



## 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 sub criterion 1b).

### Brief Measure Information

**NQF #:** 3687e

**Corresponding Measures:**

**Measure Title:** ePC-07 Severe Obstetric Complications

**Measure Steward:** The Joint Commission

**sp.02. Brief Description of Measure:**

Hospital-level measure scores are calculated as a risk-adjusted proportion of the number of delivery hospitalizations for women who experience a severe obstetric complication, as defined by the numerator, by the total number of delivery hospitalizations in the denominator during the measurement period. The hospital-level measure score will be reported as a rate per 10,000 delivery hospitalizations.

ePC07 was developed in collaboration with Yale New Haven Health Services Corporation/Center for Outcomes Research and Evaluation (CORE).

**1b.01. Developer Rationale:**

The United States experiences higher rates of maternal morbidity and mortality than most other developed countries. These rates have continued to trend upward in recent decades.<sup>1</sup> Research indicates that the overall rate of severe maternal morbidity (SMM) has increased by almost 200% between 1993 and 2014 to 144 per 10,000 delivery hospitalizations<sup>1</sup>, with more than 25,000 women per year experiencing obstetric complications.<sup>2</sup> Recent maternal mortality data from 2018 reveal that 658 women died from maternal causes, resulting in a rate of 17.4 deaths per 100,000 live births, with 77% of the deaths attributed to direct obstetric causes like hemorrhage, preeclampsia, obstetric embolism, and other complications.<sup>3</sup> This has prompted national health experts and organizations to prioritize quality improvement strategies to mitigate risk of adverse outcomes among maternal populations. The U.S. Department of Health & Human Services (HHS) has also called for action to improve maternal health and outcomes and outlines seven actions for healthcare professionals, including participating in quality improvement and safety initiatives.<sup>4</sup> There are currently only a small number of quality measures focused on maternal health, and those implemented at the national level are mostly process measures and limited in scope. While these existing measures aim to promote coordination of care and standardize health care processes, maternal health outcome measures are sorely needed. Measures that are focused on maternal health outcomes will address the patient safety priority area under the Meaningful Measures 2.0 framework, and likewise will use EHR data to address interoperability, another meaningful measure area for assessing quality of health care.<sup>5</sup>

1. Centers for Disease Control and Prevention. Severe Maternal Morbidity in the United States. January 31, 2020; <https://www.cdc.gov/reproductivehealth/maternalinfanthealth/severematernalmorbidity.html>.

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**sp.12. Numerator Statement:**

Inpatient hospitalizations for patients with severe obstetric complications including the following:

- Severe maternal morbidity diagnoses (see list below)
- Severe maternal morbidity procedures (see list below)
- Discharge disposition = expired

Severe Maternal Morbidity Diagnoses:

- Cardiac
  - Acute heart failure
  - Acute myocardial infarction
  - Aortic aneurysm
  - Cardiac arrest/ventricular fibrillation
  - Heart failure/arrest during procedure or surgery
- Hemorrhage
  - Disseminated intravascular coagulation
  - Shock
- Renal
  - Acute renal failure
- Respiratory
  - Adult respiratory distress syndrome
  - Pulmonary edema
- Sepsis
- Other OB
  - Air and thrombotic embolism
  - Amniotic fluid embolism
  - Eclampsia
  - Severe anesthesia complications
- Other Medical
  - Puerperal cerebrovascular disorder
  - Sickle cell disease with crisis

Severe Maternal Morbidity Procedures:

- Blood transfusion
- Conversion of cardiac rhythm
- Hysterectomy
- Temporary tracheostomy
- Ventilation

**sp.14. Denominator Statement:**

Initial Patient Population: Inpatient hospitalizations for patients age  $\geq 8$  years and  $< 65$  admitted to the hospital for inpatient acute care who undergo a delivery procedure with a discharge date that ends during the measurement period

Denominator: Inpatient hospitalizations for patients delivering stillborn or live birth with  $\geq 20$  weeks, 0 days gestation completed

**sp.16. Denominator Exclusions:**

Patients with confirmed diagnosis of COVID with COVID-related respiratory condition or patients with confirmed diagnosis of COVID with COVID-related respiratory procedure.

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**Measure Type:** Outcome

**sp.28. Data Source:**

Electronic Health Data

Electronic Health Records

**sp.07. Level of Analysis:**

Facility

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**IF Endorsement Maintenance – Original Endorsement Date:**

**Most Recent Endorsement Date:**

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

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

**sp.03. IF PAIRED/GROUPED, what is the reason this measure must be reported with other measures to appropriately interpret results?:**

## 1. 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 sub criteria to pass this criterion and be evaluated against the remaining criteria

Please separate added or updated information from the most recent measure evaluation within each question response in the Importance to Measure and Report: Evidence section. For example:

**Current Submission:**

Updated evidence information here.

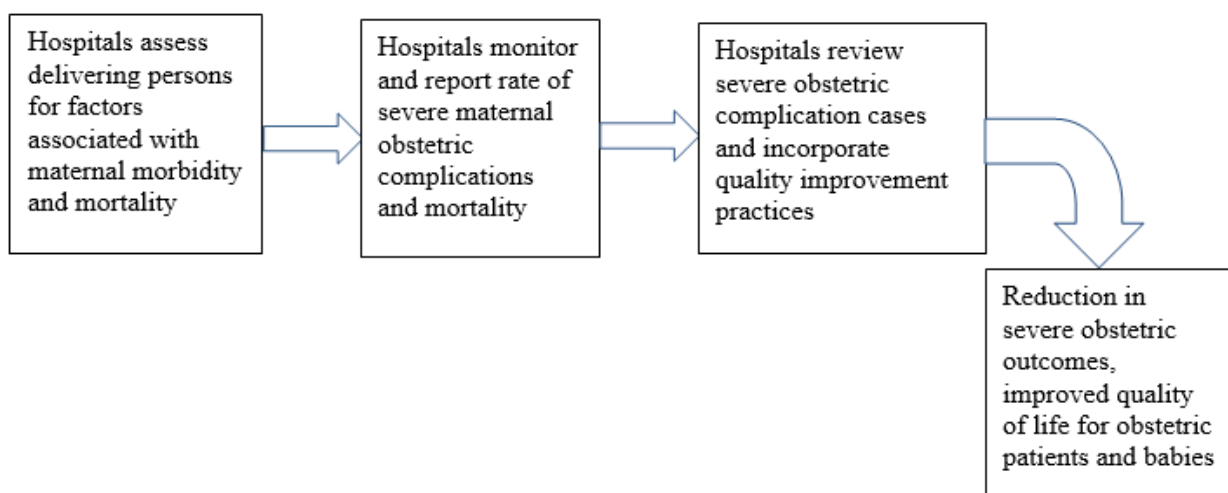
**Previous (Year) Submission:**

Evidence from the previous submission here.

**1a.01. Provide a logic model.**

Briefly describe the steps between the healthcare structures and processes (e.g., interventions, or services) and the patient's health outcome(s). The relationships in the diagram should be easily understood by general, non-technical audiences. Indicate the structure, process or outcome being measured.

**[Response Begins]**



The goal for this measure is to assess the occurrence of specific severe obstetric complications in the hospital setting by using a methodology that reliably allows comparison across hospitals. Reduction in maternal complications will reduce maternal death and disability and improve maternal quality of life. The Severe Obstetric Complication electronic clinical quality measure (eCQM) is expected to inform hospital efforts to improve maternal health outcomes and thus reduce the costs associated with adverse health outcomes. The measure specifications are harmonized with other perinatal measures (for cohort alignment) and with the Center for Disease Control and Prevention's (CDC's) 21 indicators of severe maternal morbidity (SMM) (for harmonization of the measure outcome) for broad applicability across hospitals.

<sup>1</sup>Geller SE, Rosenberg D, Cox SM, et al. The continuum of maternal morbidity and mortality: factors associated with severity. *American journal of obstetrics and gynecology*. 2004;191(3):939-944.

**[Response Ends]**

**1a.02. Provide evidence that the target population values the measured outcome, process, or structure and finds it meaningful.**

*Describe how and from whom input was obtained.*

**[Response Begins]**

To gain targeted input from the patient and caregiver perspective, a Patient Working Group was recruited through collaboration with Rainmakers Strategic Solutions LLC. The Patient Working Group was composed of seven members, including patients and caregivers with diverse experiences and perspectives. The first Patient Working Group meeting was held in August 2020 via web-based webinar during which Patient Working Group members provided input on initial measure specifications for the measure cohort, outcome and risk adjustment. The second meeting was held in July 2021 via web-based webinar, at which Patient Working Group members provided input on measure specification updates, as well as feasibility testing and reliability results and initial validity testing results. At the third meeting, a web-based webinar held in November 2021, Patient Working Group members provided input on the risk adjustment model, measure scores, and further testing results.

