CBE ID

5608e

Title

ePC-06 Unexpected Complications in Term Newborns

Project

Primary Prevention

Endorsement Status

New

Is Under Review

Yes

Next Maintenance Cycle

Spring 2026

Steward

The Joint Commission

1.0 New or Maintenance

New

1.1 Measure Structure

Single Measure

1.3 Electronic Clinical Quality Measure (eCQM)

Yes

1.6 Measure Description

ePC06 is a hospital level performance score reported as the rate per 1,000 full term newborns with no preexisting conditions who had Unexpected Newborn Complications, calculated per calendar year.

1.7 Measure Type

Outcome

1.8 Level of Analysis

Facility

1.9 Care Setting

Hospital: Inpatient

1.10 Measure Rationale

The most important childbirth outcome for families is bringing home a healthy baby. While there have been measures developed to assess clinical practices and outcomes in preterm infants, there is a complete lack of metrics that assess the health outcomes and guide quality improvement activities for term infants who represent over 90% of all births.

The Unexpected Complications in Term Newborns metric addresses this gap and measures adverse outcomes resulting in severe or moderate morbidity in otherwise healthy term infants without preexisting conditions. Importantly, this metric also serves as a balancing measure for other maternal measures such as Cesarean Birth (CMS334), Obstetric Trauma Rate - Vaginal Delivery with and without Instrument (PSI-18 and PSI-19), Elective Delivery (CMS113), and neonatal practices such as admissions to rule out sepsis for all infants exposed to chorioamnionitis. The purpose of a balancing measure is to guard against any unanticipated or unintended consequences of quality improvement activities for these measures. Implementation of ePC06 as an electronic clinical quality measure is expected to reduce reporting burden relative to the chart-abstracted (CAM) version of the measure while simultaneously enhancing analytic flexibility and usefulness for quality improvement.

1.11 Measure Webpage

https://www.jointcommission.org/en-us/knowledge-library/support-center/measurem...

1.12 eCQM Data Model

Quality Data Model (QDM) and Clinical Quality Language (CQL)

1.12a Attach MADiE Output

5608e-1.12a-QDM-Spring2026--1-.zip

1.13 Data Dictionary

Attached

1.13a Attach Data Dictionary

5608e-1.13a-DataDictionary-Spring2026.xlsx

1.14 Numerator

Inpatient hospitalization for newborns with severe or moderate complications.

1.14a Numerator Details

This measure has three measure aggregation rates: an overall performance rate (including both severe and moderate complications) and two subgroup aggregation rates of severe complications and moderate complications.

This measure evaluates inpatient hospitalization of single live newborns with severe or moderate

complications. Newborns are classified as having either severe or moderate complications, as described below.

For details on the data elements and value sets, please reference the attached data dictionary (Section 1.13a) and measure specifications (Section 1.12a).

Severe Complications:

Newborns with any of the following severe complication conditions will be included in the measure as a severe complication:

- Discharge status of patient expired or discharged to a health care facility for hospice care.
- Discharged to an acute care facility (ACF) or other health care facility (HCF) with severe complications or without any complications
- Severe morbidities diagnoses, including:
    - Neonatal severe birth trauma
    - Neonatal severe hypoxia or asphyxia
    - Neonatal severe shock and resuscitation
    - Neonatal severe respiratory complications
    - Neonatal severe infection
    - Neonatal severe neurological complications
- Severe morbidities procedures, including:
    - Neonatal severe shock and resuscitation procedures
    - Neonatal severe respiratory procedures
    - Neonatal severe neurological procedures
- Severe septicemia with length of stay more than 4 days or discharged to an ACF or other HCF

Moderate Complications:

Newborns with any of the following moderate complication conditions, when no severe complications are identified, will be included in the measure as a moderate complication:

- Moderate complications diagnoses, including:
    - Neonatal moderate birth trauma
    - Neonatal moderate respiratory complications
- Moderate complications procedures, including:

    - Neonatal moderate respiratory complications procedures
- Vaginal delivery with length of stay more than 2 days OR cesarean birth with length of stay more than 4 days, with any of the following moderate length of stay complications:
    - Moderate complications diagnoses, including:
        - Neonatal moderate birth trauma
        - Neonatal moderate respiratory complications
        - Neonatal moderate infection
    - Moderate complications procedures, including:
        - Neonatal moderate neurological complications procedures
        - Neonatal moderate respiratory complications procedures
- Discharged to an ACF or other HCF with any moderate diagnoses, moderate procedures, or moderate length of stay complications
- Length of stay more than 5 days without jaundice and social indications

1.15 Denominator

The denominator consists of inpatient hospitalization for single newborns who were born in the hospital with a discharge date during the measurement period and with either of the following conditions: Gestational age at birth of >=37 weeks Birth weight 3000 grams or more without gestational age at birth

1.15a Denominator Details

The denominator population for this measure is the same as the initial population and identifies inpatient hospitalizations for newborns who are born in the hospital and are either greater or equal to 37 weeks' gestation or have a birth weight of greater or equal to 3000 grams when gestational age at birth is unavailable.

1. Use the QDM datatype "Encounter, Performed" Diagnosis to identify and include the Single Live Born Newborn Born in Hospital (2.16.840.1.113883.3.117.1.7.1.26) whose encounter ends during day of measurement period.

2. Identify and include full term newborns with >=37 weeks gestation at birth. Use LOINC Code 76516-4 for gestational age at birth when the assessment was performed during the hospitalization.

3. If gestational age is not available, include infants whose birth weight is >= 3000g, as they are more likely to be full term. Use “Assessment, Performed” datatype to evaluate the LOINC code in the Birth Weight value set (2.16.840.1.113762.1.4.1029.194), which the assessment was performed during the hospitalization.

1.15b Denominator Exclusions

The following newborns are excluded from the denominator:

1. Newborns with congenital malformations and genetic diseases

2. Newborns with pre-existing fetal conditions

3. Newborns who were exposed to maternal drug use in-utero

1.15c Denominator Exclusions Details

The newborns with any of the following conditions are excluded from the denominator:

1. Newborns with congenital malformations and genetic diseases (Use ICD-10 and SNOMED CT codes listed in value set "Congenital Malformations" (2.16.840.1.113762.1.4.1029.133)

2. Newborns with pre-existing fetal conditions (Use ICD-10 codes and SNOMED CT listed in value set "Fetal Conditions" (2.16.840.1.113762.1.4.1029.130)

3. Newborns who were exposed to maternal drug use in-utero (Use ICD-10 and SNOMED CT codes listed in value set "Maternal Drug Use" (2.16.840.1.113762.1.4.1029.127)

1.15d Age Group

Children (0-17 years)

1.16 Type of Score

Rate/proportion

1.17 Measure Score Interpretation

Better performance = Lower score

1.18 Calculation of Measure Score

For detailed steps needed to calculate each population, please refer to Section 1.14a (Numerator Details), 1.15a (Denominator Details), 1.15b (Denominator Exclusions), and 1.15c (Denominator Exclusions).

The calculation of the measure score is an aggregate rate generated from count data reported as a rate per 1000 live births.

Overall complication rate =

(Number of encounters in Numerator / (Number of encounters in Denominator – Number of encounters in Denominator Exclusions)) * 1000

Severe complication rate =

(Number of encounters with severe complications / (Number of encounters in Denominator – Number of encounters in Denominator Exclusions)) * 1000

Moderate complication rate =

(Number of encounters with moderate complications / (Number of encounters in Denominator – Number of encounters in Denominator Exclusions)) * 1000

Please see the attached measure specifications for the complete measure logic in Section 1.12a Additionally, a measure flow diagram is included that outlines the initial population, denominator, denominator exclusions, and numerator logic, as well as a sample calculation. Please refer to the attached document for section 1.18a.

1.18a Attach measure score calculation diagram

5608e-1.18a-MeasureCalculation-Spring2026.pdf

1.19 Measure Stratification Details

The ePC-06 measure is not risk-stratified; however, the measure performance rate is stratified

into two outcome subgroups, severe complications (ePC-06.1) and moderate complications (ePC-06.2) which together make up the overall complication rate (ePC-06.0), as defined in the measure specifications. For additional details, please refer to the measure specifications attached in section 1.12a.

1.20 Types of Data Sources

Electronic Health Records

1.21a Data Collection Tool URL(s)

http://example.com

1.25 Data Source Details

Hospitals report EHR data using Certified Electronic Health Record Technology (CEHRT), and by submitting Quality Reporting Document Architecture Category 1 (QRDA-1).

1.26 Minimum Sample Size

The measure does not use sampling. For data reporting, the minimum volume threshold is not established.

2.1 Attach Logic Model

5608e-2.1-LogicModel-Spring2026--2-.docx

2.2 Evidence of Measure Importance

Recent studies have used Unexpected Newborn Complications as either a key outcome or important balancing measure focused on improving obstetric practice, and many offer comparisons to other simultaneously collected neonatal outcome measures. Our analysis also demonstrates substantial performance gaps between organizations in ePC-06 measure scores, indicating meaningful opportunity for improvement. This variation in performance demonstrates that PC-06 meaningfully differentiates organizational performance and supports its use for benchmarking and quality improvement (see Section 2.4, Performance Gap).

The published literature to date is based on the chart-abstracted version of the measure (PC-06, CBE #0716), which was initially endorsed by the Consensus-Based Entity in 2016; the current submission seeks initial endorsement of the electronically specified version (ePC-06), which is aligned with the endorsed chart-abstracted measure.

