NATIONAL QUALITY FORUM

CONFERENCE CALL OF THE SURGERY ENDORSEMENT MAINTENANCE 2010 STEERING COMMITTEE

November 29, 2011

Committee Members Present: Arden Morris, MD, MPH, FACS (Co-chair), University of Michigan; Curtis Collins, PharmD, MS, BCPS AQ-ID, University of Michigan Health System; Peter Dillon, MD, MSc, Penn State Hershey Medical Center; Richard Dutton, MD, MBA, Anesthesia Quality Institute; Vivienne Halpern, MD, FACS, Carl T Hayden VA Medical Center; Terry Rogers, MD, The Foundation for Health Care Quality; Connie Steed, MSN, RN, CIC, Greenville Hospital System; Carol Wilhoit, MD, MS, Blue Cross Blue Shield of Illinois.

NQF Staff Present: Heidi Bossley, MSN, MBA, Vice President of Performance Measures; Alexis Forman Morgan, MPH, Senior Project Manager; Karen Pace, PhD, RN, Senior Director; Jessica Weber, Project Analyst, MPH.

Measure Developers Present: Dale Bratzler, Oklahoma Foundation of Medical Quality; Carla Chronister, Oklahoma Foundation for Medical Quality; Jeffrey Geppert, Battelle Memorial Institute; Bob Jasak, American College of Surgeons; Wanda Johnson, Oklahoma Foundation for Medical Quality; Tim Kresowik, Society of Vascular Surgeons; Karen Nakano, Centers for Medicare & Medicaid Services; Mamatha Pancholi, Agency for Healthcare Research and Quality; Patrick Romano, University of California-Davis; David Shahian, The Society of Thoracic Surgeons; Jill Shelly, American College of Surgeons; Cynthia Shewan, The Society of Thoracic Surgeons.

Others Present: Elvira Ryan, The Joint Commission; Joann Sorra, Westat; Carla Zema, Zema Consulting.

The audio recording from the meeting can be found here.

MEETING PROCESS

Mrs. Forman Morgan welcomed the Steering Committee and provided a brief overview of the agenda. The purpose of this call was to:

- continue reviewing the remaining Phase II measures;
- determine if any of the AAA measures are related or competing;
- review harmonization plans for multiple prophylactic antibiotic measures; and
- review measure 1741: Patient experience with surgical care based on the consumer assessment of healthcare providers and systems (CAHPS)™ surgical care survey.

The measure developers/stewards were available on the call to respond to questions from the Committee as needed.

NATIONAL QUALITY FORUM

MEASURE EVALUATION SUMMARY

The following summary includes the Committee's original evaluation of the measures and any follow-up since the May 4-5 in-person meeting.

Measures and Evaluations

The summary below displays follow-up of 9 measures, including actions taken by the Steering Committee on conditional recommendations or preliminary review. (See the summary from the May 4-5 meeting for the original evaluation of the measures.)

Information related to the measures that were discussed on this call is highlighted.

LEGEND: Y= Yes; N = No; A = Abstain; C = Completely; P = Partially; M = Minimally; N = Not at all

0365 Pancreatic resection mortality rate (IQI 9) (risk adjusted)
Description: Percentage of adult hospital discharges with procedure code of pancreatic resection with an in-hospital death, stratified by benign and malignant disease. **Numerator Statement:** Number of deaths (DISP=20) among cases meeting the inclusion and exclusion rules for the denominator. **Denominator Statement:** Hospital discharges, age 18 years and older, with ICD-9-CM pancreatic resection code procedure and a diagnosis code of pancreatic cancer in any field, stratified by benign and malignant disease. **Exclusions:** 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) ICD-9-CM codes: 577.0

0365 Pancreatic resection mortality rate (IQI 9) (risk adjusted)

Acute pancreatitis

Adjustment/Stratification: Risk adjustment method widely or commercially available 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/User has the optin to stratify by gender, age (5-year age groups), race/ ethnicity, primary payer, and custom stratifiers./ Malignant Disease:
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
MAL NEO PANCREAS TAIL
1573
MAL NEO PANCREATIC DUCT
1574
MAL NEO ISLET LANGERHANS
1578
MALIG NEO PANCREAS NEC
1579
MALIG NEO PANCREAS NOS
Benign Disease:
All other cases

Level of Analysis: Facility/ Agency
Type of Measure: Outcome
Data Source: Electronic administrative data/ claims
Measure Steward: Agency for Healthcare Research and Quality | 540 Gaither Road | Rockville | Maryland | 20850

Steering Committee Recommendation for Endorsement: Pending final recommendation.
Rationale: The measure is based on strong evidence and evaluation criteria are met. With stratification that includes benign and malignant disease and both endovascular and open repair, its usefulness is enhanced.

If applicable, Conditions/Questions for Developer:
Overarching comment: Please provide feasibility of reporting mortality stratified by institutional volume (e.g., high, medium, low volume with parameters for each) rather than having rate and mortality separated.

1. De.2 Ensure measure description accurately captures measure focus.
2. 2a.8 Denominator Details: Do not limit to pancreatic resection for cancer - could stratify by malignant and benign. Also, consider providing volume as well as rate.
3. 2a.9 Denominator Exclusions: Please remove 'transferring to another short-term hospital (DISP=2)' from the exclusions.
4. 2a.9 Denominator Exclusions: Add exclusion for pancreatitis.

Measures 0365 and 0366 should be fully harmonized in order to properly report as a pair. This will involve including all pancreatic disease in both the numerator and denominator of both measures. They can then be stratified by malignant and benign disease.
Note: Discussion of Related and Competing measures may result in additional requests to developers specific to harmonization.

Developer Response:

1. AHRQ agrees to revise the measure description to more accurately capture the measure focus
2. AHRQ agrees to harmonize the mortality and volume indicator denominators to include benign disease in the mortality measure. Note that the mortality and volume indicator (0366) are designated as paired measures
3. This request is problematic for a few reasons. First, the outcome of interest (in-hospital mortality) is not observed for these

0365 Pancreatic resection mortality rate (IQI 9) (risk adjusted)

cases. Second, it is possible that a single case may be counted twice (once for the transferring hospital, once for the receiving hospital). Third, removing this exclusion would require using data that linked patients across hospitalizations (in order to avoid the issues #1 and #2), which is not readily available for individual hospitals across institutions. Therefore, we respectively defer a definitive response to this request pending the routine availability of linked hospitalization data, or at a minimum additional analysis using such data of the potential impact of removing the exclusion.

4. AHRQ agrees to add an exclusion for pancreatitis

Steering Committee Follow-up:

1. The Steering Committee expressed their concern about transferred patients being excluded from the measure. AHRQ responded that the number is less that 1 percent and the majority is transfer of convenience for the patient. The Steering Committee agreed that the response from the developer was adequate.
2. This was one of three related measures considered for potential harmonization. The three included: m*aintenance measure 0365*: Pancreatic resection mortality rate (IQI 9); m*aintenance measure 0366*: Pancreatic resection volume (IQI 2); and e*ndorsed measure 0738*: Survival predictor for pancreatic resection surgery. Discussion of the three measures is included here. The Steering Committee requested the measure developer continue its expedited work to combine measures 0365 and 0366, including benign disease. After some discussion, the Members agreed that because measures 0365 and 0366 are risk adjusted and measure 0738 is not, that recommendations related to harmonization of numerator and denominator should not be advanced at this time.

On the September 13 conference call, the Steering Committee reviewed Measures 0365 and 0366 which have been harmonized to reflect both benign and malignant disease. The developer stated that empirical literature has predominately focused on resections for cancer and there is a substantial difference in short term outcomes between high volume and low volume centers. They noted the potential value of including benign disease as a separate stratum. The developer also indicated that they continue to work on combining the measures into a single measure. Progress to this end will be reviewed on a subsequent conference call.

On the November 29 call, the developer indicated that testing results were provided for the revised measures (0365 and 0366) that are now stratified by benign and malignant disease. The Committee was satisfied with the testing results and recommended both measures for endorsement. The Committee will vote on final recommendation for endorsement of this measure following the conference call.

1. Importance to Measure and Report:
(1a. Impact; 1b. Performance gap; 1c. Outcome or Evidence)
Rationale: The evidence supports the measure's focus on pancreatic resections for cancer and while it is a low-volume procedure, mortality rates are high and merit tracking.

2. Scientific Acceptability of Measure Properties:
(2a. Precise specifications; 2b. Reliability testing; 2c. Validity testing; 2d. Exclusions justified; 2e. Risk adjustment/stratification; 2f. Meaningful differences; 2g. Comparability; 2h. Disparities)
Rationale: The measure was considered scientifically acceptable. The Committee discussed the importance of separate measures focusing on a pancreatic resection for cancer and a pancreatic resection for benign disease and determined that both could be captured in a single measure that is stratified to report each.

3. Usability:
(3a. Meaningful/useful for public reporting and quality improvement; 3b. Harmonized; 3c. Distinctive or additive value to existing measures)
Rationale: This measure is in use in multiple states and healthcare systems and is reported on HCUPnet as well as used in the MONAHRQ system that is provided for public reporting and quality improvement.

4. Feasibility:
(4a. Clinical data generated during care process; 4b. Electronic sources; 4c. Exclusions – no additional data source; 4d. Susceptibility to inaccuracies/ unintended consequences identified 4e. Data collection strategy can be implemented)
Rationale: This measure was considered feasible; data is obtained from electronic claims and chart abstraction.

0366 Pancreatic resection volume (IQI 2)

Description: Number of adult hospital discharges with procedure for pancreatic resection, stratified by benign and malignant disease.
Numerator Statement: Hospital discharges, age 18 years and older, with ICD-9-CM codes for pancreatic resection procedure, stratified by benign and malignant disease.
Denominator Statement: Not applicable
Exclusions: Not applicable
Adjustment/Stratification: No risk adjustment necessary/.
Malignant Disease:
ICD-9-CM pancreatic cancer diagnosis codes:

0366 Pancreatic resection volume (IQI 2)

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
MAL NEO PANCREAS TAIL
1573
MAL NEO PANCREATIC DUCT
1574
MAL NEO ISLET LANGERHANS
1578
MALIG NEO PANCREAS NEC
1579
MALIG NEO PANCREAS NOS
Benign Disease:
All other cases
Level of Analysis: Facility/ Agency
Type of Measure: Structure/management
Data Source: Electronic administrative data/ claims
Measure Steward: Agency for Healthcare Research and Quality | 540 Gaither Road | Rockville | Maryland | 20850

Steering Committee Recommendation for Endorsement: Pending final recommendation.
Rationale: The measure was considered important and cited strong evidence. With reporting as a pair with 0365 and stratification that includes benign and malignant disease and both endovascular and open repair, its usefulness is enhanced.

If applicable, Conditions/Questions for Developer:

1. De.2 Ensure measure description accurately captures measure focus.
2. 2a.3 Numerator Details: Partial resections and partial operations should be included in 0366,
3. 2a.8 Denominator Details: Do not limit to pancreatic resection for cancer.
4. 2a.9 Denominator Exclusions: Please remove 'transferring to another short-term hospital (DISP=2)' from the exclusions.
5. 2a.9 Denominator Exclusions: Add exclusion for pancreatitis.
6. 2b.3 and 2.c.3 Testing Results: Text speaks to esophageal resection. Please provide correct information and advise if there are other such errors within the submission that have required correction.

Measures 0365 and 0366 should be fully harmonized in order to properly report as a pair. This will involve including all pancreatic disease in both the numerator and denominator of both measures. They can then be stratified by malignant and benign disease.
Note: Discussion of Related and Competing measures may result in additional requests to developers specific to harmonization.

Developer Response:

1. AHRQ agrees to revise the measure description to more accurately capture the measure focus
2. AHRQ agrees to include partial resections and partial operations
3. The volume measure contains no such exclusion. However, in general AHRQ agrees to harmonize the mortality and volume indicator denominators to include benign disease in the mortality measure. Note that the mortality (0365) and volume indicator are designated as paired measures.
4. The volume measure contains no such exclusion; however, see note above regarding harmonization
5. The volume measure contains no such exclusion; however, see note above regarding harmonization
6. Such erroneous references shall be corrected

Steering Committee Follow-up:

1. The Steering Committee agreed that the response from the developer was adequate.
2. This was one of three related measures considered for potential harmonization. The three included: m*aintenance measure 0365*: Pancreatic resection mortality rate (IQI 9); m*aintenance measure 0366*: Pancreatic resection volume (IQI 2); and e*ndorsed measure 0738*: Survival predictor for pancreatic resection surgery. Discussion of the three measures is included here. The Steering Committee requested the measure developer continue its expedited work to combine measures 0365 and 0366, including benign disease. After some discussion, the Members agreed that because measures 0365 and 0366 are risk

0366 Pancreatic resection volume (IQI 2)

adjusted and measure 0738 is not, that recommendations related to harmonization of numerator and denominator should not be advanced at this time.

On the September 13 conference call, the Steering Committee reviewed Measures 0365 and 0366 which have been harmonized to reflect both benign and malignant disease. The developer stated that empirical literature has predominately focused on resections for cancer and there is a substantial difference in short term outcomes between high volume and low volume centers. They noted the potential value of including benign disease as a separate stratum. The developer also indicated that they continue to work on combining the measures into a single measure. Progress to this end will be reviewed on a subsequent conference call.

On the November 29 call, the developer indicated that testing results were provided for the revised measures (0365 and 0366) that are now stratified by benign and malignant disease. The Committee was satisfied with the testing results and recommended both measures for endorsement. The Committee will vote on final recommendation for endorsement of this measure following the conference call.