The Working Group members provided personal and insightful perspectives on key measure aspects of measure development and decisions. The members strongly believe this eQCM is an important health outcome to measure because there is room for improvement and strongly/moderately agree that this measure is a critical component of defining and comparing the quality of obstetric care between hospitals. See Section 2b.03 for further details on face validity.

**[Response Ends]**

**1a.03. Provide empirical data demonstrating the relationship between the outcome (or PRO) and at least one healthcare structure, process, intervention, or service.**

**[Response Begins]**

The high maternal mortality and morbidity rates in the United States present unique opportunities for large-scale quality measurement and improvement activities. Statistics on preventability vary but suggest that a considerable proportion of maternal mortality and morbidity events could be prevented. A 2019 report from 14 maternal mortality review committees conducting a thorough review of pregnancy-related deaths determined that 65.8% of deaths were preventable (Data from 14 U.S. Maternal Mortality Review Committees, 2008-2017).<sup>1</sup> Additionally, a study that examined preventability of pregnancy-related death, women with near-miss morbidity, and those with severe morbidity found that 40.5% of deaths, 45.5% of near miss morbidity, and 16.7% of other severe morbidities were preventable.<sup>2</sup> Geller et. al. identified areas of focus for preventability of morbidity and mortality included assessment/point of entry to care, diagnosis and recognition of high risk, referral to experts, treatment, management hierarchy, education, communication, policies and procedures, documentation, and discharge.

<sup>1</sup>Davis NL, Smoots AN, Goodman DA. Pregnancy-Related Deaths: Data from 14 US Maternal Mortality Review Committees. *Education*. 2019;40(36):8.2.

<sup>2</sup>Geller SE, Rosenberg D, Cox SM, et al. The continuum of maternal morbidity and mortality: factors associated with severity. *American journal of obstetrics and gynecology*. 2004;191(3):939-944.

**[Response Ends]**

**1b.01. Briefly explain the rationale for this measure.**

*Explain how the measure will improve the quality of care, and list the benefits or improvements in quality envisioned by use of this measure.*

**[Response Begins]**

The United States experiences higher rates of maternal morbidity and mortality than most other developed countries. These rates have continued to trend upward in recent decades.<sup>1</sup> Research indicates that the overall rate of severe maternal morbidity (SMM) has increased by almost 200% between 1993 and 2014 to 144 per 10,000 delivery hospitalizations<sup>1</sup>, with more than 25,000 women per year experiencing obstetric complications.<sup>2</sup> Recent maternal mortality data from 2018 reveal that 658 women died from maternal causes, resulting in a rate of 17.4 deaths per 100,000 live births, with 77% of the deaths attributed to direct obstetric causes like hemorrhage, preeclampsia, obstetric embolism, and other complications.<sup>3</sup> This has prompted national health experts and organizations to prioritize quality improvement strategies to mitigate risk of adverse outcomes among maternal populations. The U.S. Department of Health & Human Services (HHS) has also called for action to improve maternal health and outcomes and outlines seven actions for healthcare professionals, including participating in quality improvement and safety initiatives.<sup>4</sup> There are currently only a small number of quality measures focused on maternal health, and those implemented at the national level are mostly process measures and limited in scope. While these existing measures aim to promote coordination of care and standardize health care processes, maternal health outcome measures are sorely needed. Measures that are focused on maternal health outcomes will address the patient safety priority area under the Meaningful Measures 2.0 framework, and likewise will use EHR data to address interoperability, another meaningful measure area for assessing quality of health care.<sup>5</sup>

1. Centers for Disease Control and Prevention. Severe Maternal Morbidity in the United States. January 31, 2020; <https://www.cdc.gov/reproductivehealth/maternalinfanthealth/severematernalmorbidity.html>.

**[Response Ends]**

**1b.02. Provide performance scores on the measure as specified (current and over time) at the specified level of analysis.**

*Include mean, std dev, min, max, interquartile range, and 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 include. This information also will be used to address the sub-criterion on improvement (4b) under Usability and Use.*

**[Response Begins]**

There are a limited number of pilot hospitals, therefore the five number statistical summaries are used in place of the scores by deciles. Data for 25 hospitals are summarized in Table 1b.02 at the hospital level for 2020 discharges using a rate per 10,000 deliveries. Maternal morbidity data in literature is reported as rates per 10,000 and maternal mortality rates are reported per 100,000. The Severe Obstetric Complications rate includes both maternal morbidity and mortality and is reported as a rate per 10,000. The median number of encounters was 799 per hospital site.

**Table 1b.02.01 Risk- adjusted Hospital Level Rates**

Statistic	Value
Mean	248.8, SD 55.5
Min	157.1
25 <sup>th</sup> Percentile	215.6
50 <sup>th</sup> Percentile	238.2
75 <sup>th</sup> Percentile	287.3

Statistic	Value
Max	369.5

*Risk-adjusted rates per 10,000 on this measure*

Table 1b.02.01 displays the statistical measurements of the risk-adjusted hospital level rates. See above paragraph for specific details.

For reference, each health system will be referred to as a 'pilot site' and 'hospital' will refer to the individual hospitals within the health system. A total of 10 pilot sites, consisting of 28 hospitals were included in some phase of pilot testing.

**Table 1b.02.02 Pilot Site Characteristics**

Pilot Site ID	# of Hospitals	State	Ownership Type*	Geography* (Urban, Suburban, Rural)	# Beds*	# of Births*	Teaching Program in OB/GYN*
Pilot Site 1	10	NC, VA	Nongovt. (not-for-profit) - Other	Urban	1807 (range 36 - 740)	16334 + (range 473 - 5568)	No
Pilot Site 2	1	RI	Nongovt. (not-for-profit) - Other	Urban	247	8823	No
Pilot Site 3	1	LA	Nongovt. (not-for-profit) - Other	Urban	228	8295	No
Pilot Site 4 <sup>a</sup>	2	CA	Nongovt. (not-for-profit) - Church Operated	Urban	446	2921	No
Pilot Site 5	9	OH, MI	Nongovt. (not-for-profit) - Other, Govt. (non federal) - County	6 Urban 3 Rural	1653 (range 35 - 595)	9283 + (range 165 - 3596)	No
Pilot Site 6	1	NJ	Nongovt. (not-for-profit) - Other	Urban	446	3319	No
Pilot Site 7	1	CA	Nongovt. (not-for-profit) - Other	Urban	541	4660	Yes
Pilot Site 8 <sup>b</sup>	1	IL	Nongovt. (not-for-profit) - Other	Urban	650	2442	Yes
Pilot Site 9	1	MD	Nongovt. (not-for-profit) - Other	Urban	401	3854	No

Pilot Site ID	# of Hospitals	State	Ownership Type*	Geography* (Urban, Suburban, Rural)	# Beds*	# of Births*	Teaching Program in OB/GYN*
Pilot Site 10 <sup>c</sup>	1	PA	Nongovt. (not-for-profit) - Other	Urban	321	8796	Yes

\* Source: American Hospital Association (AHA) DataQuery™ product, at the URL <https://guide.prod.iam.aha.org/dataquery/reports>, accessed March 16, 2021

- a. Pilot Site 4 declined continued participation after Feasibility Testing
- b. Data from Pilot Site 8 was collected but not available in time for Risk Model Development
- c. Pilot Site 10 joined after Feasibility Testing

Table 1b.02.02 displays the characteristics of the entities measured. The information was retrieved from the American Hospital Association (AHA) DataQuery™ product. For each pilot site, the table provides the number of hospitals, the state, ownership type, whether the site is located in an urban, suburban or rural setting, the number of beds, births and if the hospital has a teaching program in obstetrics and gynecology.

#### [Response Ends]

**1b.03. If no or limited performance data on the measure as specified is reported above, 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. Include citations.**

#### [Response Begins]

The United States experiences higher rates of maternal morbidity and mortality than most other developed countries. These rates have continued to trend upward in recent decades.<sup>1</sup> Research indicates that the overall rate of severe maternal morbidity (SMM) has increased by almost 200% between 1993 and 2014 to 144 per 10,000 delivery hospitalizations<sup>1</sup>, with more than 25,000 women per year experiencing obstetric complications.<sup>2</sup> Recent maternal mortality data from 2018 reveal that 658 women died from maternal causes, resulting in a rate of 17.4 deaths per 100,000 live births, with 77% of the deaths attributed to direct obstetric causes like hemorrhage, preeclampsia, obstetric embolism, and other complications.<sup>3</sup> This has prompted national health experts and organizations to prioritize quality improvement strategies to mitigate risk of adverse outcomes among maternal populations. The U.S. Department of Health & Human Services (HHS) has also called for action to improve maternal health and outcomes and outlines seven actions for healthcare professionals, including participating in quality improvement and safety initiatives.<sup>4</sup> There are currently only a small number of quality measures focused on maternal health, and those implemented at the national level are mostly process measures and limited in scope. While these existing measures aim to promote coordination of care and standardize health care processes, maternal health outcome measures are sorely needed. Measures that are focused on maternal health outcomes will address the patient safety priority area under the Meaningful Measures 2.0 framework, and likewise will use EHR data to address interoperability, another meaningful measure area for assessing quality of health care.<sup>5</sup>

1. Centers for Disease Control and Prevention. Severe Maternal Morbidity in the United States. January 31, 2020; <https://www.cdc.gov/reproductivehealth/maternalinfanthealth/severematernalmorbidity.html>.