(1) Shields et al. (2018) implemented a protocol to standardize the response to Category II Fetal Heart Rate patterns in 6 hospitals. Their new protocol showed improved outcomes when compared to baseline: 5-minute Apgar scores <7 were reduced by 24.6%, and Severe Unexpected

Newborn Complications scores were reduced by 26.6%, accompanied by a slight decrease in the cesarean rate (19.8% to 18.3%).

(2) Xu et al. (2019) examined state-wide California data for neonatal outcomes following attempted vaginal birth after prior cesarean delivery. After adjustment for patient risk factors, those delivered at hospitals with above-the-median utilization and success rates of trial of labor had a higher risk for uterine rupture (adjusted risk ratio, 2.74, P < .001), and, using the California Maternal Quality Care Collaborative (CMQCC) recommend Unexpected Newborn Complications (UNC) subsets, severe newborn respiratory complications (adjusted risk ratio, 1.46, P < .001), and severe newborn neurological complications/trauma (adjusted risk ratio, 2.48, P < .001), but they had a lower risk for severe newborn infection (adjusted risk ratio, 0.80, P = .003) and overall Severe Unexpected Newborn Complications (adjusted risk ratio, 0.86, P < .001) as well as shorter length of stays (adjusted mean ratio, 0.948 for mothers and 0.924 for newborns, P < .001 for both).

(3) Kahwati et al. (2019) reported on a large-scale AHRQ study (43 hospitals) using Team Steps to help drive perinatal safety. Statistically significant decreases in indicators for obstetric trauma without instruments and primary cesarean delivery were observed. A statistically significant increase in neonatal birth trauma (AHRQ PSI 17) was observed, but the overall rate of Unexpected Newborn Complications was unchanged. They concluded that the program had a favorable impact on unit patient safety culture and processes, but the short-term impact on maternal and neonatal adverse events was mixed. This study shows that Unexpected Newborn Complications can be used to monitor the impacts of quality improvement initiatives.

(4) Main et al. (2019) used Severe Unexpected Newborn Complications as a balancing measure for a large-scale quality improvement collaborative to reduce primary cesarean births (56 hospitals, 119,000 annual births). Among collaborative hospitals, the nulliparous, term, singleton, vertex (NTSV) cesarean delivery rate fell from 29.3% in 2015 to 25.0% in 2017 (2017 vs 2015 adjusted OR [aOR] 0.76, 95% CI 0.73-0.78). None of the safety measures (Severe Unexpected Newborn Complications, 5-minute Apgar Score <5, chorioamnionitis rate, transfusion rate, and 3rd or 4th degree laceration rate) showed any difference comparing 2017 to 2015. As a sensitivity analysis, the tercile of hospitals with the greatest decline in NTSV cesarean rates (31.2% to 20.6%, 2017 vs 2015 aOR 0.54, 95% CI 0.50-0.58) was examined to evaluate whether they had a greater risk of poor maternal and neonatal outcomes. Again, no measure was statistically worse, and the Severe Unexpected Newborn Complications composite actually improved (3.2% to 2.2%, aOR 0.71, 95% CI 0.55-0.92).

(5) Kuhlmann-Capek (2020) on behalf of the NICHD MFMU Network reported an analysis examining the relationship between Severe Unexpected Newborn Complications and Umbilical artery base deficit (UABD) in nearly 10,000 term infants. There was a significant association

between UABD and both moderate and severe complications, even after adjustment for patient characteristics and cesarean delivery. The association was even stronger for severe than moderate rate of complications and very predictive for the higher quartiles of UABD. For UABD quartile 3, the aOR was 4.24, and for UABD quartile 4, the OR was 32.01.

(6) Dombrowski et al. (2020) examined the risk of trial of labor among mothers with two prior cesarean deliveries (N=42,771). Among these women, trial of labor was rarely attempted (1,228, 2.9%) and was successful in 39.4% of attempts. Trial of labor in this population was not associated with an increase in maternal morbidity but was associated with a modest increase in severe neonatal complications (OR 1.78, 95% CI 1.04-3.04).

(7) Rosenstein et al. (2021) evaluated a statewide California comprehensive quality improvement collaborative to reduce cesarean births. The study included nearly 7.6 million NTSV births and showed a highly significant statewide reduction of the cesarean rate to below the Healthy People (HP) 2030 target of 23.6%. The statewide rate of severe UNC (used as a balancing measure) did not worsen and significantly improved (2.1% to 1.5%).

(8) Panelli et al. (2021) examined maternal and neonatal morbidity after attempted operative vaginal delivery. Successful operative vaginal delivery was associated with reduced severe maternal morbidity (adjusted odds ratio, 0.55; 95% confidence interval, 0.39-0.78) without a difference in severe unexpected neonatal morbidity (adjusted odds ratio, 0.99; 95% confidence interval, 0.78-1.26). In contrast, failed operative vaginal delivery was associated with increased severe maternal morbidity (adjusted odds ratio, 2.14; 95% confidence interval, 1.20-3.82) and severe unexpected neonatal morbidity (adjusted odds ratio, 1.78; 95% confidence interval, 1.09-2.86).

(9) Rosenstein et al. (2024) further explored the statewide cesarean reduction program and compared 65 hospitals that reduced their first-birth cesarean rates to meet the HP 2030 target to 72 hospitals that did not meet the national cesarean target. In the hospitals that met the target, the severe UNC rate fell from 3.6 to 2.8% ($p<0.05$), while in the hospital that did not meet the target, there was no significant reduction (2.8% to 2.5%).

(10) Fineberg et al. (2024) examined in detail the significant reduction of cesarean rates in 3 Sacramento area hospitals during a local effort to reduce cesarean deliveries, focusing on management of the second stage and elective induction of labor. Active phase labor management was more important than labor induction in lowering the cesarean rate. There was no change in the rate of unexpected newborn complications after the interventions.

(11) Clapp et al. (2021) examined the association between severe maternal and neonatal morbidity with cesarean delivery rates. In the unadjusted analysis, every percentage point increase in a hospital's cesarean delivery rate was associated with a 3.4% (95% confidence interval, 2.3%-4.4%) and a 2.3% (95% confidence interval, 1.0%-3.5%) increase in severe maternal morbidity including and excluding transfusion, respectively. After adjustment for the case mix and hospital factors, only the relationship with severe maternal morbidity including transfusion remained significant: 3.3% (95% confidence interval, 1.7%-4.9%) increase in severe maternal morbidity per 1 percentage point increase in the cesarean delivery rate. There was no observed association between cesarean delivery rates and unexpected newborn complications.

Collectively, the published literature provides strong and consistent evidence supporting the importance of measuring Severe Unexpected Newborn Complications as a clinically meaningful outcome and balancing measure for obstetric care. Across twelve recent studies spanning randomized and quasi-experimental interventions, large multi-hospital collaboratives, and statewide observational analyses, UNC has been repeatedly used to evaluate the safety of changes in obstetric practice, including reductions in cesarean delivery, management of labor, operative vaginal delivery, and trial of labor after cesarean. These studies demonstrate that UNC is sensitive to changes in clinical practice, capable of detecting both improvements and tradeoffs, and complementary to other neonatal and maternal outcome measures.

Importantly, UNC has been shown to function effectively as a balancing measure, confirming that efforts to reduce cesarean delivery or alter labor management can be achieved without worsening, and in several cases improving, overall neonatal outcomes. There’s also strong support for the construct validity of UNC shown, in particular, by strong associations with objective markers of neonatal compromise.

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2.3 Anticipated Impact

The ePC-06 measure is intended to improve the quality and safety of intrapartum and immediate neonatal care among otherwise low-risk, term births. By identifying severe and moderate complications that are unexpected given the infant's baseline risk profile, the measure provides actionable information on outcomes that are plausibly influenced by clinical practices during labor, delivery, and the immediate postnatal period.

Prior studies evaluating unexpected newborn complications have demonstrated substantial between-hospital variation in PC-06 rates, even after restricting analyses to low-risk births, indicating that differences in care delivery and site of care contribute meaningfully to observed outcomes. Studies showed that hospital performance on the measure varies widely and is associated with characteristics of obstetric and neonatal care delivery, supporting the measure's ability to discriminate performance and identify opportunities for improvement rather than reflecting random variation alone (Jackson et al., 2025; Sebastião et al., 2017; Clapp et al., 2020).

As a result, implementation of ePC-06 is anticipated to support improvements in patient care by motivating hospitals to review clinical processes associated with preventable newborn morbidity, including fetal surveillance, timely escalation of care, neonatal resuscitation practices, and post-delivery monitoring. Reductions in unexpected complications are expected to translate into fewer NICU admissions, fewer interfacility transfers, and shorter neonatal length of stay, thereby reducing morbidity, resource utilization, and downstream health care costs.

Implementation of ePC06 as an electronic clinical quality measure is expected to reduce reporting burden relative to the chart-abstracted (CAM) version of the measure while simultaneously enhancing analytic flexibility and usefulness for quality improvement. Under CAM, PC06 is reported as aggregated counts of numerator, denominator and exclusion cases, which limits hospitals' ability to efficiently explore underlying patterns, conduct stratified analyses, or perform timely internal review beyond the core numerator and denominator definitions.

In contrast, ePC-06 is reported via QRDA Category I, which allows hospitals and measure stewards to leverage patient-level data for deeper performance analysis, without requiring additional abstraction effort. This capability facilitates more rapid feedback loops and supports targeted quality improvement activities that extend beyond compliance-oriented reporting.