1. Importance to Measure and Report:
(1a. Impact; 1b. Performance gap; 1c. Outcome or Evidence)
Rationale: The evidence supports the measure's focus on pancreatic resections for cancer and while it is a low-volume procedure, the impact in terms of mortality is important to track and report.

2. Scientific Acceptability of Measure Properties:
(2a. Precise specifications; 2b. Reliability testing; 2c. Validity testing; 2d. Exclusions justified; 2e. Risk adjustment/stratification; 2f. Meaningful differences; 2g. Comparability; 2h. Disparities)
Rationale: The measure was considered scientifically acceptable. The Committee discussed the importance of separate measures focusing on a pancreatic resection for cancer and a pancreatic resection for benign disease and determined that both could be captured in a single measure to be stratified to report each.

3. Usability:
(3a. Meaningful/useful for public reporting and quality improvement; 3b. Harmonized; 3c. Distinctive or additive value to existing measures)
Rationale: This measure is in use in multiple states and healthcare systems and is reported on HCUPnet as well as used in the MONAHRQ system that is provided for public reporting and quality improvement.

4. Feasibility:
(4a. Clinical data generated during care process; 4b. Electronic sources; 4c. Exclusions – no additional data source; 4d. Susceptibility to inaccuracies/ unintended consequences identified 4e. Data collection strategy can be implemented)
Rationale: This measure was considered feasible; data is obtained from electronic claims and chart abstraction.

0357 Abdominal aortic aneurysm (AAA) repair volume (IQI 4)

Description: Count of adult hospital discharges in a one year time period with a procedure code of AAA repair.
Numerator Statement: Discharges, age 18 years and older, with an abdominal aortic aneurysm (AAA) repair procedure and a primary or secondary diagnosis of AAA.
Denominator Statement: Not applicable.
Exclusions: Not applicable.
Adjustment/Stratification: no risk adjustment necessary/ The stratification of the denominator for open vs. endovascular and ruptured vs. unruptured involve the following codes in the denominator specification:
AAA Repair (
ICD-9-CM Procedure Codes:
OPEN ;
'3834´ = ´1´ /* AORTA RESECTION & ANAST *
´3844´ = ´1´ /* RESECT ABDM AORTA W REPL */
´3864´ = ´1´ /* EXCISION OF AORTA */
/* ENDOVASCULAR */;
´3971´ = ´1´ /* ENDO IMPL GRFT ABD AORTA */
/* Include Only: AAA */
/* ICD-9-CM Diagnosis Codes: */
/* RUPTURED */;
´4413 ´ = ´1´ /* RUPT ABD AORTIC ANEURYSM */
/* UNRUPTURED */;
´4414 ´ = ´1´ /* ABDOM AORTIC ANEURYSM */
Level of Analysis: Facility/ Agency
Type of Measure: Structure/management

0357 Abdominal aortic aneurysm (AAA) repair volume (IQI 4)

Data Source: Electronic administrative data/ claims
Measure Steward: Agency for Healthcare Research and Quality | 540 Gaither Road | Rockville | Maryland | 20850

Steering Committee Recommendation for Endorsement: Conditional *No did not pass Importance to Measure and Report Y-10; N-11*. Pending final recommendation.
Rationale: The measure initially did not pass the importance criterion; however, the Committee asked for additional information. With that information, the Committee reconsidered the measure. Final action is pending receipt and consideration of a measure that combines 0357 and 0359.

If applicable, Conditions/Questions for Developer:

1. Overarching Comment: The Steering Committee vote regarding the NQF evaluation criterion of "Importance" was split with 10 voting yes and 11 voting no and a number of members noted the measure should only be reported with the related mortality measure. The developer will want to review the measure in its entirety in this light and provide whatever additional information/specification including value as a paired measure with mortality that it believes appropriate. Should specifications change, it is important to provide information regarding testing with the changes.
2. 2a. 11 Stratification Details/Variables: Measure should stratify the measure by endovascular and open repairs.

Note: Discussion of Related and Competing measures may result in additional requests to developers specific to harmonization. As discussed the developer should meet with SVS to harmonize or blend measures concerning AAA

Developer Response:

1. AHRQ agrees to stratify the measure by endovascular and open repairs, but notes that additional methodological development will be required to ensure the measures have adequate reliability.
2. AHRQ noted at the meeting that the volume and mortality measures are to be reported as paired measures though some users may not have the information to report both.

Steering Committee Follow-Up:

The Steering Committee was concerned about volume being reported as a singular measure.

1. The Steering Committee requested information regarding needed methodological changes for the measure based on the endovascular and open repair stratification and will further consider the measure with that information. AHRQ will also further clarify the risk adjustment model.
2. The Steering Committee was concerned that the developer had not addressed creating a composite of the volume (0357) and morbidity measure (0359). Members noted that the developer had agreed to stratify the measure by endovascular and open repairs but that the measure did have reliability testing for the requested change. The Steering Committee asked for additional information about how the developer would redevelop their risk stratification model. On the August 3 conference call, the developer discussed the measure together with Measure 0359 and highlighted preliminary results of revising the measure with four strata. The developer is continuing to explore how the outcomes information can be put back together with volume for the requested composite/combined measures. The measure will move forward as a composite rather than as two measures.

On the September 13 conference call, the Steering Committee reviewed the developer's revisions to reflect four strata, ruptured or unruptured aneurysms repaired by open or endovascular approaches. These four components will be reported separately within this measure in addition to reporting overall measure performance. The developer also responded to questions about testing results and public reporting details to the satisfaction of the Committee.

On the November 29 call, the developer stated that measure 0359: Abdominal aortic artery (AAA) repair mortality rate (IQI 11) was revised and is now adjusted by volume. Although volume has been incorporated into measure 0359, the developer stated that measure 0357: Abdominal aortic aneurysm (AAA) repair volume (IQI 4) should remain. Some Committee members voiced their concerns as to whether volume should be a stand-alone measure. Members of the Committee also indicated that both measures are used by a variety of individuals for a variety of reasons. It was noted on the call that measures 0357 and 0359 are to be reported as paired measures. During the related and competing measures discussion, the Committee agreed that measures 0357 and 0359 were competing against the Leapfrog measure, measure 0736: Survival predictor for abdominal aortic aneurysm (AAA). The Committee determined that the AHRQ measures (0357 and 0359) were superior to measure 0736 as measures 0357 and 0359 distinguish between open vs. endovascular procedures and the measures are risk adjusted. The Committee will vote on each criteria and final recommendation for endorsement of this measure following the conference call.

1. Importance to Measure and Report: Y-10; N-11
(1a. Impact; 1b. Performance gap; 1c. Outcome or Evidence)
Rationale: The measure would provide key information to the public about AAA mortality, but does not provide separate information on EVARs and open repairs. The vote is reflective of the debate related to the value and implications of separately reporting open and endovascular repairs. AHRQ representatives indicated that the stratification is a component of the current software; however, the Committee would like to see this specifically reflected in the specifications of the measure. AHRQ representatives indicated that a separate risk adjustment model could be developed for open and endovascular procedures with both ruptured and unruptured

0357 Abdominal aortic aneurysm (AAA) repair volume (IQI 4)

aneurysms. The majority of AAA repairs are done endovascularly and open repairs have become more complicated.

2. Scientific Acceptability of Measure Properties:
(2a. Precise specifications; 2b. Reliability testing; 2c. Validity testing; 2d. Exclusions justified; 2e. Risk adjustment/stratification; 2f. Meaningful differences; 2g. Comparability; 2h. Disparities)
Rationale:

3. Usability:
(3a. Meaningful/useful for public reporting and quality improvement; 3b. Harmonized; 3c. Distinctive or additive value to existing measures)
Rationale:

4. Feasibility:
(4a. Clinical data generated during care process; 4b. Electronic sources; 4c. Exclusions – no additional data source; 4d. Susceptibility to inaccuracies/ unintended consequences identified 4e. Data collection strategy can be implemented)
Rationale:

0359 Abdominal aortic artery (AAA) repair mortality rate (IQI 11) (risk adjusted)

Description: Percent of adult hosptial discharges in a one-year time period with a procedure code of AAA repair and a diagnosis of AAA with an in-hospital death.
Numerator Statement: Number of deaths (DISP=20) among cases meeting the inclusion and exclusion rules for the denominator.
Denominator Statement: Discharges, age 18 years and older, with ICD-9-CM AAA repair code procedure and a diagnosis of AAA in any field. The denominator may be stratified by open vs. endovascular procedures, and ruptured vs. un-ruptured AAA.
Exclusions: 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)
Adjustment/Stratification: risk adjustment method widely or commercially available 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.
Risk adjustment factors: sex
age 18-24; age 25-29; age 30-34; age 35-39; age 40-44; age 45-49; age 50-54; age 55-59; age 60-64; age 65-69; age 70-74; age 75-79; age 80-84; age 85+
ADRG 1731 (other vascular procedures-minor)
ADRG 1732 (other vascular procedures-moderate)
ADRG 1733 (other vascular procedures-major)
ADRG 1734 (other vascular procedures-extreme)
ADRG 1691 (major thoracic and abdominal vascular procedures-minor)
ADRG 1692 (major thoracic and abdominal vascular procedures-moderate)
ADRG 1693 (major thoracic and abdominal vascular procedures-major)
ADRG 1694 (major thoracic and abdominal vascular procedures-extreme
MDC 5 (Cardiovascular)
Transfer-in status
Gender, age (5-year age groups), race/ ethnicity, primary payer, custom
The stratification of the denominator for open vs. endovascular and ruptured vs. unruptured involves the following codes in the denominator specification:
AAA Repair
ICD-9-CM Procedure Codes:
OPEN
´3834´ = ´1´ /* AORTA RESECTION & ANAST */
´3844´ = ´1´ /* RESECT ABDM AORTA W REPL */
´3864´ = ´1´ /* EXCISION OF AORTA */
ENDOVASCULAR

0359 Abdominal aortic artery (AAA) repair mortality rate (IQI 11) (risk adjusted)

´3971´ = ´1´ /* ENDO IMPL GRFT ABD AORTA */
AAA
ICD-9-CM Diagnosis Codes:
RUPTURED
´4413 ´ = ´1´ /* RUPT ABD AORTIC ANEURYSM */
UNRUPTURED
´4414 ´ = ´1´ /* ABDOM AORTIC ANEURYSM */
Level of Analysis: Facility/ Agency
Type of Measure: Outcome
Data Source: Electronic administrative data/ claims
Measure Steward: Agency for Healthcare Research and Quality | 540 Gaither Road | Rockville | Maryland | 20850

Steering Committee Recommendation for Endorsement: Pending final recommendation.
Rationale: The measure initially did not pass the importance criterion; however, the Steering Committee engaged in extensive discussion of the volume and mortality measures as noted in review of 0357 above. The Committee asked for additional information and with that information, reconsidered the measure. Final action is pending receipt and consideration of a measure that combines 0357 and 0359.

If applicable, Conditions/Questions for Developer:

1. 2a.11 Stratification Details/Variables: a) Stratify the measure by endovascular and open repairs as well as emergency vs. elective repair; b) specify the risk stratification model used; 3) identify settings where the model has been validated in addition to the training data set in which it was developed or provide other supporting data as to its validity.
2. 2b.3 Testing Results: Please provide information about signal to noise ratio.

Note: Discussion of Related and Competing measures may result in additional requests to developers specific to harmonization. As discussed, the developer should meet with SVS to harmonize or blend measures concerning AAA.

Developer Response:

1. a) As noted above, AHRQ agrees to stratify the measure by endovascular and open repairs; in addition, AHRQ agrees to stratify by ruptured vs. un-ruptured aneurysm (which is what we assume you mean by emergency vs. elective repair); but AHRQ again notes that additional methodological development will be required to ensure the measures have adequate reliability; b) the risk stratification model is specified below; c) the model has been validated on the State Inpatient Databases (SID), which consists of hospital discharge data from 40 states (constituting about 90% of hospital discharges in the U.S) for the years 2001-2008
2. The signal to noise ratio is the ratio of the between hospital variance (signal) to the within hospital variance (noise). The formula is signal / (signal + noise). The ratio itself is only a diagnostic for the degree of variance in the risk-adjusted rate systematically associated with the provider. Therefore, what matters is the magnitude of the variance in the "smoothed" rate (that is, the variance in the risk-adjusted rate after the application of the univariate shrinkage estimator based on the signal ratio). What the data demonstrate is systematic variation in the provider level rate of 2.6 to 7.6 per 100 from the 5th to 95th percentile after a signal ratio of 0.307 is applied as the shrinkage estimator (that is, after accounting for variation due to random factors).

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	-6.6044	0.1713	1486.04	0.0000
Sex	Female	1	0.4539	0.0747	36.95	0.0000
Age	65 to 74	1	0.4879	0.1072	20.72	0.0000
Age	75 to 79	1	0.8737	0.1201	52.97	0.0000
Age	80 to 84	1	1.1092	0.1200	85.50	0.0000
Age	85+	1	1.4440	0.1359	112.97	0.0000
APR-DRG	'1691' to '1692'	1	1.6789	0.1623	107.05	0.0000
APR-DRG	'1693' to '1694'	1	3.9127	0.1523	659.72	0.0000
APR-DRG	'1733' to '1734'	1	3.1568	0.1676	354.55	0.0000
MDC	5	1	2.6400	0.1483	316.85	0.0000
MDC	Other	1	2.9536	0.2252	172.05	0.0000
RUPTURED		1	2.0565	0.0808	647.42	0.0000

c-statistic 0.937

0359 Abdominal aortic artery (AAA) repair mortality rate (IQI 11) (risk adjusted)

Note: The APR-DRG consists of the DRG and the risk-of-mortality subclass (minor (1), moderate (2), major (3) and extreme (4)).

