

Common Questions About Late-Term and Postterm Pregnancy

MARY WANG, MD, *University of California, San Diego, California*

PATRICIA FONTAINE, MD, MS, *HealthPartners Institute for Education and Research, Bloomington, Minnesota*

Pregnancy is considered late term from 41 weeks, 0 days' to 41 weeks, 6 days' gestation, and postterm at 42 weeks' gestation. Early dating of the pregnancy is important for accurately determining when a pregnancy is late- or postterm, and first-trimester ultrasonography should be performed if clinical dating is uncertain. Optimal management of a low-risk, late-term pregnancy should consider maternal preference and balance the benefits and risks of induction vs. waiting for spontaneous labor. Compared with expectant management, induction at 41 weeks' gestation is associated with a small absolute decrease in perinatal mortality and decreases in other fetal and maternal risks without an increased risk of cesarean delivery. Although there is no clear evidence that antenatal testing beginning at 41 weeks' gestation prevents intrauterine fetal demise, it is often performed because the risks are low. When expectant management is chosen, most experts recommend beginning twice-weekly antenatal surveillance at 41 weeks with biophysical profile or nonstress testing plus amniotic fluid index (modified biophysical profile); induction may be deferred until 42 weeks if this surveillance is reassuring. (*Am Fam Physician*. 2014;90(3):160-165. Copyright © 2014 American Academy of Family Physicians.)

CME This clinical content conforms to AAFP criteria for continuing medical education (CME). See CME Quiz Questions on page 145.

Author disclosure: No relevant financial affiliations.

► **Patient information:** A handout on this topic is available at <http://familydoctor.org/familydoctor/en/pregnancy-newborns/labor-childbirth/pregnancy-what-to-expect-when-youre-past-your-due-date.html>.

Postterm pregnancy is defined as that lasting beyond 294 days or 42 weeks' gestation. In 2009, nearly 6% of singleton births in the United States occurred at or beyond 42 weeks' gestation.¹ More recently, attention has focused on the concept of late-term pregnancy, which is from 41 weeks, 0 days' to 41 weeks, 6 days' gestation.² Late-term pregnancy is important because of the increasing fetal and maternal risks during this time. The clinical concerns surrounding late-term pregnancy include the risks and anticipated outcomes for expectant management vs. induction, the predictors of a successful induction (i.e., an induction that leads to a vaginal delivery), the role of antenatal surveillance, and the risk of failed induction followed by cesarean delivery.

What Are the Causes of a Postterm Pregnancy?

In most cases, the etiology of postterm gestation is not well understood. Known risk factors for postterm pregnancy are a previous postterm pregnancy, nulliparity, maternal age older than 30 years, and obesity.^{3,4} A likely genetic predisposition to postterm

pregnancy has been demonstrated.⁵⁻⁷ A woman who was born postterm has a 49% increased risk of giving birth to a child beyond 42 weeks' gestation; the risk is 23% if the father of the child was born postterm.⁶ Fetal anencephaly and placental surfactant deficiency are rare causes of postterm pregnancy.⁸

Inaccurate clinical dating may lead to the misdiagnosis of late-term or postterm pregnancy.^{8,9} Traditional dating using the last menstrual period, which assumes accurate recall and ovulation at day 14, can overestimate gestational age.¹⁰⁻¹² Early ultrasonography can decrease this miscalculation and therefore decrease inductions for misclassified late-term and postterm pregnancies.¹³ Although first-trimester measurement of crown-rump length is the most accurate dating method and is often performed,^{14,15} it is not currently recommended as a standard of prenatal care in the United States.⁸

The American College of Obstetricians and Gynecologists states that the estimated date of delivery may be determined by the last menstrual period if the patient has regular, normal menstrual cycles and has not