The combination of reduced manual abstraction burden and enhanced analytic capability is expected to improve the overall value of PC-06 measurement and redirect staff resources from data collection toward interpretation, root cause analysis, and improvement initiatives. This shift supports more meaningful use of performance data while preserving the clinical intent of the original measure and maintaining feasibility for broad national adoption.

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2.4 Performance Gap

The performance gap tables below are based on all ePC-06 data submitted by hospitals to Joint Commission as part of the ORYX program for the 2024 reporting period (January 1, 2024-December 31, 2024). The data contains 288 hospitals and a total of 347,915 denominator-eligible encounters. Measure scores are reported as rates per 1,000 live births. The tables show that measure scores vary widely across organizations for the overall, severe, and moderate rates, suggesting opportunities for improvement.

Table 1. Performance Scores by Decile

PC-06.0 (Overall Rate, per 1,000 livebirths): Mean Performance Score by Decile, 1/1/2024 – 12/31/2024

	Overall	Min	Decile 1	Decile 2	Decile 3	Decile 4	Decile 5	Decile 6	Decile 7	Decile 8	Decile 9	Decile 10	Max
Mean Performance Score	**38.9**	**9.3**	**17.1**	**24.1**	**27.1**	**30.7**	**34.0**	**37.5**	**41.3**	**47.6**	**55.3**	**75.8**	**115.4**
N of Entities	**288**	**1**	**29**	**29**	**29**	**29**	**29**	**29**	**29**	**29**	**28**	**28**	**1**
N of Persons / Encounters / Episodes	**347,915**	**107**	**28,368**	**31,774**	**32,760**	**39,951**	**59,713**	**35,775**	**35,010**	**33,670**	**26,653**	**24,241**	**130**

PC-06.1 (Severe Rate, per 1,000 livebirths): Mean Performance Score by Decile, 1/1/2024 – 12/31/2024

	Overall	Min	Decile 1	Decile 2	Decile 3	Decile 4	Decile 5	Decile 6	Decile 7	Decile 8	Decile 9	Decile 10	Max
Mean Performance Score	**14.8**	**0.0**	**3.2**	**6.3**	**8.4**	**10.2**	**12.2**	**14.6**	**16.6**	**19.4**	**23.4**	**34.1**	**84.6**
N of Entities	**288**	**8**	**29**	**29**	**29**	**29**	**29**	**29**	**29**	**29**	**28**	**28**	**1**
N of Persons / Encounters / Episodes	**347,915**	**1,326**	**19,822**	**38,373**	**46,663**	**38,597**	**35,032**	**42,860**	**33,615**	**38,583**	**25,878**	**28,492**	**130**

PC-06.2 (Moderate Rate, per 1,000 livebirths): Mean Performance Score by Decile, 1/1/2024 – 12/31/2024

	Overall	Min	Decile 1	Decile 2	Decile 3	Decile 4	Decile 5	Decile 6	Decile 7	Decile 8	Decile 9	Decile 10	Max
Mean Performance Score	**24.1**	**0.0**	**7.5**	**13.4**	**15.9**	**18.1**	**20.0**	**22.6**	**25.5**	**29.6**	**36.0**	**53.9**	**88.5**
N of Entities	**288**	**3**	**29**	**29**	**29**	**29**	**29**	**29**	**29**	**29**	**28**	**28**	**1**
N of Persons / Encounters / Episodes	**347,915**	**295**	**19,368**	**39,670**	**40,205**	**39,375**	**45,477**	**36,711**	**40,130**	**32,648**	**28,723**	**25,608**	**113**

2.5 Health Care Quality Landscape

Existing perinatal quality measures and quality improvement programs do not fully address the health care needs of term newborns because they focus primarily on clinical processes or maternal outcomes and do not directly measure unexpected morbidity among otherwise healthy term newborns. While current measures such as cesarean delivery rates and elective delivery measures address important drivers of perinatal care quality, they do not capture neonatal outcomes and therefore cannot detect unintended consequences of improvement efforts targeting obstetric practices.

Other available neonatal measures tend to focus on preterm infants, specific diagnoses, or NICU utilization, which are not appropriate for evaluating outcomes among the majority of births that are term and initially low risk.

Quality improvement initiatives have demonstrated that neonatal outcomes can be improved through targeted interventions; however, without a standardized, endorsed outcome measure, these efforts cannot be consistently evaluated or compared across organizations. ePC-06 uniquely fills this critical gap by providing a validated, hospital level outcome measure that reflects the combined effects of obstetric and neonatal care and can be used both as a primary outcome and as a balancing measure for other perinatal quality initiatives.

2.6 Meaningfulness to Target Population

ePC-06: Unexpected Complications in Term Newborns measure is an eCQM that is aligned with the chart-abstracted Unexpected Complications in Term Newborns measure (CBE #0716) developed and stewarded by the California Maternal Quality Care Collaborative (CMQCC). Joint Commission and CMQCC collaborate to align on measure specifications and clinical intent. Assessment for the meaningfulness of the measure aligns with both formats of the measure as the patient population and clinical intent is the same.

This measure was evaluated by CMQCC for meaningfulness by a group of 22 experts including neonatologists, obstetricians, nursing leaders and childcare advocates. The summary question was to assess the statement “This measure, as specified, provides an accurate reflection of quality and can be used to distinguish the quality of obstetric and neonatal care at the hospital level”. The rating scale had 5 levels (1-5) with the following narrative anchors: 1=Strongly Disagree; 2= Somewhat Disagree; 3=Neutral; 4=Somewhat Agree; 5= Strongly Agree. Out of the 22 participants, 19 (86%) gave the measure a rating of 5, thereby strongly agreeing that the scores from the measure as specified would provide a useful reflection of quality. The mean rating was very high 4.82/5 and none of the participants disagreed with the statement.

The International Consortium for Healthcare Outcome Measurement (ICHOM) Pregnancy and Childbirth Standard set was developed by an international group of leading physicians, measurement experts and patients. Neonatal morbidity and neonatal health outcomes were identified as central to measuring what matters most to birthing individuals and families. ePC-06 is aligned with the ICHOM framework because it evaluates severe and moderate neonatal complications among full-term newborns without pre-existing conditions, serving as a key outcome measure of neonatal safety. The target population, families with term newborns, value bringing home a healthy baby as an important outcome of childbirth, making neonatal morbidity a highly meaningful indicator of care quality.

There has been strong interest in the use of this measure to help provide a more rounded view of hospital maternity care beyond rates of cesarean deliveries and maternal morbidity to add a focused term infant morbidity measure. To support this interest, Joint Commission developed ePC-06 to align with the CAM Unexpected Complications in Term Newborn measure. The eCQM has been implemented by 288 hospitals nationwide for reporting year 2024 to support perinatal quality improvement with QI projects in both neonatal and maternal care. US News & World Report has included Unexpected Complications in Term Newborns in their annual assessment of hospitals with maternity services. Joint Commission offers an Advanced Certification in Perinatal Care (ACPC) and an Outcomes-Driven Certification in Perinatal Care (ODC-PC) which both collect and benchmark the Unexpected Complications in Term Newborns measure to drive performance improvements in clinical outcomes, allowing both the CAM and eCQM versions. The Joint Commission's ORYX® initiative integrates performance measurement data into the accreditation process including the Unexpected Complications in Term Newborns measure.

Reference:

California Maternal Quality Care Collaborative (CMQCC). (2025). Unexpected Complications in Term Infants (CBE #0716). Partnership for Quality Measurement. https://p4qm.org/measures/0716

3.1 Contributions Towards Closing Care Gaps

This section is optional for the Spring 2026 cycle. We provide the disparity analyses conducted by CMQCC (the measure steward for the chart-abstracted PC-06 measure) for the CBE submission of the chart-abstracted measure in the 7.1 Supplemental Attachment.

Reference:

California Maternal Quality Care Collaborative (CMQCC). (2025). Unexpected Complications in Term Infants (CBE #0716). Partnership for Quality

Measurement. https://p4qm.org/measures/0716

4.1a Data Structure and Availability

Pilot testing. During pilot testing conducted in 2019-2020, we found that the vast majority of required ePC-06 data elements are routinely generated during care delivery, supported by standard clinical workflows, and available from electronic health record (EHR) systems. These data elements are collected as part of routine obstetric care, including patient demographics, encounter type and diagnosis, assessments performed, encounter diagnoses, and procedures.

The majority of the required data elements were also available in structured electronic fields. The only notable exception identified during testing was the availability and accuracy of the exact procedure start and stop timestamps Also, we found that one site did not have severe shock and resuscitation procedures in the EHR structured fields because, as part of the Code Blue documentation protocol, these procedures are scanned as a PDF and uploaded to the EHR system. To address this data element, we recommended that the hospital should enter the information in a discreet field in the EHR. For the site that only provided the procedure date without timing, we updated the measure logic by adding “day of” to resolve this issue.

Overall, pilot testing demonstrated minimal missing data for required elements, and missingness was largely attributable to known documentation variation rather than absence of electronic data. The measure is not susceptible to inaccuracies, because it relies on routinely used, well-established clinical data elements rather than subjective assessments or free-text interpretation.

Implementation Across EHR Vendors. Since testing, the measure has been implemented across multiple major EHR platforms. As of calendar year 2024, the following EHR vendors supported submission of the ePC-06 measure to Joint Commission’s Direct Data Submission Platform (DDSP), which is used for submission of ORYX performance measurement data by accredited organizations meeting ORYX Requirements: Epic; Oracle Health (formerly Cerner Millennium); MEDITECH; Altera Digital Health; ENCORE-e. Collectively, these EHR systems support most U.S. acute-care hospitals, demonstrating that the measure is technically feasible across diverse vendor environments. Successful implementation across multiple EHR platforms further supports that the required data elements are electronically available and captured through routine clinical workflows.