Steering Committee Follow-Up:

1. The Steering Committee requested information regarding needed methodological changes for the measure based on the endovascular and open repair stratification and will further review the measure with that information. AHRQ will also further clarify the risk adjustment model.
2. The Steering Committee was concerned that the developer had not addressed creating a composite of the volume (0357) and morbidity measure (0359). It noted that the developer had agreed to stratify the measure by endovascular and open repairs but that the measure did not have any reliability testing for the requested change. The Steering Committee asked for additional information about how the developer would redevelop their risk stratification model. On the August 3 conference call, the developer highlighted preliminary results about the measure's stratification. A Steering Committee member questioned whether the measure was useful for endovascular un-ruptured repairs, if the difference between the best performing hospitals was 0.00 percent and worst performing hospitals was 0.75 percent repairs, which was considered minimal. Additionally, it was noted that open ruptured repairs also showed little difference between the best performing hospitals at 24.74 percent and the worst performing hospitals at 26.53 percent. The Steering Committee resolved that while some of the collected data may show small differences, the measure would also show areas of variation. The developer further explained that they could use the data to identify hospitals that performed at better or worse than average but for other subsets.

On the August 3 conference call, the developer highlighted preliminary results of revising the measure with four strata – ruptured vs. unruptured; and open vs. endovascular repair using available data from a period of years using data from 1700 hospitals, of which 500 do endovascular repair of ruptured aneurysms. Based on the preliminary data of that stratification, a number of issues were discussed including whether the measure was useful for endovascular un-ruptured repairs, given minimal differences between the best performing hospitals (0.00 percent)and worst performing hospitals (0.75 percent);small differences in open ruptured repairs between hospitals that performed better than expected (24.74 percent) and those that performed worse than expected (26.53 percent); risk stratification approaches using inpatient diagnoses vs. clinical data or outpatient diagnoses. The Steering Committee opined that while some of the collected data may show small differences, the breakdown can show areas of variation that warrant measurement and follow up. The developer is continuing to explore how the outcomes information can be put back together with volume for the requested composite/combined measures.

On the September 13 conference call, the Steering Committee reviewed the developer's revisions to reflect four strata, ruptured or unruptured aneurysms repaired by open or endovascular approaches. These four components will be reported separately within this measure in addition to reporting overall measure performance. The developer also responded to questions about testing results and public reporting details to the satisfaction of the Committee.

On the November 29 call, the developer stated that measure 0359: Abdominal aortic artery (AAA) repair mortality rate (IQI 11) was revised and is now adjusted by volume. Although volume has been incorporated into measure 0359, the developer stated that measure 0357: Abdominal aortic aneurysm (AAA) repair volume (IQI 4) should remain. Some Committee members voiced their concerns as to whether volume should be a stand-alone measure. Members of the Committee also indicated that both measures are used by a variety of individuals for a variety of reasons. It was noted on the call that measures 0357 and 0359 are to be reported as paired measures. During the related and competing measures discussion, the Committee agreed that measures 0357 and 0359 were competing against the Leapfrog measure, measure 0736: Survival predictor for abdominal aortic aneurysm (AAA). The Committee determined that the AHRQ measures (0357 and 0359) were superior to measure 0736 as measures 0357 and 0359 distinguished between open vs. endovascular procedures and the measures are risk adjusted. The Committee will vote on each criteria and final recommendation for endorsement of this measure following the conference call.

1. Importance to Measure and Report: Y-10; N-11

(1a. Impact; 1b. Performance gap; 1c. Outcome or Evidence)

Rationale: The measure would provide key information to the public about AAA volume, but does not provide separate information on EVARs and open repairs. The majority of AAA repairs are done endovascularly and open repairs have become more complicated.

2. Scientific Acceptability of Measure Properties:

(2a. Precise specifications; 2b. Reliability testing; 2c. Validity testing; 2d. Exclusions justified; 2e. Risk adjustment/stratification; 2f. Meaningful differences; 2g. Comparability; 2h. Disparities)

Rationale:

3. Usability:

(3a. Meaningful/useful for public reporting and quality improvement; 3b. Harmonized; 3c. Distinctive or additive value to existing measures)

Rationale:

0359 Abdominal aortic artery (AAA) repair mortality rate (IQI 11) (risk adjusted)

4. Feasibility:
(4a. Clinical data generated during care process; 4b. Electronic sources; 4c. Exclusions – no additional data source; 4d. Susceptibility to inaccuracies/ unintended consequences identified 4e. Data collection strategy can be implemented)
Rationale:

1523 In-hospital mortality following elective open repair of small AAAs

Description: Percentage of aymptomatic patients undergoing open repair of small abdominal aortic aneurysms (AAA)who die while in hospital. This measure is proposed for both hospitals and individual providers.
Numerator Statement: Mortality following elective open repair of asymptomatic AAAs in men with < 6 cm dia and women with < 5.5 cm dia AAAs
Denominator Statement: All elective open repairs of asymptomatic AAAs in men with < 6 cm dia and women with < 5.5 cm dia AAAs
Exclusions: > 6 cm minor diameter - men
> 5.5 cm minor diameter - women
Symptomatic AAAs that required urgent/emergent (non-elective) repair
Adjustment/Stratification: No risk adjustment necessary/No stratification is required for this measure.
Level of Analysis: Can be measured at all levels, Clinicians : Group, Clinicians : Individual, Facility/ Agency
Type of Measure: Outcome
Data Source: Registry data
Measure Steward: Society for Vascular Surgery | 633 N. St. Clair, 24th floor | Chicago | Illinois | 60611

Steering Committee Recommendation for Endorsement: Conditional Y-9; N-11; A-1
Rationale: The evidence supports the measure's focus on small AAAs repairs and it provides important outcome data; however the Committee had a number of questions for which it requested developer response before further consideration of the measure.

If applicable, Conditions/Questions for Developer:
Overall comment: Based on the narrow margin of the Steering Committee vote related to having met criteria for endorsement the measure will be reconsidered with the response to the questions and conditions below.

1. De2. Brief Description and 2a.1 Numerator Statement: Suggested addition of 30-day mortality with in-hospital mortality. Also, please clarify whether aneurysm size can be collected using administrative (i.e., is widely available outside the Northern New England registry), or available clinical data and the added burden of such collection.
2. 2a. Measure Specifications: Provide a timeframe for availability of newly created CPT2 codes to make this a universally applicable measure.
3. 2a.3 Numerator Details: Reword the numerator details here and throughout where registry is specified to be clear that a specific registry (i.e., SVS, VSGNE) is not required to collect the data.
4. 2b Reliability Testing and 2c Validity Testing: Advise what testing will be needed and completed for the suggested modification to 30 day mortality?
5. 2d. Exclusions: Provide reconcile sample size and data for what is being measured. Also reconcile aneurysm size in the population of interest and the sizes specified throughout.
6. 2h. Disparities in Care: Provide information about disparities or plans to be able to provide data.
7. 3a.2 Use in a Public Reporting Initiative: Please provide plans for public reporting (within 3 years).

Note: Discussion of Related and Competing measures may result in additional requests to developers specific to harmonization
Developer Response:

1. We suggest in-hospital instead of 30-day mortality for several reasons. We have previously studied mortality within the first year after open AAA repair. In-hospital mortality was 2.1% and 30-day mortality was 2.3% in VSGNE, since almost every patient who died within 30 days was never discharged. [Predicting 1-year mortality after elective abdominal aortic aneurysm repair. Beck et al, J Vasc Surg. 2009.49:838-44]. Further, in-hospital mortality is more easily obtained and audited, and is immediately available at the time of discharge. Finally, there is lower cost for obtaining in-hospital results, since subsequent patient contact after discharge is not necessary. We believe that these advantages make in-hospital mortality a more appropriate measure and have not changed this portion of the application. AAA size is readily available in the medical record, and is tracked not only in VSGNE, but the SVS VQI registry, which now comprises more than 80 centers in 30 states across the U. S., and is expected to comprise all states by 2012. The SVS VQI is the de facto national registry for vascular surgery. While AAA size cannot currently be collected using administrative data, we expect that the great majority of vascular surgeons in the U.S. will be participating in SVS VQI by 2012.
2. It is our plan to request CPT2 codes to allow coding of AAA diameter by claims data. These codes will be reviewed by the CPT Performance Measures Advisory Group's next meeting, which is scheduled for July 18-19, 2011. The CPT Editorial Panel will then have to approve the codes before they can appear in any CPT publication. The Editorial Panel will meet October 13-15, 2011.

1523 In-hospital mortality following elective open repair of small AAAs

3. Numerator and denominator have been edited to clearly state than ANY registry tracking the appropriate variables can be used for reporting all of the current measures being proposed by SVS.
4. As stated above, we have already compared in-hospital and 30-day mortality in 748 patients undergoing open elective AAA repair in VSGNE and found no advantage to using 30-day mortality, which is more difficult and more expensive to collect.
5. This section has been expanded. Data are provided for large and small AAAs, showing difference in operative mortality, emphasizing the reason for including only SMALL dia AAAs in this measure. Patients with larger diameter AAAs cannot be included without complex risk adjusting that is not available. However, data indicate that MANY small AAAs are being electively repaired, and it is in this population that a quality measure is needed. Most patients with much larger AAAs always warrant treatment, since the AAA rupture risk is so high if not treated.
6. Disparities have not been reported. As additional data are acquired from the SVS registry across a much larger and varied population, future disparities may be discovered.
7. SVS intends to request that all of these measures be included in PQRS, and expects CMS to begin publishing PQRS data in the near future. Independent of this, SVS plans to request permission from participating providers and hospitals to publish these measures on the SVS public website.

Steering Committee Follow-up:

The Steering Committee expressed concern about the documentation and tracking of aneurysm size outside of the SVS registry though it was believed that this could be captured based on chart notes. The Steering Committee will have a follow-up call to review this measure as part of the AAA Repair related and competing measures once a composite has been created for measures 0357 and 0359.

On the November 29 call, during the related and competing measures discussion, the Committee determined that measures 1523 and 1534 were not competing against measures 0357, 0359 and 0736 because measures' 1523 and 1534 focus is different. The SVS measures focus on the successful outcomes of the procedure for those performed on smaller AAAs, which should only be performed if the patients are low risk and if treatment is really warranted. SVS, the developer, did indicate that they are currently expanding the data source of these two measures, measures 1523 and 1534, to include claims data. The Committee agreed to recommend measures 1523 and 1534 for endorsement as they currently stand with the expectation that the measure developer will harmonize with the AHRQ measures (0357 and 0359) if and when they revise measures 1523 and 1534 to include claims data. The Committee will vote on final recommendation for endorsement of this measure following the conference call.

1. Importance to Measure and Report: Y-18; N-3; A-0

(1a. Impact; 1b. Performance gap; 1c. Outcome or Evidence)

Rationale: The measure provides important outcome data. More AAA repairs are being conducted; although, they may not be medically necessary. However, the data provided in the measure included both small and large aneurysms, despite the stated measure's focus on only small AAAs. High mortality levels may encourage a process review.

2. Scientific Acceptability of Measure Properties: C-2; P-16; M-2; A-1

(2a. Precise specifications; 2b. Reliability testing; 2c. Validity testing; 2d. Exclusions justified; 2e. Risk adjustment/stratification; 2f. Meaningful differences; 2g. Comparability; 2h. Disparities)

Rationale: The Committee described the importance of extending the measure to 30-day mortality to identify adverse outcomes. The Committee stated the numerator time window, while verbally explained satisfactorily, could be confusing to users. Testing was questioned; while the measure focused on small aneurysms, testing was conducted on large aneurysms.

3. Usability: C-4; P-11; M-4; A-2

(3a. Meaningful/useful for public reporting and quality improvement; 3b. Harmonized; 3c. Distinctive or additive value to existing measures)

Rationale: The data used for the measure is drawn from registry data that includes both claims and chart abstracted data thus is usable for registry participants although for non-registry participants, the data would prove challenging to collect.

4. Feasibility: C-4; P-10; M-3; A-4

(4a. Clinical data generated during care process; 4b. Electronic sources; 4c. Exclusions – no additional data source; 4d. Susceptibility to inaccuracies/ unintended consequences identified 4e. Data collection strategy can be implemented)

Rationale: The registry group from which data for this measure is drawn is about 10 hospitals thus information about feasibility is limited both in terms of the number of facilities in which tested and testing with only registry data. At present there is no mechanism for identifying small aneurysms with administrative data. The developer is working to develop CPT II codes that would allow aneurysm size to be captured and reported with administrative data. This would require new/additional specifications for the measure. It was noted that the measure could be revised and limited to mortality unrelated to aneurysm size that could be collected using administrative data; this would require further modification of the measure.

1534 In-hospital mortality following elective EVAR of small AAAs

Description: Percentage of patients undergoing elective endovascular repair of small asymptomatic abdominal aortic aneurysms (AAA) who die while in hospital. This measure is proposed for both hospitals and individual providers.