SORT: KEY RECOMMENDATIONS FOR PRACTICE

Clinical recommendation	Evidence rating	References
Labor induction at 41 weeks' gestation is associated with a small but significant reduction in perinatal mortality compared with expectant management (number needed to treat = 410).	A	19, 20
Labor induction at 41 weeks' gestation decreases the cesarean delivery rate compared with spontaneous labor at 42 weeks after expectant management (number needed to treat = 30).	A	19, 24, 25, 29, 37
Infants delivered at or beyond 41 weeks' gestation are at increased risk of meconium aspiration syndrome.	C	19, 20, 23, 24
Delivery beyond 42 weeks' gestation increases the maternal complications of postpartum hemorrhage, dystocia, and maternal infection (i.e., chorioamnionitis and endometritis). However, there is no difference in risk of maternal hemorrhage or infection at 41 weeks between expectant management and induction.	B	19, 21, 28, 29
Women with pregnancies lasting beyond 41 weeks' gestation should undergo twice-weekly antenatal testing until delivery.	C	8, 32

A = consistent, good-quality patient-oriented evidence; B = inconsistent or limited-quality patient-oriented evidence; C = consensus, disease-oriented evidence, usual practice, expert opinion, or case series. For information about the SORT evidence rating system, go to <http://www.aafp.org/afpsort>.

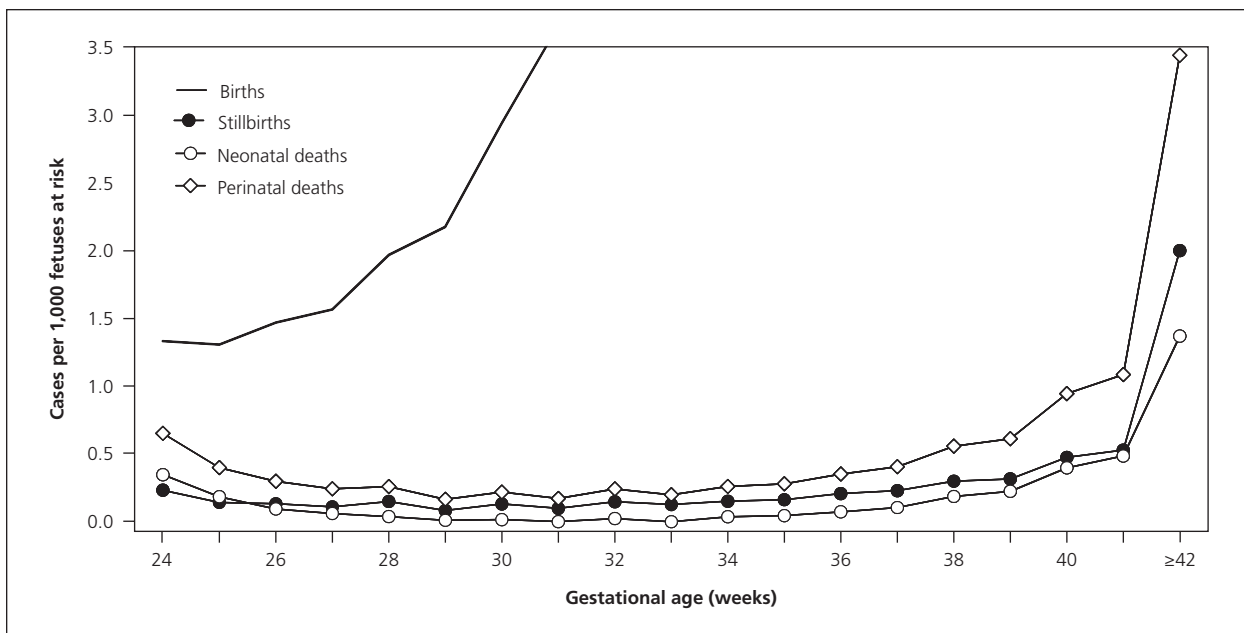


Figure 1. Rates of birth, stillbirth, neonatal deaths, and extended perinatal death in 2005 by gestational age.

