

Appendix H

Performance Measures Used To Assess Cesarean Births (Jan 2016)

Recommended Measures in Yellow

Measure	Source/ Supporting Organization(s)	Specifications for Denominator (Numerator for each is: "Among the denominator, those with a cesarean delivery")	Strengths	Limitations (including data quality issues)	Utility
Total Cesarean Rate	•Traditional	All mothers giving birth ≥ 20 weeks gestation	Easy to collect using either Discharge Diagnosis or Birth Certificate Files	Includes repeat CS and mixes CS rates for nulliparous with multiparous women (all of which occur at significantly different rates among hospitals)	Used for general population surveillance, but distorts hospital level comparisons because of lack of risk adjustment
Primary Cesarean Rate	•Traditional	All mothers giving birth ≥ 20 weeks gestation without a prior cesarean birth	Easy to collect using either Discharge Diagnosis or Birth Certificate Files	Mixes CS rates for nulliparous with multiparous women (which occur at significantly different frequencies among hospitals and have very different CS rates) and includes CS for breeches and twin gestations. Some hospitals don't code prior CS well so that repeat CS can end up in the primary rate	Used for general population surveillance, but distorts hospital level comparisons because of lack of risk adjustment and as it includes both nullips and multiples is very dependent on the proportion of nullips at the hospitals
Repeat Cesarean Rate	•Traditional	All mothers giving birth ≥ 20 weeks gestation who had at least one prior cesarean birth	Focused on women with prior cesareans	Some hospitals don't code prior CS well so that repeat CS can end up in the primary rate	Reverse of VBAC (Vaginal birth after Cesarean) rate, either one is useful. The rate of VBAC or repeat CS is often driven by medical-liability concerns
Standard Nullip aka, Low-risk First-birth (NTSV or Nulliparous, Term, Singleton, Vertex) Cesarean Rate	•NQF: #0471 •TJC: PC-02 •Leap Frog Group •CMS/CHPRA •ACOG •HP2010/2020 •NCHS	All mothers giving birth ≥ 20 weeks gestation who were Para=0 (nulliparous), At term (≥37 wks), singleton and presenting with a vertex (cephalic) presentation	Creates a standardized nullip population rate that can better compare hospitals. Excludes common conditions with very high CS rates such as breech, twins and prior CS. Concentrating on first births allows focus on labor management, the major issue for QI. NCHS also reports this measure for every state	Requires either Birth Certificate file or a hospital database that records parity (hospital discharge data does not capture parity). This excludes the possibility for calculation using claims data unless linked to the Birth Certificate. The name of "Low-risk" raises questions as the specifications clearly do not exclude all high risk conditions—"Standard nullip" is a much better descriptor	Important for other organizations to adopt to promote harmonization as every hospital that belongs to the Joint Commission with >300 annual births will be reporting this measure. Allows QI efforts to better focus on labor issues
Cesarean Delivery Rate (Term, Singleton, Vertex)	•AHRQ: IQI 21	All mothers giving birth ≥ 20 weeks gestation who were ANY parity, at term (≥37 wks), singleton and presenting with a vertex (cephalic) presentation (using ICD9 codes)	Easy to collect using Discharge Diagnosis Files	Mixes CS rates for nulliparous with multiparous women who have 5-8x lower CS rates than nulliparous women and nulliparous women have wide variation in frequency among hospitals (20-55%). Very high correlation with Total CS rate	Can give widely different results than NTSV CS because multip CS rates are so much lower than nullips'. Therefore the TSV rate is heavily dependent on the proportion of multiples to nullips at the hospital
Primary Cesarean Delivery Rate (Term, Singleton, Vertex, no prior cesarean births)	•AHRQ: IQI 33	All mothers giving birth ≥ 20 weeks gestation who were ANY parity, at term (≥37 wks), singleton and presenting with a vertex (cephalic) presentation (using ICD9 codes) and no code for a prior Cesarean birth	Easy to collect using Discharge Diagnosis Files	Mixes CS rates for nulliparous with multiparous women who have 5-8x lower CS rates than nulliparous women and nulliparous women have wide variation in their frequency among hospitals (20-55%). Very high correlation with Primary CS rates. It is also dependent on coding for the prior CS (which can easily be missed) and therefore at risk for falsely including mothers having a repeat CS	Can give widely different results than NTSV CS because multip CS rates are so much lower than nullips'. Therefore the TSV rate is heavily dependent on the proportion of multiples to nullips at the hospital

General Comments for Cesarean Birth Measures

1. Note that the denominators are always mother-based and not baby-based. This prevents double or triple counting (or more) for multiple gestations. If using Birth Certificates (a baby-based data system), a common short cut is to restrict the population to the first birth of a multiple gestation. This will miss a tiny number of cases where the first baby in a multiple gestation was a vaginal birth and a subsequent baby was a cesarean delivery). By design, this is not an issue for NTSV CS as multiple gestations are excluded.