2. U.S. Department of Health & Human Services. HHS Outlines New Plans and a Partnership to Reduce U.S. Pregnancy-related Deaths. 2020; <https://www.hhs.gov/about/news/2020/12/03/hhs-outlines-new-plans-to-reduce-us-pregnancy-related-deaths.html>.

3. Hoyert DL, Miniño AM. Maternal mortality in the United States: changes in coding, publication, and data release, 2018. 2020.



4. U.S. Department of Health & Human Services. The Surgeon General's Call to Action to Improve Maternal Health. 2020.
5. Centers for Medicare & Medicaid Services. Meaningful Measures 2.0: Moving from Measure Reduction to Modernization. 2020; <https://www.cms.gov/meaningful-measures-20-moving-measure-reduction-modernization>, 2020.

**[Response Ends]**

**1b.04. 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.**

*Describe the data source including number of measured entities; number of patients; dates of data; if a sample, characteristics of the entities included. Include mean, std dev, min, max, interquartile range, and scores by decile. For measures that show high levels of performance, i.e., "topped out", disparities data may demonstrate an opportunity for improvement/gap in care for certain sub-populations. This information also will be used to address the sub-criterion on improvement (4b) under Usability and Use.*

**[Response Begins]**

Risk ratios are provided in Table 1b.04.01 for race/ethnicity and payor. Age is not provided because it is included in the risk model. When adjusting for risk factors, Non-Hispanic - African American women have an 18% increased risk of having any SMM compared to non-Hispanic-white women, while Hispanic women had a 41% increased risk and Non-Hispanic-Asian/Pacific Islander women had a 62% increased risk for any SMM. When excluding blood transfusion only cases, compared to Non-Hispanic-White women, there was a 6% increased risk for Non-Hispanic-African American, 36% increased risk for Hispanic, and a 43% increased risk for Non-Hispanic-Asian/Pacific Islander women. When compared to private insurance, Medicaid and Medicare payors also showed an increased risk when adjusting for risk factors for any SMM and SMM excluding blood transfusion only cases.

Risk factor variables included in the risk adjustment model are as follows:

- Demographics and patient characteristics: maternal age
- Preexisting conditions and pregnancy characteristics defined by ICD-10 codes
  - o Anemia
  - o Asthma
  - o Autoimmune disease
  - o Bariatric surgery
  - o Bleeding disorder
  - o Body Mass Index (BMI)
  - o Cardiac disease
  - o Gastrointestinal disease
  - o Gestational diabetes
  - o Human Immunodeficiency Virus (HIV)
  - o Hypertension
  - o Mental health disorder
  - o Multiple pregnancy
  - o Neuromuscular disease
  - o Obstetric venous thromboembolism (VTE)

- o Other pre-eclampsia
- o Placental accreta spectrum
- o Placental abruption
- o Placenta previa
- o Preexisting diabetes
- o Preterm birth
- o Previous cesarean
- o Pulmonary hypertension
- o Renal disease
- o Severe pre-eclampsia
- o Substance abuse
- o Thyrotoxicosis
- Laboratory tests and vital signs upon hospital arrival (Hematocrit, White blood cell [WBC] count, Heart rate, Systolic blood pressure)
- Long-term anticoagulant medication use
- Social Risk Factors: economic/housing instability

Table 1b.04.01 represents data from 25 hospitals using 2020 discharges.

**Table 1b.04.01 Race/Ethnicity and Payer Risk Adjustment Rate Ratios**

Variable	Prevalence of risk factors n (%)	Any SMM Adjusted rate ratio (95% CI)	SMM excluding blood transfusion only cases Adjusted rate ratio (95% CI)
<b>Race/Ethnicity</b>	*	*	*
Non-Hispanic - White	33,371 (55.4%)	*	*
Declined/Unknown	1,916 (3.2%)	1.03 (0.75, 1.41)	1.23 (0.65, 2.30)
Hispanic	8,431 (14.0%)	1.41 (1.19, 1.67)	1.36 (0.95, 1.96)
Non-Hispanic - African American	11,853 (19.7%)	1.18 (1.02, 1.36)	1.06 (0.77, 1.47)
Non-Hispanic - Asian/Pacific Islander	2,932 (4.9%)	1.62 (1.26, 2.10)	1.43 (0.82, 2.49)
Non-Hispanic - Other	1,681 (2.8%)	1.15 (0.81, 1.63)	0.71 (0.28, 1.78)
<b>Payer</b>	*	*	*
Private Insurance	41,066 (68.2%)	*	*
Medicaid	16,221 (27.0%)	1.20 (1.05, 1.37)	1.13 (0.84, 1.50)
Medicare	223 (0.4%)	1.56 (0.87, 2.79)	1.47 (0.51, 4.24)
Other	2,518 (4.2%)	1.09 (0.82, 1.44)	0.89 (0.46, 1.72)
Self-pay or Uninsured	149 (0.2%)	0.47 (0.11, 1.98)	NA

NA: Not available due to small count

\*Cells intentionally left blank

Table 1b.04.01 displays risk-adjustment rate ratios divided among race/ethnicity and between payers. The prevalence rate is provided and the rate ratio for any SMM and SMM excluding blood transfusion only cases.

**Table 1b.04.02 Unadjusted Measure Rates per 10,000 by Age Category**

Age	rate	n
<20	304.7	2363
20-25	300.3	9757
25-30	231.2	17259
30-35	214.3	20627
35-40	244.3	10847
40+	420.5	2307

Table 1b.04.02 displays the unadjusted measure rates per 10,000 for each age category. The n is also displayed by age category. The highest unadjusted measure rates are seen in the less than 20 and 40 plus age groups.

**Table 1b.04.03 Unadjusted Measure Rates per 10,000 by Race Category**

Race	rate	n
American Indian or Alaska Native	308.6	324
Asian	260.6	3108
Black or African American	353.1	14245
Native Hawaiian or Other Pacific Islander	331.1	151
Other Race	231.4	6266
White	210.1	38698
Patient Did Not Identify	310.9	193
Missing or Unknown	285.7	175

Table 1b.04.03 displays unadjusted measure rates per 10,000 for each race category. The n is also displayed by race category. The highest unadjusted rates are seen among the Black or African American and Native Hawaiian or Other Pacific Islander.

**Table 1b.04.04 Unadjusted Measure Rates per 10,000 by Hispanic Ethnicity Category**

Hispanic ethnicity	rate	n
Hispanic or Latino	257.8	8651
Not Hispanic or Latino	246.4	52770
Patient Did Not Identify	382.9	444
Unknown	340.6	411
Missing	158.4	884

Table 1b.04.04 displays unadjusted measure rates per 10,000 by Hispanic Ethnicity category. The n is also displayed by Hispanic Ethnicity category. The highest unadjusted rates are among patients who did not identify and unknown categories.

**Table 1b.04.05 Unadjusted Measure Rates per 10,000 by Payer Category**

Payer	rate	n
Private Insurance	208.9	41506
Medicaid	346.6	17888
Medicare	592.3	287
Other	223.4	3670

Payer	rate	n
Self-pay or Uninsured	136.1	147

Table 1b.04.05 displays the unadjusted measure rates per 10,000 by payer category. The n is also displayed by payer category. The highest unadjusted rates are among Medicare and Medicaid payers.

**[Response Ends]**

**1b.05. If no or limited data on disparities from the measure as specified is reported above, then provide a summary of data from the literature that addresses disparities in care on the specific focus of measurement. Include citations. Not necessary if performance data provided in above.**

**[Response Begins]**

Our goal in selecting risk factors for adjustment was to develop parsimonious models that included clinically relevant variables strongly associated with a severe obstetric complication outcome. We used a two-stage approach, first identifying the comorbidity or clinical status risk factors that were most important in predicting the outcome, then considering the potential addition of social risk factors. Social risk factors considered were also dependent on the availability of information in the EHR. Economic/housing instability was included in the model and was chosen due to support in research literature for its inclusion and availability in the EHR. 1

Racial and ethnic disparities for women who identify as racial and ethnic minority groups are at a significantly higher risk for developing these complications than are Non-Hispanic White women.<sup>1</sup> Because of the stark differences in maternal outcomes by race/ethnicity as demonstrated in the literature, these social risk factors were examined as stratification variables rather than risk variables, as discussed below. It was determined that illumination of outcome disparities by race/ethnicity, rather than adjustment of outcomes by race/ethnicity, would best inform stakeholders and patients and be most impactful in incentivizing improvements in quality of maternal care.

