

Unexpected Complications of the Newborn

What are unexpected complications of the newborn?

Taking home a healthy baby is perhaps the most important outcome for families having a birth. While there are several measures looking at specific clinical practices and outcomes in preterm infants, there are no other measures for outcomes in term babies, who represent 90% of all births.¹ Criteria for neonatal intensive care unit admission of term babies varies greatly between hospitals and regions, so NICU admission is not useful for QI assessments and comparisons.¹⁻³ The unexpected complications of the newborn (UCN) measure focuses on healthy babies (i.e., not on prematures, multiple gestations, or babies with birth defects or other fetal conditions) who grew normally and were not exposed to maternal drug use.¹⁻³ The UCN measure determines how many newborns from this group had severe or moderate complications.¹⁻³ A combination of ICD-9 diagnosis and procedure codes and neonatal length of stay (LOS) is used to categorize complications. This measure is a key balance to other measures endorsed by the National Quality Forum (NQF) that examine obstetric care.³

Why is it important to measure unexpected complications of the newborn?

Healthy term newborns should experience the least amount of complications. However, a study found that up to 29% of low-risk pregnancies had unexpected complications of labor, delivery, and the neonatal period.⁴ The UCN indicator is important in measuring moderate, severe, and total complications.^{1,3} Under this definition, moderate complications include diagnoses or procedures that raise concern at a lower level. Most require an infant LOS that exceeds that of the mother, validating that these are indeed significant complications.² Examples include less severe respiratory complications (e.g., transient tachypnea of the newborn), or infections with a longer LOS, excluding sepsis. Severe complications, on the other hand, include neonatal death, transfer to another hospital for higher level of care, extremely low Apgar Score (≤ 3 at either 5 or 10 minutes of life), severe birth injuries such as intracranial hemorrhage or nerve injury, neurologic damage, and severe respiratory, neurologic or infectious complications.¹⁻³

How are unexpected complications of the newborn measured?

The codes from both Severe and Moderate UCN can be combined into 6 categories for further analysis (**Table 1**). The denominator comprises a group of newborns who are expected to do well and go home routinely with the mother.¹ This group includes singleton live born babies who by best obstetric estimate are at least 37.0 weeks of gestation, over 2500 g in birth weight (normally grown), do not have any congenital malformations or fetal conditions, are not exposed to maternal drug use or to selected maternal conditions. The numerators vary for moderate or severe complications, as the examples described above, under *Why is it important to measure UCN?* The UCN measure is reported as total UCN per 1000 births and has subdivisions of moderate and serious UCN.

Table 1. Frequencies of the six categories of unexpected complications of the newborn.

Categories of Complications	Frequency (%)*
Respiratory	1.35
Infection	0.63
Transfer to another hospital	0.56
Shock and resuscitation	0.45
Neurologic and birth injury	0.45
Long LOS without clear diagnosis	0.32

*Reported for California hospitals; modified from Reference 1.

Unexpected Complications of the Newborn

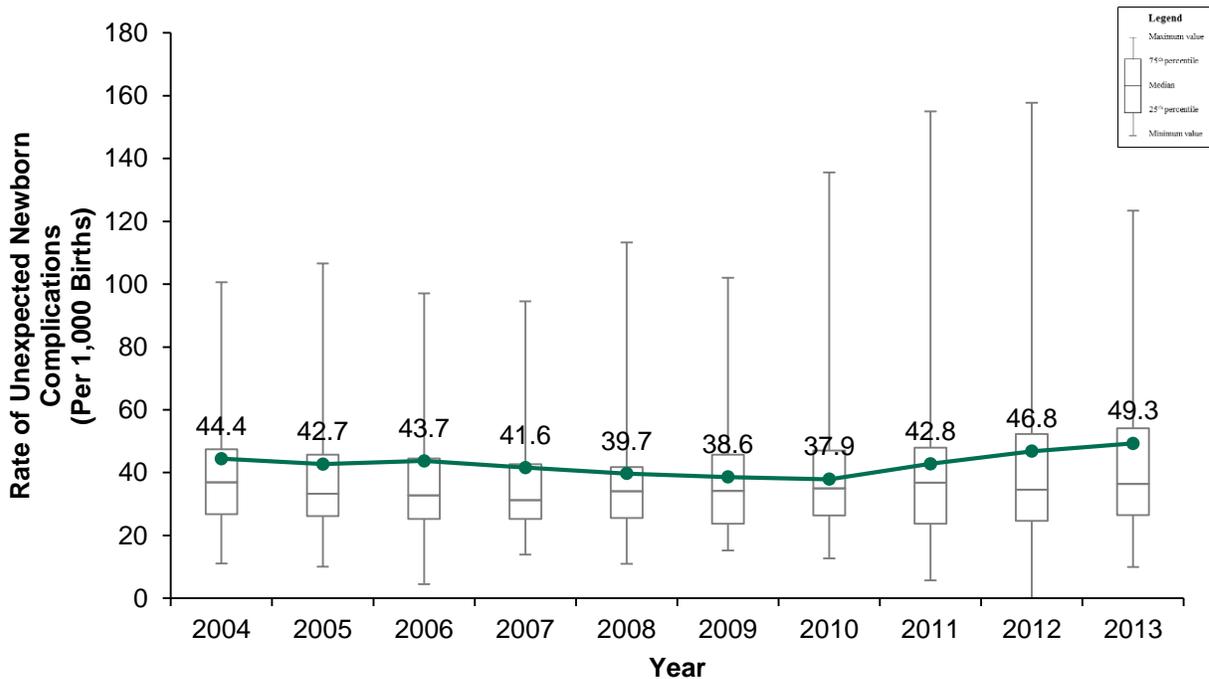
What are the limitations of measuring severe maternal morbidity?

