APEC Guidelines
Scheduling Deliveries Prior to 39 weeks Gestation

Increasing rates of elective deliveries have been noted over the past two decades with 37-38 week deliveries accounting for 17.5% of all live births across the US (Davidoff MJ, 2006). Studies have shown that elective deliveries <39 weeks result in increased infant morbidities including higher NICU admissions, transient tachypnea of the newborn, neonatal respiratory distress syndrome , ventilator support, suspected or proven sepsis, and feeding problems.(Tita ATN, 2009) (Bates E, 2010). Moreover, many have raised concerns about the correlation between deliveries <39 weeks and the risk of brain injury or long-term neurodevelopmental abnormalities. At 37 weeks, the brain weighs only 80% of what it will at 40 weeks and gray matter volume increases at a rate of 1.4% per week between 36 and 40 weeks (Guihard-Costa AM, 1990) (Kinney, 2006) (Huppi PS, 1998). In addition, 25% of the cerebellar volume develops after 35 weeks (Limperopoulos C, 2005).

The purpose of this APEC guideline is to assist the provider and the facility in developing and implementing systems to decrease the rate of <39 week elective deliveries—including both inductions and cesareans. The goal is to improve outcomes for mothers and babies. Key components of such an initiative include reducing demand through education, changing delivery scheduling processes, and collecting and reporting outcome measures and trends. While some people have been concerned that an initiative such as this would be associated with a substantial increase in the risk of stillbirth, this has not been borne out, and in the presence of a medical indication or any condition associated with an increased risk of stillbirth, induction of labor should be pursued even if <39 weeks gestation.

Box 1. Medical/Obstetric Indications for Scheduled Deliveries <39 weeks

- Abruption
- Previa
- Placenta accreta/increta/percreta
- Prior classical cesarean or myomectomy
- Preeclampsia/eclampsia
- Fetal Anomaly
- Gestational HTN
- GDM with insulin or poor control
- Pre-gestational diabetes
- PROM
- Oligohydramnios
- IUGR
- Non-reassuring fetal status
- Isoimmunization with concern for fetal anemia
- Multifetal gestation with complication (Delivery of twin gestation at 38 weeks may be a reasonable alternative even in the absence of complications)
- Maternal medical condition—cardiac, pulmonary, GI, autoimmune, neurologic—with deterioration or worsened by pregnancy
- Acute fatty liver
- Cholestasis of pregnancy
- HIV infection (Delivery at 38 weeks considered standard and no lung maturity required)

Recommendations

ACOG committee opinion 561 provides guidance to help providers avoid nonmedically indicated early-term deliveries. Maternal or fetal risk factors for which there is evidence or expert opinion to support expedient delivery <39 weeks are noted in Box 1. In some circumstances a medical indication may exist for early

delivery, but balancing risks of continuing pregnancy versus delivery requires assessment of fetal lung maturity or consideration of the risks of continuing pregnancy to determine the appropriate timing of delivery. Examples of this include, but are not limited to a diabetic on insulin, a patient with a fetal anomaly, or a patient with a prior classical cesarean. In these circumstances, an amniocentesis for fetal lung maturity studies should be considered for any scheduled deliveries prior to 39 weeks of gestation. However, as shown by Bates et al., 2010, neonates delivered at 36-38 weeks gestation, even after confirmed fetal lung maturity, were at greater risk for respiratory distress, hyperbilirubinemia and hypoglycemia. For this reason and because amniocentesis itself has associated risks, **a fetal lung maturity amniocentesis should only be done if there is a medical indication that would support its performance and a positive result would lead to delivery.** The risk of fetal demise or adverse event is sometimes high enough to warrant delivery without performing the amniocentesis for fetal lung maturity. Telephone consult with a Maternal-Fetal Medicine specialist may be sensible when considering amniocentesis for fetal lung maturity versus delivery.

ACOG committee opinion 560 provides guidance for determining the timing of medically indicated preterm births. The recommendations are dependent on accurate determination of gestational age. Consideration of the timing of delivery should be individualized and must take into account maternal and newborn risk and benefit, practice environment, and patient preference. Amniocentesis for fetal lung maturity should not be performed to facilitate an elective induction or solely because of poor dating criteria. Social indications for scheduled deliveries (e.g. history of fast labor or social issues) are recognized by ACOG as appropriate only when the gestational age is ≥39 0/7 weeks because infant morbidity rates are significantly lower at 39 weeks than 36-38 weeks. Table 1 provides recommendations for timing of delivery for specific conditions. This list is meant to be used as a guide for common indications found in clinical practice.

