



## Measure Information

This document contains the information submitted by measure developers/stewards, but is organized according to NQF's measure evaluation criteria and process. The item numbers refer to those in the submission form but may be in a slightly different order here. In general, the item numbers also reference the related criteria (e.g., item 1b.1 relates to subcriterion 1b).

### Brief Measure Information

**NQF #:** 0464

**De.2. Measure Title:** Prevention of Catheter-Related Bloodstream Infections (CRBSI) – Central Venous Catheter (CVC)

**Co.1.1. Measure Steward:** American Society of Anesthesiologists

**De.3. Brief Description of Measure:** Percentage of patients, regardless of age, who undergo central venous catheter (CVC) insertion for whom CVC was inserted with all elements of maximal sterile barrier technique, hand hygiene, skin preparation and, if ultrasound is used, sterile ultrasound techniques followed

**1b.1. Developer Rationale:** Hospital-acquired bloodstream infections are a common complication that leads to increased costs and mortality. It is estimated that approximately 51% of hospital-acquired bloodstream infections occur in an intensive care unit (ICU), with the presence of a central venous catheter being the largest risk factor for the development of a bloodstream infection in the hospital. Catheter-related bloodstream infections (CRBSIs) commonly occur when the catheter becomes contaminated by microbes on the skin during insertion. The use of maximal sterile barriers, including sterile gloves, long-sleeved sterile gown, mask, cap, and full-sized sterile drape, during insertion of the catheter has been shown to cost effectively reduce CRBSI rates compared to the use of less stringent precautions.

**S.4. Numerator Statement:** Patients for whom CVC was inserted with all elements of maximal sterile barrier technique\*, hand hygiene, skin preparation and, if ultrasound is used, sterile ultrasound techniques\*\* followed

Definitions:

\*Maximal sterile barrier technique includes ALL of the following elements:

- cap
- mask
- sterile gown
- sterile gloves
- sterile full body drape

\*\* Sterile ultrasound techniques require sterile gel and sterile probe covers

NOTE: For purposes of this measure, maximal sterile barrier technique during CVC insertion is defined to include use of: cap AND mask AND sterile gown AND sterile gloves AND a large sterile sheet AND hand hygiene AND 2% chlorhexidine for cutaneous antisepsis.

**S.7. Denominator Statement:** All patients, regardless of age, who undergo CVC insertion

**S.10. Denominator Exclusions:** Denominator Exceptions: Documentation of medical reason(s) for not following all elements of maximal sterile barrier technique, hand hygiene, skin preparation and, if ultrasound is used, sterile ultrasound techniques during CVC insertion (including increased risk of harm to patient if adherence to aseptic technique would cause delay in CVC insertion)

**De.1. Measure Type:** Process

**S.23. Data Source:** Administrative claims, Electronic Clinical Data, Electronic Clinical Data : Registry

**S.26. Level of Analysis:** Clinician : Group/Practice, Clinician : Individual, Clinician : Team, Facility

**IF Endorsement Maintenance – Original Endorsement Date:** Jul 31, 2008 **Most Recent Endorsement Date:** Jul 31, 2008

**IF this measure is included in a composite, NQF Composite#/title:**

**IF this measure is paired/grouped, NQF#/title:**

**De.4. IF PAIRED/GROUPED, what is the reason this measure must be reported with other measures to appropriately interpret results?** The measure is not paired or grouped with other measures.

## 1. Evidence, Performance Gap, Priority – Importance to Measure and Report

Extent to which the specific measure focus is evidence-based, important to making significant gains in healthcare quality, and improving health outcomes for a specific high-priority (high-impact) aspect of healthcare where there is variation in or overall less-than-optimal performance. **Measures must be judged to meet all subcriteria to pass this criterion and be evaluated against the remaining criteria.**

**1a. Evidence to Support the Measure Focus – See attached Evidence Submission Form**  
2014-01-06\_FINAL\_Importance.doc

### 1b. Performance Gap

Demonstration of quality problems and opportunity for improvement, i.e., data demonstrating:

- considerable variation, or overall less-than-optimal performance, in the quality of care across providers; and/or
- disparities in care across population groups.

#### 1b.1. Briefly explain the rationale for this measure (e.g., the benefits or improvements in quality envisioned by use of this measure)

Hospital-acquired bloodstream infections are a common complication that leads to increased costs and mortality. It is estimated that approximately 51% of hospital-acquired bloodstream infections occur in an intensive care unit (ICU), with the presence of a central venous catheter being the largest risk factor for the development of a bloodstream infection in the hospital. Catheter-related bloodstream infections (CRBSIs) commonly occur when the catheter becomes contaminated by microbes on the skin during insertion. The use of maximal sterile barriers, including sterile gloves, long-sleeved sterile gown, mask, cap, and full-sized sterile drape, during insertion of the catheter has been shown to cost effectively reduce CRBSI rates compared to the use of less stringent precautions.

**1b.2. Provide performance scores on the measure as specified (current and over time) at the specified level of analysis.** (This is required for endorsement maintenance. Include mean, std dev, min, max, interquartile range, scores by decile. Describe the data source including number of measured entities; number of patients; dates of data; if a sample, characteristics of the entities included). This information also will be used to address the subcriterion on improvement (4b.1) under Usability and Use.

A number of tables have been included in the Measure Testing form as an attachment to this application. The tables show placement of CVCs captured in the National Anesthesia Clinical Outcomes Registry (NACOR); the number of these patients with Medicare as their primary insurance; the number reporting compliance with this measure; the number with a documented reason for exception; and the number with no documentation of exception.

NACOR has captured information on more than 220,000 CVC placements from 2010-2013. The number of procedures is consistent across all 4 years (adjusting for growth in NACOR participation). This suggests that overall indications for CVC placement are not changing substantially. The proportion of patients insured by Medicare does not show a change across years.