2. Additional factors that can affect the risk for CS for individuals include: maternal age, BMI, weight gain during pregnancy, fetal weight, race, maternal

diabetes and HTN. Two large studies have suggested that these factors are less important for hospital-level rates for two reasons: (1) Age and weight appear to occur in inverse frequencies in hospital populations (high maternal age first mothers are generally thinner), thus often cancelling out their effects; (2) the frequency of pre-gestational diabetes and severe HTN are low and not particularly mal-distributed. Furthermore, most major pregnancy-related indications for primary CS such as placenta previa or severe preeclampsia are much more likely to occur before 37 weeks or in multiples (and hence be excluded). Correspondingly, the studies noted that fuller risk-adjustment models did not add appreciably to NTSV.

Performance Measures Used To Assess Vaginal Births (Jan 2016)

Recommended Measures in Yellow

Measure	Source/ Supporting Organization(s)	Specifications for Denominator and Numerator	Strengths	Limitations (including data quality issues)	Utility
Episiotomy Rate	•NQF: #0470 •Leapfrog Group	Denominator: All vaginal delivery discharges Numerator: Among the denominator, cases with an episiotomy ICD-9 procedure code	Easy to collect using Discharge Diagnosis File (ICD-9 Codes)	Not as linked to an outcome (serious injury to the perineum) as we would want	Can be used for general population. More commonly used in nulliparous women but should be low in all groups so that risk adjustment is not needed
3rd/4th Degree Laceration Rate	•Traditional (Note: NQF has withdrawn support for all 3rd/4th laceration metrics)	Denominator: All vaginal delivery discharges Numerator: Among the denominator, cases of 3rd or 4th degree lacerations	Easy to collect using Discharge Diagnosis File (ICD-9/10 Codes)	Ignores major risk factors such as baby size, malposition, maternal race, instrument delivery and most importantly, nulliparity. Also, there is poor consensus on the definition of a partial 3rd degree creating concern over consistency and comparability between facilities	Promoted for use in general population surveillance, but distorts hospital level comparisons because of lack of risk adjustment. Also has been used to promote and increase in CS rates!
3rd/4th Degree Laceration Rate: Obstetric Trauma-- Vaginal Delivery with instrument	•AHRQ: PSI 18	Denominator: All vaginal delivery discharges with any procedure code for instrument-assisted delivery. Numerator: Among the denominator, cases of 3rd or 4th degree lacerations	Easy to collect using Discharge Diagnosis File (ICD-9/10 Codes). Lacerations are much higher with operative vaginal delivery so this addresses one risk factor (but not others)	Ignores major risk factors such as baby size, malposition, maternal race, and most importantly, nulliparity. Also, there is poor consensus on the definition of a partial 3rd degree creating concern over consistency and comparability between facilities	Promoted for use in general population surveillance, but distorts hospital level comparisons because of lack of risk adjustment. Also has been used to promote and increase in CS rates!
3rd/4th Degree Laceration Rate: Obstetric Trauma--Vag- inal Delivery without instrument	•AHRQ: IQI 33	Denominator: All vaginal delivery discharges without any procedure code for instrument- assisted delivery. Numerator: Among the denominator, cases of 3rd or 4th degree lacerations	Easy to collect using Discharge Diagnosis File (ICD-9/10 Codes). Lacerations are much higher with operative vaginal delivery so this addresses one risk factor (but not others)	Ignores major risk factors such as baby size, malposition, maternal race, and most importantly, nulliparity. Also, there is poor consensus on the definition of a partial 3rd degree creating concern over consistency and comparability between facilities	Promoted for use in general population surveillance, but distorts hospital level comparisons because of lack of risk adjustment. Also has been used to promote and increase in CS rates!