The UCN measure shows significant variation within low- and high-volume hospitals; within hospitals with high-level Neonatal Intensive Care Units and within hospitals with basic-level facilities; and among Public/County facilities and among Private facilities. No one grouping as a whole is favored over another.^{1,2} A comparison trial for neonatal morbidity by gestational age tracked very closely a major East Coast perinatal data set analysis using NICU admissions and major complications, and testing the ability of UCN to discriminate among hospitals. The mean UCN reliability among 220 California hospitals was excellent (0.92) and stable (minimal variation in >90% of California hospitals over three 6-month periods).¹

How can we improve quality based on this indicator?

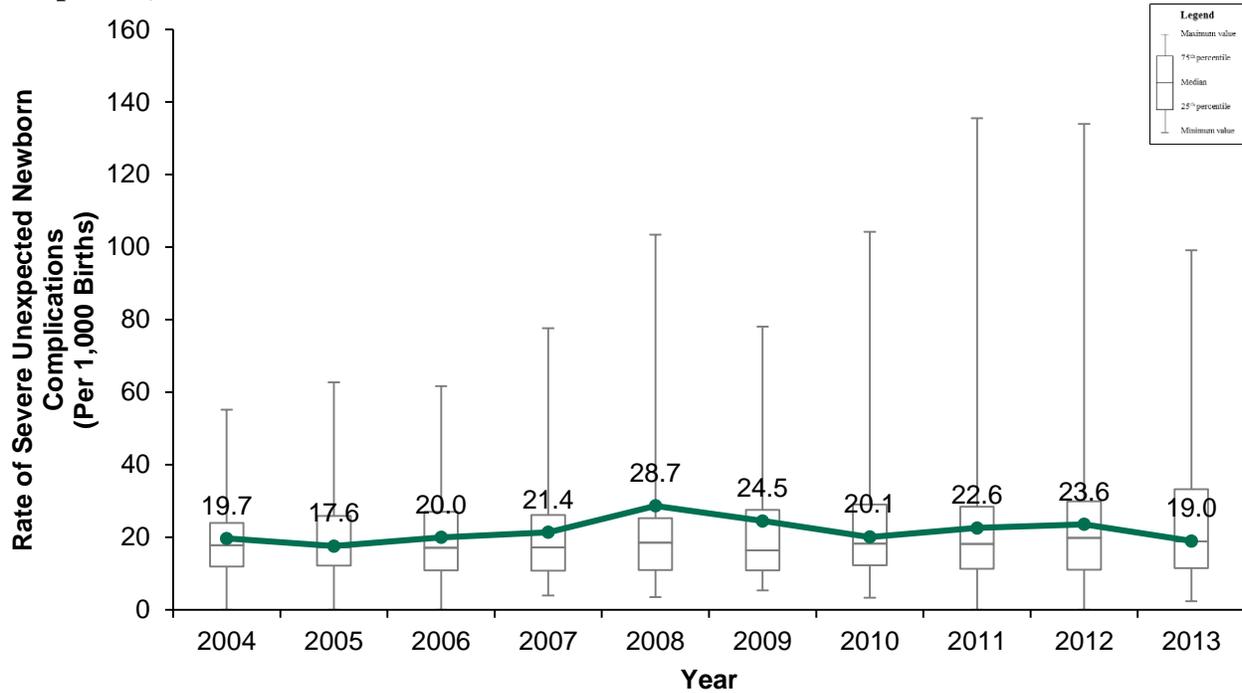
Examining hospitals with high rates of unexpected complications of the newborn has implications for expectant mothers and families, their obstetric providers, and the healthcare systems. While mothers, families, and obstetric providers will be aware of the risk of adverse outcomes in a specific hospital, health care systems should take QI efforts to ensure that birth hospitals and birthing centers have necessary resources for adequate patient quality care.⁴ It has been demonstrated that UCN rates are also related to low-risk women who deliver at both low- and high-cesarean delivery-rate hospitals.⁵ The UCN measure was originally envisioned as not deficit based to balance for obstetric services, it is very helpful for driving QI because it identifies the necessary direction to be taken. The key for QI is to provide the subanalyses of the diagnostic categories. The UCN measure can yield significant variation among diagnostic categories: some hospitals will have high rates of infection while others will have high rates of respiratory issues, suggesting specific QI opportunities in either case.³

Figure 1. Rates of total unexpected newborn complications in Florida by hospital. Hospital X, 2004-2013.