1. Leonard SA, Main EK, Scott KA, Profit J, Carmichael SL. Racial and ethnic disparities in severe maternal morbidity prevalence and trends. *Annals of epidemiology*. 2019; 33:30-36.

**[Response Ends]**

## 2. Scientific Acceptability of Measure Properties

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

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### sp.01. Provide the measure title.

Measure titles should be concise yet convey who and what is being measured (see [What Good Looks Like](#)).

#### [Response Begins]

ePC-07 Severe Obstetric Complications

#### [Response Ends]

### sp.02. Provide a brief description of the measure.

*Including type of score, measure focus, target population, timeframe, (e.g., Percentage of adult patients aged 18-75 years receiving one or more HbA1c tests per year).*

#### [Response Begins]

Hospital-level measure scores are calculated as a risk-adjusted proportion of the number of delivery hospitalizations for women who experience a severe obstetric complication, as defined by the numerator, by the total number of delivery hospitalizations in the denominator during the measurement period. The hospital-level measure score will be reported as a rate per 10,000 delivery hospitalizations.

ePC07 was developed in collaboration with Yale New Haven Health Services Corporation/Center for Outcomes Research and Evaluation (CORE).

#### [Response Ends]

### sp.04. Check all the clinical condition/topic areas that apply to your measure, below.

*Please refrain from selecting the following answer option(s). We are in the process of phasing out these answer options and request that you instead select one of the other answer options as they apply to your measure.*

*Please do not select:*

- Surgery: General

#### [Response Begins]

Perinatal Health

Perinatal Health: Labor and Delivery

Perinatal Health: Post-Partum Care

#### [Response Ends]

### sp.05. Check all the non-condition specific measure domain areas that apply to your measure, below.

#### [Response Begins]

Safety: Complications

**[Response Ends]**

**sp.06. Select one or more target population categories.**

*Select only those target populations which can be stratified in the reporting of the measure's result.*

*Please refrain from selecting the following answer option(s). We are in the process of phasing out these answer options and request that you instead select one of the other answer options as they apply to your measure.*

*Please do not select:*

- *Populations at Risk: Populations at Risk*

**[Response Begins]**

Women

**[Response Ends]**

**sp.07. Select the levels of analysis that apply to your measure.**

*Check ONLY the levels of analysis for which the measure is SPECIFIED and TESTED.*

*Please refrain from selecting the following answer option(s). We are in the process of phasing out these answer options and request that you instead select one of the other answer options as they apply to your measure.*

*Please do not select:*

- *Clinician: Clinician*
- *Population: Population*

**[Response Begins]**

Facility

**[Response Ends]**

**sp.08. Indicate the care settings that apply to your measure.**

*Check ONLY the settings for which the measure is SPECIFIED and TESTED.*

**[Response Begins]**

Inpatient/Hospital

**[Response Ends]**

**sp.09. 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. If no URL is available, indicate "none available".*

**[Response Begins]**

The specifications are posted at <https://ecqi.healthit.gov/ecqm/eh/2023/cms1028v1>

**[Response Ends]**

**sp.10. Indicate whether Health Quality Measure Format (HQMF) specifications are attached.**

*Attach the zipped output from the eQCM 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).*

**[Response Begins]**

HQMF specifications are attached.

**[Response Ends]**

Attachment: 3687e\_CMS1028v1.zip

**sp.11. Attach the simulated testing attachment.**

*All eQCMs require a simulated testing attachment to confirm that the HTML output from Bonnie testing (or testing of some other simulated data set) includes 100% coverage of measured patient population testing, with pass/fail test cases for each sub-population. This can be submitted in the form of a screenshot.*

**[Response Begins]**

Testing is attached

**[Response Ends]**

Attachment: 3687e\_PC07 Bonnie Results Stratification 1.png

Attachment: 3687e\_PC07 Bonnie Results.png

**sp.12. Attach the data dictionary, code table, or value sets (and risk model codes and coefficients when applicable). Excel formats (.xlsx or .csv) are preferred.**

*Attach an excel or csv file; if this poses an issue, [contact staff](#). Provide descriptors for any codes. Use one file with multiple worksheets, if needed.*

**[Response Begins]**

Available in attached Excel or csv file

**[Response Ends]**

Attachment: 3687e\_ValueSets.xlsx

For the question below: state the outcome being measured. Calculation of the risk-adjusted outcome should be described in sp.22.

**sp.13. State the numerator.**

*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).*

*DO NOT include the rationale for the measure.*

**[Response Begins]**

Inpatient hospitalizations for patients with severe obstetric complications including the following:

- Severe maternal morbidity diagnoses (see list below)
- Severe maternal morbidity procedures (see list below)
- Discharge disposition = expired

Severe Maternal Morbidity Diagnoses:

- Cardiac
  - Acute heart failure
  - Acute myocardial infarction
  - Aortic aneurysm
  - Cardiac arrest/ventricular fibrillation
  - Heart failure/arrest during procedure or surgery
- Hemorrhage
  - Disseminated intravascular coagulation
  - Shock
- Renal
  - Acute renal failure
- Respiratory
  - Adult respiratory distress syndrome
  - Pulmonary edema
- Sepsis
- Other OB
  - Air and thrombotic embolism
  - Amniotic fluid embolism
  - Eclampsia
  - Severe anesthesia complications
- Other Medical
  - Puerperal cerebrovascular disorder
  - Sickle cell disease with crisis

Severe Maternal Morbidity Procedures:

- Blood transfusion
- Conversion of cardiac rhythm
- Hysterectomy
- Temporary tracheostomy
- Ventilation

**[Response Ends]**

For the question below: describe how the observed outcome is identified/counted. Calculation of the risk-adjusted outcome should be described in sp.22.

**sp.14. Provide details needed to calculate the numerator.**



*All information required to identify and calculate the cases from the target population with the target process, condition, event, or outcome such as definitions, time period for data collection, 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 sp.11.*

**[Response Begins]**

1. The QDM datatype of Encounter Performed, Diagnosis evaluates the Severe Maternal Morbidity Diagnoses value set (2.16.840.1.113762.1.4.1029.255) to see if a code is present on the encounter. If so, the Encounter, Performed, PresentOnAdmission Indicator datatype evaluates the Present on Admission = No or Unable to Determine value set (2.16.840.1.113762.1.4.1029.370) and the numerator will be met if the code has a POA code of “No” or “Unable to Determine”.

2. The QDM datatype of Procedure, Performed evaluates the Severe Maternal Morbidity Procedures value set (2.16.840.1.113762.1.4.1029.256) and the Blood Transfusion value set (2.16.840.1.113762.1.4.1029.213) to see if a code is present with a corresponding procedure date anytime during the hospitalization encounter. The Blood Transfusion value set is kept separate from the other procedures so that the rates can be stratified with and without blood transfusion.

3. The QDM datatype of Encounter, Performed, Discharge Disposition evaluates the Patient Expired value set (2.16.840.1.113883.3.117.1.7.1.309) to determine if the patient expired during the encounter.

If any one of the 3 conditions above are met, the patient will be in the numerator. To access the value sets for the measure, please visit the Value Set Authority Center, sponsored by the National Library of Medicine, at <https://vsac.nlm.nih.gov/>. A list of value sets for the measure is attached in the Excel workbook provided for question sp.12.

**[Response Ends]**

For the question below: state the target population for the outcome. Calculation of the risk-adjusted outcome should be described in sp.22.

**sp.15. State the denominator.**

*Brief, narrative description of the target population being measured.*

**[Response Begins]**

Initial Patient Population: Inpatient hospitalizations for patients age  $\geq 8$  years and  $< 65$  admitted to the hospital for inpatient acute care who undergo a delivery procedure with a discharge date that ends during the measurement period

Denominator: Inpatient hospitalizations for patients delivering stillborn or live birth with  $\geq 20$  weeks, 0 days gestation completed

**[Response Ends]**

For the question below: describe how the target population is identified. Calculation of the risk-adjusted outcome should be described in sp.22.

**sp.16. Provide details needed to calculate the denominator.**

*All information required to identify and calculate the target population/denominator such as definitions, time period for data collection, 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 sp.11.*

**[Response Begins]**

For patients meeting the initial patient population:

1. The logic determines calculated gestational age (CGA) as follows:
  - a. For the Estimated Due Date (EDD), the QDM datatype Assessment, Performed: Delivery date Estimated using Delivery date Estimated LOINC Direct Reference Code 11778-8 is used. To assure the most up to date EDD is used the logic looks for the last EDD 42 weeks or less before or on delivery.
  - b. For the Date of Delivery, the QDM datatype Assessment, Performed: Date and time of obstetric delivery using Date and time of obstetric delivery LOINC Direct Reference Code 93857-1 is used. To assure the most accurate date/time of delivery the logic looks for the last assessment of date/time of delivery during the encounter. To account for deliveries that may occur outside of the inpatient encounter, the logic looks at the expanded encounter including any Emergency Department, Observation or OB Triage visits within one hour of the inpatient admission.
  - c. The logic includes a function which calculates the gestational age. This function reflects the ACOG (American College of Obstetrics and Gynecology) ReVITALize Guidelines for Calculating Gestational Age (CGA):  
$$\text{Gestational Age} = (280 - (\text{EDD} - \text{Reference Date})) / 7$$

Reference Date is the date on which you are trying to determine gestational age. For purposes of this eCQM, Reference Date would be the Date of Delivery.
2. If the necessary elements are not available to calculate CGA, CGA will be null. Then the estimated gestational age, which is derived from the QDM datatype Assessment, Performed: Estimated Gestational Age at Delivery using SNOMEDCT Value Set (2.16.840.1.113762.1.4.1045.26) is used.
3. Gestational age  $\geq$  20 weeks, 0 days will meet the logic.
4. Lastly, the QDM datatype of Procedure, Performed evaluates Procedure, Performed: Delivery Procedures (2.16.840.1.113762.1.4.1045.59) to determine if a delivery code is present. The delivery procedure codes do not distinguish live from stillborn deliveries.

