTESTINE, NOS
4661
FIXATION OF SMALL INTESTINE TO ABDOMINAL WALL
4662
OTHER FIXATION OF SMALL INTESTINE
4663
FIXATION OF LARGE INTESTINE TO ABDOMINAL WALL
4664
OTHER FIXATION OF LARGE INTESTINE
4672
CLOSURE OF FISTULA OF DUODENUM
4673
SUTURE OF LACERATION OF SMALL INTESTINE, EXCEPT DUODENUM
4674

CLOSURE OF FISTULA OF SMALL INTESTINE, EXCEPT DUODENUM
4675
SUTURE OF LACERATION OF LARGE INTESTINE
4676
CLOSURE OF FISTULA OF LARGE INTESTINE
4679
OTHER REPAIR OF INTESTINE
4680
INTRA-ABDOMINAL MANIPULATION OF INTESTINE, NOS
4681
INTRA-ABDOMINAL MANIPULATION OF SMALL INTESTINE
4682
INTRA-ABDOMINAL MANIPULATION OF LARGE INTESTINE
4691
MYOTOMY OF SIGMOID COLON
4692
MYOTOMY OF OTHER PARTS OF COLON
4693
REVISION OF ANASTOMOSIS OF SMALL INTESTINE
4694
REVISION OF ANASTOMOSIS OF LARGE INTESTINE
4697
TRANSPLANT OF INTESTINE
4699
OTHER OPERATIONS ON INTESTINES
4821
TRANSABDOMINAL PROCTOSIGMOIDOSCOPY
4825
OPEN BIOPSY OF RECTUM
4840
PULL THROUGH RESECTION OF RECTUM, NOS OCT08-
4841
SUBMUCOSAL RESECTION OF RECTUM
4842
LAP PULL-THROUGH RESECTION OF RECTUM OCT08-
4843
OPEN PULL-THROUGH RESECTION OF RECTUM OCT08-
4849
OTHER PULL-THROUGH RESECTION OF RECTUM 485
ABDOMINOPERINEAL RESECTION OF RECTUM
4850
ABDOMINOPERINEAL RESECTION OF RECTUM, NOS OCT08-
4851
LAPAROSCOPIC ABDOMINOPERINEAL RESECTION OF RECTUM OCT08-
4852
OPEN ABDOMINOPERINEAL RESECTION OF RECTUM OCT08-
4859
OTHER ABDOMINOPERINEAL RESECTION OF RECTUM OCT08-
4871
SUTURE OF LACERATION OF RECTUM
4874
RECTORECTOSTOMY
4875
ABDOMINAL PROCTOPEXY
500
HEPATOTOMY
5012
OPEN BIOPSY OF LIVER

5014
LAPAROPSCOPIC LIVER BIOPSY
5019
OTHER DIAGNOSTIC PROCEDURES ON LIVER
5021
MARSUPIALIZATION OF LESION OF LIVER
5022
PARTIAL HEPATECTOMY HAS 3 CASES
5023
OPN ABLTN LIVER LES/TISS OCT06-
5025
LAPAROPSCOPIC ABLATION OF LIVER LESION OR TISSUE
5026
ABLTN LIVER LES/TISS NEC OCT06-
5029
OTHER DESTRUCTION OF LESION OF LIVER HAS 2 CASES
503
LOBECTOMY OF LIVER
504
TOTAL HEPATECTOMY
5051
AUXILIARY LIVER TRANSPLANT
5059
OTHER TRANSPLANT OF LIVER
5061
CLOSURE OF LACERATION OF LIVER
5069
OTHER REPAIR OF LIVER
5102
TROCAR CHOLECYSTOSTOMY
5103
OTHER CHOLECYSTOSTOMY
5104
OTHER CHOLECYSTOTOMY
5113
OPEN BIOPSY OF GALLBLADDER OR BILE DUCTS
5119
OTHER DIAGNOSTIC PROCEDURES ON BILIARY TRACT
5121
OTHER PARTIAL CHOLECYSTECTOMY
5122
CHOLECYSTECTOMY
5123
LAPAROSCOPIC CHOLECYSTECTOMY SE 5122 WITH 116 CASES, THIS ONE HAS 7 CASES
5124
LAPAROSCOPIC PARTIAL CHOLECYSTECTOMY
5131
ANASTOMOSIS OF GALLBLADDER TO HEPATIC DUCTS
5132
ANASTOMOSIS OF GALLBLADDER TO INTESTINE
5133
ANASTOMOSIS OF GALLBLADDER TO PANCREAS
5134
ANASTOMOSIS OF GALLBLADDER TO STOMACH
5135
OTHER GALLBLADDER ANASTOMOSIS
5136
CHOLEDOCHOENTEROSTOMY

5137
ANASTOMOSIS OF HEPATIC DUCT TO GASTROINTESTINAL TRACT
5139
OTHER BILE DUCT ANASTOMOSIS
5141
COMMON DUCT EXPLORATION FOR REMOVAL OF CALCULUS
5142
COMMON DUCT EXPLORATION FOR RELIEF OF OTHER OBSTRUCTION
5143
INSERTION OF CHOLEDOCHOHEPATIC TUBE FOR DECOMPRESSION
5149
INCISION OF OTHER BILE DUCTS FOR RELIEF OF OBSTRUCTION
5151
EXPLORATION OF COMMON DUCT
5159
INCISION OF OTHER BILE DUCT
5161
EXCISION OF CYSTIC DUCT REMNANT
5162
EXCISION OF AMPULLA OF VATER (WITH REIMPLANTATION OF COMMON DUCT)
5163
OTHER EXCISION OF COMMON DUCT
5169
EXCISION OF OTHER BILE DUCT
5171
SIMPLE SUTURE OF COMMON BILE DUCT
5172
CHOLEDOCHOPLASTY
5179
REPAIR OF OTHER BILE DUCTS
5181
DILATION OF SPHINCTER OF ODDI
5182
PANCREATIC SPHINCTEROTOMY
5183
PANCREATIC SPHINCTEROPLASTY
5189
OTHER OPERATIONS ON SPHINCTER OF ODDI
5191
REPAIR OF LACERATION OF GALLBLADDER
5192
CLOSURE OF CHOLECYSTOSTOMY
5193
CLOSURE OF OTHER BILIARY FISTULA
5194
REVISION OF ANASTOMOSIS OF BILIARY TRACT
5195
REMOVAL OF PROSTHETIC DEVICE FROM BILE DUCT
5199
OTHER OPERATIONS ON BILIARY TRACT
5201
DRAINAGE OF PANCREATIC CYST BY CATHETER
5209
OTHER PANCREATOTOMY
5212
OPEN BIOPSY OF PANCREAS
5219
OTHER DIAGNOSTIC PROCEDURES ON PANCREAS

5222
OTHER EXCISION OR DESTRUCT OF LESION OR TISSUE OF PANCREAS OR PANC DUCT
523
MARSUPIALIZATION OF PANCREATIC CYST
524
INTERNAL DRAINAGE OF PANCREATIC CYST
5251
PROXIMAL PANCREATECTOMY
5252
DISTAL PANCREATECTOMY
5253
RADICAL SUBTOTAL PANCREATECTOMY
5259
OTHER PARTIAL PANCREATECTOMY (HAS 1 CASE)
526
TOTAL PANCREATECTOMY
527
RADICAL PANCREATICODUODENECTOMY
5280
PANCREATIC TRANSPLANT, NOS
5281
REIMPLANTATION
5282
HOMOTRANSPLANT OF PANCREAS
5283
HETEROTRANSPLANT OF PANCREAS
5292
CANNULATION OF PANCREATIC DUCT
5295
OTHER REPAIR OF PANCREAS
5296
ANASTOMOSIS OF PANCREAS (HAS 1 CASE)
5299
OTHER OPERATIONS ON PANCREAS
5300
UNILATERAL REPAIR OF INGUINAL HERNIA, NOS
5301
REPAIR OF DIRECT INGUINAL HERNIA HAS 2 CASES
5302
REPAIR OF INDIRECT INGUINAL HERNIA HAS 2 CASES
5303
REPAIR OF DIRECT INGUINAL HERNIA W/ GRAFT OR PROSTHESIS HAS 1 CASE
5304
REPAIR OF INDIRECT INGUINAL HERNIA W/ GRAFT OR PROSTHESIS
5305
REPAIR OF INGUINAL HERNIA W/ GRAFT OR PROSTHESIS, NOS
5310
BILATERAL REPAIR OF INGUINAL HERNIA, NOS
5311
BILATERAL REPAIR OF DIRECT INGUINAL HERNIA HAS 1 CASE
5312
BILATERAL REPAIR OF INDIRECT INGUINAL HERNIA
5313
BILATERAL REPAIR OF INGUINAL HERNIA, ONE DIRECT AND ONE INDIRECT
5314
BILATERAL REPAIR OF DIRECT INGUINAL HERNIA W/ GRAFT OR PROSTHESIS
5315
BILATERAL REPAIR OF INDIRECT INGUINAL HERNIA W/ GRAFT OR PROSTHESIS

5316
BILATERAL REPAIR OF INGUIN HERNIA, 1 DIRECT 1 INDIRECT, W/ GRAFT OR PROS
5317
BILATERAL INGUINAL HERNIA REPAIR W/ GRAFT OR PROSTHESIS, NOS
5321
UNILATERAL REPAIR OF FEMORAL HERNIA
5329
OTHER UNILATERAL FEMORAL HERNIORRHAPHY HAS 1 CASE
5331
BILATERAL REPAIR OF FEMORAL HERNIA W/ GRAFT OR PROSTHESIS
5339
OTHER BILATERAL FEMORAL HERNIORRHAPHY
5341
REPAIR OF UMBILICAL HERNIA W/ PROSTHESIS
5342
LAPAROPSCOPIC REPAIR OF UMBILICAL HERNIA WITH GRAFT OR PROSTHESIS OCT08-
5343
OTHER LAPAROSCOPIC UMBILICAL HERIORRHAPHY OCT08-
5349
OTHER UMBILICAL HERNIORRHAPHY HAS 2 CASES
5351
INCISIONAL HERNIA REPAIR HAS 2 CASES
5359
REPAIR OF OTHER HERNIA OF ANTERIOR ABDOMINAL WALL (HAS 5 CASES)
5361
INCISIONAL HERNIA REPAIR W/ PROSTHESIS (HAS 6 CASES)
5362
LAPAROPSCOPIC INCISIONAL HERNIA REPAIR WITH GRAFT OR PROSTHESIS OCT08-
5363
OTHER LAPAROSCOPIC REPAIR OF OTHER HERNIA OF ANTERIOR ABDOMINAL WALL WITH GRAFT OR PROSTHESIS OCT08-
5369
REPAIR OF OTHER HERNIA OF ANTERIOR ABDOMINAL WALL W/ PROSTHESIS HAS 1 CASE
537
REPAIR OF DIAPHRAGMATIC HERNIA, ABDOMINAL APPROACH
5371
LAP REPAIR OF DIAPHRAGMATIC HERNIA, ABDOMINAL APPROACH OCT08-
5372
OTHER AND OPEN REPAIR OF DIAPHRAGMATIC HERNIA, ABDOMINAL APPROACH OCT08-
5375
REPAIR OF DIAPHRAGMATIC HERNIA, ABDOMINAL APPROACH, NOS OCT08-
540
INCISION OF ABDOMINAL WALL
5411
EXPLORATORY LAPAROTOMY
5412
REOPENING OF RECENT LAPAROTOMY SITE
5419
OTHER LAPAROTOMY
5421
LAPAROSCOPY
5422
BIOPSY OF ABDOMINAL WALL OR UMBILICUS
5423
BIOPSY OF ABDOMINAL WALL OR UMBILICUS (HAS 2 CASES)
5429
OTHER DIAGNOSTIC PROCEDURES ON ABDOMINAL REGION
543

EXCISION OR DESTRUCTION OF LESION OR TISSUE OF ABDOMINAL WALL OR UMBILICUS
544
EXCISION OR DESTRUCTION OF PERITONEAL TISSUE
5451
LAPAROSCOPIC LYSIS OF PERITONEAL ADHESIONS
5459
OTHER LYSIS OF PERITONEAL ADHESIONS HAS 463 CASES
5461
RECLOSURE OF POSTOPERATIVE DISRUPTION OF ABDOMINAL WALL
6829
OTHER EXCISION OR DESTRUCTION OF LESION OF UTERUS
683
SUBTOTAL ABDOMINAL HYSTERECTOMY
6831
LAPAROSCOPIC SUPRACERVICAL HYSTERECTOMY [LSH]
6839
OTHER SUBTOTAL ABDOMINAL HYSTERECTOMY
684
TOTAL ABDOMINAL HYSTERECTOMY
6841
LAP TOTAL ABDOMINAL HYST OCT06-
6849
TOTAL ABD HYST NEC/NOS OCT06-
686
RADICAL ABDOMINAL HYSTERECTOMY
6861
LAP RADICAL ABDOMNL HYST OCT06-
6869
RADICAL ABD HYST NEC/NOS OCT06-
688
PELVIC EVISCERATION
689
OTHER AND UNSPECIFIED HYSTERECTOMY
6919
OTHER EXCISION OR DESTRUCTION OF UTERUS AND SUPPORTING STRUCTURES
6921
INTERPOSITION OPERATION
6922
OTHER UTERINE SUSPENSION
6923
VAGINAL REPAIR OF CHRONIC INVERSION OF UTERUS
6929
OTHER REPAIR OF UTERUS AND SUPPORTING STRUCTURES
693
PARACERVICAL UTERINE DENERVATION
6941
SUTURE OF LACERATION OF UTERUS
6942
CLOSURE OF FISTULA OF UTERUS
6949
OTHER REPAIR OF UTERUS
6998
OTHER OPERATIONS ON SUPPORTING STRUCTURES OF UTERUS

2a.9 Denominator Exclusions (*Brief text description of exclusions from the target population***):** Exclude:
- MDC 14 (pregnancy, childbirth, and puerperium)
- cases with a code for surgical removal of the colon (colectomy) or pelvic evisceration
- cases with any diagnosis of cancer involving or adjacent to the appendix

2a.10 Denominator Exclusion Details (*All information required to collect exclusions to the denominator, including all codes, logic, and definitions***):**

ICD-9-CM surgical removal of the colon (colectomy) or pelvic evisceration procedure codes:
1731
LAPAROSCOPIC MULTIPLE SEGMENTAL RESECTION OF LARGE INTESTINE
1732
LAPAROSCOPIC CECECTOMY
1733
LAPAROSCOPIC RIGHT HEMICOLECTOMY
1734
LAPAROSCOPIC RESECTION OF TRANSVERSE COLON
1735
LAPAROSCOPIC LEFT HEMICOLECTOMY
1736
LAPAROSCOPIC SIGMOIDECTOMY
1739
OTHER LAPAROSCOPIC PARTIAL EXCISION OF LARGE INTESTINE
4571
OPN MUL SEG LG INTES NEC
4572
OPEN CECECTOMY NEC
4573
OPN RT HEMICOLECTOMY NEC
4574
OPN TRANSV COLON RES NEC
4575
OPN LFT HEMICOLECTMY NEC
4576
OPEN SIGMOIDECTOMY NEC
4579
PRT LG INTES EXC NEC/NOS
458
TOT ABD COLECTMY
4581
LAP TOT INTR-AB COLECTMY
4582
OP TOT INTR-ABD COLECTMY
4583
TOT ABD COLECTMY NEC/NOS
688
PELVIC EVISCERATION
ICD-9-CM Cancer Involving or Adjacent to the Appendix diagnosis codes
1534
MALIGNANT NEOPLASM OF COLON, CECUM
1535
MALIGNANT NEOPLASM OF COLON, APPENDIX
1536
MALIGNANT NEOPLASM OF COLON, ASCENDING COLON
1538
MALIGNANT NEOPLASM OF COLON, OTHER SPECIFIED SITES OF LARGE INTESTINE
1539
MALIGNANT NEOPLASM OF COLON, NOS
1588
MALIGNANT NEOPLASM OF RETROPERITONEUM AND PERITONEUM, SPECIFIED PARTS OF PERITONEUM
1589
MALIGNANT NEOPLASM OF RETROPERITONEUM AND PERITONEUM, PERITONEUM, UNSPECIFIED
1590
MALIGNANT NEOPLASM OF OTHER AND ILL-DEFINED SITES WITHIN THE DIGESTIVE ORGANS AND PERITONEUM,

INTESTINAL TRACT, PART UNSPECIFIED
1598
MALIGNANT NEOPLASM OF OTHER AND ILL-DEFINED SITES WITHIN THE DIGESTIVE ORGANS AND PERITONEUM, OTHER SITES OF DIGESTIVE SYSTEM AND INTRA-ABDOMINAL ORGANS
1599
MALIGNANT NEOPLASM OF OTHER AND ILL-DEFINED SITES WITHIN THE DIGESTIVE ORGANS AND PERITONEUM, ILL-DEFINED
1952
MALIGNANT NEOPLASM OF OTHER AND ILL-DEFINED SITES, ABDOMEN
1975
SECONDARY MALIGNANT NEOPLASM OF RESPIRATORY AND DIGESTIVE SYSTEMS, LARGE INTESTINE AND RECTUM
1976
SECONDARY MALIGNANT NEOPLASM OF RESPIRATORY AND DIGESTIVE SYSTEMS, RETROPERITONEUM AND PERITONEUM
20974
SECONDARY NEUROENDOCRINE TUMOR OF PERITONEUM

2a.11 **Stratification Details/Variables (***All information required to stratify the measure including the stratification variables, all codes, logic, and definitions***):**
User has the option to stratify by gender, age (5-year age groups), race / ethnicity, primary payer, or use custom stratifiers.

2a.12-13 **Risk Adjustment Type:** No risk adjustment necessary

2a.14 **Risk Adjustment Methodology/Variables (***List risk adjustment variables and describe conceptual models, statistical models, or other aspects of model or method***):**
Not applicable

2a.15-17 **Detailed risk model available Web page URL or attachment:**

2a.18-19 **Type of Score:** Rate/proportion
2a.20 **Interpretation of Score:** Better quality = Lower score
2a.21 **Calculation Algorithm (***Describe the calculation of the measure as a flowchart or series of steps***):**
The indicator is expressed as a rate, is defined as outcome of interest / population at risk or numerator / denominator. The AHRQ Quality Indicators (AHRQ QI) software performs five steps to produce the rates. 1) Discharge-level data is used to mark inpatient records containing the outcome of interest and 2) the population at risk. For provider indicators, the population at risk is also derived from hospital discharge records; for area indicators, the population at risk is derived from U.S. Census data. 3) Calculate observed rates. Using output from steps 1 and 2, rates are calculated for user-specified combinations of stratifiers. 4) Calculate expected rates. For indicators that are not risk-adjusted, use the reference population rate. 5) Calculate risk-adjusted rate. Use the indirect standardization to account for case-mix. For indicators that are not risk-adjusted, this is the same as the observed rate 6) Calculate smoothed rate. A Univariate shrinkage factor is applied to the risk-adjusted rates. The shrinkage estimate reflects a reliability adjustment unique to each indicator. Full information on calculation algorithms and specifications can be found at http://qualityindicators.ahrq.gov/IQI_download.htm

2a.22 **Describe the method for discriminating performance** *(e.g., significance testing)***:**
Significance testing is not prescribed by the software. Users may define their methods of discriminating performance according to their application. Although all cases are measured, the rate is considered a sample in time, given the variations in case mix over time. Confidence intervals can be calculated, but again are not prescribed.

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)*:
Not applicable

2a.24 **Data Source (***Check the source(s) for which the measure is specified and tested)*
Electronic administrative data/claims

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.***):**

The data source is hospital discharge data such as the HCUP State Inpatient Databases (SID) or equivalent using UB-04 coding standards. The data collection instrument is public-use AHRQ QI software available in SAS or Windows versions.

2a.26-28 **Data source/data collection instrument reference web page URL or attachment:** URL None
http://www.qualityindicators.ahrq.gov/software.htm

2a.29-31 **Data dictionary/code table web page URL or attachment:** URL None
http://www.qualityindicators.ahrq.gov/downloads/winqi/AHRQ_QI_Windows_Software_Documentation_V41a.pdf

2a.32-35 **Level of Measurement/Analysis** (*Check the level(s) for which the measure is specified and tested)*
Facility/Agency

2a.36-37 **Care Settings (***Check the setting(s) for which the measure is specified and tested)*
Hospital

2a.38-41 **Clinical Services** (*Healthcare services being measured, check all that apply*)
Clinicians: Physicians (MD/DO)

TESTING/ANALYSIS

2b. Reliability testing

2b.1 **Data/sample** *(description of data/sample and size)*: AHRQ 2007 State Inpatient Databases (SID) with 4,000 hospitals and 30 million adult discharges

2b.2 **Analytic Method** *(type of reliability & rationale, method for testing)*:
Literature summary, expert panels and empirical analysis

2b.3 **Testing Results** *(reliability statistics, assessment of adequacy in the context of norms for the test conducted)*:
Fewer than one-third of surgery departments routinely perform incidental appendectomies, and rates may be difficult to estimate with precision at the majority of hospitals where it is not a routine procedure.195 Based on empirical evidence, this indicator is precise, with a raw provider level mean of 2.7% and a standard deviation of 3.5%.196 Relative to other indicators, a higher percentage of the variation occurs at the discharge level than for some indicators. The signal ratio (i.e., the proportion of the total variation across providers that is truly related to systematic differences in provider performance rather than random variation) is moderate, at 55.4%, indicating that some of the observed differences in provider performance do not represent true differences.

2b C☐ P☐ M☐ N☐

2c. Validity testing

2c.1 **Data/sample** *(description of data/sample and size)*: AHRQ 2007 State Inpatient Databases (SID) with 4,000 hospitals and 30 million adult discharges

2c.2 **Analytic Method** *(type of validity & rationale, method for testing)*:
Literature summary, expert panels and empirical analysis

2c.3 **Testing Results** *(statistical results, assessment of adequacy in the context of norms for the test conducted)*:
Most of the available evidence appears to contraindicate incidental appendectomy in the elderly, and performance of the procedure is subject to patient and surgeon preference. Therefore, incidental appendectomy rates may correlate poorly with other measures of hospital performance.

2c C☐ P☐ M☐ N☐

2d. Exclusions Justified

2d.1 **Summary of Evidence supporting exclusion(s):**
Exclusions remove cases where the outcome of interest may be indicated

2d C☐ P☐ M☐ N☐

2d.2 Citations for Evidence:
Updated citations will be presented in the May Steering Committee meeting

Refinement of the HCUP Quality Indicators (Technical Review), May 2001
http://qualityindicators.ahrq.gov/downloads/technical/qi_technical_review.zip

2d.3 Data/sample *(description of data/sample and size)*: AHRQ 2007 State Inpatient Databases (SID) with 4,000 hospitals and 30 million adult discharges

2d.4 Analytic Method *(type analysis & rationale)*:
Expert panel and descriptive analyses stratified by exclusion categories

2d.5 Testing Results *(e.g., frequency, variability, sensitivity analyses)*:
Refinement of the HCUP Quality Indicators (Technical Review), May 2001
http://qualityindicators.ahrq.gov/downloads/technical/qi_technical_review.zip

NA ☐

2e. Risk Adjustment for Outcomes/ Resource Use Measures

2e.1 Data/sample *(description of data/sample and size)*: Not applicable

2e.2 Analytic Method *(type of risk adjustment, analysis, & rationale)*:
Not applicable

2e.3 Testing Results *(risk model performance metrics)*:
Not applicable

2e.4 If outcome or resource use measure is not risk adjusted, provide rationale: Process measures; non-appropriate cases are excluded

2e C☐ P☐ M☐ N☐ **NA** ☐

2f. Identification of Meaningful Differences in Performance

2f.1 Data/sample from Testing or Current Use *(description of data/sample and size)*: AHRQ 2007 State Inpatient Databases (SID) with 4,000 hospitals and 30 million adult discharges

2f.2 Methods to identify statistically significant and practically/meaningfully differences in performance *(type of analysis & rationale)*:
Posterior probability distribution parameterized using the Gamma distribution

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

5th	25th	Median	75th	95th
0.002606	0.007769	0.014193	0.023527	0.042807

2f C☐ P☐ M☐ N☐

2g. Comparability of Multiple Data Sources/Methods

2g.1 Data/sample *(description of data/sample and size)*: Not applicable

2g.2 Analytic Method *(type of analysis & rationale)*:
Not applicable

2g.3 Testing Results *(e.g., correlation statistics, comparison of rankings)*:
Not applicable

2g C☐ P☐ M☐ N☐ **NA** ☐

2h. Disparities in Care

2h.1 If measure is stratified, provide stratified results *(scores by stratified categories/cohorts)*: Median income of patient´s ZIP code:
1) Estimate 2) Standard error 3) P-value: Relative to marked group-c 4) P-value:
2007 relative to 2006

2h C☐ P☐ M☐ N☐ **NA**

First quartile (lowest income) 20.383 0.472 0.001 0.000 Second quartile 20.801 0.460 0.000 0.038 Third quartile 19.020 0.471 0.187 0.028 Fourth quartile (highest income)c 18.142 0.468 0.178 **2h.2 If disparities have been reported/identified, but measure is not specified to detect disparities, provide follow-up plans:** Users may stratify based on gender and race/ethnicity	☐
TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Scientific Acceptability of Measure Properties?*	**2**
Steering Committee: Overall, to what extent was the criterion, *Scientific Acceptability of Measure Properties*, met? **Rationale:**	**2** **C** ☐ **P** ☐ **M** ☐ **N** ☐
3. USABILITY	
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)	Eval Rating
3a. Meaningful, Understandable, and Useful Information **3a.1 Current Use:** In use **3a.2 Use in a public reporting initiative (disclosure of performance results to the public at large)** (*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*)**:** Illinois (state) Illinois Hospital Report Card and Consumer Guide to Health Care http://www.healthcarereportcard.illinois.gov/ Iowa (Iowa Healthcare Collaborative) Iowa Healthcare Collaborative http://www.ihconline.org/aspx/publicreporting/iowareport.aspx Kentucky (Norton Healthcare, a hospital system) Norton Healthcare Quality Report http://www.nortonhealthcare.com/body.cfm?id=157 Kentucky (state hospital association) Kentucky Hospital Association Quality Data http://info.kyha.com/QualityData/IQISite/ Kentucky (state) Health Care Information Center http://chfs.ky.gov/ohp/healthdata Maine (state) Maine Health Data Organization http://gateway.maine.gov/mhdo2008Monahrq/home.html New Jersey (state) Find and Compare Quality Care in NJ Hospitals http://www.nj.gov/health/healthcarequality/	**3a** **C** ☐ **P** ☐ **M** ☐ **N** ☐

New York (health care coalition)
New York State Hospital Report Card
http://www.myhealthfinder.com/

Texas (state)
Reports on Hospital Performance
http://www.dshs.state.tx.us/thcic/

Washington (health care coalition)
Washington State Hospital Report Card
http://www.myhealthfinder.com/wa09/index.php

The measure is also reported on HCUPnet:
http://hcupnet.ahrq.gov/HCUPnet.jsp?Id=EB57801381F71C41&Form=MAINSEL&JS=Y&Action=%3E%3ENext%3E%3E&_MAINSEL=AHRQ%20Quality%20Indicators

This measure is used in the MONAHRQ system that is provided for public reporting and quality improvement throughout the United States: http://monahrq.ahrq.gov/

3a.3 **If used in other programs/initiatives (***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***):**
University Healthcare Consortium - An alliance of 103 academic medical centers and 219 of their affiliated hospitals. Reporting the AHRQ QIs to their member hospitals. (see www.uhc.edu. Note: measure results reported to hospitals; not reported on site).

Dallas Fort Worth Hospital Council – Reporting on measure results to over 70 hospitals in Texas (see www.dfwhc.ord. Note: measure results reported to hospitals; not reported on site).

Norton Healthcare - a multi-hospital system in Kentucky (see http://www.nortonhealthcare.com/about/Our_Performance/index.aspx)
Ministry Health Care - a multi-hospital system in Wisconsin (see http://ministryhealth.org/display/router.aspx. Note: measure results reported to hospitals; not reported on site).

Minnesota Hospital Association
http://www.mnhospitals.org/ Note: measure used in quality improvement. Not reported publicly by the association)

This measure is used in the MONAHRQ system that is provided for public reporting and quality improvement throughout the United States: http://monahrq.ahrq.gov/

Testing of Interpretability (*Testing that demonstrates the results are understood by the potential users for public reporting and quality improvement*)
3a.4 **Data/sample** *(description of data/sample and size)***:** AHRQ 2007 State Inpatient Databases (SID) with 4,000 hospitals and 30 million adult discharges

3a.5 **Methods** *(e.g., focus group, survey, QI project)***:**
A research team from the School of Public Affairs, Baruch College, under contracts with the Department of Public Health, Weill Medical College and Battelle, Inc., has developed a pair of Hospital Quality Model Reports at the request of the Agency for Healthcare Research & Quality (AHRQ). These reports are designed specifically to report comparative information on hospital performance based on the AHRQ Quality Indicators (QIs). The work was done in close collaboration with AHRQ staff and the AHRQ Quality Indicators team.
The Model Reports (discussed immediately above) are based on:
• Extensive search and analysis of the literature on hospital quality measurement and reporting, as well as public reporting on health care quality more broadly;
• Interviews with quality measurement and reporting experts, purchasers, staff of purchasing coalitions, and

executives of integrated health care delivery systems who are responsible for quality in their facilities; • Two focus groups with chief medical officers of hospitals and/or systems and two focus groups with quality managers from a broad mix of hospitals; • Four focus groups with members of the public who had recently experienced a hospital admission; and • Four rounds of cognitive interviews (a total of 62 interviews) to test draft versions of the two Model Reports with members of the public with recent hospital experience, basic computer literacy but widely varying levels of education. 3a.6 **Results** *(qualitative and/or quantitative results and conclusions)*: Given the above review of the literature and original research that was conducted, a Model report was the result that could help sponsors use the best evidence on public reports so they are most likely to have the desired effects on quality.	
3b/3c. Relation to other NQF-endorsed measures 3b.1 **NQF # and Title of similar or related measures:**	
(for NQF staff use) **Notes on similar/related endorsed or submitted measures:**	
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 or different topic but same target population): 3b.2 **Are the measure specifications harmonized? If not, why?**	**3b** C☐ P☐ M☐ N☐ NA ☐
3c. Distinctive or Additive Value 3c.1 **Describe the distinctive, improved, or additive value this measure provides to existing NQF-endorsed measures:** 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:** No competing measures found.	**3c** C☐ P☐ M☐ N☐ NA ☐
TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Usability?*	**3**
Steering Committee: Overall, to what extent was the criterion, *Usability*, met? **Rationale:**	**3** C☐ P☐ M☐ N☐
4. FEASIBILITY	
Extent to which the required data are readily available, retrievable without undue burden, and can be implemented for performance measurement. (evaluation criteria)	Eval Rating
4a. Data Generated as a Byproduct of Care Processes 4a.1-2 **How are the data elements that are needed to compute measure scores generated?** 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)	**4a** C☐ P☐ M☐ N☐
4b. Electronic Sources 4b.1 **Are all the data elements available electronically?** (*elements that are needed to compute measure scores are in defined, computer-readable fields, e.g., electronic health record, electronic claims*) Yes	**4b** C☐ P☐ M☐ N☐

4b.2 If not, specify the near-term path to achieve electronic capture by most providers.	
4c. Exclusions **4c.1 Do the specified exclusions require additional data sources beyond what is required for the numerator and denominator specifications?** No **4c.2 If yes, provide justification.**	**4c** C☐ P☐ M☐ N☐ NA ☐
4d. Susceptibility to Inaccuracies, Errors, or Unintended Consequences **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.** Coding professionals follow detail guidelines, are subject to training and credentialing requirements, peer review and audit. Incidental appendectomy does not generally affect hospital payment; therefore, widespread use of this indicator may lead to less frequent coding of the procedure when it is performed. A reduction in the rate of incidental appendectomy may lead to a subsequent increase in the incidence of acute appendicitis, although this risk is expected to be small for the elderly population.	**4d** C☐ P☐ M☐ N☐
4e. Data Collection Strategy/Implementation **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:** None **4e.2 Costs to implement the measure** (*costs of data collection, fees associated with proprietary measures*)**:** All data necessary to calculate this measure are routinely collected for hospital administrative purposes. The software for calculating the measure is available for free at: http://www.qualityindicators.ahrq.gov/software.htm **4e.3 Evidence for costs:** All data necessary to calculate this measure are routinely collected for hospital administrative purposes. The software for calculating the measure is available for free at: http://www.qualityindicators.ahrq.gov/software.htm **4e.4 Business case documentation:** All data necessary to calculate this measure are routinely collected for hospital administrative purposes. The software for calculating the measure is available for free at: http://www.qualityindicators.ahrq.gov/software.htm	**4e** C☐ P☐ M☐ N☐
TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Feasibility?*	**4**
Steering Committee: Overall, to what extent was the criterion, *Feasibility*, met? **Rationale:**	**4** C☐ P☐ M☐ N☐
RECOMMENDATION	
(for NQF staff use) **Check if measure is untested and only eligible for time-limited endorsement.**	**Time-limited** ☐
Steering Committee: Do you recommend for endorsement? **Comments:**	**Y**☐ **N**☐

A☐

CONTACT INFORMATION

Co.1 Measure Steward (Intellectual Property Owner)
Co.1 Organization
Agency for Healthcare Research and Quality, 540 Gaither Road, Rockville, Maryland, 20850

Co.2 Point of Contact
John, Bott, MSSW, MBA, John.Bott@AHRQ.hhs.gov, 301-427-1317-

Measure Developer If different from Measure Steward
Co.3 Organization
Agency for Healthcare Research and Quality, 540 Gaither Road, Rockville, Maryland, 20850

Co.4 Point of Contact
John, Bott, MSSW, MBA, John.Bott@AHRQ.hhs.gov, 301-427-1317-

Co.5 Submitter If different from Measure Steward POC
John, Bott, MSSW, MBA, John.Bott@AHRQ.hhs.gov, 301-427-1317-, Agency for Healthcare Research and Quality

Co.6 Additional organizations that sponsored/participated in measure development
UC Davis,
Stanford University,
Battelle Memorial Institute

ADDITIONAL INFORMATION

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.
None

Ad.2 If adapted, provide name of original measure: None
Ad.3-5 If adapted, provide original specifications URL or attachment

Measure Developer/Steward Updates and Ongoing Maintenance
Ad.6 Year the measure was first released: 2001
Ad.7 Month and Year of most recent revision: 10, 2010
Ad.8 What is your frequency for review/update of this measure? Annual
Ad.9 When is the next scheduled review/update for this measure? 05, 2011

Ad.10 Copyright statement/disclaimers: The AHRQ QI software is publicly available; no copyright disclaimers.

Ad.11 -13 Additional Information web page URL or attachment:

Date of Submission (*MM/DD/YY*)**:** 04/05/2011

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 #:** 0365 **NQF Project:** Surgery Endorsement Maintenance 2010
MEASURE DESCRIPTIVE INFORMATION
De.1 **Measure Title:** Pancreatic Resection Mortality Rate (IQI 9)
De.2 **Brief description of measure:** Percentage of discharges with procedure code of pancreatic resection with an in-hospital death.
1.1-2 **Type of Measure:** Outcome De.3 **If included in a composite or paired with another measure, please identify composite or paired measure** Pancreatic Resection Volume (IQI 2) (NQF #0366) and Mortality for Selected Procedures composite
De.4 **National Priority Partners Priority Area:** Population health, Safety De.5 **IOM Quality Domain**: Effectiveness 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**
A. The measure is in the public domain or an intellectual property (measure steward agreement) is signed. *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.* 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 A.2 **Indicate if Proprietary Measure** (*as defined in measure steward agreement*)**:** A.3 **Measure Steward Agreement:** Government entity and in the public domain - no agreement necessary A.4 **Measure Steward Agreement attached:**	**A** Y☐ N☐
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	**B** Y☐

every 3 years. Yes, information provided in contact section	N☐
C. The intended use of the measure includes both public reporting and quality improvement. ►**Purpose:** Public reporting, Internal quality improvement	**C** Y☐ N☐
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	**D** Y☐ N☐
(for NQF staff use) **Have all conditions for consideration been met?** **Staff Notes to Steward** (*if submission returned*)**:**	**Met** Y☐ N☐
Staff Notes to Reviewers (*issues or questions regarding any criteria*)**:**	
Staff Reviewer Name(s):	

TAP/Workgroup Reviewer Name:	
Steering Committee Reviewer Name:	
1. IMPORTANCE TO MEASURE AND REPORT	
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**	**Eval Rating**
(for NQF staff use) **Specific NPP goal**:	
1a.1 **Demonstrated High Impact Aspect of Healthcare:** Patient/societal consequences of poor quality 1a.2 1a.3 **Summary of Evidence of High Impact:** There is no evidence for the construct validity of pancreatic resection beyond the volume-outcome relationship. Ten studies examined hospital volume as compared to in-hospital mortality rates. Glasgow and Mulvihill estimated the following risk-adjusted mortality rates across hospital volume categories during the 5-year study period: 14% for 1-5 procedures, 10% for 6-10 procedures, 9% for 11-20 procedures, 7% for 21-30 procedures, 8% for 31-50 procedures, and 4% for over 50 procedures. [1] Leiberman et al. found that surgeon volume was less significantly associated with mortality (6-13% across three volume categories). [2] 1a.4 **Citations for Evidence of High Impact:** Updated citations will be presented in the May Steering Committee meeting [1] Glasgow RE, Mulvihill SJ. Hospital volume influences outcome in patients undergoing pancreatic resection for cancer. West J Med 1996;165(5):294-300. 83Lieberman MD, Kilburn H, [2] Lindsey M, et al. Relation of perioperative deaths to hospital volume among patients undergoing pancreatic resection for malignancy. Ann Surg 1995;222(5):638-45.	**1a** C☐ P☐ M☐ N☐
1b. Opportunity for Improvement 1b.1 **Benefits (improvements in quality) envisioned by use of this measure:** Pancreatic resection is a rare	**1b** C☐ P☐

procedure that requires technical proficiency; and errors in surgical technique or management may lead to clinically significant complications, such as sepsis, anastomotic breakdown, and death. Better processes of care may reduce mortality for pancreatic resection, which represents better quality care.

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1b.2 Summary of data demonstrating performance gap (variation or overall poor performance) across providers:
Adjusted rates by patient and hospital characteristics, 2007

Mean	Standard error	Location	P-value: Relative to Northeast
47.761	6.121	Northeast	1.000
26.717	5.586	Midwest	0.011
34.519	3.804	South	0.066
28.151	5.436	West	0.017

1b.3 Citations for data on performance gap:
See the following report for a complete treatment of the methodology: “Methods: Applying AHRQ Quality Indicators to Healthcare Cost and Utilization Project (HCUP) Data for the National Healthcare Quality Report” [URL: http://hcupnet.ahrq.gov/QI%20Methods.pdf?JS=Y]

1b.4 Summary of Data on disparities by population group:
Adjusted per 1,000 rates by patient characteristics, 2007

Estimate	Standard error	Age: for conditions affecting any age
25.49604219	6.203	18-44
20.63896702	2.915	45-64
43.18047556	3.987	65 and over

Estimate	Standard error	Age: for conditions affecting elderly
*	*	65-69
30.91154165	7.113	70-74
56.01131066	7.673	75-79
77.51645429	13.220	80-84
148.3092157	37.401	85 and over

Estimate	Standard error	Gender
40.43211936	3.541	Male
25.18097072	3.554	Female

Estimate	Standard error	Median income of patient´s ZIP code
32.2066155	4.894	First quartile (lowest income)
50.61487453	5.663	Second quartile
34.67138371	5.002	Third quartile
23.7719501	4.527	Fourth quartile (highest income)

Estimate	Standard error	Location of patient residence (NCHS)
39.14557373	4.453	Large central metropolitan
34.65704118	5.007	Large fringe metropolitan
34.61234796	5.208	Medium metropolitan
35.87092944	10.635	Small metropolitan
*	*	Micropolitan
*	*	Not metropolitan or micropolitan

Estimate	Standard error	Expected payment source
24.43308661	4.746	Private insurance
33.50889221	3.078	Medicare
56.92297577	11.372	Medicaid
168.3490653	28.408	Other insurance
70.49679743	18.397	Uninsured / self-pay / no charge

Estimate	Standard error	Hospital Ownership/control
34.84590011	2.947	Private, not-for-profit
50.63209793	8.493	Private, for-profit
23.51722576	5.534	Public

Estimate	Standard error	Teaching status
26.71084935	3.052	Teaching
48.35344955	4.291	Nonteaching

Estimate	Standard error	Location of hospital
27.41877829	3.309	Large central metropolitan
70.90692851	8.270	Large fringe metropolitan
33.81007218	4.897	Medium metropolitan
44.21470167	9.807	Small metropolitan
*	*	Micropolitan
*	*	Not metropolitan or micropolitan

Estimate	Standard error	Bed size of hospital
*	*	Less than 100
46.62748379	5.684	100 - 299
44.13589384	4.564	300 - 499
23.4343551	3.502	500 or more

1b.5 Citations for data on Disparities:
See the following report for a complete treatment of the methodology: "Methods: Applying AHRQ Quality Indicators to Healthcare Cost and Utilization Project (HCUP) Data for the National Healthcare Quality Report" [URL: http://hcupnet.ahrq.gov/QI%20Methods.pdf?JS=Y]

1c. Outcome or Evidence to Support Measure Focus

1c.1 Relationship to Outcomes (*For non-outcome measures, briefly describe the relationship to desired outcome. For outcomes, describe why it is relevant to the target population*)**:** Pancreatic resection is a rare procedure that requires technical proficiency; and errors in surgical technique or management may lead to clinically significant complications, such as sepsis, anastomotic breakdown, and death. Better processes of care may reduce mortality for pancreatic resection, which represents better quality care.

1c.2-3. Type of Evidence: Evidence-based guideline, Expert opinion

1c.4 Summary of Evidence (*as described in the criteria; for outcomes, summarize any evidence that healthcare services/care processes influence the outcome*)**:**
There is no evidence for the construct validity of pancreatic resection beyond the volume-outcome relationship. Ten studies examined hospital volume as compared to in-hospital mortality rates. Glasgow and Mulvihill estimated the following risk-adjusted mortality rates across hospital volume categories during the 5-

1c
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year study period: 14% for 1-5 procedures, 10% for 6-10 procedures, 9% for 11-20 procedures, 7% for 21-30 procedures, 8% for 31-50 procedures, and 4% for over 50 procedures. [1] Leiberman et al. found that surgeon volume was less significantly associated with mortality (6-13% across three volume categories). [2]

[1] Glasgow RE, Mulvihill SJ. Hospital volume influences outcome in patients undergoing pancreatic resection for cancer. West J Med 1996;165(5):294-300. 83Lieberman MD, Kilburn H,

[2] Lindsey M, et al. Relation of perioperative deaths to hospital volume among patients undergoing pancreatic resection for malignancy. Ann Surg 1995;222(5):638-45.

1c.5 Rating of strength/quality of evidence (*also provide narrative description of the rating and by whom***):** 5 Smoothing recommended Testing, rating, and review were conducted by the project team. A full report on the literature review and empirical evaluation can be found in Refinement of the HCUP Quality Indicators by the UCSF-Stanford EPC, Detailed coding information for each QI is provided in the document Prevention Quality Indicators Technical Specifications. Rating of performance on empirical evaluations, ranged from 0 to 26. The scores were intended as a guide for summarizing the performance of each indicator on four empirical tests of precision (signal variance, area-level share, signal ratio, and R-squared) and five tests of minimum bias (rank correlation, top and bottom decile movement, absolute change, and change over two deciles), as described in the previous section.

1c.6 Method for rating evidence: The project team conducted extensive empirical testing of all potential indicators using the 1995-97 HCUP State Inpatient Databases (SID) and Nationwide Inpatient Sample (NIS) to determine precision, bias, and construct validity. The 1997 SID contains uniform data on inpatient stays in community hospitals for 22 States covering approximately 60% of all U.S. hospital discharges. The NIS is designed to approximate a 20% of U.S. community hospitals and includes all stays in the sampled hospitals. Each year of the NIS contains between 6 million and 7 million records from about 1,000 hospitals. The NIS combines a subset of the SID data, hospital-level variables, and hospital and discharge weights for producing national estimates. The project team conducted tests to examine three things: precision, bias, and construct validity.
Precision. The first step in the analysis involved precision tests to determine the reliability of the indicator for distinguishing real differences in provider performance. For indicators that may be used for quality improvement, it is important to know with what precision, or surety, a measure can be attributed to an actual construct rather than random variation.
For each indicator, the variance can be broken down into three components: variation within a provider (actual differences in performance due to differing patient characteristics), variation among providers (actual differences in performance among providers), and random variation. An ideal indicator would have a substantial amount of the variance explained by between-provider variance, possibly resulting from differences in quality of care, and a minimum amount of random variation. The project team performed four tests of precision to estimate the magnitude of between-provider variance on each indicator:
• Signal standard deviation was used to measure the extent to which performance of the QI varies systematically across hospitals or areas.
• Provider/area variation share was used to calculate the percentage of signal (or true) variance relative to the total variance of the QI.
• Signal-to-noise ratio was used to measure the percentage of the apparent variation in QIs across providers that is truly related to systematic differences across providers and not random variations (noise) from year to year.
• In-sample R-squared was used to identify the incremental benefit of applying multivariate signal extraction methods for identifying additional signal on top of the signal-to-noise ratio.
In general, random variation is most problematic when there are relatively few observations per provider, when adverse outcome rates are relatively low, and when providers have little control over patient outcomes or variation in important processes of care is minimal. If a large number of patient factors that are difficult to observe influence whether or not a patient has an adverse outcome, it may be difficult to separate the "quality signal" from the surrounding noise. Two signal extraction techniques were applied to improve the precision of an indicator:
• Univariate methods were used to estimate the "true" quality signal of an indicator based on information from the specific indicator and 1 year of data.
• Multivariate signal extraction (MSX) methods were used to estimate the "true" quality signal based on information from a set of indicators and multiple years of data. In most cases, MSX methods extracted

additional signal, which provided much more precise estimates of true hospital or area quality.
Bias. To determine the sensitivity of potential QIs to bias from differences in patient severity, unadjusted performance measures for specific hospitals were compared with performance measures that had been adjusted for age and gender. All of the PQIs and some of the Inpatient Quality Indicators (IQIs) could only be risk-adjusted for age and sex. The 3M™ APR-DRG System Version 12 with Severity of Illness and Risk of Mortality subclasses was used for risk adjustment of the utilization indicators and the in-hospital mortality indicators, respectively. Five empirical tests were performed to investigate the degree of bias in an indicator:
• Rank correlation coefficient of the area or hospital with (and without) risk adjustment—gives the overall impact of risk adjustment on relative provider or area performance.
• Average absolute value of change relative to mean—highlights the amount of absolute change in performance, without reference to other providers' performance.
• Percentage of highly ranked hospitals that remain in high decile—reports the percentage of hospitals or areas that are in the highest deciles without risk adjustment that remain there after risk adjustment is performed.
• Percentage of lowly ranked hospitals that remain in low decile—reports the percentage of hospitals or areas that are in the lowest deciles without risk adjustment that remain there after risk adjustment is performed.
• Percentage that change more than two deciles—identifies the percentage of hospitals whose relative rank changes by a substantial percentage (more than 20%) with and without risk adjustment.
Construct validity. Construct validity analyses provided information regarding the relatedness or independence of the indicators. If quality indicators do indeed measure quality, then two measures of the same construct would be expected to yield similar results. The team used factor analysis to reveal underlying patterns among large numbers of variables—in this case, to measure the degree of relatedness between indicators. In addition, they analyzed correlation matrices for indicators.

1c.7 Summary of Controversy/Contradictory Evidence: See the following for a complete treatment of the topic:
http://www.qualityindicators.ahrq.gov/downloads/iqi/iqi_guide_v31.pdf
Note: The Literature Review Caveats column summarizes evidence specific to each potential concern on the link between the PQIs and quality of care, as described in step 3 above. A question mark (?) indicates that the concern is theoretical or suggested, but no specific evidence was found in the literature. A check mark indicates that the concern has been demonstrated in the literature.

1c.8 Citations for Evidence (*other than guidelines*): Updated citations will be presented in the May Steering Committee meeting

http://www.qualityindicators.ahrq.gov/downloads/iqi/iqi_guide_v31.pdf

1c.9 Quote the Specific guideline recommendation (*including guideline number and/or page number*):
Not Applicable.

1c.10 Clinical Practice Guideline Citation: Not Applicable.
1c.11 National Guideline Clearinghouse or other URL: Not Applicable.

1c.12 Rating of strength of recommendation (*also provide narrative description of the rating and by whom*):
Not Applicable.

1c.13 Method for rating strength of recommendation (*If different from USPSTF system, also describe rating and how it relates to USPSTF*):
Not Applicable.

1c.14 Rationale for using this guideline over others:
Not Applicable.

TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Importance to Measure and Report?*	**1**
Steering Committee: Was the threshold criterion, *Importance to Measure and Report*, met? **Rationale:**	**1** **Y☐** **N☐**

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. (evaluation criteria)	Eval Rating
2a. MEASURE SPECIFICATIONS	
S.1 Do you have a web page where current detailed measure specifications can be obtained? **S.2 If yes, provide web page URL:** **2a. Precisely Specified**	
2a.1 Numerator Statement (*Brief, text description of the numerator - what is being measured about the target population, e.g. target condition, event, or outcome***):** Number of deaths (DISP=20) among cases meeting the inclusion and exclusion rules for the denominator. **2a.2 Numerator Time Window (***The time period in which cases are eligible for inclusion in the numerator***):** Time window can be determined by user, but is generally a calendar year. **2a.3 Numerator Details (***All information required to collect/calculate the numerator, including all codes, logic, and definitions***):** Number of deaths (DISP=20) among cases meeting the inclusion and exclusion rules for the denominator.	
2a.4 Denominator Statement (*Brief, text description of the denominator - target population being measured***):** Discharges, age 18 years and older, with ICD-9-CM pancreatic resection code procedure and a diagnosis code of pancreatic cancer in any field. **2a.5 Target population gender:** Female, Male **2a.6 Target population age range:** 18 and older **2a.7 Denominator Time Window (***The time period in which cases are eligible for inclusion in the denominator***):** Time window can be determined by user, but is generally a calendar year. **2a.8 Denominator Details (***All information required to collect/calculate the denominator - the target population being measured - including all codes, logic, and definitions***):** Discharges, age 18 years and older, with ICD-9-CM pancreatic resection code procedure and a diagnosis code of pancreatic cancer in any field. ICD-9-CM pancreatic resection procedure codes: 526 TOTAL PANCREATECTOMY 527 RAD PANCREATICODUODENECT ICD-9-CM pancreatic cancer diagnosis codes: 1520 MALIGNANT NEOPL DUODENUM 1561 MAL NEO EXTRAHEPAT DUCTS 1562 MAL NEO AMPULLA OF VATER 1570 MAL NEO PANCREAS HEAD 1571 MAL NEO PANCREAS BODY 1572	**2a-specs** C☐ P☐ M☐ N☐

MAL NEO PANCREAS TAIL
1573
MAL NEO PANCREATIC DUCT
1574
MAL NEO ISLET LANGERHANS
1578
MALIG NEO PANCREAS NEC
1579
MALIG NEO PANCREAS NOS

2a.9 **Denominator Exclusions (***Brief text description of exclusions from the target population***):** Exclude cases:
• missing discharge disposition (DISP=missing), gender (SEX=missing), age (AGE=missing), quarter (DQTR=missing), year (YEAR=missing) or principal diagnosis (DX1 =missing)
• transferring to another short-term hospital (DISP=2)
• MDC 14 (pregnancy, childbirth, and puerperium)

2a.10 **Denominator Exclusion Details (***All information required to collect exclusions to the denominator, including all codes, logic, and definitions***):**
Exclude cases:
• missing discharge disposition (DISP=missing), gender (SEX=missing), age (AGE=missing), quarter (DQTR=missing), year (YEAR=missing) or principal diagnosis (DX1 =missing)
• transferring to another short-term hospital (DISP=2)
• MDC 14 (pregnancy, childbirth, and puerperium)

2a.11 **Stratification Details/Variables (***All information required to stratify the measure including the stratification variables, all codes, logic, and definitions***):**
User has the optin to stratify by gender, age (5-year age groups), race / ethnicity, primary payer, and custom stratifiers.

2a.12-13 **Risk Adjustment Type:** Risk adjustment method widely or commercially available

2a.14 **Risk Adjustment Methodology/Variables (***List risk adjustment variables and describe conceptual models, statistical models, or other aspects of model or method***):**
The predicted value for each case is computed using a hierarchical model (logistic regression with hospital random effect) and covariates for gender, age in years (in 5-year age groups), All Patient Refined-Diagnosis Related Group (APR-DRG) and APR-DRG risk-of-mortality subclass. The reference population used in the model is the universe of discharges for states that participate in the HCUP State Inpatient Databases (SID) for the year 2007 (updated annually), a database consisting of 43 states and approximately 30 million adult discharges. The expected rate is computed as the sum of the predicted value for each case divided by the number of cases for the unit of analysis of interest (i.e., hospital, state, and region). The risk adjusted rate is computed using indirect standardization as the observed rate divided by the expected rate, multiplied by the reference population rate.

2a.15-17 **Detailed risk model available Web page URL or attachment:** Attachment IQI Risk Adjustment Tables (Version 4 2).pdf

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***):**
Each indicator is expressed as a rate, is defined as outcome of interest / population at risk or numerator / denominator. The AHRQ Quality Indicators (AHRQ QI) software performs five steps to produce the rates. 1) Discharge-level data is used to mark inpatient records containing the outcome of interest and 2) the population at risk. For provider indicators, the population at risk is also derived from hospital discharge records; for area indicators, the population at risk is derived from U.S. Census data. 3) Calculate observed rates. Using output from steps 1 and 2, rates are calculated for user-specified combinations of stratifiers. 4) Calculate expected rates. Regression coefficients from a reference population database are applied to the discharge records and aggregated to the provider or area level. 5) Calculate risk-adjusted rate. Use the indirect standardization to account for case-mix. 6) Calculate smoothed rate. A Univariate shrinkage factor is applied to the risk-adjusted rates. The shrinkage estimate reflects a reliability adjustment unique to each

indicator. Full information on calculation algorithms and specifications can be found at http://qualityindicators.ahrq.gov/IQI_download.htm

2a.22 Describe the method for discriminating performance *(e.g., significance testing)*:
Significance testing is not prescribed by the software. Users may calculate a confidence interval for the risk-adjusted rates and a posterior probability interval for the smoothed rates at a 95% or 99% level. Users may define the relevant benchmark and the methods of discriminating performance according to their application.

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)*:
Not applicable

2a.24 Data Source (*Check the source(s) for which the measure is specified and tested)*
Electronic administrative data/claims

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.***):**
The data source is hospital discharge data such as the HCUP State Inpatient Databases (SID) or equivalent using UB-04 coding standards. The data collection instrument is public-use AHRQ QI software available in SAS or Windows versions.

2a.26-28 Data source/data collection instrument reference web page URL or attachment: URL None
http://www.qualityindicators.ahrq.gov/software.htm

2a.29-31 Data dictionary/code table web page URL or attachment: URL None
http://www.qualityindicators.ahrq.gov/downloads/winqi/AHRQ_QI_Windows_Software_Documentation_V41a.pdf

2a.32-35 Level of Measurement/Analysis (*Check the level(s) for which the measure is specified and tested)*
Facility/Agency

2a.36-37 Care Settings (*Check the setting(s) for which the measure is specified and tested)*
Hospital

2a.38-41 Clinical Services (*Healthcare services being measured, check all that apply*)
Clinicians: Physicians (MD/DO)

TESTING/ANALYSIS

2b. Reliability testing

2b.1 Data/sample *(description of data/sample and size)*: Veterans Integrated Service Networks´ (VISNs); and VA versus non-VA (Nationwide Inpatient Sample) using VA inpatient data (2004-2007).

2b.2 Analytic Method *(type of reliability & rationale, method for testing)*:
VA-and VISN-level IQI observed rates, risk-adjusted rates, and observed to expected ratios (O/Es). We examined the trends in VA-and VISN-level rates using weighted linear regression, variation in VISN-level O/Es, and compared VA to non-VA trends.