1534 In-hospital mortality following elective EVAR of small AAAs

Numerator Statement: Mortality following elective endovascular AAA repair of asymptomatic AAAs in men with < 6 cm dia and women with < 5.5 cm dia AAAs

Denominator Statement: All elective endovascular repairs of asymptomatic AAAs in men with < 6 cm dia and women with < 5.5 cm dia AAAs

Exclusions:

A registry that includes hospitalization details, AAA diameter and discharge status is required to identify patients for denominator inclusion. The Society for Vascular Surgery Vascular Quality Initiative (SVS VQI) and the Vascular Study Group of New England (VSGNE) registries records such information. Patients who underwent endovascular AAA repair are included if their aneurysm was asymptomatic and small (< 6cm dia in men, <5.5 cm dia in women, judged by preoperative imaging).

Adjustment/Stratification: No risk adjustment necessary/No stratification is required for this measure.

Level of Analysis: Can be measured at all levels, Clinicians : Group, Clinicians : Individual, Facility/ Agency

Type of Measure: Outcome

Data Source: Registry data

Measure Steward: Society for Vascular Surgery | 633 N. St. Clair, 22nd Floor | Chicago | Illinois, 60611

Steering Committee Recommendation for Endorsement: Conditional Y-9; N-12; A-0

Rationale: The evidence supports the measure's focus on small AAAs repairs and it provides important outcome data; however, the Committee has a number of questions for which it requested developer response before further consideration of the measure.

If applicable, Conditions/Questions for Developer:

Based on the narrow margin of the Steering Committee vote related to having met criteria for endorsement, the committee will reconsider the measure with the response to the questions and conditions below.

1. De2. Brief Description and 2a.1 Numerator Statement: Suggested modification- addition of 30-day mortality with in-hospital mortality. Also, please clarify whether aneurysm size can be collected using administrative (i.e., is widely available outside the Northern New England registry), or available clinical data and the added burden of such collection.
2. 2a Measure Specifications: Scope of the measure as specified will have limited impact. Please reevaluate.
3. 2b Reliability Testing and 2c Validity Testing: Identify the testing that will need to be completed for the suggested modifications?
4. 2d. Exclusions: Provide reconcile sample size and data for what is being measured. Also reconcile aneurysm size in the population of interest and the sizes specified throughout.
5. 2h. Disparities in Care: Providing information about disparities or plans to be able to provide same.
6. 3a.2 Use in a public reporting initiative: Please provide plans for public reporting (within 3 years).

Developer Response:

1. We suggest in-hospital instead of 30-day mortality for several reasons. We have previously studied mortality within the first year after elective endovascular AAA repair. In-hospital mortality was 0.48% and 30-day mortality was 0.50% in VSGNE, since almost every patient who died within 30 days was never discharged. [Predicting 1-year mortality after elective abdominal aortic aneurysm repair. Beck et al, J Vasc Surg. 2009.49:838-44]. Further, in-hospital mortality is more easily obtained and audited, and is immediately available at the time of discharge. Finally, there is lower cost for obtaining in-hospital results, since subsequent patient contact after discharge is not necessary. We believe that these advantages make in-hospital mortality a more appropriate measure and have not changed this portion of the application. AAA size is readily available in the medical record, and is tracked not only in VSGNE, but the SVS VQI registry, which now comprises more than 80 centers in 30 states across the U. S., and is expected to comprise all states by 2012. The SVS VQI is the de facto national registry for vascular surgery. While AAA size cannot currently be collected using administrative data, we expect that the great majority of vascular surgeons in the U.S. will be participating in SVS VQI by 2012.
2. We are not certain as to the exact specification within 2a to which this comment is applied. However, we disagree that this measure will have limited impact. Most AAAs are small when detected, and there is a general suspicion that too many small AAAs are being repaired unnecessarily, with a resulting unnecessary operative mortality. This measure will focus attention on the elective mortality rate of endovascular AAA repair in these patients. Although the median mortality rate is low in VSGNE, there is significant variation among hospitals, and large clinical trials have documented this mortality to be 2-3%, even for small AAAs. If 10,000 patients per year in the US undergo unnecessary endovascular repair of such small AAAs, a 3% mortality results in 300 avoidable deaths. This is an important quality measure, and needs to be established in parallel with our open AAA repair measure, so that surgeons performing AAA repair can/must report their outcomes independent of which technique they use. We have not changed the measure form, because it was not clear where to insert this information.
3. As stated above, we have already compared in-hospital and 30-day mortality in 639 patients undergoing elective endovascular AAA repair in VSGNE and found no advantage to using 30-day mortality, which is more difficult and more expensive to collect.
4. This section has been expanded. Data are provided for large and small AAAs, showing difference in operative mortality, emphasizing the reason for including only SMALL dia AAAs in this measure. Patients with larger diameter AAAs cannot be included without complex risk adjusting that is not available. However, data indicate that MANY small AAAs are being

1534 In-hospital mortality following elective EVAR of small AAAs

electively repaired, and it is in this population that a quality measure is needed. Most patients with much larger AAAs always warrant treatment, since the AAA rupture risk is so high if not treated.

5. Disparities have not been reported. As additional data are acquired from the SVS registry across a much larger and varied population, future disparities may be discovered.
6. SVS intends to request that all of these measures be included in PQRS, and expects CMS to begin publishing PQRS data in the near future. Independent of this, SVS plans to request permission from participating providers and hospitals to publish these measures on the SVS public website.

Steering Committee Follow-up:

The Steering Committee expressed concern about the documentation and tracking of aneurysm size outside of the SVS registry. The Steering Committee will have a follow-up call to review this measure as part of the AAA Repair related and competing measures once a composite has been created for measures 0357 and 0359.

On the November 29 call, during the related and competing measures discussion, the Committee decided that measures 1523 and 1534 were not competing against measures 0357, 0359 and 0736 because measures' 1523 and 1534 focus is different. The SVS measures focus on the successful outcomes of the procedure for those performed on smaller AAAs, which should only be performed if the patients are low risk and if treatment is really warranted. SVS, the developer, did indicate that they are currently revising the data source of these two measures, measures 1523 and 1534, to include claims data. The Committee agreed to recommend measures 1523 and 1534 for endorsement as they currently stand with the expectation that the measure developer will harmonize with the AHRQ measures (0357 and 0359) if and when they revise measures 1523 and 1534 to include claims data. The Committee will vote on final recommendation for endorsement of this measure following the conference call.

1. Importance to Measure and Report: Y-21; N-0 ; A-0

(1a. Impact; 1b. Performance gap; 1c. Outcome or Evidence)

Rationale: The measure provides important outcome data. More AAA repairs are being conducted; although, they may not be medically necessary. However, the data provided in the measure included both small and large aneurysms, despite the measure's focus on only small AAAs. High mortality levels may encourage a process review.

2. Scientific Acceptability of Measure Properties: C-5; P-13; M-3; N-0

(2a. Precise specifications; 2b. Reliability testing; 2c. Validity testing; 2d. Exclusions justified; 2e. Risk adjustment/stratification; 2f. Meaningful differences; 2g. Comparability; 2h. Disparities)

Rationale: The Committee discussed the importance of extending the measure to 30-day mortality to identify adverse outcomes. The Committee stated that the time window may be confusing.

3. Usability: C-3; P-15; M-2; N-1

(3a. Meaningful/useful for public reporting and quality improvement; 3b. Harmonized; 3c. Distinctive or additive value to existing measures)

Rationale: In the future the measure could be adjusted to be applicable for other procedures.

4. Feasibility: C-5; P-10; M-5; N-1

(4a. Clinical data generated during care process; 4b. Electronic sources; 4c. Exclusions – no additional data source; 4d. Susceptibility to inaccuracies/ unintended consequences identified 4e. Data collection strategy can be implemented)

Rationale: The measure did not provide wide spread testing data and may not be feasible without the registry. The developer is attempting to create CPT II codes to facilitate use beyond the registry in the future.

1741 Patient experience with surgical care based on the consumer assessment of healthcare providers and systems (CAHPS) ® surgical care survey

Description: The following 6 composites and 1 single-item measure are generated from the Consumer Assessment of Healthcare Providers and Systems (CAHPS®) Surgical Care Survey. Each measure is used to assess a particular domain of surgical care quality from the patient's perspective.

Measure 1: Information to help you prepare for surgery (2 items)
Measure 2: How well surgeon communicates with patients before surgery (4 items)
Measure 3: Surgeon's attentiveness on day of surgery (2 items)
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Rating: C=Completely; P=Partially; M=Minimally; N=Not at all; NA=Not applicable 2
Measure 4: Information to help you recover from surgery (4 items)
Measure 5: How well surgeon communicates with patients after surgery (4 items)
Measure 6: Helpful, courteous, and respectful staff at surgeon's office (2 items)
Measure 7: Rating of surgeon (1 item)
The Consumer Assessment of Healthcare Providers and Systems (CAHPS®) Surgical Care Survey
is administered to adult patients (age 18 and over) having had a major surgery as defined by CPT

1741 Patient experience with surgical care based on the consumer assessment of healthcare providers and systems (CAHPS) ® surgical care survey

codes (90 day globals) within 3 to 6 months prior to the start of the survey.
Numerator Statement: The calculation of CAHPS survey composites uses a proportional scoring method, which basically generates a proportion for each response option. (For more detail see Attachment H, Reporting Measures for the CAHPS Surgical Care Survey)
The numerator is the average proportion of respondents who answered each response category
across the questions in the composite.
For example for measures, 1, 2, 4, 5, 6 scoring would involve the following steps:
Step 1 – Calculate the proportion of cases in each response category for the each question:
P1 = Proportion of respondents who answered "yes, definitely"
P2 = Proportion of respondents who answered "yes, somewhat"
P3 = Proportion of respondents who answered "no"
Calculate all proportions for each of the questions in the composite.
Step 2 – Combine responses from the questions to form the composite
Calculate the average proportion responding to each category across the questions in the composite. For example for measure 2, in the "How Well Surgeon Communicates With Patients Before
Surgery" (four items), the calculations would be as follows:
PC1 = Composite proportion who said "yes, definitely" = (P11 + P21 + P31 + P41) / 4
PC2 = Composite proportion who said "yes, somewhat" = (P12 + P22 + P32 + P42) / 4
PC3 = Composite proportion who said "no" = (P13 + P23 + P33 + P43) / 4
The numerators for the top box or proportionate scoring method of measures 1, 2, 4, 5, and 6 is PC1
or the average proportion of respondents who answered "Yes, definitely" across the items within
each composite.
The numerator for measure 3 is the average proportion of respondents who answered "Yes" across
the items in this composite.
The numerator for the global item is the proportion of respondents who answered 9-10 to this item.
See also Attachment H: Reporting Measures for the CAHPS Surgical Care Survey.
Denominator Statement: The major criteria for selecting patients were having had a **major** surgery as defined by CPT codes (90 day globals) within 3 to 6 months prior to the start of the survey. . [For the full list of CPT codes, see Attachment J]. Results will typically be compiled over a 12-month period.
Exclusions: For each composite, respondents who answer at least one item of the composite are included in the denominator. The following patients would be excluded from all composites:
• Surgical patients whose procedure was greater than 6 months or less than 3 months prior to the start of the survey.
• Surgical patients younger than 18 years old.
• Surgical patients who are institutionalized (put in the care of a specialized institution) or deceased.
• Surgery performed had to be scheduled and not an emergency procedure since emergency procedures are unlikely to have visits with the surgeon before the surgery.
• Multiple surgery patients within the same household can be included in the sampling frame. However, once one patient in the household is sampled, any other patients in the same household would be excluded from being sampled in order to minimize survey burden to the household.
All data present for all respondents are that are not excluded are used.
Adjustment/Stratification: Case-mix adjustment/No stratification is required for this measure.
Level of Analysis: Clinicians: Individual, Group
Type of Measure: Composite
Data Source: Survey-patient
Measure Steward: American College of Surgeons | 20 F Street NW, Suite 1000 | Washington | District of Columbia, 20001

Steering Committee Recommendation for Endorsement: The Steering Committee will vote on this measure after receiving additional requested information from the developer.
Rationale:

If applicable, Conditions/Questions for Developer:

1. Provide final data results on the scale
2. Revise the composite submission form to: a) make it easier to understand what is being submitted for review; and b) provide the requested information in the correct section of the submission form.