Reprinted with permission from Joseph KS. The natural history of pregnancy: diseases of early and late gestation. BJOG. 2011;118(13):1620.

used contraceptive hormones in the three months before the last menstrual period.⁸ However, first-trimester ultrasonography is recommended if there is concern regarding the accuracy of dating based on the last menstrual period.⁸

What Are the Risks of a Late-Term or Postterm Pregnancy, and Does Induction Reduce These Risks?

A review of all live births in the United States for the years 1995 and 2005 documents gestational age-specific patterns of perinatal morbidity and mortality, with a rise in stillbirths, perinatal deaths, and neonatal deaths at 41 weeks' gestation (Figure 1).¹⁶ Other studies

also document increased fetal morbidity and mortality beyond 41 weeks' gestation.^{17,18} A large California cohort study comparing infants born at 38, 39, or 40 weeks' gestation with those born at 41 to 41 weeks, 6 days' gestation found a significantly increased risk of neonatal mortality in the latter group (adjusted odds ratio = 1.37; 95% confidence interval [CI], 1.08 to 1.73).¹⁸

A 2012 Cochrane review of 22 trials with a total of more than 9,000 women compared induction of labor at 41 weeks' gestation with expectant management.¹⁹ It showed that induction at 41 weeks was associated with fewer perinatal deaths (risk ratio = 0.31; 95% CI, 0.12 to 0.88); 410 inductions were needed to prevent one

Late-Term and Postterm Pregnancy

perinatal death. However, these findings occurred in the context of a minimal (0.3%) absolute risk of perinatal death. A second systematic review confirmed a significant reduction in perinatal mortality in this population, with a number needed to induce of 328 to prevent one perinatal death.²⁰

The fetal morbidity most clearly associated with late-term or postterm gestation is meconium aspiration syndrome,^{15,21,22} which is more common at 40 and 41 weeks' gestation compared with 39 weeks' gestation.²³ Based on high-quality evidence, the risk of meconium aspiration syndrome can be reduced by induction of labor at 41 weeks compared with allowing the pregnancy to continue to 42 weeks or beyond.^{19,20,24} Decreasing the risk of macrosomia by induction at 41 weeks may also be beneficial.²⁰ In some studies, meconium aspiration syndrome has been associated with perinatal risk of pneumonia, pneumothorax, low Apgar scores, and need for admission into the neonatal intensive care unit.¹⁷ It does not appear that induction reduces these risks, however. Meta-analyses have found no significant differences in neonatal intensive care unit admission or abnormal Apgar scores between induction at 41 weeks' gestation and expectant management.^{19,25}

Possible neurologic risks have been associated with postterm delivery. A Danish study of the National Birth Registry between 1980 and 2001 reported a small increase in the risk of epilepsy in the first year of life in postterm infants; the incidence rate ratio for epilepsy was 1.2 (95% CI, 1.0 to 1.5) for birth at 42 weeks' gestation compared with birth at 39 to 41 weeks' gestation.²⁶ A cohort study of records from more than 1 million Norwegian infants examined the prevalence of cerebral palsy among term and postterm infants. Infants born at 42 weeks' gestation had a cerebral palsy prevalence of 1.36 per 1,000 by four years of age, compared with 0.99 per 1,000, the lowest prevalence, for those born at 40 weeks' gestation.²⁷ It is unclear whether induction of labor will reduce these risks.

What Are the Risks of a Late-Term or Postterm Pregnancy to the Mother?

Postterm pregnancies also have potential maternal risks. Delivery at 42 weeks' gestation is associated with an increased risk of postpartum hemorrhage, dystocia, and maternal infection (i.e., chorioamnionitis and endometritis).^{21,28} However, studies comparing induction of labor with expectant management at 41 weeks' gestation did not show a difference between the two groups in risk of maternal postpartum hemorrhage or infections.^{19,29}

Can Membrane Sweeping Reduce the Likelihood of Prolonged Pregnancy and the Need for Induction?