2b.3 Testing Results *(reliability statistics, assessment of adequacy in the context of norms for the test conducted)*:
VA in-hospital mortality rates for Pancreatic Resection Mortality were unchanged over time. The IQIs are easily applied to VA administrative data. They can be useful to tracks rate trends over time, reveal variation between sites, and for trend comparisons with other healthcare systems. [1]

[1] Borzecki AM, Christiansen CL, Loveland S, Chew P, Rosen AK. Trends in the inpatient quality indicators: the Veterans Health Administration experience. Med Care. 2010 Aug;48(8):694-702.

2b C☐ P☐ M☐ N☐

2c. Validity testing

2c.1 Data/sample *(description of data/sample and size)*: We used 100 percent national analytic files from

2c C☐ P☐

the CMS for the calendar years 2003 through 2006. Medicare Provider Analysis and Review (MEDPAR) files, which contain hospital discharge abstracts for all fee-for-service acute care hospitalizations of all U.S. Medicare recipients, were used to create our main analytical datasets. The Medicare denominator file was used to assess patient vital status at 30 days. Using appropriate procedure codes fiom the International Classification of Diseases, version 9 (ICD-9 codes), we identified all patients aged 65-99 undergoing pancreatectomy. [1] 2c.2 **Analytic Method** *(type of validity & rationale, method for testing)*: We first estimated risk-adjusted hospital mortality rates during 2003-2004. We defined mortality as death within 30 days of operation or before hospital discharge. We adjusted for patient age, gender, race, urgency of operation, median ZIP-code income, and coexisting medical conditions. Using logistic regression, we estimated the expected number of deaths in each hospital and then divided the observed deaths by this expected number of deaths to obtain the ratio of observed to expected mortality (O/E ratio). We then multiplied the O/E ratio by the average mortality rate to obtain a risk-adjusted mortality rate for each hospital. We next used hierarchical modeling techniques to adjust these mortality estimates for reliability. Using random effects logistic regression models, we generated empirical Bayes predictions of mortality for each hospital. [1] 2c.3 **Testing Results** *(statistical results, assessment of adequacy in the context of norms for the test conducted)*: In assessing the ability of hospital mortality rankings to predict future performance, reliability adjustment was particularly important for pancreatic resection and AAA repair, hospital rankings based on reliability-adjusted mortality were superior at identifying hospitals likely to have the lowest future mortality. Without reliability adjustment, hospitals in the "best" quintile (2003-2004) with pancreatic resection had a mortality of 7.6 percent in 2005-2006; with reliability adjustment, the "best" hospital quintile had a mortality of 2.7 percent in 2003-2006. [1] References [1] Dimick, Justin B.; Staiger, Douglas O.; Birkmeyer, John D. Ranking hospitals on surgical mortality: the importance of reliability adjustment. Health Serv Res. 2010 Dec;45(6 Pt 1):1614-29. doi: 10.1111/j.1475-6773.2010.01158.x. Epub 2010 Aug 16.	M☐ N☐
2d. Exclusions Justified 2d.1 **Summary of Evidence supporting exclusion(s):** Exclusions remove cases where the outcome of interest is less likely to be preventable or more likely to be preventable or with no or very low risk 2d.2 **Citations for Evidence:** Updated citations will be presented in the May Steering Committee meeting Refinement of the HCUP Quality Indicators (Technical Review), May 2001 http://qualityindicators.ahrq.gov/downloads/technical/qi_technical_review.zip 2d.3 **Data/sample** *(description of data/sample and size)*: AHRQ 2007 State Inpatient Databases (SID) with 4,000 hospitals and 30 million adult discharges 2d.4 **Analytic Method** *(type analysis & rationale)*: Expert panel and descriptive analyses stratified by exclusion categories 2d.5 **Testing Results** *(e.g., frequency, variability, sensitivity analyses)*: Refinement of the HCUP Quality Indicators (Technical Review), May 2001 http://qualityindicators.ahrq.gov/downloads/technical/qi_technical_review.zip	2d C☐ P☐ M☐ N☐ NA ☐
2e. Risk Adjustment for Outcomes/ Resource Use Measures 2e.1 **Data/sample** *(description of data/sample and size)*: AHRQ 2007 State Inpatient Databases (SID) with 4,000 hospitals and 30 million adult discharges	2e C☐ P☐ M☐ N☐

2e.2 Analytic Method *(type of risk adjustment, analysis, & rationale)*:
Risk-adjustment models use a standard set of categories based on readily available classification systems for demographics, severity of illness and comorbidities. Within each category, covariates are initially selected based on a minimum of 30 cases in the outcome of interest. Then a stepwise regression process on a development sample is used to select a parsimonious set of covariates where p<.05. Model is then tested on a validation sample

2e.3 Testing Results *(risk model performance metrics)*:
c 0.766

2e.4 If outcome or resource use measure is not risk adjusted, provide rationale: Not applicable

NA ☐

2f. Identification of Meaningful Differences in Performance

2f.1 Data/sample from Testing or Current Use *(description of data/sample and size)*: AHRQ 2007 State Inpatient Databases (SID) with 4,000 hospitals and 30 million adult discharges

2f.2 Methods to identify statistically significant and practically/meaningfully differences in performance *(type of analysis & rationale)*:
Posterior probability distribution parameterized using the Gamma distribution

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

5th	25th	Median	75th	95th
0.018408	0.033661	0.048378	0.066901	0.100833

2f C☐ P☐ M☐ N☐

2g. Comparability of Multiple Data Sources/Methods

2g.1 Data/sample *(description of data/sample and size)*: Not applicable

2g.2 Analytic Method *(type of analysis & rationale)*:
Not applicable

2g.3 Testing Results *(e.g., correlation statistics, comparison of rankings)*:
Not applicable

2g C☐ P☐ M☐ N☐ NA☐

2h. Disparities in Care

2h.1 If measure is stratified, provide stratified results *(scores by stratified categories/cohorts)*: Median income of patient´s ZIP code:
1) Estimate 2) Standard error 3) P-value: Relative to marked group-c 4) P-value:
2007 relative to 2006
First quartile (lowest income) 32.207 4.894 0.206 0.000
Second quartile 50.615 5.663 0.000 0.154
Third quartile 34.671 5.002 0.106 0.586
Fourth quartile (highest income)c 23.772 4.527 0.024

2h.2 If disparities have been reported/identified, but measure is not specified to detect disparities, provide follow-up plans:
Users may stratify based on gender and race/ethnicity

2h C☐ P☐ M☐ N☐ NA☐

TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Scientific Acceptability of Measure Properties?*

2

Steering Committee: Overall, to what extent was the criterion, *Scientific Acceptability of Measure Properties*, met?
Rationale:

2 C☐ P☐ M☐

	N ☐
3. USABILITY	
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)	Eval Rating
3a. Meaningful, Understandable, and Useful Information **3a.1 Current Use:** In use **3a.2 Use in a public reporting initiative (disclosure of performance results to the public at large)** (*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*)**:** California (state) Hospital Inpatient Mortality Indicators for California http://www.oshpd.ca.gov/HID/Products/PatDischargeData/AHRQ/iqi-imi_overview.html Florida (state) Florida Health Finder http://www.floridahealthfinder.gov/ Kentucky (Norton Healthcare, a hospital system) Norton Healthcare Quality Report http://www.nortonhealthcare.com/body.cfm?id=157 Massachusetts (state) My HealthCare Options http://www.mass.gov/healthcareqc New Jersey (state) Find and Compare Quality Care in NJ Hospitals http://www.nj.gov/health/healthcarequality/ New York (health care coalition) New York State Hospital Report Card http://www.myhealthfinder.com/ Texas (state) Reports on Hospital Performance http://www.dshs.state.tx.us/thcic/ Vermont (state) Dept of Banking, Insurance, Securities & Health Care Administration Comparison Report http://www.bishca.state.vt.us/health-care/hospitals-health-care-practitioners/2009-vermont-hospital-report-card Washington (health care coalition) Washington State Hospital Report Card http://www.myhealthfinder.com/wa09/index.php Wisconsin (state hospital association) CheckPoint http://www.wicheckpoint.org/index.aspx The measure is also reported on HCUPnet: http://hcupnet.ahrq.gov/HCUPnet.jsp?Id=EB57801381F71C41&Form=MAINSEL&JS=Y&Action=%3E%3ENext%3E%3E&_MAINSEL=AHRQ%20Quality%20Indicators	3a C☐ P☐ M☐ N☐

This measure is used in the MONAHRQ system that is provided for public reporting and quality improvement throughout the United States: http://monahrq.ahrq.gov/

3a.3 **If used in other programs/initiatives (***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***):**
University Healthcare Consortium - An alliance of 103 academic medical centers and 219 of their affiliated hospitals. Reporting the AHRQ QIs to their member hospitals. (see www.uhc.edu. Note: measure results reported to hospitals; not reported on site).

Dallas Fort Worth Hospital Council – Reporting on measure results to over 70 hospitals in Texas (see www.dfwhc.ord. Note: measure results reported to hospitals; not reported on site).

Norton Healthcare - a multi-hospital system in Kentucky (see http://www.nortonhealthcare.com/about/Our_Performance/index.aspx)

Ministry Health Care - a multi-hospital system in Wisconsin (see http://ministryhealth.org/display/router.aspx. Note: measure results reported to hospitals; not reported on site).

Minnesota Hospital Association
http://www.mnhospitals.org/ Note: measure used in quality improvement. Not reported publicly by the association)

Premier - Premier´s "Quality Advisor" tool provides performance reports to approximately 650 hospitals for their use in monitoring and improving quality. Hospitals receive facility specific reports on this measure in Quality Advisor.

This measure is used in the MONAHRQ system that is provide for public reporting and quality improvement throughout the United States: http://monahrq.ahrq.gov/

Testing of Interpretability (*Testing that demonstrates the results are understood by the potential users for public reporting and quality improvement*)
3a.4 **Data/sample** *(description of data/sample and size)***:** AHRQ 2007 State Inpatient Databases (SID) with 4,000 hospitals and 30 million adult discharges

3a.5 **Methods** *(e.g., focus group, survey, QI project)***:**
A research team from the School of Public Affairs, Baruch College, under contracts with the Department of Public Health, Weill Medical College and Battelle, Inc., has developed a pair of Hospital Quality Model Reports at the request of the Agency for Healthcare Research & Quality (AHRQ). These reports are designed specifically to report comparative information on hospital performance based on the AHRQ Quality Indicators (QIs). The work was done in close collaboration with AHRQ staff and the AHRQ Quality Indicators team.
The Model Reports (discussed immediately above) are based on:
• Extensive search and analysis of the literature on hospital quality measurement and reporting, as well as public reporting on health care quality more broadly;
• Interviews with quality measurement and reporting experts, purchasers, staff of purchasing coalitions, and executives of integrated health care delivery systems who are responsible for quality in their facilities;
• Two focus groups with chief medical officers of hospitals and/or systems and two focus groups with quality managers from a broad mix of hospitals;
• Four focus groups with members of the public who had recently experienced a hospital admission; and
• Four rounds of cognitive interviews (a total of 62 interviews) to test draft versions of the two Model Reports with members of the public with recent hospital experience, basic computer literacy but widely varying levels of education.

3a.6 **Results** *(qualitative and/or quantitative results and conclusions)***:**
Given the above review of the literature and original research that was conducted, a Model report was the result that could help sponsors use the best evidence on public reports so they are most likely to have the desired effects on quality

3b/3c. Relation to other NQF-endorsed measures **3b.1 NQF # and Title of similar or related measures:** Leapfrog survival predictor	
(for NQF staff use) **Notes on similar/related endorsed or submitted measures:**	
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 or different topic but same target population): **3b.2 Are the measure specifications harmonized? If not, why?** Leapfrog measure is based on AHRQ specification, but is not risk-adjusted	**3b** C☐ P☐ M☐ N☐ NA ☐
3c. Distinctive or Additive Value **3c.1 Describe the distinctive, improved, or additive value this measure provides to existing NQF-endorsed measures:** AHRQ measure is risk-adjusted, is paired with a volume measure and is part of a composite measure **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:** Volume is, by itself, not an adequate proxy for case-mix	**3c** C☐ P☐ M☐ N☐ NA ☐
TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Usability?*	**3**
Steering Committee: Overall, to what extent was the criterion, *Usability*, met? **Rationale:**	**3** C☐ P☐ M☐ N☐
4. FEASIBILITY	
Extent to which the required data are readily available, retrievable without undue burden, and can be implemented for performance measurement. (evaluation criteria)	Eval Rating
4a. Data Generated as a Byproduct of Care Processes **4a.1-2 How are the data elements that are needed to compute measure scores generated?** 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)	**4a** C☐ P☐ M☐ N☐
4b. Electronic Sources **4b.1 Are all the data elements available electronically?** (*elements that are needed to compute measure scores are in defined, computer-readable fields, e.g., electronic health record, electronic claims*) Yes **4b.2 If not, specify the near-term path to achieve electronic capture by most providers.**	**4b** C☐ P☐ M☐ N☐
4c. Exclusions **4c.1 Do the specified exclusions require additional data sources beyond what is required for the numerator and denominator specifications?** No **4c.2 If yes, provide justification.**	**4c** C☐ P☐ M☐ N☐ NA ☐
4d. Susceptibility to Inaccuracies, Errors, or Unintended Consequences **4d.1 Identify susceptibility to inaccuracies, errors, or unintended consequences of the measure and**	**4d** C☐ P☐

describe how these potential problems could be audited. If audited, provide results. Coding professionals follow detail guidelines, are subject to training and credentialing requirements, peer review and audit. This procedure is performed only by a select number of hospitals, which may compromise the precision of the indicator.	**M☐** **N☐**
4e. Data Collection Strategy/Implementation **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:** Providers may wish to examine several consecutive years to potentially increase the precision of this indicator. **4e.2 Costs to implement the measure** (*costs of data collection, fees associated with proprietary measures*)**:** All data necessary to calculate this measure are routinely collected for hospital administrative purposes. The software for calculating the measure is available for free at: http://www.qualityindicators.ahrq.gov/software.htm **4e.3 Evidence for costs:** All data necessary to calculate this measure are routinely collected for hospital administrative purposes. The software for calculating the measure is available for free at: http://www.qualityindicators.ahrq.gov/software.htm **4e.4 Business case documentation:** All data necessary to calculate this measure are routinely collected for hospital administrative purposes. The software for calculating the measure is available for free at: http://www.qualityindicators.ahrq.gov/software.htm	**4e** **C☐** **P☐** **M☐** **N☐**
TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Feasibility?*	**4**
Steering Committee: Overall, to what extent was the criterion, *Feasibility*, met? **Rationale:**	**4** **C☐** **P☐** **M☐** **N☐**
RECOMMENDATION	
(for NQF staff use) **Check if measure is untested and only eligible for time-limited endorsement.**	**Time-limited ☐**
Steering Committee: Do you recommend for endorsement? **Comments:**	**Y☐** **N☐** **A☐**
CONTACT INFORMATION	
Co.1 Measure Steward (Intellectual Property Owner) **Co.1 Organization** Agency for Healthcare Research and Quality, 540 Gaither Road, Rockville, Maryland, 20850 **Co.2 Point of Contact** John, Bott, MSSW, MBA, John.Bott@AHRQ.hhs.gov, 301-427-1317-	
Measure Developer If different from Measure Steward **Co.3 Organization** Agency for Healthcare Research and Quality, 540 Gaither Road, Rockville, Maryland, 20850	

Co.4 Point of Contact John, Bott, MSSW, MBA, John.Bott@AHRQ.hhs.gov, 301-427-1317-
Co.5 Submitter If different from Measure Steward POC John, Bott, MSSW, MBA, John.Bott@AHRQ.hhs.gov, 301-427-1317-, Agency for Healthcare Research and Quality
Co.6 Additional organizations that sponsored/participated in measure development
ADDITIONAL INFORMATION
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.** UC Davis, Stanford University, Battelle Memorial Institute
Ad.2 If adapted, provide name of original measure: None **Ad.3-5 If adapted, provide original specifications URL or attachment**
Measure Developer/Steward Updates and Ongoing Maintenance **Ad.6 Year the measure was first released:** 2001 **Ad.7 Month and Year of most recent revision:** 10, 2010 **Ad.8 What is your frequency for review/update of this measure?** Annual **Ad.9 When is the next scheduled review/update for this measure?** 05, 2011
Ad.10 Copyright statement/disclaimers: The AHRQ QI software is publicly available; no copyright disclaimers
Ad.11 -13 Additional Information web page URL or attachment:
Date of Submission (*MM/DD/YY*)**:** 04/05/2011

AHRQ Quality Indicators

AHRQ Quality Indicator:
Risk Adjustment Coefficients for the IQI

Department of Health and Human Services
Agency for Healthcare Research and Quality
http://www.qualityindicators.ahrq.gov

Version 4.2 (September, 2010)

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Table 1. Risk Adjustment Coefficients for IQI #08— Esophageal Resection Volume

Parameter	Label	DF	Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
Intercept		1	-3.8815	0.2265	293.7139	<.0001
Age	65 to 74	1	0.4983	0.2738	3.3112	0.0688
Age	75+	1	0.8957	0.2954	9.1947	0.0024
APR-DRG	'1629'	1	1.6892	0.2779	36.9574	<.0001
MDC	6	1	2.7804	0.2836	96.106	<.0001
MDC	OTHER	1	2.3974	0.8411	8.1236	0.0044
c-statistic	0.766					

Table 2. Risk Adjustment Coefficients for IQI #09— Pancreatic Resection Mortality

Parameter	Label	DF	Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
Intercept		1	-3.595	0.2383	227.5534	<.0001
Sex	Female	1	-0.5729	0.2218	6.6745	0.0098
Age	65 to 74	1	0.641	0.2821	5.1632	0.0231
Age	75+	1	0.9908	0.2652	13.9585	0.0002
APR-DRG	'2603' to '2604'	1	0.9376	0.2482	14.2674	0.0002
MDC	7	1	2.7111	0.4888	30.767	<.0001
MDC	Other	1	1.0136	0.3301	9.4297	0.0021
c-statistic	0.717					

Table 3. Risk Adjustment Coefficients for IQI #11— AAA Repair Mortality

Parameter	Label	DF	Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
Intercept		1	-6.1888	0.2224	774.3759	<.0001
Sex	Female	1	0.4288	0.1136	14.2558	0.0002
Age	65 to 74	1	0.4506	0.1807	6.2158	0.0127
Age	75 to 79	1	1.1624	0.1874	38.4863	<.0001
Age	80 to 84	1	1.3711	0.1891	52.5659	<.0001
Age	85+	1	1.6313	0.2101	60.2862	<.0001
APR-DRG	'1691' to '1692'	1	1.91	0.1953	95.6603	<.0001
APR-DRG	'1693' to '1694'	1	3.1784	0.2076	234.431	<.0001
APR-DRG	'1733' to '1734'	1	2.2529	0.227	98.4816	<.0001
MDC	5	1	3.1733	0.2233	201.9927	<.0001
MDC	Other	1	3.0364	0.2938	106.8306	<.0001
RUPTURED		1	1.8117	0.1389	170.0351	<.0001
c-statistic	0.909					

Table 4. Risk Adjustment Coefficients for IQI #12— CABG Mortality

Parameter	Label	DF	Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
Intercept		1	-5.5584	0.1655	1127.9205	<.0001
Sex	Female	1	0.3537	0.0498	50.384	<.0001
Age	40 to 49	1	-0.4934	0.1563	9.9619	0.0016
Age	50 to 54	1	-0.3632	0.1411	6.6268	0.01
Age	55 to 59	1	-0.3226	0.1173	7.5635	0.006
Age	65 to 84	1	0.1919	0.0776	6.1097	0.0134
Age	85+	1	0.7057	0.1182	35.6658	<.0001
APR-DRG	'1611' to '1612'	1	1.823	0.3899	21.8585	<.0001
APR-DRG	'1613'	1	3.2934	0.2398	188.5506	<.0001
APR-DRG	'1614'	1	3.8683	0.2771	194.9419	<.0001
APR-DRG	'1621' to '1622'	1	1.9362	0.186	108.3727	<.0001
APR-DRG	'1623'	1	3.3585	0.1755	366.3713	<.0001
APR-DRG	'1624'	1	4.0058	0.1995	403.0216	<.0001
APR-DRG	'1631' to '1632'	1	1.5649	0.1831	73.0088	<.0001
APR-DRG	'1633'	1	3.2771	0.1847	314.8074	<.0001
APR-DRG	'1634'	1	4.3895	0.2137	421.7753	<.0001
APR-DRG	'1652'	1	0.7883	0.1739	20.5395	<.0001
APR-DRG	'1653'	1	2.3433	0.1639	204.2934	<.0001
APR-DRG	'1654'	1	3.5268	0.1744	409.1229	<.0001
APR-DRG	'1661'	1	0.5066	0.1746	8.4149	0.0037
APR-DRG	'1663'	1	2.5277	0.1814	194.1402	<.0001
APR-DRG	'1664'	1	3.733	0.2062	327.6303	<.0001
MDC	5	1	4.3742	0.1712	652.5993	<.0001
MDC	OTHER	1	2.6159	0.231	128.2859	<.0001
c-statistic	0.836					

Table 5. Risk Adjustment Coefficients for IQI #13— Craniotomy Mortality

Parameter	Label	DF	Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
Intercept		1	-4.3508	0.0978	1978.3487	<.0001
Age	18 to 24	1	-0.8163	0.1949	17.5386	<.0001
Age	25 to 59	1	-0.1597	0.0787	4.1142	0.0425
Age	65 to 85+	1	0.1261	0.0788	2.5638	0.1093
APR-DRG	'0212'	1	1.4101	0.0947	221.9279	<.0001
APR-DRG	'0213'	1	3.0032	0.0822	1336.081	<.0001
APR-DRG	'0214'	1	4.0545	0.0886	2092.0789	<.0001
APR-DRG	'0221' to '0222'	1	-0.5807	0.2005	8.3911	0.0038
APR-DRG	'0223'	1	1.4325	0.3499	16.7625	<.0001
APR-DRG	'0224'	1	3.5827	0.1528	549.8661	<.0001
APR-DRG	'0231' to '0232'	1	-1.2243	0.4154	8.687	0.0032
APR-DRG	'0233' to '0234'	1	1.2291	0.3931	9.7773	0.0018
APR-DRG	'0241' to '0242'	1	0.6438	0.1435	20.1296	<.0001
APR-DRG	'0243'	1	2.9958	0.2259	175.8772	<.0001
APR-DRG	'0244'	1	3.8637	0.2505	237.8197	<.0001
MDC	1	1	0.4832	0.4185	1.3329	0.2483
TRNSFER		1	0.1399	0.0688	4.1324	0.0421
c-statistic	0.865					

Table 6. Risk Adjustment Coefficients for IQI #14— Hip Replacement Mortality

Parameter	Label	DF	Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
Intercept		1	-7.7445	0.5881	173.4161	<.0001
Sex	Female	1	-0.5268	0.2494	4.4613	0.0347
Age	18 to 59	1	-0.2796	0.7318	0.146	0.7024
Age	65 to 85+	1	1.2089	0.5983	4.0827	0.0433
APR-DRG	'3013' to '3014'	1	3.4414	0.2791	152.0323	<.0001
MDC	8	1	5.5001	0.8189	45.1135	<.0001
MDC	Other	1	2.5543	1.0188	6.2858	0.0122
c-statistic	0.666					

Table 7. Risk Adjustment Coefficients for IQI #15— AMI Mortality

Parameter	Label	DF	Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
Intercept		1	-5.5309	0.1025	2912.8843	<.0001
Age	18 to 39	1	-0.5723	0.1438	15.8301	<.0001
Age	40 to 44	1	-0.7079	0.1302	29.5492	<.0001
Age	45 to 49	1	-0.2508	0.0847	8.777	0.0031
Age	50 to 54	1	-0.23	0.0716	10.3304	0.0013
Age	55 to 59	1	-0.1458	0.0644	5.1317	0.0235
Age	65 to 69	1	0.1264	0.0462	7.4857	0.0062
Age	80 to 84	1	0.123	0.0506	5.9012	0.0151
Age	85+	1	0.1959	0.0487	16.1528	<.0001
APR-DRG	'1611' to '1612'	1	1.1742	0.3682	10.1694	0.0014
APR-DRG	'1613' to '1614'	1	2.87	0.1589	326.1709	<.0001
APR-DRG	'1621' to '1622'	1	2.3699	0.253	87.7313	<.0001
APR-DRG	'1623'	1	3.9284	0.1762	497.1341	<.0001
APR-DRG	'1624'	1	4.6219	0.1993	537.5819	<.0001
APR-DRG	'1651' to '1652'	1	1.0558	0.1471	51.5343	<.0001
APR-DRG	'1653'	1	2.6729	0.1227	474.6562	<.0001
APR-DRG	'1654'	1	3.8062	0.1407	731.6044	<.0001
APR-DRG	'1731' to '1734'	1	3.8338	0.1753	478.5413	<.0001
APR-DRG	'1742'	1	1.4064	0.1109	160.7569	<.0001
APR-DRG	'1743'	1	3.035	0.1096	766.6736	<.0001
APR-DRG	'1744'	1	4.4992	0.1026	1922.9611	<.0001
APR-DRG	'1901'	1	1.4033	0.1255	125.084	<.0001
APR-DRG	'1902'	1	2.3416	0.1028	519.1431	<.0001
APR-DRG	'1903'	1	3.3619	0.0984	1167.0483	<.0001
APR-DRG	'1904'	1	4.9943	0.0982	2585.3541	<.0001
MDC	5	1	3.5402	0.1069	1096.7232	<.0001
TRNSFER		1	-0.2032	0.0352	33.3572	<.0001
c-statistic	0.84					

Table 8. Risk Adjustment Coefficients for IQI #16— Congestive Heart Failure (CHF) Morality

Parameter	Label	DF	Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
Intercept		1	-4.7839	0.0823	3378.3157	<.0001
Sex	Female	1	-0.0911	0.0209	19.0002	<.0001
Age	18 to 49	1	-0.2514	0.0732	11.804	0.0006
Age	50 to 54	1	-0.2272	0.0827	7.5415	0.006
Age	55 to 59	1	-0.2825	0.0773	13.3418	0.0003
Age	65 to 84	1	0.1631	0.0504	10.469	0.0012
Age	85+	1	0.7243	0.0515	197.8711	<.0001
APR-DRG	'1611'	1	-1.1553	0.3586	10.3805	0.0013
APR-DRG	'1612'	1	-0.6313	0.1934	10.6579	0.0011
APR-DRG	'1613'	1	0.7929	0.1423	31.039	<.0001
APR-DRG	'1614'	1	1.8894	0.2073	83.0999	<.0001
APR-DRG	'1621' to '1622'	1	2.1927	0.28	61.3336	<.0001
APR-DRG	'1623'	1	2.6975	0.1607	281.9045	<.0001
APR-DRG	'1624'	1	3.6497	0.266	188.2639	<.0001
APR-DRG	'1751' to '1753'	1	0.6797	0.1588	18.3176	<.0001
APR-DRG	'1754' to '1753'	1	2.8205	0.1979	203.1824	<.0001
APR-DRG	'1801'	1	1.8301	0.4625	15.6542	<.0001
APR-DRG	'1802'	1	1.6692	0.2363	49.9107	<.0001
APR-DRG	'1803'	1	1.6408	0.194	71.5463	<.0001
APR-DRG	'1804'	1	2.7686	0.2335	140.5392	<.0001
APR-DRG	'1911' to '1912'	1	-0.4695	0.1509	9.6757	0.0019
APR-DRG	'1913'	1	1.2774	0.1231	107.6451	<.0001
APR-DRG	'1914'	1	2.9823	0.1317	512.9154	<.0001
APR-DRG	'1942'	1	0.6476	0.0657	97.033	<.0001
APR-DRG	'1943'	1	1.8847	0.0648	846.9303	<.0001
APR-DRG	'1944'	1	3.2483	0.0667	2372.9607	<.0001
MDC	Other	1	2.2905	0.0758	912.3289	<.0001
TRANSFER		1	1.1037	0.0448	607.7695	<.0001
NOPOUB04		1	-0.1627	0.0384	17.9336	<.0001
c-statistic	0.787					

Table 9. Risk Adjustment Coefficients for IQI #17— Acute Stroke Mortality

Parameter	Label	DF	Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
Intercept		1	-4.7779	0.0769	3858.0353	<.0001
Sex	Female	1	0.1078	0.0211	26.1546	<.0001
Age	18 to 59	1	-0.0757	0.046	2.7121	0.0996
Age	65 to 84	1	0.1175	0.0432	7.4105	0.0065
Age	85+	1	0.5668	0.0465	148.6231	<.0001
APR-DRG	'0211'	1	1.7643	0.1294	185.9403	<.0001
APR-DRG	'0212'	1	2.4825	0.0973	651.6229	<.0001
APR-DRG	'0213'	1	3.7058	0.0698	2816.9317	<.0001
APR-DRG	'0214'	1	4.9984	0.0836	3571.2592	<.0001
APR-DRG	'0221'	1	2.674	0.748	12.7817	0.0004
APR-DRG	'0222'	1	3.8615	0.8397	21.1481	<.0001
APR-DRG	'0223' to '0224'	1	4.1158	0.1545	709.9606	<.0001
APR-DRG	'0231' to '0232'	1	1.4175	0.7233	3.8409	0.05
APR-DRG	'0233'	1	2.4873	1.0574	5.533	0.0187
APR-DRG	'0234'	1	5.1445	0.9157	31.5641	<.0001
APR-DRG	'0241'	1	1.8727	0.2058	82.7812	<.0001
APR-DRG	'0242'	1	1.2825	0.1443	78.9862	<.0001
APR-DRG	'0243'	1	2.6817	0.1785	225.6238	<.0001
APR-DRG	'0244'	1	4.365	0.2043	456.556	<.0001
APR-DRG	'0261' to '0263'	1	0.657	0.2763	5.6526	0.0174
APR-DRG	'0264'	1	3.2603	0.4267	58.3851	<.0001
APR-DRG	'0441'	1	2.4298	0.0839	838.6868	<.0001
APR-DRG	'0442'	1	2.4859	0.0657	1431.897	<.0001
APR-DRG	'0443'	1	3.7908	0.068	3105.1918	<.0001
APR-DRG	'0444'	1	5.7568	0.0659	7636.1247	<.0001
APR-DRG	'0452'	1	1.319	0.0636	430.6596	<.0001
APR-DRG	'0453'	1	2.5344	0.0655	1497.4027	<.0001
APR-DRG	'0454'	1	4.5409	0.065	4887.2957	<.0001
MDC	OTHER	1	2.9747	0.076	1530.5147	<.0001
NOPOUB04		1	-0.1218	0.0391	9.6938	0.0018
c-statistic	0.867					

Table 10. Risk Adjustment Coefficients for IQI #18— Gastrointestinal Hemorrhage Mortality

Parameter	Label	DF	Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
Intercept		1	-4.9398	0.1126	1924.0822	<.0001
Age	18 to 59	1	-0.2965	0.079	14.088	0.0002
Age	65 to 85+	1	-0.0774	0.071	1.1897	0.2754
APR-DRG	'2201'	1	2.1735	0.2815	59.5954	<.0001
APR-DRG	'2202'	1	3.1192	0.1674	347.1631	<.0001
APR-DRG	'2203'	1	3.6192	0.1693	456.9285	<.0001
APR-DRG	'2204'	1	4.2114	0.1786	556.042	<.0001
APR-DRG	'2211'	1	1.6253	0.2517	41.689	<.0001
APR-DRG	'2212'	1	2.6266	0.1705	237.2128	<.0001
APR-DRG	'2213'	1	3.1793	0.1829	302.2699	<.0001
APR-DRG	'2214'	1	3.9948	0.2133	350.7657	<.0001
APR-DRG	'2411' to '2413'	1	0.5478	0.1063	26.5532	<.0001
APR-DRG	'2414'	1	3.3789	0.1228	757.4054	<.0001
APR-DRG	'2421' to '2423'	1	0.8485	0.1435	34.9789	<.0001
APR-DRG	'2424'	1	3.759	0.1871	403.6886	<.0001
APR-DRG	'2441' to '2442'	1	-0.6038	0.1569	14.8119	0.0001
APR-DRG	'2443'	1	1.3852	0.1675	68.351	<.0001
APR-DRG	'2444'	1	2.805	0.2217	160.1017	<.0001
APR-DRG	'2532'	1	1.1375	0.1061	114.9845	<.0001
APR-DRG	'2533'	1	2.6386	0.1027	659.8818	<.0001
APR-DRG	'2534'	1	3.966	0.1118	1257.6056	<.0001
APR-DRG	'2541' to '2534'	1	0.9522	0.1252	57.8663	<.0001
APR-DRG	'2544'	1	3.7078	0.1967	355.1874	<.0001
MDC	OTHER	1	2.0508	0.1154	315.7461	<.0001
TRNSFER		1	0.6498	0.1009	41.4807	<.0001
c-statistic	0.801					

Table 11. Risk Adjustment Coefficients for IQI #19— Hip Fracture Mortality

Parameter	Label	DF	Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
Intercept		1	-4.7106	0.1757	718.5872	<.0001
Sex	Female	1	-0.618	0.0482	164.6048	<.0001
Age	70 to 84	1	0.2934	0.1345	4.757	0.0292
Age	85+	1	0.8633	0.133	42.1391	<.0001
APR-DRG	'3011' to '3012'	1	0.6775	0.1108	37.3896	<.0001
APR-DRG	'3013'	1	2.0114	0.1247	260.3111	<.0001
APR-DRG	'3014'	1	3.42	0.1619	446.0751	<.0001
APR-DRG	'3082'	1	0.8711	0.1083	64.6453	<.0001
APR-DRG	'3083'	1	1.6901	0.1218	192.6662	<.0001
APR-DRG	'3084'	1	3.3395	0.149	502.5498	<.0001
APR-DRG	'3401'	1	1.6847	0.172	95.9664	<.0001
APR-DRG	'3402'	1	2.4317	0.1232	389.4181	<.0001
APR-DRG	'3403'	1	3.6119	0.1282	793.2462	<.0001
APR-DRG	'3404'	1	4.897	0.1803	737.5389	<.0001
MDC	8	1	2.9954	0.2052	213.1684	<.0001
MDC	24	1	2.0906	0.1527	187.3945	<.0001
TRNSFER		1	-0.6047	0.1426	17.9742	<.0001
NOPOUB04		1	-0.2743	0.0835	10.7754	0.001
c-statistic	0.781					

Table 12. Risk Adjustment Coefficients for IQI #20— Pneumonia Mortality

Parameter	Label	DF	Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
Intercept		1	-5.2951	0.0727	5298.8772	<.0001
Sex	Female	1	-0.086	0.0204	17.7729	<.0001
Age	18 to 24	1	-1.3808	0.1826	57.175	<.0001
Age	25 to 29	1	-0.7709	0.1657	21.6467	<.0001
Age	30 to 34	1	-0.902	0.1728	27.2474	<.0001
Age	35 to 39	1	-0.7524	0.1348	31.1691	<.0001
Age	40 to 44	1	-0.6298	0.1067	34.8258	<.0001
Age	45 to 49	1	-0.4094	0.0839	23.805	<.0001
Age	50 to 54	1	-0.2398	0.0741	10.4561	0.0012
Age	55 to 59	1	-0.1395	0.068	4.2135	0.0401
Age	80 to 84	1	0.1353	0.0472	8.204	0.0042
Age	85+	1	0.6544	0.0486	181.072	<.0001
APR-DRG	'1211'		2.3317	0.2424	92.4967	<.0001
APR-DRG	'1212'		3.0907	0.2437	160.8801	<.0001
APR-DRG	'1213'		3.7813	0.1906	393.5565	<.0001
APR-DRG	'1214'		4.4652	0.3292	183.9698	<.0001
APR-DRG	'1301'		4.1444	0.13	1016.692	<.0001
APR-DRG	'1302'		4.4796	0.0861	2704.0825	<.0001
APR-DRG	'1303' to '1304		4.7612	0.0739	4149.821	<.0001
APR-DRG	'1371'		0.6835	0.2058	11.028	0.0009
APR-DRG	'1372'		1.9055	0.0823	535.9019	<.0001
APR-DRG	'1373'		2.8942	0.0765	1430.6224	<.0001
APR-DRG	'1374'		3.8094	0.0855	1986.5583	<.0001
APR-DRG	'1392'		1.5301	0.0639	572.8548	<.0001
APR-DRG	'1393'		2.8703	0.0638	2023.8499	<.0001
APR-DRG	'1394'		4.106	0.069	3545.5669	<.0001
MDC	4		3.2777	0.076	1859.0451	<.0001
MDC	25		1.9735	0.1451	184.8627	<.0001
TRNSFER		1	0.7565	0.0453	278.5969	<.0001
c-statistic	0.82					

Table 13. Risk Adjustment Coefficients for IQI #30— PTCA Mortality

Parameter	Label	DF	Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
Intercept		1	-8.103	0.1892	1833.6033	<.0001
Sex	Female	1	0.1963	0.0445	19.4537	<.0001
Age	40 to 59	1	-0.1966	0.0882	4.9698	0.0258
Age	65 to 74	1	0.2213	0.0838	6.9696	0.0083
Age	75 to 79	1	0.494	0.089	30.7954	<.0001
Age	80 to 84	1	0.7121	0.0896	63.1971	<.0001
Age	85+	1	0.9988	0.094	112.8227	<.0001
XCV7	'1653' to '1654'	1	5.4367	0.1979	754.6098	<.0001
XCV8	'1741'	1	2.1583	0.1847	136.5049	<.0001
XCV9	'1742'	1	3.4075	0.169	406.3311	<.0001
XCV10	'1743'	1	4.987	0.1681	880.0752	<.0001
XCV11	'1744'	1	6.5069	0.1634	1586.6957	<.0001
XCV12	'1752'	1	1.6049	0.1908	70.7398	<.0001
XCV13	'1753'	1	3.5558	0.1879	358.1517	<.0001
XCV14	'1754'	1	5.6858	0.1825	970.5981	<.0001
MDC	4	1	5.1047	0.1989	658.7486	<.0001
MDC	5	1	4.6865	0.1782	691.5277	<.0001
MDC	8	1	5.0961	0.2476	423.7293	<.0001
MDC	18	1	5.5861	0.2457	516.8031	<.0001
MDC	Other	1	4.8713	0.1879	672.1156	<.0001
TRNSFER		1	-0.2195	0.0606	13.1348	0.0003
NOPOUB04		1	0.2302	0.0859	7.1811	0.0074
c-statistic	0.926					

Table 14. Risk Adjustment Coefficients for IQI #31— Carotid Endarterectomy Mortality

Parameter	Label	DF	Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
Intercept		1	-6.7639	0.3273	427.0058	<.0001
Age	18 to 59	1	-0.2683	0.4254	0.3978	0.5282
Age	65 to 85+	1	0.2311	0.2984	0.5999	0.4386
APR-DRG	'0242' to '0244'	1	1.4449	0.2435	35.2038	<.0001
MDC	1	1	4.8932	0.4347	126.6903	<.0001
MDC	5	1	3.3153	0.2493	176.8522	<.0001
MDC	OTHER	1	3.1313	0.3788	68.3355	<.0001
c-statistic	0.791					

Table 15. Risk Adjustment Coefficients for IQI #32— AMI Mortality without Transfer

Parameter	Label	DF	Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
Intercept		1	-5.547	0.1165	2265.8252	<.0001
Age	18 to 39	1	-0.5633	0.1555	13.1163	0.0003
Age	40 to 44	1	-0.8479	0.1518	31.2114	<.0001
Age	45 to 49	1	-0.2378	0.092	6.6777	0.0098
Age	50 to 54	1	-0.1965	0.0774	6.4394	0.0112
Age	55 to 59	1	-0.1529	0.0705	4.702	0.0301
Age	65 to 84	1	0.1024	0.0494	4.2935	0.0383
Age	85+	1	0.1602	0.0526	9.2791	0.0023
APR-DRG	'1611' to '1614'		2.3049	0.1885	149.5439	<.0001
APR-DRG	'1621' to '1622'		2.6022	0.2722	91.4184	<.0001
APR-DRG	'1623'		4.0904	0.1976	428.382	<.0001
APR-DRG	'1624'		4.5735	0.2273	405.0203	<.0001
APR-DRG	'1651' to '1652'		1.0541	0.1702	38.3341	<.0001
APR-DRG	'1653'		2.6411	0.1405	353.2873	<.0001
APR-DRG	'1654'		3.7736	0.1611	548.9976	<.0001
APR-DRG	'1731' to '1734		3.8506	0.1993	373.1832	<.0001
APR-DRG	'1742'		1.4819	0.1256	139.1057	<.0001
APR-DRG	'1743'		3.0768	0.1246	609.7831	<.0001
APR-DRG	'1744'		4.5534	0.1169	1516.4966	<.0001
APR-DRG	'1901'		1.4896	0.1395	114.0264	<.0001
APR-DRG	'1902'		2.3685	0.1167	411.6313	<.0001
APR-DRG	'1903'		3.4042	0.112	923.1996	<.0001
APR-DRG	'1904'		5.0095	0.1121	1997.3244	<.0001
MDC	5		3.7358	0.1237	911.7123	<.0001
c-statistic	0.831					

Table A.1. Population Age Categories

POPCAT	AGE RANGE
1	low - 4
2	5 - 9
3	10 - 14
4	15 - 17
5	18 - 24
6	25 - 29
7	30 - 34
8	35 - 39
9	40 - 44
10	45 - 49
11	50 - 54
12	55 - 59
13	60 - 64
14	65 - 69
15	70 - 74
16	75 - 79
17	80 - 84
18	85 - high

Table A.2. All Patient Refined Diagnosis Related Groups (APR-DRG) Labels v20.0

DRG	M/S	MDC	DESCRIPTION	D
1	P		LIVER TRANSPLANT	
2	P		HEART &IOR LUNG TRANSPLANT	
3	P		BONE MARROW TRANSPLANT	
4	P		TRACHEOSTOMY EXCEPT FOR FACE,MOUTH & NECK DIAGNOSES	
5	P		TRACHEOSTOMY FOR FACE,MOUTH & NECK DIAGNOSES	
20	P	1	CRANIOTOMYFORTRAUMA	
21	P	1	CRANIOTOMY EXCEPT FOR TRAUMA	
22	P	1	VENTRICULAR SHUNT PROCEDURES	
23	P	1	SPINAL PROCEDURES	
24	P	1	EXTRACRANIALVASCULARPROCEDURES	
25	P	1	NERVOUS SYSTEM PROC FOR PERIPHERAL NERVE DISORDERS	
26	P	1	NERVOUS SYST PROC FOR CRANIAL NERV & 0TH NERV SYS DISORD	
40	M	1	SPINAL DISORDERS & INJURIES	
41	M	1	NERVOUS SYSTEM NEOPLASMS	
42	M	1	DEGENERATIVE NERVOUS SYSTEM DISORDERS	
43	M	1	MULTIPLE SCLEROSIS & CEREBELLAR ATAXIA	
44	M	1	INTRACRANIAL HEMORRHAGE	
45	M	1	CVAWINFARCT	
46	M	1	NONSPECIFIC CVA & PRECEREBRAL OCCLUSION W/O INFARCT	
47	M	1	TRANSIENT ISCHEMIA	
48	M	1	CRANIAL & PERIPHERAL NERVE DISORDERS	
49	M	1	BACTERIAL & TUBERCULOUS INFECTIONS OF NERVOUS SYSTEM	
50	M	1	NON-BACTERIAL INFECTIONS OF NERVOUS SYSTEM EXC VIRAL MENINGITIS	
51	M	1	VIRAL MENINGITIS	
52	M	1	NONTRAUMATIC STUPOR & COMA	
53	M	1	SEIZURE	
54	M	1	MIGRAINE&OTHERHEADACHES	
55	M	1	HEAD TRAUMA W COMA >1 HR OR HEMORRHAGE	
56	M	1	SKULL FRACTURE & SPEC INTRACRANIAL INJURY, COMA <1 HR OR NO COMA	
57	M	1	CONCUSSION,UNSPEC INTRACRANIAL INJURY, COMA <1 HR OR NO COMA	
58	M	1	OTHER DISORDERS OF NERVOUS SYSTEM	
70	P	2	ORBITAL PROCEDURES	
71	P	2	INTRAOCULAR PROCEDURES EXCEPTLENS	
72	P	2	EXTRAOCULAR PROCEDURES EXCEPT ORBIT	
73	P	2	LENS PROCEDURES W OR W/O VITRECTOMY	
80	M	2	ACUTE MAJOR EYE INFECTIONS	
81	M	2	NEUROLOGICAL EYE DISORDERS	
82	M	2	OTHER DISORDERS OF THE EYE	
90	P	3	MAJOR LARYNX & TRACHEAL PROCEDURES EXCEPT TRACHEOSTOMY	
91	P	3	OTHER MAJOR HEAD & NECK PROCEDURES	
92	P	3	FACIAL BONE PROCEDURES EXCEPT MAJOR HEAD & NECK	
93	P	3	SINUS & MASTOID PROCEDURES	
94	P	3	MOUTH PROCEDURES	
95	P	3	CLEFTLIP& PALATE REPAIR	
96	P	3	SIALOADENECTOMY & SALIVARY GLAND PROCEDURES	
97	P	3	TONSILLECTOMY &ADENOIDECTOMY PROCEDURES	
98	P	3	OTHER EAR, NOSE, MOUTH & THROAT PROCEDURES	
110	M	3	EAR, NOSE, MOUTH & THROAT MALIGNANCY	

111	M	3	DYSEQUILIBRIUM
112	M	3	EPISTAXIS
113	M	3	EPIGLOTTITIS,OTITIS MEDIA,URI & LARYNGOTRACHEITIS
114	M	3	DENTAL&ORALDISEASE
115	M	3	OTHER EAR, NOSE, MOUTH & THROAT DIAGNOSES
120	P	4	MAJOR RESPIRATORY PROCEDURES
121	P	4	NON-MAJOR RESPIRATORY PROCEDURES
122	P	4	OTHER RESPIRATORYSYSTEM PROCEDURES
130	M	4	RESPIRATORY SYSTEM DIAGNOSIS W VENTILATOR SUPPORT 96+ HOURS
131	M	4	CYSTIC FIBROSIS
132	M	4	BPD & 0TH CHRONIC RESPIRATORY DIS ARISING IN PERINATAL PERIOD
133	M	4	PULMONARY EDEMA & RESPIRATORY FAILURE
134	M	4	PULMONARY EMBOLISM
135	M	4	MAJORCHESTTRAUMA
136	M	4	RESPIRATORY MALIGNANCY
137	M	4	RESPIRATORY INFECTIONS & INFLAMMATIONS
138	M	4	RSV PNEUMONIA & WHOOPING COUGH
139	M	4	SIMPLE PNEUMONIA
140	M	4	CHRONIC OBSTRUCTIVE PULMONARY DISEASE
141	M	4	ASTHMA&BRONCHIOLITIS
142	M	4	INTERSTITIAL LUNG DISEASE
143	M	4	PNEUMOTHORAX & PLEURAL EFFUSION
144	M	4	RESPIRATORY SYSTEM SIGNS, SYMPTOMS & OTHER DIAGNOSES
160	P	5	MAJOR CARDIOTHORACIC REPAIR OF HEART ANOMALY
161	P	5	CARDIAC DEFIBRILLATOR IMPLANT
162	P	5	CARDIAC VALVE PROCEDURES W CARDIAC CATHETERIZATION
163	P	5	CARDIAC VALVE PROCEDURES W/O CARDIAC CATHETERIZATION
164	P	5	CORONARY BYPASS WMALFUNCTIONING CORONARY BYPASS GRAFT
165	P	5	CORONARY BYPASS W/O MALFUNCTIONING CORONARY BYPASS W CARDIAC CATH
166	P	5	CORONARY BYPASS W/O MALFUNCTIONING CORONARY BYPASS W/O CARDIAC CATH
167	P	5	OTHERCARDIOTHORACICPROCEDURES
168	P	5	MAJORTHORACICVASCULARPROCEDURES
169	P	5	MAJORABDOMINALVASCULARPROCEDURES
170	P	5	PERMANENT CARDIAC PACEMAKER IMPLANT W AMI,HEART FAILURE OR SHOCK
171	P	5	PERM CARDIAC PACEMAKER IMPLANT W/O AMI, HEART FAILURE OR SHOCK
172	P	5	AMPUTATION FOR CIRC SYSTEM DISORDER EXCEPT UPPER LIMB & TOE
173	P	5	OTHERVASCULARPROCEDURES
174	P	5	PERCUTANEOUS CARDIOVASCULAR PROCEDURES WAMI
175	P	5	PERCUTANEOUS CARDIOVASCULAR PROCEDURES W/O AMI
176	P	5	CARDIAC PACEMAKER & DEFIBRILLATOR DEVICE REPLACEMENT
177	P	5	CARDIAC PACEMAKER & DEFIBRILLATOR REVISION EXCEPT DEVICE REPLACEMENT
178	P	5	UPPER LIMB & TOE AMPUTATION FOR CIRC SYSTEM DISORDERS
179	P	5	VEIN LIGATION & STRIPPING
180	P	5	OTHER CIRCULATORY SYSTEM PROCEDURES
190	M	5	CIRCULATORY DISORDERS WAMI
191	M	5	CARDIAC CATHETERIZATION W CIRC DISORD EXC ISCHEMIC HEART DISEASE
192	M	5	CARDIAC CATHETERIZATION FOR ISCHEMIC HEART DISEASE
193	M	5	ACUTE&SUBACUTEENDOCARDITIS
194	M	5	HEART FAILURE
195	M	5	DEEPVEINTHROMBOPHLEBITIS

196	M	5	CARDIACARREST,UNEXPLAINED
197	M	5	PERIPHERAL&OTHERVASCULARDISORDERS
198	M	5	ATHEROSCLEROSIS
199	M	5	HYPERTENSION
200	M	5	CARDIAC CONGENITAL & VALVULAR DISORDERS
201	M	5	CARDIAC ARRHYTHMIA & CONDUCTION DISORDERS
202	M	5	ANGINA PECTORIS
203	M	5	CHEST PAIN
204	M	5	SYNCOPE & COLLAPSE
205	M	5	CARDIOMYOPATHY
206	M	5	MALFUNCTION,REACTION & COMP OF CARDIAC OR VASC DEVICE OR PROC
207	M	5	OTHER CIRCULATORY SYSTEM DIAGNOSES
220	P	6	MAJOR STOMACH, ESOPHAGEAL & DUODENAL PROCEDURES
221	P	6	MAJOR SMALL & LARGE BOWEL PROCEDURES
222	P	6	MINOR STOMACH, ESOPHAGEAL & DUODENAL PROCEDURES
223	P	6	MINOR SMALL & LARGE BOWEL PROCEDURES
224	P	6	PERITONEALADHESIOLYSIS
225	P	6	APPENDECTOMY
226	P	6	ANAL & STOMAL PROCEDURES
227	P	6	HERNIA PROCEDURES EXCEPT INGUINAL & FEMORAL
228	P	6	INGUINAL & FEMORAL HERNIA PROCEDURES
229	P	6	OTHER DIGESTIVE SYSTEM PROCEDURES
240	M	6	DIGESTIVE MALIGNANCY
241	M	6	PEPTIC ULCER & GASTRITIS
242	M	6	MAJOR ESOPHAGEAL DISORDERS
243	M	6	OTHER ESOPHAGEAL DISORDERS
244	M	6	DIVERTICULITIS & DIVERTICULOSIS
245	M	6	INFLAMMATORY BOWEL DISEASE
246	M	6	G.I. VASCULAR INSUFFICIENCY
247	M	6	G.I. OBSTRUCTION
248	M	6	MAJOR G.I. BACTERIAL INFECTIONS
249	M	6	NONBACTERIAL GASTROENTERITIS & ABDOMINAL PAIN
250	M	6	OTHER DIGESTIVE SYSTEM DIAGNOSES
260	P	7	PANCREAS, LIVER & SHUNT PROCEDURES
261	P	7	MAJOR BILIARY TRACT PROCEDURES
262	P	7	CHOLECYSTECTOMY EXCEPT LAPAROSCOPIC
263	P	7	LAPAROSCOPIC CHOLECYSTECTOMY
264	P	7	OTHER HEPATOBILIARY & PANCREAS PROCEDURES
280	M	7	CIRRHOSIS&ALCOHOLICHEPATITIS
281	M	7	MALIGNANCY OF HEPATOBILIARY SYSTEM & PANCREAS
282	M	7	DISORDERS OF PANCREAS EXCEPT MALIGNANCY
283	M	7	DISORDERS OF LIVER EXCEPT MALIG, CIRRHOSIS OR ALCOHOLIC HEPATITIS
284	M	7	DISORDERS OF THE BILIARY TRACT
300	P	8	BILATERAL & MULTIPLE MAJOR JOINT PROCS OF LOWER EXTREMITY
301	P	8	MAJOR JOINT & LIMB REATTACH PROC OF LOWER EXTREMITY FOR TRAUMA
302	P	8	MAJOR JOINT & LIMB REATTACH PROC OF LOWER EXTREM EXC FOR TRAUMA
303	P	8	DORSAL & LUMBAR FUSION PROC FOR CURVATURE OF BACK
304	P	8	DORSAL & LUMBAR FUSION PROC EXCEPT FOR CURVATURE OF BACK
305	P	8	AMPUTATION FOR MUSCULOSKELET SYSTEM & CONN TISSUE DISORDERS
306	P	8	MAJOR JOINT & LIMB REATTACHMENT PROCEDURES OF UPPER EXTREMITY

307	P	8	CRANIAL & FACIAL BONE RECONSTRUCTIVE PROCEDURES
308	P	8	HIP & FEMUR PROCEDURES EXCEPT MAJOR JOINT FOR TRAUMA
309	P	8	HIP & FEMUR PROCEDURES EXCEPT MAJOR JOINT FOR NONTRAUMA
310	P	8	BACK & NECK PROCEDURES EXCEPT DORSAL & LUMBAR FUSION
311	P	8	SKIN GRAFT & WND DEBRID FOR OPEN WND,MS & CONN TISS DIS,EXC HAND
312	P	8	SKIN GRFT & WND DEBRID EXC OPN WND,FOR MS & CONN TIS DIS,EXC HAND
313	P	8	KNEE&LOWERLEGPROCEDURESEXCEPTFOOT
314	P	8	FOOT PROCEDURES
315	P	8	SHOULDER, ELBOW& FOREARM PROCEDURES
316	P	8	HAND&WRISTPROCEDURES
317	P	8	SOFTTISSUEPROCEDURES
318	P	8	REMOVAL OF INTERNAL FIXATION DEVICE
319	P	8	LOCAL EXCISION OF MUSCULOSKELETAL SYSTEM
320	P	8	OTHER MUSCULOSKELETEL SYSTEM & CONNECTIVE TISSUE PROCEDURES
340	M	8	FRACTURES OF FEMUR
341	M	8	FRACTURE OF PELVIS OR DISLOCATION OF HIP
342	M	8	FRACTURE OR DISLOCATION EXCEPT FEMUR & PELVIS
343	M	8	MUSCULOSKELETAL & CONN TISS MALIGNANCY & PATHOLOGICAL FRACTURES
344	M	8	OSTEOMYELITIS
345	M	8	SEPTIC ARTHRITIS
346	M	8	CONNECTIVE TISSUE DISORDERS
347	M	8	MEDICALBACKPROBLEMS
348	M	8	OTHERBONE DISEASES
349	M	8	MALFUNCTION, REACTION & COMP OF ORTHOPEDIC DEVICE OR PROCEDURE
350	M	8	MUSCULOSKELETAL SIGNS,SYMPTOMS,SPRAINS & MINOR INFLAMMATORY DIS
351	M	8	OTHER MUSCULOSKELETAL SYSTEM & CONNECTIVE TISSUE DIAGNOSES
360	P	9	SKIN GRAFT & WOUND DEBRID FOR SKIN ULCER & CELLULITIS
361	P	9	SKIN GRAFT & WOUND DEBRID EXC FOR SKIN ULCER & CELLULITIS
362	P	9	MASTECTOMY PROCEDURES
363	P	9	BREAST PROCEDURES EXCEPT MASTECTOMY
364	P	9	OTHER SKIN, SUBCUTANEOUS TISSUE & BREAST PROCEDURES
380	M	9	SKIN ULCERS
381	M	9	MAJOR SKIN DISORDERS
382	M	9	MALIGNANT BREAST DISORDERS
383	M	9	CELLULITIS
384	M	9	TRAUMA TO THE SKIN, SUBCUTANEOUS TISSUE & BREAST
385	M	9	OTHER SKIN & BREAST DISORDERS
400	P	10	AMPUTAT OF LOWER LIMB FOR ENDOCRINE, NUTRIT & METABOLIC DISORDERS
401	P	10	ADRENAL & PITUITARY PROCEDURES
402	P	10	SKIN GRAFT & WOUND DEBRID FOR ENDOC,NUTRIT & METAB DISORDERS
403	P	10	PROCEDURES FOR OBESITY
404	P	10	THYROID, PARATHYROID&THYROGLOSSAL PROCEDURES
405	P	10	OTHER ENDOCRINE, NUTRITITIONAL & METABOLIC PROCEDURES
420	M	10	DIABETES
421	M	10	NUTRITIONAL & MISC METABOLIC DISORDERS
422	M	10	HYPOVOLEMIA&ELECTROLYTEDISORDERS
423	M	10	INBORN ERRORS OF METABOLISM
424	M	10	OTHER ENDOCRINE DISORDERS
440	P	11	KIDNEY TRANSPLANT
441	P	11	MAJOR BLADDER PROCEDURES