Patient demographics are included in the tables displayed in response to question 1.6 in the Measure Testing form. We show the numbers and percent of cases in which measure compliance is reported. The measure is more likely to be successfully reported in Medicare patients than in the population at large, by about 2:1. This may reflect the financial incentives of the PQRS program.

Successful measure reporting is skewed towards ASA Physical Status IV patients, which may reflect concentration of these patients

in larger, university hospitals. These facilities are more likely to be routinely performing surgeries in which a CVC would be indicated, and to be caring for higher-acuity patients who are more likely to require central access for monitoring and fluid administration. Larger hospitals are more likely to have invested in the information technology which facilitates documentation and reporting of this measure. This suggests a gap in performance for which continued reporting of this measure could be a useful metric of closure.

The low percentage of cases in which measure performance is reported reflects several factors. The most significant is likely the technical capacity to transmit this data to NACOR, which is not uniform across participating practices. The 5% Medicare data set shows a reporting rate of greater than 40% for anesthesia providers, in contrast to the 5-8% shown here. The difference is accounted for by practices which report their performance to CMS but do not or cannot share it with NACOR. This structural gap will close rapidly in the future as interoperability of EHR and quality capture systems improves. Of note, for those cases in which performance is reported, the rate of success or documented exceptions vs. undocumented failures is similar at 98-99%. Please see the validity testing section of the Measure Testing form for data analysis and comparison.

Most noteworthy in both data sets is the observation that less than 50% of anesthesia providers are reporting this measure. This may represent a failure of clinical compliance, a failure of documentation, a failure of collection, or a failure of data transmission. While anesthesiology in general has one of the higher participation rates in PQRS there is still a substantial gap to be addressed. This argues for continued use of a measure such as this one, with a strong evidence base in support, good face validity and minimal economic burden.

**1b.3. If no or limited performance data on the measure as specified is reported in 1b2, then provide a summary of data from the literature that indicates opportunity for improvement or overall less than optimal performance on the specific focus of measurement.**

The source of the data presented in 1b.2 and 1b.4 is the National Anesthesia Clinical Outcomes Registry (NACOR), maintained by the Anesthesia Quality Institute. NACOR is a voluntary registry open to all anesthesia departments in the United States. The 9,981 physician providers in NACOR who reported central venous catheter (CVC) insertion from 2010-2013 represent approximately 25% of the anesthesiologist work force. Data in NACOR are collected by automated reports from local digital systems, including billing software, quality capture systems and anesthesia information management systems (AIMS; a component of the facility electronic healthcare record). The entire NACOR database includes more than 14,000,000 cases collected over the past 4 years. The AQI maintains NACOR for the primary purpose of local quality improvement; the 300 participating practices have continual online access to their own data, to summary and trending reports, and to national and peer group benchmarks. Data are presented at the practice, facility and individual provider level.

NACOR is certified by CMS to report PQRS measures for anesthesiologists, including this one. However most anesthesiologists who report this measure do so on a 'claims made' basis through their billing software. In some practices this information is copied to NACOR as well, but in other practices it is not part of the NACOR submission.

Further information on NACOR is available on the AQI website at [www.aqihq.org](http://www.aqihq.org). References for a more complete understanding of NACOR include:

Dutton RP, Dukatz A. Quality improvement using automated data sources: the anesthesia quality institute. *Anesthesiol Clin*. 2011 29(3):439-54.

Grissom TE, DuKatz A, Kordylewski H, Dutton RP. Bring out your data: The evolution of the National Anesthesia Clinical Outcomes Registry. *International Journal of Computational Models and Algorithms in Medicine*, 2011; 2: 51-69.

**1b.4. Provide disparities data from the measure as specified (current and over time) by population group, e.g., by race/ethnicity, gender, age, insurance status, socioeconomic status, and/or disability. (This is required for endorsement maintenance. Describe the data source including number of measured entities; number of patients; dates of data; if a sample, characteristics of the entities include.) This information also will be used to address the subcriterion on improvement (4b.1) under Usability and Use.**

The table displayed as a response to question 1.6 in the Measure Testing form shows information on compliance with this measure collected in the past 4 years in the National Anesthesia Clinical Outcomes Registry (NACOR), broken down by the average income of the zip code area in which the patient lives.

Attention should be focused on column representing the number of cases meeting all measure criteria, which shows a skew in successful compliance with this measure towards patients in higher income zip codes. This disparity may reflect increased resources for gathering performance data, increased penetration of EHRs in higher socioeconomic regions, or an actual performance bias based on patient status. By contrast, the next tables show the same information broken down by patient age and sex.

The table displayed as a response to question 1.6 in the Measure Testing form shows there is no evident bias in performance based on the age or gender of the patient, although there does appear to be increased reporting of the measure overall in patients with Medicare listed as their primary insurance.

The suggestion of a disparity in reporting and/or compliance with this measure based on socioeconomic status of the patient indicates a need for continued collection and reporting. Further analysis will be needed to assess performance on the practice, facility and provider level. The goal will be to determine whether this bias is the result of system factors such as investment in information technology and/or quality management personnel, or patient factors such as race or social status.

**1b.5. If no or limited data on disparities from the measure as specified is reported in 1b4, then provide a summary of data from the literature that addresses disparities in care on the specific focus of measurement. Include citations.**

See 1b.3 above. NACOR collects data on all aspects of anesthesia practice, including numerous patient characteristics. While patient race is not usually requested or reported, the zip code of every patient is collected. These data can be used to estimate the socioeconomic status of large populations by comparison with the mean household income for that zip code, as reported by the US census.