4.1b Implementation Costs and Burden

The implementation of this measure incurs minimal costs since it leverages existing data from the electronic health record. There are no requirements for additional data entry or significant modifications to clinician workflow, as all utilized data elements are byproducts of standard clinical documentation. While initial uptake may introduce cost for initial implementation, the

future use of eCQM will decrease the burden of manual abstraction for the chart-abstracted measure.

4.1c Confidentiality

The ePC-06 measure is designed to be collected and reported in a manner that protects patient confidentiality and complies with all applicable federal and state privacy requirements, including HIPAA. The measure relies exclusively on data elements that are routinely captured in certified electronic health record technology (CEHRT) as part of standard clinical care, such as diagnosis codes, procedure codes, discharge disposition, and dates of service. No additional patient data collection, contact with patients, or patient surveys are required for the measure calculation.

Hospitals submit ePC-06 data using Quality Reporting Document Architecture (QRDA) Category I, in which each XML file contains structured, encounter-level clinical data for individual patients who meet the initial patient population criteria for selected electronic clinical quality measures. While QRDA I files include patient-level information, submissions are transmitted through secure, established reporting systems and are subject to Joint Commission data-security and privacy controls. Direct patient identifiers are not used for public reporting or external dissemination of measure results.

4.2 Attach Feasibility Scorecard

5408-4.2-Scorecard-Spring2026.xlsx

4.3 Feasibility Informed Final Measure

The CBE feasibility scorecard results for ePC-06 indicate that the vast majority of required data elements demonstrate high feasibility across both EHR implementations, with 79–100% of elements within each domain not requiring review. The limited issues identified are concentrated almost exclusively in data accuracy and workflow domains for procedure-level start and stop date/time fields and availability of data sources for code blue procedure documentation. The measure logic was updated to address the issues identified with procedure start and stop date/time fields. Regarding data source availability for code blue procedure documentation, to address this data element we recommended that the hospital enter the information in a discrete field within the EHR.

As a result, the observed feasibility concerns do not affect denominator identification, numerator classification, or risk stratification, nor do they introduce ambiguity into the measure’s clinical intent. Core data elements—including encounter type, diagnoses, birth weight, gestational age, discharge disposition, and procedure occurrence—demonstrated consistently high availability, accuracy, standards alignment, and workflow integration across both EHRs.

Based on the feasibility findings, only minimal changes were required to the final ePC-06 specifications; therefore, no significant revisions to the measure logic, required data elements, or implementation requirements were necessary.

Feasibility is further supported by recent EHR vendor implementation practices. ePC-06 has now been implemented using structured fields within major EHR systems, reducing reliance on unstructured documentation and supporting consistent, automated reporting. Correspondingly, 288 organizations successfully submitted ePC-06 as an eCQM to the Joint Commission in 2024, providing empirical evidence that the measure is operationally feasible to implement and report at scale.

In summary, the feasibility scorecard findings reflect documentation variability in non-critical timestamp fields rather than substantive limitations in the availability or reliability of data required to calculate the ePC-06 measure. Taken together with widespread EHR implementation and demonstrated national reporting, these findings indicate that ePC-06 is feasible to implement and does not pose a barrier to accurate, consistent reporting across health systems.

4.4 Proprietary Information

Not a proprietary measure and no proprietary components

5.1.1 Data Used for Testing

We used data reported by hospitals to Joint Commission through the ORYX program for the 2024 reporting period (January 1, 2024 – December 31, 2024). For analytic testing purposes, we recalculated ePC-06 scores by applying the updated numerator logic finalized in the 2026 measure specifications (as described in Section 1.14a) to the 2024 encounter-level data.

Prior versions of the measure specification classified newborns with a discharge disposition of transfer as having a severe unexpected complication by default, even when only moderate complication diagnosis or procedure codes were present. This resulted in over-classification of severe complications, particularly for hospitals without NICU capability that appropriately transfer newborns for higher-level care. The 2026 numerator updates corrected this issue by allowing transferred cases to meet criteria for moderate complications when moderate complication codes are present, improving clinical validity and alignment with real-world care patterns (see Section 6.2.3). Applying the 2026 numerator logic to the data therefore allowed us to evaluate measure performance under the most current measure specification.

This dataset was used for all reliability, validity, and performance gap analyses, with the exception of feasibility and data-element validity testing. The analytic dataset included 288 hospitals and 347,915 denominator-eligible encounters. Both encounter-level and hospital-level data were used

in analyses.

For feasibility and data-element validity assessment, we used data collected during pilot testing (conducted between March 2019 and August 2020) from two hospital systems. The pilot data includes 6,699 cases from 18 hospitals using two different EHR systems (Epic and Cerner). To assess data-element validity, a total of 61 sample cases were re-abstracted through virtual site visits. These analyses focused on the accuracy and reliability of individual data elements required to calculate the measure and are not affected by subsequent updates to measure logic; changes to numerator classification rules do not alter the underlying data elements assessed for feasibility or validity.

5.1.1a Dates of Testing Data

All testing except feasibility and data element validity: January 1, 2024 – December 31, 2024

Feasibility and data element validity: Cases submitted ranged from January 7, 2019, to March 25, 2019, for one system, and from July 14, 2019, to September 28, 2019, for the other.

5.1.2 Differences in Data

Please see sections 5.1.1 and 5.1.1a.

5.1.3 Characteristics of Measured Entities

288 hospitals reported ePC-06 to Joint Commission for the 2024 reporting period. See Supplementary Table 2 in the 7.1 Supplemental Attachment for a breakdown of hospital characteristics among these organizations. Overall, the sample was predominantly composed of acute care hospitals (88.5%), with a small proportion of Department of Defense acute care facilities (6.6%) and critical access hospitals (2.8%). Most hospitals were located in urban areas (79.9%). Geographically, hospitals were most commonly located in the South (42.7%), followed by the Midwest (24.7%), West (19.4%), and Northeast (11.1%). Hospital size varied, ranging from hospitals with 6-24 total beds to hospitals with 500+ beds.

5.1.4 Characteristics of Units of the Eligible Population

A total of 347,915 denominator-eligible encounters were included across the 288 hospitals that reported ePC-06 to Joint Commission for the 2024 reporting period. See Supplementary Table 3 in the 7.1 Supplemental Attachment for a breakdown of patient characteristics among these denominator-eligible encounters. The majority of patients were not Hispanic or Latino (65.7%), while 21.8% identified as Hispanic or Latino. More than half of patients were White (52.9%), followed by Black or African American (13.1%), and Asian (4.4%). The distribution of sex was nearly equal, with 47.2% female.

5.2.1 Level(s) of Reliability Testing Conducted

Accountable entity level (i.e., measure score) (e.g., signal-to-noise analysis)

5.2.2 Method(s) of Reliability Testing

We assessed signal-to-noise reliability that describes how well the clinical quality measure can distinguish performance of one hospital from another (Adams et al., 2010; Yu et al., 2013). The signal is the proportion of the variability in measured performance that can be explained by real differences in performance across hospitals (true quality of perinatal care). Noise variance is the portion of variation in measured performance that is due to random variation (e.g., sampling variability, measurement error, unmeasured patient heterogeneity) rather than true differences in quality.

Reliability scores range from 0 to 1. A reliability of 0 implies that all variability in a measure is attributable to measurement error. Conversely, a reliability of 1 implies that all variability is attributable to true differences in performance.

Since the measured outcome at the patient level is binary (a patient did or did not have a complication), the number of newborn complications observed at a given hospital can be modeled as a binomial process, with variability driven by sample size and random patient-level fluctuation (stochastic variation in outcomes that arises because individual patients, even with similar observed characteristics, do not have identical risks of experiencing an event). At the same time, hospitals differ in their true underlying rate of newborn complications, reflecting real heterogeneity in performance across institutions. The beta-binomial model formalizes this structure by assuming that hospital-specific probabilities of newborn complications are drawn from a beta distribution, which captures between-hospital variability (signal), while observed event counts conditional on those probabilities follow a binomial distribution, capturing within-hospital sampling variability (noise). This hierarchical formulation allows the total observed variance in hospital performance to be decomposed into signal and noise components, providing a principled basis for estimating signal-to-noise reliability for measures derived from binary patient-level outcomes. The resulting reliability for each hospital is defined as: reliability = signal variance / (signal variance + noise variance).

References:

1. Adams, J. (2009, June 25). *The reliability of provider profiling: A tutorial* (Technical Report No. TR-653). RAND Corporation. https://www.rand.org/pubs/technical_reports/TR653.html

2. Adams, J. L., Mehrotra, A., Thomas, J. W., & McGlynn, E. A. (2010). Physician cost profiling—Reliability and risk of misclassification. *New England Journal of Medicine, 362*(11),

1014–1021. https://doi.org/10.1056/NEJMsa0906323

3. Yu, H., Mehrotra, A., & Adams, J. (2013). Reliability of utilization measures for primary care physician profiling. *Healthcare, 1*(1–2), 22–29. https://doi.org/10.1016/j.hjdsi.2013.04.002

5.2.3 Reliability Testing Results

Table 2a below contains the distribution of reliability estimates across hospitals for each of the three numerator strata (overall, severe, and moderate rates) by deciles of N, or the number of denominator-eligible encounters.

Table 2b provides the distribution of reliability estimates by deciles of reliability.