Developer Response:

1. Importance to Measure and Report:
(1a. Impact; 1b. Performance gap; 1c. Outcome or Evidence)

1741 Patient experience with surgical care based on the consumer assessment of healthcare providers and systems (CAHPS) ® surgical care survey
Rationale:
2. Scientific Acceptability of Measure Properties: *(2a. Precise specifications; 2b. Reliability testing; 2c. Validity testing; 2d. Exclusions justified; 2e. Risk adjustment/stratification; 2f. Meaningful differences; 2g. Comparability; 2h. Disparities)* **Rationale:**
3. Usability: *(3a. Meaningful/useful for public reporting and quality improvement; 3b. Harmonized; 3c. Distinctive or additive value to existing measures)* **Rationale:**
4. Feasibility: *(4a. Clinical data generated during care process; 4b. Electronic sources; 4c. Exclusions – no additional data source; 4d. Susceptibility to inaccuracies/ unintended consequences identified 4e. Data collection strategy can be implemented)* **Rationale:**

0128 Duration of antibiotic prophylaxis for cardiac surgery patients
Description: Percent of patients aged 18 years and older undergoing cardiac surgery whose prophylactic antibiotics were discontinued within 48 hours after surgery end time **Numerator Statement:** Number of patients undergoing cardiac surgery whose prophylactic antibiotics were discontinued within 48 hours after surgery end time **Denominator Statement:** Number of patients undergoing cardiac surgery **Exclusions:** Exclusions: -Patients who had a principal diagnosis suggestive of preoperative infectious diseases -Patients whose ICD-9-CM principal procedure was performed entirely by Laparoscope -Patients enrolled in clinical trials -Patients with documented infection prior to surgical procedure of interest -Patients who expired perioperatively -Patients who were receiving antibiotics more than 24 hours prior to surgery -Patients who were receiving antibiotics within 24 hours prior to arrival -Patients who did not receive any antibiotics during this hospitalization -Patients with reasons to extend antibiotics This list will be provided in the STS Adult Cardiac Surgery Database Data Manager's Training Manual as acceptable exclusions. **Adjustment/Stratification:** no risk adjustment necessary/No stratification is required for this measure. **Level of Analysis:** Clinicians: Group, Facility/ Agency, Population: Counties or cities, Population: National, Population: Regional/ network, Population: States **Type of Measure:** Process **Data Source:** Registry data **Measure Steward:** Society of Thoracic Surgeons | 633 North Saint Clair Street, Suite 2320 | Chicago | Illinois | 60611
Steering Committee Recommendation for Endorsement: Conditional Y-17, N-2; A-0 Pending final recommendation. **Rationale:** The measure was considered important due to the potential for prolonged antibiotic use and the percent of antimicrobial resistance.
Steering Committee Follow-up: This was one of four related measures considered for potential harmonization. The four included: m*aintenance measure 0529*: Prophylactic antibiotics discontinued within 24 hours after surgery end time; e*ndorsed measure 0637*: Discontinuation of prophylactic antibiotics (cardiac procedures); m*aintenance measure 0128*: Duration of antibiotic prophylaxis for cardiac surgery patients; and e*ndorsed measure 0271*: Discontinuation of prophylactics antibiotics (non-cardiac procedures). Discussion of the four measures is included here. The Steering Committee determined there were no competing measures in the group. Members requested that the developers evaluate the extent to which harmonization of the four measures could be accomplished. They asked that initial focus be on refining the exclusions to ensure they capture the same information and that end times of 24 and 48 hours be examined in terms of whether there are cardiac surgeries for which the different end times are specifically indicated and if so that they be specified for capture within the relevant measures. Also, members asked that the laparoscopy exclusion be removed from Measure 0128. For those measures not within the current project (AMA-PCPI measures 0637 and 0271), NQF staff will relay the requests of the Committee for their action as they update and test the measures. The measure developers provided a response to the Committee's request. The developers are currently working to schedule a

0128 Duration of antibiotic prophylaxis for cardiac surgery patients

conference call to begin discussing harmonization and/or combining the antibiotic prophylaxis measures per the Committee's request. On the November 29 call, the Committee agreed to recommend measure 0128 as it currently stands with the expectation that the harmonized measure will be submitted to the next Surgery project in 2013. The Committee will vote on final recommendation for endorsement of this measure following the conference call.

1. Importance to Measure and Report: Y-18, N-1
(1a. Impact; 1b. Performance gap; 1c. Outcome or Evidence)
Rationale: The measure noted a performance gap in appropriate antibiotic administration, which can increase the incidence of deep sternal wound infection or antimicrobial resistance.

2. Scientific Acceptability of Measure Properties: C-10; P-6; M-2; N-1
(2a. Precise specifications; 2b. Reliability testing; 2c. Validity testing; 2d. Exclusions justified; 2e. Risk adjustment/stratification; 2f. Meaningful differences; 2g. Comparability; 2h. Disparities)
Rationale: The Committee debated the time period for antibiotic discontinuation reviewing the merits of 48 hours versus 24 hours.

3. Usability: C-13; P-6; M-0; N-0
(3a. Meaningful/useful for public reporting and quality improvement; 3b. Harmonized; 3c. Distinctive or additive value to existing measures)
Rationale: The measure will be reported as part of a composite in the future.

4. Feasibility: C-11; P-8; M-0; N-0
(4a. Clinical data generated during care process; 4b. Electronic sources; 4c. Exclusions – no additional data source; 4d. Susceptibility to inaccuracies/ unintended consequences identified 4e. Data collection strategy can be implemented)
Rationale: The measure presented minimal evidence of costs.

0529 Prophylactic antibiotics discontinued within 24 hours after surgery end time

Description: Surgical patients whose prophylactic antibiotics were discontinued within 24 hours after Anesthesia End Time (48 hours for CABG or Other Cardiac Surgery). The Society of Thoracic Surgeons (STS) Practice Guideline for Antibiotic Prophylaxis in Cardiac Surgery (2006) indicates that there is no reason to extend antibiotics beyond 48 hours for cardiac surgery and very explicitly states that antibiotics should not be extended beyond 48 hours even with tubes and drains in place for cardiac surgery.
Numerator Statement: Number of surgical patients whose prophylactic antibiotics were discontinued within 24 hours after Anesthesia End Time (48 hours for CABG or Other Cardiac Surgery).
Denominator Statement: All selected surgical patients with no evidence of prior infection. Included Populations:
An ICD-9-CM Principal Procedure Code of selected surgeries (as defined in Appendix A, Table 5.10 for ICD-9-CM codes) AND
An ICD-9-CM Principal Procedure Code of selected surgeries (as defined in Appendix A, Table 5.01-5.08 for ICD-9-CM codes)
Exclusions: Excluded Populations:
Patients less than 18 years of age
Patients who have a length of Stay greater than 120 days
Patients who had a principal diagnosis suggestive of preoperative infectious diseases (as defined in Appendix A, Table 5.09 for ICD-9-CM codes)
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 with physician/advanced practice nurse/physician assistant (physician/APN/PA) documented infection prior to surgical procedure of interest
Patients who expired perioperatively
Patients who had other procedures requiring general or spinal anesthesia that occurred within three days (four days for CABG or Other Cardiac Surgery) prior to or after the procedure of interest (during separate surgical episodes) during this hospital stay
Patients who were receiving antibiotics more than 24 hours prior to surgery (except colon surgery patients taking oral prophylactic antibiotics)
Patients who were receiving antibiotics within 24 hours prior to arrival (except colon surgery patients taking oral prophylactic antibiotics)
Patients who did not receive any antibiotics during this hospitalization.
Patients who received urinary antiseptics only (as defined in Appendix C, Table 3.11)
Patients with Reasons to Extend Antibiotics.
Adjustment/Stratification: no risk adjustment necessary/The antibiotic prophylaxis measures are stratified according to surgery type. The tables are subsets of Table 5.10 (see link for Specification Manual and Appendix A, Tables 5.01 to 5.08. The specific procedures must be in the large table (Table 5.10) to be eligible for the SCIP measures. The measure specific tables for SCIP-Inf-3 are 5.01 to 5.08
Level of Analysis: Facility/ Agency, Population: National, Can be measured at all levels, Program: QIO
Type of Measure: Process

0529 Prophylactic antibiotics discontinued within 24 hours after surgery end time
Data Source: Electorinc administrative data/ claims; Electronic Health/ Medical Record; Paper medical record/ flow-sheet Most facilities use vendors to collect the data electronically. CMS provides a free, downloadable tool called CART. A paper tool modeled after the data collected electronically is provided as an attachment. CART downloads can be found on QualityNet.org at http://www.qualitynet.org/dcs/ContentServer?c=Page&pagename=QnetPublic%2FPage%2FQnetTier2&cid=1138900279093 **Measure Steward:** Centers for Medicare & Medicaid Services | 7500 Security Boulevard , Mail Stop S3-01-02 | Baltimore | Maryland | 21244-1850
Steering Committee Recommendation for Endorsement: Conditional Y-19; N-0; A-0 Pending final recommendation. **Rationale:** The measure is important and provides an appropriate timeline for discontinuing antibiotic therapy promoting appropriate use of antibiotics.
Steering Committee Comments: This was one of four related measures considered for potential harmonization. The four included: m*aintenance measure 0529*: Prophylactic antibiotics discontinued within 24 hours after surgery end time; e*ndorsed measure 0637*: Discontinuation of prophylactic antibiotics (cardiac procedures); m*aintenance measure 0128*: Duration of antibiotic prophylaxis for cardiac surgery patients; and e*ndorsed measure 0271*: Discontinuation of prophylactics antibiotics (non-cardiac procedures). Discussion of the four measures is included here. The Steering Committee determined there were no competing measures in the group. Members requested that the developers evaluate the extent to which harmonization of the four measures could be accomplished. They asked that initial focus be on refining the exclusions to ensure they capture the same information and that end times of 24 and 48 hours be examined in terms of whether there are cardiac surgeries for which the different end times are specifically indicated and if so that they be specified for capture within the relevant measures. Also, members asked that the laparoscopy exclusion be removed from Measure 0128. For those measures not within the current project (AMA-PCPI measures 0637 and 0271), NQF staff will relay the requests of the Committee for their consideration as they update and test the measures. The measure developers provided a response to the Committee's request. The developers are currently working to schedule a conference call to begin discussing harmonization or combining the antibiotic prophylaxis measures per the Committee's request. On the November 29 call, the Committee agreed to recommend measure 0529 as it currently stands with the expectation that the harmonized measure will be submitted to the next Surgery project in 2013. The Committee will vote on final recommendation for endorsement of this measure following the conference call.
1. Importance to Measure and Report: Y-19; N-0 *(1a. Impact; 1b. Performance gap; 1c. Outcome or Evidence)* **Rationale:** The measure has a small performance gap but includes evidence that disparities among subpopulations demonstrate performance below 90 percent.
2. Scientific Acceptability of Measure Properties: C-14; P-4; M-1; N-0 *(2a. Precise specifications; 2b. Reliability testing; 2c. Validity testing; 2d. Exclusions justified; 2e. Risk adjustment/stratification; 2f. Meaningful differences; 2g. Comparability; 2h. Disparities)* **Rationale:** The Committee discussed single dose prophylaxis compared with 24 hour prophylaxis and no post-operative prophylaxis noting the timeframe of this measure is standard at present. They also discussed requesting the measure's 24 hour timeframe to be changed to shorten duration when the evidence supports. The laparoscopic exclusion is removed effective January 1, 2012.
3. Usability: C-18; P-1; M-0; N-0 *(3a. Meaningful/useful for public reporting and quality improvement; 3b. Harmonized; 3c. Distinctive or additive value to existing measures)* **Rationale:** The measure is currently in use and is part of the Surgical Care Improvement Project (SCIP) measure set.
4. Feasibility: C-16; P-3; M-0; N-0 *(4a. Clinical data generated during care process; 4b. Electronic sources; 4c. Exclusions – no additional data source; 4d. Susceptibility to inaccuracies/ unintended consequences identified 4e. Data collection strategy can be implemented)* **Rationale:** The measure relies on administrative claims data.

NQF MEMBER AND PUBLIC COMMENT

No comments were made.

NEXT STEPS

NATIONAL QUALITY FORUM

Mrs. Forman Morgan indicated that staff would send the revised and updated composite submission form for measure 1741 to the Committee when the developer submitted the updated information. The Committee will vote via Survey Monkey on final recommendation for NQF endorsement on all measures discussed on today's call with the exception of measure 1741.

The phase I measures were approved by the CSAC and are now currently being reviewed by the Board of Directors. Final ratification is expected this week. Once the measures are ratified, the measures will go out for a 30-day appeals process. Mrs. Forman Morgan will send out the press release to the Committee once the measures have been ratified.

The phase II measures are currently in NQF Member Voting; voting will close on December 5. CSAC will review the phase II measures on their December 12 conference call. Mrs. Forman Morgan will send out the CSAC agenda to the Committee once it has been finalized.

Table of Similar, or Competing Measures and those with potential for Harmonization

AAA Repair

AHRQ and Leapfrog measures have similar measure focus though view differently which combines volume and mortality (i.e., mortality vs. combined volume and mortality to predict survival) and use administrative/claims data; level of analysis for both is facility.
SVS measures have a focus similar to that of the AHRQ mortality measure and use registry data. Level of analysis can be at group, individual or facility level.