A pregnant woman nearing term may be counseled about sweeping of the membranes as a possible measure to prevent late-term or postterm induction. Membrane sweeping includes an introduction of the clinician's finger in the cervical os in a "sweeping" circular motion to help stimulate local uterine production of prostaglandin. A Cochrane review showed that beginning sweeping at term (beyond 38 weeks) reduced the duration of pregnancy and reduced the likelihood that the pregnancy would continue beyond 41 weeks (relative risk = 0.59; 95% CI, 0.46 to 0.74) or 42 weeks (relative risk = 0.28; 95% CI, 0.15 to 0.50). Number needed to treat (sweep) to prevent one induction was eight.³⁰ Potential disadvantages of membrane sweeping are patient pain, vaginal bleeding, and irregular contractions.^{30,31}

How Should Late-Term and Postterm Pregnancy Be Managed?

If a pregnancy reaches 41 weeks and there are no medical indications for induction, the patient should be counseled about the benefits and harms of induction compared with expectant management. Thoughtful informed consent should include a discussion of maternal and fetal risks; the option of waiting for spontaneous labor; descriptions of induction methods; and the likelihood of successful induction based on clinical predictors, as well as the possible need for cesarean delivery if the induction fails or maternal or fetal conditions change.

Induction may be recommended for low-risk pregnancies at 41 weeks' gestation because it has been shown to decrease the risk of fetal perinatal mortality and morbidity. Because the absolute risk of fetal morbidity in expectant management is low, especially in the setting of antenatal testing and monitoring, it is reasonable to wait until 42 weeks' gestation for induction if the patient prefers.^{8,9,22} *Figure 2* is an algorithm for the management of late-term and postterm pregnancy.

What Antenatal Testing Should Be Performed as Part of Expectant Management?

There are few data comparing the effects of antenatal testing in late-term or postterm pregnancy, and no single method of antenatal testing has been shown to be superior.⁸ However, there is also no evidence that antenatal testing is harmful.⁸ Most experts recommend twice-weekly antenatal surveillance for low-risk pregnancies beginning at 41 weeks using amniotic fluid index measurement and either a biophysical profile or

Management of Late-Term and Postterm Pregnancy

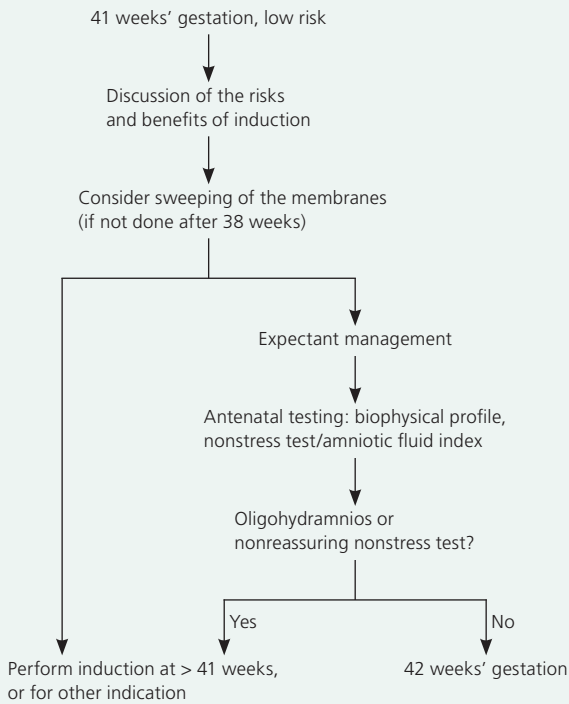


Figure 2. Algorithm for the management of late-term and postterm pregnancy.

nonstress testing.^{8,32} Table 1 summarizes antenatal testing methods.

A common practice is to start with a nonstress test and amniotic fluid index (modified biophysical profile). If there is evidence of oligohydramnios, delivery should

be advised. If the nonstress test is nonreactive, then a biophysical profile or contraction stress test is usually performed³³; however, some clinicians and patients may elect induction at 41 weeks' gestation or later in the setting of a nonreactive nonstress test.³³ It is important to note that the amniotic fluid index result in a traditional biophysical profile is considered normal by a measurement of a single 2- × 2-cm pocket and does not require a four-quadrant measurement. When a four-quadrant amniotic fluid index is performed, oligohydramnios is defined as a total measurement of less than 5 cm. A positive contraction stress test or biophysical profile score of less than 6 is an indication for induction in this setting.