5.2.4 Interpretation of Reliability Results

Across all three ePC-06 numerator strata, reliability increased as the denominator size increased, and the CBE reliability threshold (≥0.6) was met for the majority of hospitals, supporting the use of these measures for hospital-level performance assessment while appropriately acknowledging increased uncertainty among the smallest volume entities**.**

ePC-06.0 (Overall Rate). The overall mean signal-to-noise reliability for the ePC-06.0 measure was 0.758, with over 80% of hospitals having a reliability of 0.6 or above, indicating acceptable reliability at the hospital level. Mean reliability estimates across denominator deciles ranged from 0.415 to 0.941 (Table 2a), with a minimum and maximum reliability of 0.159 and 0.972, respectively (Table 2b). While reliability was lower among the smaller denominator deciles, reliability increased monotonically with increasing denominator size and exceeded the CBE-recommended threshold of 0.6 beginning in Decile 3 and all higher deciles of denominator size. These findings demonstrate that, for the majority of hospitals, particularly those with moderate to large volumes, the measure reliably distinguishes true differences in performance from random variation.

ePC-06.1 (Severe Rate). For the ePC-06.1 measure, the overall mean signal-to-noise reliability was 0.698, with over 70% of hospitals having a reliability of 0.6 or above, meeting the CBE criterion for acceptable reliability. Mean reliability estimates across denominator deciles ranged from 0.411 to 0.900 (Table 2a), with a minimum and maximum reliability of 0.064 and 1.000, respectively (Table 2b). As expected for a rarer outcome, reliability was lower among hospitals with the smallest denominators; however, mean reliability met and exceeded the 0.6 threshold in Decile 4 and remained high across all higher deciles of denominator size. This pattern indicates that the severe complication rate is sufficiently reliable for hospital-level assessment among most

reporting entities and that observed variation in performance for higher volume hospitals reflects true differences rather than random noise.

ePC-06.2 (Moderate Rate). The ePC-06.2 measure demonstrated strong reliability, with an overall mean signal-to-noise reliability of 0.760, with over 80% of hospitals having a reliability of 0.6 or above. Mean reliability estimates across denominator deciles ranged from 0.475 to 0.943 (Table 2a), with a minimum and maximum reliability of 0.127 and 1.000, respectively (Table 2b). Mean reliability exceeded the CBE recommended threshold of 0.6 in Decile 3 and remained above this threshold for all higher deciles of denominator size, indicating robust performance discrimination for the majority of hospitals. Compared with the severe rate, the moderate rate achieved higher reliability at lower denominator sizes, consistent with the higher event frequency and greater statistical stability of this outcome.

Taken together, these results demonstrate that the ePC-06.0 (overall rate of complications), ePC-06.1 (severe rate of complications), and ePC-06.2 (moderate rate of complications) measures meet CBE expectations for accountable entity-level reliability.

Table 2a. Accountable Entity Level Reliability Testing Results by Denominator, Target Population Size

ePC-06.0 (Overall Rate, per 1,000 livebirths) Reliability by Denominator Decile, hospital level, 1/1/2024 - 12/31/2024

Metric	Overall	Min	Decile 1	Decile 2	Decile 3	Decile 4	Decile 5	Decile 6	Decile 7	Decile 8	Decile 9	Decile 10	Max
Reliability	0.76	0.16	0.42	0.58	0.64	0.73	0.79	0.81	0.86	0.89	0.92	0.94	0.97
Mean Performance Score	38.88	53.57	41.12	36.45	43.15	38.51	37.44	43.51	39.93	35.93	33.90	38.66	35.36
N of Entities	288	1	29	29	29	29	29	29	29	29	28	28	1
N of Persons / Encounters / Episodes	347,915	56	3,973	7,817	11,649	16,511	22,609	29,553	38,516	48,086	64,776	104,425	6,137

ePC-06.1 (Severe Rate, per 1,000 livebirths) Reliability by Denominator Decile, hospital level, 1/1/2024 - 12/31/2024

Metric	Overall	Min	Decile 1	Decile 2	Decile 3	Decile 4	Decile 5	Decile 6	Decile 7	Decile 8	Decile 9	Decile 10	Max
Reliability	0.70	0.12	0.41	0.50	0.54	0.66	0.70	0.73	0.82	0.85	0.88	0.90	0.93
Mean Performance Score	14.76	17.86	18.67	14.51	16.04	13.16	15.00	16.34	12.63	12.44	12.82	15.99	19.88
N of Entities	288	1	29	29	29	29	29	29	29	29	28	28	1
N of Persons / Encounters / Episodes	347,915	56	3,973	7,817	11,649	16,511	22,609	29,553	38,516	48,086	64,776	104,425	6,137

ePC-06.2 (Moderate Rate, per 1,000 livebirths) Reliability by Denominator Decile, hospital level, 1/1/2024 - 12/31/2024

Metric	Overall	Min	Decile 1	Decile 2	Decile 3	Decile 4	Decile 5	Decile 6	Decile 7	Decile 8	Decile 9	Decile 10	Max
Reliability	0.76	0.15	0.48	0.59	0.64	0.72	0.80	0.81	0.84	0.89	0.92	0.94	0.98
Mean Performance Score	24.11	35.71	22.45	21.94	27.11	25.34	22.44	27.17	27.30	23.49	21.08	22.67	15.48
N of Entities	288	1	29	29	29	29	29	29	29	29	28	28	1
N of Persons / Encounters / Episodes	347,915	56	3,973	7,817	11,649	16,511	22,609	29,553	38,516	48,086	64,776	104,425	6,137

Table 2b. Accountable Entity Level Reliability Testing Results by Reliability Score

Example: Reliability by Decile, hospital level, 1/1/2024 - 12/31/2024

Measure	Overall	Min	Decile 1	Decile 2	Decile 3	Decile 4	Decile 5	Decile 6	Decile 7	Decile 8	Decile 9	Decile 10	Max
Overall rate (PC-06.0)	0.76	0.16	0.37	0.56	0.65	0.74	0.79	0.83	0.87	0.90	0.93	0.95	0.97
Severe rate (PC-06.1)	0.70	0.06	0.25	0.44	0.58	0.66	0.72	0.78	0.83	0.87	0.91	0.96	1.00
Moderate rate (PC-06.2)	0.76	0.13	0.37	0.55	0.66	0.74	0.79	0.84	0.88	0.90	0.93	0.96	1.00

5.3.1 Level(s) of Validity Testing Conducted

Person or encounter level (i.e., data element) (e.g., sensitivity and specificity), Accountable entity level (i.e., measure score) (e.g., criterion validity)

5.3.2 Type of Accountable Entity Level Validity Testing Conducted

Empirical validity testing at the accountable entity-level (e.g., criterion validity, construct validity, known groups analysis)

5.3.3 Method(s) of Validity Testing

1. Data element validity. Data element validity for the measure was assessed through a re-abstraction study designed to evaluate the accuracy of patient-level data elements used in measure calculation. All required clinical and editable demographic data elements were manually re-abstracted from the full medical record by trained reviewers, with the original, electronically extracted (EHR-derived) data blinded to minimize bias. The re-abstracted values served as the gold standard and were compared to the original EHR-derived data at both the individual data-element level and the overall measure result level. Any discrepancies were reviewed and adjudicated with reasons documented. Agreement between the original EHR-derived and re-abstracted data reflects the accuracy of the electronic data extraction (construct validity), rather than consistency between abstractors reviewing the same source (inter-abstractor reliability). In this context, Cohen's kappa statistic quantifies the chance-corrected agreement between the electronic data and the gold standard, supporting inference regarding data element-level and measure-level validity.

Agreement was evaluated separately for clinical and demographic data elements. For the overall measure result, agreement was quantified using the Cohen's kappa statistic, which corrects for chance agreement and is consistent with CBE guidance for inter-rater reliability and data element validity testing. Data element-level agreement was assessed using percent agreement (match rates) across abstraction pairs.

The assessment included re-abstraction across two independent systems, with a total of 61 abstracted patient records contributing to the combined analysis. All critical data elements contributing to the numerator, denominator, and exclusions were included in the evaluation.

2. Convergent validity. The convergent validity of ePC-06 was evaluated based on a-priori hypotheses derived from prior published work (Jackson et al., 2025), which examined relationships among perinatal quality measures capturing obstetric practice patterns and neonatal outcomes.

Based on the literature and underlying clinical logic, we hypothesized that ePC-06 would be negatively associated with PC-02 (Cesarean Birth), reflecting differences in obstetric management strategies that may influence neonatal complication risk. We also hypothesized that these associations would be stronger for severe neonatal complications (ePC-06.1) than for moderate complications (ePC-06.2), as severe neonatal morbidity is more closely tied to delivery complexity

and maternal clinical instability.

We assessed convergent validity at the accountable-entity level by examining the correlations between hospital-level ePC-06 rates and established perinatal quality measures that reflect related constructs of obstetric and neonatal care quality (PC-02: Cesarian Birth). We opted to use Spearman rank-order correlation because hospital performance rates are non-normally distributed, may include outliers, and the relationships between the measures may not necessarily be linear. Rank-based correlations are therefore more appropriate and robust for evaluating hospital-level associations in this context.

As a sensitivity test, to mitigate the influence of potential outliers on the estimated correlation coefficients, we trimmed observations with values outside the 1st and 99th percentiles.

Analyses were conducted among hospitals with non-missing data for both measures in each comparison. Statistical significance was assessed using two-sided tests, with interpretation focused on direction, magnitude, and clinical significance, rather than statistical significance alone.