442	P	11	KIDNEY & URINARY TRACT PROCEDURES FOR MALIGNANCY
443	P	11	KIDNEY & URINARY TRACT PROCEDURES FOR NONMALIGNANCY
444	P	11	CREATE, REVISE, REMOVE RENAL ACCESS DEVICE
445	P	11	MINORBLADDERPROCEDURES
446	P	11	URETHRAL&TRANSURETHRALPROCEDURES
447	P	11	OTHER KIDNEY& URINARY TRACT PROCEDURES
460	M	11	RENAL FAILURE
461	M	11	KIDNEY & URINARY TRACT MALIGNANCY
462	M	11	NEPHRITIS
463	M	11	KIDNEY&URINARYTRACTINFECTIONS
464	M	11	URINARY STONES W ESW LITHOTRIPSY
465	M	11	URINARY STONES W/O ESW LITHOTRIPSY
466	M	11	MALFUNCTIONS,REACTIONS & COMP OF GU DEVICE,GRAFT OR TRANSPLANT
467	M	11	KIDNEY & URINARY TRACT SIGNS & SYMPTOMS
468	M	11	OTHER KIDNEY & URINARY TRACT DIAGNOSES
480	P	12	MAJOR MALE PELVIC PROCEDURES
481	P	12	PENIS PROCEDURES
482	P	12	TRANSURETHRAL PROSTATECTOMY
483	P	12	TESTES PROCEDURES
484	P	12	OTHER MALE REPRODUCTIVE SYSTEM PROCEDURES
500	M	12	MALIGNANCY, MALE REPRODUCTIVE SYSTEM
501	M	12	MALE REPRODUCTIVE SYSTEM DIAGNOSES EXCEPT MALIGNANCY
510	P	13	PELVIC EVISCERATION, RADICAL HYSTERECTECTOMY & RADICAL VULVECTOMY
511	P	13	UTERINE &ADNEXA PROCEDURES FOROVARIAN &ADNEXAL MALIGNANCY
512	P	13	UTERINE &ADNEXA PROCEDURES FOR NON-OVARIAN & NON-ADNEXAL MALIG
513	P	13	UTERINE & ADNEXA PROCEDURES FOR CA IN SITU & NONMALIGNANCY
514	P	13	FEMALE REPRODUCTIVE SYSTEM RECONSTRUCTIVE PROCEDURES
515	P	13	VAGINA, CERVIX&VULVAPROCEDURES
516	P	13	LAPAROSCOPY&TUBALINTERRUPTION
517	P	13	D&C&CONIZATION
518	P	13	OTHER FEMALE REPRODUCTIVE SYSTEM PROCEDURES
530	M	13	FEMALE REPRODUCTIVE SYSTEM MALIGNANCY
531	M	13	FEMALE REPRODUCTIVE SYSTEM INFECTIONS
532	M	13	MENSTRUAL & OTHER FEMALE REPRODUCTIVE SYSTEM DISORDERS
540	P	14	CESAREAN DELIVERY
541	P	14	VAGINAL DELIVERY W STERILIZATION &/OR D&C
542	P	14	VAGINAL DELIVERY W PROC EXCEPT STERILIZATION &/OR D&C
543	P	14	POSTPARTUM & POST ABORTION DIAGNOSES W PROCEDURE
544	P	14	ABORTION W D&C, ASPIRATION CURETTAGE OR HYSTEROTOMY
560	M	14	VAGINAL DELIVERY
561	M	14	POSTPARTUM & POST ABORTION DIAGNOSES W/O PROCEDURE
562	M	14	ECTOPIC PREGNANCY
563	M	14	THREATENED ABORTION
564	M	14	ABORTION W/O D&C, ASPIRATION CURETTAGE OR HYSTEROTOMY
565	M	14	FALSE LABOR
566	M	14	OTHER ANTEPARTUM DIAGNOSES
580	M	15	NEONATE,TRANSFERRED<5DAYSOLD,NOTBORN HERE
581	M	15	NEONATE, TRANSFERRED <5 DAYSOLD, BORN HERE
582	P	15	NEONATE,WORGANTRANSPLANT
583	P	15	NEONATE,WECMO

590	P	15	NEONATE, BIRTHWT <750GW MAJOR PROCEDURE
591	M	15	NEONATE, BIRTHWT<750GW/OMAJORPROCEDURE
592	P	15	NEONATE, BIRTHWT 750G-999G W MAJOR PROCEDURE
593	M	15	NEONATE, BIRTHWT 750G-999G W/O MAJOR PROCEDURE
600	P	15	NEONATE, BIRTHWT 1000-1499GWMAJOR PROCEDURE
601	M	15	NEONATE, BIRTHWT 1000-1499G WMAJORANOM OR HEREDITARY CONDITION
602	M	15	NEONATE, BIRTHWT 1000-1499GW RESPIRATORY DISTRESS SYNDROME
603	M	15	OTHER NEONATE, BIRTHWT 1000-1499G
610	P	15	NEONATE, BIRTHWT 1500-1999GW MAJOR PROCEDURE
611	M	15	NEONATE, BIRTHWT 1500-1999G W MAJOR ANOM OR HEREDITARY CONDITION
612	M	15	NEONATE, BIRTHWT 1500-1999GW RESPIRATORY DISTRESS SYNDROME
613	M	15	NEONATE, BIRTHWT 1500-1999G W CONGENITAL OR PERINATAL INFECTIONS
614	M	15	OTHER NEONATE, BIRTHWT 1500-1999G
620	P	15	NEONATE, BIRTHWT2000-2499G WMAJOR PROCEDURE
621	M	15	NEONATE, BIRTHWT2000-2499G W MAJOR ANOM OR HEREDITARY CONDITION
622	M	15	NEONATE, BIRTHWT 2000-2499GW RESPIRATORY DISTRESS SYNDROME
623	M	15	NEONATE, BIRTHWT 2000-2499G W CONGENITAL OR PERINATAL INFECTIONS
624	M	15	NEONATE,BWT 2000-2499G NOT BORN HERE
625	M	15	NEONATE, BIRTHWT 2000-2499G, BORN HERE, W OTHER SIGNIF CONDTN
626	M	15	NEONATE, BWT2000-2499G,BORN HERE, NORMAL NB & NB WOTHER PROB
630	P	15	NEONATE, BIRTHWT>2499GWMAJORCARDIOVASCPROCEDURE
631	P	15	NEONATE, BIRTHWT >2499GW OTHER MAJOR PROCEDURE
632	P	15	NEONATE, BIRTHWT >2499GWOTHER PROCEDURE
633	M	15	NEONATE, BIRTHWT >2499GW MAJOR ANOMALY OR HEREDITARY CONDITION
634	M	15	NEONATE, BIRTHWT >2499GW RESPIRATORY DISTRESS SYNDROME
635	M	15	NEONATE, BIRTHWT >2499G WASPIRATION SYNDROME
636	M	15	NEONATE, BIRTHWT >2499GW CONGENITAL/PERINATAL INFECTIONS
637	M	15	NEONATE,BWT>2499G NOT BORN HERE, PDX OTHER SIGNIF CONDITION
638	M	15	NEONATE, BIRTHWT>2499G, NOT BORN HERE, PDX OTHER PROBLEM
639	M	15	NEONATE, BIRTHWT>2499G, BORN HERE, WOTHER SIGNIF CONDITION
640	M	15	NEONATE,BWT >2499G,BORN HERE, NORMAL NB & NB W OTHER PROB
650	P	16	SPLENECTOMY
651	P	16	OTHER PROCEDURES OF BLOOD & BLOOD FORMING ORGANS
660	M	16	AGRANULOCYTOSIS & OTHER NEUTROPENIA
661	M	16	COAGULATION DISORDERS
662	M	16	SICKLE CELL ANEMIA CRISIS
663	M	16	RED BLOOD CELL DISORDERS EXCEPT SICKLE CELL ANEMIA CRISIS
664	M	16	OTHER DISORDERS OF BLOOD & BLOOD FORMING ORGANS
680	P	17	LYMPHOMA&LEUKEMIAWMAJORPROCEDURE
681	P	17	LYMPHOMA & LEUKEMIA W ANY OTHER PROCEDURE
682	P	17	MYELOPROLIF DISORDER & POORLY DIFF NEOPL W MAJOR PROCEDURE
683	P	17	MYELOPROLIF DISORDER & POORLY DIFF NEOPL W ANY OTHER PROCEDURE
690	M	17	ACUTE LEUKEMIA
691	M	17	LYMPHOMA& NON-ACUTE LEUKEMIA
692	M	17	RADIOTHERAPY
693	M	17	CHEMOTHERAPY
694	M	17	OTHER MYELOPROLIF DISORDERS & POORLY DIFF NEOPLASM DIAGNOSIS
710	P	18	PROCEDURES FOR INFECTIOUS & PARASITIC DISEASES
711	P	18	PROCEDURES FOR POSTOPERATIVE & POST TRAUMATIC INFECTIONS
720	M	18	SEPTICEMIA

721	M	18	POSTOPERATIVE & POST-TRAUMATIC INFECTIONS
722	M	18	FEVEROFUNKNOWNORIGIN
723	M	18	VIRAL ILLNESS
724	M	18	OTHER INFECTIOUS & PARASITIC DISEASES
740	P	19	PROCEDURE W PRINCIPAL DIAGNOSES OF MENTAL ILLNESS
750	M	19	SCHIZOPHRENIA
751	M	19	PSYCHOSES
752	M	19	DISORDERS OF PERSONALITY & IMPULSE CONTROL
753	M	19	BIPOLAR DISORDERS
754	M	19	DEPRESSION
755	M	19	NEUROSESEXCEPTDEPRESSIVE
756	M	19	ACUTE ADJUST REACT & DISTURBANCE OF PSYCHOSOCIAL DYSFUNCTION
757	M	19	ORGANIC DISTURBANCES & MENTAL RETARDATION
758	M	19	CHILDHOOD MENTAL DISORDERS
759	M	19	COMPULSIVE NUTRITION DISORDERS
760	M	19	OTHERMENTALDISORDERS
770	M	20	DRUG & ALCOHOL ABUSE OR DEPENDENCE, LEFT AGAINST MEDICAL ADVICE
771	M	20	ALCOHOL & DRUG DEPENDENCE W COMBINED REHAB & DETOX THERAPY
772	M	20	ALCOHOL & DRUG DEPENDENCE W REHABILITATION THERAPY
773	M	20	OPIOID ABUSE & DEPENDENCE
774	M	20	COCAINEABUSE&DEPENDENCE
775	M	20	ALCOHOL ABUSE & DEPENDENCE
776	M	20	OTHERDRUGABUSE&DEPENDENCE
790	P	21	SKIN GRAFT & WOUND DEBRIDEMENT FOR INJURIES
791	P	21	PROCEDURES FOR COMPLICATIONS OF TREATMENT
792	P	21	OTHER PROCEDURES FOR INJURIES
810	M	21	INJURIES TO UNSPECIFIED OR MULTIPLE SITES
811	M	21	ALLERGIC REACTIONS
812	M	21	POISONING & TOXIC EFFECTS OF DRUGS
813	M	21	COMPLICATIONSOFTREATMENT
814	M	21	CHILDORADULTMALTREATMENTSYNDROME
815	M	21	OTHER INJURY, POISONING & TOXIC EFFECT DIAGNOSES
830	M	22	BURNS, TRANSFERRED TO ANOTHER ACUTE CARE FACILITY
831	P	22	EXTENSIVE BURNS W PROCEDURE
832	P	22	NON EXTENSIVE BURNS W SKIN GRAFT
833	P	22	NONEXTENSIVE BURNS W WOUND DEBRIDEMENT & OTHER PROCEDURES
840	M	22	BURNS W/O PROCEDURE
850	P	23	PROCEDURE W DIAGNOSES OF OTHER CONTACT W HEALTH SERVICES
860	M	23	REHABILITATION
861	M	23	SIGNS & SYMPTOMS
862	M	23	OTHER FACTORS INFLUENCING HEALTH STATUS
870	P	24	TRACHEOSTOMY FOR HIV INFECTIONS
871	P	24	HIV W PROC W MULTIPLE MAJOR HIV RELATED INFECTIONS
872	P	24	HIV W PROCEDURE W MAJOR HIV RELATED DIAGNOSIS
873	P	24	HIV W PROCEDURE W/O MAJOR HIV RELATED DIAGNOSIS
890	M	24	HIV W MULTIPLE MAJOR HIV RELATED INFECTIONS
891	M	24	HIV W MAJ HIV REL DIAG W MULT MAJ OR SIGNIF HIV REL DIAG
892	M	24	HIV W MAJ HIV REL DIAG W/O MULT MAJ OR SIGNIF HIV REL DIAG
893	M	24	HIV W SIGNIFICANT HIV RELATED DIAGNOSIS
894	M	24	HIV W/O MAJOR OR SIGNIFICANT HIV RELATED DIAGNOSIS

910	P	25	CRANIOTOMY,SPINE,HIP & MAJOR LIMB PROC FOR MULTIPLE SIG TRAUMA
911	P	25	OTHER PROCEDURES FOR MULTIPLE SIGNIFICANT TRAUMA
930	M	25	HEAD, CHEST & LOWER LIMB DIAGNOSES OF MULTIPLE SIGNIFICANT TRAUMA
931	M	25	OTHER DIAGNOSES OF MULTIPLE SIGNIFICANT TRAUMA
950	P		EXTENSIVE PROCEDURE UNRELATED TO PRINCIPAL DIAGNOSIS
951	P		PROSTATIC PROCEDURE UNRELATED TO PRINCIPAL DIAGNOSIS
952	P		NONEXTENSIVE PROCEDURE UNRELATED TO PRINCIPAL DIAGNOSIS
955	M		PRINCIPAL DIAGNOSIS INVALID AS DISCHARGE DIAGNOSIS
956	M		UNGROUPABLE

Table A.3. Major Diagnostic Classification (MDC) Categories

MDC	Description
1	DISEASES & DISORDERS OF THE NERVOUS SYSTEM
2	DISEASES & DISORDERS OF THE EYE
3	DISEASES & DISORDERS OF THE EAR, NOSE, MOUTH & THROAT
4	DISEASES & DISORDERS OF THE RESPIRATORY SYSTEM
5	DISEASES & DISORDERS OF THE CIRCULATORY SYSTEM
6	DISEASES & DISORDERS OF THE DIGESTIVE SYSTEM
7	DISEASES & DISORDERS OF THE HEPATOBILIARY SYSTEM & PANCREAS
8	DISEASES & DISORDERS OF THE MUSCULOSKELETAL SYSTEM & CONN TISSUE
9	DISEASES & DISORDERS OF THE SKIN, SUBCUTANEOUS TISSUE & BREAST
10	ENDOCRINE, NUTRITIONAL & METABOLIC DISEASES & DISORDERS
11	DISEASES & DISORDERS OF THE KIDNEY & URINARY TRACT
12	DISEASES & DISORDERS OF THE MALE REPRODUCTIVE SYSTEM
13	DISEASES & DISORDERS OF THE FEMALE REPRODUCTIVE SYSTEM
14	PREGNANCY, CHILDBIRTH & THE PUERPERIUM
15	NEWBORNS & OTHER NEONATES WITH CONDTN ORIG IN PERINATAL PERIOD
16	DISEASES & DISORDERS OF BLOOD, BLOOD FORMING ORGANS, IMMUNOLOG DISORD
17	MYELOPROLIFERATIVE DISEASES & DISORDERS, POORLY DIFFERENTIATED NEOPLASM
18	INFECTIOUS & PARASITIC DISEASES, SYSTEMIC OR UNSPECIFIED SITES
19	MENTAL DISEASES & DISORDERS
20	ALCOHOL/DRUG USE & ALCOHOL/DRUG INDUCED ORGANIC MENTAL DISORDERS
21	INJURIES, POISONINGS & TOXIC EFFECTS OF DRUGS
22	BURNS
23	FACTORS INFLUENCING HLTH STAT & OTHR CONTACTS WITH HLTH SERVCS
24	MULTIPLE SIGNIFICANT TRAUMA
25	HUMAN IMMUNODEFICIENCY VIRUS INFECTIONS

Table A.4. Transfer, Procedure Days, UB-04 Categories

Category	Description	Definition
TRNSFER	Transfer-in	If admission type (ATYPE) not equal to ‘4’ (newborn) and - admission source (ASOURCE) equal to ‘2’ (Another Hospital) or - point of origin (POINTOFORIGINUB04) equal to '4' (Transfer from a Hospital)
NOPOUB04	UB-04 Point-of-Origin Data Not Available	If admission source (ASOURCE) is not equal to missing and point of origin (POINTOFORIGINUB04) is equal to missing
NOPRDAY	Procedure Days Data Not Available	If PRDAY1 and PRDAY2 and . . . PRDAYn is equal to missing, where n is the number of Procedure Codes reported the user’s data.

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 #:** 0366 **NQF Project:** Surgery Endorsement Maintenance 2010
MEASURE DESCRIPTIVE INFORMATION
De.1 **Measure Title:** Pancreatic Resection Volume (IQI 2)
De.2 **Brief description of measure:** Number of discharges with procedure for pancreatic resection.
1.1-2 **Type of Measure:** Structure/management De.3 **If included in a composite or paired with another measure, please identify composite or paired measure** Pancreatic Resection Mortality (IQI 9) NQF #0365
De.4 **National Priority Partners Priority Area:** Population health, 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**
A. The measure is in the public domain or an intellectual property (measure steward agreement) is signed. *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.* 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 A.2 **Indicate if Proprietary Measure** (*as defined in measure steward agreement*)**:** A.3 **Measure Steward Agreement:** Government entity and in the public domain - no agreement necessary A.4 **Measure Steward Agreement attached:**	**A** Y☐ N☐
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	**B** Y☐ N☐

C. The intended use of the measure includes both public reporting and quality improvement. ►**Purpose:** Public reporting, Internal quality improvement	**C** Y☐ N☐
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	**D** Y☐ N☐
(for NQF staff use) **Have all conditions for consideration been met?** **Staff Notes to Steward** (*if submission returned*)**:**	**Met** Y☐ N☐
Staff Notes to Reviewers (*issues or questions regarding any criteria*)**:**	
Staff Reviewer Name(s):	

TAP/Workgroup Reviewer Name:	
Steering Committee Reviewer Name:	
1. IMPORTANCE TO MEASURE AND REPORT	
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**	**Eval Rating**
(for NQF staff use) **Specific NPP goal**:	
1a.1 **Demonstrated High Impact Aspect of Healthcare:** Severity of illness, Patient/societal consequences of poor quality 1a.2 1a.3 **Summary of Evidence of High Impact:** Higher volumes have been repeatedly associated with better outcomes after pancreatic surgery, although these findings may be limited by inadequate risk adjustment of the outcome measure. One study used clinical data to estimate the association between hospital volume and mortality following pancreatic cancer surgery. Begg et al. analyzed retrospective data from the Surveillance, Epidemiology, and End Results (SEER)-Medicare linked database from 1984 through 1993. [1] The crude 30-day mortality rate was 12.9% at hospitals performing 1-5 pancreatic resections during the study period, versus 7.7% and 5.8% at hospitals performing 610 and 11 or more procedures, respectively. The association between volume and mortality remained highly significant (p<.001) in a multivariate model, adjusting for comorbidities, cancer stage and volume, and age. Lieberman et al. used 1984-91 hospital discharge data from New York State to analyze the association between mortality after pancreatic cancer resection and hospital volumes. [2] Adjusting for the year of surgery, age, sex, race, payer source, transfer status, and the total number of secondary diagnoses, the standardized mortality rate was 19% at minimal-volume hospitals (fewer than 10 patients during the study period); 12% at low-volume hospitals (10-50 patients); 13% at medium-volume hospitals (51-80 patients); and 6% at high-volume hospitals (more than 80 patients). Studies using data from Ontario and Medicare data have generated similar results. [3] [4] Empirical evidence shows that pancreatic resection volume—after adjusting for age, sex, and APR-DRG—is	**1a** C☐ P☐ M☐ N☐

independently and negatively correlated with mortality for pancreatic resection (r=-.41, p<.001). [5]

Empirical evidence shows that a low percentage of procedures were performed at high-volume hospitals. At threshold 1, 30.3% of pancreatic resection procedures were performed at high-volume providers (and 5.1% of providers are high volume). [6] At threshold 2, 27.0% were performed at high-volume providers (and 4.2% of providers are high volume). [6] [7]

1a.4 Citations for Evidence of High Impact: Updated citations will be presented in the May Steering Committee meeting

[1] Begg CB, Cramer LD, Hoskins WJ, et al. Impact of hospital volume on operative mortality for major cancer surgery. JAMA 1998;280(20):1747-51.
[2] Lieberman MD, Kilburn H, Lindsey M, et al. Relation of perioperative deaths to hospital volume among patients undergoing pancreatic resection for malignancy. Ann Surg 1995;222(5):638-45.
[3] Simunovic M, To T, Theriault M, et al. Relation between hospital surgical volume and outcome for pancreatic resection for neoplasm in a publicly funded health care system [see comments]. Cmaj 1999;160(5):643-8.
[4] Birkmeyer JD, Finlayson SR, Tosteson AN, et al. Effect of hospital volume on in-hospital mortality with pancreaticoduodenectomy. Surgery 1999;125(3):250-6.
[5] Nationwide Inpatient Sample.
[6] Glasgow RE, Mulvihill SJ. Hospital volume influences outcome in patients undergoing pancreatic resection for cancer. West J Med 1996;165(5):294-300.
[7] Nationwide Inpatient Sample and State Inpatient Databases. Healthcare Cost and Utilization Project. Agency for Healthcare Research and Quality, Rockville, MD. http://www.ahrq.gov/data/hcup

1b. Opportunity for Improvement

1b.1 Benefits (improvements in quality) envisioned by use of this measure: Pancreatic resection is a rare procedure that requires technical proficiency; and errors in surgical technique or management may lead to clinically significant complications, such as sepsis, anastomotic breakdown, and death. Higher volumes have been associated with better outcomes, which represent better quality.

1b.2 Summary of data demonstrating performance gap (variation or overall poor performance) across providers:
Comparative Data for the IQI based on the 2008 Nationwide Inpatient Sample (NIS):

	Sex
1,109	Males
1,117	Females
	Age
134	18 to 39
960	40 to 64
673	65 to 74
459	75+
1,049	Medicare
129	Medicaid
1,034	Other

1b.3 Citations for data on performance gap:
See the following report for a complete treatment of the methodology: "Methods: Applying AHRQ Quality Indicators to Healthcare Cost and Utilization Project (HCUP) Data for the National Healthcare Quality Report" [URL: http://hcupnet.ahrq.gov/QI%20Methods.pdf?JS=Y]

1b.4 Summary of Data on disparities by population group:
Comparative Data for the IQI based on the 2008 Nationwide Inpatient Sample (NIS)

Sex

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1,109 Males
1,117 Females

Age
134 18 to 39
960 40 to 64
673 65 to 74
459 75+

1,049 Medicare
129 Medicaid
1,034 Other

1b.5 Citations for data on Disparities:
See the following report for a complete treatment of the methodology: "Methods: Applying AHRQ Quality Indicators to Healthcare Cost and Utilization Project (HCUP) Data for the National Healthcare Quality Report" [URL: http://hcupnet.ahrq.gov/QI%20Methods.pdf?JS=Y]

1c. Outcome or Evidence to Support Measure Focus

1c.1 Relationship to Outcomes (*For non-outcome measures, briefly describe the relationship to desired outcome. For outcomes, describe why it is relevant to the target population*)**:** Pancreatic resection is a rare procedure that requires technical proficiency; and errors in surgical technique or management may lead to clinically significant complications, such as sepsis, anastomotic breakdown, and death. Higher volumes have been associated with better outcomes, which represent better quality.

1c.2-3. Type of Evidence: Expert opinion, Systematic synthesis of research

1c.4 Summary of Evidence (*as described in the criteria; for outcomes, summarize any evidence that healthcare services/care processes influence the outcome*)**:**
Higher volumes have been repeatedly associated with better outcomes after pancreatic surgery, although these findings may be limited by inadequate risk adjustment of the outcome measure.
One study used clinical data to estimate the association between hospital volume and mortality following pancreatic cancer surgery. Begg et al. analyzed retrospective data from the Surveillance, Epidemiology, and End Results (SEER)-Medicare linked database from 1984 through 1993. [1] The crude 30-day mortality rate was 12.9% at hospitals performing 1-5 pancreatic resections during the study period, versus 7.7% and 5.8% at hospitals performing 610 and 11 or more procedures, respectively. The association between volume and mortality remained highly significant (p<.001) in a multivariate model, adjusting for comorbidities, cancer stage and volume, and age.
Lieberman et al. used 1984-91 hospital discharge data from New York State to analyze the association between mortality after pancreatic cancer resection and hospital volumes. [2] Adjusting for the year of surgery, age, sex, race, payer source, transfer status, and the total number of secondary diagnoses, the standardized mortality rate was 19% at minimal-volume hospitals (fewer than 10 patients during the study period); 12% at low-volume hospitals (10-50 patients); 13% at medium-volume hospitals (51-80 patients); and 6% at high-volume hospitals (more than 80 patients). Studies using data from Ontario and Medicare data have generated similar results. [3] [4]

Empirical evidence shows that pancreatic resection volume—after adjusting for age, sex, and APR-DRG—is independently and negatively correlated with mortality for pancreatic resection (r=-.41, p<.001). [5]

Empirical evidence shows that a low percentage of procedures were performed at high-volume hospitals. At threshold 1, 30.3% of pancreatic resection procedures were performed at high-volume providers (and 5.1% of providers are high volume). [6] At threshold 2, 27.0% were performed at high-volume providers (and 4.2% of providers are high volume). [6] [7]

[1] Begg CB, Cramer LD, Hoskins WJ, et al. Impact of hospital volume on operative mortality for major cancer surgery. JAMA 1998;280(20):1747-51.
[2] Lieberman MD, Kilburn H, Lindsey M, et al. Relation of perioperative deaths to hospital volume among

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patients undergoing pancreatic resection for malignancy. Ann Surg 1995;222(5):638-45.
[3] Simunovic M, To T, Theriault M, et al. Relation between hospital surgical volume and outcome for pancreatic resection for neoplasm in a publicly funded health care system [see comments]. Cmaj 1999;160(5):643-8.
[4] Birkmeyer JD, Finlayson SR, Tosteson AN, et al. Effect of hospital volume on in-hospital mortality with pancreaticoduodenectomy. Surgery 1999;125(3):250-6.
[5] Nationwide Inpatient Sample.
[6] Glasgow RE, Mulvihill SJ. Hospital volume influences outcome in patients undergoing pancreatic resection for cancer. West J Med 1996;165(5):294-300.
[7] Nationwide Inpatient Sample and State Inpatient Databases. Healthcare Cost and Utilization Project. Agency for Healthcare Research and Quality, Rockville, MD. http://www.ahrq.gov/data/hcup

1c.5 Rating of strength/quality of evidence (*also provide narrative description of the rating and by whom***):**
Not Applicable. Testing, rating, and review were conducted by the project team. A full report on the literature review and empirical evaluation can be found in Refinement of the HCUP Quality Indicators by the UCSF-Stanford EPC, Detailed coding information for each QI is provided in the document Prevention Quality Indicators Technical Specifications. Rating of performance on empirical evaluations, ranged from 0 to 26. The scores were intended as a guide for summarizing the performance of each indicator on four empirical tests of precision (signal variance, area-level share, signal ratio, and R-squared) and five tests of minimum bias (rank correlation, top and bottom decile movement, absolute change, and change over two deciles), as described in the previous section.

1c.6 Method for rating evidence: The project team conducted extensive empirical testing of all potential indicators using the 1995-97 HCUP State Inpatient Databases (SID) and Nationwide Inpatient Sample (NIS) to determine precision, bias, and construct validity. The 1997 SID contains uniform data on inpatient stays in community hospitals for 22 States covering approximately 60% of all U.S. hospital discharges. The NIS is designed to approximate a 20% of U.S. community hospitals and includes all stays in the sampled hospitals. Each year of the NIS contains between 6 million and 7 million records from about 1,000 hospitals. The NIS combines a subset of the SID data, hospital-level variables, and hospital and discharge weights for producing national estimates. The project team conducted tests to examine three things: precision, bias, and construct validity.
Precision. The first step in the analysis involved precision tests to determine the reliability of the indicator for distinguishing real differences in provider performance. For indicators that may be used for quality improvement, it is important to know with what precision, or surety, a measure can be attributed to an actual construct rather than random variation.
For each indicator, the variance can be broken down into three components: variation within a provider (actual differences in performance due to differing patient characteristics), variation among providers (actual differences in performance among providers), and random variation. An ideal indicator would have a substantial amount of the variance explained by between-provider variance, possibly resulting from differences in quality of care, and a minimum amount of random variation. The project team performed four tests of precision to estimate the magnitude of between-provider variance on each indicator:
• Signal standard deviation was used to measure the extent to which performance of the QI varies systematically across hospitals or areas.
• Provider/area variation share was used to calculate the percentage of signal (or true) variance relative to the total variance of the QI.
• Signal-to-noise ratio was used to measure the percentage of the apparent variation in QIs across providers that is truly related to systematic differences across providers and not random variations (noise) from year to year.
• In-sample R-squared was used to identify the incremental benefit of applying multivariate signal extraction methods for identifying additional signal on top of the signal-to-noise ratio.
In general, random variation is most problematic when there are relatively few observations per provider, when adverse outcome rates are relatively low, and when providers have little control over patient outcomes or variation in important processes of care is minimal. If a large number of patient factors that are difficult to observe influence whether or not a patient has an adverse outcome, it may be difficult to separate the "quality signal" from the surrounding noise. Two signal extraction techniques were applied to improve the precision of an indicator:
• Univariate methods were used to estimate the "true" quality signal of an indicator based on information from the specific indicator and 1 year of data.

• Multivariate signal extraction (MSX) methods were used to estimate the "true" quality signal based on information from a set of indicators and multiple years of data. In most cases, MSX methods extracted additional signal, which provided much more precise estimates of true hospital or area quality. Bias. To determine the sensitivity of potential QIs to bias from differences in patient severity, unadjusted performance measures for specific hospitals were compared with performance measures that had been adjusted for age and gender. All of the PQIs and some of the Inpatient Quality Indicators (IQIs) could only be risk-adjusted for age and sex. The 3M™ APR-DRG System Version 12 with Severity of Illness and Risk of Mortality subclasses was used for risk adjustment of the utilization indicators and the in-hospital mortality indicators, respectively. Five empirical tests were performed to investigate the degree of bias in an indicator: • Rank correlation coefficient of the area or hospital with (and without) risk adjustment—gives the overall impact of risk adjustment on relative provider or area performance. • Average absolute value of change relative to mean—highlights the amount of absolute change in performance, without reference to other providers' performance. • Percentage of highly ranked hospitals that remain in high decile—reports the percentage of hospitals or areas that are in the highest deciles without risk adjustment that remain there after risk adjustment is performed. • Percentage of lowly ranked hospitals that remain in low decile—reports the percentage of hospitals or areas that are in the lowest deciles without risk adjustment that remain there after risk adjustment is performed. • Percentage that change more than two deciles—identifies the percentage of hospitals whose relative rank changes by a substantial percentage (more than 20%) with and without risk adjustment. Construct validity. Construct validity analyses provided information regarding the relatedness or independence of the indicators. If quality indicators do indeed measure quality, then two measures of the same construct would be expected to yield similar results. The team used factor analysis to reveal underlying patterns among large numbers of variables—in this case, to measure the degree of relatedness between indicators. In addition, they analyzed correlation matrices for indicators. **1c.7 Summary of Controversy/Contradictory Evidence:** See the following for a complete treatment of the topic: http://www.qualityindicators.ahrq.gov/downloads/iqi/iqi_guide_v31.pdf Note: The Literature Review Caveats column summarizes evidence specific to each potential concern on the link between the PQIs and quality of care, as described in step 3 above. A question mark (?) indicates that the concern is theoretical or suggested, but no specific evidence was found in the literature. A check mark indicates that the concern has been demonstrated in the literature. **1c.8 Citations for Evidence (*other than guidelines*):** Updated citations will be presented in the May Steering Committee meeting http://www.qualityindicators.ahrq.gov/downloads/iqi/iqi_guide_v31.pdf **1c.9 Quote the Specific guideline recommendation (*including guideline number and/or page number*):** Not Applicable. **1c.10 Clinical Practice Guideline Citation:** Not Applicable. **1c.11 National Guideline Clearinghouse or other URL:** Not Applicable. **1c.12 Rating of strength of recommendation (*also provide narrative description of the rating and by whom*):** Not Applicable. **1c.13 Method for rating strength of recommendation** (*If different from USPSTF system, also describe rating and how it relates to USPSTF)*: Not Applicable. **1c.14 Rationale for using this guideline over others:** Not Applicable.	
TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Importance to Measure and Report?*	**1**
Steering Committee: Was the threshold criterion, *Importance to Measure and Report*, met?	**1**

Rationale:	**Y☐ N☐**
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. (evaluation criteria)	**Eval Rating**
2a. MEASURE SPECIFICATIONS	
S.1 Do you have a web page where current detailed measure specifications can be obtained? **S.2 If yes, provide web page URL:** **2a. Precisely Specified**	
2a.1 Numerator Statement (*Brief, text description of the numerator - what is being measured about the target population, e.g. target condition, event, or outcome*)**:** Discharges, age 18 years and older, with ICD-9-CM codes for pancreatic resection procedure. **2a.2 Numerator Time Window** (*The time period in which cases are eligible for inclusion in the numerator*)**:** Time window can be determined by user, but is generally a calendar year. **2a.3 Numerator Details** (*All information required to collect/calculate the numerator, including all codes, logic, and definitions*)**:** Discharges, age 18 years and older, with ICD-9-CM codes for pancreatic resection procedure. ICD-9-CM pancreatic resection procedure codes: 526 TOTAL PANCREATECTOMY 527 RAD PANCREATICODUODENECT Exclude cases: • MDC 14 (pregnancy, childbirth, and puerperium)	
2a.4 Denominator Statement (*Brief, text description of the denominator - target population being measured*)**:** not applicable **2a.5 Target population gender:** Female, Male **2a.6 Target population age range:** 18 and older **2a.7 Denominator Time Window** (*The time period in which cases are eligible for inclusion in the denominator*)**:** Not applicable **2a.8 Denominator Details** (*All information required to collect/calculate the denominator - the target population being measured - including all codes, logic, and definitions*)**:** Not applicable	
2a.9 Denominator Exclusions (*Brief text description of exclusions from the target population*)**:** Not applicable **2a.10 Denominator Exclusion Details** (*All information required to collect exclusions to the denominator, including all codes, logic, and definitions*)**:** Not applicable	**2a-specs C☐ P☐ M☐ N☐**
2a.11 Stratification Details/Variables (*All information required to stratify the measure including the stratification variables, all codes, logic, and definitions*)**:** Not applicable	

2a.12-13 Risk Adjustment Type: No risk adjustment necessary

2a.14 Risk Adjustment Methodology/Variables (*List risk adjustment variables and describe conceptual models, statistical models, or other aspects of model or method***):**
Not applicable

2a.15-17 Detailed risk model available Web page URL or attachment:

2a.18-19 Type of Score: Count
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***):**
The volume is the number of discharges with a procedure for pancreatic resection.

2a.22 Describe the method for discriminating performance *(e.g., significance testing)***:**
Performance discrimination is based on pre-defined thresholds derived from the literature. Threshold 1: 10 or more procedures per year Threshold 2: 11 or more procedures per year

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)*:
Not applicable

2a.24 Data Source (*Check the source(s) for which the measure is specified and tested)*
Electronic administrative data/claims

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.***):**
Hospital administrative discharge data. See data requirements in the AHRQ QI Windows Application Documentation: http://www.qualityindicators.ahrq.gov/software.htm

2a.26-28 Data source/data collection instrument reference web page URL or attachment: URL
http://www.qualityindicators.ahrq.gov/software.htm

2a.29-31 Data dictionary/code table web page URL or attachment: URL
http://www.qualityindicators.ahrq.gov/downloads/winqi/AHRQ_QI_Windows_Software_Documentation_V41a.pdf

2a.32-35 Level of Measurement/Analysis (*Check the level(s) for which the measure is specified and tested)*
Facility/Agency

2a.36-37 Care Settings (*Check the setting(s) for which the measure is specified and tested)*
Hospital

2a.38-41 Clinical Services (*Healthcare services being measured, check all that apply*)
Clinicians: Physicians (MD/DO)

TESTING/ANALYSIS

2b. Reliability testing

2b.1 Data/sample *(description of data/sample and size)***:** AHRQ 2007 State Inpatient Databases (SID) with 4,000 hospitals and 30 million adult discharges

2b.2 Analytic Method *(type of reliability & rationale, method for testing)***:**
Expert panels and empirical analysis

2b.3 Testing Results *(reliability statistics, assessment of adequacy in the context of norms for the test conducted)***:**
Esophageal resection is measured accurately with discharge data. Most facilities perform 10 or fewer esophagectomies for cancer during a 5 year
period

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2c. Validity testing

2c.1 Data/sample *(description of data/sample and size)*: AHRQ 2007 State Inpatient Databases (SID) with 4,000 hospitals and 30 million adult discharges

2c.2 Analytic Method *(type of validity & rationale, method for testing)*:
Expert panels and empirical analysis

2c.3 Testing Results *(statistical results, assessment of adequacy in the context of norms for the test conducted)*:
Higher volumes have been repeatedly associated with better outcomes after esophageal surgery, although these findings may be limited by inadequate risk adjustment of the outcome measure.

Only one study used clinical data to estimate the association between hospital volume and mortality following esophageal cancer surgery. Begg et al. analyzed retrospective data from the Surveillance, Epidemiology, and End Results (SEER)-Medicare linked database from 1984 through 1993.22 The crude 30-day mortality rate was 17.3% at hospitals that performed 1-5 esophagectomies on Medicare patients during the study period, versus 3.9% and 3.4% at hospitals that performed 6-10 and 11 or more esophagectomies, respectively. The association between volume and mortality remained highly significant (p<.001) in a multivariate model, adjusting for the number of comorbidities, cancer stage and volume, and age.
Studies based on California and Maryland data found that the risk-adjusted mortality rates at low-volume hospitals were around 3.0 times those at high-volume hospitals.23 24 Empirical evidence shows that esophageal resection volume—after adjusting for age, sex, and APR-DRG—is moderately and negatively correlated with mortality for esophageal resection (r=-.29, p<.05), as well as mortality after other cancer resection procedures.25

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2d. Exclusions Justified

2d.1 Summary of Evidence supporting exclusion(s):
Not applicable

2d.2 Citations for Evidence:
Not applicable

2d.3 Data/sample *(description of data/sample and size)*: Not applicable

2d.4 Analytic Method *(type analysis & rationale)*:
Not applicable

2d.5 Testing Results *(e.g., frequency, variability, sensitivity analyses)*:
Not applicable

2d C☐ P☐ M☐ N☐ NA☐

2e. Risk Adjustment for Outcomes/ Resource Use Measures

2e.1 Data/sample *(description of data/sample and size)*: Not applicable

2e.2 Analytic Method *(type of risk adjustment, analysis, & rationale)*:
Not applicable

2e.3 Testing Results *(risk model performance metrics)*:
Not applicable

2e.4 If outcome or resource use measure is not risk adjusted, provide rationale: Not applicable

2e C☐ P☐ M☐ N☐ NA☐

2f. Identification of Meaningful Differences in Performance

2f.1 Data/sample from Testing or Current Use *(description of data/sample and size)*: AHRQ 2007 State Inpatient Databases (SID) with 4,000 hospitals and 30 million adult discharges

2f.2 Methods to identify statistically significant and practically/meaningfully differences in performance

2f C☐ P☐ M☐ N☐

(type of analysis & rationale): Emprical analysis **2f.3 Provide Measure Scores from Testing or Current Use** *(description of scores, e.g., distribution by quartile, mean, median, SD, etc.; identification of statistically significant and meaningfully differences in performance)*: Hospitals Q1 Q2 Q3 Q4 857 1.1 1.8 3.1 12.7	
2g. Comparability of Multiple Data Sources/Methods **2g.1 Data/sample** *(description of data/sample and size)*: Not applicable **2g.2 Analytic Method** *(type of analysis & rationale)*: Not applicable **2g.3 Testing Results** *(e.g., correlation statistics, comparison of rankings)*: Not applicable	**2g** C☐ P☐ M☐ N☐ NA ☐
2h. Disparities in Care **2h.1 If measure is stratified, provide stratified results** *(scores by stratified categories/cohorts)*: Not applicable **2h.2 If disparities have been reported/identified, but measure is not specified to detect disparities, provide follow-up plans:** Not applicable	**2h** C☐ P☐ M☐ N☐ NA ☐
TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Scientific Acceptability of Measure Properties?*	**2**
Steering Committee: Overall, to what extent was the criterion, *Scientific Acceptability of Measure Properties*, met? **Rationale:**	***2*** **C** ☐ **P** ☐ **M** ☐ **N** ☐
3. USABILITY	
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)	**Eval Rating**
3a. Meaningful, Understandable, and Useful Information **3a.1 Current Use:** In use **3a.2 Use in a public reporting initiative (disclosure of performance results to the public at large)** *(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)*: California (state) Hospital Inpatient Mortality Indicators for California http://www.oshpd.ca.gov/HID/Products/PatDischargeData/AHRQ/iqi-imi_overview.html Illinois (state hospital association) Illinois Hospitals Caring for You www.illinoishospitals.org Kentucky (Norton Healthcare, a hospital system)	**3a** C☐ P☐ M☐ N☐

Norton Healthcare Quality Report
http://www.nortonhealthcare.com/body.cfm?id=157

New Jersey (state)
Find and Compare Quality Care in NJ Hospitals
http://www.nj.gov/health/healthcarequality/

New York (health care coalition)
New York State Hospital Report Card
http://www.myhealthfinder.com/

Texas (state)
Reports on Hospital Performance
http://www.dshs.state.tx.us/thcic/

Vermont (state)
Dept of Banking, Insurance, Securities & Health Care Administration Comparison Report

http://www.bishca.state.vt.us/health-care/hospitals-health-care-practitioners/2009-vermont-hospital-report-card

Washington (health care coalition)
Washington State Hospital Report Card
http://www.myhealthfinder.com/wa09/index.php

The measure is also reported on HCUPnet:
http://hcupnet.ahrq.gov/HCUPnet.jsp?Id=EB57801381F71C41&Form=MAINSEL&JS=Y&Action=%3E%3ENext%3E%3E&_MAINSEL=AHRQ%20Quality%20Indicators

This measure is used in the MONAHRQ system that is provided for public reporting and quality improvement throughout the United States: http://monahrq.ahrq.gov/

3a.3 **If used in other programs/initiatives (***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***):**
University Healthcare Consortium - An alliance of 103 academic medical centers and 219 of their affiliated hospitals. Reporting the AHRQ QIs to their member hospitals. (see www.uhc.edu. Note: measure results reported to hospitals; not reported on site).

Dallas Fort Worth Hospital Council – Reporting on measure results to over 70 hospitals in Texas (see www.dfwhc.ord. Note: measure results reported to hospitals; not reported on site).

Norton Healthcare - a multi-hospital system in Kentucky (see http://www.nortonhealthcare.com/about/Our_Performance/index.aspx)
Ministry Health Care - a multi-hospital system in Wisconsin (see http://ministryhealth.org/display/router.aspx. Note: measure results reported to hospitals; not reported on site).

Minnesota Hospital Association
http://www.mnhospitals.org/ Note: measure used in quality improvement. Not reported publicly by the association).

This measure is used in the MONAHRQ system that is provided for public reporting and quality improvement throughout the United States: http://monahrq.ahrq.gov/

Testing of Interpretability (*Testing that demonstrates the results are understood by the potential users for public reporting and quality improvement*)
3a.4 **Data/sample** *(description of data/sample and size)***:** AHRQ 2007 State Inpatient Databases (SID) with

4,000 hospitals and 30 million adult discharges **3a.5 Methods** *(e.g., focus group, survey, QI project)*: A research team from the School of Public Affairs, Baruch College, under contracts with the Department of Public Health, Weill Medical College and Battelle, Inc., has developed a pair of Hospital Quality Model Reports at the request of the Agency for Healthcare Research & Quality (AHRQ). These reports are designed specifically to report comparative information on hospital performance based on the AHRQ Quality Indicators (QIs). The work was done in close collaboration with AHRQ staff and the AHRQ Quality Indicators team. The Model Reports (discussed immediately above) are based on: • Extensive search and analysis of the literature on hospital quality measurement and reporting, as well as public reporting on health care quality more broadly; • Interviews with quality measurement and reporting experts, purchasers, staff of purchasing coalitions, and executives of integrated health care delivery systems who are responsible for quality in their facilities; • Two focus groups with chief medical officers of hospitals and/or systems and two focus groups with quality managers from a broad mix of hospitals; • Four focus groups with members of the public who had recently experienced a hospital admission; and • Four rounds of cognitive interviews (a total of 62 interviews) to test draft versions of the two Model Reports with members of the public with recent hospital experience, basic computer literacy but widely varying levels of education. **3a.6 Results** *(qualitative and/or quantitative results and conclusions)*: Given the above review of the literature and original research that was conducted, a Model report was the result that could help sponsors use the best evidence on public reports so they are most likely to have the desired effects on quality.	
3b/3c. Relation to other NQF-endorsed measures **3b.1 NQF # and Title of similar or related measures:** Leapfrog survival predictor	
(for NQF staff use) **Notes on similar/related endorsed or submitted measures:**	
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 or different topic but same target population): **3b.2 Are the measure specifications harmonized? If not, why?** Other measure is based on the AHRQ QI specification, but volume not reported separately	**3b** C☐ P☐ M☐ N☐ NA ☐
3c. Distinctive or Additive Value **3c.1 Describe the distinctive, improved, or additive value this measure provides to existing NQF-endorsed measures:** AHRQ QI reports separate volume and mortality, which is risk-adjusted **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:** The AHRQ QI is associated with a risk-adjusted mortality measure	**3c** C☐ P☐ M☐ N☐ NA ☐
TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Usability?*	**3**
Steering Committee: Overall, to what extent was the criterion, *Usability*, met? **Rationale:**	**3** C☐ P☐ M☐ N☐
4. FEASIBILITY	
Extent to which the required data are readily available, retrievable without undue burden, and can be implemented for performance measurement. (evaluation criteria)	Eval Rating

4a. Data Generated as a Byproduct of Care Processes **4a.1-2 How are the data elements that are needed to compute measure scores generated?** 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)	**4a** C☐ P☐ M☐ N☐
4b. Electronic Sources **4b.1 Are all the data elements available electronically?** (*elements that are needed to compute measure scores are in defined, computer-readable fields, e.g., electronic health record, electronic claims*) Yes **4b.2 If not, specify the near-term path to achieve electronic capture by most providers.**	**4b** C☐ P☐ M☐ N☐
4c. Exclusions **4c.1 Do the specified exclusions require additional data sources beyond what is required for the numerator and denominator specifications?** No **4c.2 If yes, provide justification.**	**4c** C☐ P☐ M☐ N☐ NA ☐
4d. Susceptibility to Inaccuracies, Errors, or Unintended Consequences **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.** Coding professionals follow detail guidelines, are subject to training and credentialing requirements, peer review and audit. Pancreatic resection is measured accurately with discharge data. Most facilities perform 10 or fewer pancreatectomies for cancer during a 5year period; therefore, this indicator is expected to have poor precision.	**4d** C☐ P☐ M☐ N☐
4e. Data Collection Strategy/Implementation **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:** Low-volume providers may attempt to increase their volume without improving quality of care by performing the procedure on patients who may not qualify or benefit from the procedure. Additionally, shifting procedures to high-volume providers may impair access to care for certain types of patients. **4e.2 Costs to implement the measure** (*costs of data collection, fees associated with proprietary measures*)**:** All data necessary to calculate this measure are routinely collected for hospital administrative purposes. The software for calculating the measure is available for free at: http://www.qualityindicators.ahrq.gov/software.htm **4e.3 Evidence for costs:** All data necessary to calculate this measure are routinely collected for hospital administrative purposes. The software for calculating the measure is available for free at: http://www.qualityindicators.ahrq.gov/software.htm **4e.4 Business case documentation:** All data necessary to calculate this measure are routinely collected for hospital administrative purposes. The software for calculating the measure is available for free at: http://www.qualityindicators.ahrq.gov/software.htm	**4e** C☐ P☐ M☐ N☐
TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Feasibility?*	**4**
Steering Committee: Overall, to what extent was the criterion, *Feasibility*, met?	**4**

Rationale:	C☐ P☐ M☐ N☐
RECOMMENDATION	
(for NQF staff use) **Check if measure is untested and only eligible for time-limited endorsement.**	Time-limited ☐
Steering Committee: Do you recommend for endorsement? **Comments:**	Y☐ N☐ A☐

CONTACT INFORMATION

Co.1 Measure Steward (Intellectual Property Owner)
Co.1 Organization
Agency for Healthcare Research and Quality, 540 Gaither Road, Rockville, Maryland, 20850

Co.2 Point of Contact
Joh, Bott, MSSW, MBA, david.atkins@ahrq.hhs.gov, 301-427-1317-

Measure Developer If different from Measure Steward
Co.3 Organization
Agency for Healthcare Research and Quality, 540 Gaither Road, Rockville, Maryland, 20850

Co.4 Point of Contact
Joh, Bott, MSSW, MBA, david.atkins@ahrq.hhs.gov, 301-427-1317-

Co.5 Submitter If different from Measure Steward POC
Joh, Bott, MSSW, MBA, david.atkins@ahrq.hhs.gov, 301-427-1317-, Agency for Healthcare Research and Quality

Co.6 Additional organizations that sponsored/participated in measure development
UC Davis,
Stanford University,
Battelle Memorial Institute

ADDITIONAL INFORMATION

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.
None

Ad.2 If adapted, provide name of original measure: None
Ad.3-5 If adapted, provide original specifications URL or attachment

Measure Developer/Steward Updates and Ongoing Maintenance
Ad.6 Year the measure was first released: 2001
Ad.7 Month and Year of most recent revision: 10, 2010
Ad.8 What is your frequency for review/update of this measure? Annual
Ad.9 When is the next scheduled review/update for this measure? 05, 2011

Ad.10 Copyright statement/disclaimers: The AHRQ QI software is publicly available; no copyright disclaimers.

Ad.11 -13 Additional Information web page URL or attachment:

Date of Submission (*MM/DD/YY*)**:** 04/05/2011

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 #:** 1480 **NQF Project:** Surgery Endorsement Maintenance 2010
MEASURE DESCRIPTIVE INFORMATION
De.1 **Measure Title:** Patient(s) 18 years of age and older on a beta-blocker at admission or within seven days of discharge of an isolated CABG procedure.
De.2 **Brief description of measure***:* Patient(s) 18 years of age and older hospitalized for an isolated CABG procedure taking a beta-blocker at admission or within seven days of discharge.
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**
De.4 **National Priority Partners Priority Area:** Population health De.5 **IOM Quality Domain**: Effectiveness De.6 **Consumer Care Need:** Staying healthy

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**
A. The measure is in the public domain or an intellectual property (measure steward agreement) is signed. *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.* 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 A.2 **Indicate if Proprietary Measure** (*as defined in measure steward agreement*)**:** Proprietary measure A.3 **Measure Steward Agreement:** Agreement will be signed and submitted prior to or at the time of measure submission A.4 **Measure Steward Agreement attached:** Ingenix_MeasureStewardAddendum100510.pdf	**A** Y☐ N☐
B. The measure owner/steward verifies there is an identified responsible entity and process to maintain and	**B**

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	Y☐ N☐
C. The intended use of the measure includes both public reporting and quality improvement. ►**Purpose:** Public reporting, Internal quality improvement Accountability, Payment incentive	**C** Y☐ N☐
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	**D** Y☐ N☐
(for NQF staff use) **Have all conditions for consideration been met?** **Staff Notes to Steward** (*if submission returned*)**:**	**Met** Y☐ N☐
Staff Notes to Reviewers (*issues or questions regarding any criteria*)**:**	
Staff Reviewer Name(s):	

TAP/Workgroup Reviewer Name:	
Steering Committee Reviewer Name:	
1. IMPORTANCE TO MEASURE AND REPORT	
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**	**Eval Rating**
(for NQF staff use) **Specific NPP goal**:	
1a.1 **Demonstrated High Impact Aspect of Healthcare:** Affects large numbers, Leading cause of morbidity/mortality, Patient/societal consequences of poor quality 1a.2 1a.3 **Summary of Evidence of High Impact:** Coronary artery bypass graft (CABG) surgery is one of the most common operations performed in the world and accounts for more resources spent in cardiovascular medicine than any other single procedure (1). Preoperative or early postoperative beta-blocker therepy is recommended for patients without contraindications as standard treatment to reduce atrial fibrillation after CABG surgery. Postoperative atrial fibrillation increases the length of hospitalization after CABG, increases cost, and is associated with a 2- to 3-fold increase in postoperative stroke. Nearly every study of beta-blocker treatment used to reduce atrial fibrillation has show benefit. Stopping beta-blocker medications during the perioperative period doubles the incidence of postoperative atrial fibrillation (1). 1a.4 **Citations for Evidence of High Impact:** 1.ACC/AHA 2004 guideline update for coronary artery bypass graft surgery: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee to Update the 1999 Guidelines for Coronary Artery Bypass Graft Surgery). Circulation 2004;110(14):e340-437.	**1a** C☐ P☐ M☐ N☐

1b. Opportunity for Improvement

1b.1 Benefits (improvements in quality) envisioned by use of this measure: This measure identifies patients 18 years of age and older with an isolated CABG procedure who had a beta-blocker medication prescription dispensed while hospitalized, within 7 days of the CABG hospitalization discharge, or had an active beta-blocker medication prescription at the time of the CABG hospitalization. The goal of this measure is to improve CABG surgery outcomes by identifying patients who may be candidates for beta-blocker medications and improve overall compliance to this recommended aspect of care. Beta-blocker treatment has been demonstrated to improve outcomes after CABG surgery, including reduced length of hospitalization, lower cost, and a 2- to 3-fold decrease in postoperative stroke.

1b.2 Summary of data demonstrating performance gap (variation or overall poor performance) across providers:
Using a geographically diverse 15 million member benchmark database (this database represents predominately a commercial population less than 65 year of age) the compliance rate, as defined in this measure, was 73.3 percent. This indicates an opportunity for care improvement.

1b.3 Citations for data on performance gap:
Ingenix EBM Connect benchmark results, October 2010

1b.4 Summary of Data on disparities by population group:
none

1b.5 Citations for data on Disparities:
none

1b
C☐
P☐
M☐
N☐

1c. Outcome or Evidence to Support Measure Focus

1c.1 Relationship to Outcomes (*For non-outcome measures, briefly describe the relationship to desired outcome. For outcomes, describe why it is relevant to the target population*)**:** This measure identifies patients who have not received a beta-blocker medication after CABG surgery. Although this is a process measure, beta-blocker treatment has been shown to prevent atrial fibrillation and related complications after CABG surgery. Specifically, beta-blocker treatment decreases the incidence of postoperative atrial fibrillation, resulting in reduced length of hospitalization after CABG, lower cost, and a 2- to 3-fold decrease in postoperative stroke.

This measure will identify surgeons or surgical centers with low compliance to beta-blocker treatment. Improved compliance to this recommended aspect of care can lead to quality improvement initiatives that improve patient outcomes and reduce overall costs.