Table 1: Recommendations for the Timing of Medically Indicated Delivery (ACOG 2013)

Condition	**Recommended GA Goal & acceptable Range**
Placenta Previa – No prior bleeding	37^0 (36^0 – 37^6)
Placenta Previa – Multiple prior bleeding episodes	36^0 (34^0 – 36^6)
Vasa Previa Suspected	36^0 – 37^6
Prior Classical/Vertical Cesarean/Prior uterine rupture	37^0 (36^0 – 37^6)
Prior Myomectomy (not hysteroscopic)	38^0 (37^0 – 38^6)

Growth Restriction (<5th)	
Normal testing (BPP, Dopplers, No maternal co-morbidities)	37^0 (37^0 - 37^6)
Abnormal Dopplers, oligohydramnios, or maternal co-morbidities#	34^0 - 36^6
Growth Restriction (5th-9th)	
Normal testing	39^0 - 39^6
Twins	
Di-Di—Normal growth	38^0 (38^0 – 38^6)
Di-Di—IUGR of one or both	37^0 (36^0 – 38^6)
Di-Di—Abnormal Doppler, oligohydramnios, maternal co-morbidites#	34^0 – 36^6
Mono-Di – Normal growth, no TTTS Hx	37^0 (37^0 – 37^6)
Mono-Di – IUGR	36^0 (34^0 - 36^6)
Mono-Di – H/O TTTS, abnormal Doppler, oligohydramnios, or maternal co-morbidities#	32^0 (32^0 - 36^6)
Monoamniotic	≥32^0 (32^0 - 34^6)
Oligohydramnios (Isolated)	37^0 (36^0 - 37^6)
CHTN*	
No meds/Controlled on meds	39^0 - 39^6
Uncontrolled or requiring ≥ 2 medications	37^0 - 37^6
* Assumes normal testing, normal growth, and normal fluid. If any of these are present, manage as above.	
Gestational Hypertension	≥37^0
Pre-Eclampsia: Mild	≥ 37^0 or with fetal lung maturity prior
Pre-Eclampsia: Severe	At diagnosis or no later than 34 weeks if Dx prior
Diabetes	
Gestational – Well controlled Diet/oral agent	41^0 (40^0 – 41^6)
Gestational – Oral agent or insulin required	39^0 - 39^6
Pre-gestational – Well controlled without maternal co-morbidities#	39^0 - 39^6
Pre-gestational – Class D or >; poorly controlled; polyhydramnios; EFW > 90th percentile; BMI >50	38^0 - 38^6
If evidence of fetal growth restriction, HTN, or other complications develops, earlier delivery should be considered.	

PPROM	34 weeks
Fetal Anomalies	39^0 (38^0 - 39^6)
Cholestasis of pregnancy	37^0 - 37^6
HIV infection	38^0 – 38^6 by C/S if VL >1,000; Otherwise no indication for early delivery or induction
Isoimmunization (Titer ≥ 1:16; Kell ≥1:8) Non-Transfusion requiring Transfusion requiring	 39^0 (37^0 - 39^6) Individualize with the fetal treatment team

#Co-morbidities are defined as any maternal condition that increases the likelihood of adverse outcome including pre-eclampsia, diabetes, chronic hypertension, or other condition associated with placental dysfunction.

Education

The March of Dimes in conjunction with the California Maternal Quality Care Collaborative (CMQCC) developed a toolkit entitled "Elimination of Non-medically Indicated (Elective) Deliveries Before 39 Weeks Gestational Age" which can be found at http://cmqcc.org/resources/1974. Resources include background research data on risks associated with deliveries before 39 weeks, implementation strategies, data collection procedures, clinician education, patient education material, sample forms and slide shows. This toolkit should be used by providers and facilities to develop systems to eliminate elective deliveries <39 weeks.