**[Response Ends]**

**sp.17. Describe the denominator exclusions.**

*Brief narrative description of exclusions from the target population.*

**[Response Begins]**

Patients with confirmed diagnosis of COVID with COVID-related respiratory condition or patients with confirmed diagnosis of COVID with COVID-related respiratory procedure.

**[Response Ends]**

**sp.18. Provide details needed to calculate the denominator exclusions.**

*All information required to identify and calculate exclusions from the denominator such as definitions, time period for data collection, 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 sp.11.*

**[Response Begins]**

A denominator exclusion for COVID plus respiratory conditions was added post pilot due to the growing evidence of perinatal complications in women who have COVID infection with respiratory conditions.

Patients with confirmed diagnosis of COVID with COVID-related respiratory condition or patients with confirmed diagnosis of COVID with COVID-related respiratory procedure are excluded.

1. The QDM datatype of Encounter Performed, Diagnosis evaluates the COVID 19 Confirmed value set (2.16.840.1.113762.1.4.1029.373) to see if a code is present on the encounter.

AND

2. The QDM datatype of Encounter Performed, Diagnosis evaluates the COVID 19 Related Respiratory Conditions value set (2.16.840.1.113762.1.4.1029.376) to see if a code is present on the encounter OR the QDM datatype of Procedure Performed evaluates COVID 19 Related Respiratory Procedures (2.16.840.1.113762.1.4.1029.379) and that the procedure starts during the encounter.

**[Response Ends]**

**sp.19. Provide all information required to stratify the measure results, if necessary.**

*Include the stratification variables, definitions, specific data collection items/responses, code/value sets, and the risk-model covariates and coefficients for the clinically-adjusted version of the measure when appropriate. Note: lists of individual codes with descriptors that exceed 1 page should be provided in an Excel or csv file in required format in the Data Dictionary field.*

**[Response Begins]**

A subset of the numerator population will be reported in Stratification as Stratum 1: Nontransfusion only severe obstetric complications (excluding cases where transfusion was the only severe obstetric complication)

Calculation:

(Risk-standardized number of encounters with nontransfusion only severe obstetric complications (excluding cases where transfusion was the only severe obstetric complication) / Number of encounters in Denominator) \* 10,000

The logic includes a definition entitled: "Delivery Encounter Greater Than Or Equal To 20 Weeks Gestation Completed With Severe Obstetric Complications (Excluding Blood Transfusions)". This definition unions the following 2 definitions:

- "Delivery Encounter Greater Than Or Equal To 20 Weeks Gestation Completed With Severe Obstetric Complications Diagnosis or Procedure (Excluding Blood Transfusion)"
- Union "Delivery Encounter Greater Than Or Equal To 20 Weeks Gestation Completed With Expiration"

The first definition includes patients with a Severe Obstetric Complication Diagnosis or a procedure indicative of severe obstetric complication (other than blood transfusion) as described in the numerator. Cases with blood transfusions are not excluded from this definition if they have another SOC. Thereby, patients who only had a SOC of blood transfusion would not qualify for Stratum 1.

**[Response Ends]**

**sp.20. Is this measure adjusted for socioeconomic status (SES)?**

**[Response Begins]**

No

**[Response Ends]**

**sp.21. Select the risk adjustment type.**

*Select type. Provide specifications for risk stratification and/or risk models in the Scientific Acceptability section.*

**[Response Begins]**

Statistical risk model with risk factors (specify number of risk factors)

**[Statistical risk model with risk factors (specify number of risk factors) Please Explain]**

There are 34 risk factors in the risk model. The measure is not adjusted for SES; however, it does adjust for Economic Housing Instability.

**[Response Ends]**

**sp.22. Select the most relevant type of score.**

*Attachment: If available, please provide a sample report.*

**[Response Begins]**

Rate/proportion

**[Response Ends]**

**sp.23. Select the appropriate interpretation of the measure score.**

*Classifies interpretation of score according to whether better quality or resource use is associated with a higher score, a lower score, a score falling within a defined interval, or a passing score*

**[Response Begins]**

Better quality = Lower score

**[Response Ends]**

**sp.24. Diagram or describe the calculation of the measure score as an ordered sequence of steps.**

*Identify the target population; exclusions; cases meeting the target process, condition, event, or outcome; time period of data, aggregating data; risk adjustment; etc.*

**[Response Begins]**

Please see the attached HQMF specifications for the complete measure logic in response to question sp.10. Additionally, a flow diagram of the denominator, denominator exclusions, and numerator logic is attached to the NQF submission form as a supplemental document.

**[Response Ends]**

**sp.27. If measure testing is based on a sample, provide instructions for obtaining the sample and guidance on minimum sample size.**

*Examples of samples used for testing:*

- *Testing may be conducted on a sample of the accountable entities (e.g., hospital, physician). The analytic unit specified for the particular measure (e.g., physician, hospital, home health agency) determines the sampling strategy for scientific acceptability testing.*
- *The sample should represent the variety of entities whose performance will be measured. The [2010 Measure Testing Task Force](#) recognized that the samples used for reliability and validity testing often have limited generalizability because measured entities volunteer to participate. Ideally, however, all types of entities whose performance will be measured should be included in reliability and validity testing.*
- *The sample should include adequate numbers of units of measurement and adequate numbers of patients to answer the specific reliability or validity question with the chosen statistical method.*
- *When possible, units of measurement and patients within units should be randomly selected.*

**[Response Begins]**

No sampling.

**[Response Ends]**

**sp.30. Select only the data sources for which the measure is specified.**

**[Response Begins]**

Electronic Health Data  
Electronic Health Records

**[Response Ends]**

**sp.31. Identify the specific data source or data collection instrument.**

*For example, provide the name of the database, clinical registry, collection instrument, etc., and describe how data are collected.*

**[Response Begins]**

Not applicable.

**[Response Ends]**

**sp.32. Provide the data collection instrument.**

**[Response Begins]**

No data collection instrument provided

**[Response Ends]**



### 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.

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**3.01. Check all methods below that are used to generate the data elements needed to compute the measure score.**

**[Response Begins]**

Generated or collected by and used by healthcare personnel during the provision of care (e.g., blood pressure, lab value, diagnosis, depression score)

Coded by someone other than person obtaining original information (e.g., DRG, ICD-10 codes on claims)

**[Response Ends]**

**3.02. Detail to what extent the specified data elements are available electronically in defined fields.**

*In other words, indicate whether data elements that are needed to compute the performance measure score are in defined, computer-readable fields.*

**[Response Begins]**

ALL data elements are in defined fields in a combination of electronic sources

**[Response Ends]**

**3.03. 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 data elements not from electronic sources.**

**[Response Begins]**

Not applicable.

**[Response Ends]**

**3.05. Complete and attach the [NQF Feasibility Score Card](#).**

**[Response Begins]**

See attachment.

**[Response Ends]**

**3.06. Describe difficulties (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.**

**[Response Begins]**

For feasibility testing, virtual EHR Walkthroughs were conducted with nine healthcare sites consisting of 27 individual hospitals, representing three different EHR systems. Feasibility testing included assessment of clinical and documentation workflows compared to measure intent, assessment of data element availability and accuracy, and assessment of use of data standards. Subsequent to the fourth EHR walkthrough, The Joint Commission staff determined several of the pilot sites were unable to accurately capture 2 main data elements: the timestamp for the procedure performed and the laboratory test result of the PaO2/FiO2 ratio. The Joint Commission staff proposed to address these feasibility challenges by revising the draft specifications to better align with clinical

intent and decrease burden for a lab result that was not commonly calculated in the EHR. Consequently, feasibility scores based on the revised specifications increased to 98%.