**1c. High Priority** (previously referred to as High Impact)

The measure addresses:

- a specific national health goal/priority identified by DHHS or the National Priorities Partnership convened by NQF; OR
- a demonstrated high-priority (high-impact) aspect of healthcare (e.g., affects large numbers of patients and/or has a substantial impact for a smaller population; leading cause of morbidity/mortality; high resource use (current and/or future); severity of illness; and severity of patient/societal consequences of poor quality).

**1c.1. Demonstrated high priority aspect of healthcare**

A leading cause of morbidity/mortality, Frequently performed procedure, High resource use, Patient/societal consequences of poor quality

**1c.2. If Other:**

**1c.3. Provide epidemiologic or resource use data that demonstrates the measure addresses a high priority aspect of healthcare.**

**List citations in 1c.4.**

Central Venous Catheter (CVC) insertions are one of the most frequently performed procedures in hospitals, and specifically within Intensive Care Units (ICUs). It is estimated that over 5 million CVCs are placed in the United States annually, and 15 million CVC days (i.e., the total number of days of exposure to CVCs by all patients) occur in ICUs each year.<sup>1</sup>

There is consensus within the literature that catheter-related bloodstream infections (CRBSI) profoundly impact resource use within hospitals.<sup>2-10</sup> Estimates of increased hospital lengths of stay range from 7 days to 40 days, with most studies finding an increase of at least 20 days. Specifically within the ICU, increased lengths of stay range from 5 to 27 days. Increased costs have also been found to range from about \$3,000 (1991 dollars) to up to \$60,000 per patient due to these infections.

If the proper precautions are not taken during CVC insertion and infection results, it could hold severe consequences for the patient. There is evidence that CRBSI can significantly increase a patient's risk for morbidity and/or mortality.<sup>2,5,11</sup> One study in 1994 concluded that CRBSI increased mortality risk by 35%, which was the highest estimate found in the literature.<sup>7</sup>

**1c.4. Citations for data demonstrating high priority provided in 1a.3**

1. O'Grady NP, Alexander M, Dellinger EP, et al. (2002). Guidelines for the prevention of intravascular catheter-related infections. Centers for Disease Control. Washington, DC.
2. Arnow PM, Quimosing EM, Beach M. (1993). Consequences of intravascular catheter sepsis. Clin Infect Dis. 16(6):778-84.
3. Blot SI, Depuydt P, Annemans L, et al. (2005). Clinical and economic outcomes in critically ill patients with nosocomial catheter-related bloodstream infections. Clin Infect Dis. 41(11):1591-8.

4. Chen YY, Chou YC, Chou P. (2005). Impact of nosocomial infection on cost of illness and length of stay in intensive care units. *Infect Control Hosp Epidemiol.* 26(3):281-7.
5. DiGiovine B, Chenoweth C, Watts C, Higgins M. (1999). The attributable mortality and costs of primary nosocomial bloodstream infections in the intensive care unit. *Am J Respir Crit Care Med.* 160:976-81.
6. Dimick JB, Pelz RK, Consunji R, et al. (2001). Increased resource use associated with catheter-related bloodstream infection in the surgical intensive care unit. *Arch Surg.* 136(2):229-34.
7. Pittet D, Tarara D, Wenzel RP. (1994). Nosocomial bloodstream infection in critically ill patients. Excess length of stay, extra costs, and attributable mortality. *JAMA.* 271(20):1598-601.
8. Rello J, Ochagavia A, Sabanes E, et al. (2000). Evaluation of outcome of intravenous catheter-related infections in critically ill patients. *Am J Respir Crit Care Med.* 162(3 Pt 1):1027-30.
9. Warren DK, Quadir WW, Hollenbeak CS, et al. (2006). Attributable cost of catheter-associated bloodstream infections among intensive care patients in a nonteaching hospital. *Crit Care Med.* 34(8):2084-9.
10. Warren DK, Zack JE, Elward AM, et al. (2001). Nosocomial primary bloodstream infections in intensive care unit patients in a nonteaching community medical center: a 21-month prospective study. *Clin Infect Dis.* 33(8):1329-35.
11. Smith RL, Meixler SM, Simberkoff MS. (1991). Excess mortality in critically ill patients with nosocomial bloodstream infections. *Chest.* 100(1):164-7.

**1c.5. If a PRO-PM (e.g. HRQoL/functional status, symptom/burden, experience with care, health-related behaviors), provide evidence that the target population values the measured PRO and finds it meaningful. (Describe how and from whom their input was obtained.)**

This is not a PRO-PM measure.

## 2. Reliability and Validity—Scientific Acceptability of Measure Properties

Extent to which the measure, as specified, produces consistent (reliable) and credible (valid) results about the quality of care when implemented. **Measures must be judged to meet the subcriteria for both reliability and validity to pass this criterion and be evaluated against the remaining criteria.**

**2a.1. Specifications** The measure is well defined and precisely specified so it can be implemented consistently within and across organizations and allows for comparability. eMeasures should be specified in the Health Quality Measures Format (HQMF) and the Quality Data Model (QDM).

**De.5. Subject/Topic Area** (check all the areas that apply):

Cancer, Cancer : Bladder, Cancer : Breast, Cancer : Colorectal, Cancer : Gynecologic, Cancer : Hematologic, Cancer : Liver, Cancer : Lung, Esophageal, Cancer : Pancreatic, Cancer : Prostate, Cardiovascular, Cardiovascular : Congestive Heart Failure, Gastrointestinal (GI), Gastrointestinal (GI) : Cirrhosis, Gastrointestinal (GI) : GI Bleeding, Musculoskeletal : Hip/Pelvic Fracture, Musculoskeletal : Joint Surgery, Neurology : Brain Injury, Pulmonary/Critical Care, Pulmonary/Critical Care : Critical Care, Surgery, Surgery : Cardiac Surgery, Surgery : General Surgery, Surgery : Perioperative, Surgery : Thoracic Surgery, Surgery : Vascular Surgery

**De.6. Cross Cutting Areas** (check all the areas that apply):

Safety, Safety : Complications, Safety : Healthcare Associated Infections

**S.1. Measure-specific Web Page** (Provide a URL link to a web page specific for this measure that contains current detailed specifications including code lists, risk model details, and supplemental materials. Do not enter a URL linking to a home page or to general information.)