3. Known group validity. The known group validity (a type of construct validity) was assessed by:

1. Comparing the length of stay (LOS) for newborns with and without complications (ePC-06.0 overall rate). We hypothesized that newborns with complications will have longer LOS than those without complications.

2. Comparing the LOS among newborns with complications (ePC-06.0 overall rate) at hospitals with and without NICUs. We hypothesized that there will be a longer LOS for newborns with complications at NICU hospitals, reflecting greater on-site capability to provide prolonged neonatal care whereas non-NICU hospitals are more likely to transfer newborns with complications to higher-level facilities thereby shortening their LOS at the non-NICU facilities.

Because the numbers of moderate (ePC-06.2) and severe (ePC-06.1) complications were relatively small in the analytic sample, resulting in limited statistical power and unstable estimates, we restricted formal hypothesis testing to the overall neonatal complication rate (ePC-06.0), which provided a more robust and reliable basis for hypothesis testing.

References:

Jackson, F. I., Vintzileos, A. M., Abelman, S. H., Suarez, F., Combs, A., Klein, V., Davidoff, A., Rochelson, B. L., & Blitz, M. J. (2025). Integrating cesarean delivery rates with maternal and neonatal outcomes: A dyadic framework for perinatal quality assessment. *American Journal of Obstetrics & Gynecology, 234*(1, Suppl.), S47–S56.

5.3.4 Validity Testing Results

Data element validity. At the measure level, agreement between the electronically extracted and re-abstracted measure results was high. Across both systems, the overall agreement rate was 98.4%, with an overall kappa of 0.97. These findings support the accuracy of the electronic data extraction as a prerequisite for criterion validity of the computed measure score.

At the data element level, agreement was generally high across core clinical elements used to define eligibility, timing, and outcomes. Key elements such as admission and discharge date/time, birth weight, gestational age, encounter type, medical record number, organizational identifiers, and inpatient status demonstrated perfect or near-perfect agreement across abstraction pairs.

Some variability was observed for a small subset of elements. Secondary diagnoses and procedure start date/time exhibited lower agreement rates, which the testing documentation attributes to differences in how these elements were collected and documented relative to abstraction instructions. The lower agreement observed for procedure start and stop time data elements was addressed by updating the measure logic. In addition, demographic elements such as race and ethnicity (which are not required by the measure calculation) showed lower agreement compared with other data elements, reflecting known challenges in the consistent capture of these fields in clinical systems rather than deficiencies in the measure logic itself.

Despite these exceptions, the overall pattern of results indicates that the critical clinical data elements driving measure calculation are captured with high accuracy, and that variability in secondary or demographic fields does not materially affect the validity of the measure score. The high measure-level kappa further supports that discrepancies at the individual data-element level do not translate into meaningful disagreement in the final measure result.

For the EHR vendors supporting measure submission to JC’s Direct Data Submission Platform (DDSP) see section 4.1a.

Convergent validity.

Association with PC-02 (Cesarean Birth).

1. ePC-06.0 (overall rate) showed a small negative correlation with PC-02 (Spearman $\rho = -0.11$), which did not reach statistical significance at the $p \leq 0.05$ level ($p=0.08$).

2. ePC-06.1 (severe rate) demonstrated a small but statistically significant ($p<0.001$) negative correlation with PC-02 (Spearman $\rho = -0.20$).

3. ePC-06.2 (moderate rate) showed no meaningful association with PC-02 (Spearman $\rho = 0.03$).

The weak negative association between ePC-06 and PC-02 is consistent with the role of PC-06 as a balancing measure, suggesting that hospitals with lower cesarean delivery rates may, in some settings, experience higher rates of overall unexpected neonatal complications.

Known group validity.

Newborns with any ePC-06 complication (ePC-06.0) had substantially longer hospital stays than newborns without complications. Among newborns with ePC-06.0 complications (n = 13,123), the mean LOS was 4.1 days, and the median LOS was 3.2 days. In contrast, newborns without any ePC-06 complications (n = 334,792) had a mean and median LOS of 1.9 days. The difference in the mean LOS (2.1 days) between newborns with and without complications was statistically significant at $p<0.001$ based on a two-sided t-test.

Hospitals with NICU capability exhibited longer LOS among newborns with complications compared with non-NICU hospitals. The mean and median LOS for newborns with complications at NICU hospitals was 4.5 days and 3.6 days, respectively, compared to 2.7 and 2.3 days at the non-NICU hospitals. The difference in the mean LOS among newborns with any complications in NICU vs. non-NICU hospitals was 1.8 days and was statistically significant at $p<0.001$ using a two-sided t-test.

Note: we could not obtain NICU status for 11 hospitals (3.8% of the sample). Hospitals with missing NICU status showed LOS patterns similar to non-NICU hospitals.

5.3.4a Attach Additional Validity Testing Results

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5.3.5 Interpretation of Validity Results

Data element validity. The data element validity testing provides strong evidence that the ePC-06 measure is calculated from accurate and consistently captured clinical data elements, and that the resulting measure scores are valid representations of hospital performance. The excellent measure-level agreement, combined with high agreement for key clinical data elements, supports the data-element validity of the measure.

Convergent validity. The results of the convergent validity (i.e., the negative association between ePC-06 and ePC-02) testing are directionally consistent with Jackson et al. (2025) and with the prespecified hypotheses regarding the relationships among cesarean delivery rates, neonatal complications, and severe obstetric morbidity.

Higher cesarean delivery rates (ePC-02) were weakly associated with lower rates of unexpected neonatal complications, particularly for the overall rate (ePC-06.0) and the severe complication rate (ePC-06.1). This inverse association suggests that obstetric practice patterns that favor cesarean delivery in selected clinical scenarios may reduce exposure to the most serious neonatal adverse events, such as hypoxic injury, birth trauma, or emergent postnatal instability that necessitates transfer to higher-level care. These mechanisms are plausible for severe complications, which are more directly influenced by intrapartum decision-making and the timing and mode of delivery.

In contrast, the association between cesarean delivery rates and moderate neonatal complications was minimal, indicating that variation in cesarean use appears to have less influence on outcomes that are more sensitive to postnatal care practices, clinical observation thresholds, or local neonatal management protocols. Taken together, these findings are consistent with prior work suggesting that cesarean delivery may play a protective role against a subset of rare but severe neonatal outcomes, while simultaneously underscoring the importance of monitoring neonatal safety as cesarean reduction initiatives are pursued.

Importantly, the observed associations were small in magnitude, reinforcing that cesarean delivery rates alone do not determine neonatal outcomes. Instead, these results support the

interpretation of ePC-06 as a complementary outcome measure that reflects the combined effects of obstetric and neonatal care quality, rather than a direct inverse indicator of cesarean utilization.

Consistent with our hypothesis, the strongest and most consistent associations were observed for the severe neonatal complications (ePC-06.1), while correlations involving moderate neonatal complications (ePC-06.2) were small and not statistically significant. This pattern supports the clinical expectation that severe neonatal outcomes are more tightly linked to delivery complexity and maternal clinical instability than moderate complications.

Although the magnitude of correlations observed in this study is attenuated relative to those reported by Jackson et al. (2025), these differences can be plausibly attributed to the larger and more heterogeneous national hospital sample used in our analyses. Larger, more diverse samples are expected to yield smaller but more generalizable associations. Importantly, the direction and relative strength of associations across ePC-06 numerator strata closely mirror clinical expectations, providing supportive evidence of convergent validity.

Known group validity. Our analyses confirmed the hypotheses that unexpected neonatal complications are associated with longer hospital stays and that patients with complications have longer length of stay at the NICU hospitals.

Length of stay by complication status. As hypothesized, newborns experiencing ePC-06.0 complications had substantially longer hospital stays than newborns without complications. Newborns with complications had a mean LOS of approximately 4.1 days (median = 3.2 days), compared with a mean and median LOS of approximately 1.9 days among newborns without complications. The clear separation in both mean and median LOS indicates that PC-06.0 identifies clinically meaningful events associated with increased resource utilization and care intensity, rather than transient or minor conditions. This finding supports the construct validity of the measure and is consistent with expectations that unexpected neonatal complications prolong hospitalization.

Length of stay for newborns with complications by NICU status. Consistent with our hypothesis, hospitals with NICU capability exhibited longer LOS for the newborns with complications compared to non-NICU hospitals. The difference in the mean and median LOS between the NICU and non-NICU hospitals was 1.8 and 1.3 days, respectively. Observed pattern is clinically expected and likely reflects differences in care settings, with NICU hospitals more likely to retain and manage higher-acuity neonatal cases rather than transferring them. The direction of these findings supports the interpretation that newborns with complications have

longer LOS at NICU hospitals.

5.4.1 Methods Used to Address Risk Factors

No risk adjustment or stratification

5.4.1b Rationale For No Adjustment or Stratification

RATIONALE

The California Maternal Quality Care Collaborative (CMQCC) is the measure steward and original measure developer for the chart-abstracted version of the Unexpected Complications in Term Newborns measure. Joint Commission converted the chart-abstracted measure to an eCQM and works with CMQCC to keep the measures aligned. Importantly, the decision to not risk-adjust ePC-06 aligns with the chart-abstracted version of the measure (PC-06, CBE #0716) which is currently endorsed by CBE as a non-risk-adjusted outcome. In the context of healthcare performance assessment, the purpose of a risk adjustment model is to reduce bias due to case mix characteristics present at the start of care (in this case, the admission for the birth of the baby). This measure is not risk-adjusted but rather uses denominator exclusions to identify a standard low-risk population (described in Section 1). When constructing the measure, the exclusion criteria were chosen to ensure that the target population would be healthy, term babies with no pre-existing complications, thus reducing bias due to case mix complications. Newborns more at risk for experiencing adverse outcomes (premature babies, low birth weight infants, babies with congenital malformations, exposure to maternal substance use, and other fetal conditions) were excluded from the target population. Thus, many factors that could drive the need for risk adjustment were excluded a priori.