**Table 3.06.01 Overall Feasibility Rates**

PILOT SITES	FEASIBILITY RATE 1	FEASIBILITY RATE 2
	Initial	Revised
Pilot Site 1	97%	97%
Pilot Site 2	87%	94%
Pilot Site 3	97%	100%
Pilot Site 4	97%	97%
Pilot Site 5	96%	98%
Pilot Site 6	91%	100%
Pilot Site 7	97%	100%
Pilot Site 8	97%	100%
Pilot Site 9	90%	99%
Overall	95%	98%

Feasibility Rate 1: reflects the rate inclusive of the timestamp for the procedure performed and the laboratory test result of the PaO<sub>2</sub>/FiO<sub>2</sub> ratio.

Feasibility Rate 2: reflects the rate with the revised specifications, using date only for procedures performed (no timestamp) and laboratory test results of PaO<sub>2</sub>.

**Table 3.06.02 Feasibility Rates by Domain**

PILOT SITES	DATA AVAILABILITY	DATA ACCURACY	DATA STANDARDS	WORKFLOW
Pilot Site 1	100%	100%	87%	100%
Pilot Site 2	94%	94%	94%	94%
Pilot Site 3	100%	100%	100%	100%
Pilot Site 4	96%	99%	96%	99%
Pilot Site 5	100%	100%	94%	99%
Pilot Site 6	100%	100%	100%	100%
Pilot Site 7	100%	100%	100%	100%
Pilot Site 8	100%	100%	100%	100%
Pilot Site 9	100%	100%	96%	100%
Overall	99%	99%	96%	99%

This table shows the feasibility rates by domain reflecting the revised specifications.

Based on an overall feasibility score of 98%, ePC07 data elements were found to be highly feasible. Validity testing showed an overall data element agreement rate of 90.4% and an overall measure outcome agreement rate of 91.2% (see Tables 2b.03.03 and 2b.03.04 for more details of findings).

Specific feedback obtained from feasibility testing are listed below. Other findings were site specific and changes to the measure specifications were not deemed necessary.

- Sites were unable to accurately capture 2 main data elements: the timestamp for the procedure performed and the laboratory test result of the PaO<sub>2</sub>/FiO<sub>2</sub> ratio. The PaO<sub>2</sub>/FiO<sub>2</sub> ratio was replaced with



the PaO2 lab value. One site erroneously mapped the baby's cord blood PaO2 level instead of the mother's PaO2 level.

- Platelet count alone was not specific enough to identify a severe obstetric complication. During reliability visits, we saw that most cases included codes from the risk adjustment value set for anemia or bleeding disorders and did not require additional treatment or longer length of stay. Most of these cases had platelet levels that were lower on admission and fluctuated above and below 100.
- In the original version of the logic, the denominator exclusion was stated as inpatient hospitalizations for patients with trauma complicating childbirth diagnoses. Pilot testing revealed no cases where the trauma was an indication for delivery or had an impact on care. The trauma code is used too broadly in the field and does not represent the clinical intent for exclusion.
- It is common practice for hospitals to admit laboring patients to an OB Triage status until true labor is confirmed. This is an outpatient status where critical elements of care are performed. If the patient is ultimately admitted, the care rendered in the outpatient setting will not be evaluated if the logic only qualifies on the inpatient encounter.
- POA codes are not consistently assigned to SNOMED codes.

**[Response Ends]**

Consider implications for both individuals providing data (patients, service recipients, respondents) and those whose performance is being measured.

**3.07. Detail 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),**

**Attach the fee schedule here, if applicable.**

**[Response Begins]**

Not applicable

**[Response Ends]**

## 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.

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Extent to which intended audiences (e.g., consumers, purchasers, providers, policy makers) can understand the results of the measure and are likely to find them useful for decision making.

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 demonstrating performance improvement.

### 4a.01. Check all current uses. For each current use checked, please provide:

- **Name of program and sponsor**
- **URL**
- **Purpose**
- **Geographic area and number and percentage of accountable entities and patients included**
- **Level of measurement and setting**

#### [Response Begins]

Regulatory and Accreditation Programs

#### [Regulatory and Accreditation Programs Please Explain]

- **Name of program and sponsor:** ORYX Performance Measure Reporting: Hospital Accreditation Program (HAP) and Critical Access Hospital Accreditation (CAH) Program, The Joint Commission
- **URL:** <https://www.jointcommission.org/measurement/reporting/accreditation-oryx/>
- **Purpose:** An accreditation program that recognizes hospitals that meet standard requirements to provide safe and effective patient care.
- **Geographic area and number and percentage of accountable entities and patients included:**  
The Joint Commission accredits 63% of hospitals, 81% of beds; participating hospitals with maternity services includes >2500 US hospitals Nationwide. First year in production. No production data available.
- **Level of measurement and setting:** Outcome measure inpatient delivery hospitalization, all TJC participating hospitals with maternity services

Quality Improvement with Benchmarking (external benchmarking to multiple organizations)

#### [Quality Improvement with Benchmarking (external benchmarking to multiple organizations) Please Explain]

- **Name of program and sponsor:** ORYX Performance Measure Reporting: Hospital Accreditation Program (HAP) and Critical Access Hospital Accreditation (CAH) Program, The Joint Commission
- **URL:** <https://www.jointcommission.org/measurement/reporting/accreditation-oryx/>
- **Purpose:** An accreditation program that recognizes hospitals that meet standard requirements to provide safe and effective patient care. The data submitted to The Joint Commission is analyzed for trends and benchmarks.
- **Geographic area and number and percentage of accountable entities and patients included:**

The Joint Commission accredits 63% of hospitals, 81% of beds; participating hospitals with maternity services includes >2500 US hospitals Nationwide. First year in production. No production data available.

- **Level of measurement and setting:** Outcome measure inpatient delivery hospitalization, all TJC participating hospitals with maternity services

Quality Improvement (Internal to the specific organization)

**[Quality Improvement (Internal to the specific organization) Please Explain]**

- **Name of program and sponsor:** ORYX Performance Measure Reporting: Hospital Accreditation Program (HAP) and Critical Access Hospital Accreditation (CAH) Program, The Joint Commission
- **URL:** <https://www.jointcommission.org/measurement/reporting/accreditation-oryx/>
- **Purpose:** An accreditation program that recognizes hospitals that meet standard requirements to provide safe and effective patient care. The data submitted to The Joint Commission is analyzed for trends and benchmarks and provided to the organizations for internal quality improvement purposes.
- **Geographic area and number and percentage of accountable entities and patients included:**  
The Joint Commission accredits 63% of hospitals, 81% of beds; participating hospitals with maternity services includes >2500 US hospitals Nationwide. First year in production. No production data available.
- **Level of measurement and setting:** Outcome measure inpatient delivery hospitalization, all TJC participating hospitals with maternity services

**[Response Ends]**

**4a.02. Check all planned uses.**

**[Response Begins]**

Public reporting

Measure Currently in Use

**[Response Ends]**

**4a.03. If not currently publicly reported OR used in at least one other accountability application (e.g., payment program, certification, licensing), explain why the measure is not in use.**

*For example, do policies or actions of the developer/steward or accountable entities restrict access to performance results or block implementation?*

**[Response Begins]**

**[Response Ends]**

**4a.04. If not currently publicly reported OR used in at least one other accountability application, provide a credible plan for implementation within the expected timeframes: used in any accountability application within 3 years, and publicly reported within 6 years of initial endorsement.**

*A 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.*

**[Response Begins]**

**[Response Ends]**

**4a.05. Describe how performance results, data, and assistance with interpretation have been provided to those being measured or other users during development or implementation.**

*Detail how many and which types of measured entities and/or others were included. If only a sample of measured entities were included, describe the full population and how the sample was selected.*

**[Response Begins]**

For reference, each health system will be referred to as a 'pilot site' and 'hospital' will refer to the individual hospitals within the health system. A total of 10 pilot sites consisting of 28 hospitals were included in the pilot project. For feasibility testing, 9 pilot sites with a total of 27 hospitals were included for analysis. After feasibility testing, 1 pilot site representing 2 hospitals withdrew from the project and one additional hospital was added. Therefore, data was collected from 9 pilot sites representing 26 hospitals. Reliability and validity testing was completed on 6 sites representing 15 hospitals.

After the pilot testing concluded and final results were analyzed, a pilot summary report was created and shared with each pilot site via email. Contents of the summary report were presented in a clear manner, with the purpose of each testing modality explained along with information on how to interpret the results of statistical testing. The pilot summary included general measure information, feasibility, reliability and validity testing, risk model, and performance results. Each pilot site received their own individual site measure results and analysis along with the aggregate pilot summary report. Prior to the pilot testing, Joint Commission staff provided virtual information sessions reviewing measure specifications, pilot testing overview and an EHR walkthrough session. Q&A opportunities were provided to the sites. Joint Commission staff also offered assistance to the pilot sites for any questions they had regarding the pilot summary reports.

**[Response Ends]**

**4a.06. Describe the process for providing measure results, including when/how often results were provided, what data were provided, what educational/explanatory efforts were made, etc.**

**[Response Begins]**

Upon completion of testing, a live national webinar was held on March 8, 2022, to introduce the ePC07 measure including a detailed explanation of the specifications. The webinar included an opportunity for audience members to ask questions.

