NATIONAL QUALITY FORUM

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~~rimary~~ 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	Number of deaths (DISP=20) among cases	For the observed mortality, the hospital	ANY registry that includes hospitalization	A registry that includes hospitalization details,

	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
	abdominal aortic aneurysm repair procedure and a principal~~rimary~~ 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,	meeting the inclusion and exclusion rules for the denominator.	submits the observed deaths for AAA cases in patients without rupture as identified using the denominator and exclusion codes.	details, AAA diameter 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)).	AAA diameter 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) 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
	childbirth, and 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

	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 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 ~~Each indicator is expressed as a rate, is defined as outcome of interest / population at risk or numerator / denominator. The AHRQ Quality Indicators (AHRQ QI) software performs five steps to produce the rates. 1) Discharge-level data is used to mark inpatient records containing the outcome of interest and 2) the population at risk. For provider indicators, the population at risk is also~~			

	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
		~~derived from hospital discharge records; for area indicators, the population at risk is derived from U.S. Census data. 3) Calculate observed rates. Using output from steps 1 and 2, rates are calculated for user-specified combinations of stratifiers. 4) Calculate expected rates. Regression coefficients from a reference population database are applied to the discharge records and aggregated to the provider or area level. 5) Calculate risk-adjusted rate. Use the indirect standardization to account for case-mix. 6) Calculate smoothed rate. A Univariate shrinkage factor is applied to the risk-adjusted rates. The shrinkage estimate reflects a reliability adjustment unique to each indicator. Full information on calculation algorithms and specifications can be found at~~			

	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
		~~http://qualityindicators.ahrq.gov/IQI_download.htm~~			
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