A measure specific web page is not applicable to this process measure.

**S.2a. If this is an eMeasure**, HQMF specifications must be attached. Attach the output from the eMeasure authoring tool (MAT) - if the MAT was not used, contact staff. (Use the specification fields in this online form for the plain-language description of the specifications)

No HQMF specs Attachment:

**S.2b. Data Dictionary, Code Table, or Value Sets** (and risk model codes and coefficients when applicable) must be attached. (Excel or csv file in the suggested format preferred - if not, contact staff)

No data dictionary Attachment:

**S.3. For endorsement maintenance**, please briefly describe any changes to the measure specifications since last endorsement date and explain the reasons.

The following changes were made to the measure application:

Application Number: De.2. Measure Title

Previous Language: Anesthesiology and Critical Care: Prevention of Catheter-Related Bloodstream Infections (CRBSI) – Central Venous Catheter (CVC) Insertion Protocol

New Language: Prevention of Catheter-Related Bloodstream Infections (CRBSI) – Central Venous Catheter (CVC)

Reason: The measure title was updated to reflect the work of the AMA-PCPI Anesthesiology and Critical Care workgroup's deliberations.

Application Number: De.3. Brief description of measure

Previous Language: Percentage of patients who undergo CVC insertion for whom CVC was inserted with all elements of maximal sterile barrier technique (cap AND mask AND sterile gown AND sterile gloves AND a large sterile sheet AND hand hygiene AND 2% chlorhexidine for cutaneous antisepsis) followed

New Language: Percentage of patients, regardless of age, who undergo central venous catheter (CVC) insertion for whom CVC was inserted with all elements of maximal sterile barrier technique, hand hygiene, skin preparation and, if ultrasound is used, sterile ultrasound techniques followed

Reason: The measure description was updated to reflect the work of the AMA-PCPI Anesthesiology and Critical Care workgroup's deliberations on including ultrasound techniques.

Application Number: S.4. Numerator Statement

Previous Language: Percentage of patients who undergo CVC insertion for whom CVC was inserted with all elements of maximal sterile barrier technique (cap AND mask AND sterile gown AND sterile gloves AND a large sterile sheet AND hand hygiene AND 2% chlorhexidine for cutaneous antisepsis) followed

New Language: Patients for whom CVC was inserted with all elements of maximal sterile barrier technique\*, hand hygiene, skin preparation and, if ultrasound is used, sterile ultrasound techniques\*\* followed

Definitions:

\*Maximal sterile barrier technique includes ALL of the following elements:

- cap
- mask
- sterile gown
- sterile gloves
- sterile full body drape

\*\* Sterile ultrasound techniques require sterile gel and sterile probe covers

Reason: The numerator statement was updated to reflect the work of the AMA-PCPI Anesthesiology and Critical Care workgroup's deliberations on streamlining language and including ultrasound techniques in the measure.

Application Number: S.6. Numerator Details

Previous Language: Report the following CPT Category II code:

6030F: All elements of maximal sterile barrier technique including: cap AND mask AND sterile gown AND sterile gloves AND a large sterile sheet AND hand hygiene AND 2% chlorhexidine for cutaneous asepsis, followed

New Language: Report the following CPT Category II code:

6030F: All elements of maximal sterile barrier technique followed including: cap and mask and sterile gown and sterile gloves and a large sterile sheet and hand hygiene and 2% chlorhexidine for cutaneous antisepsis (or acceptable alternative antiseptics, per current guideline)

Reason: The language has been updated to match current CPT® Category II Code 6030F.

Application Number: S.7. Denominator Statement

Previous Language: All patients who undergo CVC insertion

New Language: All patients, regardless of age, who undergo CVC insertion

Reason: To clearly define patient population.



Application Number: S.9. Denominator Details

Previous Language: CPT® codes for:

Central Venous Access Device Insertion Procedures – 36555, 36556, 36557, 36558, 36560, 36561, 36563, 36565, 36566, 36568, 36569, 36570, 36571

Central Venous Access Device Replacement Procedures – 36578, 36580, 36581, 36582, 36583, 36584, 36585

New Language: CPT® codes for:

Central Venous Access Device Insertion Procedures – 36555, 36556, 36557, 36558, 36560, 36561, 36563, 36565, 36566, 36568, 36569, 36570, 36571

Central Venous Access Device Replacement Procedures – 36578, 36580, 36581, 36582, 36583, 36584, 36585

Cardiac Catheterization Procedure: 93503

Reason: The denominator details were updated to reflect the work of the AMA-PCPI Anesthesiology and Critical Care workgroup's deliberations for including 93503. Inclusion of 93503 also aligns with the CMS Physician Quality Reporting System specifications on its related measure. Using the Medicare Limited Data Set, the ASA recognized that 93503 accounts for a significant number of procedures under the PQRS #76 measure.

S.10. – Denominator Exclusions

Previous Language: Documentation of medical reason(s) for not following all elements of maximal sterile barrier technique during CVC insertion (including CVC insertion performed on emergency basis)

New Language: Denominator Exceptions: Documentation of medical reason(s) for not following all elements of maximal sterile barrier technique, hand hygiene, skin preparation and, if ultrasound is used, sterile ultrasound techniques during CVC insertion (including increased risk of harm to patient if adherence to aseptic technique would cause delay in CVC insertion)

Reason: The measure specifies exceptions and not exclusions.