Education is key to decreasing the demand for elective scheduled deliveries <39 weeks. Learning must occur at multiple levels in order to be effective; audiences include clinicians, healthcare providers, patients and the public. Clinician and staff education should include data on the risks associated with births <39 weeks for use when discussing the plan of care with their patients. Patients should be provided verbal and written educational material on the definition of full term, 39 weeks. Counseling sessions regarding the risks of non-medically indicated deliveries prior to 39 weeks should be documented in the patient chart. In addition, public education regarding risks of deliveries <39 weeks should be provided through diverse venues such as health fairs and other social media venues.

The Joint Commission National Quality Measures PC-01 Elective Delivery measures data on elective deliveries ≥37 to <39 weeks of gestation. Hospitals should develop policies and procedures

that follow ACOG criteria regarding elective deliveries < 39 weeks gestation to use for the oversight of scheduled deliveries. Standardized forms should be developed and used to collect gestational age and indications for delivery at the time of delivery scheduling. Physician leaders should establish "ownership" of the program and form a quality committee to review exceptions to the policy. Progress of the program should be tracked via quality indicators and reported and displayed for clinician and staff review.

Quality improvement programs aimed at eliminating elective deliveries prior to 39 weeks gestation across the U.S. have proven to be successful. In 2001, the Intermountain Healthcare Women and Newborn Clinical Integration Guidance Council began such a program. Within six months they noted elective deliveries <39 weeks declined from 28% to 10% and at by the six year mark it was down to 3% (Oshiro B, 2009). A publication by Fisch et al. in 2009 reported a similar finding at Magee Women's Hospital with induction rates for <39 week elective deliveries dropping from 11.8% to 4.3% in two years. The Ohio Perinatal Quality Collaborative (OPQC) made up of 20 Ohio maternity hospitals, implemented a policy to eliminate deliveries <39 weeks gestation without medical or obstetric indication and found a decline of these deliveries from 25% in July 2008 to <5% in August 2009.

These publications demonstrate that programs designed and implemented to eliminate elective deliveries <39 weeks gestation are successful when they are driven by data, involve multidisciplinary teams and reference and enforce specific guidelines.

Quality Indicators/Benchmarks

- GA at delivery
- Delivery indication
- Neonatal outcomes

References

ACOG. (2013 reaffirmed 2015). Medically indicated late-preterm and early-term deliveries. *The American College of Obstetricians and Gynecologists Committee Opinion 560.*

ACOG. (2013 reaffirmed 2015). Nonmedically indicated early-term deliveries. *The American College of Obstetricians and Gynecologists Committee Opinion 561.*

ACOG. (2009 reaffirmed 2016). Clinical management guidelines for obstetricians-gynecologists: Induction of labor. *The American College of Obstetricians and Gynecologists Practice Bulletin Number 107* .

Bates E, R. D. (2010). Neonatal outcomes after demonstrated fetal lung maturity before 39 weeks of gestation. *Obstetrics & Gynecology* , 1288-1295.

Davidoff MJ, D. T. (2006). Changes in the gestational age distribution among U.S. singleton births: impact on rates of later preterm birth, 1992 to 2002. *Semin Perinatology* , 8-15.

Fisch JM, E. D. (2009). Labor induction process improvement: a patient quality-of-care initiative. *Obstetrics & Gynecology* , 797-803.

Guihard-Costa AM, L. J. (1990). Differential growth between the fetal brain and its infratentorial part. *Early Human Development* , 27-40.

Huppi PS, W. S. (1998). Quantitative magnetic resonance imaging of brain development in premature and mature newborns. *Annals of Neurology* , 224-235.

Kinney, H. (2006). The near-term (late preterm) human brain and risk for periventricular leukomalacia: a review. *Semin Perinatology* , 81-88.

Limperopoulos C, S. J. (2005). Late gestation cerebellar growth is rapid and impeded by preterm birth. *Pediatrics* , 688-695.

Main e, O. B.-K. (2010). Elimination of non-medically indicated (elective) deliveries before 39 weeks gestational age (California Maternal Quality Care Collaborative toolkit to transform maternity care). *A California Toolkit to Transform Maternity Care* . California: March of Dimes.

Oshiro B, H. E. (2009). Decreasing elective deliveries before 39 weeks gestation in an integrated health care system. *Obstetrics & Gynecology* , 804-811.

Tita ATN, L. M. (2009). Timing of elective cesarean delivery at term and neonatal outcomes. *The New England Journal of Medicine* , 111-20.