Appendix H

Performance Measures Used To Assess Term Neonatal Outcomes (Jan 2016)

Recommended Measures in Yellow

Measure	Source/ Supporting Organization(s)	Specifications for Denominator and Numerator	Strengths	Limitations (including data quality issues)	Utility
Birth Trauma –Injury to Neonate	•AHRQ: PSI 17	Denominator: Live births excluding cases (using ICD-9/10 codes) with birth weight <2,000g, or brachial plexus injury or osteogenesis imperfecta Numerator: Among the denominator, those with ICD9/10 codes for birth trauma (the ICD-9 series of 767.x but not including Erb’s palsy or clavicle fracture)	Easy to collect using Discharge Diagnosis File (ICD-9/10 Codes)	The coding for birth weight can be incomplete. The selection of diagnosis codes for birth injuries has raised many questions: why exclude brachial plexus and Erb’s palsy? Most important however is the fact that 2/3 of the identified cases are because of the code: 767.8 “Other Specified Birth Trauma” which can refer to a wide range of mild to moderate issues that are very dependent on the coder	The limitations have led to a lack of endorsement by NQF but it is still used by some because of its ease of collection. It generally runs at 0.2%
Healthy Term Newborn, aka Unexpected Neonatal Complications	•NQF: #0716 •CMQCC	Denominator: Live births at term without preexisting conditions (excludes IUGR, all fetal anomalies and conditions, maternal drug use) Numerator: Among the denominator, cases with very low Apgars, neonatal transfer, death, major or moderate complications by ICD-9/10 codes some with LOS parameters to guard against over-coding	Collected using administrative data only (no chart review). Serves an important role as a balancing measure to ensure that neonatal outcomes are preserved when working to lower the CS rate	Requires a Neonatal Discharge Diagnosis file linked to a Birth Certificate file to generate all the potential complications and exclusions. It is a complicated set of algorithms to generate the measure	Used wisely in California and by NPIC

Performance Measures Used To Assess Vaginal Birth After Cesarean (Jan 2016)

Recommended Measures in Yellow

Measure	Source/	Specifications for Denominator and Numerator	Strengths	Limitations (including data quality issues)	Utility
Vaginal Birth After Cesarean (VBAC) Rate	•Traditional •AHRQ: IQI 34	Denominator: All women delivering with a prior cesarean birth Numerator: Among the denominator, those with a vaginal birth	Easy to collect using Discharge Diagnosis File (ICD-9/10 Codes or Birth Certificate Codes). Vaginal birth is much better coded than a trial of labor	While vaginal birth is much better coded than a trial of labor, Some hospitals don't code prior CS well so that some repeat CS cases can end up in the primary rate	Given the current low availability of VBAC this metric now serves as an important access measure rather than a quality measure
VBAC Attempt Rate	•Traditional	Denominator: All women delivering with a prior cesarean birth Numerator: Among the denominator, those with a trial of labor (successful or not)	Easy to collect using Discharge Diagnosis File (ICD-9/10 Codes or Birth Certificate Codes) but has accuracy issues noted in limitations	Often difficult to identify those women who had a trial of labor. While there are ICD9/10 codes and Birth Certificate codes there is room for improvement. It is much simpler to just identify those who had a vaginal birth (VBAC rate)	This measure is a component of the VBAC rate and identifies the most common issue with a low VBAC rate—that of poor attempt rate
VBAC Success Rate	•Traditional	Denominator: All women with a prior Cesarean birth who are having a trial of labor Numerator: Among the denominator, those with a vaginal birth	Easy to collect using Discharge Diagnosis File (ICD-9/10 Codes or Birth Certificate Codes) but has accuracy issues noted in limitations	Often difficult to identify those women who had a trial of labor. While there are ICD9/10 codes and Birth Certificate codes there is room for improvement. It is much simpler to just identify those who had a vaginal birth (VBAC rate)	This measure is a component of the VBAC rate and identifies the portion of the VBAC rate that has the least variation, it is nearly always 70% +/-10%
Vaginal Birth After Cesarean (VBAC) Rate, Uncomplicated	•AHRQ: IQI 22	Denominator: All women delivering with a prior cesarean birth, excluding cases with breech presentations, preterm or multiple gestations, and fetal deaths Numerator: Among the denominator, those with a vaginal birth	This attempts to address concerns over including women with prior CS who had other contraindications for VBAC in an attempt to increase the Face Validity of the measure. Easy to collect using Discharge Diagnosis File (ICD-9/10 Codes or Birth Certificate Codes)	The extra codes don't add much burden but as noted above, Some hospitals don't code prior CS well so that some repeat CS cases can end up in the primary rate. There is not a good reason to exclude all births before 37 weeks of gestation	Highly correlated (r2=0.99) with IQI 34 (overall VBAC rate) that is much better known so does not really add value

Labor/Birth Performance Measures Proposed But Not Yet Tested (Jan 2016)

It should be noted that the development of new performance measures is actually a very difficult task and requires significant effort for validation.