**S.4. Numerator Statement** (Brief, narrative description of the measure focus or what is being measured about the target population, i.e., cases from the target population with the target process, condition, event, or outcome)

IF an OUTCOME MEASURE, state the outcome being measured. Calculation of the risk-adjusted outcome should be described in the calculation algorithm.

Patients for whom CVC was inserted with all elements of maximal sterile barrier technique\*, hand hygiene, skin preparation and, if ultrasound is used, sterile ultrasound techniques\*\* followed

Definitions:

\*Maximal sterile barrier technique includes ALL of the following elements:

- cap
- mask
- sterile gown
- sterile gloves
- sterile full body drape

\*\* Sterile ultrasound techniques require sterile gel and sterile probe covers

NOTE: For purposes of this measure, maximal sterile barrier technique during CVC insertion is defined to include use of: cap AND mask AND sterile gown AND sterile gloves AND a large sterile sheet AND hand hygiene AND 2% chlorhexidine for cutaneous antisepsis.

**S.5. Time Period for Data** (What is the time period in which data will be aggregated for the measure, e.g., 12 mo, 3 years, look back to August for flu vaccination? Note if there are different time periods for the numerator and denominator.)

The time period for data includes at least five years (2008-2012) of Medicare Limited Data Set. We have also used three years of data from the National Anesthesia Clinical Outcomes Registry (NACOR; 2010-2012). There is no difference in time periods for the numerator or denominator.

**S.6. Numerator Details** (All information required to identify and calculate the cases from the target population with the target process, condition, event, or outcome such as definitions, specific data collection items/responses, code/value sets – Note: lists of individual codes with descriptors that exceed 1 page should be provided in an Excel or csv file in required format at S.2b)

IF an OUTCOME MEASURE, describe how the observed outcome is identified/counted. Calculation of the risk-adjusted outcome should be described in the calculation algorithm.

Report the following CPT Category II code:

6030F: All elements of maximal sterile barrier technique including: cap AND mask AND sterile gown AND sterile gloves AND a large sterile sheet AND hand hygiene AND 2% chlorhexidine for cutaneous asepsis (or acceptable alternative antiseptics, per current guideline)

**S.7. Denominator Statement** (Brief, narrative description of the target population being measured)

All patients, regardless of age, who undergo CVC insertion

**S.8. Target Population Category** (Check all the populations for which the measure is specified and tested if any):

Children's Health, Maternal Health, Populations at Risk, Populations at Risk : Individuals with multiple chronic conditions, Populations at Risk : Veterans, Senior Care

**S.9. Denominator Details** (All information required to identify and calculate the target population/denominator such as definitions, specific data collection items/responses, code/value sets – Note: lists of individual codes with descriptors that exceed 1 page should be provided in an Excel or csv file in required format at S.2b)

CPT® codes for:

Central Venous Access Device Insertion Procedures – 36555, 36556, 36557, 36558, 36560, 36561, 36563, 36565, 36566, 36568, 36569, 36570, 36571

Central Venous Access Device Replacement Procedures – 36578, 36580, 36581, 36582, 36583, 36584, 36585

Cardiac Catheterization Procedure: 93503 (placement of a pulmonary artery catheter)

**S.10. Denominator Exclusions** (Brief narrative description of exclusions from the target population)

Denominator Exceptions: Documentation of medical reason(s) for not following all elements of maximal sterile barrier technique, hand hygiene, skin preparation and, if ultrasound is used, sterile ultrasound techniques during CVC insertion (including increased risk of harm to patient if adherence to aseptic technique would cause delay in CVC insertion)

**S.11. Denominator Exclusion Details** (All information required to identify and calculate exclusions from the denominator such as definitions, specific data collection items/responses, code/value sets – Note: lists of individual codes with descriptors that exceed 1 page should be provided in an Excel or csv file in required format at S.2b)

For cases with a documented reason for exception: Append modifier to CPT Category II code: 6030F-1P

**S.12. Stratification Details/Variables** (All information required to stratify the measure results including the stratification variables, definitions, specific data collection items/responses, code/value sets – Note: lists of individual codes with descriptors that exceed 1 page should be provided in an Excel or csv file in required format with at S.2b)

This question does not apply to this measure. The measure is not risk adjusted.

**S.13. Risk Adjustment Type** (Select type. Provide specifications for risk stratification in S.12 and for statistical model in S.14-15)

No risk adjustment or risk stratification

If other:

**S.14. Identify the statistical risk model method and variables** (Name the statistical method - e.g., logistic regression and list all the risk factor variables. Note - risk model development and testing should be addressed with measure testing under Scientific Acceptability)

This question does not apply to this measure. The measure is not risk adjusted.

**S.15. Detailed risk model specifications** (must be in attached data dictionary/code list Excel or csv file. Also indicate if available at measure-specific URL identified in S.1.)

Note: Risk model details (including coefficients, equations, codes with descriptors, definitions), should be provided on a separate worksheet in the suggested format in the Excel or csv file with data dictionary/code lists at S.2b.

**S.15a. Detailed risk model specifications** (if not provided in excel or csv file at S.2b)

**S.16. Type of score:**



Ratio

If other:

**S.17. Interpretation of Score** (Classifies interpretation of score according to whether better quality is associated with a higher score, a lower score, a score falling within a defined interval, or a passing score)

Better quality = Higher score

**S.18. Calculation Algorithm/Measure Logic** (Describe the calculation of the measure score as an ordered sequence of steps including identifying the target population; exclusions; cases meeting the target process, condition, event, or outcome; aggregating data; risk adjustment; etc.)