Unexpected Complications of the Newborn

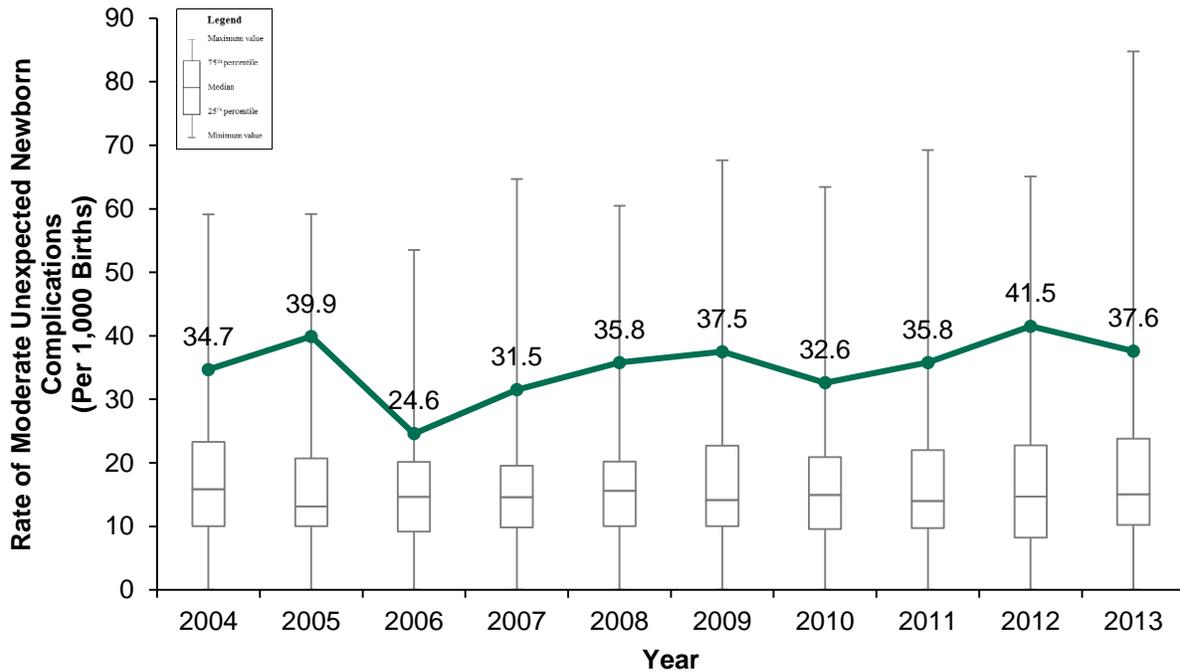
Figure 2. Rates of severe* unexpected newborn complications in Florida by hospital. Hospital X, 2004-2013.



*Moderate complications include diagnoses or procedures that raise concern but at a lower level than the list for severe (eg, use of continuous positive airway pressure [CPAP] or bone fracture), most of which require an infant length of stay (LOS) that exceeds that of the mother and include less severe respiratory complications (eg, transient tachypnea of the newborn) or infections with a longer LOS but not sepsis.³

Unexpected Complications of the Newborn

Figure 3. Rates of moderate* unexpected newborn complications in Florida by hospital. Hospital X, 2004-2013.



*Severe complications include neonatal death, transfer to another hospital for higher level of care, extremely low Apgar Score (≤ 3 at either 5 or 10 minutes of life), severe birth injuries such as intracranial hemorrhage or nerve injury, neurologic damage, severe respiratory, neurologic or infectious complications.³

References

1. California Maternal Quality Care Collaborative (CMQCC). (2007). Unexpected complications in term newborns. Retrieved Jun 14, 2015 from <https://www.cmqcc.org/newborn>.
2. National Perinatal Information Center (NPIC). (n.d.). V.12.4 Special Report: Unexpected Newborn Complications Update (NQF #716 “Healthy Term Newborn”). Retrieved Jun 14, 2015 from http://www.npic.org/services/V124_Special_Report_SAMPLE.pdf
3. National Quality Forum (NQF). (2009). NQF #716: Unexpected Newborn Complications Update (aka Healthy Term Newborn). Retrieved Jun 14, 2015 from https://www.wsha.org/images/activEdit/Unexpected_Newborn_Complications_V2.3_July2013%20with%20Code%20Tables.pdf
4. Danilack VA, Nunes AP, Phipps MG. Unexpected complications of low-risk pregnancies in the United States. *Am J Obstet Gynecol.* 2015;212(6):809.e1-6. doi: 10.1016/j.ajog.2015.03.038.
5. Gould JB, Danielsen B, Korst LM, et al. Cesarean delivery rates and neonatal morbidity in a low-risk population. *Obstet Gynecol.* 2004;104(1):11-9. doi: 10.1097/01.AOG.0000127035.64602.97.