Severe Obstetric Complications is a new measure, and our implementation plan includes continuous customer engagement. The Joint Commission developed dashboards as part of the ongoing continuous customer engagement project. The dashboard report—posted in the Resources and Tools section of an accredited hospital's secure Joint Commission Connect® extranet site—is representative of each organization's relative performance on each of the selected measures. For each measure, the dashboard shows that organization's performance compared to national, state, and Joint Commission-accredited organization averages. The dashboard is not a scorable element on the survey, but rather, a tool to facilitate discussion about ongoing quality improvement work. For example, surveyors may ask an organization how it addresses the subset of performance measures in the report and what action(s) the organization is taking to improve processes. In addition, the Joint Commission analyzes aggregate performance of each measure and identifies the measures for which the greatest opportunities for improvement exist among accredited hospitals. Based on those findings, an educational webinar series that address the high-opportunity topics is developed. All accredited hospitals have access to the educational webinar series. Organizations with high opportunity for improvement are particularly encouraged to participate.

**[Response Ends]**

**4a.07. Summarize the feedback on measure performance and implementation from the measured entities and others. Describe how feedback was obtained.**

**[Response Begins]**

Since ePC07 was recently published in January of 2022, we do not have measure performance data as of yet. However, we were able to obtain feedback during the pilot testing of this measure. See section 4a.05 for details on pilot test sites. Feedback was also obtained through Technical Expert Panel meetings and surveys, Patient Workgroup meetings and surveys, and public comment.

The Joint Commission plans to use an automated feedback system currently used for feedback on other measures. Access is available to the measured entities and the vendors contracted by measured entities. The measure leads from the clinical team and the eCQM team are responsible for each individual measure set. The system is monitored daily, and responses are typically provided within 8 business hours.

**[Response Ends]**

**4a.08. Summarize the feedback obtained from those being measured.**

**[Response Begins]**

During pilot site recruitment and engagement, feedback received from hospitals indicated that leadership teams were interested in the measure, and development of a Severe Obstetric Complications measure was vital and of great value. One hospital was planning on adding the ePC-07 metric to their annual dashboard for future use.

Feedback Obtained During Public Comment:

- The Call for Public Comment ran from November 19, 2021, to December 18, 2021.
- The measure developer solicited public comments by email notification to CMS listserv groups, emails to relevant stakeholders and stakeholder organizations, and posting on the CMS Public Comment website. We received eighteen responses on this topic.
- Some highlights of the public comment are that commenters provided support for:
  - focusing measurement on addressing severe maternal morbidity and improving maternal health outcomes.
  - the usefulness of this measure in assessing and improving the quality of care for patients.
  - publicly reporting both an overall rate of severe obstetric complications and a rate of severe obstetric complications excluding blood transfusion-only cases.

**[Response Ends]**

**4a.09. Summarize the feedback obtained from other users.**

**[Response Begins]**

- The face validity assessment demonstrated that the Technical Expert Panel members believe that this eCQM is an important health outcome to measure because there is room for improvement, it will produce reliable and valid rates, and hospitals can use the results for performance improvement. While there are some concerns with the feasibility of implementation and whether this measure is a critical component of defining and comparing the quality of obstetric care between hospitals, the majority of the

responses from the TEP either agreed or strongly agreed with the ability of this measure to improve patient outcomes. See Section 2b.03 for further details on face validity.

- As described in 1a.02, the Patient Working Group members strongly believe this eCQM is an important health outcome to measure because there is room for improvement and strongly/moderately agree that this measure is a critical component of defining and comparing the quality of obstetric care between hospitals. See Section 2b.03 for further details on face validity.

**[Response Ends]**

**4a.10. Describe how the feedback described has been considered when developing or revising the measure specifications or implementation, including whether the measure was modified and why or why not.**

**[Response Begins]**

- As mentioned in 3.06, pilot sites were unable to accurately capture 2 main data elements: the timestamp for the procedure performed and the laboratory test result of the PaO<sub>2</sub>/FiO<sub>2</sub> ratio. The Joint Commission addressed these feasibility challenges by revising the draft specifications to better align with clinical intent and decrease burden for a lab result not commonly calculated in the EHR. The PaO<sub>2</sub>/FiO<sub>2</sub> ratio was replaced with the PaO<sub>2</sub> lab value which was removed from the final specifications as it was found to be a low volume test and mapping was burdensome.
- Platelet count < 100 10<sup>3</sup>/uL was removed from the numerator (see 4a.08 for reason).
- Trauma was removed from the denominator exclusion logic (see 4a.08 for reason).
- A denominator exclusion for COVID plus respiratory conditions was added post pilot due to the growing evidence of perinatal complications in women who have COVID-19 infection with respiratory conditions.
- To account for care rendered in an outpatient setting, the logic evaluates any care rendered in the Emergency Department, observation or OB Triage areas within one hour of inpatient admission.

Since pilot testing revealed that POA codes are not consistently assigned to SNOMED codes, SNOMED codes were removed from most numerator and risk variable value sets. It is important that this measure discerns that a severe obstetric complication was not present on admission (POA) and that any condition used for risk adjustment was POA. POA code assignment for ICD10 codes is thoroughly adopted and implemented by healthcare organizations. We recognize the importance and value of SNOMED codes and have therefore developed draft value sets for SNOMED codes for use in future versions of the measure specifically in the numerator and risk variables. We will continue to investigate the feasibility of implementing SNOMED codes with POA codes to allow for use in the measure logic and ensure clinical intent.

**[Response Ends]**

**4b.01. You may refer to data provided in Importance to Measure and Report: Gap in Care/Disparities, but do not repeat here. Discuss any progress on improvement (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). If no improvement was demonstrated, provide an explanation. 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.**

**[Response Begins]**

This is a de novo eCQM intended to measure inpatient acute care hospital quality and performance related to severe obstetric complications and death during the delivery hospitalization. The measure is intended to be used

alongside the suite of existing perinatal process of care quality measures and existing quality improvement efforts focused on reducing maternal morbidity and mortality.

Although there are limited measures to assess variability among hospitals, rates in the United States are higher than all other developed countries, presenting an opportunity for improvement. Using the CDC definition of SMM, the US median rate was 1.4% and the highest hospital rate was 12.2%.<sup>29</sup> USA Today's database of childbirth complication rates at maternity hospitals, with data from 1,027 hospitals in 13 states from 2014-2017, showed marked variation in median rates of childbirth complications; this variability may reflect similar trends for maternal complications.<sup>1,3</sup>

Maternal morbidity has garnered a lot of national attention, with a broad range of SMM events and outcomes that can be examined, many of which are closely associated with mortality.<sup>2,3</sup> Several initiatives have shown promise in reducing maternal morbidity events. For example, since the inception of the California Maternal Quality Care Collaborative (CMQCC), focused on metrics and toolkits to improve maternal outcomes, the maternal mortality rate in California declined by 55% between 2006 and 2013.<sup>4</sup> The CMQCC obstetric hemorrhage collaborative resulted in a 20.8% reduction in SMM in California hospitals compared with the 1.2% reduction in SMM among nonparticipating hospitals.<sup>3</sup> The state of California has established a successful framework for assessing and improving quality of maternal care, and outcomes suggest great potential for nationally reducing maternal care complications.

State and national initiatives to measure, track, and reduce maternal morbidity and mortality have produced encouraging results. The Severe Obstetric Complications eCQM could expand these improvements in care, outcomes, and cost savings at a national level. The eCQM will provide hospitals with benchmarking and actionable data to inform their quality improvement efforts; the use of EHR data will provide them with the potential to repurpose the data and measure logic for internal quality control using real-time feedback to further mitigate harm to mothers. Additionally, the eCQM can provide information that allows patients to compare hospitals' performance to aid in their decision making when choosing care.

Additional information can be found in 1a.03.

1. Deadly Deliveries: Childbirth complication rates at maternity hospitals. <https://www.usatoday.com/maternal-mortality-harm-hospital-database/>.
2. National Quality Forum. Maternal Morbidity and Mortality Environmental Scan. 2020.
3. Main EK. Reducing maternal mortality and severe maternal morbidity through state-based quality improvement initiatives. *Clinical obstetrics and gynecology*. 2018;61(2):319-331.
4. California Maternal Quality Care Collaborative (CMQCC). Who We Are. <https://www.cmqcc.org/who-we-are>, 2020.

#### **[Response Ends]**

**4b.02. Explain any unexpected findings (positive or negative) during implementation of this measure, including unintended impacts on patients.**

#### **[Response Begins]**

The measure specifications were posted January 28, 2022, for optional use in the Joint Commission ORYX Performance Measure Reporting Requirements: Hospital Accreditation Program (HAP) and Critical Access Hospital Accreditation (CAH) Program. No implementation findings at this time. Data will be submitted to The Joint Commission in 2023 for optional year 2022.