This question does not apply to this measure. The measure is not risk adjusted.

**S.19. Calculation Algorithm/Measure Logic Diagram URL or Attachment** (You also may provide a diagram of the Calculation Algorithm/Measure Logic described above at measure-specific Web page URL identified in S.1 OR in attached appendix at A.1)

No diagram provided

**S.20. Sampling** (If measure is based on a sample, provide instructions for obtaining the sample and guidance on minimum sample size.)

IF a PRO-PM, identify whether (and how) proxy responses are allowed.

The measure is not based on a sample or survey.

**S.21. Survey/Patient-reported data** (If measure is based on a survey, provide instructions for conducting the survey and guidance on minimum response rate.)

IF a PRO-PM, specify calculation of response rates to be reported with performance measure results.

The measure is not based on a sample or survey.

**S.22. Missing data** (specify how missing data are handled, e.g., imputation, delete case.)

Required for Composites and PRO-PMs.

The measure is not a composite, PRO-PM, or eMeasure.

**S.23. Data Source** (Check ONLY the sources for which the measure is SPECIFIED AND TESTED).

If other, please describe in S.24.

Administrative claims, Electronic Clinical Data, Electronic Clinical Data : Registry

**S.24. Data Source or Collection Instrument** (Identify the specific data source/data collection instrument e.g. name of database, clinical registry, collection instrument, etc.)

IF a PRO-PM, identify the specific PROM(s); and standard methods, modes, and languages of administration.

Data is gathered by the Anesthesia Quality Institute and the National Anesthesia Clinical Outcomes Registry. Data source for reporting also includes the Medicare Limited Data Set.

**S.25. Data Source or Collection Instrument** (available at measure-specific Web page URL identified in S.1 OR in attached appendix at A.1)

No data collection instrument provided

**S.26. Level of Analysis** (Check ONLY the levels of analysis for which the measure is SPECIFIED AND TESTED)

Clinician : Group/Practice, Clinician : Individual, Clinician : Team, Facility

**S.27. Care Setting** (Check ONLY the settings for which the measure is SPECIFIED AND TESTED)

Hospital/Acute Care Facility

If other:

**S.28. COMPOSITE Performance Measure** - Additional Specifications (Use this section as needed for aggregation and weighting rules, or calculation of individual performance measures if not individually endorsed.)

The question does not apply to this measure. The measure is not a Composite Performance Measure.

**2a. Reliability – See attached Measure Testing Submission Form**  
**2b. Validity – See attached Measure Testing Submission Form**  
[2014-01-06\\_NQF\\_MeasSubm\\_MeasTesting\\_0464\\_FINAL-635246243464123104.docx](#)

### 3. Feasibility

Extent to which the specifications including measure logic, require data that are readily available or could be captured without undue burden and can be implemented for performance measurement.

#### 3a. Byproduct of Care Processes

For clinical measures, the required data elements are routinely generated and used during care delivery (e.g., blood pressure, lab test, diagnosis, medication order).

##### 3a.1. Data Elements Generated as Byproduct of Care Processes.

[Abstracted from a record by someone other than person obtaining original information \(e.g., chart abstraction for quality measure or registry\)](#)

If other:

#### 3b. Electronic Sources

The required data elements are available in electronic health records or other electronic sources. If the required data are not in electronic health records or existing electronic sources, a credible, near-term path to electronic collection is specified.

**3b.1. To what extent are the specified data elements available electronically in defined fields?** (*i.e., data elements that are needed to compute the performance measure score are in defined, computer-readable fields*)

[Some data elements are in defined fields in electronic sources](#)

**3b.2. If ALL the data elements needed to compute the performance measure score are not from electronic sources, specify a credible, near-term path to electronic capture, OR provide a rationale for using other than electronic sources.**

[Electronic documentation of compliance with Maximum Barrier Precautions when placing central lines is not universally available in EHRs. In future, work will be needed with vendors to enable providers to document compliance in a structured way within the EHR.](#)

**3b.3. If this is an eMeasure, provide a summary of the feasibility assessment in an attached file or make available at a measure-specific URL.**

Attachment:

#### 3c. Data Collection Strategy

Demonstration that the data collection strategy (e.g., source, timing, frequency, sampling, patient confidentiality, costs associated with fees/licensing of proprietary measures) can be implemented (e.g., already in operational use, or testing demonstrates that it is ready to put into operational use). For eMeasures, a feasibility assessment addresses the data elements and measure logic and demonstrates the eMeasure can be implemented or feasibility concerns can be adequately addressed.

**3c.1. Describe what you have learned/modified as a result of testing and/or operational use of the measure regarding data collection, availability of data, missing data, timing and frequency of data collection, sampling, patient confidentiality, time and cost of data collection, other feasibility/implementation issues.**

**IF a PRO-PM, consider implications for both individuals providing PROM data (patients, service recipients, respondents) and those whose performance is being measured.**

[Advancing science and local implementation of this measure in selected practices have indicated the need to include sterile use of ultrasound as part of maximum barrier precautions for CVC placement. This change has occurred in both external guideline statements and in this measure renewal.](#)

[Operational use of this measure over the past 3 years has revealed that many anesthesiologists \(approximately 50%\) are not reporting this measure when they place CVCs. From the data to date it cannot be determined if:](#)

- > [Providers are not compliant with recommendations](#)
- > [Providers are compliant but not documenting this fact](#)
- > [Documentation of compliance is not reaching a digital record \(either primarily or by transcription\)](#)

> Digital documentation exists but is not submitted to CMS or NACOR.

The digital documentation that does reach CMS and NACOR indicates success with this measure in 98-99% of cases, but this might reflect a bias towards reporting only when compliance and documentation are present. The greatest gap at present appears to be provider adoption of this measure.