1c.2-3. Type of Evidence: Evidence-based guideline, Randomized controlled trial, Other CMS PQRI

1c.4 Summary of Evidence (*as described in the criteria; for outcomes, summarize any evidence that healthcare services/care processes influence the outcome*)**:**
Preoperative or early postoperative beta-blocker therepy is recommended for patients without contraindications as standard treatment to reduce atrial fibrillation after CABG surgery. Postoperative atrial fibrillation increases the length of hospitalization after CABG, increases cost, and is associated with a 2- to 3-fold increase in postoperative stroke. Nearly every study of beta-blocker treatment used to reduce atrial fibrillation has show benefit. Stopping beta-blocker medications during the perioperative period doubles the incidence of postoperative atrial fibrillation (1).

1c.5 Rating of strength/quality of evidence (*also provide narrative description of the rating and by whom***):**
Class I, Level of Evidence: B (ACC/AHA 2004 CABG surgery guidelines)

1c.6 Method for rating evidence: The ACC/AHA guideline recommendation format for classifying indications and summarizing both the evidence and expert opinions is as follows:

Classification of Recommendations

1c
C☐
P☐
M☐
N☐

Class I: Conditions for which there is evidence for and/or general agreement that the procedure or treatment is useful and effective.
Class II: Conditions for which there is conflicting evidence and/or divergence of opinion about the usefulness/efficacy of a procedure or treatment.
Class IIa: The weight of evidence or opinion is in favor of the procedure or treatment.
Class IIb: Usefulness/efficacy is less well established by evidence or opinion.
Class III: Conditions for which there is evidence and/or general agreement that the procedure or treatment is not useful/effective and in some cases may be harmful.

Level of Evidence
Level of Evidence A: Data derived from multiple randomized clinical trials or meta-analyses.
Level of Evidence B: Data derived from a single randomized trial, or nonrandomized studies.
Level of Evidence C: Only consensus opinion of experts, case studies, or standard-of-care.

1c.7 **Summary of Controversy/Contradictory Evidence:** There is no significant controversy regarding this recommendation.

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

1c.9 **Quote the Specific guideline recommendation (***including guideline number and/or page number***):**
Section 4.1.5 (page e377):
Class I
Preoperative or early postoperative administration of beta-blockers in patients without contraindications should be used as the standard therapy to reduce the
incidence and/or clinical sequelae of atrial fibrillation after CABG. (Level of Evidence: B)

1c.10 **Clinical Practice Guideline Citation:** ACC/AHA 2004 guideline update for coronary artery bypass graft surgery: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee to Update the 1999 Guidelines for Coronary Artery Bypass Graft Surgery). Circulation 2004;110(14):e340-437.
1c.11 **National Guideline Clearinghouse or other URL:** http://circ.ahajournals.org/

1c.12 **Rating of strength of recommendation (***also provide narrative description of the rating and by whom***):**
Class I, Level of Evidence: B (ACC/AHA 2004 CABG surgery guidelines)

1c.13 **Method for rating strength of recommendation** (*If different from USPSTF system, also describe rating and how it relates to USPSTF)***:**
The ACC/AHA guideline recommendation format for classifying indications and summarizing both the evidence and expert opinions is as follows:

Classification of Recommendations
Class I: Conditions for which there is evidence for and/or general agreement that the procedure or treatment is useful and effective.
Class II: Conditions for which there is conflicting evidence and/or divergence of opinion about the usefulness/efficacy of a procedure or treatment.
Class IIa: The weight of evidence or opinion is in favor of the procedure or treatment.
Class IIb: Usefulness/efficacy is less well established by evidence or opinion.
Class III: Conditions for which there is evidence and/or general agreement that the procedure or treatment is not useful/effective and in some cases may be harmful.

Level of Evidence
Level of Evidence A: Data derived from multiple randomized clinical trials or meta-analyses.
Level of Evidence B: Data derived from a single randomized trial, or nonrandomized studies.
Level of Evidence C: Only consensus opinion of experts, case studies, or standard-of-care.

This strength of recommendation would be consistent with the following USPSTF classifications:
Level of Certainty Regarding Net Benefit: High/Moderate

Grade: A 1c.14 **Rationale for using this guideline over others:** ACC/AHA is an internationally recognized organization that, with the assistance of cardiovascular experts, has developed this comprehensive guideline for the management of patients undergoing CABG surgery.	
TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Importance to Measure and Report?*	**1**
Steering Committee: Was the threshold criterion, *Importance to Measure and Report*, met? **Rationale:**	**1** **Y☐** **N☐**
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. (evaluation criteria)	**Eval Rating**
2a. MEASURE SPECIFICATIONS	
S.1 **Do you have a web page where current detailed measure specifications can be obtained?** S.2 **If yes, provide web page URL:** **2a. Precisely Specified**	
2a.1 **Numerator Statement (***Brief, text description of the numerator - what is being measured about the target population, e.g. target condition, event, or outcome***):** Patient(s)who are taking a Beta-blocker at CABG admission date or within seven days of discharge. 2a.2 **Numerator Time Window (***The time period in which cases are eligible for inclusion in the numerator***):** 90 days prior to the CABG admission date through 7 days after hospital discharge 2a.3 **Numerator Details (***All information required to collect/calculate the numerator, including all codes, logic, and definitions***):** The patient must fulfill at least one of the following three criteria: 1. The patient filled a prescription for a Beta-blocker-containing medication (HEDIS-defined code set RX0228, see attachment at the end of this application, or procedure code set PR0174) during the following time period: CABG admission date through seven days after the hospital discharge 2. The patient either had a claim with a procedure code for Beta-blocker therapy prescribed (procedure code set PR0174) during the 35 days prior to the CABG admission date, OR, the patient filled one or more prescriptions for a Beta-blocker containing medication (HEDIS-defined code set RX0228, see attached) with the days supplied greater than or equal to the number of days between the fill date on the prescription and the CABG admission date. 3. The patient had a claim with a procedure code for Beta-blocker at discharge (CMS-defined, PR0378) during the following time period: CABG admission date through seven days after the hospital discharge Cd Set Code Set Description Prc Cd Categ Procedure Code Descrption PR0174 Beta-blocker therapy prescribed 4006F CPT Beta-blocker tx prescribed Cd Set Code Set Description Prc Cd Categ Procedure Code Descrpt PR0378 Beta-blocker at discharge (CMS) G8582 HCPCS Beta-blocker at discharge	
2a.4 **Denominator Statement (***Brief, text description of the denominator - target population being measured***):** People hospitalized for an isolated CABG procedure 2a.5 **Target population gender:** Female, Male 2a.6 **Target population age range:** 18 years of age or older on the report start date 2a.7 **Denominator Time Window (***The time period in which cases are eligible for inclusion in the*	**2a-specs** **C☐** **P☐** **M☐** **N☐**

denominator):
CABG events are identified 12 months prior to the report period end date through 7 days prior to the report period end date

2a.8 **Denominator Details** (*All information required to collect/calculate the denominator - the target population being measured - including all codes, logic, and definitions*):
1. The patient must have a CABG event defined as follows:
Note: Build multiple events initiated by a CABG procedure during the study window if denominator requirements are met for all events.
During the following time period: 12 months prior to the report period end date through 7 days prior to the report period end date, begin multiple episodes for inpatient encounters based on the inpatient encounter discharge date (Category of Care = Facility Event – Confinement/Admission) where the confinement includes a claim with a procedure code for Coronary Artery Bypass Graft (code set PR0224). Define an event as the time period from admission to seven days after discharge.
2. Patient must have been continuously enrolled in Medical benefits throughout the event with no breaks in enrollment.

Cd Set	Code Set Description	Prc Cd Categ	Proc Code Descrption
PR0224	Coronary artery bypass graft	33510 CPT	CABG, vein only; single coronary venous graft
PR0224	Coronary artery bypass graft	33511 CPT	CABG, vein only; 2 coronary venous grafts
PR0224	Coronary artery bypass graft	33512 CPT	CABG, vein only; 3 coronary venous grafts
PR0224	Coronary artery bypass graft	33513 CPT	CABG, vein only; 4 coronary venous grafts
PR0224	Coronary artery bypass graft	33514 CPT	CABG, vein only; 5 coronary venous grafts
PR0224	Coronary artery bypass graft	33516 CPT	CABG, vein only; 6 or more coronary venous grafts
PR0224	Coronary artery bypass graft	33517 CPT	CABG using ven& art graft(s); single vein graft
PR0224	Coronary artery bypass graft	33518 CPT	CABG using ven& art graft(s); 2 venous grafts
PR0224	Coronary artery bypass graft	33519 CPT	CABG using ven& art graft(s); 3 venous grafts
PR0224	Coronary artery bypass graft	33521 CPT	CABG using ven& art graft(s); 4 venous grafts
PR0224	Coronary artery bypass graft	33522 CPT	CABG using ven& art graft(s); 5 venous grafts
PR0224	Coronary artery bypass graft	33523 CPT	CABG using ven& art graft(s); 6 or more venous grafts
PR0224	Coronary artery bypass graft	33533 CPT	CABG, using arterial graft(s); single arterial graft
PR0224	Coronary artery bypass graft	33534 CPT	CABG, using arterial graft(s); 2 coronary arterial grafts
PR0224	Coronary artery bypass graft	33535 CPT	CABG, using arterial graft(s); 3 coronary arterial grafts
PR0224	Coronary artery bypass graft	33536 CPT	CABG, using arterial graft(s); 4 or more arterial grafts

2a.9 **Denominator Exclusions** (*Brief text description of exclusions from the target population*): 1. Exclude patients who were readmitted to an acute or non-acute care facility for any diagnosis within seven days after discharge
2. Exclude the event if the patient died during the admission
3. Exclude the patient if the patient did not have pharmacy benefits throughout the CABG event
4. Exclude patients who had a contraindication to Beta-blockers or were taking Beta-blocker exclusion medications

2a.10 Denominator Exclusion Details (*All information required to collect exclusions to the denominator, including all codes, logic, and definitions***):**

1. Exclude patients if, during the seven days after hospital discharge there was a claim for a Facility Event – Confinement/Admission.

Note: Transfer to another acute care facility is considered a readmission and will be excluded.

2. Exclude the event if the patient died during the admission, as evidenced by the discharge status for the admission was Patient Status Indicator equal to 20 (Expired)

3. Exclude patients who did not have continuous enrollment in pharmacy benefits throughout the event (CABG admission date through 7 days after discharge).

4. Exclude patients who had one of the following during the 24 months prior to the end of the report end date: a diagnosis of contraindications to Beta-blockers (diagnosis code set DX0242), or a prescription for a Beta-blocker exclusion medication (HEDIS-defined code set RX0229, see attached), or a procedure code for Beta-blocker contraindicated/not indicated (procedure code set PR0377).

Cd Set	Code Set Description	Dx Cd	Dx Code Description
DX0242	Contraindications to Beta-Blockers	426.0	Atrioventricular block, complete
DX0242	Contraindications to Beta-Blockers	426.12	Mobitz (type) II AV block
DX0242	Contraindications to Beta-Blockers	426.13	Other second degree AV block
DX0242	Contraindications to Beta-Blockers	426.2	Left bundle branch hemiblock
DX0242	Contraindications to Beta-Blockers	426.3	Other left bundle branch block
DX0242	Contraindications to Beta-Blockers	426.4	Right bundle branch block
DX0242	Contraindications to Beta-Blockers	426.51	Right bundle branch block and left post fascicular block
DX0242	Contraindications to Beta-Blockers	426.52	Right bundle branch block and left ant fascicular block
DX0242	Contraindications to Beta-Blockers	426.53	Other bilat bundle branch block
DX0242	Contraindications to Beta-Blockers	426.54	Trifascicular block
DX0242	Contraindications to Beta-Blockers	426.7	Anomalous AV excitation
DX0242	Contraindications to Beta-Blockers	427.81	Sinoatrial node dysfunction
DX0242	Contraindications to Beta-Blockers	458.0	Orthostatic hypotension
DX0242	Contraindications to Beta-Blockers	458.1	Chronic hypotension
DX0242	Contraindications to Beta-Blockers	458.21	Hypotension of hemodialysis
DX0242	Contraindications to Beta-Blockers	458.29	Other iatrogenic hypotension
DX0242	Contraindications to Beta-Blockers	458.8	Other specified hypotension
DX0242	Contraindications to Beta-Blockers	458.9	Unspecified hypotension
DX0242	Contraindications to Beta-Blockers	491.20	Obstruc chronic bronchitis, without exacerbation
DX0242	Contraindications to Beta-Blockers	491.21	Obstruc chronic bronchitis, with (acute) exacerbation
DX0242	Contraindications to Beta-Blockers	491.22	Obstruc chronic bronchitis with acute bronchitis
DX0242	Contraindications to Beta-Blockers	493.00	Extrinsic asthma, unspecified
DX0242	Contraindications to Beta-Blockers	493.01	Extrinsic asthma with status asthmaticus
DX0242	Contraindications to Beta-Blockers	493.02	Extrinsic asthma, with (acute) exacerbation
DX0242	Contraindications to Beta-Blockers	493.10	Intrinsic asthma, unspecified
DX0242	Contraindications to Beta-Blockers	493.11	Intrinsic asthma with status asthmaticus
DX0242	Contraindications to Beta-Blockers	493.12	Intrinsic asthma, with (acute) exacerbation
DX0242	Contraindications to Beta-Blockers	493.21	Chron obstructv asthma, unspec
DX0242	Contraindications to Beta-Blockers	493.21	Chronic obstructive asthma with status asthmaticus
DX0242	Contraindications to Beta-Blockers	493.22	Chronic obstructive asthma,

with (acute) exacerbation
DX0242 Contraindications to Beta-Blockers 493.81 Exercise induced bronchospasm
DX0242 Contraindications to Beta-Blockers 493.82 Cough variant asthma
DX0242 Contraindications to Beta-Blockers 493.90 Asthma, unspec, unspec status
DX0242 Contraindications to Beta-Blockers 493.91 Asthma, unspecified with status asthmaticus
DX0242 Contraindications to Beta-Blockers 493.92 Asthma, unspecified, with (acute) exacerbation
DX0242 Contraindications to Beta-Blockers 496 Chronic airway obstruction, not elsewhere classified
DX0242 Contraindications to Beta-Blockers 506.4 Chronic respiratory conditions due to fumes and vapors

Cd Set	Code Set Description	Prc Cd Categ	Prc Cd	Descrption
PR0377	Beta-blocker contraindicated/not indicated	G8583	HCPCS	Beta-blocker contraind/not indicated

2a.11 Stratification Details/Variables (*All information required to stratify the measure including the stratification variables, all codes, logic, and definitions***):**
none

2a.12-13 Risk Adjustment Type: No risk adjustment necessary

2a.14 Risk Adjustment Methodology/Variables (*List risk adjustment variables and describe conceptual models, statistical models, or other aspects of model or method***):**

2a.15-17 Detailed risk model available Web page URL or attachment:

2a.18-19 Type of Score: Rate/proportion
2a.20 Interpretation of Score: Better quality = Lower score
2a.21 Calculation Algorithm (*Describe the calculation of the measure as a flowchart or series of steps***):**
1. Exclude members who meet denominator exclusion criteria
2. Assign a YES or NO result to remaining members based on numerator response
3. Rate = YES/[YES+NO]

2a.22 Describe the method for discriminating performance *(e.g., significance testing)***:**
Over 700 patients met the denominator from a geographically diverse 15 million member benchmark database. Nearly 200 patients did not meet numerator compliance, indicating a significant gap in care. The subsequent compliance rate was 73.3 percent.

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)*:
A 15 million patient population sample was chosen to analyze the potential patient safety gap in care. The sample was derived from more than 60 million patients based on criteria including national geographic representation, commercial health coverage and patient age less than 65.

2a.24 Data Source (*Check the source(s) for which the measure is specified and tested)*
Electronic administrative data/claims, Pharmacy data

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.***):**
Our data source is a proprietary Ingenix provider database that includes more than 60 million patients, over multiple years. It includes data from multiple payors. This measure specifically uses the following data from this database: member demographics, ICD-9 codes, revenue codes, CPT codes, place of service, and pharmacy claims.

2a.26-28 Data source/data collection instrument reference web page URL or attachment:

2a.29-31 Data dictionary/code table web page URL or attachment: Attachment Input Guide_NQF-

634217949489723447.doc

2a.32-35 Level of Measurement/Analysis (*Check the level(s) for which the measure is specified and tested)*
Clinicians: Individual, Clinicians: Group, Facility/Agency, Health Plan, Integrated delivery system, Multi-site/corporate chain, Population: states, Population: counties or cities, Program: Disease management, Program: QIO, Can be measured at all levels

2a.36-37 Care Settings (*Check the setting(s) for which the measure is specified and tested)*
Hospital, Ambulatory Care: Clinic, Ambulatory Care: Emergency Dept, Nursing home (NH) /Skilled Nursing Facility (SNF), Ambulatory Care: Hospital Outpatient, Rehabilitation Facility

2a.38-41 Clinical Services (*Healthcare services being measured, check all that apply*)
Clinicians: Physicians (MD/DO)

TESTING/ANALYSIS

2b. Reliability testing

2b.1 Data/sample *(description of data/sample and size)***:** Our data sample included a geographically diverse 15 million member benchmark database. The database represents predominately a commercial population less than 65 year of age. This benchmark database contained service dates 1/1/2007 through 12/31/2009.

2b.2 Analytic Method *(type of reliability & rationale, method for testing)***:**
Quality assurance of each measure is accomplished through the testing using multiple methods. Types of testing, data samples and volume vary to ensure the integrity of the measure. Rigorous development, analysis and testing processes are deployed for creating measure specifications. Software testing ensures the software is working as designed. Reliability and validity testing of measures is based on differing data samples and volume of members. National benchmarks are created on a large volume set of data representing members throughout the United States. All quality checks for all measure results must have consistent results and meet expected outcomes based on industry knowledge and experience.

Customer Acceptance Testing (CAT) is another important quality process. CAT ensures that the clinical measures are functioning as intended and that they generate accurate results for typical billing patterns. Using actual claims data a team of business analysts, nurses, and health services researchers conducts a detailed analysis of the output. For each clinical condition in the product (e.g., Diabetes Mellitus, Coronary Artery Disease, etc.) there is a set of CAT data with up to 4000 members who satisfy the condition confirmation criteria. This data is extracted from a large (50+ million member) multi-payer benchmark database and contains inpatient, outpatient, pharmacy, and laboratory data. The testing team analyzes claims from individual members and compares the creation of denominators (target population), numerators, and exclusions from this manual review process to output results from the quality measure.

Regression testing is the part of CAT that verifies the reliability of the product across software releases. For a new release the testing team confirms that every unchanged measure produces the same results as in previous releases, accounting for systematic changes to the software (e.g., code updates, logic changes, etc). Regression testing is conducted at multiple points throughout the software development cycle.

2b.3 Testing Results *(reliability statistics, assessment of adequacy in the context of norms for the test conducted)***:**
Within our data sample, 731 members met the denominator definition for this measure during the measurement year. Of these members, 536 received a beta-blocker medication. The overall compliance rate for this measure was 73.3 percent.

Identical results were produced when this measure was run in the same population during the same time period. When this measure was run in similar populations during the same time period, results were comparable (ranging from 70.5 to 75.5 percent).

2b
C☐
P☐
M☐
N☐

2c. Validity testing — **2c**

2c.1 Data/sample *(description of data/sample and size)*: Our data sample included a geographically diverse 15 million member benchmark database. The database represents predominately a commercial population less than 65 year of age. This benchmark database contained service dates 1/1/2007 through 12/31/2009. **2c.2 Analytic Method** *(type of validity & rationale, method for testing)*: Face Validity Testing (FVT) is the final testing step in the software release cycle. One million members are randomly selected from the large multi-payer benchmark database and their claims data is processed through the software. A systematic, comprehensive review is used to evaluate these FVT results. 1. The Medical Director reviews the results to verify that: a. Prevalence rates for a condition are comparable to nationally published rates; b. Compliance rates for a measure are comparable to the rates reported in the published literature or by other national sources. If no comparable sources are available, the rates are judged based on what is clinically reasonable. 2. All results are reviewed for face validity by members of our external physician clinical consultant panel. **2c.3 Testing Results** *(statistical results, assessment of adequacy in the context of norms for the test conducted)*: No statistical tests are used to interpret our test results.	C☐ P☐ M☐ N☐
2d. Exclusions Justified **2d.1 Summary of Evidence supporting exclusion(s):** Patients are excluded from this measure if they died during the CABG hospitalization. This is consistent with the CMS PQRI logic (1). In addition, patients are excluded from the denominator if they were readmitted within 7 days of hospital discharge. This recommendation was based on consensus expert opinion from our external consultant panel since readmission within 7 days would overlap with the numerator intervention time period. Finally, patients are excluded if they have a contraindication for beta-blocker therapy (1). **2d.2 Citations for Evidence:** ACC/AHA 2004 guideline update for coronary artery bypass graft surgery: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee to Update the 1999 Guidelines for Coronary Artery Bypass Graft Surgery). Circulation 2004;110(14):e340-437. **2d.3 Data/sample** *(description of data/sample and size)*: Our data sample included a geographically diverse 15 million member benchmark database. The database represents predominately a commercial population less than 65 year of age. This benchmark database contained service dates 1/1/2007 through 12/31/2009. **2d.4 Analytic Method** *(type analysis & rationale)*: Impact of measure exclusions is included in our FVT testing process and review of benchmark results. A systematic, comprehensive review is used to evaluate these results. 1. The Medical Director reviews the results to verify that: a. Exclusion rates for a condition and measure are comparable to nationally published rates; b. Exclusion rates for a measure are comparable to the rates reported in the published literature or by other national sources. If no comparable sources are available, the rates are judged based on what is clinically reasonable. 2. All results are reviewed for face validity by members of our external physician clinical consultant panel. **2d.5 Testing Results** *(e.g., frequency, variability, sensitivity analyses)*: Within our data sample, 731 members met the denominator definition for this measure during the measurement year. Of these members, 536 received a beta-blocker medication. The overall compliance rate for this measure was 73.3 percent. Approximately 12 percent of members were excluded from the denominator based on criteria summarized in 2d.1.	**2d** C☐ P☐ M☐ N☐ NA☐
2e. Risk Adjustment for Outcomes/ Resource Use Measures **2e.1 Data/sample** *(description of data/sample and size)*: No risk adjustment was applied to this measure.	**2e** C☐ P☐ M☐

2e.2 **Analytic Method** *(type of risk adjustment, analysis, & rationale)*: 2e.3 **Testing Results** *(risk model performance metrics)*: 2e.4 **If outcome or resource use measure is not risk adjusted, provide rationale:**	N☐ NA☐
2f. Identification of Meaningful Differences in Performance 2f.1 **Data/sample from Testing or Current Use** *(description of data/sample and size)*: Our data sample included a geographically diverse 15 million member benchmark database. The database represents predominately a commercial population less than 65 year of age. This benchmark database contained service dates 1/1/2007 through 12/31/2009. 2f.2 **Methods to identify statistically significant and practically/meaningfully differences in performance** *(type of analysis & rationale)*: The identification of meaningful differences in performance is included in our FVT testing process and review of benchmark results. A systematic, comprehensive review is used to evaluate these results. 1. The Medical Director reviews the results to verify that: a. Compliance rates are comparable to nationally published rates; b. Compliance rates are similar to rates reported in the published literature or by other national sources. If no comparable sources are available, the rates are judged based on what is clinically reasonable. c. Compliance rates, based on literature support, indicate a gap in care and opportunity for care improvement. 2. All results are reviewed for face validity by members of our external physician clinical consultant panel. No statistical tests are used to identify meaningful differences in performance. 2f.3 **Provide Measure Scores from Testing or Current Use** *(description of scores, e.g., distribution by quartile, mean, median, SD, etc.; identification of statistically significant and meaningfully differences in performance)*: Within our data sample, 731 members met the denominator definition for this measure during the measurement year. Of these members, 536 received a beta-blocker medication. The overall compliance rate for this measure was 73.3 percent. When looking at 6 different populations during the same time period, results ranged from 70.5 to 75.5 percent.	**2f** C☐ P☐ M☐ N☐
2g. Comparability of Multiple Data Sources/Methods 2g.1 **Data/sample** *(description of data/sample and size)*: Our testing process does not compare multiple data sources. 2g.2 **Analytic Method** *(type of analysis & rationale)*: 2g.3 **Testing Results** *(e.g., correlation statistics, comparison of rankings)*:	**2g** C☐ P☐ M☐ N☐ NA☐
2h. Disparities in Care 2h.1 **If measure is stratified, provide stratified results** *(scores by stratified categories/cohorts)*: Measure is not stratified. 2h.2 **If disparities have been reported/identified, but measure is not specified to detect disparities, provide follow-up plans:** Does not apply.	**2h** C☐ P☐ M☐ N☐ NA☐
TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Scientific Acceptability of Measure Properties?*	**2**
Steering Committee: Overall, to what extent was the criterion, *Scientific Acceptability of Measure Properties*, met?	**2** C☐

Rationale:	P☐ M☐ N☐
3. USABILITY	
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)	Eval Rating
3a. Meaningful, Understandable, and Useful Information 3a.1 **Current Use:** In use 3a.2 **Use in a public reporting initiative (disclosure of performance results to the public at large)** (*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*)**:** Health plans, physicians (individuals and groups), care management, and other vendors/customers are using this on a national level. Customers are able to select their measures depending on their business needs. As such, we do not know which specific measures are used by our customers or are use in public reporting initiatives. Our plan over the next three years is to identify at least two large customers who are using this measure as part of a QI or other program initiative so that we can provide the information requested here. 3a.3 **If used in other programs/initiatives (***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***):** Health plans, physicians (individuals and groups), care management, and other vendors/customers use many of our measures on a national level for quality improvement, disease management, and physician sharing programs. Customers are able to select their measures depending on their business needs. As such, we do not know which specific measures are used by our customers. Our plan over the next three years is to identify at least two large customers who are using this measure as part of a QI or other program initiative so that we can provide the information requested here. **Testing of Interpretability** (*Testing that demonstrates the results are understood by the potential users for public reporting and quality improvement*) 3a.4 **Data/sample** *(description of data/sample and size)***:** Results are summarized and reported by users/customers depending on their business need - we do not have access to this information. Because of us by multiple users/customers, there is no single data sample, methodology, or public reporting format. 3a.5 **Methods** *(e.g., focus group, survey, QI project)***:** Survey of two customers 3a.6 **Results** *(qualitative and/or quantitative results and conclusions)***:** In March 2011, we received the following feedback from customers who have used our quality measures: 1. "Ingenix's measures are well-specified both in the detailed specifications as well as in the measure description. They delineate the specific numerator requirements (e.g. services, time frames) as well as details surrounding the denominator (e.g. age, gender, conditions, exclusion specifications). Many other measurement sets from other organizations lack this level of specificity forcing the end-user to speculate as to how it was defined. Ingenix's transparency leads to greater trust in the measurements." 2. The Market medical directors and internal staff understand and are comfortable with the Ingenix measures. No physicians have reported concerns about understanding the measures or results. The Ingenix measures are accompanied by extensive documentation that explain measure criteria and results.	3a C☐ P☐ M☐ N☐
3b/3c. Relation to other NQF-endorsed measures 3b.1 **NQF # and Title of similar or related measures:** NQF #117: Beta Blockade at Discharge	

(for NQF staff use) **Notes on similar/related endorsed or submitted measures:**	
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 or different topic but same target population): **3b.2 Are the measure specifications harmonized? If not, why?** Measure specifications are harmonized with respect to denominator definition and criteria.	**3b** C☐ P☐ M☐ N☐ NA☐
3c. Distinctive or Additive Value **3c.1 Describe the distinctive, improved, or additive value this measure provides to existing NQF-endorsed measures:** Measure 117, which is currently part of the CMS PQRI program (CMS PQRI measure 170), allows use of G codes only to identify numerator compliance. Also, measure 117 is available for registry reporting only. Our Ingenix measure uses pharmacy claims, in addition to the CMS PQRI G codes, to identify numerator compliance. This use of claims data significantly increases the usability of this measure. It increases the ability to identify gaps in care, support quality improvement programs, and measure provider performance. Finally, our measure is not dependent on voluntary participation in the registry program. **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:** Measure 117, which is currently part of the CMS PQRI program (CMS PQRI measure 170), allows use of G codes only to identify numerator compliance. Also, measure 117 is available for registry reporting only. Our Ingenix measure uses pharmacy claims, in addition to the CMS PQRI G codes, to identify numerator compliance. This use of claims data significantly increases the usability of this measure. It increases the ability to identify gaps in care, support quality improvement programs, and measure provider performance. Our measure is not dependent on voluntary participation in the registry program.	**3c** C☐ P☐ M☐ N☐ NA☐
TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Usability?*	**3**
Steering Committee: Overall, to what extent was the criterion, *Usability*, met? **Rationale:**	**3** C☐ P☐ M☐ N☐
4. FEASIBILITY	
Extent to which the required data are readily available, retrievable without undue burden, and can be implemented for performance measurement. (evaluation criteria)	**Eval Rating**
4a. Data Generated as a Byproduct of Care Processes **4a.1-2 How are the data elements that are needed to compute measure scores generated?** 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)	**4a** C☐ P☐ M☐ N☐
4b. Electronic Sources **4b.1 Are all the data elements available electronically?** (*elements that are needed to compute measure scores are in defined, computer-readable fields, e.g., electronic health record, electronic claims*) Yes **4b.2 If not, specify the near-term path to achieve electronic capture by most providers.**	**4b** C☐ P☐ M☐ N☐
4c. Exclusions **4c.1 Do the specified exclusions require additional data sources beyond what is required for the numerator and denominator specifications?** No	**4c** C☐ P☐ M☐ N☐ NA☐

4c.2 If yes, provide justification.	
4d. Susceptibility to Inaccuracies, Errors, or Unintended Consequences **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.** none anticipated	**4d** C☐ P☐ M☐ N☐
4e. Data Collection Strategy/Implementation **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:** We have not needed to modify this measure based on test results or use of this measure. Members are excluded from this measure if they do not have pharmacy benefits. This eliminates errors due to pharmacy data incompleteness. **4e.2 Costs to implement the measure** (*costs of data collection, fees associated with proprietary measures*)**:** We do not have access to this information. This would vary based on the customer/vendor, patient population, and programs/interventions associated with measure use. We have a proprietary database that is used to develop and test our measures; benchmark results are provided to our customers at no extra charge. With respect to measures endorsed by NQF, these measures have been placed in the public domain, consistent with our contractual agreement. Currently, 11 Ingenix measures are endorsed; there is no fee associated with the use of these measures. **4e.3 Evidence for costs:** not available **4e.4 Business case documentation:** not available	**4e** C☐ P☐ M☐ N☐
TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Feasibility?*	**4**
Steering Committee: Overall, to what extent was the criterion, *Feasibility*, met? **Rationale:**	**4** C☐ P☐ M☐ N☐
RECOMMENDATION	
(for NQF staff use) **Check if measure is untested and only eligible for time-limited endorsement.**	**Time-limited** ☐
Steering Committee: Do you recommend for endorsement? **Comments:**	Y☐ N☐ A☐
CONTACT INFORMATION	
Co.1 Measure Steward (Intellectual Property Owner) **Co.1 Organization** Ingenix, 12125 Technology Drive, Eden Prairie, Minnesota, 55344 **Co.2 Point of Contact** Kay, Schwebke, Medical Director, kay.schwebke@ingenix.com, 952-833-7154-	
Measure Developer If different from Measure Steward	

Co.3 **Organization**
Ingenix, 12125 Technology Drive, Eden Prairie, Minnesota, 55344

Co.4 **Point of Contact**
Kay, Schwebke, Medical Director, kay.schwebke@ingenix.com, 952-833-7154-

Co.5 **Submitter If different from Measure Steward POC**
Kay, Schwebke, Medical Director, kay.schwebke@ingenix.com, 952-833-7154-, Ingenix

Co.6 **Additional organizations that sponsored/participated in measure development**

ADDITIONAL INFORMATION

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.**
Our external consultant panel participates in the original literature search process, measure development, code set review, testing review, and maintenance processes. Panel members include the following:

NAME & Title Employer/Position
Alexander, Beth Pharm D, BCPS Assistant Professor, Augsburg College
Ayenew, Woubeshet, MD Hennepin Faculty Associates; Hennepin County Medical Center
Becker, Keith, MD Fairview Medical Center
Betcher, Susan, MD Allina Medical Clinic
Bruer, Paul, MD Comprehensive Ophthamology, LLC
Capecchi, Joseph, MD Allina Medical Clinic
Giesler, Janell, MD Allina Medical Clinic
Grabowski, Carol, MD Allina Medical Clinic
Hansen, Calvin, MD Iowa Health Physicians
Hargrove, Jody, MD Arthritis and Rheumatology Consultants
Hermann, Richard, MD Tufts - New England Medical Center
Jemming, Brian, Pharm D CentraCare Health System
Kohen, Jeffrey, MD Veterans Affairs Medical Center
McCarthy, Teresa, MD University of Minnesota, Department of Family Medicine & Community Health
McEvoy, Charlene, MD, MPH HealthPartners & HealthPartners Research Foundation; Assistant Professor of Medicine, University of Minnesota
McGee, Deanna, Pharm D, BCPS Retail Pharmacy
Ogle, Kathleen, MD Hennepin Faculty Associates; Hennepin County Medical Center: Assistant Professor of Medicine, University of Minnesota Medical School
Peter, Kathleen, MD Park Nicollet Medical Center
Pieper-Bigelow, Christina, MD Allina Medical Clinic
Redmon, Bruce, MD University of Minnesota Physicians
Scharpf, Steven, MD Mountain Valleys Health Centers

Ad.2 **If adapted, provide name of original measure:**
Ad.3-5 **If adapted, provide original specifications URL or attachment**

Measure Developer/Steward Updates and Ongoing Maintenance
Ad.6 **Year the measure was first released:** 2006
Ad.7 **Month and Year of most recent revision:** 11, 2009
Ad.8 **What is your frequency for review/update of this measure?** every three years at minimum
Ad.9 **When is the next scheduled review/update for this measure?** 11, 2012

Ad.10 **Copyright statement/disclaimers:**

Ad.11 -13 Additional Information web page URL or attachment: Attachment Beta-blocker RX code sets.xls

Date of Submission (*MM/DD/YY*)**:** 03/25/2011

NDC Code	Brand Name	Generic Product Name	Route	Category
00003020776	Corgard	nadolol 40 mg oral tablet	oral	noncardioselective beta-blockers
00003024176	Corgard	nadolol 80 mg oral tablet	oral	noncardioselective beta-blockers
00005323423	Ziac	bisoprolol-hydrochlorothiazide 5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
00005323538	Ziac	bisoprolol-hydrochlorothiazide 10 mg-6.25 mg oral tablet	oral	antihypertensive combinations
00005323823	Ziac	bisoprolol-hydrochlorothiazide 2.5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
00006043768	Blocadren	timolol 20 mg oral tablet	oral	noncardioselective beta-blockers
00007337013	Coreg CR	carvedilol 10 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00007337059	Coreg CR	carvedilol 10 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00007337113	Coreg CR	carvedilol 20 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00007337159	Coreg CR	carvedilol 20 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00007337213	Coreg CR	carvedilol 40 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00007337259	Coreg CR	carvedilol 40 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00007337313	Coreg CR	carvedilol 80 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00007337359	Coreg CR	carvedilol 80 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00007413920	Coreg	carvedilol 3.125 mg oral tablet	oral	noncardioselective beta-blockers
00007414020	Coreg	carvedilol 6.25 mg oral tablet	oral	noncardioselective beta-blockers
00007414120	Coreg	carvedilol 12.5 mg oral tablet	oral	noncardioselective beta-blockers
00007414220	Coreg	carvedilol 25 mg oral tablet	oral	noncardioselective beta-blockers
00024230020	Kerlone	betaxolol 20 mg oral tablet	oral	cardioselective beta-blockers
00024230110	Kerlone	betaxolol 10 mg oral tablet	oral	cardioselective beta-blockers
00025510131	Kerlone	betaxolol 10 mg oral tablet	oral	cardioselective beta-blockers
00025520131	Kerlone	betaxolol 20 mg oral tablet	oral	cardioselective beta-blockers
00028003501	Lopressor HCT	hydrochlorothiazide-metoprolol 25 mg-50 mg oral tablet	oral	antihypertensive combinations
00028005101	Lopressor	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
00028005110	Lopressor	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
00028005301	Lopressor HCT	hydrochlorothiazide-metoprolol 25 mg-100 mg oral tablet	oral	antihypertensive combinations
00028007101	Lopressor	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
00028007110	Lopressor	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
00028007301	Lopressor HCT	hydrochlorothiazide-metoprolol 50 mg-100 mg oral tablet	oral	antihypertensive combinations
00046042181	Inderal	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
00046042195	Inderal	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
00046042281	Inderal	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
00046042295	Inderal	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
00046042481	Inderal	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
00046042495	Inderal	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
00046042681	Inderal	propranolol 60 mg oral tablet	oral	noncardioselective beta-blockers
00046042881	Inderal	propranolol 80 mg oral tablet	oral	noncardioselective beta-blockers
00046042895	Inderal	propranolol 80 mg oral tablet	oral	noncardioselective beta-blockers
00046047081	Inderal LA	propranolol 60 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00046047181	Inderal LA	propranolol 80 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00046047381	Inderal LA	propranolol 120 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00046047981	Inderal LA	propranolol 160 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00046048481	Inderide	hydrochlorothiazide-propranolol 25 mg-40 mg oral tablet	oral	antihypertensive combinations
00046048881	Inderide	hydrochlorothiazide-propranolol 25 mg-80 mg oral tablet	oral	antihypertensive combinations
00054372763	Propranolol Hydrochloride	propranolol 20 mg/5 mL oral solution	oral	noncardioselective beta-blockers

NDC Code	Brand Name	Generic Product Name	Route	Category
00054373063	Propranolol Hydrochloride	propranolol 40 mg/5 mL oral solution	oral	noncardioselective beta-blockers
00054876416	Propranolol Hydrochloride	propranolol 20 mg/5 mL oral solution	oral	noncardioselective beta-blockers
00074166413	Cartrol	carteolol 2.5 mg oral tablet	oral	noncardioselective beta-blockers
00074166513	Cartrol	carteolol 5 mg oral tablet	oral	noncardioselective beta-blockers
00078045805	Lopressor	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
00078045809	Lopressor	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
00078045905	Lopressor	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
00078045909	Lopressor	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
00078046005	Lopressor HCT	hydrochlorothiazide-metoprolol 25 mg-50 mg oral tablet	oral	antihypertensive combinations
00078046105	Lopressor HCT	hydrochlorothiazide-metoprolol 25 mg-100 mg oral tablet	oral	antihypertensive combinations
00078046205	Lopressor HCT	hydrochlorothiazide-metoprolol 50 mg-100 mg oral tablet	oral	antihypertensive combinations
00085024404	Normodyne	labetalol 100 mg oral tablet	oral	noncardioselective beta-blockers
00085024405	Normodyne	labetalol 100 mg oral tablet	oral	noncardioselective beta-blockers
00085024407	Normodyne	labetalol 100 mg oral tablet	oral	noncardioselective beta-blockers
00085024408	Normodyne	labetalol 100 mg oral tablet	oral	noncardioselective beta-blockers
00085043803	Normodyne	labetalol 300 mg oral tablet	oral	noncardioselective beta-blockers
00085043805	Normodyne	labetalol 300 mg oral tablet	oral	noncardioselective beta-blockers
00085043806	Normodyne	labetalol 300 mg oral tablet	oral	noncardioselective beta-blockers
00085075204	Normodyne	labetalol 200 mg oral tablet	oral	noncardioselective beta-blockers
00085075205	Normodyne	labetalol 200 mg oral tablet	oral	noncardioselective beta-blockers
00085075207	Normodyne	labetalol 200 mg oral tablet	oral	noncardioselective beta-blockers
00085075208	Normodyne	labetalol 200 mg oral tablet	oral	noncardioselective beta-blockers
00091450015	Levatol	penbutolol 20 mg oral tablet	oral	noncardioselective beta-blockers
00093005101	Carvedilol	carvedilol 3.125 mg oral tablet	oral	noncardioselective beta-blockers
00093005105	Carvedilol	carvedilol 3.125 mg oral tablet	oral	noncardioselective beta-blockers
00093013501	Carvedilol	carvedilol 6.25 mg oral tablet	oral	noncardioselective beta-blockers
00093013505	Carvedilol	carvedilol 6.25 mg oral tablet	oral	noncardioselective beta-blockers
00093073301	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
00093073310	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
00093073401	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
00093073410	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
00093075201	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
00093075210	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
00093075301	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
00093075305	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
00093078701	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
00093078710	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
00093106001	Sotalol Hydrochloride	sotalol 120 mg oral tablet	oral	noncardioselective beta-blockers
00093106101	Sotalol Hydrochloride	sotalol 80 mg oral tablet	oral	noncardioselective beta-blockers
00093106201	Sotalol Hydrochloride	sotalol 160 mg oral tablet	oral	noncardioselective beta-blockers
00093106301	Sotalol Hydrochloride	sotalol 240 mg oral tablet	oral	noncardioselective beta-blockers
00093423501	Nadolol	nadolol 20 mg oral tablet	oral	noncardioselective beta-blockers
00093423601	Nadolol	nadolol 40 mg oral tablet	oral	noncardioselective beta-blockers
00093423701	Nadolol	nadolol 80 mg oral tablet	oral	noncardioselective beta-blockers
00093527056	Bisoprolol Fumarate	bisoprolol 5 mg oral tablet	oral	cardioselective beta-blockers

NDC Code	Brand Name	Generic Product Name	Route	Category
00093527156	Bisoprolol Fumarate	bisoprolol 10 mg oral tablet	oral	cardioselective beta-blockers
00093729501	Carvedilol	carvedilol 12.5 mg oral tablet	oral	noncardioselective beta-blockers
00093729505	Carvedilol	carvedilol 12.5 mg oral tablet	oral	noncardioselective beta-blockers
00093729601	Carvedilol	carvedilol 25 mg oral tablet	oral	noncardioselective beta-blockers
00093729605	Carvedilol	carvedilol 25 mg oral tablet	oral	noncardioselective beta-blockers
00093740106	Sotalol Hydrochloride AF	sotalol AF 80 mg oral tablet	oral	noncardioselective beta-blockers
00093740206	Sotalol Hydrochloride AF	sotalol AF 120 mg oral tablet	oral	noncardioselective beta-blockers
00093740306	Sotalol Hydrochloride AF	sotalol AF 160 mg oral tablet	oral	noncardioselective beta-blockers
00115271101	Sotalol Hydrochloride	sotalol 80 mg oral tablet	oral	noncardioselective beta-blockers
00115272201	Sotalol Hydrochloride	sotalol 120 mg oral tablet	oral	noncardioselective beta-blockers
00115273301	Sotalol Hydrochloride	sotalol 160 mg oral tablet	oral	noncardioselective beta-blockers
00115274401	Sotalol Hydrochloride	sotalol 240 mg oral tablet	oral	noncardioselective beta-blockers
00115531101	Bendroflumethiazide-Nadolol	bendroflumethiazide-nadolol 5 mg-40 mg oral tablet	oral	antihypertensive combinations
00115532201	Bendroflumethiazide-Nadolol	bendroflumethiazide-nadolol 5 mg-80 mg oral tablet	oral	antihypertensive combinations
00172421760	Pindolol	pindolol 5 mg oral tablet	oral	noncardioselective beta-blockers
00172421860	Pindolol	pindolol 10 mg oral tablet	oral	noncardioselective beta-blockers
00172423560	Nadolol	nadolol 20 mg oral tablet	oral	noncardioselective beta-blockers
00172423570	Nadolol	nadolol 20 mg oral tablet	oral	noncardioselective beta-blockers
00172423660	Nadolol	nadolol 40 mg oral tablet	oral	noncardioselective beta-blockers
00172423760	Nadolol	nadolol 80 mg oral tablet	oral	noncardioselective beta-blockers
00172423860	Nadolol	nadolol 120 mg oral tablet	oral	noncardioselective beta-blockers
00172423960	Nadolol	nadolol 160 mg oral tablet	oral	noncardioselective beta-blockers
00172436460	Labetalol Hydrochloride	labetalol 100 mg oral tablet	oral	noncardioselective beta-blockers
00172436470	Labetalol Hydrochloride	labetalol 100 mg oral tablet	oral	noncardioselective beta-blockers
00172436560	Labetalol Hydrochloride	labetalol 200 mg oral tablet	oral	noncardioselective beta-blockers
00172436570	Labetalol Hydrochloride	labetalol 200 mg oral tablet	oral	noncardioselective beta-blockers
00172436660	Labetalol Hydrochloride	labetalol 300 mg oral tablet	oral	noncardioselective beta-blockers
00182181289	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
00182181389	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
00182181489	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
00182181589	Propranolol Hydrochloride	propranolol 80 mg oral tablet	oral	noncardioselective beta-blockers
00182183301	Hydrochlorothiazide-Propranolol	hydrochlorothiazide-propranolol 25 mg-40 mg oral tablet	oral	antihypertensive combinations
00182183401	Hydrochlorothiazide-Propranolol	hydrochlorothiazide-propranolol 25 mg-80 mg oral tablet	oral	antihypertensive combinations
00182192601	Propranolol Hydrochloride LA	propranolol 60 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00182192701	Propranolol Hydrochloride LA	propranolol 80 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00182192801	Propranolol Hydrochloride LA	propranolol 120 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00182192901	Propranolol Hydrochloride LA	propranolol 160 mg oral capsule, extended release	oral	noncardioselective beta-blockers

NDC Code	Brand Name	Generic Product Name	Route	Category
00182194301	Atenolol-Chlorthalidone	atenolol-chlorthalidone 100 mg-25 mg oral tablet	oral	antihypertensive combinations
00182196601	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
00182196610	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
00182196701	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
00182196710	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
00182198701	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
00182198710	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
00182198810	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
00182820200	Labetalol Hydrochloride	labetalol 100 mg oral tablet	oral	noncardioselective beta-blockers
00182820289	Labetalol Hydrochloride	labetalol 100 mg oral tablet	oral	noncardioselective beta-blockers
00182820300	Labetalol Hydrochloride	labetalol 200 mg oral tablet	oral	noncardioselective beta-blockers
00182820389	Labetalol Hydrochloride	labetalol 200 mg oral tablet	oral	noncardioselective beta-blockers
00182823500	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
00182823589	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
00182823600	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
00182823689	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
00185001001	Labetalol Hydrochloride	labetalol 100 mg oral tablet	oral	noncardioselective beta-blockers
00185001005	Labetalol Hydrochloride	labetalol 100 mg oral tablet	oral	noncardioselective beta-blockers
00185011701	Labetalol Hydrochloride	labetalol 200 mg oral tablet	oral	noncardioselective beta-blockers
00185011705	Labetalol Hydrochloride	labetalol 200 mg oral tablet	oral	noncardioselective beta-blockers
00185011801	Labetalol Hydrochloride	labetalol 300 mg oral tablet	oral	noncardioselective beta-blockers
00185011805	Labetalol Hydrochloride	labetalol 300 mg oral tablet	oral	noncardioselective beta-blockers
00185017001	Sotalol Hydrochloride	sotalol 120 mg oral tablet	oral	noncardioselective beta-blockers
00185017101	Sotalol Hydrochloride	sotalol 80 mg oral tablet	oral	noncardioselective beta-blockers
00185017105	Sotalol Hydrochloride	sotalol 80 mg oral tablet	oral	noncardioselective beta-blockers
00185017401	Sotalol Hydrochloride	sotalol 240 mg oral tablet	oral	noncardioselective beta-blockers
00185017701	Sotalol Hydrochloride	sotalol 160 mg oral tablet	oral	noncardioselective beta-blockers
00185028101	Metoprolol Succinate ER	metoprolol succinate 25 mg oral tablet, extended release	oral	cardioselective beta-blockers
00185028110	Metoprolol Succinate ER	metoprolol succinate 25 mg oral tablet, extended release	oral	cardioselective beta-blockers
00185028201	Metoprolol Succinate ER	metoprolol succinate 50 mg oral tablet, extended release	oral	cardioselective beta-blockers
00185028210	Metoprolol Succinate ER	metoprolol succinate 50 mg oral tablet, extended release	oral	cardioselective beta-blockers
00185028301	Metoprolol Succinate ER	metoprolol succinate 100 mg oral tablet, extended release	oral	cardioselective beta-blockers
00185028310	Metoprolol Succinate ER	metoprolol succinate 100 mg oral tablet, extended release	oral	cardioselective beta-blockers
00185028401	Metoprolol Succinate ER	metoprolol succinate 200 mg oral tablet, extended release	oral	cardioselective beta-blockers
00185028410	Metoprolol Succinate ER	metoprolol succinate 200 mg oral tablet, extended release	oral	cardioselective beta-blockers
00185070101	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 2.5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
00185070105	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 2.5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
00185070130	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 2.5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
00185070401	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
00185070405	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 5 mg-6.25 mg oral tablet	oral	antihypertensive combinations

NDC Code	Brand Name	Generic Product Name	Route	Category
00185070430	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
00185070701	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 10 mg-6.25 mg oral tablet	oral	antihypertensive combinations
00185070705	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 10 mg-6.25 mg oral tablet	oral	antihypertensive combinations
00185070730	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 10 mg-6.25 mg oral tablet	oral	antihypertensive combinations
00185077101	Bisoprolol Fumarate	bisoprolol 5 mg oral tablet	oral	cardioselective beta-blockers
00185077130	Bisoprolol Fumarate	bisoprolol 5 mg oral tablet	oral	cardioselective beta-blockers
00185077401	Bisoprolol Fumarate	bisoprolol 10 mg oral tablet	oral	cardioselective beta-blockers
00185077430	Bisoprolol Fumarate	bisoprolol 10 mg oral tablet	oral	cardioselective beta-blockers
00186108805	Toprol-XL	metoprolol succinate 25 mg oral tablet, extended release	oral	cardioselective beta-blockers
00186108839	Toprol-XL	metoprolol succinate 25 mg oral tablet, extended release	oral	cardioselective beta-blockers
00186109005	Toprol-XL	metoprolol succinate 50 mg oral tablet, extended release	oral	cardioselective beta-blockers
00186109039	Toprol-XL	metoprolol succinate 50 mg oral tablet, extended release	oral	cardioselective beta-blockers
00186109205	Toprol-XL	metoprolol succinate 100 mg oral tablet, extended release	oral	cardioselective beta-blockers
00186109239	Toprol-XL	metoprolol succinate 100 mg oral tablet, extended release	oral	cardioselective beta-blockers
00186109405	Toprol-XL	metoprolol succinate 200 mg oral tablet, extended release	oral	cardioselective beta-blockers
00186730005	Metoprolol Succinate ER	metoprolol succinate 25 mg oral tablet, extended release	oral	cardioselective beta-blockers
00186730105	Metoprolol Succinate ER	metoprolol succinate 50 mg oral tablet, extended release	oral	cardioselective beta-blockers
00186730205	Metoprolol Succinate ER	metoprolol succinate 100 mg oral tablet, extended release	oral	cardioselective beta-blockers
00186730305	Metoprolol Succinate ER	metoprolol succinate 200 mg oral tablet, extended release	oral	cardioselective beta-blockers
00223255001	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
00223255002	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
00223255101	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
00223255102	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
00223255201	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
00223255202	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
00223255301	Propranolol Hydrochloride	propranolol 60 mg oral tablet	oral	noncardioselective beta-blockers
00223255302	Propranolol Hydrochloride	propranolol 60 mg oral tablet	oral	noncardioselective beta-blockers
00223255401	Propranolol Hydrochloride	propranolol 80 mg oral tablet	oral	noncardioselective beta-blockers
00223255402	Propranolol Hydrochloride	propranolol 80 mg oral tablet	oral	noncardioselective beta-blockers
00228217511	Carvedilol	carvedilol 3.125 mg oral tablet	oral	noncardioselective beta-blockers
00228217611	Carvedilol	carvedilol 6.25 mg oral tablet	oral	noncardioselective beta-blockers
00228217711	Carvedilol	carvedilol 12.5 mg oral tablet	oral	noncardioselective beta-blockers
00228217811	Carvedilol	carvedilol 25 mg oral tablet	oral	noncardioselective beta-blockers
00228232710	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
00228232750	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
00228232910	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
00228232996	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
00228233110	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
00228233150	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
00228235810	Hydrochlorothiazide-Propranolol	hydrochlorothiazide-propranolol 25 mg-40 mg oral tablet	oral	antihypertensive combinations

NDC Code	Brand Name	Generic Product Name	Route	Category
00228235850	Hydrochlorothiazide-Propranolol	hydrochlorothiazide-propranolol 25 mg-40 mg oral tablet	oral	antihypertensive combinations
00228236010	Hydrochlorothiazide-Propranolol	hydrochlorothiazide-propranolol 25 mg-80 mg oral tablet	oral	antihypertensive combinations
00228236096	Hydrochlorothiazide-Propranolol	hydrochlorothiazide-propranolol 25 mg-80 mg oral tablet	oral	antihypertensive combinations
00228253410	Pindolol	pindolol 5 mg oral tablet	oral	noncardioselective beta-blockers
00228253510	Pindolol	pindolol 10 mg oral tablet	oral	noncardioselective beta-blockers
00228255410	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
00228255450	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
00228255496	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
00228255510	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
00228255550	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
00228255596	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
00228265010	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 2.5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
00228265110	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
00228265203	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 10 mg-6.25 mg oral tablet	oral	antihypertensive combinations
00228277811	Propranolol Hydrochloride LA	propranolol 60 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00228277850	Propranolol Hydrochloride LA	propranolol 60 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00228277911	Propranolol Hydrochloride LA	propranolol 80 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00228277950	Propranolol Hydrochloride LA	propranolol 80 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00228278011	Propranolol Hydrochloride LA	propranolol 120 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00228278050	Propranolol Hydrochloride LA	propranolol 120 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00228278111	Propranolol Hydrochloride LA	propranolol 160 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00228278150	Propranolol Hydrochloride LA	propranolol 160 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00245001201	Sorine	sotalol 80 mg oral tablet	oral	noncardioselective beta-blockers
00245001211	Sorine	sotalol 80 mg oral tablet	oral	noncardioselective beta-blockers
00245001289	Sorine	sotalol 80 mg oral tablet	oral	noncardioselective beta-blockers
00245001301	Sorine	sotalol 120 mg oral tablet	oral	noncardioselective beta-blockers
00245001311	Sorine	sotalol 120 mg oral tablet	oral	noncardioselective beta-blockers
00245001389	Sorine	sotalol 120 mg oral tablet	oral	noncardioselective beta-blockers
00245001401	Sorine	sotalol 160 mg oral tablet	oral	noncardioselective beta-blockers
00245001411	Sorine	sotalol 160 mg oral tablet	oral	noncardioselective beta-blockers
00245001489	Sorine	sotalol 160 mg oral tablet	oral	noncardioselective beta-blockers

NDC Code	Brand Name	Generic Product Name	Route	Category
00245001501	Sorine	sotalol 240 mg oral tablet	oral	noncardioselective beta-blockers
00245001511	Sorine	sotalol 240 mg oral tablet	oral	noncardioselective beta-blockers
00245001589	Sorine	sotalol 240 mg oral tablet	oral	noncardioselective beta-blockers
00245008410	Propranolol Hydrochloride LA	propranolol 60 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00245008411	Propranolol Hydrochloride LA	propranolol 60 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00245008510	Propranolol Hydrochloride LA	propranolol 80 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00245008511	Propranolol Hydrochloride LA	propranolol 80 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00245008610	Propranolol Hydrochloride LA	propranolol 120 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00245008611	Propranolol Hydrochloride LA	propranolol 120 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00245008710	Propranolol Hydrochloride LA	propranolol 160 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00245008711	Propranolol Hydrochloride LA	propranolol 160 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00247101200	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
00247101230	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
00247104430	Corgard	nadolol 40 mg oral tablet	oral	noncardioselective beta-blockers
00247104460	Corgard	nadolol 40 mg oral tablet	oral	noncardioselective beta-blockers
00247105004	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
00247105030	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
00247105052	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
00247105059	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
00247105060	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
00247105100	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
00247105130	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
00247105160	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
00247105199	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
00247105230	Hydrochlorothiazide-Propranolol	hydrochlorothiazide-propranolol 25 mg-40 mg oral tablet	oral	antihypertensive combinations
00247105245	Hydrochlorothiazide-Propranolol	hydrochlorothiazide-propranolol 25 mg-40 mg oral tablet	oral	antihypertensive combinations
00247106500	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
00247106530	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
00247106560	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
00247106577	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
00247106590	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
00247107200	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
00247107206	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
00247107214	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
00247107230	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers

NDC Code	Brand Name	Generic Product Name	Route	Category
00247107260	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
00247107290	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
00247111914	Lopressor	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
00247111930	Lopressor	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
00247111952	Lopressor	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
00247111960	Lopressor	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
00247112030	Lopressor	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
00247112060	Lopressor	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
00247112130	Lopressor HCT	hydrochlorothiazide-metoprolol 25 mg-50 mg oral tablet	oral	antihypertensive combinations
00247112160	Lopressor HCT	hydrochlorothiazide-metoprolol 25 mg-50 mg oral tablet	oral	antihypertensive combinations
00247112230	Lopressor HCT	hydrochlorothiazide-metoprolol 25 mg-100 mg oral tablet	oral	antihypertensive combinations
00247112260	Lopressor HCT	hydrochlorothiazide-metoprolol 25 mg-100 mg oral tablet	oral	antihypertensive combinations
00247112330	Lopressor HCT	hydrochlorothiazide-metoprolol 50 mg-100 mg oral tablet	oral	antihypertensive combinations
00247112360	Lopressor HCT	hydrochlorothiazide-metoprolol 50 mg-100 mg oral tablet	oral	antihypertensive combinations
00247113330	Normodyne	labetalol 100 mg oral tablet	oral	noncardioselective beta-blockers
00247113360	Normodyne	labetalol 100 mg oral tablet	oral	noncardioselective beta-blockers
00247113430	Normodyne	labetalol 200 mg oral tablet	oral	noncardioselective beta-blockers
00247113460	Normodyne	labetalol 200 mg oral tablet	oral	noncardioselective beta-blockers
00247114602	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
00247114607	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
00247114630	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
00247114660	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
00247127300	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
00247127330	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
00247127379	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
00247127399	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
00247127400	Toprol-XL	metoprolol succinate 100 mg oral tablet, extended release	oral	cardioselective beta-blockers
00247127460	Toprol-XL	metoprolol succinate 100 mg oral tablet, extended release	oral	cardioselective beta-blockers
00247138420	Sectral	acebutolol 200 mg oral capsule	oral	cardioselective beta-blockers
00247163430	Propranolol Hydrochloride	propranolol 80 mg oral tablet	oral	noncardioselective beta-blockers
00247167130	Ziac	bisoprolol-hydrochlorothiazide 2.5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
00247167230	Ziac	bisoprolol-hydrochlorothiazide 5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
00247167330	Ziac	bisoprolol-hydrochlorothiazide 10 mg-6.25 mg oral tablet	oral	antihypertensive combinations
00247180100	Labetalol Hydrochloride	labetalol 100 mg oral tablet	oral	noncardioselective beta-blockers
00247180130	Labetalol Hydrochloride	labetalol 100 mg oral tablet	oral	noncardioselective beta-blockers
00247180160	Labetalol Hydrochloride	labetalol 100 mg oral tablet	oral	noncardioselective beta-blockers
00247180177	Labetalol Hydrochloride	labetalol 100 mg oral tablet	oral	noncardioselective beta-blockers
00247180190	Labetalol Hydrochloride	labetalol 100 mg oral tablet	oral	noncardioselective beta-blockers
00247180200	Labetalol Hydrochloride	labetalol 200 mg oral tablet	oral	noncardioselective beta-blockers
00247180230	Labetalol Hydrochloride	labetalol 200 mg oral tablet	oral	noncardioselective beta-blockers
00247180260	Labetalol Hydrochloride	labetalol 200 mg oral tablet	oral	noncardioselective beta-blockers
00247180277	Labetalol Hydrochloride	labetalol 200 mg oral tablet	oral	noncardioselective beta-blockers
00247180290	Labetalol Hydrochloride	labetalol 200 mg oral tablet	oral	noncardioselective beta-blockers
00247180300	Labetalol Hydrochloride	labetalol 300 mg oral tablet	oral	noncardioselective beta-blockers
00247180330	Labetalol Hydrochloride	labetalol 300 mg oral tablet	oral	noncardioselective beta-blockers

NDC Code	Brand Name	Generic Product Name	Route	Category
00247180360	Labetalol Hydrochloride	labetalol 300 mg oral tablet	oral	noncardioselective beta-blockers
00247180377	Labetalol Hydrochloride	labetalol 300 mg oral tablet	oral	noncardioselective beta-blockers
00247180390	Labetalol Hydrochloride	labetalol 300 mg oral tablet	oral	noncardioselective beta-blockers
00247188700	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 2.5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
00247188730	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 2.5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
00247188760	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 2.5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
00247188777	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 2.5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
00247188790	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 2.5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
00247188800	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
00247188830	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
00247188860	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
00247188877	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
00247188890	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
00247188900	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 10 mg-6.25 mg oral tablet	oral	antihypertensive combinations
00247188930	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 10 mg-6.25 mg oral tablet	oral	antihypertensive combinations
00247188960	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 10 mg-6.25 mg oral tablet	oral	antihypertensive combinations
00247188977	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 10 mg-6.25 mg oral tablet	oral	antihypertensive combinations
00247188990	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 10 mg-6.25 mg oral tablet	oral	antihypertensive combinations
00247192300	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
00247192360	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
00247207630	Propranolol Hydrochloride LA	propranolol 80 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00247207660	Propranolol Hydrochloride LA	propranolol 80 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00247233100	Coreg	carvedilol 3.125 mg oral tablet	oral	noncardioselective beta-blockers
00247233130	Coreg	carvedilol 3.125 mg oral tablet	oral	noncardioselective beta-blockers
00247233160	Coreg	carvedilol 3.125 mg oral tablet	oral	noncardioselective beta-blockers
00247233177	Coreg	carvedilol 3.125 mg oral tablet	oral	noncardioselective beta-blockers
00247233190	Coreg	carvedilol 3.125 mg oral tablet	oral	noncardioselective beta-blockers
00247233200	Coreg	carvedilol 6.25 mg oral tablet	oral	noncardioselective beta-blockers

NDC Code	Brand Name	Generic Product Name	Route	Category
00247233230	Coreg	carvedilol 6.25 mg oral tablet	oral	noncardioselective beta-blockers
00247233260	Coreg	carvedilol 6.25 mg oral tablet	oral	noncardioselective beta-blockers
00247233277	Coreg	carvedilol 6.25 mg oral tablet	oral	noncardioselective beta-blockers
00247233290	Coreg	carvedilol 6.25 mg oral tablet	oral	noncardioselective beta-blockers
00247233300	Coreg	carvedilol 12.5 mg oral tablet	oral	noncardioselective beta-blockers
00247233330	Coreg	carvedilol 12.5 mg oral tablet	oral	noncardioselective beta-blockers
00247233360	Coreg	carvedilol 12.5 mg oral tablet	oral	noncardioselective beta-blockers
00247233377	Coreg	carvedilol 12.5 mg oral tablet	oral	noncardioselective beta-blockers
00247233390	Coreg	carvedilol 12.5 mg oral tablet	oral	noncardioselective beta-blockers
00247233400	Coreg	carvedilol 25 mg oral tablet	oral	noncardioselective beta-blockers
00247233430	Coreg	carvedilol 25 mg oral tablet	oral	noncardioselective beta-blockers
00247233460	Coreg	carvedilol 25 mg oral tablet	oral	noncardioselective beta-blockers
00247233477	Coreg	carvedilol 25 mg oral tablet	oral	noncardioselective beta-blockers
00247233490	Coreg	carvedilol 25 mg oral tablet	oral	noncardioselective beta-blockers
00310010110	Tenormin	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
00310010510	Tenormin	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
00310010710	Tenormin	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
00310011510	Tenoretic 50	atenolol-chlorthalidone 50 mg-25 mg oral tablet	oral	antihypertensive combinations
00310011710	Tenoretic 100	atenolol-chlorthalidone 100 mg-25 mg oral tablet	oral	antihypertensive combinations
00339531512	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
00339531712	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
00339531912	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
00339532012	Propranolol Hydrochloride	propranolol 60 mg oral tablet	oral	noncardioselective beta-blockers
00339532112	Propranolol Hydrochloride	propranolol 80 mg oral tablet	oral	noncardioselective beta-blockers
00339575312	Propranolol Hydrochloride LA	propranolol 60 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00339575512	Propranolol Hydrochloride LA	propranolol 80 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00339575712	Propranolol Hydrochloride LA	propranolol 120 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00339575912	Propranolol Hydrochloride LA	propranolol 160 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00364075601	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
00364075602	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
00364075701	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
00364075702	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
00364075801	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
00364075802	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
00364235901	Timolol Maleate	timolol 20 mg oral tablet	oral	noncardioselective beta-blockers
00364251301	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
00364251302	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
00364251390	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
00364251401	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
00364251490	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
00364252701	Atenolol-Chlorthalidone	atenolol-chlorthalidone 50 mg-25 mg oral tablet	oral	antihypertensive combinations

NDC Code	Brand Name	Generic Product Name	Route	Category
00364252801	Atenolol-Chlorthalidone	atenolol-chlorthalidone 100 mg-25 mg oral tablet	oral	antihypertensive combinations
00378001801	Metoprolol Tartrate	metoprolol tartrate 25 mg oral tablet	oral	cardioselective beta-blockers
00378001805	Metoprolol Tartrate	metoprolol tartrate 25 mg oral tablet	oral	cardioselective beta-blockers
00378001891	Metoprolol Tartrate	metoprolol tartrate 25 mg oral tablet	oral	cardioselective beta-blockers
00378002801	Nadolol	nadolol 20 mg oral tablet	oral	noncardioselective beta-blockers
00378003201	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
00378003210	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
00378004701	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
00378004710	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
00378005201	Pindolol	pindolol 5 mg oral tablet	oral	noncardioselective beta-blockers
00378005501	Timolol Maleate	timolol 5 mg oral tablet	oral	noncardioselective beta-blockers
00378009601	Bendroflumethiazide-Nadolol	bendroflumethiazide-nadolol 5 mg-40 mg oral tablet	oral	antihypertensive combinations
00378009901	Bendroflumethiazide-Nadolol	bendroflumethiazide-nadolol 5 mg-80 mg oral tablet	oral	antihypertensive combinations
00378012701	Pindolol	pindolol 10 mg oral tablet	oral	noncardioselective beta-blockers
00378018201	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
00378018210	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
00378018301	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
00378018310	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
00378018401	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
00378018410	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
00378018501	Propranolol Hydrochloride	propranolol 80 mg oral tablet	oral	noncardioselective beta-blockers
00378018505	Propranolol Hydrochloride	propranolol 80 mg oral tablet	oral	noncardioselective beta-blockers
00378021801	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
00378021810	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
00378022101	Timolol Maleate	timolol 10 mg oral tablet	oral	noncardioselective beta-blockers
00378023101	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
00378023110	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
00378030501	Sotalol Hydrochloride	sotalol 80 mg oral tablet	oral	noncardioselective beta-blockers
00378031001	Sotalol Hydrochloride	sotalol 120 mg oral tablet	oral	noncardioselective beta-blockers
00378031401	Sotalol Hydrochloride	sotalol 160 mg oral tablet	oral	noncardioselective beta-blockers
00378034701	Hydrochlorothiazide-Propranolol	hydrochlorothiazide-propranolol 25 mg-80 mg oral tablet	oral	antihypertensive combinations
00378042401	Hydrochlorothiazide-Metoprolol	hydrochlorothiazide-metoprolol 25 mg-50 mg oral tablet	oral	antihypertensive combinations
00378043401	Hydrochlorothiazide-Metoprolol	hydrochlorothiazide-metoprolol 25 mg-100 mg oral tablet	oral	antihypertensive combinations
00378044501	Hydrochlorothiazide-Metoprolol	hydrochlorothiazide-metoprolol 50 mg-100 mg oral tablet	oral	antihypertensive combinations
00378050101	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 2.5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
00378050110	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 2.5 mg-6.25 mg oral tablet	oral	antihypertensive combinations

NDC Code	Brand Name	Generic Product Name	Route	Category
00378050301	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
00378050310	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
00378050501	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 10 mg-6.25 mg oral tablet	oral	antihypertensive combinations
00378050505	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 10 mg-6.25 mg oral tablet	oral	antihypertensive combinations
00378052301	Bisoprolol Fumarate	bisoprolol 5 mg oral tablet	oral	cardioselective beta-blockers
00378052393	Bisoprolol Fumarate	bisoprolol 5 mg oral tablet	oral	cardioselective beta-blockers
00378052401	Bisoprolol Fumarate	bisoprolol 10 mg oral tablet	oral	cardioselective beta-blockers
00378052493	Bisoprolol Fumarate	bisoprolol 10 mg oral tablet	oral	cardioselective beta-blockers
00378071501	Timolol Maleate	timolol 20 mg oral tablet	oral	noncardioselective beta-blockers
00378073101	Hydrochlorothiazide-Propranolol	hydrochlorothiazide-propranolol 25 mg-40 mg oral tablet	oral	antihypertensive combinations
00378075701	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
00378075710	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
00378075793	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
00378113201	Nadolol	nadolol 80 mg oral tablet	oral	noncardioselective beta-blockers
00378113210	Nadolol	nadolol 80 mg oral tablet	oral	noncardioselective beta-blockers
00378117101	Nadolol	nadolol 40 mg oral tablet	oral	noncardioselective beta-blockers
00378117110	Nadolol	nadolol 40 mg oral tablet	oral	noncardioselective beta-blockers
00378120001	Acebutolol Hydrochloride	acebutolol 200 mg oral capsule	oral	cardioselective beta-blockers
00378140001	Acebutolol Hydrochloride	acebutolol 400 mg oral capsule	oral	cardioselective beta-blockers
00378206301	Atenolol-Chlorthalidone	atenolol-chlorthalidone 50 mg-25 mg oral tablet	oral	antihypertensive combinations
00378206401	Atenolol-Chlorthalidone	atenolol-chlorthalidone 100 mg-25 mg oral tablet	oral	antihypertensive combinations
00378206493	Atenolol-Chlorthalidone	atenolol-chlorthalidone 100 mg-25 mg oral tablet	oral	antihypertensive combinations
00378363101	Carvedilol	carvedilol 3.125 mg oral tablet	oral	noncardioselective beta-blockers
00378363105	Carvedilol	carvedilol 3.125 mg oral tablet	oral	noncardioselective beta-blockers
00378363201	Carvedilol	carvedilol 6.25 mg oral tablet	oral	noncardioselective beta-blockers
00378363205	Carvedilol	carvedilol 6.25 mg oral tablet	oral	noncardioselective beta-blockers
00378363301	Carvedilol	carvedilol 12.5 mg oral tablet	oral	noncardioselective beta-blockers
00378363305	Carvedilol	carvedilol 12.5 mg oral tablet	oral	noncardioselective beta-blockers
00378363401	Carvedilol	carvedilol 25 mg oral tablet	oral	noncardioselective beta-blockers
00378363405	Carvedilol	carvedilol 25 mg oral tablet	oral	noncardioselective beta-blockers
00378512301	Sotalol Hydrochloride AF	sotalol AF 80 mg oral tablet	oral	noncardioselective beta-blockers
00378512401	Sotalol Hydrochloride AF	sotalol AF 120 mg oral tablet	oral	noncardioselective beta-blockers
00378512501	Sotalol Hydrochloride AF	sotalol AF 160 mg oral tablet	oral	noncardioselective beta-blockers
00378616001	Propranolol Hydrochloride LA	propranolol 60 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00378616005	Propranolol Hydrochloride LA	propranolol 60 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00378618001	Propranolol Hydrochloride LA	propranolol 80 mg oral capsule, extended release	oral	noncardioselective beta-blockers

NDC Code	Brand Name	Generic Product Name	Route	Category
00378618005	Propranolol Hydrochloride LA	propranolol 80 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00378622001	Propranolol Hydrochloride LA	propranolol 120 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00378622005	Propranolol Hydrochloride LA	propranolol 120 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00378626001	Propranolol Hydrochloride LA	propranolol 160 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00378626005	Propranolol Hydrochloride LA	propranolol 160 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00406202201	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
00406202210	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
00406202301	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
00406202310	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
00406202401	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
00406202410	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
00456140201	Bystolic	nebivolol 2.5 mg oral tablet	oral	cardioselective beta-blockers
00456140230	Bystolic	nebivolol 2.5 mg oral tablet	oral	cardioselective beta-blockers
00456140263	Bystolic	nebivolol 2.5 mg oral tablet	oral	cardioselective beta-blockers
00456140501	Bystolic	nebivolol 5 mg oral tablet	oral	cardioselective beta-blockers
00456140530	Bystolic	nebivolol 5 mg oral tablet	oral	cardioselective beta-blockers
00456140563	Bystolic	nebivolol 5 mg oral tablet	oral	cardioselective beta-blockers
00456141001	Bystolic	nebivolol 10 mg oral tablet	oral	cardioselective beta-blockers
00456141030	Bystolic	nebivolol 10 mg oral tablet	oral	cardioselective beta-blockers
00456141063	Bystolic	nebivolol 10 mg oral tablet	oral	cardioselective beta-blockers
00456142001	Bystolic	nebivolol 20 mg oral tablet	oral	cardioselective beta-blockers
00456142030	Bystolic	nebivolol 20 mg oral tablet	oral	cardioselective beta-blockers
00490005300	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 2.5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
00490005330	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 2.5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
00490005360	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 2.5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
00490005390	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 2.5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
00536333201	Atenolol-Chlorthalidone	atenolol-chlorthalidone 50 mg-25 mg oral tablet	oral	antihypertensive combinations
00536424701	Nadolol	nadolol 80 mg oral tablet	oral	noncardioselective beta-blockers
00536491202	Propranolol Hydrochloride LA	propranolol 80 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00536563901	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
00555042705	Hydrochlorothiazide-Propranolol	hydrochlorothiazide-propranolol 25 mg-40 mg oral tablet	oral	antihypertensive combinations
00591046201	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
00591046210	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
00591046301	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers

NDC Code	Brand Name	Generic Product Name	Route	Category
00591046310	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
00591060501	Labetalol Hydrochloride	labetalol 100 mg oral tablet	oral	noncardioselective beta-blockers
00591060505	Labetalol Hydrochloride	labetalol 100 mg oral tablet	oral	noncardioselective beta-blockers
00591060601	Labetalol Hydrochloride	labetalol 200 mg oral tablet	oral	noncardioselective beta-blockers
00591060605	Labetalol Hydrochloride	labetalol 200 mg oral tablet	oral	noncardioselective beta-blockers
00591060701	Labetalol Hydrochloride	labetalol 300 mg oral tablet	oral	noncardioselective beta-blockers
00591084101	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 2.5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
00591084105	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 2.5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
00591084201	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
00591084205	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
00591084301	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 10 mg-6.25 mg oral tablet	oral	antihypertensive combinations
00591084330	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 10 mg-6.25 mg oral tablet	oral	antihypertensive combinations
00591555401	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
00591555410	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
00591555501	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
00591555510	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
00591555601	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
00591555610	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
00591555701	Propranolol Hydrochloride	propranolol 80 mg oral tablet	oral	noncardioselective beta-blockers
00591555705	Propranolol Hydrochloride	propranolol 80 mg oral tablet	oral	noncardioselective beta-blockers
00591577701	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
00591577710	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
00591577801	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
00591578201	Atenolol-Chlorthalidone	atenolol-chlorthalidone 50 mg-25 mg oral tablet	oral	antihypertensive combinations
00591578301	Atenolol-Chlorthalidone	atenolol-chlorthalidone 100 mg-25 mg oral tablet	oral	antihypertensive combinations
00603462832	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
00603549228	Propranolol Hydrochloride	propranolol 60 mg oral tablet	oral	noncardioselective beta-blockers
00603549721	Propranolol Hydrochloride LA	propranolol 60 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00603549821	Propranolol Hydrochloride LA	propranolol 80 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00603549921	Propranolol Hydrochloride LA	propranolol 120 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00603550021	Propranolol Hydrochloride LA	propranolol 160 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00603576921	Sotalol Hydrochloride	sotalol 80 mg oral tablet	oral	noncardioselective beta-blockers
00603576928	Sotalol Hydrochloride	sotalol 80 mg oral tablet	oral	noncardioselective beta-blockers
00603577021	Sotalol Hydrochloride	sotalol 120 mg oral tablet	oral	noncardioselective beta-blockers
00603577121	Sotalol Hydrochloride	sotalol 160 mg oral tablet	oral	noncardioselective beta-blockers

NDC Code	Brand Name	Generic Product Name	Route	Category
00603577221	Sotalol Hydrochloride	sotalol 240 mg oral tablet	oral	noncardioselective beta-blockers
00603607121	Timolol Maleate	timolol 5 mg oral tablet	oral	noncardioselective beta-blockers
00603607221	Timolol Maleate	timolol 10 mg oral tablet	oral	noncardioselective beta-blockers
00615256143	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
00615256153	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
00615256163	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
00615256213	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
00615256253	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
00615256263	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
00615256353	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
00615256363	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
00615350613	Pindolol	pindolol 10 mg oral tablet	oral	noncardioselective beta-blockers
00615353243	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
00615353253	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
00615353263	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
00615354443	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
00615354453	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
00615354463	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
00615354713	Pindolol	pindolol 5 mg oral tablet	oral	noncardioselective beta-blockers
00615355213	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
00615355253	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
00615355263	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
00615355353	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
00615355363	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
00677104210	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
00677104310	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
00677104405	Propranolol Hydrochloride	propranolol 80 mg oral tablet	oral	noncardioselective beta-blockers
00677110701	Hydrochlorothiazide-Propranolol	hydrochlorothiazide-propranolol 25 mg-80 mg oral tablet	oral	antihypertensive combinations
00677136401	Propranolol Hydrochloride LA	propranolol 80 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00677136501	Propranolol Hydrochloride LA	propranolol 120 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00677136601	Propranolol Hydrochloride LA	propranolol 160 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00677147801	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
00677147810	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
00677147901	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
00677147910	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
00677148001	Atenolol-Chlorthalidone	atenolol-chlorthalidone 50 mg-25 mg oral tablet	oral	antihypertensive combinations
00677148101	Atenolol-Chlorthalidone	atenolol-chlorthalidone 100 mg-25 mg oral tablet	oral	antihypertensive combinations
00677148201	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
00677148210	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
00677148301	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
00677148310	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers

NDC Code	Brand Name	Generic Product Name	Route	Category
00677163301	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
00677170101	Labetalol Hydrochloride	labetalol 100 mg oral tablet	oral	noncardioselective beta-blockers
00677170105	Labetalol Hydrochloride	labetalol 100 mg oral tablet	oral	noncardioselective beta-blockers
00677170201	Labetalol Hydrochloride	labetalol 200 mg oral tablet	oral	noncardioselective beta-blockers
00677170205	Labetalol Hydrochloride	labetalol 200 mg oral tablet	oral	noncardioselective beta-blockers
00677170301	Labetalol Hydrochloride	labetalol 300 mg oral tablet	oral	noncardioselective beta-blockers
00677170305	Labetalol Hydrochloride	labetalol 300 mg oral tablet	oral	noncardioselective beta-blockers
00677170905	Sotalol Hydrochloride	sotalol 80 mg oral tablet	oral	noncardioselective beta-blockers
00677170906	Sotalol Hydrochloride	sotalol 80 mg oral tablet	oral	noncardioselective beta-blockers
00677170907	Sotalol Hydrochloride	sotalol 80 mg oral tablet	oral	noncardioselective beta-blockers
00677171001	Sotalol Hydrochloride	sotalol 120 mg oral tablet	oral	noncardioselective beta-blockers
00677171005	Sotalol Hydrochloride	sotalol 120 mg oral tablet	oral	noncardioselective beta-blockers
00677171006	Sotalol Hydrochloride	sotalol 120 mg oral tablet	oral	noncardioselective beta-blockers
00677171101	Sotalol Hydrochloride	sotalol 160 mg oral tablet	oral	noncardioselective beta-blockers
00677171105	Sotalol Hydrochloride	sotalol 160 mg oral tablet	oral	noncardioselective beta-blockers
00677171106	Sotalol Hydrochloride	sotalol 160 mg oral tablet	oral	noncardioselective beta-blockers
00677171201	Sotalol Hydrochloride	sotalol 240 mg oral tablet	oral	noncardioselective beta-blockers
00677171205	Sotalol Hydrochloride	sotalol 240 mg oral tablet	oral	noncardioselective beta-blockers
00677171206	Sotalol Hydrochloride	sotalol 240 mg oral tablet	oral	noncardioselective beta-blockers
00677171207	Sotalol Hydrochloride	sotalol 240 mg oral tablet	oral	noncardioselective beta-blockers
00677189301	Sotalol Hydrochloride AF	sotalol AF 80 mg oral tablet	oral	noncardioselective beta-blockers
00677189306	Sotalol Hydrochloride AF	sotalol AF 80 mg oral tablet	oral	noncardioselective beta-blockers
00677189401	Sotalol Hydrochloride AF	sotalol AF 120 mg oral tablet	oral	noncardioselective beta-blockers
00677189406	Sotalol Hydrochloride AF	sotalol AF 120 mg oral tablet	oral	noncardioselective beta-blockers
00677189501	Sotalol Hydrochloride AF	sotalol AF 160 mg oral tablet	oral	noncardioselective beta-blockers
00677189506	Sotalol Hydrochloride AF	sotalol AF 160 mg oral tablet	oral	noncardioselective beta-blockers
00781107801	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
00781107810	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
00781112601	Timolol Maleate	timolol 5 mg oral tablet	oral	noncardioselective beta-blockers
00781118101	Nadolol	nadolol 20 mg oral tablet	oral	noncardioselective beta-blockers
00781118110	Nadolol	nadolol 20 mg oral tablet	oral	noncardioselective beta-blockers
00781118192	Nadolol	nadolol 20 mg oral tablet	oral	noncardioselective beta-blockers
00781118201	Nadolol	nadolol 40 mg oral tablet	oral	noncardioselective beta-blockers
00781118210	Nadolol	nadolol 40 mg oral tablet	oral	noncardioselective beta-blockers
00781118292	Nadolol	nadolol 40 mg oral tablet	oral	noncardioselective beta-blockers
00781118301	Nadolol	nadolol 80 mg oral tablet	oral	noncardioselective beta-blockers
00781122301	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
00781122310	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
00781122801	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
00781122810	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
00781131501	Atenolol-Chlorthalidone	atenolol-chlorthalidone 50 mg-25 mg oral tablet	oral	antihypertensive combinations
00781131601	Atenolol-Chlorthalidone	atenolol-chlorthalidone 100 mg-25 mg oral tablet	oral	antihypertensive combinations
00781135413	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
00781136413	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
00781137113	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers

NDC Code	Brand Name	Generic Product Name	Route	Category
00781137213	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
00781138405	Propranolol Hydrochloride	propranolol 80 mg oral tablet	oral	noncardioselective beta-blockers
00781143101	Hydrochlorothiazide-Propranolol	hydrochlorothiazide-propranolol 25 mg-40 mg oral tablet	oral	antihypertensive combinations
00781143201	Hydrochlorothiazide-Propranolol	hydrochlorothiazide-propranolol 25 mg-80 mg oral tablet	oral	antihypertensive combinations
00781150601	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
00781150610	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
00781150701	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
00781150710	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
00781182401	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
00781183301	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 10 mg-6.25 mg oral tablet	oral	antihypertensive combinations
00781184101	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 2.5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
00781206101	Propranolol Hydrochloride LA	propranolol 60 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00781522101	Carvedilol	carvedilol 3.125 mg oral tablet	oral	noncardioselective beta-blockers
00781522201	Carvedilol	carvedilol 6.25 mg oral tablet	oral	noncardioselective beta-blockers
00781522301	Carvedilol	carvedilol 12.5 mg oral tablet	oral	noncardioselective beta-blockers
00781522401	Carvedilol	carvedilol 25 mg oral tablet	oral	noncardioselective beta-blockers
00904041161	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
00904041461	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
00904041640	Propranolol Hydrochloride	propranolol 60 mg oral tablet	oral	noncardioselective beta-blockers
00904041660	Propranolol Hydrochloride	propranolol 60 mg oral tablet	oral	noncardioselective beta-blockers
00904041840	Propranolol Hydrochloride	propranolol 80 mg oral tablet	oral	noncardioselective beta-blockers
00904041860	Propranolol Hydrochloride	propranolol 80 mg oral tablet	oral	noncardioselective beta-blockers
00904041861	Propranolol Hydrochloride	propranolol 80 mg oral tablet	oral	noncardioselective beta-blockers
00904042160	Propranolol Hydrochloride LA	propranolol 60 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00904042260	Propranolol Hydrochloride LA	propranolol 80 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00904042360	Propranolol Hydrochloride LA	propranolol 120 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00904042460	Propranolol Hydrochloride LA	propranolol 160 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00904043860	Hydrochlorothiazide-Propranolol	hydrochlorothiazide-propranolol 25 mg-80 mg oral tablet	oral	antihypertensive combinations
00904340860	Timolol Maleate	timolol 5 mg oral tablet	oral	noncardioselective beta-blockers
00904340960	Timolol Maleate	timolol 10 mg oral tablet	oral	noncardioselective beta-blockers
00904506960	Nadolol	nadolol 20 mg oral tablet	oral	noncardioselective beta-blockers
00904507060	Nadolol	nadolol 40 mg oral tablet	oral	noncardioselective beta-blockers
00904507160	Nadolol	nadolol 80 mg oral tablet	oral	noncardioselective beta-blockers
00904539260	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers

NDC Code	Brand Name	Generic Product Name	Route	Category
00904539261	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
00904587061	Carvedilol	carvedilol 3.125 mg oral tablet	oral	noncardioselective beta-blockers
00904587161	Carvedilol	carvedilol 6.25 mg oral tablet	oral	noncardioselective beta-blockers
00904587261	Carvedilol	carvedilol 12.5 mg oral tablet	oral	noncardioselective beta-blockers
00904587361	Carvedilol	carvedilol 25 mg oral tablet	oral	noncardioselective beta-blockers
00904589061	Metoprolol Tartrate	metoprolol tartrate 25 mg oral tablet	oral	cardioselective beta-blockers
00904592861	Labetalol Hydrochloride	labetalol 100 mg oral tablet	oral	noncardioselective beta-blockers
00904592961	Labetalol Hydrochloride	labetalol 200 mg oral tablet	oral	noncardioselective beta-blockers
00904593061	Labetalol Hydrochloride	labetalol 300 mg oral tablet	oral	noncardioselective beta-blockers
00904594761	Propranolol Hydrochloride LA	propranolol 60 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00904594861	Propranolol Hydrochloride LA	propranolol 80 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00904594961	Propranolol Hydrochloride LA	propranolol 120 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00904595061	Propranolol Hydrochloride LA	propranolol 160 mg oral capsule, extended release	oral	noncardioselective beta-blockers
00904603360	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
00904603361	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
00904603380	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
00904603460	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
00904603461	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
00904603480	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
00904763460	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
00904763461	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
00904763480	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
00904763560	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
00904763561	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
00904777260	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
00904777261	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
00904777280	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
00904777360	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
00904777361	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
00904777380	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
00904781660	Nadolol	nadolol 20 mg oral tablet	oral	noncardioselective beta-blockers
00904781760	Nadolol	nadolol 40 mg oral tablet	oral	noncardioselective beta-blockers
00904781860	Nadolol	nadolol 80 mg oral tablet	oral	noncardioselective beta-blockers
00904782060	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
00904782080	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
00904782160	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
00904782180	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
00904788160	Atenolol-Chlorthalidone	atenolol-chlorthalidone 50 mg-25 mg oral tablet	oral	antihypertensive combinations
00904789360	Pindolol	pindolol 5 mg oral tablet	oral	noncardioselective beta-blockers
00904789460	Pindolol	pindolol 10 mg oral tablet	oral	noncardioselective beta-blockers
00904794660	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers

NDC Code	Brand Name	Generic Product Name	Route	Category
00904794680	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
00904794760	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
00904794780	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
10702001301	Betaxolol Hydrochloride	betaxolol 10 mg oral tablet	oral	cardioselective beta-blockers
10702001401	Betaxolol Hydrochloride	betaxolol 20 mg oral tablet	oral	cardioselective beta-blockers
12280004900	Toprol-XL	metoprolol succinate 100 mg oral tablet, extended release	oral	cardioselective beta-blockers
12280005000	Toprol-XL	metoprolol succinate 50 mg oral tablet, extended release	oral	cardioselective beta-blockers
12280005015	Toprol-XL	metoprolol succinate 50 mg oral tablet, extended release	oral	cardioselective beta-blockers
12280005030	Toprol-XL	metoprolol succinate 50 mg oral tablet, extended release	oral	cardioselective beta-blockers
12280014500	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
12280017200	Toprol-XL	metoprolol succinate 100 mg oral tablet, extended release	oral	cardioselective beta-blockers
12280017230	Toprol-XL	metoprolol succinate 100 mg oral tablet, extended release	oral	cardioselective beta-blockers
12280030315	Labetalol Hydrochloride	labetalol 200 mg oral tablet	oral	noncardioselective beta-blockers
12280030330	Labetalol Hydrochloride	labetalol 200 mg oral tablet	oral	noncardioselective beta-blockers
12280037600	Coreg	carvedilol 3.125 mg oral tablet	oral	noncardioselective beta-blockers
12280037630	Coreg	carvedilol 3.125 mg oral tablet	oral	noncardioselective beta-blockers
12280040330	Coreg CR	carvedilol 10 mg oral capsule, extended release	oral	noncardioselective beta-blockers
12280040430	Coreg CR	carvedilol 20 mg oral capsule, extended release	oral	noncardioselective beta-blockers
12280040530	Coreg CR	carvedilol 40 mg oral capsule, extended release	oral	noncardioselective beta-blockers
12280040630	Coreg CR	carvedilol 80 mg oral capsule, extended release	oral	noncardioselective beta-blockers
13411016901	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
13411016903	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
13411016906	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
13411016909	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
13411016910	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
13411017601	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
13411017603	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
13411017606	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
13411017609	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
13411017610	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
15330002501	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
15330002510	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
15330002801	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
15330002810	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
15330002901	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
15330002910	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
15330020801	Sotalol Hydrochloride AF	sotalol AF 80 mg oral tablet	oral	noncardioselective beta-blockers
15330020901	Sotalol Hydrochloride AF	sotalol AF 120 mg oral tablet	oral	noncardioselective beta-blockers
15330021001	Sotalol Hydrochloride AF	sotalol AF 160 mg oral tablet	oral	noncardioselective beta-blockers
16590013230	InnoPran XL	propranolol 80 mg oral capsule, extended release	oral	noncardioselective beta-blockers
16590013260	InnoPran XL	propranolol 80 mg oral capsule, extended release	oral	noncardioselective beta-blockers
16590013330	InnoPran XL	propranolol 120 mg oral capsule, extended release	oral	noncardioselective beta-blockers

NDC Code	Brand Name	Generic Product Name	Route	Category
16590013360	InnoPran XL	propranolol 120 mg oral capsule, extended release	oral	noncardioselective beta-blockers
16714002104	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
16714002106	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
16714002204	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
16714002206	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
16714002304	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
16714002306	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
16714002404	Propranolol Hydrochloride	propranolol 60 mg oral tablet	oral	noncardioselective beta-blockers
16714002504	Propranolol Hydrochloride	propranolol 80 mg oral tablet	oral	noncardioselective beta-blockers
16714002505	Propranolol Hydrochloride	propranolol 80 mg oral tablet	oral	noncardioselective beta-blockers
21695029130	Toprol-XL	metoprolol succinate 50 mg oral tablet, extended release	oral	cardioselective beta-blockers
21695029830	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
21695029900	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
21695029930	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
21695039730	Sotalol Hydrochloride	sotalol 80 mg oral tablet	oral	noncardioselective beta-blockers
21695066960	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
23155011001	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
23155011010	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
23155011101	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
23155011110	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
23155011201	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
23155011301	Propranolol Hydrochloride	propranolol 60 mg oral tablet	oral	noncardioselective beta-blockers
23155011401	Propranolol Hydrochloride	propranolol 80 mg oral tablet	oral	noncardioselective beta-blockers
23155011405	Propranolol Hydrochloride	propranolol 80 mg oral tablet	oral	noncardioselective beta-blockers
23490509601	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
23490509602	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
23490509603	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
23490509701	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
23490509702	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
23490509703	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
23490509801	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
23490509802	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
23490592000	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
23490592001	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
23490592101	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
23490592102	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
23490620303	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
23490620306	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
23490620309	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
23490650303	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 10 mg-6.25 mg oral tablet	oral	antihypertensive combinations
23490650403	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
23490650406	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 5 mg-6.25 mg oral tablet	oral	antihypertensive combinations

NDC Code	Brand Name	Generic Product Name	Route	Category
23490650409	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
23490786103	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 2.5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
23490936903	Carvedilol	carvedilol 3.125 mg oral tablet	oral	noncardioselective beta-blockers
23490936906	Carvedilol	carvedilol 3.125 mg oral tablet	oral	noncardioselective beta-blockers
23490937003	Carvedilol	carvedilol 6.25 mg oral tablet	oral	noncardioselective beta-blockers
23490937006	Carvedilol	carvedilol 6.25 mg oral tablet	oral	noncardioselective beta-blockers
23490937103	Carvedilol	carvedilol 12.5 mg oral tablet	oral	noncardioselective beta-blockers
23490937106	Carvedilol	carvedilol 12.5 mg oral tablet	oral	noncardioselective beta-blockers
23490937203	Carvedilol	carvedilol 25 mg oral tablet	oral	noncardioselective beta-blockers
23490937206	Carvedilol	carvedilol 25 mg oral tablet	oral	noncardioselective beta-blockers
23629000101	Acebutolol Hydrochloride	acebutolol 200 mg oral capsule	oral	cardioselective beta-blockers
23629003901	Labetalol Hydrochloride	labetalol 300 mg oral tablet	oral	noncardioselective beta-blockers
23629004101	Labetalol Hydrochloride	labetalol 100 mg oral tablet	oral	noncardioselective beta-blockers
23629039001	Labetalol Hydrochloride	labetalol 300 mg oral tablet	oral	noncardioselective beta-blockers
23629041001	Labetalol Hydrochloride	labetalol 100 mg oral tablet	oral	noncardioselective beta-blockers
24090047088	Inderal LA	propranolol 60 mg oral capsule, extended release	oral	noncardioselective beta-blockers
24090047188	Inderal LA	propranolol 80 mg oral capsule, extended release	oral	noncardioselective beta-blockers
24090047388	Inderal LA	propranolol 120 mg oral capsule, extended release	oral	noncardioselective beta-blockers
24090047988	Inderal LA	propranolol 160 mg oral capsule, extended release	oral	noncardioselective beta-blockers
33358019230	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
33358019330	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
33358019430	Propranolol Hydrochloride	propranolol 60 mg oral tablet	oral	noncardioselective beta-blockers
33358024200	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
33358024230	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
33358024260	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
33358024290	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
33358024300	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
33358024330	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
43063000601	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
43063012593	Carvedilol	carvedilol 12.5 mg oral tablet	oral	noncardioselective beta-blockers
43063012693	Carvedilol	carvedilol 3.125 mg oral tablet	oral	noncardioselective beta-blockers
43063012793	Carvedilol	carvedilol 6.25 mg oral tablet	oral	noncardioselective beta-blockers
43063012993	Carvedilol	carvedilol 25 mg oral tablet	oral	noncardioselective beta-blockers
43063013330	Sotalol Hydrochloride	sotalol 80 mg oral tablet	oral	noncardioselective beta-blockers
43063013490	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 10 mg-6.25 mg oral tablet	oral	antihypertensive combinations
43063013590	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 2.5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
43063063090	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
43478090088	Propranolol Hydrochloride LA	propranolol 60 mg oral capsule, extended release	oral	noncardioselective beta-blockers

NDC Code	Brand Name	Generic Product Name	Route	Category
43478090188	Propranolol Hydrochloride LA	propranolol 80 mg oral capsule, extended release	oral	noncardioselective beta-blockers
43478090288	Propranolol Hydrochloride LA	propranolol 120 mg oral capsule, extended release	oral	noncardioselective beta-blockers
43478090388	Propranolol Hydrochloride LA	propranolol 160 mg oral capsule, extended release	oral	noncardioselective beta-blockers
49884028201	Propranolol Hydrochloride LA	propranolol 60 mg oral capsule, extended release	oral	noncardioselective beta-blockers
49884028210	Propranolol Hydrochloride LA	propranolol 60 mg oral capsule, extended release	oral	noncardioselective beta-blockers
49884032801	Propranolol Hydrochloride LA	propranolol 80 mg oral capsule, extended release	oral	noncardioselective beta-blockers
49884032810	Propranolol Hydrochloride LA	propranolol 80 mg oral capsule, extended release	oral	noncardioselective beta-blockers
49884032901	Propranolol Hydrochloride LA	propranolol 120 mg oral capsule, extended release	oral	noncardioselective beta-blockers
49884032910	Propranolol Hydrochloride LA	propranolol 120 mg oral capsule, extended release	oral	noncardioselective beta-blockers
49884033001	Propranolol Hydrochloride LA	propranolol 160 mg oral capsule, extended release	oral	noncardioselective beta-blockers
49884033010	Propranolol Hydrochloride LA	propranolol 160 mg oral capsule, extended release	oral	noncardioselective beta-blockers
49884040401	Metoprolol Succinate ER	metoprolol succinate 25 mg oral tablet, extended release	oral	cardioselective beta-blockers
49884040410	Metoprolol Succinate ER	metoprolol succinate 25 mg oral tablet, extended release	oral	cardioselective beta-blockers
49884040501	Metoprolol Succinate ER	metoprolol succinate 50 mg oral tablet, extended release	oral	cardioselective beta-blockers
49884040510	Metoprolol Succinate ER	metoprolol succinate 50 mg oral tablet, extended release	oral	cardioselective beta-blockers
49884040601	Metoprolol Succinate ER	metoprolol succinate 100 mg oral tablet, extended release	oral	cardioselective beta-blockers
49884040610	Metoprolol Succinate ER	metoprolol succinate 100 mg oral tablet, extended release	oral	cardioselective beta-blockers
49884040701	Metoprolol Succinate ER	metoprolol succinate 200 mg oral tablet, extended release	oral	cardioselective beta-blockers
49884040710	Metoprolol Succinate ER	metoprolol succinate 200 mg oral tablet, extended release	oral	cardioselective beta-blockers
49884041201	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
49884041210	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
49884041301	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
49884041310	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
49884044201	Pindolol	pindolol 5 mg oral tablet	oral	noncardioselective beta-blockers
49884044301	Pindolol	pindolol 10 mg oral tablet	oral	noncardioselective beta-blockers
49884045601	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
49884045610	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
49884045701	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
49884045710	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
49884058201	Sotalol Hydrochloride	sotalol 80 mg oral tablet	oral	noncardioselective beta-blockers

NDC Code	Brand Name	Generic Product Name	Route	Category
49884058210	Sotalol Hydrochloride	sotalol 80 mg oral tablet	oral	noncardioselective beta-blockers
49884058301	Sotalol Hydrochloride	sotalol 120 mg oral tablet	oral	noncardioselective beta-blockers
49884058310	Sotalol Hydrochloride	sotalol 120 mg oral tablet	oral	noncardioselective beta-blockers
49884058401	Sotalol Hydrochloride	sotalol 160 mg oral tablet	oral	noncardioselective beta-blockers
49884058410	Sotalol Hydrochloride	sotalol 160 mg oral tablet	oral	noncardioselective beta-blockers
49884058501	Sotalol Hydrochloride	sotalol 240 mg oral tablet	oral	noncardioselective beta-blockers
49884058510	Sotalol Hydrochloride	sotalol 240 mg oral tablet	oral	noncardioselective beta-blockers
49884058701	Acebutolol Hydrochloride	acebutolol 200 mg oral capsule	oral	cardioselective beta-blockers
49884058801	Acebutolol Hydrochloride	acebutolol 400 mg oral capsule	oral	cardioselective beta-blockers
49884094401	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
49884094410	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
49999001000	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
49999001030	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
49999001060	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
49999010400	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
49999010430	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
49999010460	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
49999017800	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
49999017830	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
49999020130	Nadolol	nadolol 40 mg oral tablet	oral	noncardioselective beta-blockers
49999020230	Nadolol	nadolol 80 mg oral tablet	oral	noncardioselective beta-blockers
49999020330	Nadolol	nadolol 160 mg oral tablet	oral	noncardioselective beta-blockers
49999022600	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
49999022630	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
49999022660	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
49999028660	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
49999045400	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
49999045410	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
49999045430	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
49999048230	Toprol-XL	metoprolol succinate 25 mg oral tablet, extended release	oral	cardioselective beta-blockers
49999048300	Toprol-XL	metoprolol succinate 50 mg oral tablet, extended release	oral	cardioselective beta-blockers
49999048330	Toprol-XL	metoprolol succinate 50 mg oral tablet, extended release	oral	cardioselective beta-blockers
49999048400	Toprol-XL	metoprolol succinate 100 mg oral tablet, extended release	oral	cardioselective beta-blockers
49999048430	Toprol-XL	metoprolol succinate 100 mg oral tablet, extended release	oral	cardioselective beta-blockers
49999051230	Atenolol-Chlorthalidone	atenolol-chlorthalidone 50 mg-25 mg oral tablet	oral	antihypertensive combinations
49999055590	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
49999057510	Metoprolol Tartrate	metoprolol tartrate 25 mg oral tablet	oral	cardioselective beta-blockers
49999057520	Metoprolol Tartrate	metoprolol tartrate 25 mg oral tablet	oral	cardioselective beta-blockers
49999057530	Metoprolol Tartrate	metoprolol tartrate 25 mg oral tablet	oral	cardioselective beta-blockers
49999057720	Coreg	carvedilol 3.125 mg oral tablet	oral	noncardioselective beta-blockers
49999086600	Bisoprolol Fumarate	bisoprolol 5 mg oral tablet	oral	cardioselective beta-blockers
49999087230	Coreg	carvedilol 25 mg oral tablet	oral	noncardioselective beta-blockers
49999093830	Coreg	carvedilol 12.5 mg oral tablet	oral	noncardioselective beta-blockers

NDC Code	Brand Name	Generic Product Name	Route	Category
49999093930	Coreg	carvedilol 6.25 mg oral tablet	oral	noncardioselective beta-blockers
49999099600	Toprol-XL	metoprolol succinate 200 mg oral tablet, extended release	oral	cardioselective beta-blockers
50111046701	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
50111046703	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
50111046801	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
50111046803	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
50111046901	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
50111046903	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
50111047001	Propranolol Hydrochloride	propranolol 60 mg oral tablet	oral	noncardioselective beta-blockers
50111047101	Propranolol Hydrochloride	propranolol 80 mg oral tablet	oral	noncardioselective beta-blockers
50111047102	Propranolol Hydrochloride	propranolol 80 mg oral tablet	oral	noncardioselective beta-blockers
50111047301	Hydrochlorothiazide-Propranolol	hydrochlorothiazide-propranolol 25 mg-40 mg oral tablet	oral	antihypertensive combinations
50111047302	Hydrochlorothiazide-Propranolol	hydrochlorothiazide-propranolol 25 mg-40 mg oral tablet	oral	antihypertensive combinations
50111047401	Hydrochlorothiazide-Propranolol	hydrochlorothiazide-propranolol 25 mg-80 mg oral tablet	oral	antihypertensive combinations
50111047402	Hydrochlorothiazide-Propranolol	hydrochlorothiazide-propranolol 25 mg-80 mg oral tablet	oral	antihypertensive combinations
50419010510	Betapace	sotalol 80 mg oral tablet	oral	noncardioselective beta-blockers
50419010511	Betapace	sotalol 80 mg oral tablet	oral	noncardioselective beta-blockers
50419010610	Betapace	sotalol 160 mg oral tablet	oral	noncardioselective beta-blockers
50419010611	Betapace	sotalol 160 mg oral tablet	oral	noncardioselective beta-blockers
50419010710	Betapace	sotalol 240 mg oral tablet	oral	noncardioselective beta-blockers
50419010711	Betapace	sotalol 240 mg oral tablet	oral	noncardioselective beta-blockers
50419010910	Betapace	sotalol 120 mg oral tablet	oral	noncardioselective beta-blockers
50419010911	Betapace	sotalol 120 mg oral tablet	oral	noncardioselective beta-blockers
50419011506	Betapace AF	sotalol AF 80 mg oral tablet	oral	noncardioselective beta-blockers
50419011511	Betapace AF	sotalol AF 80 mg oral tablet	oral	noncardioselective beta-blockers
50419011606	Betapace AF	sotalol AF 160 mg oral tablet	oral	noncardioselective beta-blockers
50419011611	Betapace AF	sotalol AF 160 mg oral tablet	oral	noncardioselective beta-blockers
50419011906	Betapace AF	sotalol AF 120 mg oral tablet	oral	noncardioselective beta-blockers
50419011911	Betapace AF	sotalol AF 120 mg oral tablet	oral	noncardioselective beta-blockers
51079025519	Metoprolol Tartrate	metoprolol tartrate 25 mg oral tablet	oral	cardioselective beta-blockers
51079027701	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
51079027719	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
51079027720	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
51079027801	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
51079027820	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
51079027901	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
51079027920	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
51079028001	Propranolol Hydrochloride	propranolol 80 mg oral tablet	oral	noncardioselective beta-blockers
51079028020	Propranolol Hydrochloride	propranolol 80 mg oral tablet	oral	noncardioselective beta-blockers
51079068401	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers

NDC Code	Brand Name	Generic Product Name	Route	Category
51079068419	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
51079068420	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
51079068463	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
51079068501	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
51079068520	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
51079075901	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
51079075919	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
51079075920	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
51079075963	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
51079077101	Carvedilol	carvedilol 3.125 mg oral tablet	oral	noncardioselective beta-blockers
51079077117	Carvedilol	carvedilol 3.125 mg oral tablet	oral	noncardioselective beta-blockers
51079077119	Carvedilol	carvedilol 3.125 mg oral tablet	oral	noncardioselective beta-blockers
51079077120	Carvedilol	carvedilol 3.125 mg oral tablet	oral	noncardioselective beta-blockers
51079080101	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
51079080119	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
51079080120	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
51079080130	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
51079080156	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
51079080157	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
51079080201	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
51079080219	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
51079080220	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
51079081201	Nadolol	nadolol 20 mg oral tablet	oral	noncardioselective beta-blockers
51079081220	Nadolol	nadolol 20 mg oral tablet	oral	noncardioselective beta-blockers
51079081301	Nadolol	nadolol 40 mg oral tablet	oral	noncardioselective beta-blockers
51079081320	Nadolol	nadolol 40 mg oral tablet	oral	noncardioselective beta-blockers
51079081401	Nadolol	nadolol 80 mg oral tablet	oral	noncardioselective beta-blockers
51079081420	Nadolol	nadolol 80 mg oral tablet	oral	noncardioselective beta-blockers
51079092801	Labetalol Hydrochloride	labetalol 100 mg oral tablet	oral	noncardioselective beta-blockers
51079092820	Labetalol Hydrochloride	labetalol 100 mg oral tablet	oral	noncardioselective beta-blockers
51079092901	Labetalol Hydrochloride	labetalol 200 mg oral tablet	oral	noncardioselective beta-blockers
51079092920	Labetalol Hydrochloride	labetalol 200 mg oral tablet	oral	noncardioselective beta-blockers
51079093001	Carvedilol	carvedilol 6.25 mg oral tablet	oral	noncardioselective beta-blockers
51079093017	Carvedilol	carvedilol 6.25 mg oral tablet	oral	noncardioselective beta-blockers
51079093019	Carvedilol	carvedilol 6.25 mg oral tablet	oral	noncardioselective beta-blockers
51079093020	Carvedilol	carvedilol 6.25 mg oral tablet	oral	noncardioselective beta-blockers
51079093101	Carvedilol	carvedilol 12.5 mg oral tablet	oral	noncardioselective beta-blockers
51079093117	Carvedilol	carvedilol 12.5 mg oral tablet	oral	noncardioselective beta-blockers
51079093119	Carvedilol	carvedilol 12.5 mg oral tablet	oral	noncardioselective beta-blockers
51079093120	Carvedilol	carvedilol 12.5 mg oral tablet	oral	noncardioselective beta-blockers
51079093201	Carvedilol	carvedilol 25 mg oral tablet	oral	noncardioselective beta-blockers
51079093220	Carvedilol	carvedilol 25 mg oral tablet	oral	noncardioselective beta-blockers
51079095401	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 2.5 mg-6.25 mg oral tablet	oral	antihypertensive combinations

NDC Code	Brand Name	Generic Product Name	Route	Category
51079095420	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 2.5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
51079095501	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
51079095520	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
51079095601	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 10 mg-6.25 mg oral tablet	oral	antihypertensive combinations
51079095620	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 10 mg-6.25 mg oral tablet	oral	antihypertensive combinations
51285004001	Ziac	bisoprolol-hydrochlorothiazide 10 mg-6.25 mg oral tablet	oral	antihypertensive combinations
51285004702	Ziac	bisoprolol-hydrochlorothiazide 2.5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
51285004901	Ziac	bisoprolol-hydrochlorothiazide 10 mg-6.25 mg oral tablet	oral	antihypertensive combinations
51285005002	Ziac	bisoprolol-hydrochlorothiazide 5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
51285006001	Zebeta	bisoprolol 5 mg oral tablet	oral	cardioselective beta-blockers
51285006101	Zebeta	bisoprolol 10 mg oral tablet	oral	cardioselective beta-blockers
51285083805	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
51655034924	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
51655035024	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
51655038424	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
51655053024	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
51655053025	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
51655053224	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
51655092624	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
51655092825	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
52152017902	Betaxolol Hydrochloride	betaxolol 10 mg oral tablet	oral	cardioselective beta-blockers
52152018002	Betaxolol Hydrochloride	betaxolol 20 mg oral tablet	oral	cardioselective beta-blockers
52544030501	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
52544030510	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
52544030601	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
52544030610	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
52544030701	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
52544030710	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
52544030801	Propranolol Hydrochloride	propranolol 80 mg oral tablet	oral	noncardioselective beta-blockers
52544030805	Propranolol Hydrochloride	propranolol 80 mg oral tablet	oral	noncardioselective beta-blockers
52544035201	Propranolol Hydrochloride	propranolol 60 mg oral tablet	oral	noncardioselective beta-blockers
52544035205	Propranolol Hydrochloride	propranolol 60 mg oral tablet	oral	noncardioselective beta-blockers
52544046310	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
52544060501	Labetalol Hydrochloride	labetalol 100 mg oral tablet	oral	noncardioselective beta-blockers
52544060505	Labetalol Hydrochloride	labetalol 100 mg oral tablet	oral	noncardioselective beta-blockers
52544060701	Labetalol Hydrochloride	labetalol 300 mg oral tablet	oral	noncardioselective beta-blockers
52544065401	Sotalol Hydrochloride	sotalol 80 mg oral tablet	oral	noncardioselective beta-blockers
52555045001	Atenolol-Chlorthalidone	atenolol-chlorthalidone 50 mg-25 mg oral tablet	oral	antihypertensive combinations
52555045101	Atenolol-Chlorthalidone	atenolol-chlorthalidone 100 mg-25 mg oral tablet	oral	antihypertensive combinations
52555045401	Pindolol	pindolol 5 mg oral tablet	oral	noncardioselective beta-blockers

NDC Code	Brand Name	Generic Product Name	Route	Category
52555045501	Pindolol	pindolol 10 mg oral tablet	oral	noncardioselective beta-blockers
52959021201	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
52959021210	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
52959021220	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
52959021245	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
52959021250	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
52959021260	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
52959024130	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 10 mg-6.25 mg oral tablet	oral	antihypertensive combinations
52959024730	Propranolol Hydrochloride LA	propranolol 80 mg oral capsule, extended release	oral	noncardioselective beta-blockers
52959025300	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
52959025320	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
52959025330	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
52959025340	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
52959025830	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
52959028030	Tenormin	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
52959033710	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
52959033730	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
52959046301	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
52959046330	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
52959046360	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
52959082730	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
52959083930	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
52959083960	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
52959089560	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
53265041210	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
53265041211	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
53265041310	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
53265041311	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
53265041410	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
53265041411	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
53489035401	Labetalol Hydrochloride	labetalol 100 mg oral tablet	oral	noncardioselective beta-blockers
53489035405	Labetalol Hydrochloride	labetalol 100 mg oral tablet	oral	noncardioselective beta-blockers
53489035501	Labetalol Hydrochloride	labetalol 200 mg oral tablet	oral	noncardioselective beta-blockers
53489035505	Labetalol Hydrochloride	labetalol 200 mg oral tablet	oral	noncardioselective beta-blockers
53489035601	Labetalol Hydrochloride	labetalol 300 mg oral tablet	oral	noncardioselective beta-blockers
53489035605	Labetalol Hydrochloride	labetalol 300 mg oral tablet	oral	noncardioselective beta-blockers
53489036601	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
53489036610	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
53489036701	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
53489036710	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
53489052901	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers

NDC Code	Brand Name	Generic Product Name	Route	Category
53489052910	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
53489053001	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
53489053010	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
53489053101	Atenolol-Chlorthalidone	atenolol-chlorthalidone 50 mg-25 mg oral tablet	oral	antihypertensive combinations
53489053201	Atenolol-Chlorthalidone	atenolol-chlorthalidone 100 mg-25 mg oral tablet	oral	antihypertensive combinations
53489053601	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
53489053610	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
53489055501	Bisoprolol Fumarate	bisoprolol 5 mg oral tablet	oral	cardioselective beta-blockers
53489055507	Bisoprolol Fumarate	bisoprolol 5 mg oral tablet	oral	cardioselective beta-blockers
53489055601	Bisoprolol Fumarate	bisoprolol 10 mg oral tablet	oral	cardioselective beta-blockers
53489055607	Bisoprolol Fumarate	bisoprolol 10 mg oral tablet	oral	cardioselective beta-blockers
53746022005	Propranolol Hydrochloride	propranolol 80 mg oral tablet	oral	noncardioselective beta-blockers
53746022079	Propranolol Hydrochloride	propranolol 80 mg oral tablet	oral	noncardioselective beta-blockers
54569044200	Propranolol Hydrochloride	propranolol 60 mg oral tablet	oral	noncardioselective beta-blockers
54569055700	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
54569055701	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
54569055703	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
54569055900	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
54569055901	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
54569055903	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
54569056101	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
54569056102	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
54569056103	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
54569056300	Inderal LA	propranolol 80 mg oral capsule, extended release	oral	noncardioselective beta-blockers
54569056400	Inderal LA	propranolol 120 mg oral capsule, extended release	oral	noncardioselective beta-blockers
54569059000	Normodyne	labetalol 200 mg oral tablet	oral	noncardioselective beta-blockers
54569059600	Tenoretic 50	atenolol-chlorthalidone 50 mg-25 mg oral tablet	oral	antihypertensive combinations
54569163400	Inderal LA	propranolol 60 mg oral capsule, extended release	oral	noncardioselective beta-blockers
54569249900	Propranolol Hydrochloride	propranolol 80 mg oral tablet	oral	noncardioselective beta-blockers
54569309700	Propranolol Hydrochloride LA	propranolol 80 mg oral capsule, extended release	oral	noncardioselective beta-blockers
54569343200	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
54569343201	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
54569343203	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
54569343204	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
54569343205	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
54569365400	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
54569365403	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
54569378700	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
54569378701	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
54569378702	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
54569378800	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
54569378801	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
54569378900	Nadolol	nadolol 20 mg oral tablet	oral	noncardioselective beta-blockers
54569379000	Nadolol	nadolol 40 mg oral tablet	oral	noncardioselective beta-blockers

NDC Code	Brand Name	Generic Product Name	Route	Category
54569379100	Nadolol	nadolol 80 mg oral tablet	oral	noncardioselective beta-blockers
54569388500	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
54569388502	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
54569444100	Toprol-XL	metoprolol succinate 50 mg oral tablet, extended release	oral	cardioselective beta-blockers
54569444200	Toprol-XL	metoprolol succinate 100 mg oral tablet, extended release	oral	cardioselective beta-blockers
54569470700	Ziac	bisoprolol-hydrochlorothiazide 2.5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
54569470800	Ziac	bisoprolol-hydrochlorothiazide 5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
54569471800	Toprol-XL	metoprolol succinate 200 mg oral tablet, extended release	oral	cardioselective beta-blockers
54569471801	Toprol-XL	metoprolol succinate 200 mg oral tablet, extended release	oral	cardioselective beta-blockers
54569536800	Ziac	bisoprolol-hydrochlorothiazide 10 mg-6.25 mg oral tablet	oral	antihypertensive combinations
54569538500	Coreg	carvedilol 3.125 mg oral tablet	oral	noncardioselective beta-blockers
54569540400	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
54569540401	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
54569541700	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 2.5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
54569541701	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 2.5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
54569541900	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 10 mg-6.25 mg oral tablet	oral	antihypertensive combinations
54569541901	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 10 mg-6.25 mg oral tablet	oral	antihypertensive combinations
54569587000	Metoprolol Succinate ER	metoprolol succinate 25 mg oral tablet, extended release	oral	cardioselective beta-blockers
54569595400	Metoprolol Succinate ER	metoprolol succinate 50 mg oral tablet, extended release	oral	cardioselective beta-blockers
54569596100	Metoprolol Succinate ER	metoprolol succinate 100 mg oral tablet, extended release	oral	cardioselective beta-blockers
54569853200	Corgard	nadolol 40 mg oral tablet	oral	noncardioselective beta-blockers
54569854300	Lopressor	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
54569854500	Lopressor	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
54569854501	Lopressor	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
54569857400	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
54569859100	Nadolol	nadolol 40 mg oral tablet	oral	noncardioselective beta-blockers
54738046801	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
54738046803	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
54738046901	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
54738046903	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
54868005200	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
54868005201	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
54868005202	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
54868005302	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
54868005303	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers

NDC Code	Brand Name	Generic Product Name	Route	Category
54868005306	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
54868005307	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
54868010600	Coreg CR	carvedilol 20 mg oral capsule, extended release	oral	noncardioselective beta-blockers
54868029300	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
54868029301	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
54868029303	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
54868029304	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
54868029305	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
54868029306	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
54868032100	Tenoretic 50	atenolol-chlorthalidone 50 mg-25 mg oral tablet	oral	antihypertensive combinations
54868067400	Corgard	nadolol 40 mg oral tablet	oral	noncardioselective beta-blockers
54868067401	Corgard	nadolol 40 mg oral tablet	oral	noncardioselective beta-blockers
54868068000	Inderal LA	propranolol 80 mg oral capsule, extended release	oral	noncardioselective beta-blockers
54868068001	Inderal LA	propranolol 80 mg oral capsule, extended release	oral	noncardioselective beta-blockers
54868068501	Lopressor	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
54868069601	Propranolol Hydrochloride	propranolol 80 mg oral tablet	oral	noncardioselective beta-blockers
54868069602	Propranolol Hydrochloride	propranolol 80 mg oral tablet	oral	noncardioselective beta-blockers
54868069603	Propranolol Hydrochloride	propranolol 80 mg oral tablet	oral	noncardioselective beta-blockers
54868070100	Tenormin	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
54868085400	Propranolol Hydrochloride LA	propranolol 160 mg oral capsule, extended release	oral	noncardioselective beta-blockers
54868085401	Propranolol Hydrochloride LA	propranolol 160 mg oral capsule, extended release	oral	noncardioselective beta-blockers
54868100401	Normodyne	labetalol 200 mg oral tablet	oral	noncardioselective beta-blockers
54868106300	Lopressor	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
54868106301	Lopressor	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
54868106302	Lopressor	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
54868107801	Propranolol Hydrochloride LA	propranolol 80 mg oral capsule, extended release	oral	noncardioselective beta-blockers
54868107803	Propranolol Hydrochloride LA	propranolol 80 mg oral capsule, extended release	oral	noncardioselective beta-blockers
54868107805	Propranolol Hydrochloride LA	propranolol 80 mg oral capsule, extended release	oral	noncardioselective beta-blockers
54868144100	Inderal LA	propranolol 60 mg oral capsule, extended release	oral	noncardioselective beta-blockers
54868144101	Inderal LA	propranolol 60 mg oral capsule, extended release	oral	noncardioselective beta-blockers
54868144200	Inderal LA	propranolol 120 mg oral capsule, extended release	oral	noncardioselective beta-blockers
54868144201	Inderal LA	propranolol 120 mg oral capsule, extended release	oral	noncardioselective beta-blockers
54868144202	Inderal LA	propranolol 120 mg oral capsule, extended release	oral	noncardioselective beta-blockers
54868151700	Propranolol Hydrochloride LA	propranolol 60 mg oral capsule, extended release	oral	noncardioselective beta-blockers
54868151701	Propranolol Hydrochloride LA	propranolol 60 mg oral capsule, extended release	oral	noncardioselective beta-blockers
54868151702	Propranolol Hydrochloride LA	propranolol 60 mg oral capsule, extended release	oral	noncardioselective beta-blockers

NDC Code	Brand Name	Generic Product Name	Route	Category
54868151703	Propranolol Hydrochloride LA	propranolol 60 mg oral capsule, extended release	oral	noncardioselective beta-blockers
54868151800	Propranolol Hydrochloride LA	propranolol 120 mg oral capsule, extended release	oral	noncardioselective beta-blockers
54868151801	Propranolol Hydrochloride LA	propranolol 120 mg oral capsule, extended release	oral	noncardioselective beta-blockers
54868151802	Propranolol Hydrochloride LA	propranolol 120 mg oral capsule, extended release	oral	noncardioselective beta-blockers
54868187100	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
54868187101	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
54868187102	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
54868187104	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
54868197100	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
54868197101	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
54868197103	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
54868234901	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
54868234902	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
54868234903	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
54868234904	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
54868234905	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
54868257200	Inderal LA	propranolol 160 mg oral capsule, extended release	oral	noncardioselective beta-blockers
54868257201	Inderal LA	propranolol 160 mg oral capsule, extended release	oral	noncardioselective beta-blockers
54868257202	Inderal LA	propranolol 160 mg oral capsule, extended release	oral	noncardioselective beta-blockers
54868268300	Atenolol-Chlorthalidone	atenolol-chlorthalidone 50 mg-25 mg oral tablet	oral	antihypertensive combinations
54868268301	Atenolol-Chlorthalidone	atenolol-chlorthalidone 50 mg-25 mg oral tablet	oral	antihypertensive combinations
54868268302	Atenolol-Chlorthalidone	atenolol-chlorthalidone 50 mg-25 mg oral tablet	oral	antihypertensive combinations
54868286400	Trandate	labetalol 100 mg oral tablet	oral	noncardioselective beta-blockers
54868286401	Trandate	labetalol 100 mg oral tablet	oral	noncardioselective beta-blockers
54868298900	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
54868298902	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
54868298903	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
54868298904	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
54868298905	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
54868298906	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
54868299000	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
54868299002	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
54868299003	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
54868299004	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
54868306400	Atenolol-Chlorthalidone	atenolol-chlorthalidone 100 mg-25 mg oral tablet	oral	antihypertensive combinations
54868325701	Nadolol	nadolol 40 mg oral tablet	oral	noncardioselective beta-blockers
54868325702	Nadolol	nadolol 40 mg oral tablet	oral	noncardioselective beta-blockers
54868325703	Nadolol	nadolol 40 mg oral tablet	oral	noncardioselective beta-blockers
54868325704	Nadolol	nadolol 40 mg oral tablet	oral	noncardioselective beta-blockers
54868325705	Nadolol	nadolol 40 mg oral tablet	oral	noncardioselective beta-blockers
54868358700	Toprol-XL	metoprolol succinate 50 mg oral tablet, extended release	oral	cardioselective beta-blockers

NDC Code	Brand Name	Generic Product Name	Route	Category
54868358701	Toprol-XL	metoprolol succinate 50 mg oral tablet, extended release	oral	cardioselective beta-blockers
54868358702	Toprol-XL	metoprolol succinate 50 mg oral tablet, extended release	oral	cardioselective beta-blockers
54868358703	Toprol-XL	metoprolol succinate 50 mg oral tablet, extended release	oral	cardioselective beta-blockers
54868358704	Toprol-XL	metoprolol succinate 50 mg oral tablet, extended release	oral	cardioselective beta-blockers
54868358705	Toprol-XL	metoprolol succinate 50 mg oral tablet, extended release	oral	cardioselective beta-blockers
54868372101	Nadolol	nadolol 80 mg oral tablet	oral	noncardioselective beta-blockers
54868372102	Nadolol	nadolol 80 mg oral tablet	oral	noncardioselective beta-blockers
54868417300	Ziac	bisoprolol-hydrochlorothiazide 5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
54868417900	Ziac	bisoprolol-hydrochlorothiazide 10 mg-6.25 mg oral tablet	oral	antihypertensive combinations
54868422300	Toprol-XL	metoprolol succinate 100 mg oral tablet, extended release	oral	cardioselective beta-blockers
54868422301	Toprol-XL	metoprolol succinate 100 mg oral tablet, extended release	oral	cardioselective beta-blockers
54868422302	Toprol-XL	metoprolol succinate 100 mg oral tablet, extended release	oral	cardioselective beta-blockers
54868422303	Toprol-XL	metoprolol succinate 100 mg oral tablet, extended release	oral	cardioselective beta-blockers
54868422304	Toprol-XL	metoprolol succinate 100 mg oral tablet, extended release	oral	cardioselective beta-blockers
54868439500	Coreg	carvedilol 25 mg oral tablet	oral	noncardioselective beta-blockers
54868439501	Coreg	carvedilol 25 mg oral tablet	oral	noncardioselective beta-blockers
54868439502	Coreg	carvedilol 25 mg oral tablet	oral	noncardioselective beta-blockers
54868439503	Coreg	carvedilol 25 mg oral tablet	oral	noncardioselective beta-blockers
54868439600	Coreg	carvedilol 12.5 mg oral tablet	oral	noncardioselective beta-blockers
54868439601	Coreg	carvedilol 12.5 mg oral tablet	oral	noncardioselective beta-blockers
54868439602	Coreg	carvedilol 12.5 mg oral tablet	oral	noncardioselective beta-blockers
54868439603	Coreg	carvedilol 12.5 mg oral tablet	oral	noncardioselective beta-blockers
54868442100	Coreg	carvedilol 3.125 mg oral tablet	oral	noncardioselective beta-blockers
54868442101	Coreg	carvedilol 3.125 mg oral tablet	oral	noncardioselective beta-blockers
54868442102	Coreg	carvedilol 3.125 mg oral tablet	oral	noncardioselective beta-blockers
54868442300	Betapace	sotalol 80 mg oral tablet	oral	noncardioselective beta-blockers
54868442400	Coreg	carvedilol 6.25 mg oral tablet	oral	noncardioselective beta-blockers
54868442401	Coreg	carvedilol 6.25 mg oral tablet	oral	noncardioselective beta-blockers
54868442402	Coreg	carvedilol 6.25 mg oral tablet	oral	noncardioselective beta-blockers
54868442403	Coreg	carvedilol 6.25 mg oral tablet	oral	noncardioselective beta-blockers
54868443500	Sotalol Hydrochloride	sotalol 80 mg oral tablet	oral	noncardioselective beta-blockers
54868443501	Sotalol Hydrochloride	sotalol 80 mg oral tablet	oral	noncardioselective beta-blockers
54868443502	Sotalol Hydrochloride	sotalol 80 mg oral tablet	oral	noncardioselective beta-blockers
54868443503	Sotalol Hydrochloride	sotalol 80 mg oral tablet	oral	noncardioselective beta-blockers
54868457600	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
54868457601	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
54868457602	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 5 mg-6.25 mg oral tablet	oral	antihypertensive combinations

NDC Code	Brand Name	Generic Product Name	Route	Category
54868457700	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 2.5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
54868457701	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 2.5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
54868457800	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 10 mg-6.25 mg oral tablet	oral	antihypertensive combinations
54868457801	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 10 mg-6.25 mg oral tablet	oral	antihypertensive combinations
54868462100	Zebeta	bisoprolol 5 mg oral tablet	oral	cardioselective beta-blockers
54868466100	Toprol-XL	metoprolol succinate 25 mg oral tablet, extended release	oral	cardioselective beta-blockers
54868466101	Toprol-XL	metoprolol succinate 25 mg oral tablet, extended release	oral	cardioselective beta-blockers
54868466102	Toprol-XL	metoprolol succinate 25 mg oral tablet, extended release	oral	cardioselective beta-blockers
54868466103	Toprol-XL	metoprolol succinate 25 mg oral tablet, extended release	oral	cardioselective beta-blockers
54868484400	Labetalol Hydrochloride	labetalol 200 mg oral tablet	oral	noncardioselective beta-blockers
54868484401	Labetalol Hydrochloride	labetalol 200 mg oral tablet	oral	noncardioselective beta-blockers
54868484402	Labetalol Hydrochloride	labetalol 200 mg oral tablet	oral	noncardioselective beta-blockers
54868490300	Labetalol Hydrochloride	labetalol 300 mg oral tablet	oral	noncardioselective beta-blockers
54868490301	Labetalol Hydrochloride	labetalol 300 mg oral tablet	oral	noncardioselective beta-blockers
54868490302	Labetalol Hydrochloride	labetalol 300 mg oral tablet	oral	noncardioselective beta-blockers
54868492100	Labetalol Hydrochloride	labetalol 100 mg oral tablet	oral	noncardioselective beta-blockers
54868492101	Labetalol Hydrochloride	labetalol 100 mg oral tablet	oral	noncardioselective beta-blockers
54868493200	Betaxolol Hydrochloride	betaxolol 10 mg oral tablet	oral	cardioselective beta-blockers
54868493201	Betaxolol Hydrochloride	betaxolol 10 mg oral tablet	oral	cardioselective beta-blockers
54868502100	Metoprolol Tartrate	metoprolol tartrate 25 mg oral tablet	oral	cardioselective beta-blockers
54868502101	Metoprolol Tartrate	metoprolol tartrate 25 mg oral tablet	oral	cardioselective beta-blockers
54868502102	Metoprolol Tartrate	metoprolol tartrate 25 mg oral tablet	oral	cardioselective beta-blockers
54868506800	Toprol-XL	metoprolol succinate 200 mg oral tablet, extended release	oral	cardioselective beta-blockers
54868506801	Toprol-XL	metoprolol succinate 200 mg oral tablet, extended release	oral	cardioselective beta-blockers
54868506802	Toprol-XL	metoprolol succinate 200 mg oral tablet, extended release	oral	cardioselective beta-blockers
54868506803	Toprol-XL	metoprolol succinate 200 mg oral tablet, extended release	oral	cardioselective beta-blockers
54868509500	Bisoprolol Fumarate	bisoprolol 5 mg oral tablet	oral	cardioselective beta-blockers
54868529500	Nadolol	nadolol 20 mg oral tablet	oral	noncardioselective beta-blockers
54868529501	Nadolol	nadolol 20 mg oral tablet	oral	noncardioselective beta-blockers
54868534400	Corzide 80/5	bendroflumethiazide-nadolol 5 mg-80 mg oral tablet	oral	antihypertensive combinations
54868534401	Corzide 80/5	bendroflumethiazide-nadolol 5 mg-80 mg oral tablet	oral	antihypertensive combinations
54868534402	Corzide 80/5	bendroflumethiazide-nadolol 5 mg-80 mg oral tablet	oral	antihypertensive combinations
54868539500	InnoPran XL	propranolol 120 mg oral capsule, extended release	oral	noncardioselective beta-blockers
54868540000	Hydrochlorothiazide-Metoprolol	hydrochlorothiazide-metoprolol 25 mg-50 mg oral tablet	oral	antihypertensive combinations
54868540001	Hydrochlorothiazide-Metoprolol	hydrochlorothiazide-metoprolol 25 mg-50 mg oral tablet	oral	antihypertensive combinations

NDC Code	Brand Name	Generic Product Name	Route	Category
54868552400	Hydrochlorothiazide-Metoprolol	hydrochlorothiazide-metoprolol 25 mg-100 mg oral tablet	oral	antihypertensive combinations
54868552401	Hydrochlorothiazide-Metoprolol	hydrochlorothiazide-metoprolol 25 mg-100 mg oral tablet	oral	antihypertensive combinations
54868554900	Sotalol Hydrochloride	sotalol 160 mg oral tablet	oral	noncardioselective beta-blockers
54868554901	Sotalol Hydrochloride	sotalol 160 mg oral tablet	oral	noncardioselective beta-blockers
54868556400	Propranolol Hydrochloride	propranolol 60 mg oral tablet	oral	noncardioselective beta-blockers
54868556401	Propranolol Hydrochloride	propranolol 60 mg oral tablet	oral	noncardioselective beta-blockers
54868558800	Nadolol	nadolol 160 mg oral tablet	oral	noncardioselective beta-blockers
54868561400	Sotalol Hydrochloride	sotalol 120 mg oral tablet	oral	noncardioselective beta-blockers
54868572900	Metoprolol Succinate ER	metoprolol succinate 25 mg oral tablet, extended release	oral	cardioselective beta-blockers
54868572901	Metoprolol Succinate ER	metoprolol succinate 25 mg oral tablet, extended release	oral	cardioselective beta-blockers
54868572902	Metoprolol Succinate ER	metoprolol succinate 25 mg oral tablet, extended release	oral	cardioselective beta-blockers
54868572903	Metoprolol Succinate ER	metoprolol succinate 25 mg oral tablet, extended release	oral	cardioselective beta-blockers
54868572904	Metoprolol Succinate ER	metoprolol succinate 25 mg oral tablet, extended release	oral	cardioselective beta-blockers
54868573000	Metoprolol Succinate ER	metoprolol succinate 50 mg oral tablet, extended release	oral	cardioselective beta-blockers
54868573001	Metoprolol Succinate ER	metoprolol succinate 50 mg oral tablet, extended release	oral	cardioselective beta-blockers
54868573002	Metoprolol Succinate ER	metoprolol succinate 50 mg oral tablet, extended release	oral	cardioselective beta-blockers
54868573003	Metoprolol Succinate ER	metoprolol succinate 50 mg oral tablet, extended release	oral	cardioselective beta-blockers
54868573100	Metoprolol Succinate ER	metoprolol succinate 100 mg oral tablet, extended release	oral	cardioselective beta-blockers
54868573101	Metoprolol Succinate ER	metoprolol succinate 100 mg oral tablet, extended release	oral	cardioselective beta-blockers
54868573102	Metoprolol Succinate ER	metoprolol succinate 100 mg oral tablet, extended release	oral	cardioselective beta-blockers
54868573103	Metoprolol Succinate ER	metoprolol succinate 100 mg oral tablet, extended release	oral	cardioselective beta-blockers
54868573200	Metoprolol Succinate ER	metoprolol succinate 200 mg oral tablet, extended release	oral	cardioselective beta-blockers
54868575500	Propranolol Hydrochloride LA	propranolol 80 mg oral capsule, extended release	oral	noncardioselective beta-blockers
54868575501	Propranolol Hydrochloride LA	propranolol 80 mg oral capsule, extended release	oral	noncardioselective beta-blockers
54868577100	Coreg CR	carvedilol 80 mg oral capsule, extended release	oral	noncardioselective beta-blockers
54868586900	Coreg CR	carvedilol 40 mg oral capsule, extended release	oral	noncardioselective beta-blockers
54921010110	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
54921010139	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
54921010510	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
54921010534	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
54921010539	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
54921010710	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
54921011510	Atenolol-Chlorthalidone	atenolol-chlorthalidone 50 mg-25 mg oral tablet	oral	antihypertensive combinations
54921011710	Atenolol-Chlorthalidone	atenolol-chlorthalidone 100 mg-25 mg oral tablet	oral	antihypertensive combinations
55045123607	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
55045123608	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers

NDC Code	Brand Name	Generic Product Name	Route	Category
55045123609	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
55045186001	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
55045186002	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
55045186006	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
55045186008	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
55045186009	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
55045207801	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
55045207806	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
55045207808	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
55045221700	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
55045221702	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
55045221706	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
55045221708	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
55045221709	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
55045226901	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
55045226902	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
55045226906	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
55045226908	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
55045226909	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
55045228200	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
55045228202	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
55045228206	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
55045228207	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
55045228208	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
55045228209	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
55045243101	Toprol-XL	metoprolol succinate 50 mg oral tablet, extended release	oral	cardioselective beta-blockers
55045243108	Toprol-XL	metoprolol succinate 50 mg oral tablet, extended release	oral	cardioselective beta-blockers
55045249801	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
55045249808	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
55045275508	Atenolol-Chlorthalidone	atenolol-chlorthalidone 50 mg-25 mg oral tablet	oral	antihypertensive combinations
55045299008	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
55045300608	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 10 mg-6.25 mg oral tablet	oral	antihypertensive combinations
55045316000	Sotalol Hydrochloride	sotalol 80 mg oral tablet	oral	noncardioselective beta-blockers
55045336101	Toprol-XL	metoprolol succinate 25 mg oral tablet, extended release	oral	cardioselective beta-blockers
55045336108	Toprol-XL	metoprolol succinate 25 mg oral tablet, extended release	oral	cardioselective beta-blockers
55045337108	Propranolol Hydrochloride	propranolol 60 mg oral tablet	oral	noncardioselective beta-blockers
55045376208	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
55045379801	Metoprolol Succinate ER	metoprolol succinate 25 mg oral tablet, extended release	oral	cardioselective beta-blockers
55111025201	Carvedilol	carvedilol 3.125 mg oral tablet	oral	noncardioselective beta-blockers
55111025205	Carvedilol	carvedilol 3.125 mg oral tablet	oral	noncardioselective beta-blockers
55111025301	Carvedilol	carvedilol 6.25 mg oral tablet	oral	noncardioselective beta-blockers
55111025305	Carvedilol	carvedilol 6.25 mg oral tablet	oral	noncardioselective beta-blockers
55111025401	Carvedilol	carvedilol 12.5 mg oral tablet	oral	noncardioselective beta-blockers

NDC Code	Brand Name	Generic Product Name	Route	Category
55111025405	Carvedilol	carvedilol 12.5 mg oral tablet	oral	noncardioselective beta-blockers
55111025501	Carvedilol	carvedilol 25 mg oral tablet	oral	noncardioselective beta-blockers
55111025505	Carvedilol	carvedilol 25 mg oral tablet	oral	noncardioselective beta-blockers
55289009330	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
55289009390	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
55289009393	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
55289009397	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
55289009650	Nadolol	nadolol 20 mg oral tablet	oral	noncardioselective beta-blockers
55289013197	Inderal	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
55289017130	Lopressor	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
55289022730	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
55289022790	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
55289022797	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
55289022801	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
55289022803	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
55289022806	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
55289022814	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
55289022830	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
55289022860	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
55289022890	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
55289022897	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
55289023301	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
55289023310	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
55289023312	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
55289023360	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
55289023390	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
55289023397	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
55289023401	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
55289023430	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
55289023460	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
55289023490	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
55289025430	Tenormin	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
55289038230	Metoprolol Tartrate	metoprolol tartrate 25 mg oral tablet	oral	cardioselective beta-blockers
55289038293	Metoprolol Tartrate	metoprolol tartrate 25 mg oral tablet	oral	cardioselective beta-blockers
55289041301	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
55289041330	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
55289041360	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
55289041390	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
55289041393	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
55289041394	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
55289041397	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
55289058730	Tenormin	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
55289062730	Lopressor	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
55289063030	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 5 mg-6.25 mg oral tablet	oral	antihypertensive combinations

NDC Code	Brand Name	Generic Product Name	Route	Category
55289065330	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
55289065390	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
55289085530	Toprol-XL	metoprolol succinate 50 mg oral tablet, extended release	oral	cardioselective beta-blockers
55289090230	Toprol-XL	metoprolol succinate 25 mg oral tablet, extended release	oral	cardioselective beta-blockers
55289098630	Coreg	carvedilol 6.25 mg oral tablet	oral	noncardioselective beta-blockers
55289098830	Atenolol-Chlorthalidone	atenolol-chlorthalidone 100 mg-25 mg oral tablet	oral	antihypertensive combinations
55289099330	Atenolol-Chlorthalidone	atenolol-chlorthalidone 50 mg-25 mg oral tablet	oral	antihypertensive combinations
55289099360	Atenolol-Chlorthalidone	atenolol-chlorthalidone 50 mg-25 mg oral tablet	oral	antihypertensive combinations
55289099390	Atenolol-Chlorthalidone	atenolol-chlorthalidone 50 mg-25 mg oral tablet	oral	antihypertensive combinations
55887004860	Carvedilol	carvedilol 6.25 mg oral tablet	oral	noncardioselective beta-blockers
55887004930	Carvedilol	carvedilol 25 mg oral tablet	oral	noncardioselective beta-blockers
55887004960	Carvedilol	carvedilol 25 mg oral tablet	oral	noncardioselective beta-blockers
55887007401	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
55887007430	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
55887007460	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
55887007490	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
55887018001	Labetalol Hydrochloride	labetalol 100 mg oral tablet	oral	noncardioselective beta-blockers
55887018030	Labetalol Hydrochloride	labetalol 100 mg oral tablet	oral	noncardioselective beta-blockers
55887024230	Sotalol Hydrochloride	sotalol 120 mg oral tablet	oral	noncardioselective beta-blockers
55887025930	Labetalol Hydrochloride	labetalol 200 mg oral tablet	oral	noncardioselective beta-blockers
55887026730	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 2.5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
55887027401	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
55887027430	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
55887027460	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
55887027490	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
55887034830	Nadolol	nadolol 40 mg oral tablet	oral	noncardioselective beta-blockers
55887034920	Nadolol	nadolol 20 mg oral tablet	oral	noncardioselective beta-blockers
55887034930	Nadolol	nadolol 20 mg oral tablet	oral	noncardioselective beta-blockers
55887034990	Nadolol	nadolol 20 mg oral tablet	oral	noncardioselective beta-blockers
55887045330	Propranolol Hydrochloride	propranolol 60 mg oral tablet	oral	noncardioselective beta-blockers
55887045360	Propranolol Hydrochloride	propranolol 60 mg oral tablet	oral	noncardioselective beta-blockers
55887047401	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
55887047430	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
55887047460	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
55887047490	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
55887047492	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
55887055901	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
55887055930	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
55887055960	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
55887055990	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
55887057560	Coreg	carvedilol 12.5 mg oral tablet	oral	noncardioselective beta-blockers
55887058501	Atenolol-Chlorthalidone	atenolol-chlorthalidone 50 mg-25 mg oral tablet	oral	antihypertensive combinations
55887058530	Atenolol-Chlorthalidone	atenolol-chlorthalidone 50 mg-25 mg oral tablet	oral	antihypertensive combinations
55887058560	Atenolol-Chlorthalidone	atenolol-chlorthalidone 50 mg-25 mg oral tablet	oral	antihypertensive combinations

NDC Code	Brand Name	Generic Product Name	Route	Category
55887058582	Atenolol-Chlorthalidone	atenolol-chlorthalidone 50 mg-25 mg oral tablet	oral	antihypertensive combinations
55887058590	Atenolol-Chlorthalidone	atenolol-chlorthalidone 50 mg-25 mg oral tablet	oral	antihypertensive combinations
55887059930	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
55887059960	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
55887059990	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
55887061330	Atenolol-Chlorthalidone	atenolol-chlorthalidone 100 mg-25 mg oral tablet	oral	antihypertensive combinations
55887061360	Atenolol-Chlorthalidone	atenolol-chlorthalidone 100 mg-25 mg oral tablet	oral	antihypertensive combinations
55887061382	Atenolol-Chlorthalidone	atenolol-chlorthalidone 100 mg-25 mg oral tablet	oral	antihypertensive combinations
55887062501	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 10 mg-6.25 mg oral tablet	oral	antihypertensive combinations
55887062530	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 10 mg-6.25 mg oral tablet	oral	antihypertensive combinations
55887062560	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 10 mg-6.25 mg oral tablet	oral	antihypertensive combinations
55887062590	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 10 mg-6.25 mg oral tablet	oral	antihypertensive combinations
55887072930	Toprol-XL	metoprolol succinate 50 mg oral tablet, extended release	oral	cardioselective beta-blockers
55887073160	Coreg	carvedilol 6.25 mg oral tablet	oral	noncardioselective beta-blockers
55887079290	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
55887083220	Metoprolol Tartrate	metoprolol tartrate 25 mg oral tablet	oral	cardioselective beta-blockers
55887083230	Metoprolol Tartrate	metoprolol tartrate 25 mg oral tablet	oral	cardioselective beta-blockers
55887083260	Metoprolol Tartrate	metoprolol tartrate 25 mg oral tablet	oral	cardioselective beta-blockers
55887083801	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
55887083830	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
55887083860	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
55887083890	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
55887099830	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
55887099860	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
55887099890	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
55953096140	Timolol Maleate	timolol 5 mg oral tablet	oral	noncardioselective beta-blockers
55953097240	Timolol Maleate	timolol 10 mg oral tablet	oral	noncardioselective beta-blockers
55953098440	Timolol Maleate	timolol 20 mg oral tablet	oral	noncardioselective beta-blockers
57664016608	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
57664016618	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
57664016708	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
57664016718	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
57664024213	Carvedilol	carvedilol 3.125 mg oral tablet	oral	noncardioselective beta-blockers
57664024218	Carvedilol	carvedilol 3.125 mg oral tablet	oral	noncardioselective beta-blockers
57664024288	Carvedilol	carvedilol 3.125 mg oral tablet	oral	noncardioselective beta-blockers
57664024413	Carvedilol	carvedilol 6.25 mg oral tablet	oral	noncardioselective beta-blockers
57664024418	Carvedilol	carvedilol 6.25 mg oral tablet	oral	noncardioselective beta-blockers
57664024488	Carvedilol	carvedilol 6.25 mg oral tablet	oral	noncardioselective beta-blockers
57664024513	Carvedilol	carvedilol 12.5 mg oral tablet	oral	noncardioselective beta-blockers
57664024518	Carvedilol	carvedilol 12.5 mg oral tablet	oral	noncardioselective beta-blockers

NDC Code	Brand Name	Generic Product Name	Route	Category
57664024588	Carvedilol	carvedilol 12.5 mg oral tablet	oral	noncardioselective beta-blockers
57664024713	Carvedilol	carvedilol 25 mg oral tablet	oral	noncardioselective beta-blockers
57664024718	Carvedilol	carvedilol 25 mg oral tablet	oral	noncardioselective beta-blockers
57664024788	Carvedilol	carvedilol 25 mg oral tablet	oral	noncardioselective beta-blockers
57664026418	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
57664026488	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
57664026518	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
57664026588	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
57664026618	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
57664026688	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
57664047708	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
57664047718	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
57664050608	Metoprolol Tartrate	metoprolol tartrate 25 mg oral tablet	oral	cardioselective beta-blockers
57664050618	Metoprolol Tartrate	metoprolol tartrate 25 mg oral tablet	oral	cardioselective beta-blockers
57866315501	Metoprolol Tartrate	metoprolol tartrate 25 mg oral tablet	oral	cardioselective beta-blockers
57866333001	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
57866333003	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
57866333101	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
57866333102	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
57866333201	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
57866430901	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
57866431301	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
57866431401	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
57866431501	Propranolol Hydrochloride	propranolol 60 mg oral tablet	oral	noncardioselective beta-blockers
57866431601	Propranolol Hydrochloride	propranolol 80 mg oral tablet	oral	noncardioselective beta-blockers
57866491101	Propranolol Hydrochloride LA	propranolol 60 mg oral capsule, extended release	oral	noncardioselective beta-blockers
57866491201	Propranolol Hydrochloride LA	propranolol 80 mg oral capsule, extended release	oral	noncardioselective beta-blockers
57866491301	Propranolol Hydrochloride LA	propranolol 120 mg oral capsule, extended release	oral	noncardioselective beta-blockers
57866491401	Propranolol Hydrochloride LA	propranolol 160 mg oral capsule, extended release	oral	noncardioselective beta-blockers
57866633701	Nadolol	nadolol 40 mg oral tablet	oral	noncardioselective beta-blockers
57866633801	Nadolol	nadolol 80 mg oral tablet	oral	noncardioselective beta-blockers
57866633901	Nadolol	nadolol 20 mg oral tablet	oral	noncardioselective beta-blockers
57866657801	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
57866657901	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
57866662201	Labetalol Hydrochloride	labetalol 100 mg oral tablet	oral	noncardioselective beta-blockers
57866662301	Labetalol Hydrochloride	labetalol 200 mg oral tablet	oral	noncardioselective beta-blockers
57866705301	Metoprolol Succinate ER	metoprolol succinate 25 mg oral tablet, extended release	oral	cardioselective beta-blockers
57866705401	Metoprolol Succinate ER	metoprolol succinate 50 mg oral tablet, extended release	oral	cardioselective beta-blockers
57866705601	Metoprolol Succinate ER	metoprolol succinate 100 mg oral tablet, extended release	oral	cardioselective beta-blockers
57866903201	Sotalol Hydrochloride	sotalol 80 mg oral tablet	oral	noncardioselective beta-blockers

NDC Code	Brand Name	Generic Product Name	Route	Category
57866903202	Sotalol Hydrochloride	sotalol 80 mg oral tablet	oral	noncardioselective beta-blockers
57866903203	Sotalol Hydrochloride	sotalol 80 mg oral tablet	oral	noncardioselective beta-blockers
57866903204	Sotalol Hydrochloride	sotalol 80 mg oral tablet	oral	noncardioselective beta-blockers
57866903301	Sotalol Hydrochloride	sotalol 120 mg oral tablet	oral	noncardioselective beta-blockers
57866903302	Sotalol Hydrochloride	sotalol 120 mg oral tablet	oral	noncardioselective beta-blockers
57866903303	Sotalol Hydrochloride	sotalol 120 mg oral tablet	oral	noncardioselective beta-blockers
57866903304	Sotalol Hydrochloride	sotalol 120 mg oral tablet	oral	noncardioselective beta-blockers
57866903401	Sotalol Hydrochloride	sotalol 160 mg oral tablet	oral	noncardioselective beta-blockers
57866903402	Sotalol Hydrochloride	sotalol 160 mg oral tablet	oral	noncardioselective beta-blockers
57866903403	Sotalol Hydrochloride	sotalol 160 mg oral tablet	oral	noncardioselective beta-blockers
57866903404	Sotalol Hydrochloride	sotalol 160 mg oral tablet	oral	noncardioselective beta-blockers
58016000100	Propranolol Hydrochloride	propranolol 60 mg oral tablet	oral	noncardioselective beta-blockers
58016000130	Propranolol Hydrochloride	propranolol 60 mg oral tablet	oral	noncardioselective beta-blockers
58016000160	Propranolol Hydrochloride	propranolol 60 mg oral tablet	oral	noncardioselective beta-blockers
58016000190	Propranolol Hydrochloride	propranolol 60 mg oral tablet	oral	noncardioselective beta-blockers
58016004500	Toprol-XL	metoprolol succinate 200 mg oral tablet, extended release	oral	cardioselective beta-blockers
58016004530	Toprol-XL	metoprolol succinate 200 mg oral tablet, extended release	oral	cardioselective beta-blockers
58016004560	Toprol-XL	metoprolol succinate 200 mg oral tablet, extended release	oral	cardioselective beta-blockers
58016004590	Toprol-XL	metoprolol succinate 200 mg oral tablet, extended release	oral	cardioselective beta-blockers
58016013600	Propranolol Hydrochloride LA	propranolol 80 mg oral capsule, extended release	oral	noncardioselective beta-blockers
58016013630	Propranolol Hydrochloride LA	propranolol 80 mg oral capsule, extended release	oral	noncardioselective beta-blockers
58016018800	Sotalol Hydrochloride	sotalol 80 mg oral tablet	oral	noncardioselective beta-blockers
58016018802	Sotalol Hydrochloride	sotalol 80 mg oral tablet	oral	noncardioselective beta-blockers
58016018830	Sotalol Hydrochloride	sotalol 80 mg oral tablet	oral	noncardioselective beta-blockers
58016018860	Sotalol Hydrochloride	sotalol 80 mg oral tablet	oral	noncardioselective beta-blockers
58016018890	Sotalol Hydrochloride	sotalol 80 mg oral tablet	oral	noncardioselective beta-blockers
58016028600	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
58016028602	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
58016028630	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
58016028660	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
58016028690	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
58016030030	Acebutolol Hydrochloride	acebutolol 200 mg oral capsule	oral	cardioselective beta-blockers
58016030060	Acebutolol Hydrochloride	acebutolol 200 mg oral capsule	oral	cardioselective beta-blockers
58016030090	Acebutolol Hydrochloride	acebutolol 200 mg oral capsule	oral	cardioselective beta-blockers

NDC Code	Brand Name	Generic Product Name	Route	Category
58016033100	Atenolol-Chlorthalidone	atenolol-chlorthalidone 100 mg-25 mg oral tablet	oral	antihypertensive combinations
58016033130	Atenolol-Chlorthalidone	atenolol-chlorthalidone 100 mg-25 mg oral tablet	oral	antihypertensive combinations
58016033160	Atenolol-Chlorthalidone	atenolol-chlorthalidone 100 mg-25 mg oral tablet	oral	antihypertensive combinations
58016033190	Atenolol-Chlorthalidone	atenolol-chlorthalidone 100 mg-25 mg oral tablet	oral	antihypertensive combinations
58016033300	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
58016033315	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
58016033330	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
58016033360	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
58016037300	Toprol-XL	metoprolol succinate 50 mg oral tablet, extended release	oral	cardioselective beta-blockers
58016037302	Toprol-XL	metoprolol succinate 50 mg oral tablet, extended release	oral	cardioselective beta-blockers
58016037390	Toprol-XL	metoprolol succinate 50 mg oral tablet, extended release	oral	cardioselective beta-blockers
58016044200	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
58016044202	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
58016044230	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
58016044260	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
58016044290	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
58016044299	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
58016052600	Atenolol-Chlorthalidone	atenolol-chlorthalidone 50 mg-25 mg oral tablet	oral	antihypertensive combinations
58016052602	Atenolol-Chlorthalidone	atenolol-chlorthalidone 50 mg-25 mg oral tablet	oral	antihypertensive combinations
58016052630	Atenolol-Chlorthalidone	atenolol-chlorthalidone 50 mg-25 mg oral tablet	oral	antihypertensive combinations
58016052660	Atenolol-Chlorthalidone	atenolol-chlorthalidone 50 mg-25 mg oral tablet	oral	antihypertensive combinations
58016052690	Atenolol-Chlorthalidone	atenolol-chlorthalidone 50 mg-25 mg oral tablet	oral	antihypertensive combinations
58016052800	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
58016052815	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
58016052830	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
58016052860	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
58016052900	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
58016052910	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
58016052915	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
58016052920	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
58016052930	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
58016052950	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
58016053100	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
58016053115	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
58016053130	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
58016053200	Propranolol Hydrochloride	propranolol 80 mg oral tablet	oral	noncardioselective beta-blockers
58016053202	Propranolol Hydrochloride	propranolol 80 mg oral tablet	oral	noncardioselective beta-blockers
58016053215	Propranolol Hydrochloride	propranolol 80 mg oral tablet	oral	noncardioselective beta-blockers
58016053230	Propranolol Hydrochloride	propranolol 80 mg oral tablet	oral	noncardioselective beta-blockers
58016053260	Propranolol Hydrochloride	propranolol 80 mg oral tablet	oral	noncardioselective beta-blockers
58016058200	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
58016058215	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
58016058220	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
58016058230	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
58016058260	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers

NDC Code	Brand Name	Generic Product Name	Route	Category
58016060400	Propranolol Hydrochloride LA	propranolol 80 mg oral capsule, extended release	oral	noncardioselective beta-blockers
58016060430	Propranolol Hydrochloride LA	propranolol 80 mg oral capsule, extended release	oral	noncardioselective beta-blockers
58016060460	Propranolol Hydrochloride LA	propranolol 80 mg oral capsule, extended release	oral	noncardioselective beta-blockers
58016060490	Propranolol Hydrochloride LA	propranolol 80 mg oral capsule, extended release	oral	noncardioselective beta-blockers
58016077100	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
58016077112	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
58016077115	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
58016077120	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
58016077130	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
58016077160	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
58016085900	Inderal LA	propranolol 80 mg oral capsule, extended release	oral	noncardioselective beta-blockers
58016085930	Inderal LA	propranolol 80 mg oral capsule, extended release	oral	noncardioselective beta-blockers
58016085960	Inderal LA	propranolol 80 mg oral capsule, extended release	oral	noncardioselective beta-blockers
58016085990	Inderal LA	propranolol 80 mg oral capsule, extended release	oral	noncardioselective beta-blockers
58016097400	Toprol-XL	metoprolol succinate 25 mg oral tablet, extended release	oral	cardioselective beta-blockers
58016097430	Toprol-XL	metoprolol succinate 25 mg oral tablet, extended release	oral	cardioselective beta-blockers
58016097460	Toprol-XL	metoprolol succinate 25 mg oral tablet, extended release	oral	cardioselective beta-blockers
58016097490	Toprol-XL	metoprolol succinate 25 mg oral tablet, extended release	oral	cardioselective beta-blockers
58177029304	Metoprolol Succinate ER	metoprolol succinate 25 mg oral tablet, extended release	oral	cardioselective beta-blockers
58177029309	Metoprolol Succinate ER	metoprolol succinate 25 mg oral tablet, extended release	oral	cardioselective beta-blockers
58177029311	Metoprolol Succinate ER	metoprolol succinate 25 mg oral tablet, extended release	oral	cardioselective beta-blockers
58177035804	Metoprolol Succinate ER	metoprolol succinate 200 mg oral tablet, extended release	oral	cardioselective beta-blockers
58177035809	Metoprolol Succinate ER	metoprolol succinate 200 mg oral tablet, extended release	oral	cardioselective beta-blockers
58177036804	Metoprolol Succinate ER	metoprolol succinate 100 mg oral tablet, extended release	oral	cardioselective beta-blockers
58177036809	Metoprolol Succinate ER	metoprolol succinate 100 mg oral tablet, extended release	oral	cardioselective beta-blockers
58177036811	Metoprolol Succinate ER	metoprolol succinate 100 mg oral tablet, extended release	oral	cardioselective beta-blockers
58177036904	Metoprolol Succinate ER	metoprolol succinate 50 mg oral tablet, extended release	oral	cardioselective beta-blockers
58177036909	Metoprolol Succinate ER	metoprolol succinate 50 mg oral tablet, extended release	oral	cardioselective beta-blockers
58177036911	Metoprolol Succinate ER	metoprolol succinate 50 mg oral tablet, extended release	oral	cardioselective beta-blockers
58864001601	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
58864001628	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
58864001630	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
58864001660	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
58864006501	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
58864006530	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
58864036330	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers

NDC Code	Brand Name	Generic Product Name	Route	Category
58864043160	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
58864064556	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
58864068030	Propranolol Hydrochloride	propranolol 60 mg oral tablet	oral	noncardioselective beta-blockers
58864069530	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
58864071730	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
58864072730	Coreg	carvedilol 25 mg oral tablet	oral	noncardioselective beta-blockers
58864073730	Coreg	carvedilol 6.25 mg oral tablet	oral	noncardioselective beta-blockers
58864074930	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
58864074990	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
58864075930	Toprol-XL	metoprolol succinate 100 mg oral tablet, extended release	oral	cardioselective beta-blockers
58864076530	Toprol-XL	metoprolol succinate 50 mg oral tablet, extended release	oral	cardioselective beta-blockers
58864078430	Bisoprolol-Hydrochlorothiazide	bisoprolol-hydrochlorothiazide 5 mg-6.25 mg oral tablet	oral	antihypertensive combinations
59591000768	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
59591019468	Timolol Maleate	timolol 10 mg oral tablet	oral	noncardioselective beta-blockers
59591026368	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
59591026568	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
59762125801	Bisoprolol Fumarate	bisoprolol 5 mg oral tablet	oral	cardioselective beta-blockers
59762125802	Bisoprolol Fumarate	bisoprolol 5 mg oral tablet	oral	cardioselective beta-blockers
59762126101	Bisoprolol Fumarate	bisoprolol 10 mg oral tablet	oral	cardioselective beta-blockers
59762126102	Bisoprolol Fumarate	bisoprolol 10 mg oral tablet	oral	cardioselective beta-blockers
59762130001	Metoprolol Tartrate	metoprolol tartrate 25 mg oral tablet	oral	cardioselective beta-blockers
59762130003	Metoprolol Tartrate	metoprolol tartrate 25 mg oral tablet	oral	cardioselective beta-blockers
59762130101	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
59762130103	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
59762130201	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
59762130203	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
59772246101	Nadolol	nadolol 20 mg oral tablet	oral	noncardioselective beta-blockers
59772246201	Nadolol	nadolol 40 mg oral tablet	oral	noncardioselective beta-blockers
59772246203	Nadolol	nadolol 40 mg oral tablet	oral	noncardioselective beta-blockers
59772246301	Nadolol	nadolol 80 mg oral tablet	oral	noncardioselective beta-blockers
59772246303	Nadolol	nadolol 80 mg oral tablet	oral	noncardioselective beta-blockers
59772246401	Nadolol	nadolol 120 mg oral tablet	oral	noncardioselective beta-blockers
59772246501	Nadolol	nadolol 160 mg oral tablet	oral	noncardioselective beta-blockers
59772369220	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
59772369305	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
59772880410	Pindolol	pindolol 5 mg oral tablet	oral	noncardioselective beta-blockers
59772880510	Pindolol	pindolol 10 mg oral tablet	oral	noncardioselective beta-blockers
59911547002	Propranolol Hydrochloride LA	propranolol 60 mg oral capsule, extended release	oral	noncardioselective beta-blockers
59911547102	Propranolol Hydrochloride LA	propranolol 80 mg oral capsule, extended release	oral	noncardioselective beta-blockers
59911547301	Propranolol Hydrochloride LA	propranolol 120 mg oral capsule, extended release	oral	noncardioselective beta-blockers

NDC Code	Brand Name	Generic Product Name	Route	Category
59911547302	Propranolol Hydrochloride LA	propranolol 120 mg oral capsule, extended release	oral	noncardioselective beta-blockers
60346052306	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
60429074801	Sotalol Hydrochloride	sotalol 80 mg oral tablet	oral	noncardioselective beta-blockers
60429074901	Sotalol Hydrochloride	sotalol 120 mg oral tablet	oral	noncardioselective beta-blockers
60429075001	Sotalol Hydrochloride	sotalol 160 mg oral tablet	oral	noncardioselective beta-blockers
60429075101	Sotalol Hydrochloride	sotalol 240 mg oral tablet	oral	noncardioselective beta-blockers
60429075301	Betaxolol Hydrochloride	betaxolol 10 mg oral tablet	oral	cardioselective beta-blockers
60429075401	Betaxolol Hydrochloride	betaxolol 20 mg oral tablet	oral	cardioselective beta-blockers
60505008000	Sotalol Hydrochloride	sotalol 80 mg oral tablet	oral	noncardioselective beta-blockers
60505008100	Sotalol Hydrochloride	sotalol 160 mg oral tablet	oral	noncardioselective beta-blockers
60505008200	Sotalol Hydrochloride	sotalol 240 mg oral tablet	oral	noncardioselective beta-blockers
60505015900	Sotalol Hydrochloride	sotalol 120 mg oral tablet	oral	noncardioselective beta-blockers
60505022201	Sotalol Hydrochloride AF	sotalol AF 80 mg oral tablet	oral	noncardioselective beta-blockers
60505022301	Sotalol Hydrochloride AF	sotalol AF 120 mg oral tablet	oral	noncardioselective beta-blockers
60505022401	Sotalol Hydrochloride AF	sotalol AF 160 mg oral tablet	oral	noncardioselective beta-blockers
60505260601	Carvedilol	carvedilol 3.125 mg oral tablet	oral	noncardioselective beta-blockers
60505260608	Carvedilol	carvedilol 3.125 mg oral tablet	oral	noncardioselective beta-blockers
60505260701	Carvedilol	carvedilol 6.25 mg oral tablet	oral	noncardioselective beta-blockers
60505260708	Carvedilol	carvedilol 6.25 mg oral tablet	oral	noncardioselective beta-blockers
60505260801	Carvedilol	carvedilol 12.5 mg oral tablet	oral	noncardioselective beta-blockers
60505260808	Carvedilol	carvedilol 12.5 mg oral tablet	oral	noncardioselective beta-blockers
60505260901	Carvedilol	carvedilol 25 mg oral tablet	oral	noncardioselective beta-blockers
60505260908	Carvedilol	carvedilol 25 mg oral tablet	oral	noncardioselective beta-blockers
60793028301	Corzide 40/5	bendroflumethiazide-nadolol 5 mg-40 mg oral tablet	oral	antihypertensive combinations
60793028401	Corzide 80/5	bendroflumethiazide-nadolol 5 mg-80 mg oral tablet	oral	antihypertensive combinations
60793080001	Corgard	nadolol 20 mg oral tablet	oral	noncardioselective beta-blockers
60793080101	Corgard	nadolol 40 mg oral tablet	oral	noncardioselective beta-blockers
60793080201	Corgard	nadolol 80 mg oral tablet	oral	noncardioselective beta-blockers
60814071001	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
60814071010	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
60814071101	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
60814071110	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
60951078270	Timolol Maleate	timolol 5 mg oral tablet	oral	noncardioselective beta-blockers
60951078370	Timolol Maleate	timolol 10 mg oral tablet	oral	noncardioselective beta-blockers
60976034643	Trandate	labetalol 100 mg oral tablet	oral	noncardioselective beta-blockers
60976034644	Trandate	labetalol 100 mg oral tablet	oral	noncardioselective beta-blockers
60976034647	Trandate	labetalol 100 mg oral tablet	oral	noncardioselective beta-blockers
60976034743	Trandate	labetalol 200 mg oral tablet	oral	noncardioselective beta-blockers
60976034744	Trandate	labetalol 200 mg oral tablet	oral	noncardioselective beta-blockers
60976034747	Trandate	labetalol 200 mg oral tablet	oral	noncardioselective beta-blockers
61392001830	Pindolol	pindolol 10 mg oral tablet	oral	noncardioselective beta-blockers
61392001831	Pindolol	pindolol 10 mg oral tablet	oral	noncardioselective beta-blockers
61392001832	Pindolol	pindolol 10 mg oral tablet	oral	noncardioselective beta-blockers
61392001839	Pindolol	pindolol 10 mg oral tablet	oral	noncardioselective beta-blockers

NDC Code	Brand Name	Generic Product Name	Route	Category
61392001845	Pindolol	pindolol 10 mg oral tablet	oral	noncardioselective beta-blockers
61392001851	Pindolol	pindolol 10 mg oral tablet	oral	noncardioselective beta-blockers
61392001854	Pindolol	pindolol 10 mg oral tablet	oral	noncardioselective beta-blockers
61392001856	Pindolol	pindolol 10 mg oral tablet	oral	noncardioselective beta-blockers
61392001860	Pindolol	pindolol 10 mg oral tablet	oral	noncardioselective beta-blockers
61392001890	Pindolol	pindolol 10 mg oral tablet	oral	noncardioselective beta-blockers
61392001891	Pindolol	pindolol 10 mg oral tablet	oral	noncardioselective beta-blockers
61392006930	Nadolol	nadolol 40 mg oral tablet	oral	noncardioselective beta-blockers
61392006931	Nadolol	nadolol 40 mg oral tablet	oral	noncardioselective beta-blockers
61392006932	Nadolol	nadolol 40 mg oral tablet	oral	noncardioselective beta-blockers
61392006939	Nadolol	nadolol 40 mg oral tablet	oral	noncardioselective beta-blockers
61392006945	Nadolol	nadolol 40 mg oral tablet	oral	noncardioselective beta-blockers
61392006951	Nadolol	nadolol 40 mg oral tablet	oral	noncardioselective beta-blockers
61392006954	Nadolol	nadolol 40 mg oral tablet	oral	noncardioselective beta-blockers
61392006960	Nadolol	nadolol 40 mg oral tablet	oral	noncardioselective beta-blockers
61392006990	Nadolol	nadolol 40 mg oral tablet	oral	noncardioselective beta-blockers
61392006991	Nadolol	nadolol 40 mg oral tablet	oral	noncardioselective beta-blockers
61392028030	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
61392028031	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
61392028032	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
61392028039	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
61392028045	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
61392028051	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
61392028054	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
61392028056	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
61392028060	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
61392028090	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
61392028091	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
61392028630	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
61392028631	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
61392028632	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
61392028639	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
61392028645	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
61392028651	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
61392028654	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
61392028656	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
61392028660	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
61392028690	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
61392028691	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
61392039530	Pindolol	pindolol 5 mg oral tablet	oral	noncardioselective beta-blockers
61392039531	Pindolol	pindolol 5 mg oral tablet	oral	noncardioselective beta-blockers
61392039532	Pindolol	pindolol 5 mg oral tablet	oral	noncardioselective beta-blockers
61392039539	Pindolol	pindolol 5 mg oral tablet	oral	noncardioselective beta-blockers
61392039545	Pindolol	pindolol 5 mg oral tablet	oral	noncardioselective beta-blockers
61392039551	Pindolol	pindolol 5 mg oral tablet	oral	noncardioselective beta-blockers