Measure	Source/	Specifications for Denominator and Numerator	Strengths	Limitations (including data quality issues)	Utility
Spontaneous Labor and Birth	•Proposed by AMA-PCPI Taskforce (2010)	Denominator: All mothers with nulliparous singleton, term, vertex pregnancies Numerator: Among the denominator, those with a spontaneous labor onset (no induction) and a spontaneous vaginal delivery without an episiotomy	Can be collected using Discharge Diagnosis File (ICD-9/10 Codes) but requires the addition of parity. Provides an easy to understand metric for consumers	Requires a linked data set. Unsure if this measure adds value beyond the NTSV Cesarean rate and the episiotomy rate	No testing yet performed. Unknown if adds more than current measures. Judgment is withheld until testing has been reported
Second Stage of Labor: Mother-Initiated, Spontaneous Pushing	•Proposed by AWHONN (#02) (2014)	Denominator: All women in Second Stage labor (and not having a scheduled cesarean) Numerator: those from the denominator with documentation in the medical record providing evidence of mother-initiated, spontaneous pushing	Likely to be used to drive practice change rather than public reporting	Requires chart review of 30 randomly selected retrospective cases. Frequency is not yet determined. This also represents a challenging charting requirement for the nurse. Unclear if requirement is mother-initiated, spontaneous pushing for the entire second stage or a partial period. The evidence base for this measure is not as strong as usually desired	No testing yet performed. Unclear whether it will lead to any changes in outcomes. Judgment is withheld until testing has been reported
Labor Support	•Proposed by AWHONN (#10a) (2014)	Denominator: All women in labor (spontaneous or induced excluding medical reasons for admission) Numerator: those from the denominator with documentation in the medical record of continuous labor support	Likely to be used to drive practice change rather than public reporting	Requires chart review of 30 randomly selected retrospective cases. Frequency is not yet determined. This also represents a challenging charting requirement for the nurse. Continuous labor support is defined as being “in the room continuously” and providing a series of non-pharmacologic interventions. Apparently can be provided by an RN or Doula, but is vague for other individuals (family or friends)	No testing yet performed. Continuous support for the entire labor is very difficult to support currently on most L&D’s. Hard to justify for early labor and induction patients (such as cervical ripening). Judgment is withheld until testing has been reported
Partial Labor Support	•Proposed by AWHONN (#10b) (2014)	Denominator: All women in labor (spontaneous or induced excluding medical reasons for admission) Numerator: those from the denominator with documentation in the medical record indicating that the woman received at least one non-pharmacologic nursing intervention to support labor every hour for the duration of the First stage of labor	Likely to be used to drive practice change rather than public reporting	Requires chart review of 30 randomly selected retrospective cases. Frequency is not yet determined. Will require extensive charting. While there is data to support continuous labor support and fewer Cesarean births, this measure of partial labor support has no underlying studies to support it. The non-pharmacologic interventions are poorly defined and poorly validated	No testing yet performed. Hard to justify for early labor and induction patients (such as cervical ripening). Judgment is withheld until testing has been reported

It should be noted that the development of new performance measures is actually a very difficult task and requires significant effort for validation.

<p>Freedom of Movement during Labor</p>	<p>•Proposed by AWHONN (#11) (2014)</p>	<p>Part A sample: Denominator: All women ≥37 weeks of gestation in the first stage of labor without epidural analgesia and without scheduled cesarean Numerator: at a randomly selected observation point, those among the denominator who are laboring in a location other than a bed</p> <p>Part B sample: Denominator: All women ≥37 weeks of gestation in the First stage of labor with epidural analgesia and without scheduled cesarean Numerator: at a randomly selected observation point, those among the denominator who are laboring in a position other than supine</p>	<p>Likely to be used to drive practice change rather than public reporting</p>	<p>At least 30 randomly selected observations for each of the two samples, including cases from all shifts. Frequency is not yet determined. Appears to involve organized observations of practice rather than chart reviews. Either way there is significant data collection burden and ability to skew results (“The observer is now on the floor”). Does not take into account a women’s desire to be in bed for part of her labor or be supine after epidural. No normative data available</p>	<p>Interesting process measure but no testing yet performed. Unclear that intervention will lead to outcome improvements</p>
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