	Maintenance Measure 0357: Abdominal aortic aneurysm (AAA) repair volume (IQI 4)	**Maintenance Measure 0359**: Abdominal aortic artery (AAA) repair mortality rate (IQI 11)	**Endorsed Measure 0736:** Survival predictor for abdominal aortic aneurysm (AAA)	**New Candidate Standard 1523**: In-hospital mortality following elective open repair of small AAAs	**New Candidate Standard 1534**: In-hospital mortality following elective EVAR of small AAAs
Status	Currently undergoing maintenance review **Notes: 0357 and 0359 reported as a pair. Importance Y-10; N-11 related to lack of stratification; vote on remaining criteria pending developer response to requests related to methods changes for stratification by open and EVAR and RA model clarification. Developer asked to meet with SVS to harmonize or blend AAA measures**	Currently undergoing maintenance review **Notes: 0357 and 0359 reported as a pair Importance Y-10; N-11 related to lack of stratification; vote on remaining criteria pending developer response to requests related to methods changes for stratification by open and EVAR and RA model clarification. Developer asked to meet with SVS to harmonize or blend AAA measures**	Endorsed 9/2010	Currently undergoing review **Notes: Criteria met N-11, Y-9; SC requests to permit further consideration addressed, remaining concern documentation and tracking of aneurysm size outside registry**	Currently undergoing review **Notes: Criteria met N-12, Y-9; SC requests to permit further consideration addressed, remaining concern documentation and tracking of aneurysm size outside registry**
Steward	Agency for Healthcare Research and Quality	Agency for Healthcare Research and Quality	Leapfrog Group	Society for Vascular Surgery	Society for Vascular Surgery

	Maintenance Measure 0357: Abdominal aortic aneurysm (AAA) repair volume (IQI 4)	**Maintenance Measure 0359**: Abdominal aortic artery (AAA) repair mortality rate (IQI 11)	**Endorsed Measure 0736:** Survival predictor for abdominal aortic aneurysm (AAA)	**New Candidate Standard 1523**: In-hospital mortality following elective open repair of small AAAs	**New Candidate Standard 1534**: In-hospital mortality following elective EVAR of small AAAs
Description	Count of discharges with a procedure code of provider-level AAA repair.	Percent of adult hospital discharges in a one-year time period with a procedure code of AAA repair and a diagnosis of AAA with an in-hospital death.	A reliability adjusted measure of AAA repair performance that optimally combines two important domains: AAA hospital volume and AAA operative mortality, to provide predictions on hospital AAA survival rates in patients age 18 and over.	Percentage of asymptomatic patients undergoing open repair of small abdominal aortic aneurysms (AAA) who die while in hospital. This measure is proposed for both hospitals and individual providers.	Percentage of patients undergoing elective endovascular repair of small asymptomatic abdominal aortic aneurysms (AAA) who die while in hospital. This measure is proposed for both hospitals and individual providers.
Type of Measure	Structure/management	Outcome	Outcome	Outcome	Outcome
Numerator	Discharges, age 18 years and older, with an abdominal aortic aneurysm repair procedure and a principal or secondary diagnosis of AAA. Time window: Time window can be determined by user, but is generally a calendar year. Note the volume-outcome estimates are based on one year of data.	Number of deaths (DISP=20) among cases meeting the inclusion and exclusion rules for the denominator. Time window: Time window can be determined by user, but is generally a calendar year. Note that the reliability weights are calculated on one year of data.	Survival rate for patients age 18 and over without AAA rupture who undergo an AAA repair. Time Window: During the hospital admission	Mortality following elective open repair of asymptomatic AAAs in men with < 6 cm dia and women with < 5.5 cm dia AAAs. Time window: Lifetime for provider reporting, annual for hospital reporting	Mortality following elective endovascular AAA repair of asymptomatic AAAs in men with < 6 cm dia and women with < 5.5 cm dia AAAs. Time window: Lifetime for provider reporting, annual for hospital reporting
Numerator Details	Discharges, age 18 years and older, with an abdominal aortic	Number of deaths (DISP=20) among cases meeting the inclusion and	For the observed mortality, the hospital submits the observed	ANY registry that includes hospitalization details, AAA diameter	A registry that includes hospitalization details, AAA diameter and

	Maintenance Measure 0357: Abdominal aortic aneurysm (AAA) repair volume (IQI 4)	**Maintenance Measure 0359**: Abdominal aortic artery (AAA) repair mortality rate (IQI 11)	**Endorsed Measure 0736:** Survival predictor for abdominal aortic aneurysm (AAA)	**New Candidate Standard 1523**: In-hospital mortality following elective open repair of small AAAs	**New Candidate Standard 1534**: In-hospital mortality following elective EVAR of small AAAs
	aneurysm repair procedure and a principal or secondary diagnosis of AAA in any field. ICD-9-CM AAA procedure codes: 3834 AORTA RESECTION & ANAST 3844 RESECT ABDM AORTA W REPL 3864 EXCISION OF AORTA 3971 ENDO IMPLANT OF GRAFT IN AORTA ICD-9-CM AAA diagnosis codes: 4413 RUPT ABD AORTIC ANEURYSM 4414 ABDOM AORTIC ANEURYSM Exclude cases: • MDC 14 (pregnancy, childbirth, and	exclusion rules for the denominator.	deaths for AAA cases in patients without rupture as identified using the denominator and exclusion codes.	and discharge status 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) are examples of registries that record such information but the measure is not limited to these registries. Patients who died in hospital following elective open infrarenal AAA repair if their aneurysm was asymptomatic and small (< 6cm dia in men, <5.5 cm dia in women, judged by preoperative imaging (CT, MR or ultrasound)).	discharge status 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 records such information. Patients who died in hospital following endovascular infrarenal AAA repair (EVAR) if their asymptomatic aneurysm was repaired electively and was asymptomatic and small (< 6cm dia in men, <5.5 cm dia in women, judged by preoperative imaging (CT, MR or ultrasound)).

	Maintenance Measure 0357: Abdominal aortic aneurysm (AAA) repair volume (IQI 4)	**Maintenance Measure 0359**: Abdominal aortic artery (AAA) repair mortality rate (IQI 11)	**Endorsed Measure 0736:** Survival predictor for abdominal aortic aneurysm (AAA)	**New Candidate Standard 1523**: In-hospital mortality following elective open repair of small AAAs	**New Candidate Standard 1534**: In-hospital mortality following elective EVAR of small AAAs
	puerperium)				
Denominator	N/A	Discharges, age 18 years and older, with ICD-9-CM AAA repair code procedure and a diagnosis of AAA in any field. The denominator may be stratified by open vs. endovascular procedures, and ruptured vs. un-ruptured AAA. Time window: Time window can be determined by user, but is generally a calendar year.	All hospital patients age 18 and over without rupture who had an AAA repair. Time Window: 12 months	All elective open repairs of asymptomatic AAAs in men with < 6 cm dia and women with < 5.5 cm dia AAAs. Time window: Lifetime for provider reporting, annual for hospital reporting	All elective endovascular repairs of asymptomatic AAAs in men with < 6 cm dia and women with < 5.5 cm dia AAAs. Time window: Lifetime for provider reporting, annual for hospital reporting
Denominator Categories	Female, Male; 18 and older	Female, Male; 18 and older		Female, Male; 18 years or older	Female, Male; 18 years or older
Denominator Details	N/A	Discharges, age 18 years and older, with ICD-9-CM AAA repair code procedure and a diagnosis of AAA in any field. The denominator may be stratified by open vs. endovascular procedures, and ruptured vs. un-ruptured AAA. ICD-9-CM AAA repair procedure codes:	For the volume predicted mortality, hospitals count the number of all AAA repair cases using the following procedure codes. ICD-9-CM Procedure Codes for AAA repair 3834 Aorta Resection & Anast 3844 Resection Abdominal Aorta with	ANY registry that includes hospitalization details, AAA diameter and discharge status is required to identify patients for denominator inclusion. The Society for Vascular Surgery Vascular Quality Initiative (SVS VQI) and the Vascular Study Group of New England (VSGNE) are examples of	A registry that includes hospitalization details, AAA diameter and discharge status is required to identify patients for denominator inclusion. The Society for Vascular Surgery Vascular Quality Initiative (SVS VQI) and the Vascular Study Group of New England (VSGNE) registries records such

	Maintenance Measure 0357: Abdominal aortic aneurysm (AAA) repair volume (IQI 4)	**Maintenance Measure 0359**: Abdominal aortic artery (AAA) repair mortality rate (IQI 11)	**Endorsed Measure 0736:** Survival predictor for abdominal aortic aneurysm (AAA)	**New Candidate Standard 1523**: In-hospital mortality following elective open repair of small AAAs	**New Candidate Standard 1534**: In-hospital mortality following elective EVAR of small AAAs
		3834 AORTA RESECTION & ANAST 3844 RESECT ABDM AORTA W REPL 3864 EXCISION OF AORTA 3971 ENDO IMPLANT OF GRAFT IN AORTA ICD-9-CM AAA diagnosis codes: 4413 RUPT ABD AORTIC ANEURYSM 4414 ABDOM AORTIC ANEURYSM 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	replacement 3864 Excision of aorta 3925 Aorta-iliac-femoral bypass 3971 Endo Implant of Graft in Aorta For the observed mortality hospitals count the number of AAA repair cases that also have a diagnosis of unruptured AAA using the following codes. ICD-9CM Codes for AAA without rupture 441.4 Dissection of aorta aneurysm unspecified site 441.7 Thoracoabdominal aneurysm without rupture 441.9 Aortic aneurysm of unspecified site without rupture	registries that record such information but the measure is not limited to these registries. Patients who underwent elective open AAA repair are included if their aneurysm was asymptomatic and small (< 6cm dia in men, <5.5 cm dia in women, judged by preoperative imaging (CT, MR or ultrasound)).	information. Patients who underwent endovascular AAA repair are included if their aneurysm was asymptomatic and small (< 6cm dia in men, <5.5 cm dia in women, judged by preoperative imaging).

	Maintenance Measure 0357: Abdominal aortic aneurysm (AAA) repair volume (IQI 4)	**Maintenance Measure 0359**: Abdominal aortic artery (AAA) repair mortality rate (IQI 11)	**Endorsed Measure 0736:** Survival predictor for abdominal aortic aneurysm (AAA)	**New Candidate Standard 1523**: In-hospital mortality following elective open repair of small AAAs	**New Candidate Standard 1534**: In-hospital mortality following elective EVAR of small AAAs
		short-term hospital (DISP=2) • MDC 14 (pregnancy, childbirth, and puerperium)			
Exclusions	Numerator exclusions • MDC 14 (pregnancy, childbirth, and puerperium)	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)	Patients with ruptured aneurysm or thoracoabdominal aneurysms.	> 6 cm minor diameter - men > 5.5 cm minor diameter - women Symptomatic AAAs that required urgent/emergent (non-elective) repair	> 6 cm diameter - men > 5.5 cm diameter – women Symptomatic AAAs that required urgent/emergent (non-elective) repair
Exclusion Details	This volume measure does not have a denominator.	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	For the count of all AAA procedures exclude: 3845 Thoracoabdominal procedures. For the observed mortality domain, exclude all Thoracic Diagnosis Codes and dissection codes for AAA 441.0x General code	Patients undergoing non-elective open repair of symptomatic AAAs or those with AAAs larger than the diameters noted above.	Patients undergoing non-elective open repair of symptomatic AAAs or those with AAAs larger than the diameters noted above.

	Maintenance Measure 0357: Abdominal aortic aneurysm (AAA) repair volume (IQI 4)	**Maintenance Measure 0359**: Abdominal aortic artery (AAA) repair mortality rate (IQI 11)	**Endorsed Measure 0736:** Survival predictor for abdominal aortic aneurysm (AAA)	**New Candidate Standard 1523**: In-hospital mortality following elective open repair of small AAAs	**New Candidate Standard 1534**: In-hospital mortality following elective EVAR of small AAAs
		short-term hospital (DISP=2) • MDC 14 (pregnancy, childbirth, and puerperium)	441.1 Thoracic aneurysm ruptured 441.2 Thoracic aneurysm without rupture 441.3 Abdominal aneurysm ruptured 441.5 Aortic aneurysm of unspecified site ruptured 441.6 Thoracoabdominal aneurysm ruptured. Mortality Domain does excludes thoracic aneurysm Procedure Code: 38.45 Resection of vessel with replacement, other thoracic vessels.		
Risk Adjustment	No risk adjustment necessary	Risk adjustment method widely or commercially available. 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-	We used an empirical Bayes approach to combine mortality rates with information on hospital volume at each hospital. In traditional empirical Bayes methods, a point estimate (e.g., mortality rate observed at a hospital) is adjusted for reliability by shrinking it towards the overall mean (e.g., overall mortality rate in the population).	No risk adjustment necessary	No risk adjustment necessary

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		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. Risk adjustment factors: sex age 18-24; age 25-29; age 30-34; age 35-39; age 40-44; age 45-49; age 50-54; age 55-59; age 60-64; age 65-69;	We modified this traditional approach by shrinking the observed mortality rate back toward the mortality rate expected given the volume at that hospital—we refer to this as the "volume-predicted mortality". With this approach, the observed mortality rate is weighted according to how reliably it is estimated, with the remaining weight placed on the information regarding hospital volume [volume-predicted mortality]. Risk adjustment for patient characteristics is not used because in sensitivity analysis, composite measures based on an unadjusted mortality input and a risk-adjusted mortality input had a correlation of (.95) and thus were equally good at predicting future		

	Maintenance Measure 0357: Abdominal aortic aneurysm (AAA) repair volume (IQI 4)	**Maintenance Measure 0359**: Abdominal aortic artery (AAA) repair mortality rate (IQI 11)	**Endorsed Measure 0736:** Survival predictor for abdominal aortic aneurysm (AAA)	**New Candidate Standard 1523**: In-hospital mortality following elective open repair of small AAAs	**New Candidate Standard 1534**: In-hospital mortality following elective EVAR of small AAAs
		age 70-74; age 75-79; age 80-84; age 85+ each age category*female ADRG 1731 (other vascular procedures-minor) ADRG 1732 (other vascular procedures-moderate) ADRG 1733 (other vascular procedures-major) ADRG 1734 (other vascular procedures-extreme) ADRG 1691 (major thoracic and abdominal vascular procedures-minor) ADRG 1692 (major thoracic and abdominal vascular procedures-moderate) ADRG 1693 (major thoracic and abdominal vascular procedures-major) ADRG 1694 (major thoracic and abdominal vascular procedures-extreme ADRG 9999 (other)	performance. The formula for calculating the survival predictor has two components, one is a volume predicted mortality rate, and the second is an observed mortality rate. The volume predicted mortality rate reflects the hospitals experience performing AAA surgeries (thus, it includes all AAA surgeries) and uses mortality for all hospitals at that specific volume to create the volume predicted mortality. The input data from the hospitals for this domain is a volume count of all AAAs performed in the hospital. The second domain is the observed mortality, for this domain the population is the group		