NDC Code	Brand Name	Generic Product Name	Route	Category
61392039554	Pindolol	pindolol 5 mg oral tablet	oral	noncardioselective beta-blockers
61392039556	Pindolol	pindolol 5 mg oral tablet	oral	noncardioselective beta-blockers
61392039560	Pindolol	pindolol 5 mg oral tablet	oral	noncardioselective beta-blockers
61392039590	Pindolol	pindolol 5 mg oral tablet	oral	noncardioselective beta-blockers
61392039591	Pindolol	pindolol 5 mg oral tablet	oral	noncardioselective beta-blockers
61392042030	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
61392042031	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
61392042032	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
61392042034	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
61392042039	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
61392042045	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
61392042051	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
61392042054	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
61392042056	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
61392042060	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
61392042090	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
61392042091	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
61392042330	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
61392042331	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
61392042332	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
61392042334	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
61392042339	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
61392042345	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
61392042351	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
61392042354	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
61392042356	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
61392042360	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
61392042390	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
61392042391	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
61392042730	Propranolol Hydrochloride	propranolol 80 mg oral tablet	oral	noncardioselective beta-blockers
61392042731	Propranolol Hydrochloride	propranolol 80 mg oral tablet	oral	noncardioselective beta-blockers
61392042732	Propranolol Hydrochloride	propranolol 80 mg oral tablet	oral	noncardioselective beta-blockers
61392042739	Propranolol Hydrochloride	propranolol 80 mg oral tablet	oral	noncardioselective beta-blockers
61392042745	Propranolol Hydrochloride	propranolol 80 mg oral tablet	oral	noncardioselective beta-blockers
61392042751	Propranolol Hydrochloride	propranolol 80 mg oral tablet	oral	noncardioselective beta-blockers
61392042754	Propranolol Hydrochloride	propranolol 80 mg oral tablet	oral	noncardioselective beta-blockers
61392042756	Propranolol Hydrochloride	propranolol 80 mg oral tablet	oral	noncardioselective beta-blockers
61392042760	Propranolol Hydrochloride	propranolol 80 mg oral tablet	oral	noncardioselective beta-blockers
61392042790	Propranolol Hydrochloride	propranolol 80 mg oral tablet	oral	noncardioselective beta-blockers
61392042791	Propranolol Hydrochloride	propranolol 80 mg oral tablet	oral	noncardioselective beta-blockers
61392043030	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
61392043031	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
61392043032	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
61392043039	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
61392043045	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers

NDC Code	Brand Name	Generic Product Name	Route	Category
61392043051	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
61392043054	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
61392043056	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
61392043060	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
61392043090	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
61392043091	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
61392054230	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
61392054231	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
61392054232	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
61392054239	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
61392054245	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
61392054251	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
61392054254	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
61392054260	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
61392054265	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
61392054290	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
61392054291	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
61392054330	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
61392054331	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
61392054332	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
61392054339	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
61392054345	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
61392054351	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
61392054354	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
61392054356	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
61392054360	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
61392054365	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
61392054390	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
61392054391	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
61392054630	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
61392054631	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
61392054632	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
61392054639	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
61392054645	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
61392054651	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
61392054654	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
61392054656	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
61392054660	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
61392054690	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
61392054691	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
61570017501	Corzide 40/5	bendroflumethiazide-nadolol 5 mg-40 mg oral tablet	oral	antihypertensive combinations
61570017601	Corzide 80/5	bendroflumethiazide-nadolol 5 mg-80 mg oral tablet	oral	antihypertensive combinations
61570020001	Corgard	nadolol 20 mg oral tablet	oral	noncardioselective beta-blockers
61570020056	Corgard	nadolol 20 mg oral tablet	oral	noncardioselective beta-blockers
61570020101	Corgard	nadolol 40 mg oral tablet	oral	noncardioselective beta-blockers

NDC Code	Brand Name	Generic Product Name	Route	Category
61570020110	Corgard	nadolol 40 mg oral tablet	oral	noncardioselective beta-blockers
61570020156	Corgard	nadolol 40 mg oral tablet	oral	noncardioselective beta-blockers
61570020201	Corgard	nadolol 80 mg oral tablet	oral	noncardioselective beta-blockers
61570020256	Corgard	nadolol 80 mg oral tablet	oral	noncardioselective beta-blockers
61570020301	Corgard	nadolol 120 mg oral tablet	oral	noncardioselective beta-blockers
61570020401	Corgard	nadolol 160 mg oral tablet	oral	noncardioselective beta-blockers
62037083001	Metoprolol Succinate ER	metoprolol succinate 25 mg oral tablet, extended release	oral	cardioselective beta-blockers
62037083010	Metoprolol Succinate ER	metoprolol succinate 25 mg oral tablet, extended release	oral	cardioselective beta-blockers
62037083101	Metoprolol Succinate ER	metoprolol succinate 50 mg oral tablet, extended release	oral	cardioselective beta-blockers
62037083110	Metoprolol Succinate ER	metoprolol succinate 50 mg oral tablet, extended release	oral	cardioselective beta-blockers
62269025624	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
62269025630	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
62269025654	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
62269025724	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
62269025924	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
62269025930	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
62584026501	Metoprolol Tartrate	metoprolol tartrate 25 mg oral tablet	oral	cardioselective beta-blockers
62584026511	Metoprolol Tartrate	metoprolol tartrate 25 mg oral tablet	oral	cardioselective beta-blockers
62584026601	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
62584026611	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
62584026701	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
62584026711	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
62584046701	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
62584046711	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
62584046780	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
62584046785	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
62584071501	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
62584071511	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
62584078801	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
62584078811	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
62584084201	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
62584084285	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
62584084301	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
62584084385	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
63304057901	Metoprolol Tartrate	metoprolol tartrate 25 mg oral tablet	oral	cardioselective beta-blockers
63304057910	Metoprolol Tartrate	metoprolol tartrate 25 mg oral tablet	oral	cardioselective beta-blockers
63304058001	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
63304058010	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
63304058101	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
63304058110	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
63304062101	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
63304062110	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
63304062201	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
63304062210	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
63304062301	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers

NDC Code	Brand Name	Generic Product Name	Route	Category
63304062310	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
63629142301	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
63629142302	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
63629146201	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
63629146202	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
63629146301	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
63629146302	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
63629146303	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
63629146304	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
63629257001	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
63629257002	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
63629257003	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
63629290901	Atenolol-Chlorthalidone	atenolol-chlorthalidone 50 mg-25 mg oral tablet	oral	antihypertensive combinations
63629290902	Atenolol-Chlorthalidone	atenolol-chlorthalidone 50 mg-25 mg oral tablet	oral	antihypertensive combinations
63629290903	Atenolol-Chlorthalidone	atenolol-chlorthalidone 50 mg-25 mg oral tablet	oral	antihypertensive combinations
63629290904	Atenolol-Chlorthalidone	atenolol-chlorthalidone 50 mg-25 mg oral tablet	oral	antihypertensive combinations
63739002701	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
63739002703	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
63739002710	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
63739002715	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
63739002801	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
63739002803	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
63739002810	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
63739002815	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
63739017301	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
63739017303	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
63739017310	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
63739017315	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
63739036610	Labetalol Hydrochloride	labetalol 200 mg oral tablet	oral	noncardioselective beta-blockers
63739040510	Metoprolol Tartrate	metoprolol tartrate 25 mg oral tablet	oral	cardioselective beta-blockers
63739042810	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
63874033201	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
63874033202	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
63874033207	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
63874033210	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
63874033214	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
63874033215	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
63874033220	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
63874033230	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
63874033260	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
63874033290	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
63874036801	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
63874036802	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
63874036815	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
63874036820	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers

NDC Code	Brand Name	Generic Product Name	Route	Category
63874036828	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
63874036830	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
63874036860	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
63874038801	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
63874038807	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
63874038810	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
63874038812	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
63874038815	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
63874038820	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
63874038830	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
63874040601	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
63874040610	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
63874040614	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
63874040615	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
63874040620	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
63874040628	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
63874040630	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
63874040660	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
63874040701	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
63874040710	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
63874040715	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
63874040720	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
63874040730	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
63874040760	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
63874040790	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
63874045401	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
63874045402	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
63874045404	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
63874045415	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
63874045420	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
63874045430	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
63874045460	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
63874046801	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
63874046810	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
63874046814	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
63874046815	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
63874046820	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
63874046830	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
63874046860	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
63874046890	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
63874048601	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
63874048602	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
63874048615	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
63874048630	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
63874048640	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers

NDC Code	Brand Name	Generic Product Name	Route	Category
63874048660	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
63874067601	Atenolol-Chlorthalidone	atenolol-chlorthalidone 100 mg-25 mg oral tablet	oral	antihypertensive combinations
63874067612	Atenolol-Chlorthalidone	atenolol-chlorthalidone 100 mg-25 mg oral tablet	oral	antihypertensive combinations
63874067615	Atenolol-Chlorthalidone	atenolol-chlorthalidone 100 mg-25 mg oral tablet	oral	antihypertensive combinations
63874067620	Atenolol-Chlorthalidone	atenolol-chlorthalidone 100 mg-25 mg oral tablet	oral	antihypertensive combinations
64376050301	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
64376050310	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
65162066910	Acebutolol Hydrochloride	acebutolol 200 mg oral capsule	oral	cardioselective beta-blockers
65162067010	Acebutolol Hydrochloride	acebutolol 400 mg oral capsule	oral	cardioselective beta-blockers
65162072510	Sotalol Hydrochloride AF	sotalol AF 80 mg oral tablet	oral	noncardioselective beta-blockers
65162072710	Sotalol Hydrochloride AF	sotalol AF 120 mg oral tablet	oral	noncardioselective beta-blockers
65162073110	Sotalol Hydrochloride AF	sotalol AF 160 mg oral tablet	oral	noncardioselective beta-blockers
65483039110	Trandate	labetalol 100 mg oral tablet	oral	noncardioselective beta-blockers
65483039111	Trandate	labetalol 100 mg oral tablet	oral	noncardioselective beta-blockers
65483039150	Trandate	labetalol 100 mg oral tablet	oral	noncardioselective beta-blockers
65483039210	Trandate	labetalol 200 mg oral tablet	oral	noncardioselective beta-blockers
65483039222	Trandate	labetalol 200 mg oral tablet	oral	noncardioselective beta-blockers
65483039250	Trandate	labetalol 200 mg oral tablet	oral	noncardioselective beta-blockers
65483039310	Trandate	labetalol 300 mg oral tablet	oral	noncardioselective beta-blockers
65483039333	Trandate	labetalol 300 mg oral tablet	oral	noncardioselective beta-blockers
65483039350	Trandate	labetalol 300 mg oral tablet	oral	noncardioselective beta-blockers
65726025010	InnoPran XL	propranolol 80 mg oral capsule, extended release	oral	noncardioselective beta-blockers
65726025025	InnoPran XL	propranolol 80 mg oral capsule, extended release	oral	noncardioselective beta-blockers
65726025110	InnoPran XL	propranolol 120 mg oral capsule, extended release	oral	noncardioselective beta-blockers
65726025125	InnoPran XL	propranolol 120 mg oral capsule, extended release	oral	noncardioselective beta-blockers
65862006201	Metoprolol Tartrate	metoprolol tartrate 25 mg oral tablet	oral	cardioselective beta-blockers
65862006301	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
65862006399	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
65862006401	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
65862006499	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
65862008601	Bisoprolol Fumarate	bisoprolol 5 mg oral tablet	oral	cardioselective beta-blockers
65862008630	Bisoprolol Fumarate	bisoprolol 5 mg oral tablet	oral	cardioselective beta-blockers
65862008701	Bisoprolol Fumarate	bisoprolol 10 mg oral tablet	oral	cardioselective beta-blockers
65862008730	Bisoprolol Fumarate	bisoprolol 10 mg oral tablet	oral	cardioselective beta-blockers
65862014201	Carvedilol	carvedilol 3.125 mg oral tablet	oral	noncardioselective beta-blockers
65862014301	Carvedilol	carvedilol 6.25 mg oral tablet	oral	noncardioselective beta-blockers
65862014401	Carvedilol	carvedilol 12.5 mg oral tablet	oral	noncardioselective beta-blockers
65862014501	Carvedilol	carvedilol 25 mg oral tablet	oral	noncardioselective beta-blockers
65862016801	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
65862016899	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
65862016901	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
65862016999	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
65862017001	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
65862017099	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
66105099403	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers

NDC Code	Brand Name	Generic Product Name	Route	Category
66105099406	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
66105099410	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
66105099411	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
66105099415	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
66105099603	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
66105099606	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
66105099610	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
66105099611	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
66105099615	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
66116023930	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
66116045530	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
66267003130	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
66336012560	Coreg	carvedilol 3.125 mg oral tablet	oral	noncardioselective beta-blockers
66336012660	Coreg	carvedilol 6.25 mg oral tablet	oral	noncardioselective beta-blockers
66336051430	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
66336051460	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
66336052330	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
66336052360	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
66336058730	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
66336058760	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
66336058790	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
66336071930	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
66336071960	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
67046003030	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
67046047530	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
67046047630	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
67046059030	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
67046059060	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
67253042010	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
67253042011	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
67253042110	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
67253042111	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
67253042210	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
67253042211	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
67286417701	Sectral	acebutolol 200 mg oral capsule	oral	cardioselective beta-blockers
67286417901	Sectral	acebutolol 400 mg oral capsule	oral	cardioselective beta-blockers
67801030430	Toprol-XL	metoprolol succinate 50 mg oral tablet, extended release	oral	cardioselective beta-blockers
67801031530	Toprol-XL	metoprolol succinate 100 mg oral tablet, extended release	oral	cardioselective beta-blockers
67801031603	Toprol-XL	metoprolol succinate 200 mg oral tablet, extended release	oral	cardioselective beta-blockers
67857070001	Sectral	acebutolol 200 mg oral capsule	oral	cardioselective beta-blockers
67857070101	Sectral	acebutolol 400 mg oral capsule	oral	cardioselective beta-blockers
68084020901	Propranolol Hydrochloride LA	propranolol 60 mg oral capsule, extended release	oral	noncardioselective beta-blockers

NDC Code	Brand Name	Generic Product Name	Route	Category
68084020911	Propranolol Hydrochloride LA	propranolol 60 mg oral capsule, extended release	oral	noncardioselective beta-blockers
68084021001	Propranolol Hydrochloride LA	propranolol 80 mg oral capsule, extended release	oral	noncardioselective beta-blockers
68084021011	Propranolol Hydrochloride LA	propranolol 80 mg oral capsule, extended release	oral	noncardioselective beta-blockers
68084021101	Propranolol Hydrochloride LA	propranolol 120 mg oral capsule, extended release	oral	noncardioselective beta-blockers
68084021111	Propranolol Hydrochloride LA	propranolol 120 mg oral capsule, extended release	oral	noncardioselective beta-blockers
68084021201	Propranolol Hydrochloride LA	propranolol 160 mg oral capsule, extended release	oral	noncardioselective beta-blockers
68084021211	Propranolol Hydrochloride LA	propranolol 160 mg oral capsule, extended release	oral	noncardioselective beta-blockers
68084026101	Carvedilol	carvedilol 3.125 mg oral tablet	oral	noncardioselective beta-blockers
68084026111	Carvedilol	carvedilol 3.125 mg oral tablet	oral	noncardioselective beta-blockers
68084026201	Carvedilol	carvedilol 6.25 mg oral tablet	oral	noncardioselective beta-blockers
68084026211	Carvedilol	carvedilol 6.25 mg oral tablet	oral	noncardioselective beta-blockers
68084026301	Carvedilol	carvedilol 12.5 mg oral tablet	oral	noncardioselective beta-blockers
68084026311	Carvedilol	carvedilol 12.5 mg oral tablet	oral	noncardioselective beta-blockers
68084026401	Carvedilol	carvedilol 25 mg oral tablet	oral	noncardioselective beta-blockers
68084026411	Carvedilol	carvedilol 25 mg oral tablet	oral	noncardioselective beta-blockers
68115003830	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
68115003930	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
68115003960	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
68115003990	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
68115004015	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
68115004030	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
68115004060	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
68115004090	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
68115023800	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
68115023830	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
68115023860	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
68115023890	Metoprolol Tartrate	metoprolol tartrate 100 mg oral tablet	oral	cardioselective beta-blockers
68115023930	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
68115023960	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
68115023990	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
68115023997	Metoprolol Tartrate	metoprolol tartrate 50 mg oral tablet	oral	cardioselective beta-blockers
68115030760	Propranolol Hydrochloride	propranolol 10 mg oral tablet	oral	noncardioselective beta-blockers
68115030860	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
68115030899	Propranolol Hydrochloride	propranolol 20 mg oral tablet	oral	noncardioselective beta-blockers
68115030930	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
68115030960	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
68115030990	Propranolol Hydrochloride	propranolol 40 mg oral tablet	oral	noncardioselective beta-blockers
68115031030	Propranolol Hydrochloride	propranolol 80 mg oral tablet	oral	noncardioselective beta-blockers

NDC Code	Brand Name	Generic Product Name	Route	Category
68115031060	Propranolol Hydrochloride	propranolol 80 mg oral tablet	oral	noncardioselective beta-blockers
68115041930	Toprol-XL	metoprolol succinate 25 mg oral tablet, extended release	oral	cardioselective beta-blockers
68115055100	Coreg	carvedilol 6.25 mg oral tablet	oral	noncardioselective beta-blockers
68115062900	Propranolol Hydrochloride	propranolol 60 mg oral tablet	oral	noncardioselective beta-blockers
68115062930	Propranolol Hydrochloride	propranolol 60 mg oral tablet	oral	noncardioselective beta-blockers
68115066100	Sotalol Hydrochloride	sotalol 80 mg oral tablet	oral	noncardioselective beta-blockers
68115071500	Toprol-XL	metoprolol succinate 200 mg oral tablet, extended release	oral	cardioselective beta-blockers
68115072700	Coreg	carvedilol 25 mg oral tablet	oral	noncardioselective beta-blockers
68115074100	Toprol-XL	metoprolol succinate 25 mg oral tablet, extended release	oral	cardioselective beta-blockers
68382002201	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
68382002210	Atenolol	atenolol 25 mg oral tablet	oral	cardioselective beta-blockers
68382002301	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
68382002310	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
68382002401	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
68382002410	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
68382009201	Carvedilol	carvedilol 3.125 mg oral tablet	oral	noncardioselective beta-blockers
68382009205	Carvedilol	carvedilol 3.125 mg oral tablet	oral	noncardioselective beta-blockers
68382009217	Carvedilol	carvedilol 3.125 mg oral tablet	oral	noncardioselective beta-blockers
68382009301	Carvedilol	carvedilol 6.25 mg oral tablet	oral	noncardioselective beta-blockers
68382009305	Carvedilol	carvedilol 6.25 mg oral tablet	oral	noncardioselective beta-blockers
68382009317	Carvedilol	carvedilol 6.25 mg oral tablet	oral	noncardioselective beta-blockers
68382009401	Carvedilol	carvedilol 12.5 mg oral tablet	oral	noncardioselective beta-blockers
68382009405	Carvedilol	carvedilol 12.5 mg oral tablet	oral	noncardioselective beta-blockers
68382009417	Carvedilol	carvedilol 12.5 mg oral tablet	oral	noncardioselective beta-blockers
68382009501	Carvedilol	carvedilol 25 mg oral tablet	oral	noncardioselective beta-blockers
68382009505	Carvedilol	carvedilol 25 mg oral tablet	oral	noncardioselective beta-blockers
68382009517	Carvedilol	carvedilol 25 mg oral tablet	oral	noncardioselective beta-blockers
68387053830	Atenolol	atenolol 50 mg oral tablet	oral	cardioselective beta-blockers
68387053930	Atenolol	atenolol 100 mg oral tablet	oral	cardioselective beta-blockers
68462016201	Carvedilol	carvedilol 3.125 mg oral tablet	oral	noncardioselective beta-blockers
68462016205	Carvedilol	carvedilol 3.125 mg oral tablet	oral	noncardioselective beta-blockers
68462016301	Carvedilol	carvedilol 6.25 mg oral tablet	oral	noncardioselective beta-blockers
68462016305	Carvedilol	carvedilol 6.25 mg oral tablet	oral	noncardioselective beta-blockers
68462016401	Carvedilol	carvedilol 12.5 mg oral tablet	oral	noncardioselective beta-blockers
68462016405	Carvedilol	carvedilol 12.5 mg oral tablet	oral	noncardioselective beta-blockers
68462016501	Carvedilol	carvedilol 25 mg oral tablet	oral	noncardioselective beta-blockers
68462016505	Carvedilol	carvedilol 25 mg oral tablet	oral	noncardioselective beta-blockers

NDC Code	Brand Name	Generic Product Name	Route	Category
00074301460	Azmacort	triamcinolone 75 mcg/inh inhalation aerosol	inhalation	inhaled corticosteroids
00075006037	Azmacort	triamcinolone 100 mcg/inh inhalation aerosol with adapter	inhalation	inhaled corticosteroids
00085134101	Asmanex Twisthaler 120 Dose	mometasone 220 mcg/inh inhalation aerosol powder	inhalation	inhaled corticosteroids
00085134102	Asmanex Twisthaler 60 Dose	mometasone 220 mcg/inh inhalation aerosol powder	inhalation	inhaled corticosteroids
00085134103	Asmanex Twisthaler 30 Dose	mometasone 220 mcg/inh inhalation aerosol powder	inhalation	inhaled corticosteroids
00085134104	Asmanex Twisthaler 14 Dose	mometasone 220 mcg/inh inhalation aerosol powder	inhalation	inhaled corticosteroids
00085146102	Asmanex Twisthaler 30 Dose	mometasone 110 mcg/inh inhalation aerosol powder	inhalation	inhaled corticosteroids
00085146107	Asmanex Twisthaler 7 Dose	mometasone 110 mcg/inh inhalation aerosol powder	inhalation	inhaled corticosteroids
00093681573	Budesonide	budesonide 0.25 mg/2 mL inhalation suspension	inhalation	inhaled corticosteroids
00093681673	Budesonide	budesonide 0.5 mg/2 mL inhalation suspension	inhalation	inhaled corticosteroids
00173049100	Flovent	fluticasone 44 mcg/inh inhalation aerosol with adapter	inhalation	inhaled corticosteroids
00173049400	Flovent	fluticasone 110 mcg/inh inhalation aerosol with adapter	inhalation	inhaled corticosteroids
00173049500	Flovent	fluticasone 220 mcg/inh inhalation aerosol with adapter	inhalation	inhaled corticosteroids
00173049700	Flovent	fluticasone 44 mcg/inh inhalation aerosol with adapter	inhalation	inhaled corticosteroids
00173049800	Flovent	fluticasone 110 mcg/inh inhalation aerosol with adapter	inhalation	inhaled corticosteroids
00173049900	Flovent	fluticasone 220 mcg/inh inhalation aerosol with adapter	inhalation	inhaled corticosteroids
00173050400	Flovent Rotadisk	fluticasone 250 mcg inhalation powder	inhalation	inhaled corticosteroids
00173051100	Flovent Rotadisk	fluticasone 50 mcg inhalation powder	inhalation	inhaled corticosteroids
00173060002	Flovent Diskus	fluticasone 50 mcg inhalation powder	inhalation	inhaled corticosteroids
00173060102	Flovent Diskus	fluticasone 250 mcg inhalation powder	inhalation	inhaled corticosteroids
00173060202	Flovent Diskus	fluticasone 100 mcg inhalation powder	inhalation	inhaled corticosteroids
00173069500	Advair Diskus	fluticasone-salmeterol 100 mcg-50 mcg inhalation powder	inhalation	bronchodilator combinations
00173069502	Advair Diskus	fluticasone-salmeterol 100 mcg-50 mcg inhalation powder	inhalation	bronchodilator combinations
00173069504	Advair Diskus	fluticasone-salmeterol 100 mcg-50 mcg inhalation powder	inhalation	bronchodilator combinations
00173069600	Advair Diskus	fluticasone-salmeterol 250 mcg-50 mcg inhalation powder	inhalation	bronchodilator combinations
00173069602	Advair Diskus	fluticasone-salmeterol 250 mcg-50 mcg inhalation powder	inhalation	bronchodilator combinations
00173069604	Advair Diskus	fluticasone-salmeterol 250 mcg-50 mcg inhalation powder	inhalation	bronchodilator combinations
00173069700	Advair Diskus	fluticasone-salmeterol 500 mcg-50 mcg inhalation powder	inhalation	bronchodilator combinations
00173069702	Advair Diskus	fluticasone-salmeterol 500 mcg-50 mcg inhalation powder	inhalation	bronchodilator combinations
00173069704	Advair Diskus	fluticasone-salmeterol 500 mcg-50 mcg inhalation powder	inhalation	bronchodilator combinations
00173071500	Advair HFA	fluticasone-salmeterol CFC free 45 mcg-21 mcg/inh inhalation aerosol with adapter	inhalation	bronchodilator combinations
00173071520	Advair HFA	fluticasone-salmeterol CFC free 45 mcg-21 mcg/inh inhalation aerosol with adapter	inhalation	bronchodilator combinations
00173071600	Advair HFA	fluticasone-salmeterol CFC free 115 mcg-21 mcg/inh inhalation aerosol with adapter	inhalation	bronchodilator combinations
00173071620	Advair HFA	fluticasone-salmeterol CFC free 115 mcg-21 mcg/inh inhalation aerosol with adapter	inhalation	bronchodilator combinations
00173071700	Advair HFA	fluticasone-salmeterol CFC free 230 mcg-21 mcg/inh inhalation aerosol with adapter	inhalation	bronchodilator combinations
00173071720	Advair HFA	fluticasone-salmeterol CFC free 230 mcg-21 mcg/inh inhalation aerosol with adapter	inhalation	bronchodilator combinations
00173071800	Flovent HFA	fluticasone CFC free 44 mcg/inh inhalation aerosol with adapter	inhalation	inhaled corticosteroids
00173071820	Flovent HFA	fluticasone CFC free 44 mcg/inh inhalation aerosol with adapter	inhalation	inhaled corticosteroids
00173071900	Flovent HFA	fluticasone CFC free 110 mcg/inh inhalation aerosol with adapter	inhalation	inhaled corticosteroids

NDC Code	Brand Name	Generic Product Name	Route	Category
00173071920	Flovent HFA	fluticasone CFC free 110 mcg/inh inhalation aerosol with adapter	inhalation	inhaled corticosteroids
00173072000	Flovent HFA	fluticasone CFC free 220 mcg/inh inhalation aerosol with adapter	inhalation	inhaled corticosteroids
00173072020	Flovent HFA	fluticasone CFC free 220 mcg/inh inhalation aerosol with adapter	inhalation	inhaled corticosteroids
00186037020	Symbicort	budesonide-formoterol 160 mcg-4.5 mcg/inh inhalation aerosol with adapter	inhalation	bronchodilator combinations
00186037028	Symbicort	budesonide-formoterol 160 mcg-4.5 mcg/inh inhalation aerosol with adapter	inhalation	bronchodilator combinations
00186037220	Symbicort	budesonide-formoterol 80 mcg-4.5 mcg/inh inhalation aerosol with adapter	inhalation	bronchodilator combinations
00186037228	Symbicort	budesonide-formoterol 80 mcg-4.5 mcg/inh inhalation aerosol with adapter	inhalation	bronchodilator combinations
00186042604	Budesonide	budesonide 0.5 mg/2 mL inhalation suspension	inhalation	inhaled corticosteroids
00186091542	Pulmicort Turbuhaler	budesonide 200 mcg/inh inhalation powder	inhalation	inhaled corticosteroids
00186091612	Pulmicort Flexhaler	budesonide 180 mcg/inh inhalation powder	inhalation	inhaled corticosteroids
00186091706	Pulmicort Flexhaler	budesonide 90 mcg/inh inhalation powder	inhalation	inhaled corticosteroids
00186198804	Pulmicort Respules	budesonide 0.25 mg/2 mL inhalation suspension	inhalation	inhaled corticosteroids
00186198904	Pulmicort Respules	budesonide 0.5 mg/2 mL inhalation suspension	inhalation	inhaled corticosteroids
00186199004	Pulmicort Respules	budesonide 1 mg/2 mL inhalation suspension	inhalation	inhaled corticosteroids
00247019020	Azmacort	triamcinolone 75 mcg/inh inhalation aerosol	inhalation	inhaled corticosteroids
00247065907	AeroBid	flunisolide 250 mcg/inh inhalation aerosol with adapter	inhalation	inhaled corticosteroids
00247070307	AeroBid-M	flunisolide 250 mcg/inh inhalation aerosol	inhalation	inhaled corticosteroids
00247157513	Flovent	fluticasone 44 mcg/inh inhalation aerosol with adapter	inhalation	inhaled corticosteroids
00247157612	Flovent	fluticasone 110 mcg/inh inhalation aerosol with adapter	inhalation	inhaled corticosteroids
00247157613	Flovent	fluticasone 110 mcg/inh inhalation aerosol with adapter	inhalation	inhaled corticosteroids
00247157713	Flovent	fluticasone 220 mcg/inh inhalation aerosol with adapter	inhalation	inhaled corticosteroids
00247197360	Advair Diskus	fluticasone-salmeterol 250 mcg-50 mcg inhalation powder	inhalation	bronchodilator combinations
00247198360	Advair Diskus	fluticasone-salmeterol 100 mcg-50 mcg inhalation powder	inhalation	bronchodilator combinations
00247221560	Advair Diskus	fluticasone-salmeterol 500 mcg-50 mcg inhalation powder	inhalation	bronchodilator combinations
00456067099	AeroBid-M	flunisolide 250 mcg/inh inhalation aerosol	inhalation	inhaled corticosteroids
00456067299	AeroBid	flunisolide 250 mcg/inh inhalation aerosol with adapter	inhalation	inhaled corticosteroids
12280041013	Flovent	fluticasone 44 mcg/inh inhalation aerosol with adapter	inhalation	inhaled corticosteroids
16590002520	Azmacort	triamcinolone 75 mcg/inh inhalation aerosol	inhalation	inhaled corticosteroids
21695019601	Advair Diskus	fluticasone-salmeterol 250 mcg-50 mcg inhalation powder	inhalation	bronchodilator combinations
21695019701	Advair Diskus	fluticasone-salmeterol 500 mcg-50 mcg inhalation powder	inhalation	bronchodilator combinations
23490754201	Advair Diskus	fluticasone-salmeterol 250 mcg-50 mcg inhalation powder	inhalation	bronchodilator combinations
35356009914	Asmanex Twisthaler 14 Dose	mometasone 220 mcg/inh inhalation aerosol powder	inhalation	inhaled corticosteroids
49999061412	Flovent HFA	fluticasone CFC free 110 mcg/inh inhalation aerosol with adapter	inhalation	inhaled corticosteroids
49999081960	Advair Diskus	fluticasone-salmeterol 250 mcg-50 mcg inhalation powder	inhalation	bronchodilator combinations
49999098460	Advair Diskus	fluticasone-salmeterol 100 mcg-50 mcg inhalation powder	inhalation	bronchodilator combinations
49999098560	Advair Diskus	fluticasone-salmeterol 500 mcg-50 mcg inhalation powder	inhalation	bronchodilator combinations
52959013100	AeroBid	flunisolide 250 mcg/inh inhalation aerosol with adapter	inhalation	inhaled corticosteroids
52959028603	Azmacort	triamcinolone 75 mcg/inh inhalation aerosol	inhalation	inhaled corticosteroids
54569005300	Azmacort	triamcinolone 75 mcg/inh inhalation aerosol	inhalation	inhaled corticosteroids
54569101300	AeroBid	flunisolide 250 mcg/inh inhalation aerosol with adapter	inhalation	inhaled corticosteroids
54569397600	AeroBid-M	flunisolide 250 mcg/inh inhalation aerosol	inhalation	inhaled corticosteroids

NDC Code	Brand Name	Generic Product Name	Route	Category
54569460200	Flovent	fluticasone 110 mcg/inh inhalation aerosol with adapter	inhalation	inhaled corticosteroids
54569460300	Flovent	fluticasone 220 mcg/inh inhalation aerosol with adapter	inhalation	inhaled corticosteroids
54569474100	Pulmicort Turbuhaler	budesonide 200 mcg/inh inhalation powder	inhalation	inhaled corticosteroids
54569486300	Flovent	fluticasone 44 mcg/inh inhalation aerosol with adapter	inhalation	inhaled corticosteroids
54569489600	Flovent Rotadisk	fluticasone 50 mcg inhalation powder	inhalation	inhaled corticosteroids
54569516200	Pulmicort Respules	budesonide 0.25 mg/2 mL inhalation suspension	inhalation	inhaled corticosteroids
54569516300	Pulmicort Respules	budesonide 0.5 mg/2 mL inhalation suspension	inhalation	inhaled corticosteroids
54569524100	Advair Diskus	fluticasone-salmeterol 100 mcg-50 mcg inhalation powder	inhalation	bronchodilator combinations
54569524200	Advair Diskus	fluticasone-salmeterol 250 mcg-50 mcg inhalation powder	inhalation	bronchodilator combinations
54569524300	Advair Diskus	fluticasone-salmeterol 500 mcg-50 mcg inhalation powder	inhalation	bronchodilator combinations
54569566300	Flovent HFA	fluticasone CFC free 110 mcg/inh inhalation aerosol with adapter	inhalation	inhaled corticosteroids
54569567100	Flovent HFA	fluticasone CFC free 44 mcg/inh inhalation aerosol with adapter	inhalation	inhaled corticosteroids
54569570200	Flovent HFA	fluticasone CFC free 220 mcg/inh inhalation aerosol with adapter	inhalation	inhaled corticosteroids
54569592800	Pulmicort Flexhaler	budesonide 180 mcg/inh inhalation powder	inhalation	inhaled corticosteroids
54868126801	Azmacort	triamcinolone 75 mcg/inh inhalation aerosol	inhalation	inhaled corticosteroids
54868188301	AeroBid	flunisolide 250 mcg/inh inhalation aerosol with adapter	inhalation	inhaled corticosteroids
54868418200	Flovent	fluticasone 110 mcg/inh inhalation aerosol with adapter	inhalation	inhaled corticosteroids
54868426400	Flovent	fluticasone 44 mcg/inh inhalation aerosol with adapter	inhalation	inhaled corticosteroids
54868429500	Pulmicort Turbuhaler	budesonide 200 mcg/inh inhalation powder	inhalation	inhaled corticosteroids
54868439200	Flovent	fluticasone 220 mcg/inh inhalation aerosol with adapter	inhalation	inhaled corticosteroids
54868451600	Advair Diskus	fluticasone-salmeterol 500 mcg-50 mcg inhalation powder	inhalation	bronchodilator combinations
54868451700	Advair Diskus	fluticasone-salmeterol 250 mcg-50 mcg inhalation powder	inhalation	bronchodilator combinations
54868451800	Advair Diskus	fluticasone-salmeterol 100 mcg-50 mcg inhalation powder	inhalation	bronchodilator combinations
54868529400	AeroBid-M	flunisolide 250 mcg/inh inhalation aerosol	inhalation	inhaled corticosteroids
54868536200	Flovent HFA	fluticasone CFC free 110 mcg/inh inhalation aerosol with adapter	inhalation	inhaled corticosteroids
54868554700	Asmanex Twisthaler 60 Dose	mometasone 220 mcg/inh inhalation aerosol powder	inhalation	inhaled corticosteroids
54868554701	Asmanex Twisthaler 60 Dose	mometasone 220 mcg/inh inhalation aerosol powder	inhalation	inhaled corticosteroids
54868562100	Pulmicort Respules	budesonide 0.5 mg/2 mL inhalation suspension	inhalation	inhaled corticosteroids
54868563700	Flovent HFA	fluticasone CFC free 220 mcg/inh inhalation aerosol with adapter	inhalation	inhaled corticosteroids
54868577400	Pulmicort Respules	budesonide 0.25 mg/2 mL inhalation suspension	inhalation	inhaled corticosteroids
54868584400	Pulmicort Flexhaler	budesonide 180 mcg/inh inhalation powder	inhalation	inhaled corticosteroids
54868585700	Qvar	beclomethasone 40 mcg/inh inhalation aerosol with adapter	inhalation	inhaled corticosteroids
54868585800	Qvar	beclomethasone 80 mcg/inh inhalation aerosol with adapter	inhalation	inhaled corticosteroids
55045186803	AeroBid	flunisolide 250 mcg/inh inhalation aerosol with adapter	inhalation	inhaled corticosteroids
55045252007	AeroBid-M	flunisolide 250 mcg/inh inhalation aerosol	inhalation	inhaled corticosteroids
55045281900	Flovent	fluticasone 110 mcg/inh inhalation aerosol with adapter	inhalation	inhaled corticosteroids
55045291901	Flovent	fluticasone 220 mcg/inh inhalation aerosol with adapter	inhalation	inhaled corticosteroids
55045305401	Flovent	fluticasone 44 mcg/inh inhalation aerosol with adapter	inhalation	inhaled corticosteroids
55045306300	Qvar	beclomethasone 40 mcg/inh inhalation aerosol with adapter	inhalation	inhaled corticosteroids
55045335100	Flovent HFA	fluticasone CFC free 110 mcg/inh inhalation aerosol with adapter	inhalation	inhaled corticosteroids
55045335400	Flovent HFA	fluticasone CFC free 220 mcg/inh inhalation aerosol with adapter	inhalation	inhaled corticosteroids
55045338801	Advair Diskus	fluticasone-salmeterol 100 mcg-50 mcg inhalation powder	inhalation	bronchodilator combinations
55045341600	Flovent HFA	fluticasone CFC free 44 mcg/inh inhalation aerosol with adapter	inhalation	inhaled corticosteroids
55045368601	Advair Diskus	fluticasone-salmeterol 250 mcg-50 mcg inhalation powder	inhalation	bronchodilator combinations
55045369508	Qvar	beclomethasone 80 mcg/inh inhalation aerosol with adapter	inhalation	inhaled corticosteroids

NDC Code	Brand Name	Generic Product Name	Route	Category
55887067860	Advair Diskus	fluticasone-salmeterol 100 mcg-50 mcg inhalation powder	inhalation	bronchodilator combinations
58016460401	Advair Diskus	fluticasone-salmeterol 250 mcg-50 mcg inhalation powder	inhalation	bronchodilator combinations
58016481201	Advair Diskus	fluticasone-salmeterol 100 mcg-50 mcg inhalation powder	inhalation	bronchodilator combinations
58016481301	Advair Diskus	fluticasone-salmeterol 500 mcg-50 mcg inhalation powder	inhalation	bronchodilator combinations
59310017540	Qvar	beclomethasone 40 mcg/inh inhalation aerosol with adapter	inhalation	inhaled corticosteroids
59310017780	Qvar	beclomethasone 80 mcg/inh inhalation aerosol with adapter	inhalation	inhaled corticosteroids
60346028274	AeroBid-M	flunisolide 250 mcg/inh inhalation aerosol	inhalation	inhaled corticosteroids
60598006160	Azmacort	triamcinolone 75 mcg/inh inhalation aerosol	inhalation	inhaled corticosteroids
63874071420	Azmacort	triamcinolone 75 mcg/inh inhalation aerosol	inhalation	inhaled corticosteroids
68115054720	Azmacort	triamcinolone 75 mcg/inh inhalation aerosol	inhalation	inhaled corticosteroids
68115063713	Flovent	fluticasone 220 mcg/inh inhalation aerosol with adapter	inhalation	inhaled corticosteroids
68115065201	AeroBid	flunisolide 250 mcg/inh inhalation aerosol with adapter	inhalation	inhaled corticosteroids
68115065301	AeroBid-M	flunisolide 250 mcg/inh inhalation aerosol	inhalation	inhaled corticosteroids
68115065701	Advair Diskus	fluticasone-salmeterol 500 mcg-50 mcg inhalation powder	inhalation	bronchodilator combinations
68115076001	Advair Diskus	fluticasone-salmeterol 100 mcg-50 mcg inhalation powder	inhalation	bronchodilator combinations
68115077507	Qvar	beclomethasone 80 mcg/inh inhalation aerosol with adapter	inhalation	inhaled corticosteroids
68115092460	Advair Diskus	fluticasone-salmeterol 250 mcg-50 mcg inhalation powder	inhalation	bronchodilator combinations

INGENIX®

Input Guide

Release 7.0, Technical Guide for Windows, February 2008

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What Input Files to Prepare

The following list specifies what input files you prepare for processing:

- The claims data file (required)
- The member data file (required)
- The member term data file (required)

Field Type Definitions and Input File Requirements

This chapter lists the field requirements for your input files. One of the attributes listed among the requirements is defined as "Type". There are four field types used to describe a field's value, and they are defined below.

Field Type	Definition
AlphaNum	A value made of letters and/or numbers. If a value of this type is made of numbers only, it will not be a value that can be operated on mathematically. For example, it would be inappropriate to subtract one procedure code from another procedure code even though both values may contain only numbers.
Num	A value made of numbers only, and which can logically be operated on mathematically. Age is an example of this type. One particular field, while not used in mathematical calculations, is defined in the EBM Connect software as such that it accepts only numeric values. (To enter a non-numeric value would cause EBM Connect processing to stop.) Therefore, this field is defined as Num. It is the Case ID field in the optional disease registry input file.
Date	A value which can be interpreted as a date value. Values should always use four-digit years but the format may vary otherwise.
DecNum	A value made of numbers and a decimal point. These values can also logically be operated on mathematically.

Claims Input File

The claims file contains detailed information on services that were billed or performed or otherwise rendered. The claims file includes:

- Medical claims, including medical services, facility services and clinic services
- Pharmacy claims, including billed prescriptions and drugs
- Lab claims, including lab test and results information

Field Name	Type	Length	Required or Optional
Family ID	AlphaNum	1-30	Always required for all claims
Patient ID	AlphaNum	0-2	Optional
Amount Paid	DecNum	1-11	Required for all claims
Amount Allowed	DecNum	0-11	Required for all claims
Procedure Code	AlphaNum	5	Required if there is no revenue code, NDC, or LOINC® code
Procedure Code Modifier	AlphaNum	2	Required for medical claims
Revenue Code	AlphaNum	0 or 4	Optional (applies to medical claims when used)
First Diagnosis Code	AlphaNum	5 or 6	Required for medical claims
Second Diagnosis Code	AlphaNum	0, 5 or 6	Optional (applies to medical claims when used)
Third Diagnosis Code	AlphaNum	0, 5 or 6	Optional (applies to medical claims when used)
Fourth Diagnosis Code	AlphaNum	0, 5 or 6	Optional (applies to medical claims when used)
First Date of Service	Date	8 or 10	Always required for all claims
Last Date of Service	Date	8 or 10	Required for all claims

Paid Date	Date	0, 8 or 10	Optional
Type of Service	AlphaNum	0-10	Optional
Provider ID	AlphaNum	1-20	Required for medical claims
Ordering Provider ID	AlphaNum	0-20	Optional
Provider Type	AlphaNum	1-10	Required for medical claims
Provider Specialty Type	AlphaNum	1-10	Required for medical claims
Provider Key	AlphaNum	1-20	Required for medical claims
NDC	AlphaNum	0 or 11	Required for Rx claims
Day Supply	Num	0-4	Required for Rx claims
Quantity Count	DecNum	0-10	Required for Rx claims
LOINC®	AlphaNum	0 or 7	Required for lab claims
Lab Test Result	AlphaNum	0-18	Required for lab claims
Place of Service	AlphaNum	1-10	Required for medical claims
Unique Record ID	AlphaNum	1-28	Required for all claims
Claim Number	AlphaNum	1-28	Required for all claims
Bill Type Frequency Indicator	Num	0 or 1	Optional
Patient Status	AlphaNum	1-2	Required for facility claims (involving admission or confinement).
Facility Type	AlphaNum	0-2	Optional
Bed Type	AlphaNum	0-1	Optional
First ICD-9 Procedure Code	AlphaNum	0, 4 or 5	Optional, but will impact results (applies to medical claims when used)
Second ICD-9 Procedure Code	AlphaNum	0, 4 or 5	Optional (see above)
Third ICD-9 Procedure Code	AlphaNum	0, 4 or 5	Optional (see above)
Fourth ICD-9 Procedure Code	AlphaNum	0, 4 or 5	Optional (see above)

Field Descriptions

Instructions for each input field are as follows:

Family ID

This field identifies all members of a family and can be any alphanumeric string.

Note: Remember that each Family ID (and Patient ID) listed in your claims input file must have a corresponding record in your member input data file and your member term data file.

Patient ID

This field identifies individual members within a family. If present, this field must be sorted within Family ID, so that all records for an individual are contiguous. If the Family ID uniquely identifies an individual, this field need not be specified (that is, its length in the dictionary will be zero).

Amount Paid

The amount paid for this claim line.

Amount Allowed

The allowed amount for this claim line. This amount typically represents the total amount reimbursed including deductibles, copays, coinsurance, insurer paid, etc.

Procedure Code

The procedure code must be one of:

- A procedure code specified in the Physician's Current Procedure Terminology, 4th Edition (CPT®-4 codes) defined by the American Medical Association, for the years 1997 and later.
- A procedure code specified by the HCFA Common Procedure Coding System, Level II code (HCPCS) defined by the Centers for Medicare and Medicaid Services (CMS) for the years 1999 and later.
- A National Uniform Billing Committee (NUBC) revenue code.

Note: When the NUBC code is entered in the Procedure Code field, it should be padded to the right with blanks because the Procedure Code field always occupies five characters.

- If your organization defines its own procedure codes and/or revenue codes, they must be mapped to standard procedure and revenue codes.

Procedure Code Modifier

Use this field to specify any procedure code modifier that accompanies the procedure code.

Revenue Code

The revenue code, if one was entered for the claim. Supported values in this field are NUBC revenue codes. If your organization defines its own revenue codes, they must be mapped to standard revenue codes.

The revenue code is an optional field, allowing you to define your input records so that you can place an NUBC revenue code and a CPT/HCPCS procedure code on a single record line.

For claim records that do not have a revenue code, leave the revenue code field blank.

First Diagnosis Code Through Fourth Diagnosis Code

Up to four diagnoses may be entered for each claim, but only the first is required.

If your organization defines its own diagnosis codes, they must be mapped to standard ICD-9 diagnosis codes.

First Date of Service and Last Date of Service

The first date and last date represented by the claim line. If you choose to use a date format with separators (such as YYYY/MM/DD or YYYY-MM-DD), the separators are ignored on input, so you can use any character as a separator. Valid formats include: YYYYMMDD, MMDDYYYY, DDMMYYYY, YYYY/MM/DD, MM/DD/ YYYY, and DD/MM/YYYY, where the separator can be any character.

Paid Date

This field is optional. This is the date the claim was paid. The format of the paid date must be the same as that used in the First and Last Date of Service.

Type of Service

This is an optional code which represents the type of service (TOS) performed for this claim. If no specific value is available for this field, it should be filled with blanks. If this field is not used (i.e., its length is set to zero in the configuration), non-pharmaceutical claims with no procedure code will be treated as ancillary records.

Provider ID

Provider identification number from the claim. Used to identify who performed the service.

Ordering Provider ID

This is an optional field. This is the identification number of the provider who ordered the service.

Provider Type

This code represents the type of provider who performed the service. Examples of provider types would be chiropractor, nurse practitioner, medical doctor, counselor, pharmacy, hospital or treatment facility.

Provider Specialty Type

This code represents the specialty of the provider who performed the service.

Provider Key

Unique number or code for a physician who has multiple provider IDs or specialties. A single health care provider may have multiple provider IDs in your input claims data, but this person or entity should have only one provider key.

NDC

If this is a pharmaceutical claim, this field should contain the drug's NDC code. For non-pharmaceutical claim records, the NDC field should be filled with blanks.

Day Supply

For pharmacy records, the number of days a filled prescription is expected to last. If you have no pharmacy records, the Days Supply is an optional field.

Quantity Count

Quantity of drug dispensed in metric units:

Each - solid oral dosage forms (tablet, capsule), powder filled (dry) vials, packets, patches, units of use packages, suppositories, bars.

Milliliter - (cc) liquid oral dosage forms, liquid filled vials, ampules, reconstituted oral products.

Grams - ointments, bulk powders (not IV).
If you have no pharmacy records, the Quantity Count is an optional field.

LOINC®

Logical Observation Identifiers Names and Codes (LOINC®). The LOINC Code is a universal identifier for a lab test for a particular analyte. The LOINC User's Guide and database can be found at www.regenstrief.org.

Enter a LOINC code if the record is a lab record. For non-lab records, leave the LOINC field blank.

If you have no lab records in your claims input, the LOINC code is optional.

Notes:

(1) When using lab results data that has not been mapped to a LOINC code, map the comparable vendor-specific test number provided by the laboratory vendor(s) to one of these default codes.

(2) This is a retired code which may be present on historical data, or which some laboratories may be continuing to use. Input record data with this code is included in the definition of this test.

Lab Test Result

If the record is a lab record, use this field to enter the result value of lab test. For non-lab records, this field should be blank.

If you have no lab records in your claims input, the Lab Test Result is optional.

Place of Service

Place of service (POS). You must map your internal POS codes to Centers for Medicare and Medicaid Services (CMS) standard POS codes.

Unique Record ID

This required field contains a unique identifier representing the service line from the claim. For medical services, this ID typically represents the service row from the CMS 1500 or CMS 1450/UB92 claim form.

Claim Number

A unique identifier used to link service lines for a specific claim submitted for a member. If a claim has multiple service lines, each service will have a unique record ID and the same claim number to represent the claim.

Bill Type Frequency Indicator

This optional field is used to indicate the disposition of confinements.

Patient Status

This field is required for facility claims. The contents will be the patient status indicator field from the NUBC UB-92 form. This field can denote whether the member died during a confinement.

Facility Type

This field is optional. Space for it is provided to allow for additional post grouping analysis. The contents will typically be the UB-92 facility type data value. This would allow records to be easily selected for diagnosis related grouping (DRG) based on the facility type.

Bed Type

If a value is present, this field acts as an additional discriminator in determining whether a Facility record extends an existing confinement or starts a new confinement.

First ICD-9 Procedure Code Through Fourth ICD-9 Procedure Code

If your claims have ICD-9 procedure codes, include them in your claims input file.

If a decimal point will appear in this field in your claim records, the length should be given as 5. If the decimal separator is not used, the length is 4. If these fields are unused, the length is zero.

Member Input File

The member data file contains the most current information about the member.

Field Descriptions

Field	Type	Length	Required or Optional
Family ID	AlphaNum	1-30	Required
Patient ID	AlphaNum	0-2	Optional
Patient Gender	AlphaNum	1	Required
Date of Birth	Date	8 or 10	Required
Member Beginning Eligibility Date	Date	0, 8 or 10	Optional
Member Ending Eligibility Date	Date	0, 8 or 10	Optional

Instructions for each input field are as follows:

Family ID

This field identifies all members of a family and can be any alphanumeric string. The records in the member file must be sorted first on the Family ID (together with Patient ID, if available) so that all records for an individual are contiguous.

Patient ID

This field identifies individual members within a family. If present, this field must be sorted within Family ID, so that all records for an individual are contiguous. If the Family ID uniquely identifies an individual, this field need not be specified (that is, its length in the dictionary will be zero).

Patient Gender and Date of Birth

The member's gender (F or M) and date of birth. If you choose to use a date format with separators (such as YYYY/MM/DD or YYYY-MM-DD), the separators are ignored on input, so you can use any character as a separator. Valid date formats include: YYYYMMDD, MMDDYYYY, DDMMYYYY, YYYY/MM/DD, MM/DD/YYYY, and DD/MM/YYYY, where the separator can be any character.

Member Beginning Eligibility Date and Ending Eligibility Date

The first date on which the member became covered under the plan and the last date of the member's coverage. If you choose to use a date format with separators (such as YYYY/MM/DD or YYYY-MM-DD), the separators are ignored on input, so you can use any character as a separator. Valid formats include: YYYYMMDD, MMDDYYYY, DDMMYYYY, YYYY/MM/DD, MM/DD/YYYY, and DD/MM/YYYY, where the separator can be any character.

Member Term Input File

The member term data file contains member coverage and term activity information. Plan coverage begin and end dates are required in order to correctly calculate the other fields in the member term file. There may be more than one record per individual member.

Field Descriptions

Field	Type	Length	Required or Optional
Family ID	AlphaNum	1-30	Required
Patient ID	AlphaNum	0-2	Optional
Member Beginning Eligibility Date	Date	8 or 10	Required
Member Ending Eligibility Date	Date	8 or 10	Required
Primary Care Provider	AlphaNum	20	Required
Provider Specialty Type	AlphaNum	1-10	Required
Medical Flag	AlphaNum	1	Required
Pharmacy Flag	AlphaNum	1	Required

Instructions for each input field are as follows:

Family ID

This field identifies all members of a family and can be any alphanumeric string. The records in the member term file must be sorted first on the Family ID (together with Patient ID, if available) so that all records for an individual are contiguous.

Patient ID

This field identifies individual members within a family.

Member Beginning Eligibility Date and Member Ending Eligibility Date

The first date on which the member became covered under the plan and the last date of the member's coverage. If you choose to use a date format with separators (such as YYYY/MM/DD or YYYY-MM-DD), the separators are ignored on input, so you can use any character as a separator. Valid formats include: YYYYMMDD, MMDDYYYY, DDMMYYYY, YYYY/MM/DD, MM/DD/YYYY, and DD/MM/YYYY, where the separator can be any character.

Primary Care Provider

The provider key for the member's primary care physician. A single health care physician may have multiple provider IDs in your input claims data, but this person should have only one provider key.

Provider Specialty Type

This code represents the specialty of the primary care physician.

Medical Flag

Identifies whether the member has medical coverage (Y or N).

Pharmacy Flag

Identifies whether the member has pharmacy coverage (Y or N).