In alignment with CMQCC, we did not adjust for gestational age within the term range (37-43 weeks) based on the recognition that morbidity prevalence differs across gestational ages due to varying obstetric practices, such as elective early deliveries (prior to 39 weeks) or delayed inductions beyond 41 weeks, which directly influence neonatal outcomes. The effect of these practices themselves is important to be included in the measure.

Variables related to quality of care are purposely not included in risk models for performance measures used to assess quality. Risk adjustment should not mask or adjust for factors that are driving the differences in neonatal health outcomes at hospitals. Accordingly, we did not adjust for a hospital’s neonatal intensive care unit level, birth volume, ownership status, teaching status, or number of maternal-fetal care specialists. Finally, our exclusions already account for most conditions typically associated with social risk factors, like preterm birth or poor fetal growth, thus no additional social risk adjustments were performed.

Analyses and interpretations performed by the California Maternal Quality Care Collaborative (CMQCC) in their submission of a chart-abstracted version of this measure that supports the decision not to adjust for patient factors are summarized below, with the conclusion that these factors did not meaningfully change hospital-level UNC rates.

However, CMQCC documented in its endorsement application that hospitals' performance on the measure varies based on hospitals' American Academy of Pediatrics (AAP) neonatal care levels. AAP Level I facilities do not have a NICU and therefore must transfer a higher proportion of infants out (which are all severe UNC). This effect was also reported in the literature. CMQCC also showed that hospitals without a NICU are typically the lowest volume facilities and thus also have less reliable scores. Given this finding, CMQCC recommended separate reporting for hospitals without a NICU (AAP Level 1) to allow for focused quality improvement efforts.

In response to measure feedback from organizations and CMQCC, Joint Commission revised measure specifications for the 2026 reporting year. The specifications were updated to allow cases to meet criteria for moderate complications when a newborn has a discharge disposition transfer to an acute care facility or other health care facility and moderate complication codes. Those transfers without a moderate complication code are still counted as severe complications. Given this change, we expect coding of moderate complications related to transfers to increase and transfers defaulting to severe because no complication is specified to decrease. The change improves alignment with clinical practice (see section 5.1.1 for details). All empirical analyses presented in this submission (with the exception of data-element validity testing) were conducted based on the data reflecting updated measure specifications for 2026 reporting year.

Given the influence of NICU status on transfers, programs can tailor how they use the measure to their program needs. JC's Outcomes-Driven Certification: Perinatal Care program stratifies hospital performance on the severe rate of Unexpected Newborn Complications by AAP neonatal care levels (AAP Level 1 vs. AAP Level 2-4) to determine certification decisions, with the goal of maximizing performance improvement through peer-group learning within an optional certification program in which measure results are not publicly reported. Given this measure is not publicly reported or used for reimbursement, hospitals may use UNC rates internally for targeted performance improvement, taking into account their neonatal care resources and transfer patterns. If this measure were used for reimbursement, stratification by NICU capability (AAP Level 1 vs. AAP Level 2-4) would be appropriate to reduce the risk of external misinterpretation of hospital performance.

Finally, the need for risk adjustment for the measure has been examined in the recent literature. In a large, population-based analysis, Glazer et al. (2024) demonstrated that while maternal characteristics are associated with individual-level risk of unexpected newborn complications, adjusting hospital PC-06 rates for maternal case mix resulted in only modest changes in overall

hospital performance for most facilities. The median change in hospital rates after adjustment was approximately 1.4 unexpected complications per 1,000 births, and most hospitals experienced little to no change in relative performance. The overall impact of adjustment was, thus, limited, particularly relative to the added analytic complexity and data burden required for its routine implementation.

The changes observed after adjustment were more pronounced among hospitals with specific facility characteristics, such as lower delivery volume, public ownership, and higher proportions of Medicaid-insured or Black and Hispanic birthing people. These findings suggest that the impact of risk adjustment at the hospital level may reflect structural and organizational features of care settings rather than unmeasured clinical risk attributable to delivery quality. Adjusting for such facility characteristics would risk obscuring meaningful variation in care and inappropriately control for factors closely tied to access, resources, and organization-level performance.

Taken together, this evidence supports the use of unadjusted PC-06 rates for identifying variation in care and supporting quality improvement, while avoiding the added complexity, data burden, and interpretive challenges, particularly for performance improvement, associated with routine risk adjustment. For performance improvement purposes, unadjusted rates preserve transparency, feasibility, and interpretability while maintaining sensitivity to meaningful differences in care.

References:

Glazer, K. B., Zeitlin, J., Boychuk, N., Egorova, N. N., Hebert, P. L., Janevic, T., & Howell, E. A. (2024). Maternal characteristics and rates of unexpected complications in term newborns by hospital. *JAMA Network Open, 7(*5), e2411699. https://doi.org/10.1001/jamanetworkopen.2024.11699

Summary of CMQCC Analyses Supporting No Risk Adjustment for the chart-abstracted version of this measure (CBE ID: 0716)

The California Maternal Quality Care Collaborative (CMQCC) conducted extensive analyses to assess whether additional risk adjustment was necessary for the chart-abstracted Unexpected Complications in Term Newborns (UNC) measure. See Supplementary Figures 1 through 12 in the 7.1 Supplemental Attachment to view results of their analyses. To evaluate the potential influence

of unaccounted clinical and sociodemographic differences, CMQCC developed hospital-level risk-adjusted UNC rates using multivariate logistic regression models. These models controlled for a comprehensive set of maternal, obstetric, and infant characteristics, including maternal age, maternal pre-pregnancy BMI, payment source, prenatal care, nulliparity, infant birth weight, sex, gestational age, induction of labor, mode of delivery, and maternal comorbidities (preeclampsia, chronic hypertension, diabetes, and gestational diabetes.

Predicted probabilities from these models were used to calculate expected numbers of severe and total UNC events for each hospital. CMQCC then derived observed-to-expected (O/E) ratios and calculated risk-adjusted hospital UNC rates by applying these ratios to the California statewide average UNC rates. Hospitals were additionally analyzed separately by AAP neonatal level of care (Level I vs. Levels II–IV), which emerged as the primary source of variation in UNC rates.

Across analyses, CMQCC found that risk adjustment had minimal impact on hospital performance classification. For severe UNC, the average absolute difference between observed and risk-adjusted rates was approximately 0.1 percentage points, and 85% of hospitals remained in the same quartile after adjustment, displayed in a caterpillar plot in Supplementary Figure 2. Importantly, all hospitals identified as high-rate outliers using observed rates also exceeded outlier thresholds after risk adjustment, demonstrating that elevated performance signals were not driven by case-mix differences. Similar findings were observed for total UNC (Supplementary Figures 3 and 4).

Additionally, CMQCC compared the distribution of AAP Level I hospitals over a two-year period versus a single year to alleviate concerns about reliability in hospitals with low delivery volumes. Supplementary Figures 11 and 12 illustrate observed and risk-adjusted severe and total UNC rates for 53 AAP Level I hospitals after pooling 2021 and 2022 data. Hospital ranking and outlier status were largely unchanged, and the majority of hospitals identified as outliers in a single year remained outliers when data were aggregated across two years. This finding demonstrated that elevated UNC rates reflected persistent performance issues rather than year-to-year noise.

Collectively, these analyses led CMQCC to conclude that the UNC measure denominator already defines a clinically homogeneous, low-risk population and that further risk adjustment is unnecessary and would not meaningfully improve measure validity or interpretability. They also led CMQCC to recommend that the measure scores of hospitals with and without Level 1 NICUs be considered separately.

Furthermore, Sebastião et al. (2017) examined hospital variation in unexpected compliications in term newborns and found hospital differences in unexpected complications seem to be driven

more by identified hospital factors than individual factors. Substantial reductions in observed hospital variation in complication rates were achieved only by adjusting for hospital geographic location, level of care or birth volume, and percentage of Medicaid births. We note, however, that risk adjustment by hospital characteristics is generally inappropriate because these are provider-level traits, not patient risks. Adjusting for them can mask poor performance and create lower standards for certain types of facilities.

Expanding on Sebastião et al. (2017), Glazer et al. (2024) investigated the association between maternal characteristics and hospital unexpected newborn complication (UNC) rates. Adjusting for maternal characteristics, including preexisting and gestational diabetes, preeclampsia, BMI and more maternal comorbidities, produced only modest changes in hospital-level PC-06 rates, with a median change of ~1–2 complications per 1,000 births across hospitals. In addition the median (IQR) change per 1,000 births for adjusted vs unadjusted rates showed that hospitals with low and medium volume, public hospitals, and those with high proportions of births covered by Medicaid had significantly lower UNC rates (improved performance) after adjustment, indicating that facility characteristics may be associated with variation in performance rather than maternal case mix.