	Maintenance Measure 0357: Abdominal aortic aneurysm (AAA) repair volume (IQI 4)	**Maintenance Measure 0359**: Abdominal aortic artery (AAA) repair mortality rate (IQI 11)	**Endorsed Measure 0736:** Survival predictor for abdominal aortic aneurysm (AAA)	**New Candidate Standard 1523**: In-hospital mortality following elective open repair of small AAAs	**New Candidate Standard 1534**: In-hospital mortality following elective EVAR of small AAAs
		MDC 5 (cardiovascular) Transfer-in-status	of AAA cases without rupture, the data needed for this domain is the number of observed deaths occurring for AAA cases without rupture, within the inpatient setting. The general composite measure calculation is as follows: Predicted Survival = 1-Predicted Mortality Predicted Mortality = (weight)*(mortality) + (1-weight)*(volume predicted mortality) Volume predicted mortality* = intercept - coefficient*ln(caseload), where the intercepts and coefficients are derived from regression using the NIS data and the caseload comes from the Leapfrog Hospital Survey (answer to question #1 for each high-risk procedure). *Any negative values are		

	Maintenance Measure 0357: Abdominal aortic aneurysm (AAA) repair volume (IQI 4)	**Maintenance Measure 0359**: Abdominal aortic artery (AAA) repair mortality rate (IQI 11)	**Endorsed Measure 0736:** Survival predictor for abdominal aortic aneurysm (AAA)	**New Candidate Standard 1523**: In-hospital mortality following elective open repair of small AAAs	**New Candidate Standard 1534**: In-hospital mortality following elective EVAR of small AAAs
			reset to "0" Weight = mortality signal/(mortality signal + [mortality sigma/caseload]), where mortality signal and sigma are derived from the NIS data and the caseload comes from the Leapfrog Hospital Survey (answer to question #1 for each high-risk procedure). Method: We used an empirical Bayes approach to combine mortality rates with information on hospital volume at each hospital. In traditional empirical Bayes methods, a point estimate (e.g., mortality rate observed at a hospital) is adjusted for reliability by shrinking it towards the overall mean (e.g., overall mortality rate in the population). We modified this traditional approach by shrinking the observed		

	Maintenance Measure 0357: Abdominal aortic aneurysm (AAA) repair volume (IQI 4)	**Maintenance Measure 0359**: Abdominal aortic artery (AAA) repair mortality rate (IQI 11)	**Endorsed Measure 0736:** Survival predictor for abdominal aortic aneurysm (AAA)	**New Candidate Standard 1523**: In-hospital mortality following elective open repair of small AAAs	**New Candidate Standard 1534**: In-hospital mortality following elective EVAR of small AAAs
			mortality rate back toward the mortality rate expected given the volume at that hospital—we refer to this as the "volume-predicted mortality". With this approach, the observed mortality rate is weighted according to how reliably it is estimated, with the remaining weight placed on the information regarding hospital volume [volume-predicted mortality]. Risk adjustment for patient characteristics is not used because in sensitivity analysis, composite measures based on an unadjusted mortality input and a risk-adjusted mortality input had a correlation of (.95) and thus were equally good at predicting future performance. The formula for		

	Maintenance Measure 0357: Abdominal aortic aneurysm (AAA) repair volume (IQI 4)	**Maintenance Measure 0359**: Abdominal aortic artery (AAA) repair mortality rate (IQI 11)	**Endorsed Measure 0736:** Survival predictor for abdominal aortic aneurysm (AAA)	**New Candidate Standard 1523**: In-hospital mortality following elective open repair of small AAAs	**New Candidate Standard 1534**: In-hospital mortality following elective EVAR of small AAAs
			calculating the survival predictor has two components, one is a volume predicted mortality rate, and the second is an observed mortality rate. The volume predicted mortality rate reflects the hospitals experience performing AAA surgeries (thus, it includes all AAA surgeries) and uses mortality for all hospitals at that specific volume to create the volume predicted mortality. The input data from the hospitals for this domain is a volume count of all AAAs performed in the hospital. The second domain is the observed mortality, for this domain the population is the group of AAA cases without rupture, the data needed for this domain is the		

	Maintenance Measure 0357: Abdominal aortic aneurysm (AAA) repair volume (IQI 4)	**Maintenance Measure 0359**: Abdominal aortic artery (AAA) repair mortality rate (IQI 11)	**Endorsed Measure 0736:** Survival predictor for abdominal aortic aneurysm (AAA)	**New Candidate Standard 1523**: In-hospital mortality following elective open repair of small AAAs	**New Candidate Standard 1534**: In-hospital mortality following elective EVAR of small AAAs
			number of observed deaths occurring for AAA cases without rupture, within the inpatient setting. The general composite measure calculation is as follows: Predicted Survival = 1-Predicted Mortality Predicted Mortality = (weight)*(mortality) + (1-weight)*(volume predicted mortality) Volume predicted mortality* = intercept - coefficient*ln(caseload), where the intercepts and coefficients are derived from regression using the NIS data and the caseload comes from the Leapfrog Hospital Survey (answer to question #1 for each high-risk procedure). *Any negative values are reset to "0" Weight = mortality		

	Maintenance Measure 0357: Abdominal aortic aneurysm (AAA) repair volume (IQI 4)	**Maintenance Measure 0359**: Abdominal aortic artery (AAA) repair mortality rate (IQI 11)	**Endorsed Measure 0736:** Survival predictor for abdominal aortic aneurysm (AAA)	**New Candidate Standard 1523**: In-hospital mortality following elective open repair of small AAAs	**New Candidate Standard 1534**: In-hospital mortality following elective EVAR of small AAAs
			signal/(mortality signal + [mortality sigma/caseload]), where mortality signal and sigma are derived from the NIS data and the caseload comes from the Leapfrog Hospital Survey (answer to question #1 for each high-risk procedure).		
Stratification	The stratification of the denominator for open vs. endovascular and ruptured vs. unruptured involve the following codes in the denominator specification: Abdominal Aortic Aneurysm Repair (PRAAAR) Volume Indicator IQI #4 Mortality (post-op) Indicator IQI #11 AAA Repair ICD-9-CM Procedure Codes: PROC FORMAT; OPEN VALUE $PRAAARP	Gender, age (5-year age groups), race / ethnicity, primary payer, custom The stratification of the denominator for open vs. endovascular and ruptured vs. unruptured involves the following codes in the denominator specification: Abdominal Aortic Aneurysm Repair (PRAAAR) Volume Indicator / IQI #4 Mortality (post-op) Indicator / IQI #11 AAA Repair ICD-9-CM Procedure Codes: PROC FORMAT		N/A	N/A

	Maintenance Measure 0357: Abdominal aortic aneurysm (AAA) repair volume (IQI 4)	**Maintenance Measure 0359**: Abdominal aortic artery (AAA) repair mortality rate (IQI 11)	**Endorsed Measure 0736:** Survival predictor for abdominal aortic aneurysm (AAA)	**New Candidate Standard 1523**: In-hospital mortality following elective open repair of small AAAs	**New Candidate Standard 1534**: In-hospital mortality following elective EVAR of small AAAs
	3834 = 1 /AORTA RESECTION & ANAST 3844 = 1 / RESECT ABDM AORTA W REPL 3864 = 1 /EXCISION OF AORTA/ OTHER = 0 ENDOVASCULAR VALUE $PRAAA2P 3971= 1 /ENDO IMPL GRFT ABD AORTA/ OTHER = 0 Include Only: AAA ICD-9-CM Diagnosis Codes: RUPTURED VALUE $PRAAARD 4413 = 1 / RUPT ABD AORTIC ANEURYSM / OTHER = 0 UNRUPTURED VALUE $PRAAA2D 4414 = 1 / ABDOM AORTIC ANEURYSM / OTHER = 0 The following analytic results were achieved with the specification modification: Table 1. Reference	OPEN VALUE $PRAAARP 3834 = 1 /AORTA RESECTION & ANAST 3844 = 1 /RESECT ABDM AORTA W REPL 3864 = 1 /EXCISION OF AORTA/ OTHER = 0 ENDOVASCULAR VALUE $PRAAA2P 3971 = 1/ENDO IMPL GRFT ABD AORTA/ OTHER = 0 Include Only: AAA ICD-9-CM Diagnosis Codes: RUPTURED VALUE $PRAAARD 4413 = 1 /RUPT ABD AORTIC ANEURYSM/ OTHER = 0 UNRUPTURED VALUE $PRAAA2D 4414 = 1 /ABDOM AORTIC ANEURYSM/ OTHER = 0 The following analytic results were achieved with the specification modification:			

	Maintenance Measure 0357: Abdominal aortic aneurysm (AAA) repair volume (IQI 4)	**Maintenance Measure 0359**: Abdominal aortic artery (AAA) repair mortality rate (IQI 11)	**Endorsed Measure 0736:** Survival predictor for abdominal aortic aneurysm (AAA)	**New Candidate Standard 1523**: In-hospital mortality following elective open repair of small AAAs	**New Candidate Standard 1534**: In-hospital mortality following elective EVAR of small AAAs
	Population Rate and Volume Open, Ruptured Open, Un-ruptured Endovascular, Ruptured Endovascular, Un-ruptured Original (Composite) Population Rate 2004 39.04% 4.43% 29.11% 1.05% 6.09% 2005 41.10% 4.45% 28.06% 1.03% 5.76% 2006 41.11% 4.53% 29.18% 0.93% 5.22% 2007 39.77% 4.48% 24.84% 1.16% 4.88% 2008 38.27% 4.82% 27.17% 1.02% 4.61% %Change -2.0% 8.5% -6.9% -2.9% -27.9% Volume 2004 3,241 15,723 456 17,438 36,768 2005 2,876 12,941 568 19,981 36,292 2006 2,652 11,152 647 22,778 37,156 2007 2,445 9,693 799 25,101 37,970 2008 2,352 8,851 1,068 28,103 40,293	Table 1. Reference Population Rate and Volume Open, Ruptured Open, Un-ruptured Endovascular, Ruptured Endovascular, Un-ruptured Original(Composite) Population Rate 2004 39.04% 4.43% 29.11% 1.05% 6.09% 2005 41.10% 4.45% 28.06% 1.03% 5.76% 2006 41.11% 4.53% 29.18% 0.93% 5.22% 2007 39.77% 4.48% 24.84% 1.16% 4.88% 2008 38.27% 4.82% 27.17% 1.02% 4.61% %Change -2.0% 8.5% -6.9% -2.9% -27.9% Volume 2004 3,241 15,723 456 17,438 36,768 2005 2,876 12,941 568 19,981 36,292 2006 2,652 11,152 647 22,778 37,156 2007 2,445 9,693 799 25,101 37,970 2008 2,352 8,851 1,068			

	Maintenance Measure 0357: Abdominal aortic aneurysm (AAA) repair volume (IQI 4)	**Maintenance Measure 0359**: Abdominal aortic artery (AAA) repair mortality rate (IQI 11)	**Endorsed Measure 0736:** Survival predictor for abdominal aortic aneurysm (AAA)	**New Candidate Standard 1523**: In-hospital mortality following elective open repair of small AAAs	**New Candidate Standard 1534**: In-hospital mortality following elective EVAR of small AAAs
	%Change -32.1% -57.5% 85.1% 47.7% 9.2% Source: State Inpatient Databases (SID), Healthcare Cost and Utilization Project (HCUP) Table 2. Hospital Discrimination, 2008 Open, Ruptured Open, Un-ruptured Endovascular, Ruptured Endovascular, Un-ruptured Original (Composite) Hospitals 1,015 1,343 507 1,439 1,711 Best Performing 24.74% 10.20% 12.91% 0.00% 4.64% Worst Performing 26.53% 24.26% 39.11% 0.75% 5.52% 5th 32.15% 2.25% 20.14% 0.16% 3.02% 10th 33.42% 2.67% 21.52% 0.24% 3.32% 25th 35.60% 3.49% 23.98% 0.46% 3.86% Median 38.14% 4.59%	28,103 40,293 %Change -32.1% -57.5% 85.1% 47.7% 9.2% Source: State Inpatient Databases (SID), Healthcare Cost and Utilization Project (HCUP) Table 2. Hospital Discrimination, 2008 Open, Ruptured Open, Un-ruptured Endovascular, Ruptured Endovascular, Un-ruptured Original(Composite) Hospitals 1,015 1,343 507 1,439 1,711 Best Performing 24.74% 10.20% 12.91% 0.00% 4.64% Worst Performing 26.53% 24.26% 39.11% 0.75% 5.52% 5th 32.15% 2.25% 20.14% 0.16% 3.02% 10th 33.42% 2.67% 21.52% 0.24% 3.32% 25th 35.60% 3.49% 23.98% 0.46% 3.86% Median 38.14% 4.59%			

	Maintenance Measure 0357: Abdominal aortic aneurysm (AAA) repair volume (IQI 4)	**Maintenance Measure 0359**: Abdominal aortic artery (AAA) repair mortality rate (IQI 11)	**Endorsed Measure 0736:** Survival predictor for abdominal aortic aneurysm (AAA)	**New Candidate Standard 1523**: In-hospital mortality following elective open repair of small AAAs	**New Candidate Standard 1534**: In-hospital mortality following elective EVAR of small AAAs
	26.91% 0.84% 4.53% 75th 40.79% 5.90% 30.08% 1.39% 5.27% 90th 43.28% 7.27% 33.14% 2.04% 6.00% 95th 44.82% 8.18% 35.06% 2.52% 6.47% Source: State Inpatient Databases (SID), Healthcare Cost and Utilization Project (HCUP). Best performing is below the median at 95% probability; worst performing is above the median at 95% probability. Table 2A. Model Covariates, 2008 Open, Ruptured Open, Un-ruptured Endovascular, Ruptured Endovascular, Un-ruptured Original (Composite) Frequency N 2,284 8,729 1,038 27,989 39,963 Female 23.5% 27.3% 21.5% 17.8% 20.3%	26.91% 0.84% 4.53% 75th 40.79% 5.90% 30.08% 1.39% 5.27% 90th 43.28% 7.27% 33.14% 2.04% 6.00% 95th 44.82% 8.18% 35.06% 2.52% 6.47% Source: State Inpatient Databases (SID), Healthcare Cost and Utilization Project (HCUP). Best performing is below the median at 95% probability; worst performing is above the median at 95% probability. Table 2A. Model Covariates, 2008 Open, Ruptured Open, Un-ruptured Endovascular, Rupture Endovascular, Un-ruptured Original(Composite) Frequency N 2,284 8,729 1,038 27,989 39,963 Female 23.5% 27.3% 21.5% 17.8% 20.3% 18 - 24 0.0% 0.0% 0.0%			