For at least some providers, practices and facilities it is clearly possible to report this measure successfully. The scientific literature would suggest that in these locations the rate of CRBSI would be lower, but this cannot yet be confirmed.

Reporting this measure does not appear to threaten patient confidentiality or to impose an undue reporting burden. The need for local abstractors to review paper records to digitally record this information for upload will be reduced with increased penetration into routine practice of Anesthesia Information Management Systems that include a structured field for documenting compliance with sterile precautions when placing a CVC.

**3c.2. Describe any fees, licensing, or other requirements to use any aspect of the measure as specified** (e.g., value/code set, risk model, programming code, algorithm).

There are no fees, licensing, or other requirements to use any aspect of the measure as specified.

## 4. Usability and Use

Extent to which potential audiences (e.g., consumers, purchasers, providers, policy makers) are using or could use performance results for both accountability and performance improvement to achieve the goal of high-quality, efficient healthcare for individuals or populations.

### 4a. Accountability and Transparency

Performance results are used in at least one accountability application within three years after initial endorsement and are publicly reported within six years after initial endorsement (or the data on performance results are available). If not in use at the time of initial endorsement, then a credible plan for implementation within the specified timeframes is provided.

#### 4.1. Current and Planned Use

NQF-endorsed measures are expected to be used in at least one accountability application within 3 years and publicly reported within 6 years of initial endorsement in addition to performance improvement.

| Planned  | Current Use (for current use provide URL)  |
|--|--|
| Public Health/Disease Surveillance   | Public Reporting<br>Physician Quality Reporting System<br><a href="http://www.cms.gov/pqrs">www.cms.gov/pqrs</a> |
| Quality Improvement with Benchmarking<br>(external benchmarking to multiple organizations) | Payment Program<br>Physician Quality Reporting System<br><a href="http://www.cms.gov/pqrs">www.cms.gov/pqrs</a>  |
| Quality Improvement (Internal to the specific organization)                                | Regulatory and Accreditation Programs<br>Ongoing Professional Practice Evaluation<br>The Joint Commission        |

#### 4a.1. For each CURRENT use, checked above, provide:

- Name of program and sponsor
- Purpose
- Geographic area and number and percentage of accountable entities and patients included

Centers for Medicare & Medicaid Services, Physician Quality Reporting System

The Joint Commission and other accrediting bodies require that hospitals perform ongoing professional practice evaluations (OPPE)

of individual providers at the time of credentialing or renewal (at least every two years). Anesthesia practices and hospitals use compliance with this measure as a metric for OPPE.

**4a.2. If not currently publicly reported OR used in at least one other accountability application (e.g., payment program, certification, licensing) what are the reasons?** (e.g., Do policies or actions of the developer/steward or accountable entities restrict access to performance results or impede implementation?)

The question does not apply this measure. The measure is publicly reported.

**4a.3. If not currently publicly reported OR used in at least one other accountability application, provide a credible plan for implementation within the expected timeframes -- any accountability application within 3 years and publicly reported within 6 years of initial endorsement.** (Credible plan includes the specific program, purpose, intended audience, and timeline for implementing the measure within the specified timeframes. A plan for accountability applications addresses mechanisms for data aggregation and reporting.)

The question does not apply this measure. The measure is publicly reported.

#### 4b. Improvement

Progress toward achieving the goal of high-quality, efficient healthcare for individuals or populations is demonstrated. If not in use for performance improvement at the time of initial endorsement, then a credible rationale describes how the performance results could be used to further the goal of high-quality, efficient healthcare for individuals or populations.

**4b.1. Progress on Improvement. (Not required for initial endorsement unless available.)**

Performance results on this measure (current and over time) should be provided in 1b.2 and 1b.4. Discuss:

- Progress (trends in performance results, number and percentage of people receiving high-quality healthcare)
- Geographic area and number and percentage of accountable entities and patients included

The data presented in the Measure Testing form, from both NACOR and the CMS 5% data, represent large national samples of performance related to CVC insertion. Although not complete samples, both data sets include patients, facilities and practices in all parts of the country and in all healthcare settings. Both are large enough to provide a representative look at a common procedure such as CVC insertion. The data do not demonstrate improvement in this measure over the short window of time for which data are available, but they do demonstrate a substantial gap in the documentation and reporting of compliance with this measure.

Using the Medicare Limited Data Set Carrier SAF – 5% File and analyzing data from five years (2008-2012), the data demonstrates that the Percentage of CVC Insertions with Reported Use of CRBSI Protocol increase from 8.1% in 2008 to 38.0% in 2010 to 48.4% in 2012. Please refer to the table displayed in 2b3.2 in the Measure Testing form.

**4b.2. If no improvement was demonstrated, what are the reasons? If not in use for performance improvement at the time of initial endorsement, provide a credible rationale that describes how the performance results could be used to further the goal of high-quality, efficient healthcare for individuals or populations.**

While evidence of improvement at the national level is not yet available for this measure, at the local level there are a number of anesthesia and critical care practices which have already demonstrated that close adherence is associated with a substantial reduction in the rate of Catheter Related Blood Stream Infection (data summarized above).

This is a measure with high face validity and low burden of reporting, which reflects performance on a common procedure for most anesthesia providers. Compliance can be easily documented in electronic records at the time of the procedure note for the CVC placement itself, allowing this measure to transition easily to passive collection as an e-measure. We believe that it will be well worth retaining this measure for anesthesia professionals, as a further incentive for the meaningful use of EHRs.

#### 4c. Unintended Consequences

The benefits of the performance measure in facilitating progress toward achieving high-quality, efficient healthcare for individuals or populations outweigh evidence of unintended negative consequences to individuals or populations (if such evidence exists).