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 #:** 1519 **NQF Project:** Surgery Endorsement Maintenance 2010
MEASURE DESCRIPTIVE INFORMATION
De.1 **Measure Title:** Statin Therapy at Discharge after Lower Extremity Bypass (LEB)
De.2 **Brief description of measure:** Percentage of patients aged 18 years and older undergoing infrainguinal lower extremity bypass who are prescribed a statin medication at discharge. This measure is proposed for both hospitals and individual providers.
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** NA
De.4 **National Priority Partners Priority Area:** Population health, Safety De.5 **IOM Quality Domain**: Effectiveness, Patient-centered 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
A. The measure is in the public domain or an intellectual property (measure steward agreement) is signed. *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.* 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 A.2 **Indicate if Proprietary Measure** (*as defined in measure steward agreement*)**:** A.3 **Measure Steward Agreement:** Agreement will be signed and submitted prior to or at the time of measure submission A.4 **Measure Steward Agreement attached:** Agreement With Measure Stewards_Agreement Between_National Quality Forum (12-6-2010)-634278516835518374.pdf	A Y☐ N☐

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	**B** Y☐ N☐
C. The intended use of the measure includes both public reporting and quality improvement. ►**Purpose:** Public reporting, Internal quality improvement Accountability, Payment incentive	**C** Y☐ N☐
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	**D** Y☐ N☐
(for NQF staff use) **Have all conditions for consideration been met?** **Staff Notes to Steward** (*if submission returned*)**:**	**Met** Y☐ N☐
Staff Notes to Reviewers (*issues or questions regarding any criteria*)**:**	
Staff Reviewer Name(s):	

TAP/Workgroup Reviewer Name:	
Steering Committee Reviewer Name:	
1. IMPORTANCE TO MEASURE AND REPORT	
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**	**Eval Rating**
(for NQF staff use) **Specific NPP goal**:	
1a.1 **Demonstrated High Impact Aspect of Healthcare:** Affects large numbers, Frequently performed procedure, High resource use, Severity of illness, Patient/societal consequences of poor quality 1a.2 1a.3 **Summary of Evidence of High Impact:** Patients who present with lower extremity ischemia bear a large systemic burden of atherosclerotic disease, and therefore face not only the immediate risk of limb loss1 but also an increased risk for cardiovascular events.2-4 The benefits of statin therapy for cardiovascular risk reduction in the PAD population have been demonstrated in several studies, most notably the Heart Protection Study.5, 6 The Heart Protection Study (HPS) is the largest trial to assess the effects of statins on major morbidity and mortality. The investigators enrolled over 20,000 patients deemed to be at high risk for cardiovascular events and randomized them to receive either 40mg of simvastatin or placebo. On survival analysis, they demonstrated that treatment with a statin was significantly associated with a decrease in all-cause mortality (12.9% vs. 14.7%, p=.0003) and that this effect was primarily driven by the reduction in death from vascular causes (7.6% vs. 9.1%, p<.0001). A recently published subgroup analysis6 focusing specifically on patients with documented PAD (n=6748) did not include mortality data. However, the authors demonstrated a significant reduction in the rate of first major vascular event in the simvastatin treatment arm (relative reduction of 22%; p<.0001), when compared to placebo. The PREVENT III trial was a prospective, randomized, double-blinded, multicenter trial designed to examine	**1a** C☐ P☐ M☐ N☐

the efficacy of a novel pharmacologic agent (edifoligide) in preventing autogenous vein graft failure in 1404 patients who underwent infrainguinal vein bypass at 83 hospitals exclusively for the treatment of critical limb ischemia.7 This LEB trial, with its high-risk critical limb ischemia (CLI) population, provides another relevant database for examination of the role of statins. The salient finding from this study is that the use of statin drugs was associated with a significant one-year survival benefit in patients undergoing surgical bypass for CLI.8 The Kaplan-Meier analysis also suggested that the benefit continues to increase with time, and might be even greater with longer term follow-up. In these 1404 patients, those not receiving statins experienced a 40% increase in the risk of death at one year. This effect was demonstrated both in the propensity score weighted analysis (HR 1.40, CI 1.02-1.92), and in the Cox proportional hazards model (HR 1.47, CI 1.11-1.96). These findings are consistent with prior observational studies that have examined the effects of statins, albeit, in heterogeneous PAD populations.9-11 The largest of these observational studies, conducted by Feringa and colleagues, enrolled 1374 patients with PAD and followed them for a mean duration of 6.4 years. The authors demonstrated a strong independent association between statin use and all-cause mortality (HR 1.41 for non-users, $p<0.0001$).9

The DECREASE study randomized 497 patients who had not previously been treated with a statin to receive either 80 mg of extended-release fluvastatin or placebo once daily before undergoing major non-cardiac vascular surgery.12 On evaluation of the primary endpoint, statin therapy conferred a 45% decreased hazard ratio (10.8% versus 19%, $p=0.01$) for perioperative myocardial infarction. Furthermore, death from cardiovascular causes or myocardial infarction occurred in 4.8% of patients in the fluvastatin group and 10.1% of patients in the placebo group (hazard ratio, 0.47; 95% CI, 0.24 to 0.94; $p= 0.03$). Fluvastatin therapy was not associated with a significant increase in the rate of adverse events. Several additional studies in patients undergoing LEB have shown similar reductions in perioperative morbidity and mortality associated with statin use.10, 13, 14

Recent studies have also demonstrated a specific benefit in graft patency after LEB in patients on statin therapy.15-17 Abbruzzese et al observed that statin use was associated with improved secondary patency (3-fold increased risk compared to non-users) among 197 patients who had undergone lower extremity bypass using saphenous vein, in a single-center retrospective analysis.16

1a.4 Citations for Evidence of High Impact:

1. Dormandy JA, Rutherford RB. Management of peripheral arterial disease (PAD). TASC Working Group. TransAtlantic Inter-Society Consensus (TASC). J Vasc Surg 2000;31:S1-S296.
2. Criqui MH, Langer RD, Fronek A, Feigelson HS, Klauber MR, McCann TJ, et al. Mortality over a period of 10 years in patients with peripheral arterial disease. N Engl J Med 1992;326:381-6.
3. McKenna M, Wolfson S, Kuller L. The ratio of ankle and arm arterial pressure as an independent predictor of mortality. Atherosclerosis 1991;87:119-28.
4. Howell MA, Colgan MP, Seeger RW, Ramsey DE, Sumner DS. Relationship of severity of lower limb peripheral vascular disease to mortality and morbidity: a six-year follow-up study. J Vasc Surg 1989;9:691-6; discussion 6-7.
5. MRC/BHF Heart Protection Study of cholesterol lowering with simvastatin in 20,536 high-risk individuals: a randomised placebo-controlled trial. Lancet 2002;360:7-22.
6. Randomized trial of the effects of cholesterol-lowering with simvastatin on peripheral vascular and other major vascular outcomes in 20,536 people with peripheral arterial disease and other high-risk conditions. J Vasc Surg 2007;45:645-54; discussion 53-4.
7. Conte MS, Bandyk DF, Clowes AW, Moneta GL, Seely L, Lorenz TJ, et al. Results of PREVENT III: a multicenter, randomized trial of edifoligide for the prevention of vein graft failure in lower extremity bypass surgery. J Vasc Surg 2006;43:742-51; discussion 51.
8. Schanzer A, Hevelone N, Owens CD, Beckman JA, Belkin M, Conte MS. Statins are independently associated with reduced mortality in patients undergoing infrainguinal bypass graft surgery for critical limb ischemia. J Vasc Surg 2008;47:774-81.
9. Feringa HH, Karagiannis SE, van Waning VH, Boersma E, Schouten O, Bax JJ, et al. The effect of intensified lipid-lowering therapy on long-term prognosis in patients with peripheral arterial disease. J Vasc Surg 2007;45:936-43.
10. Ward RP, Leeper NJ, Kirkpatrick JN, Lang RM, Sorrentino MJ, Williams KA. The effect of preoperative statin therapy on cardiovascular outcomes in patients undergoing infrainguinal vascular surgery. Int J Cardiol 2005;104:264-8.
11. Kertai MD, Boersma E, Westerhout CM, van Domburg R, Klein J, Bax JJ, et al. Association between

long-term statin use and mortality after successful abdominal aortic aneurysm surgery. Am J Med 2004;116:96-103.
12. Schouten O, Boersma E, Hoeks SE, Benner R, van Urk H, van Sambeek MR, et al. Fluvastatin and perioperative events in patients undergoing vascular surgery. N Engl J Med 2009;361:980-9.
13. Poldermans D, Bax JJ, Kertai MD, Krenning B, Westerhout CM, Schinkel AF, et al. Statins are associated with a reduced incidence of perioperative mortality in patients undergoing major noncardiac vascular surgery. Circulation 2003;107:1848-51.
14. O´Neil-Callahan K, Katsimaglis G, Tepper MR, Ryan J, Mosby C, Ioannidis JP, et al. Statins decrease perioperative cardiac complications in patients undergoing noncardiac vascular surgery: the Statins for Risk Reduction in Surgery (StaRRS) study. J Am Coll Cardiol 2005;45:336-42.
15. Christenson J. Preoperative lipid control with simvastatin reduces the risk for graft failure already 1 year after myocardial revascularization. Cardiovasc Surg 2001;9:33-43.
16. Abbruzzese TA, Havens J, Belkin M, Donaldson MC, Whittemore AD, Liao JK, et al. Statin therapy is associated with improved patency of autogenous infrainguinal bypass grafts. J Vasc Surg 2004;39:1178-85.
17. Henke PK, Blackburn S, Proctor MC, Stevens J, Mukherjee D, Rajagopalin S, et al. Patients undergoing infrainguinal bypass to treat atherosclerotic vascular disease are underprescribed cardioprotective medications: effect on graft patency, limb salvage, and mortality. Journal of Vascular Surgery 2004;39:357-65.
18. Hirsch AT, Haskal ZJ, Hertzer NR, Bakal CW, Creager MA, Halperin JL, et al. ACC/AHA 2005 Practice Guidelines for the management of patients with peripheral arterial disease (lower extremity, renal, mesenteric, and abdominal aortic): a collaborative report from the American Association for Vascular Surgery/Society for Vascular Surgery, Society for Cardiovascular Angiography and Interventions, Society for Vascular Medicine and Biology, Society of Interventional Radiology, and the ACC/AHA Task Force on Practice Guidelines (Writing Committee to Develop Guidelines for the Management of Patients With Peripheral Arterial Disease): endorsed by the American Association of Cardiovascular and Pulmonary Rehabilitation; National Heart, Lung, and Blood Institute; Society for Vascular Nursing; TransAtlantic Inter-Society Consensus; and Vascular Disease Foundation. Circulation 2006;113:e463-654.
19. Hirsch AT, Criqui MH, Treat-Jacobson D, Regensteiner JG, Creager MA, Olin JW, et al. Peripheral arterial disease detection, awareness, and treatment in primary care. Jama 2001;286:1317-24.
20. McDermott MM, Mehta S, Ahn H, Greenland P. Atherosclerotic Risk Factors Are Less Intensively Treated in Patients with Peripheral Arterial Disease Than in Patients with Coronary Artery Disease. J Gen Intern Med 1997;12:209-15.
21. Mukherjee D, Lingam P, Chetcuti S, Grossman PM, Moscucci M, Luciano AE, et al. Missed opportunities to treat atherosclerosis in patients undergoing peripheral vascular interventions: insights from the University of Michigan Peripheral Vascular Disease Quality Improvement Initiative (PVD-QI2). Circulation 2002;106:1909-12.

1b. Opportunity for Improvement

1b.1 Benefits (improvements in quality) envisioned by use of this measure: Based on the data summarized in this application, this quality measure will be associated with decreased perioperative morbidity and mortality from major adverse cardiac events including stroke, myocardial infarction, and death. The data also suggest a potential association between perioperative statin use and improved bypass graft patency.

Patients who require LEB have advanced peripheral arterial disease and meet guidelines for secondary prevention with statins. Many of these patients have not received adequate managment of PAD risk factors. The episode of care assoicated with LEB provides an opportunity to initiate statin therapy in these patients in order to improve survival and reduce cardiovascular complications following the procedure.

1b.2 Summary of data demonstrating performance gap (variation or overall poor performance) across providers:
Current guidelines support the use of statin therapy in all PAD patients with a target LDL level of less than 100 mg/dL (<70 mg/dL for patients deemed at very high risk).18 Because of the pleiotrophic effects of statins, PAD guidelines recommend that all PAD patients be treated, independent of LDL level. However, a significant percentage of patients undergoing lower extremity bypass are not on statin therapy before or after surgery. In the PREVENT III trial referenced above, only 46% of patients were on statin therapy prior to surgery and only 45% of patients were prescribed statin therapy on hospital discharge.8 In the Vascular Study Group of New England (VSGNE), a multicenter quality improvement consortium, data has

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been collected on 3,693 patients who have undergone LEB. Unpublished analyses of these data demonstrate that only 41% of patients were taking statins preoperatively before LEB in 2004. Through quality improvement efforts, this percentage of patients dischared on statins has increased to 79% during the first 6 months of 2010. However, this rate of statin use falls significantly short of the 90% goal set forth by this quality improvement group in 2008. This under-treatment of patients with PAD has been echoed by several other reports in the literature and provides substantial opportunity for improvement.19-21

Patients undergoing infrainguinal LEB in VSGNE were analyzed for this measure submission. There are 2496 patients in the registry who underwent infrainguinal LEB between 2003-2010. Of these, 2% died in hospital. Of those discharged alive, only 2% were intolerant to statins. Across 13 hospitals, the median statin prescribed at discharge rate was 73%, with an interquartile range of 69% to 80%. Across 63 individual providers, the median statin prescribed at discharge rate was 75%, with an interquartile range of 66% to 84%. SVS and VSGNE have set quality targets at 90%. These data demonstrate both significant variation and a significant performance gap.

1b.3 Citations for data on performance gap:

1. Dormandy JA, Rutherford RB. Management of peripheral arterial disease (PAD). TASC Working Group. TransAtlantic Inter-Society Consensus (TASC). J Vasc Surg 2000;31:S1-S296.
2. Criqui MH, Langer RD, Fronek A, Feigelson HS, Klauber MR, McCann TJ, et al. Mortality over a period of 10 years in patients with peripheral arterial disease. N Engl J Med 1992;326:381-6.
3. McKenna M, Wolfson S, Kuller L. The ratio of ankle and arm arterial pressure as an independent predictor of mortality. Atherosclerosis 1991;87:119-28.
4. Howell MA, Colgan MP, Seeger RW, Ramsey DE, Sumner DS. Relationship of severity of lower limb peripheral vascular disease to mortality and morbidity: a six-year follow-up study. J Vasc Surg 1989;9:691-6; discussion 6-7.
5. MRC/BHF Heart Protection Study of cholesterol lowering with simvastatin in 20,536 high-risk individuals: a randomised placebo-controlled trial. Lancet 2002;360:7-22.
6. Randomized trial of the effects of cholesterol-lowering with simvastatin on peripheral vascular and other major vascular outcomes in 20,536 people with peripheral arterial disease and other high-risk conditions. J Vasc Surg 2007;45:645-54; discussion 53-4.
7. Conte MS, Bandyk DF, Clowes AW, Moneta GL, Seely L, Lorenz TJ, et al. Results of PREVENT III: a multicenter, randomized trial of edifoligide for the prevention of vein graft failure in lower extremity bypass surgery. J Vasc Surg 2006;43:742-51; discussion 51.
8. Schanzer A, Hevelone N, Owens CD, Beckman JA, Belkin M, Conte MS. Statins are independently associated with reduced mortality in patients undergoing infrainguinal bypass graft surgery for critical limb ischemia. J Vasc Surg 2008;47:774-81.
9. Feringa HH, Karagiannis SE, van Waning VH, Boersma E, Schouten O, Bax JJ, et al. The effect of intensified lipid-lowering therapy on long-term prognosis in patients with peripheral arterial disease. J Vasc Surg 2007;45:936-43.
10. Ward RP, Leeper NJ, Kirkpatrick JN, Lang RM, Sorrentino MJ, Williams KA. The effect of preoperative statin therapy on cardiovascular outcomes in patients undergoing infrainguinal vascular surgery. Int J Cardiol 2005;104:264-8.
11. Kertai MD, Boersma E, Westerhout CM, van Domburg R, Klein J, Bax JJ, et al. Association between long-term statin use and mortality after successful abdominal aortic aneurysm surgery. Am J Med 2004;116:96-103.
12. Schouten O, Boersma E, Hoeks SE, Benner R, van Urk H, van Sambeek MR, et al. Fluvastatin and perioperative events in patients undergoing vascular surgery. N Engl J Med 2009;361:980-9.
13. Poldermans D, Bax JJ, Kertai MD, Krenning B, Westerhout CM, Schinkel AF, et al. Statins are associated with a reduced incidence of perioperative mortality in patients undergoing major noncardiac vascular surgery. Circulation 2003;107:1848-51.
14. O´Neil-Callahan K, Katsimaglis G, Tepper MR, Ryan J, Mosby C, Ioannidis JP, et al. Statins decrease perioperative cardiac complications in patients undergoing noncardiac vascular surgery: the Statins for Risk Reduction in Surgery (StaRRS) study. J Am Coll Cardiol 2005;45:336-42.
15. Christenson J. Preoperative lipid control with simvastatin reduces the risk for graft failure already 1 year after myocardial revascularization. Cardiovasc Surg 2001;9:33-43.
16. Abbruzzese TA, Havens J, Belkin M, Donaldson MC, Whittemore AD, Liao JK, et al. Statin therapy is associated with improved patency of autogenous infrainguinal bypass grafts. J Vasc Surg 2004;39:1178-85.
17. Henke PK, Blackburn S, Proctor MC, Stevens J, Mukherjee D, Rajagopalin S, et al. Patients

undergoing infrainguinal bypass to treat atherosclerotic vascular disease are underprescribed cardioprotective medications: effect on graft patency, limb salvage, and mortality. Journal of Vascular Surgery 2004;39:357-65.
18. Hirsch AT, Haskal ZJ, Hertzer NR, Bakal CW, Creager MA, Halperin JL, et al. ACC/AHA 2005 Practice Guidelines for the management of patients with peripheral arterial disease (lower extremity, renal, mesenteric, and abdominal aortic): a collaborative report from the American Association for Vascular Surgery/Society for Vascular Surgery, Society for Cardiovascular Angiography and Interventions, Society for Vascular Medicine and Biology, Society of Interventional Radiology, and the ACC/AHA Task Force on Practice Guidelines (Writing Committee to Develop Guidelines for the Management of Patients With Peripheral Arterial Disease): endorsed by the American Association of Cardiovascular and Pulmonary Rehabilitation; National Heart, Lung, and Blood Institute; Society for Vascular Nursing; TransAtlantic Inter-Society Consensus; and Vascular Disease Foundation. Circulation 2006;113:e463-654.
19. Hirsch AT, Criqui MH, Treat-Jacobson D, Regensteiner JG, Creager MA, Olin JW, et al. Peripheral arterial disease detection, awareness, and treatment in primary care. Jama 2001;286:1317-24.
20. McDermott MM, Mehta S, Ahn H, Greenland P. Atherosclerotic Risk Factors Are Less Intensively Treated in Patients with Peripheral Arterial Disease Than in Patients with Coronary Artery Disease. J Gen Intern Med 1997;12:209-15.
21. Mukherjee D, Lingam P, Chetcuti S, Grossman PM, Moscucci M, Luciano AE, et al. Missed opportunities to treat atherosclerosis in patients undergoing peripheral vascular interventions: insights from the University of Michigan Peripheral Vascular Disease Quality Improvement Initiative (PVD-QI2). Circulation 2002;106:1909-12.

1b.4 Summary of Data on disparities by population group:
There are not published data regarding disparities in statin usage after infrainguinal bypass in different population groups. Such data will become available if this measure is adopted for reporting and used by more centers with more varied population demographics than found in the New England region.

1b.5 Citations for data on Disparities:
None found

1c. Outcome or Evidence to Support Measure Focus

1c.1 Relationship to Outcomes (*For non-outcome measures, briefly describe the relationship to desired outcome. For outcomes, describe why it is relevant to the target population*)**:** As summarized above, this quality measure will be associated with decreased perioperative morbidity and mortality from major adverse cardiac events including stroke, myocardial infarction, and death in patients undergoing lower extremity bypass. The data also suggest a potential association between perioperative statin use and improved bypass graft patency.

1c.2-3. Type of Evidence: Cohort study, Observational study, Evidence-based guideline, Randomized controlled trial, Expert opinion, Meta-analysis

1c.4 Summary of Evidence (*as described in the criteria; for outcomes, summarize any evidence that healthcare services/care processes influence the outcome*)**:**
Please see the summary of the data presented in 1.a.3.

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

1c.6 Method for rating evidence: Data obtained from randomized prospective controlled trials.
1. MRC/BHF Heart Protection Study of cholesterol lowering with simvastatin in 20,536 high-risk individuals: a randomised placebo-controlled trial. Lancet 2002;360:7-22.
2. Randomized trial of the effects of cholesterol-lowering with simvastatin on peripheral vascular and other major vascular outcomes in 20,536 people with peripheral arterial disease and other high-risk conditions. J Vasc Surg 2007;45:645-54
3. Schouten O, Boersma E, Hoeks SE, Benner R, van Urk H, van Sambeek MR, et al. Fluvastatin and perioperative events in patients undergoing vascular surgery. N Engl J Med 2009;361:980-9.

1c
C☐
P☐
M☐
N☐

1c.7 Summary of Controversy/Contradictory Evidence: None

1c.8 Citations for Evidence (*other than guidelines*): 1.MRC/BHF Heart Protection Study of cholesterol lowering with simvastatin in 20,536 high-risk individuals: a randomised placebo-controlled trial. Lancet 2002;360:7-22.
2. Randomized trial of the effects of cholesterol-lowering with simvastatin on peripheral vascular and other major vascular outcomes in 20,536 people with peripheral arterial disease and other high-risk conditions. J Vasc Surg 2007;45:645-54; discussion 53-4.
3. Schanzer A, Hevelone N, Owens CD, Beckman JA, Belkin M, Conte MS. Statins are independently associated with reduced mortality in patients undergoing infrainguinal bypass graft surgery for critical limb ischemia. J Vasc Surg 2008;47:774-81.
4. Feringa HH, Karagiannis SE, van Waning VH, Boersma E, Schouten O, Bax JJ, et al. The effect of intensified lipid-lowering therapy on long-term prognosis in patients with peripheral arterial disease. J Vasc Surg 2007;45:936-43.
5. Ward RP, Leeper NJ, Kirkpatrick JN, Lang RM, Sorrentino MJ, Williams KA. The effect of preoperative statin therapy on cardiovascular outcomes in patients undergoing infrainguinal vascular surgery. Int J Cardiol 2005;104:264-8.
6. Kertai MD, Boersma E, Westerhout CM, van Domburg R, Klein J, Bax JJ, et al. Association between long-term statin use and mortality after successful abdominal aortic aneurysm surgery. Am J Med 2004;116:96-103.
7. Schouten O, Boersma E, Hoeks SE, Benner R, van Urk H, van Sambeek MR, et al. Fluvastatin and perioperative events in patients undergoing vascular surgery. N Engl J Med 2009;361:980-9.
8. Poldermans D, Bax JJ, Kertai MD, Krenning B, Westerhout CM, Schinkel AF, et al. Statins are associated with a reduced incidence of perioperative mortality in patients undergoing major noncardiac vascular surgery. Circulation 2003;107:1848-51.
9. O´Neil-Callahan K, Katsimaglis G, Tepper MR, Ryan J, Mosby C, Ioannidis JP, et al. Statins decrease perioperative cardiac complications in patients undergoing noncardiac vascular surgery: the Statins for Risk Reduction in Surgery (StaRRS) study. J Am Coll Cardiol 2005;45:336-42.
10. Christenson J. Preoperative lipid control with simvastatin reduces the risk for graft failure already 1 year after myocardial revascularization. Cardiovasc Surg 2001;9:33-43.
11. Abbruzzese TA, Havens J, Belkin M, Donaldson MC, Whittemore AD, Liao JK, et al. Statin therapy is associated with improved patency of autogenous infrainguinal bypass grafts. J Vasc Surg 2004;39:1178-85.
12. Henke PK, Blackburn S, Proctor MC, Stevens J, Mukherjee D, Rajagopalin S, et al. Patients undergoing infrainguinal bypass to treat atherosclerotic vascular disease are underprescribed cardioprotective medications: effect on graft patency, limb salvage, and mortality. Journal of Vascular Surgery 2004;39:357-65.

1c.9 Quote the Specific guideline recommendation (*including guideline number and/or page number*):
Recommendation #2, Section B1.2.3 (Dormandy et al.)
"In symptomatic PAD patients, statins should be the primary agents to lower LDL cholesterol levels to reduce the risk of cardiovascular events (1)."

Section 2.6.1.1. (Hirsch et al)
"Treatment with a hydroxymethyl glutaryl (HMG)coenzyme-A reductase inhibitor (statin) medication is indicated for all patients with PAD to achieve a target
LDL cholesterol level of less than 100 mg per dL.(Level of Evidence: B)
1. Treatment with an HMG coenzyme-A reductase inhibitor (statin) medication to achieve a target LDL cholesterol level of less than 70 mg per dL is reasonable
for patients with lower extremity PAD at very high risk of ischemic events. (Level of Evidence: B"

1c.10 Clinical Practice Guideline Citation: 1. Dormandy JA, Rutherford RB. Management of peripheral arterial disease (PAD). TASC Working Group. TransAtlantic Inter-Society Consensus (TASC). J Vasc Surg 2000;31:S1-S296.
2. Hirsch AT, Haskal ZJ, Hertzer NR, Bakal CW, Creager MA, Halperin JL, et al. ACC/AHA 2005 Practice Guidelines for the management of patients with peripheral arterial disease (lower extremity, renal, mesenteric, and abdominal aortic): a collaborative report from the American Association for Vascular Surgery/Society for Vascular Surgery, Society for Cardiovascular Angiography and Interventions, Society for Vascular Medicine and Biology, Society of Interventional Radiology, and the ACC/AHA Task Force on Practice

Guidelines (Writing Committee to Develop Guidelines for the Management of Patients With Peripheral Arterial Disease): endorsed by the American Association of Cardiovascular and Pulmonary Rehabilitation; National Heart, Lung, and Blood Institute; Society for Vascular Nursing; TransAtlantic Inter-Society Consensus; and Vascular Disease Foundation. Circulation 2006;113:e463-654. **1c.11 National Guideline Clearinghouse or other URL:** NA **1c.12 Rating of strength of recommendation** (*also provide narrative description of the rating and by whom*)**:** NA **1c.13 Method for rating strength of recommendation** (*If different from USPSTF system, also describe rating and how it relates to USPSTF*)**:** NA **1c.14 Rationale for using this guideline over others:** This quality measure will be associated with decreased perioperative morbidity and mortality from major adverse cardiac events including stroke, myocardial infarction, and death, in patients undergoing lower extremity bypass.	
TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Importance to Measure and Report?*	**1**
Steering Committee: Was the threshold criterion, *Importance to Measure and Report*, met? **Rationale:**	**1** **Y☐** **N☐**
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. (evaluation criteria)	**Eval Rating**
2a. MEASURE SPECIFICATIONS	
S.1 Do you have a web page where current detailed measure specifications can be obtained? **S.2 If yes, provide web page URL:** **2a. Precisely Specified**	
2a.1 Numerator Statement (*Brief, text description of the numerator - what is being measured about the target population, e.g. target condition, event, or outcome*)**:** Patients undergoing infrainguinal lower extremity bypass who are prescribed a statin medication at discharge. **2a.2 Numerator Time Window** (*The time period in which cases are eligible for inclusion in the numerator*)**:** Lifetime for provider reporting, annual for hospital reporting **2a.3 Numerator Details** (*All information required to collect/calculate the numerator, including all codes, logic, and definitions*)**:** A registry that includes anatomic details or CPT procedure codes is required to identify patients for numerator inclusion. The Society for Vascular Surgery Vascular Quality Initiative (SVS VQI) and the Vascular Study Group of New England (VSGNE)registries capture detailed anatomic information. Infrainguinal lower extremity bypass is defined as a bypass beginning at or below the external iliac artery and extending into the ipsilateral leg. It includes procedures with CPT codes 35656, 35556, 35583, 35666, 35566, 35585, 35671, 35571, 35587. The numerator is calculated as the number of patients age 18 and over undergoing such a procedure who are prescribed a statin medication at the time of discharge, which is also captured in the above registries.	**2a-specs** **C☐** **P☐** **M☐** **N☐**
2a.4 Denominator Statement (*Brief, text description of the denominator - target population being measured*)**:** All patients aged 18 years and older undergoing lower extremity bypass as defined above who are	

discharged alive, excluding those patients who are intolerant to statins.

2a.5 **Target population gender:** Female, Male
2a.6 **Target population age range:** 18 years or older

2a.7 **Denominator Time Window (***The time period in which cases are eligible for inclusion in the denominator***):**
Lifetime for provider reporting, annual for hospital reporting

2a.8 **Denominator Details (***All information required to collect/calculate the denominator - the target population being measured - including all codes, logic, and definitions***):**
A registry that includes anatomic details or CPT procedure codes is required to identify patients for denominator inclusion. The Society for Vascular Surgery Vascular Quality Initiative and the Vascular Study Group of New England registries capture detailed anatomic information. Infrainguinal lower extremity bypass is defined as a bypass beginning at or below the external iliac artery and extending into the ipsilateral leg. It includes procedures with CPT codes 35656, 35556, 35583, 35666, 35566, 35585, 35671, 35571, 35587. Only patients who are discharged alive are included in the denominator, and patients who are intolerant to statins are excluded, as described below.

2a.9 **Denominator Exclusions (***Brief text description of exclusions from the target population***):** Chart documentation that patient was not an eligible candidate for statin therapy due to known drug intolerance, or patient died before discharge.

2a.10 **Denominator Exclusion Details (***All information required to collect exclusions to the denominator, including all codes, logic, and definitions***):**
Chart documentation that patient was not an eligible candidate for statin therapy due to known drug intolerance, or patient died before discharge. These data are captured in the SVS VQI and VSGNE registries.

2a.11 **Stratification Details/Variables (***All information required to stratify the measure including the stratification variables, all codes, logic, and definitions***):**
Not required

2a.12-13 **Risk Adjustment Type:** No risk adjustment necessary

2a.14 **Risk Adjustment Methodology/Variables (***List risk adjustment variables and describe conceptual models, statistical models, or other aspects of model or method***):**
NA

2a.15-17 **Detailed risk model available Web page URL or attachment:**

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***):**
All patients age 18 and older undergoing infrainguinal LEB who were prescribed statin at discharge divided by (all patients over 18 undergoing infrainguinal LEB minus those intolerant to statins minus those who died before discharge).

2a.22 **Describe the method for discriminating performance** *(e.g., significance testing)***:**
Standard statistical comparison of rates to provide confidence levels to discriminate meaningful differences from the mean.

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)*:
NA

2a.24 **Data Source (***Check the source(s) for which the measure is specified and tested)*
Registry data

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.***):**
The Society for Vascular Surgery Vascular Quality Initiative Registry
The Vascular Study Group of New England Registry

2a.26-28 Data source/data collection instrument reference web page URL or attachment: Attachment Infra-Inguinal_Bypass_v1.9.xls

2a.29-31 Data dictionary/code table web page URL or attachment: Attachment LEB defs v.01.09.doc

2a.32-35 Level of Measurement/Analysis (*Check the level(s) for which the measure is specified and tested)*
Clinicians: Individual, Clinicians: Group, Facility/Agency, Can be measured at all levels

2a.36-37 Care Settings (*Check the setting(s) for which the measure is specified and tested)*
Hospital

2a.38-41 Clinical Services (*Healthcare services being measured, check all that apply*)
Clinicians: Physicians (MD/DO)

TESTING/ANALYSIS

2b. Reliability testing

2b.1 Data/sample *(description of data/sample and size)*: A random sample of 100 patient records representing 5 procedures relevant to the measure from 5 different hospitals based on data collected during the past 2 years. In addition, in-hospital mortality was examined by claims based analysis of 7,205 patients discharged and recorded in the VSGNE registry between 2003 to 2007.

2b.2 Analytic Method *(type of reliability & rationale, method for testing)*:
A nurse abstractor completed a form based on medical record review for the variables relevant to this measure. The results of this chart review were then compared with the original registry data. The Kappa statistic was used to judge reliability of the data. For mortality validation, claims data from each of 12 hospitals were matched to patient identified data within the VSGNE registry to compare discharge status (alive vs. dead). Any discrepencies were then further evaluated based on a medical record audit.

2b.3 Testing Results *(reliability statistics, assessment of adequacy in the context of norms for the test conducted)*:
The key variables for this measure and testing results were:

1. Correct procedure (infrainguinal lower extremity bypass) performed. Kappa =1.0
2. Statin prescribed at discharge: Kappa=.80 (.11 SE)
3. Hospital mortality: Kappa = .91 (SE .01)

4. Age: 100% agreement, Kappa = 1.0 for age 18 or older categories.
5. Intolerant to statins: Kappa = 1.0

2b
C ☐
P ☐
M ☐
N ☐

2c. Validity testing

2c.1 Data/sample *(description of data/sample and size)*: See reliability testing

2c.2 Analytic Method *(type of validity & rationale, method for testing)*:
The valididty testing of statin prescribed at discharge used the medical record as the gold standard. Discharge medications are routinely and carefully documented in both the discharge summary and discharge orders. The medication list on both the discharge summary and discharge orders were compared to confirm validity.

Patient age and hospital mortality have face validity. Correctness of operation type compared the operative report as the gold standard with the progress note in the medical record.

Data collected over time in VSGNE have been compared to published literature.

2c.3 Testing Results *(statistical results, assessment of adequacy in the context of norms for the test*

2c
C ☐
P ☐
M ☐
N ☐

conducted): 100% agreement was found between statin prescribed at discharge on the discharge summary and discharge orders. 100% agreement was also found between the procedure type reported in the operative note and that recorded in the daily progress notes. Discharge statin use has been tracked in VSGNE for these procedures since 2003. Under a quality program, the proportion of patients discharged on statins has gradually improved, providing validity for this measurement.	
2d. Exclusions Justified **2d.1 Summary of Evidence supporting exclusion(s):** The only exclusions are patients who died before discharge, and patients intolerant to statins, as documented in the medical record. Such patients cannot receive statins. **2d.2 Citations for Evidence:** face validity **2d.3 Data/sample** *(description of data/sample and size)*: 2496 patients in the registry who underwent infrainguinal LEB between 2003-2010 in VSGNE, all patients in registry for this procedure **2d.4 Analytic Method** *(type analysis & rationale)*: Rate determination **2d.5 Testing Results** *(e.g., frequency, variability, sensitivity analyses)*: 2% patients died in hospital 2% were alive but intolerant to statins Of the remaining, 73% were discharged on statins. Across 13 hospitals, the median statin prescribed at discharge rate was 73%, with an interquartile range of 69% to 80%. Across 63 individual providers, the median statin prescribed at discharge rate was 75%, with an interquartile range of 66% to 84%.	**2d** C☐ P☐ M☐ N☐ NA☐
2e. Risk Adjustment for Outcomes/ Resource Use Measures **2e.1 Data/sample** *(description of data/sample and size)*: Not required for this process measure. **2e.2 Analytic Method** *(type of risk adjustment, analysis, & rationale)*: NA **2e.3 Testing Results** *(risk model performance metrics)*: NA **2e.4 If outcome or resource use measure is not risk adjusted, provide rationale:** NA	**2e** C☐ P☐ M☐ N☐ NA☐
2f. Identification of Meaningful Differences in Performance **2f.1 Data/sample from Testing or Current Use** *(description of data/sample and size)*: see section 1.b.3 and above 2,d,5 **2f.2 Methods to identify statistically significant and practically/meaningfully differences in performance** *(type of analysis & rationale)*: Standard statistial analysis to determine 95% confidence interval for hospitals and providers to determine practical difference from mean **2f.3 Provide Measure Scores from Testing or Current Use** *(description of scores, e.g., distribution by quartile, mean, median, SD, etc.; identification of statistically significant and meaningfully differences in performance)*: see above	**2f** C☐ P☐ M☐ N☐
2g. Comparability of Multiple Data Sources/Methods	**2g**

2g.1 Data/sample *(description of data/sample and size)*: Other sources not available for testing. **2g.2 Analytic Method** *(type of analysis & rationale)*: NA **2g.3 Testing Results** *(e.g., correlation statistics, comparison of rankings)*: NA	C☐ P☐ M☐ N☐ NA☐
2h. Disparities in Care **2h.1 If measure is stratified, provide stratified results** *(scores by stratified categories/cohorts)*: NA **2h.2 If disparities have been reported/identified, but measure is not specified to detect disparities, provide follow-up plans:** NA	**2h** C☐ P☐ M☐ N☐ NA☐
TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Scientific Acceptability of Measure Properties?*	**2**
Steering Committee: Overall, to what extent was the criterion, *Scientific Acceptability of Measure Properties*, met? **Rationale:**	***2*** C☐ P☐ M☐ N☐
3. USABILITY	
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)	**Eval Rating**
3a. Meaningful, Understandable, and Useful Information **3a.1 Current Use:** In use **3a.2 Use in a public reporting initiative (disclosure of performance results to the public at large)** *(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)*: Data from SVS VQI and VSGNE are reported to each hospital and provider in a format that can be transmitted to an appropriate public reporting mechanism. **3a.3 If used in other programs/initiatives (***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***):** The Vascular Surgery Group of New England (VSGNE) has been tracking periperative statin use in patients undergoing lower extremity bypass. In the VSGNE, a multicenter quality improvement consortium, data has been collected on 3,693 patients who have undergone LEB. Unpublished analyses of these data demonstrate that only 41% of patients were taking statins preoperatively before LEB in 2004. Through quality improvement efforts, percentage of statins prescribed at disccharge has increased to 79% during the first 6 months of 2010. However, this rate of statin use falls significantly short of the 90% goal set forth by this quality improvement group in 2008. www.vsgne.org **Testing of Interpretability** (*Testing that demonstrates the results are understood by the potential users for public reporting and quality improvement*) **3a.4 Data/sample** *(description of data/sample and size)*: VSGNE samples previously described **3a.5 Methods** *(e.g., focus group, survey, QI project)*: Semi-annual meetings of providers in VSGNE **3a.6 Results** *(qualitative and/or quantitative results and conclusions)*:	**3a** C☐ P☐ M☐ N☐

Benchamrk reports of this process measure have been provided to VSGNE member physician and hospitals since 2003, and discussed at semi-annual meetings. There have been no questions about interpretability.	
3b/3c. Relation to other NQF-endorsed measures **3b.1 NQF # and Title of similar or related measures:** 0118 Antilipid therapy at discharge 0439 Discharged on statin medication	
(for NQF staff use) **Notes on similar/related endorsed or submitted measures:**	
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 or different topic but same target population): **3b.2 Are the measure specifications harmonized? If not, why?** Yes	**3b** C☐ P☐ M☐ N☐ NA☐
3c. Distinctive or Additive Value **3c.1 Describe the distinctive, improved, or additive value this measure provides to existing NQF-endorsed measures:** Different patient population **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:**	**3c** C☐ P☐ M☐ N☐ NA☐
TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Usability?*	**3**
Steering Committee: Overall, to what extent was the criterion, *Usability*, met? **Rationale:**	**3** C☐ P☐ M☐ N☐
4. FEASIBILITY	
Extent to which the required data are readily available, retrievable without undue burden, and can be implemented for performance measurement. (evaluation criteria)	Eval Rating
4a. Data Generated as a Byproduct of Care Processes **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)	**4a** C☐ P☐ M☐ N☐
4b. Electronic Sources **4b.1 Are all the data elements available electronically?** (*elements that are needed to compute measure scores are in defined, computer-readable fields, e.g., electronic health record, electronic claims*) Yes **4b.2 If not, specify the near-term path to achieve electronic capture by most providers.**	**4b** C☐ P☐ M☐ N☐
4c. Exclusions **4c.1 Do the specified exclusions require additional data sources beyond what is required for the numerator and denominator specifications?** No **4c.2 If yes, provide justification.**	**4c** C☐ P☐ M☐ N☐ NA☐

4d. Susceptibility to Inaccuracies, Errors, or Unintended Consequences **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.** It is possible to miss or inacurately code statin status. We have overcome this by providing each site with a list of generic and trade names for known statin medications.	**4d** C☐ P☐ M☐ N☐
4e. Data Collection Strategy/Implementation **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:** In the VSGNE experience which has been tracking statin usage since 2003, we have not experienced any difficulty with obtaining data related to statin usage. Our percent missing for perioperative statin use has been less than 2%. **4e.2 Costs to implement the measure** (*costs of data collection, fees associated with proprietary measures*)**:** In the context of the VSGNE and SVS VQI registries, there is no additional cost as all of these data are already collected. **4e.3 Evidence for costs:** NA **4e.4 Business case documentation:**	**4e** C☐ P☐ M☐ N☐
TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for *Feasibility?*	**4**
Steering Committee: Overall, to what extent was the criterion, *Feasibility*, met? **Rationale:**	**4** C☐ P☐ M☐ N☐
RECOMMENDATION	
(for NQF staff use) **Check if measure is untested and only eligible for time-limited endorsement.**	**Time-limited** ☐
Steering Committee: Do you recommend for endorsement? **Comments:**	**Y**☐ **N**☐ **A**☐
CONTACT INFORMATION	
Co.1 Measure Steward (Intellectual Property Owner) **Co.1 Organization** Society for Vascular Surgery, 633 N. Saint Clair St., 22nd Floor, Chicago, Illinois, 60611 **Co.2 Point of Contact** Sarah, Murphy, Staff, smurphy@vascularsociety.org, 312-334-2305-	
Measure Developer If different from Measure Steward **Co.3 Organization** Society for Vascular Surgery, 633 N. Saint Clair St., 22nd Floor, Chicago, Illinois, 60611 **Co.4 Point of Contact** Sarah, Murphy, Staff, smurphy@vascularsociety.org, 312-334-2305-	

Co.5 Submitter If different from Measure Steward POC Sarah, Murphy, Staff, smurphy@vascularsociety.org, 312-334-2305-, Society for Vascular Surgery
Co.6 Additional organizations that sponsored/participated in measure development The Vascular Study Group of New England
ADDITIONAL INFORMATION
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.** N/A
Ad.2 If adapted, provide name of original measure: **Ad.3-5 If adapted, provide original specifications URL or attachment**
Measure Developer/Steward Updates and Ongoing Maintenance **Ad.6 Year the measure was first released:** 2010 **Ad.7 Month and Year of most recent revision:** 12, 2010 **Ad.8 What is your frequency for review/update of this measure?** **Ad.9 When is the next scheduled review/update for this measure?**
Ad.10 Copyright statement/disclaimers:
Ad.11 -13 Additional Information web page URL or attachment:
Date of Submission (*MM/DD/YY*)**:** 03/27/2011

Vascular Quality Initiative - Infra-Inguinal Bypass

Last Name | First Name | Middle Initial

Date of Birth | Medical Record Number | Social Security Number

General Information

Patient Data

Zip Code

Ethnicity ☐ Not Hispanic or Latino; ☐ Hispanic or Latino

Height ☐ inches or cm

Weight ☐ lbs or kg

Gender ☐ male; ☐ femal

Race ☐ Whit ☐ Black or African American; ☐ Asian; ☐ More than 1 rac ☐ American Indian or Alaskan Native; ☐ Native Hawaiian or other Pacific Islander; ☐ Unknown/other

Admission Data

Visit code (not required)

Admit Date

Surgeon

Discharge Status ☐ home; ☐ rehab unit; ☐ nursing home ☐ deac ☐ other hospital ☐ skilled nursing facility

If dead, date of death

Tranfered from? ☐ no; ☐ hospital; ☐ rehab unit

Discharge Date

Surgery Date

Does the patient have Medicare Part B? ☐ no; ☐ yes

Demographics

Smoking ☐ never; ☐ prior (>1 yr); ☐ current (within yr)

Diabetes ☐ none; ☐ diet; ☐ oral meds ☐ insulin

CAD symptoms ☐ none; ☐ hx MI but no sx; ☐ stable angina; ☐ unstable angina or MI < 6 m

CHF ☐ none; ☐ asymp, hx CHF; ☐ mild ☐ severe

Dialysis ☐ no; ☐ functioning transplant; ☐ on dialysis

Stress Test ☐ normal ☐ (+) ischemia; ☐ (+) MI ☐ (+)both ☐ not done

ASA Class ☐ 1 normal/health ☐ 2 w/mild systemic dx; ☐ 3 w/sever systen ☐ 4 w/severe systemic dx that is a constant threat to life; ☐ 5 moribund, not expectd to survive w/o op

HbA1c ☐ % (most recent value available pre- or post-op)

Hypertension ☐ no; ☐ yes (>=140/90 or histo

Beta blockers ☐ nc ☐ op day only; ☐ pre-op 1-30 days; ☐ chronic >30 days; ☐ no-intolerant

CABG/PTCA ☐ none ☐ <5y ☐ >=5yrs ag

COPD ☐ no ☐ not treated ☐ on me ☐ on home oxygen

Creatinine ☐ mg/dl OR µmol/L

Pre-adm Living ☐ home ☐ nursing ho

Pre-op Hemoglobin ☐ g/dl OR g/L

Previous arterial

Bypass ☐ no; ☐ yes

Aneurysm Repair ☐ no; ☐ yes

Major Amp ☐ no; ☐ yes

CEA ☐ no; ☐ yes

PTA/Stent ☐ no; ☐ yes

Pre-Op Medications

ASA ☐ no; ☐ yes ☐ intolerant

Statin ☐ no; ☐ yes ☐ intolerant

Plavix ☐ no; ☐ yes ☐ intolera

History

	Right	Left
Indication	☐ asymptomatic; ☐ claudication; ☐ rest pain; ☐ tissue loss; ☐ acute ischemia; ☐ not treated	☐ asymptomatic; ☐ claudication; ☐ rest pain; ☐ tissue loss; ☐ acute ischemia; ☐ not treated
Pathology	☐ not treated; ☐ occlusive; ☐ aneurysm	☐ not treated; ☐ occlusive; ☐ aneurysm
Ambulation Pre-Op	☐ amb; ☐ amb w/assistance; ☐ wheelchair; ☐ bedridden	

Previous	Right	Left
Inflow Bypass	☐ no; ☐ yes	☐ no; ☐ yes
Inflow PTA/Stent	☐ no; ☐ yes	☐ no; ☐ yes
Leg Bypass	☐ no; ☐ yes	☐ no; ☐ yes
Leg PTA/Stent	☐ no; ☐ yes	☐ no; ☐ yes
Major Amputation	☐ no; ☐ yes	☐ no; ☐ yes
Minor Amputation	☐ no; ☐ yes	☐ no; ☐ yes

Pre-Op	Right	Left
Pre-Op ABI		
Pre-Op TBI		

Pre-Op Imaging

Duplex ☐ no; ☐ yes

DSA/Arteriorgram ☐ no; ☐ yes

MRA ☐ no; ☐ yes

Vein Mapping ☐ no; ☐ yes

CTA ☐ no; ☐ yes

Vascular Quality Initiative - Infra-Inguinal Bypass

Procedure

Urgency	☐ elective; ☐ urgent; ☐ emergent	Anesthesia	☐ spina ☐ epidural; ☐ general
Side	☐ right ☐ left	Skin Prep	☐ chlorhexadine; ☐ alcohol; ☐ iodine; ☐ chlor+iodine; ☐ chlor+alcohol; ☐ iodine+alcohol ☐ all 3
Graft Origin	☐ ext iliac; ☐ com fe ☐ profunda; ☐ SFA; ☐ AK pop ☐ BK pop; ☐ tibial	Graft Recipient	☐ SFA; ☐ profunda; ☐ AK pop ☐ BK pop; ☐ T-P trunk; ☐ AT; ☐ PT; ☐ peroneal; ☐ DP ankle; ☐ PT ank ☐ tarsal/plantar; ☐ com fem
Graft Vein Type	☐ none; ☐ reversed GSV; ☐ in situ GSV; ☐ non-reversed transposed GSV; ☐ lesser saph; ☐ cephalic; ☐ basilic; ☐ composite vein	# Vein Segments	☐ none; ☐ 1; ☐ 2; ☐ 3 or more
Prosthetic	☐ none; ☐ Dacron; ☐ PTFE; ☐ non-autologous biologic; ☐ composite w/vein	EBL	☐ ml
Groin Incision	☐ none; ☐ vertical; ☐ horizontal	Total Procedure Time	☐ minutes
If a Graft Vein used, complete the following 2 variables:			
Vein Harvest Incision	☐ continuous; ☐ skip; ☐ endoscopic	Vein Graft Location	☐ sub-cutaneous ☐ sub-fascial

Adjuncts

Vein Cuff	☐ no; ☐ yes	Sequential Graft	☐ no; ☐ yes

Heart Rate

On Arrival in OR	☐ bpm	Highest intra-op	☐ bpm

Concomitant Proximal Ipsilateral

PVI	☐ no; ☐ yes (complete a Peripheral Vascular Intervention procedure form)
Bypass	☐ no; ☐ yes (complete a Supra-Inguinal Bypass procedure form)
Endarterectomy	☐ no; ☐ yes

Completion Study

Doppler	☐ no; ☐ yes	Duplex	☐ no; ☐ yes
Arteriogram	☐ no; ☐ yes		

Post-Op Data

Wound Infection	☐ no; ☐ yes	Graft Infection	☐ no; ☐ yes
Transfusion # units PRBC	☐ # units transfused during total hospitalization	Myocardial Infarction	☐ no; ☐ troponin only; ☐ EKG or clinical
Dysrhythmia	☐ no; ☐ yes	CHF	☐ no; ☐ yes
Respiratory	☐ no; ☐ pneumonia; ☐ ventilatc	Change of Renal Function	☐ none; ☐ creat. increase > 0.5 mg/dl (44.2 µmol/L); ☐ temp. dialysis; ☐ permanent dialysis
Stroke	☐ none ☐ mino ☐ major	Ipsilateral Amputation	☐ no; ☐ minor amp; ☐ BK amp; ☐ AK amp
Discharge Patency	☐ primary; ☐ prim. assisted; ☐ secondary; ☐ occluded	Patency Judged by	☐ doppler only; ☐ palpable graft pul ☐ palpable distal pulse; ☐ ABI increase >0.15; ☐ duplex
Return to OR	☐ no; ☐ yes		
for Bleeding	☐ no; ☐ yes	for Thrombosis	☐ no; ☐ yes
for Infection	☐ no; ☐ yes	for Revision	☐ no; ☐ yes

Discharge Medications

ASA	☐ no; ☐ yes ☐ intolerar	Statin	☐ no; ☐ yes ☐ intolerar	Plavix	☐ no; ☐ yes ☐ intolerar
Beta Blocker	☐ no; ☐ yes ☐ intolerar	Coumadin	☐ no; ☐ yes ☐ intolerar		

Discharge	**Right**		**Left**
Post-Op ABI		Post-Op ABI	
Post-Op TBI		Post-Op TBI	

Discharge Ambulation: ☐ amb; ☐ amb w/assistance; ☐ wheelchair; ☐ bedridden

Peri-Op Antibiotic Ordered

Start <1hr Pre-op	☐ no; ☐ yes ☐ no, for medical reason	Stop <24hr Post-op	☐ no; ☐ yes ☐ no, for medical reason
1st-2nd Gen Cephalosporin	☐ no; ☐ yes ☐ no, for medical reason		

Vascular Quality Initiative - Infra-Inguinal Bypass Follow-Up

Last Name:		First Name:		DOB:	
MRN:		SSN:		Zip/Postal Code:	
Visit Code:		Surgeon:		Surgery Date:	
				Side:	

General Information

Date of Contact

Contact By ☐ Office Visit; ☐ Phone; ☐ Refused follow-up visit; ☐ Lost to follow-u

Current Smoking ☐ No; ☐ Yes (within last 6 months)

Current Living Status ☐ Home; ☐ Nursing Home; ☐ Dead

Date of Death

Cause ☐ Operation Related; ☐ Non-Related; ☐ Unsure

Current Medications

ASA ☐ No; ☐ Yes; ☐ Intolerant

Plavix ☐ No; ☐ Yes; ☐ Intolerant

Coumadin ☐ No; ☐ Yes; ☐ Intoleran

Beta Blocker ☐ No; ☐ Yes; ☐ Intolerant

Statin ☐ No; ☐ Yes; ☐ Intolerant

Infra-Inguinal Bypass

Current Ambulation ☐ amb; ☐ amb w/assistance ☐ wheelchair; ☐ bedridden

Ipsilateral Symptoms ☐ asymptomatic; ☐ claudication; ☐ rest pain; ☐ tissue loss

Current Patency ☐ primary; ☐ prim. assisted; ☐ secondary; ☐ occluded

Patency Judged by ☐ doppler only; ☐ palpable graft pulse; ☐ palpable distal pulse; ☐ ABI increase >0.15; ☐ duplex

Ipsilateral ABI

Ipsilateral TBI

Infection ☐ none; ☐ superficial cellulitis; ☐ deep abcess; ☐ infection involving artery or graft

Bypass Revision ☐ n ☐ yes, surgery; ☐ yes, catheter-based; ☐ both

Date

Thrombectomy/lyis - Revision ☐ n ☐ yes, surgery; ☐ yes, catheter-based; ☐ both

Date

Major Amputation ☐ no; ☐ minor amp; ☐ BK amp; ☐ AK amp

Date

LOWER EXTREMITY BYPASS DEFINITIONS– v.01.09

If more than one response applies, select the most severe (highest number) response for each data field.

Pre-op Data

Smoking: Prior = quit ≥ 1 year ago. Current = still smoking within last 12 months. Include cigarettes, pipe, or cigar.

HTN (Hypertension): Defined as ≥ 140/90, either systolic or diastolic, at admission or within last 6 months, or clearly documented in medical record.

Beta-blockers: Peri-operative = started within one month before surgery or during surgery. Chronic = more than one month before surgery.

CAD Symptoms (Coronary artery disease**):** Stable angina = stable pattern or symptoms with or without antianginal medication. Unstable angina = new onset, increasing frequency, lasting > 20 min and/or rest angina.

CABG/PTCA: Coronary artery bypass, angioplasty, or stent.

CHF (Congestive Heart Failure): Documented CHF: Mild = SOB on exertion; Severe = SOB at rest, pulmonary edema, or pitting ankle edema. (Use 2 = mild if severity not documented.)

COPD: Not treated = COPD documented in record but not treated with medication. Medication includes theophylline, aminophylline, inhalers or steroids

Dialysis: Transplant = patient has functioning kidney transplant; Dialysis = currently on hemo- or peritoneal dialysis.

Creatinine: Last available measurement taken before procedure. If multiple measurements, use highest within 30 days of surgery.

Stress Test: Includes stress EKG, stress echo, nuclear stress scans, within 2 years of surgery.

Pre-admin living: Use last living status before any current, acute hospitalization, or rehab unit.

Previous Arterial:

Bypass - Any non-cardiac arterial bypass for occlusive disease
CEA - Carotid endarterectomy
Aneurysm Repair – Any known true arterial aneurysm repair (excluding cerebral or pseudo-aneurysm)
PTA/Stent – Of any non-cardiac artery
Major Amputation – Any amputation above the foot or hand

Pre-Op Medications: Taken within 36 hours of surgery. Statins include any HMG-CoA reductase inhibitor, such as Lipitor, Mevacor, Pravachol, Zocor, Lescol, etc. If Plavix is discontinued prior to surgery it should be coded = 0.

Pre-op Hemoglobin: Most recent pre-op hemoglobin within past 30 days.

Indication: Acute ischemia requires motor-sensory loss, sudden onset, and need for emergent treatment within 24 hours of presentation. Urgent = 12-72 hours. Emergent = <12 hours.

Pathology: If both aneurysm and occlusive disease, select the pathology that was the principal indication for the procedure.

Ambulation Pre-op: Chose best ambulation category experienced within one month of admission (lowest category).

Previous Ipsilateral/Contralateral: Inflow: aorto-iliac-femoral. Leg: intra-inguinal. Amputation: Major = above or below knee (loss of foot); Minor = within foot.

Pre-opABI, TBI: Use highest value from affected leg. TBI = toe-brachial index. Use actual units. Use 2.0 if non-compressible.

DSA/Angiogram: Digital subtraction or conventional arteriogram.

Procedure

Urgency: Urgent = required operation within 72 hours, but >12 hrs of admission. Emergent = required operation within 12 hrs of admission to prevent limb loss.

Recipient: Use most distal site if sequential bypass.

Vein type: Use composite for spliced vein from more than one vein site.

Concomitant Proximal Ipsilateral: Procedure performed proximal to or at origin of leg bypass graft to improve inflow during same operation.

Post-op Data

Wound infection: Culture positive or requiring antibiotic treatment.

Graft infection: Documented in record as exposed graft or graft infection.

Transfusion: Total of all PRBC transfusions pre-op, intra-op, and post-op during this hospitalization.

Myocardial Infarction: Troponin: by local standards for MI. EKG: new Q waves, new ST and T wave changes. Clinical: documentation of MI by clinical criteria or ECHO or other imaging modality.

Dysrhythmia: New rhythm disturbance requiring treatment with medications or cardioversion.

CHF: Pulmonary edema with requirement for monitoring or treatment in ICU.

Respiratory: Pneumonia = Lobar infiltrate on CXR and pure growth of recognized pathogen or 4+ growth of recognized pathogen in presence of mixed growth. Ventilator = required after initially extubated (if applicable).

Change renal function: New increase in creatinine of 0.5mg/dl. New dialysis includes peritoneal dialysis, hemodialysis, and hemo-filtration. (Applies to new dialysis not present pre-op.)

Bleeding; Infection; Thrombosis; Revision: Use 666 if Return to OR = 0.

Discharge patency: Primary = without other intervention; Primary-assisted = after intervention but without thrombosis; Secondary = after intervention for thrombosis.

Patency judged by: Use highest applicable modality. Palpable: clearly palpable pulse (not by Doppler). ABI: increase ABI (or TBI) ≥ 0.15 compared with pre-op.

Post-op ABI, TBI: Use highest value from affected leg. TBI = toe-brachial index. Use actual units. Use 2.0 if non-compressible.

Peri-operative Antibiotics: Use 0=no if antibiotic was not ordered. To use 1=yes, antibiotic must be ordered to be given within 1 hour prior to skin incision and must be ordered to be discontinued within 24 hrs of end of time of operation. To use 2=no for medical reason, a medical reason must be documented in the chart that antibiotic not given. **Acceptable antibiotics include:** Ampicilin/sulbactam, Aztreonam, Cefazolin, Cefmetazole, Cefotetan, Cefuroxime, Ciprofloxacin, Clindamycin, Ertapenem, Erythromycin base, Gatifloxacin, Gentamicin, Levofloxacin, Metronidazole, Moxifloxacin, Neomycin, and Vancomycin.

1st-2nd Generation Cepahalosporin: (Cefazolin or Cefuroxime) Use response 1=yes, if ordered. If documented in medical record that not ordered for medical reason use 2. Otherwise use 0=no.