	Maintenance Measure 0357: Abdominal aortic aneurysm (AAA) repair volume (IQI 4)	**Maintenance Measure 0359**: Abdominal aortic artery (AAA) repair mortality rate (IQI 11)	**Endorsed Measure 0736:** Survival predictor for abdominal aortic aneurysm (AAA)	**New Candidate Standard 1523**: In-hospital mortality following elective open repair of small AAAs	**New Candidate Standard 1534**: In-hospital mortality following elective EVAR of small AAAs
	18 - 24 0.0% 0.0% 0.0% 0.0% 0.0% 25 - 29 0.1% 0.1% 0.0% 0.0% 0.0% 30 - 34 0.0% 0.1% 0.0% 0.0% 0.0% 35 - 39 0.0% 0.1% 0.1% 0.0% 0.1% 40 - 44 0.1% 0.5% 0.0% 0.1% 0.1% 45 - 49 0.8% 0.9% 0.8% 0.3% 0.5% 50 - 54 1.9% 2.4% 1.8% 1.2% 1.5% 55 - 59 4.7% 6.3% 5.8% 3.5% 4.3% 60 - 64 11.0% 12.5% 9.0% 9.4% 10.2% 70 - 74 18.7% 21.4% 14.9% 20.1% 20.2% 75 - 79 19.7% 20.5% 16.4% 22.2% 21.6% 80 - 84 17.3% 11.5% 19.7% 17.3% 16.1% 85 - high 10.0% 4.3% 16.8% 9.4% 8.5% 169-1 0.0% 26.7% 0.1% 0.6% 6.3% 169-2 0.0% 30.2% 0.0% 1.1% 7.3% 169-3 0.1% 21.1% 0.0% 0.5% 5.0%	0.0% 0.0% 25 - 29 0.1% 0.1% 0.0% 0.0% 0.0% 30 - 34 0.0% 0.1% 0.0% 0.0% 0.0% 35 - 39 0.0% 0.1% 0.1% 0.0% 0.1% 40 - 44 0.1% 0.5% 0.0% 0.1% 0.1% 45 - 49 0.8% 0.9% 0.8% 0.3% 0.5% 50 - 54 1.9% 2.4% 1.8% 1.2% 1.5% 55 - 59 4.7% 6.3% 5.8% 3.5% 4.3% 60 - 64 11.0% 12.5% 9.0% 9.4% 10.2% 70 - 74 18.7% 21.4% 14.9% 20.1% 20.2% 75 - 79 19.7% 20.5% 16.4% 22.2% 21.6% 80 - 84 17.3% 11.5% 19.7% 17.3% 16.1% 85 - high 10.0% 4.3% 16.8% 9.4% 8.5% 169-1 0.0% 26.7% 0.1% 0.6% 6.3% 169-2 0.0% 30.2% 0.0% 1.1% 7.3% 169-3 0.1% 21.1% 0.0% 0.5% 5.0% 169-4 88.4% 14.5% 6.2%			

	Maintenance Measure 0357: Abdominal aortic aneurysm (AAA) repair volume (IQI 4)	**Maintenance Measure 0359**: Abdominal aortic artery (AAA) repair mortality rate (IQI 11)	**Endorsed Measure 0736:** Survival predictor for abdominal aortic aneurysm (AAA)	**New Candidate Standard 1523**: In-hospital mortality following elective open repair of small AAAs	**New Candidate Standard 1534**: In-hospital mortality following elective EVAR of small AAAs
	169-4 88.4% 14.5% 6.2% 0.4% 8.6% 173-2 0.0% 0.0% 0.0% 35.1% 24.6% 173-3 0.0% 0.0% 0.1% 7.6% 5.3% 173-4 0.0% 0.0% 84.4% 2.3% 3.8% MDC 5 11.5% 7.5% 9.2% 2.1% 4.0% Transfer-in 14.5% 2.4% 18.5% 1.6% 2.9% Source: State Inpatient Databases (SID), Healthcare Cost and Utilization Project (HCUP). APR-DRG 169 (MAJOR THORACIC & ABDOMINAL VASCULAR PROCEDURES); APR-DRG 173 (OTHER VASCULAR PROCEDURES) Table 2B. Model Covariates, 2008 Open, Ruptured Open, Un-ruptured Endovascular, Ruptured Endovascular,	0.4% 8.6% 173-2 0.0% 0.0% 0.0% 35.1% 24.6% 173-3 0.0% 0.0% 0.1% 7.6% 5.3% 173-4 0.0% 0.0% 84.4% 2.3% 3.8% MDC 5 11.5% 7.5% 9.2% 2.1% 4.0% Transfer-in 14.5% 2.4% 18.5% 1.6% 2.9% Source: State Inpatient Databases (SID), Healthcare Cost and Utilization Project (HCUP). APR-DRG 169 (MAJOR THORACIC & ABDOMINAL VASCULAR PROCEDURES); APR-DRG 173 (OTHER VASCULAR PROCEDURES) Table 2B. Model Covariates, 2008 Open, Ruptured Open, Un-ruptured Endovascular, Ruptured Endovascular, Un-ruptured Original			

	Maintenance Measure 0357: Abdominal aortic aneurysm (AAA) repair volume (IQI 4)	**Maintenance Measure 0359**: Abdominal aortic artery (AAA) repair mortality rate (IQI 11)	**Endorsed Measure 0736:** Survival predictor for abdominal aortic aneurysm (AAA)	**New Candidate Standard 1523**: In-hospital mortality following elective open repair of small AAAs	**New Candidate Standard 1534**: In-hospital mortality following elective EVAR of small AAAs
	Un-ruptured Original (Composite) Odds Ratios Female 1.116 1.063 1.548* 1.386* 1.143* 18 - 24 25 - 29 30 - 34 35 - 39 40 - 44 45 - 49 0.538 0.634 0.387 50 - 54 0.445 0.483 1.761 0.637 55 - 59 0.547* 0.713 0.526 1.068 0.644* 60 - 64 0.910 0.814 1.048 1.613 0.999 70 - 74 1.721* 1.023 1.699 1.138 1.328* 75 - 79 1.804* 1.410 1.800* 1.862* 1.569* 80 - 84 2.941* 2.459* 2.346* 2.002* 2.499* 85 - high 4.225* 2.469* 2.052* 2.717* 3.006* 169-1 0.052* 41.786* 13.066* 169-2 0.070* 15.660* 13.998* 169-3 0.284* 71.019* 55.144* 169-4 1.375* 2.372* 1.587	(Composite) Odds Ratios Female 1.116 1.063 1.548* 1.386* 1.143* 18 - 24 25 - 29 30 - 34 35 - 39 40 - 44 45 - 49 0.538 0.634 0.387 50 - 54 0.445 0.483 1.761 0.637 55 - 59 0.547* 0.713 0.526 1.068 0.644* 60 - 64 0.910 0.814 1.048 1.613 0.999 70 - 74 1.721* 1.023 1.699 1.138 1.328* 75 - 79 1.804* 1.410 1.800* 1.862* 1.569* 80 - 84 2.941* 2.459* 2.346* 2.002* 2.499* 85 - high 4.225* 2.469* 2.052* 2.717* 3.006* 169-1 0.052* 41.786* 13.066* 169-2 0.070* 15.660* 13.998* 169-3 0.284* 71.019* 55.144* 169-4 1.375* 2.372* 1.587 173-2 1.576 1.470			

	Maintenance Measure 0357: Abdominal aortic aneurysm (AAA) repair volume (IQI 4)	**Maintenance Measure 0359**: Abdominal aortic artery (AAA) repair mortality rate (IQI 11)	**Endorsed Measure 0736:** Survival predictor for abdominal aortic aneurysm (AAA)	**New Candidate Standard 1523**: In-hospital mortality following elective open repair of small AAAs	**New Candidate Standard 1534**: In-hospital mortality following elective EVAR of small AAAs
	173-2 1.576 1.470 173-3 32.328* 30.741* 173-4 0.789 MDC 5 1.000 1.000 1.000 1.000 1.000 Transfer-in 0.948 0.779 1.011 1.824* 1.251* C-statistic 0.659 0.868 0.626 0.942 0.940 Source: State Inpatient Databases (SID), Healthcare Cost and Utilization Project (HCUP); * - significant at p<.05	173-3 32.328* 30.741* 173-4 0.789 MDC 5 1.000 1.000 1.000 1.000 1.000 Transfer-in 0.948 0.779 1.011 1.824* 1.251* C-statistic 0.659 0.868 0.626 0.942 0.940 Source: State Inpatient Databases (SID), Healthcare Cost and Utilization Project (HCUP); * - significant at p<.05			
Type Score	Count	Rate/proportion		Rate/proportion	Rate/proportion
Algorithm	The volume is the number of discharges with a diagnosis of, and a procedure for AAA. There are four volume strata: open vs. endovascular, and ruptured vs. un-ruptured.	There are four rates calculated, one for each stratum (open vs. endovascular, ruptured vs. un-ruptured). Each stratum indicator is expressed as a rate, and is defined as outcome of interest / population at risk or numerator / denominator. The AHRQ Quality Indicators (AHRQ QI) software performs several steps to produce the rates. 1) Discharge-level data is used to		Identify denominator, exclude non-elective repair of symptomatic or ruptured patients and men with AAA >6 cm, and women with AAA >5.5, find number of deaths Outcome = deaths/ # cases	Identify denominator, exclude non-elective repair of symptomatic or ruptured patients and men with AAA >6 cm, and women with AAA >5.5, find number of deaths Outcome = deaths/ # cases

	Maintenance Measure 0357: Abdominal aortic aneurysm (AAA) repair volume (IQI 4)	**Maintenance Measure 0359**: Abdominal aortic artery (AAA) repair mortality rate (IQI 11)	**Endorsed Measure 0736:** Survival predictor for abdominal aortic aneurysm (AAA)	**New Candidate Standard 1523**: In-hospital mortality following elective open repair of small AAAs	**New Candidate Standard 1534**: In-hospital mortality following elective EVAR of small AAAs
		identify inpatient records containing the outcome of interest and 2) the population at risk. For provider indicators, the population at risk is derived from hospital discharge records; 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 level. 5) Calculate risk-adjusted rate. Use the indirect standardization to account for case-mix. 6) Calculate smoothed rate. A multi-variate shrinkage factor is applied to the risk-adjusted rates. The shrinkage estimate reflects a reliability adjustment unique to each indicator and hospital, and takes			

	Maintenance Measure 0357: Abdominal aortic aneurysm (AAA) repair volume (IQI 4)	**Maintenance Measure 0359**: Abdominal aortic artery (AAA) repair mortality rate (IQI 11)	**Endorsed Measure 0736:** Survival predictor for abdominal aortic aneurysm (AAA)	**New Candidate Standard 1523**: In-hospital mortality following elective open repair of small AAAs	**New Candidate Standard 1534**: In-hospital mortality following elective EVAR of small AAAs
		into account both the signal (between provider variance) and noise (within provider variance) for the indicator in each stratum, but also the covariance with the indicators across stratum. The smoothed rate is a weighted average of the hospital- and stratum-specific risk-adjusted rate and the volume- and stratum-specific risk-adjusted rate, where the weight is the multi-variate shrinkage factor; 7) Calculate combined rate across stratum. The overall rate is a weighted average of the stratum-specific rates. The "disease" weights are the relative frequency of ruptured and un-ruptured cases in the reference population. The "procedure" weights are the relative frequency of open and endovascular cases in the hospital. The stratum weight is the			

	Maintenance Measure 0357: Abdominal aortic aneurysm (AAA) repair volume (IQI 4)	**Maintenance Measure 0359**: Abdominal aortic artery (AAA) repair mortality rate (IQI 11)	**Endorsed Measure 0736:** Survival predictor for abdominal aortic aneurysm (AAA)	**New Candidate Standard 1523**: In-hospital mortality following elective open repair of small AAAs	**New Candidate Standard 1534**: In-hospital mortality following elective EVAR of small AAAs
		disease weight multiplied by the procedure weight and the sum of weights across stratum is normalized to 1.0. Additional information on calculation algorithms and specifications can be found at http://qualityindicators.ahrq.gov/Downloads/Resources/Publications/2011/QI%20Empirical%20Methods%2005-03-11.pdf			
Data Source	Electronic administrative data/claims	Electronic administrative data/claims	Electronic administrative data/claims	Registry data	Registry data
Level of Measurement /Analysis	Facility/agency	Facility/agency	Facility/agency	Clinicians: Individual, group; Facility/agency; Can be measured at all levels	Clinicians: Individual, group; Facility/agency; Can be measured at all levels
Care Settings	Hospital	Hospital	Hospital	Hospital	Hospital