**4c.1. Were any unintended negative consequences to individuals or populations identified during testing; OR has evidence of unintended negative consequences to individuals or populations been reported since implementation? If so, identify the negative unintended consequences and describe how benefits outweigh them or actions taken to mitigate them.**

Documentation of compliance with maximum barrier precautions when placing a CVC has not led to any unintended consequences.

Compliance with the recommended standards has a strong association with improved patient outcomes, and this fact is generally well-recognized in anesthesia practice. The increased time required to comply, and the increased use of resources such as drapes, gloves, and prep solution, are trivial compared to the benefits of preventing even a single CVC-associated infection. The time required to complete the documentation itself is trivial, is supported by existing anesthesia records (both paper and electronic) and will become more so as Anesthesia Information Management Systems continue to advance.

## 5. Comparison to Related or Competing Measures

If a measure meets the above criteria and there are endorsed or new related measures (either the same measure focus or the same target population) or competing measures (both the same measure focus and the same target population), the measures are compared to address harmonization and/or selection of the best measure.

### 5. Relation to Other NQF-endorsed Measures

Are there related measures (conceptually, either same measure focus or target population) or competing measures (conceptually both the same measure focus and same target population)? If yes, list the NQF # and title of all related and/or competing measures.

No

**5.1a. List of related or competing measures (selected from NQF-endorsed measures)**

**5.1b. If related or competing measures are not NQF endorsed please indicate measure title and steward.**

### 5a. Harmonization

The measure specifications are harmonized with related measures;

**OR**

The differences in specifications are justified

**5a.1. If this measure conceptually addresses EITHER the same measure focus OR the same target population as NQF-endorsed measure(s):**

**Are the measure specifications completely harmonized?**

No

**5a.2. If the measure specifications are not completely harmonized, identify the differences, rationale, and impact on interpretability and data collection burden.**

*This question does not apply to the measure.*

### 5b. Competing Measures

The measure is superior to competing measures (e.g., is a more valid or efficient way to measure);

**OR**

Multiple measures are justified.

**5b.1. If this measure conceptually addresses both the same measure focus and the same target population as NQF-endorsed measure(s):**

**Describe why this measure is superior to competing measures (e.g., a more valid or efficient way to measure quality); OR provide a rationale for the additive value of endorsing an additional measure. (Provide analyses when possible.)**

*There are no competing measures.*

## Appendix

**A.1 Supplemental materials may be provided in an appendix.** All supplemental materials (such as data collection instrument or methodology reports) should be organized in one file with a table of contents or bookmarks. If material pertains to a specific submission form number, that should be indicated. Requested information should be provided in the submission form and required attachments. There is no guarantee that supplemental materials will be reviewed.

|   |
|---|
| <b>No appendix Attachment:</b>  |
| <b>Contact Information</b>  |
| <p><b>Co.1 Measure Steward (Intellectual Property Owner):</b> American Society of Anesthesiologists</p> <p><b>Co.2 Point of Contact:</b> Maureen A., Amos, M.S., m.amos@asahq.org, 202-289-2222-</p> <p><b>Co.3 Measure Developer if different from Measure Steward:</b> American Society of Anesthesiologists</p> <p><b>Co.4 Point of Contact:</b> Maureen A., Amos, M.S., m.amos@asahq.org, 202-289-2222-</p>   |
| <b>Additional Information</b>   |
| <p><b>Ad.1 Workgroup/Expert Panel involved in measure development</b><br/> <b>Provide a list of sponsoring organizations and workgroup/panel members' names and organizations. Describe the members' role in measure development.</b></p> <p>The Measure Expert Panel, listed below, reviewed NQF #0464 measure specifications and were asked to rate their agreement with the following statement: "The scores obtained from the measure as specified will provide an accurate reflection of quality and can be used to distinguish good and poor quality." The results were displayed in 2b2.3.</p> <p>Beverly K. Philip, MD<br/> Anesthesiologist, Brigham and Women's Hospital<br/> Professor of Anaesthesia, Harvard Medical School<br/> Boston, MA</p> <p>Caleb R. Schultz, MD, MPH<br/> Staff Physician<br/> Veterans Health Administration Medical Center<br/> Minneapolis, MN</p> <p>Johnathan L Pregler, MD<br/> Clinical Professor, Department of Anesthesiology<br/> Director, UCLA Surgery Center<br/> David Geffen School of Medicine at UCLA<br/> Los Angeles, CA</p> <p>Joseph W. Szokol, MD, JD, MBA<br/> Vice Chairman, Department of Anesthesiology<br/> NorthShore University Health System<br/> Evanston, IL</p> <p>Jesse M. Ehrenfeld, MD, MPH<br/> Medical Director, Perioperative Quality<br/> Vanderbilt University<br/> Nashville, TN</p> <p>David P. Martin, MD, PhD<br/> Associate Professor of Anesthesiology<br/> Mayo Clinic<br/> Rochester, MN</p> <p>Peggy G. Duke, MD<br/> Cardiothoracic Anesthesiologist<br/> Director of Quality, Department Anesthesiology<br/> Emory Healthcare, Emory University Hospital<br/> Atlanta, GA</p> <p>Stanley W. Stead, MD, MBA</p> |



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**Measure Developer/Steward Updates and Ongoing Maintenance**

**Ad.2 Year the measure was first released:** 2008

**Ad.3 Month and Year of most recent revision:** 12, 2013

**Ad.4 What is your frequency for review/update of this measure?** Every Year

**Ad.5 When is the next scheduled review/update for this measure?** 12, 2014

**Ad.6 Copyright statement:** [NA](#)

**Ad.7 Disclaimers:** [NA](#)

**Ad.8 Additional Information/Comments:** [NA](#)