Potential unintended consequences: Measuring obstetric complication outcomes based on EHR data may cause a shift in a hospital's resources to support EHR data extraction and reporting, and away from other functions. Also, although the measure numerator definition is broad, hospitals may potentially focus on complications captured in the measure, while dismissing other complications not currently measured but that are important, as well.

**[Response Ends]**

**4b.03. Explain any unexpected benefits realized from implementation of this measure.**

**[Response Begins]**

The measure specifications were posted January 28, 2022, for optional use in the Joint Commission ORYX Performance Measure Reporting Requirements: Hospital Accreditation Program (HAP) and Critical Access Hospital Accreditation (CAH) Program. No implementation findings at this time.

**[Response Ends]**



## 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.

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If you are updating a maintenance measure submission for the first time in MIMS, please note that the previous related and competing data appearing in question 5.03 may need to be entered in to 5.01 and 5.02, if the measures are NQF endorsed. Please review and update questions 5.01, 5.02, and 5.03 accordingly.

**5.01. Search and select all NQF-endorsed related measures (conceptually, either same measure focus or target population).**

**NOTE: If there are no related measures, please select N/A.**

*(Can search and select measures.)*

**[Response Begins]**

**[Response Ends]**

**5.02. Search and select all NQF-endorsed competing measures (conceptually, the measures have both the same measure focus and target population).**

**NOTE: If there are no competing measures, please select N/A.**

*(Can search and select measures.)*

**[Response Begins]**

**[Response Ends]**

**5.03. If there are related or competing measures to this measure, but they are not NQF-endorsed, please indicate the measure title and steward.**

**[Response Begins]**

No related or competing measures.

**[Response Ends]**

**5.04. If this measure conceptually addresses EITHER the same measure focus OR the same target population as NQF-endorsed measure(s), indicate whether the measure specifications are harmonized to the extent possible.**

**[Response Begins]**

No

**[Response Ends]**

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

**[Response Begins]**

Not applicable. No related or competing measures.

**[Response Ends]**

**5.06. Describe why this measure is superior to competing measures (e.g., a more valid or efficient way to measure quality). Alternatively, justify endorsing an additional measure.**

*Provide analyses when possible.*

**[Response Begins]**

National evaluation of hospitals' performance on maternal morbidity and mortality is limited because there are currently no maternal morbidity or obstetric complications outcome measures in national reporting programs. Current quality measures related to pregnancy and maternal health proposed for or in public reporting programs are largely process measures (e.g., Maternity Care: Post-partum Follow Up and Care Coordination) and outcome measures related to delivery type (e.g., PC-01 Elective Delivery).

There are numerous state agencies, private and/or non-profit organizations, and collaboratives that have spearheaded maternal health and quality improvement initiatives. For instance, the Alliance for Innovation in Maternal Health (AIM) developed evidence-based patient safety bundles to address leading causes of SMM, like obstetric hemorrhage and hypertension. The CDC Perinatal Collaboratives also support various state-based efforts to promote high quality maternal care. The CMQCC created the Maternal Data Center (MDC) for hospitals with Labor and Delivery units in California, Oregon, and Washington. The MDC is an online tool that receives patient discharge data on maternity care services, linking these data to birth certificate or clinical data, and feeding back to clinicians' perinatal performance data for supporting quality improvement.<sup>1</sup> The MDC allows hospital performance regional and statewide comparisons. Overall, such quality metrics do not currently cater to a national population because there is extensive variation and timing delays in the widespread adoption and implementation of safety protocols in obstetric care across states.<sup>2,3</sup> Moreover, data examining the nationwide implementation of these resources are not widely available.<sup>2,4</sup> Therefore, the development of a obstetric complications outcome measure addresses a national measurement gap that can build on learnings from existing maternal health initiatives and measures.

1. California Maternal Quality Care Collaborative (CMQCC). Maternal Data Center.

<https://www.cmqcc.org/maternal-data-center>, 2020.

2 Main EK. Reducing maternal mortality and severe maternal morbidity through state-based quality improvement initiatives. *Clinical obstetrics and gynecology*. 2018;61(2):319-331.

3. Lenfant C. Clinical research to clinical practice—lost in translation? *New England Journal of Medicine*. 2003;349(9):868-874.

4. Maher-Griffiths C. Maternal Quality Outcomes and Cost. *Critical Care Nursing Clinics*. 2019;31(2):177-193.

**[Response Ends]**

## Appendix

**Supplemental materials may be provided in an appendix.:**

Available in attached file

Attachment: 3687e\_Severe Obstetric Complications Flow Diagram.pdf

## Contact Information

**Measure Steward (Intellectual Property Owner):** The Joint Commission

**Measure Steward Point of Contact:** Alban, JohnMarc, jalban@jointcommission.org

**Measure Developer if different from Measure Steward:** The Joint Commission

**Measure Developer Point(s) of Contact:** Alban, JohnMarc, jalban@jointcommission.org

## Additional Information

**1. Provide any supplemental materials, if needed, as an appendix. All supplemental materials (such as data collection instrument or methodology reports) should be collated one file with a table of contents or bookmarks. If material pertains to a specific criterion, that should be indicated.**

**[Response Begins]**

Available in attached file

**[Response Ends]**

Attachment: 3687e\_Severe Obstetric Complications Flow Diagram.pdf

**2. List the workgroup/panel members' names and organizations.**

*Describe the members' role in measure development.*

**[Response Begins]**

Expert and stakeholder input for the development of this measure was sought from a TEP, a Patient Working Group, and ongoing consultation with Dr. Elliott Main. Members brought expertise in quality improvement, electronic capture of medical information, healthcare disparities, obstetrics and gynecology, and patient perspective. TEP members nominated themselves (or were nominated) to participate in this stakeholder group. The members were engaged during key development milestones providing input on draft measure specifications for the measure cohort, outcome, and risk adjustment, alpha testing and feasibility results, initial beta testing results, and proposed updated measure specifications, as well as the risk adjustment model, measure scores, and further testing results.

**Technical Expert Panel (TEP) Members:**

Suzanne McMurtry Baird, DNP, RN

Co-Owner and Nursing Director, Clinical Concepts in Obstetrics, LLC  
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Debra Bingham, DrPH, RN, FAAN

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Quincy, MA

James T. Christmas, MD

National Medical Director, Women's and Obstetrics, HCA Healthcare  
Nashville, TN

Blair Dudley, MPH

Senior Manager, Transform Maternity Care, Pacific Business Group on Health  
Oakland, CA

Tomeka Isaac, MBA

Patient Representative

Denver, NC

Ajshay James

Patient Representative

Houston, TX

Deborah Kilday, MSN, RN

Manager, Performance Partner – Women, infants, and Children, Strategy, Innovation, and Population Health,  
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VP Quality Programs, Harris Health

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President, National Perinatal Information Center

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Investigator, The Lundquist Institute

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Brooke Villarreal, DNP, MSRN, RN-BC

Director, Public Reporting and Outcomes Measurement, HCA Healthcare

Nashville, TN

**Expert Clinical Consultant:**

Elliott Main, MD

Medical Director, California Maternal Quality Care Collaborative (CMQCC) and

Clinical Professor, Obstetrics and Gynecology at Stanford University

Mill Valley, California

**The Patient Working Group:**

The Patient Working Group provided personal and insightful perspectives on key measure aspects of measure development and decisions.

**Patient Working Group Members:**

Leah Bahrencu

Austin, TX

Marianne Drexler

Durham, NC

Nikki Montgomery

Euclid, OH

Katie Silwa

Hagerstown, MD

Molly Firth

Tumwater, WA

Kayleigh Summers

Pottstown, PA

Kim Sandstrom

Ocala, FL

**[Response Ends]**

**3. Indicate the year the measure was first released.**

**[Response Begins]**

New measure- plan to release January 2022 for optional use by The Joint Commission accredited organizations.

**[Response Ends]**

**4. Indicate the month and year of the most recent revision.**

**[Response Begins]**

12/2021

**[Response Ends]**

**5. Indicate the frequency of review, or an update schedule, for this measure.**

**[Response Begins]**

The measure maintenance process includes ongoing review of the evidence supporting the measure, code tables, and necessary logic updates. Questions frequently received and feedback from stakeholders are used to strengthen the specifications for the measure. The measure specifications are updated on an annual basis.

**[Response Ends]**

**6. Indicate the next scheduled update or review of this measure.**

**[Response Begins]**

Spring, 2022

**[Response Ends]**

**7. Provide a copyright statement, if applicable. Otherwise, indicate "N/A".**

**[Response Begins]**

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**[Response Ends]**

**8. State any disclaimers, if applicable. Otherwise, indicate "N/A".**

**[Response Begins]**

These performance measures are not clinical guidelines and do not establish a standard of medical care and have not been tested for all potential applications. The measures and specifications are provided without warranty.

**[Response Ends]**

**9. Provide any additional information or comments, if applicable. Otherwise, indicate "N/A".**

**[Response Begins]**

N/A

**[Response Ends]**