At the same time, risk adjustment adds practical and operational burdens, including

- Heavy reliance on linked maternal-infant data
- Risk of introducing new forms of bias or instability

References:

California Maternal Quality Care Collaborative (CMQCC). (2025). Unexpected Complications in Term Infants (CBE #0716). Partnership for Quality Measurement. https://p4qm.org/measures/0716

Sebastião, Y. V., Womack, L. S., López Castillo, H., Balakrishnan, M., Bruder, K., Alitz, P., Detman, L. A., Bronson, E. A., Curran, J. S., & Sappenfield, W. M. (2017). Hospital variations in unexpected complications among term newborns. *Pediatrics, 139*(3), e20162364. https://doi.org/10.1542/peds.2016-2364

Glazer, K. B., Zeitlin, J., Boychuk, N., Egorova, N. N., Hebert, P. L., Janevic, T., & Howell, E. A. (2024). Maternal characteristics and rates of unexpected complications in term newborns by

hospital. *JAMA Network Open, 7*(5), e2411699. https://doi.org/10.1001/jamanetworkopen.2024.11699

6.1.1 Current Status

In use

6.1.2 Current or Planned Use(s)

Regulatory and Accreditation Programs, Professional Certification or Recognition Program, Quality Improvement with Benchmarking (external benchmarking to multiple organizations), Quality Improvement (Internal to the specific organization)

6.1.3 Program Details

Name of the program and sponsor
ORYX-Joint Commission (JC)
URL of the program
https://jointcommission-ddsp.atlassian.net/wiki/spaces/DCS/pages/1030553629/HAP...
Purpose of the program

Accreditation

Geographic area and percentage of accountable entities and patients included

Measure is used nationally, with 16.7% (288) of JC accredited hospitals with OB services submit the eCQM version of the measure.

Applicable level of analysis and care setting

Inpatient hospital

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Name of the program and sponsor
Advanced Certification in Perinatal Care (JC) and Outcomes Driven Certification in Perinatal Care-new for 2026 (JC)
URL of the program
https://www.jointcommission.org/en-us/certification/perinatal-care
Purpose of the program

Certification

Geographic area and percentage of accountable entities and patients included

National voluntary certification program with 66 hospitals submitting the measure.

Applicable level of analysis and care setting

Inpatient hospital

6.1.4 Attributes for Accountability Use

ePC-06 is currently used within Joint Commission's perinatal care certifications and hospital quality programs, including Outcomes-Driven Certification, the Advanced Certification in Perinatal Care (ACPC) program, and the ORYX performance measurement and improvement initiative for accredited hospitals, where it supports both quality improvement and accountability functions. As implemented within these programs, ePC-06 functions as an accountability measure by informing evaluation of organizational performance in certification and accreditation contexts. At the same time, the primary intent of the measure is to support quality improvement by identifying opportunities to reduce unexpected newborn complications and improve care processes, including those that may also contribute to improved maternal and perinatal outcomes. There are no current plans to use ePC-06 in pay-for-performance or penalty programs.

ePC-06 is not risk-adjusted for social risk factors. As demonstrated in the evidence summarized in Section 2, ePC-06 is specified within a clinically defined low-risk population and has been shown to detect meaningful variation in performance across hospitals, even after restricting to otherwise healthy term births. This variation is largely attributable to differences in care delivery and clinical practices, rather than underlying patient risk.

As an outcome measure intended to identify unexpected newborn complications and monitor unintended consequences of changes in obstetric care, adjusting for social risk factors could also potentially reduce the measure's ability to detect clinically meaningful differences in perinatal care. In particular, such adjustment could obscure disparities in outcomes and mask variation in the quality and safety of care delivered to disadvantaged populations

6.2.1 Actions of Measured Entities to Improve Performance

To improve performance on the PC-06 eCQM, hospitals must reduce unexpected complications in term newborns. Commonly used systematic continuous performance improvement methods can be used to support quality improvement. The steps below outline the key actions to improve ePC-06 outcomes:

1. Implement evidence-based clinical practices.
2. Educate clinical and quality staff on PC-06 eCQM requirements.
3. Conduct systematic case reviews and root cause analyses of unexpected newborn complication (UNC) events.
4. Implement quality improvement initiatives, update evidence-based protocols and educate and train staff.
5. Participate in Joint Commission PIQ Expert-to-Expert annual webinars and review annual measure specification and value set updates.
6. Maintain collaboration with the eCQM implementation and quality team to regularly review specification updates, validate data capture, and address workflow or system gaps to support ongoing performance improvement and reliable reporting.

6.2.2 Feedback on Measure Performance

During the ePC-06 measure development, feedback on measure performance and implementation was obtained through a structured Technical Expert Panel (TEP) process convened by Joint Commission. Input was gathered via formal TEP meetings, written public comments, and review of alpha and beta testing results, with participation from clinicians, quality leaders, and informaticists. Overall, participants expressed strong support for outcome based perinatal measures including this measure, that capture clinically meaningful morbidity and highlight variation in care.

This feedback was actively considered in measure development and maintenance. Consistent with recommendations to avoid masking quality signals, ePC-06 retains its unadjusted design with carefully defined denominator exclusions rather than broad risk adjustment. Feedback on burden and feasibility supported specification simplification and, for ePC-06, transition to electronic reporting to reduce manual abstraction. Suggestions to distinguish rare but serious events from more frequent moderate complications reinforced the decision to report three performance rates for the measure (overall, severe, and moderate rates) rather than specification exclusions that could potentially incentivize inappropriate coding practices.

Joint Commission (JC) receives regular feedback through the JC Q&A forum, where entities submit questions related to measure specification details, coding, and implementation. In addition, JC conducts an annual review process in which submitted questions are evaluated to determine the need for measure specification changes or value set updates, either based on the questions received or annual terminology updates. For any measure specification changes, Joint Commission regularly shares information with and receives feedback from the California Maternal Quality Care Collaborative (CMQCC).

6.2.3 Consideration of Measure Feedback

Measure feedback from Joint Commission Q/A forum is routinely reviewed to identify questions that may have a potential impact on the measure specifications. One key theme involved facilities without a NICU, where transfer or discharge disposition codes automatically classified cases as severe complications, even when only moderate complication codes were present. This resulted in higher severe complication rates for non-NICU hospitals due to the need to transfer some newborns.

In response, Joint Commission conducted data analyses, engaged in follow-up discussions with organizations, and sought feedback from CMQCC. Insights from this process led to revisions to the measure specifications for the 2026 reporting year. The specifications were updated to allow cases to meet criteria for moderate complications when a newborn has a discharge disposition transfer to an acute care facility or other health care facility and moderate complication codes,

improving alignment with clinical practice.

6.2.4 Progress on Improvement

At this time, there is insufficient data to assess trends in performance or improvement over time for ePC-06. Uptake of the measure has increased rapidly in recent years, but the measure has not yet been implemented with sufficient duration, stability, or longitudinal continuity across accountable health care organizations (HCOs) to support valid trend analyses or conclusions regarding changes in performance. The number of participating hospitals was 9 in 2021, 36 in 2022, and 61 in 2023.

Because the majority of participation is recent (228 organizations participated in reporting in 2024), observed differences in aggregate results are more likely to reflect changes in the composition of reporting entities, data completeness, and implementation maturity rather than true changes in quality of care. In addition, the relatively short reporting history limits the ability to assess performance trends within subpopulations, geographic regions, or consistent sets of accountable entities. As a result, estimates of the number or percentage of patients receiving high-quality care, or changes in outcomes over time, would be unreliable at this stage.

As additional years of data accrue and participation stabilizes, future analyses will assess trends in ePC-06 performance overall and across relevant subpopulations, including severity strata and facility characteristics. At present, the available data primarily support evaluation of feasibility, adoption, and cross-sectional variation, rather than improvement over time.

6.2.5 Unexpected Findings

To address unexpected findings identified through routine performance monitoring and feedback submitted through the Joint Commission Q/A forum, Joint Commission conducts follow-up data analyses, engages directly with reporting organizations, and consults with the California Maternal Quality Care Collaborative (CMQCC). One key theme involved hospitals without a NICU, where prior specifications classified all transferred newborns as having severe complications, even when only moderate complication codes were present, leading to systematically higher severe rates driven by appropriate transfer practices rather than differences in clinical care.

Insights from this review informed revisions to the measure specifications for the 2026 reporting year (described in Section 6.2.3). The updated specifications allow transferred cases to meet criteria for moderate complications when supported by corresponding diagnosis or procedure codes, improving alignment with clinical practice and reducing unintended bias related to neonatal care capability. Transfers without accompanying diagnosis codes are still assigned the outcome of a severe complication. Lessons from these discussions were also incorporated into Joint Commission educational materials, including the annual PIQ Expert-to-Expert webinar

series, to support consistent implementation and accurate reporting.

6.2.5a Potential Unintended Consequences

Several implementation learnings emerged after implementation, including that transfers can disproportionately affect measured outcomes for smaller or non-tertiary hospitals. Potential unintended consequences, such as misinterpretation of results, avoidance of high-risk patients, or overreaction to rare events, are mitigated through clear positioning of ePC-06 as a quality-improvement-focused measure rather than a pay-for-performance tool. Taken together, stakeholder feedback supports the conclusion that the benefits of ePC-06—improved visibility into unexpected newborn harm and identification of opportunities for improvement—outweigh potential risks when the measure is implemented and interpreted as intended.

7.1 Supplemental Attachment

5608e-7.1-Supplemental-Spring2026--1-.docx

Developer POC email

Rbelarmino@JOINTCOMMISSION.ORG

Measure Developer POC

Raquel Belarmino
The Joint Commission
Oakbook Terrace , IL
United States

The measure developer is different from the measure steward

No

Steward Address

Kelley Franklin
Oakbrook Terrace, IL
United States

Steward Organization

The Joint Commission

Steward Organization URL

https://www.jointcommission.org/en-us

Steward POC email

KFRANKLIN@JOINTCOMMISSION.ORG