What Are the Clinical Predictors of a Successful Late-Term or Postterm Induction?

Clinical factors for predicting a successful induction should be assessed by the clinician at 41 weeks' gestation. The Bishop score, which consists of fetal station and cervical effacement, dilation, consistency, and position, has been used to help predict favorability of induction. A Bishop score greater than 6 is considered favorable.¹⁹ In one study, nulliparous women with a Bishop score of less than 5 who were induced (including the use of cervical ripening agents) had a cesarean delivery rate of 31.5%, compared with 18.1% in those with a Bishop score of 5 or greater; this finding was not specific for pregnancy beyond 41 weeks.³⁴ A recent study found that shorter cervical length and lower body mass index are better predictors of successful induction than the Bishop score.³⁵

Table 1. Antenatal Testing Methods

Method	Testing component
Nonstress test	Fetal heart tone assessment: reactive is > 2 accelerations in a 20-minute period (15 beats per minute × 15 seconds above baseline heart rate); nonreactive (abnormal) is ≤ 2 accelerations
Modified biophysical profile	Amniotic fluid index and nonstress test
Biophysical profile	Amniotic fluid index: At least one vertical pocket > 2- × 2-cm
Fetal breathing: 0 or 2 points	Fetal breathing: One or more episodes of fetal breathing of ≥ 30 seconds within 30 minutes
Movement: 0 or 2 points	Movement: Three or more discrete body or limb movements within 30 minutes
Tone: 0 or 2 points	Tone: One or more episodes of extension and flexion of fetal extremity or opening and closing of a hand
Nonstress test: 0 or 2 points	Nonstress test: See above
Total 8 points plus amniotic fluid index = 10 points	
Contraction stress test	Fetal tolerance of stimulated contractions: Three per 10-minute interval; late decelerations occurring with at least 50% of contractions is considered a positive (abnormal) result

Recommendation	Sponsoring organization
Do not schedule elective, non–medically indicated inductions of labor or cesarean deliveries before 39 weeks, 0 days' gestation.	American Academy of Family Physicians; American College of Obstetricians and Gynecologists
Avoid elective, non–medically indicated inductions of labor between 39 weeks, 0 days' and 41 weeks, 0 days' gestation unless the cervix is deemed favorable.	American Academy of Family Physicians; American College of Obstetricians and Gynecologists

Source: For supporting citations, see <http://www.aafp.org/afp/cw-table.pdf>. For more information on the Choosing Wisely Campaign, see <http://www.choosingwisely.org>. To search Choosing Wisely recommendations relevant to primary care, see <http://www.aafp.org/afp/recommendations/search.htm>.

Does Induction at 41 Weeks' Gestation Increase the Risk of Cesarean Delivery?

In 2009, the total cesarean delivery rate in the United States reached a record high at 32.9% of all births, and it remained at 32.8% as of 2012.^{1,36} Clinicians and patients are often concerned that induction at 41 weeks will increase the patient's risk of cesarean delivery. However, a Cochrane review showed a small decrease in the risk of cesarean delivery following induction at 41 weeks compared with spontaneous labor at 42 weeks after expectant management (risk ratio = 0.89; 95% CI, 0.81 to 0.97).¹⁹ The number needed to induce at 41 weeks' gestation to prevent one cesarean delivery compared with expectant management was approximately 30.¹⁹ Other studies also report a lower cesarean delivery rate with induction at 41 weeks.^{24,25,29,37}

However, induction alters the birth experience by adding medical interventions, and some women may prefer to wait for spontaneous labor. The risks of waiting for the onset of spontaneous labor are low between 41 and 42 weeks' gestation (e.g., stillbirth rate is just over one per 1,000 births)⁹; therefore, expectant management should be considered during this period based on patient preference and willingness to undergo antenatal fetal surveillance.

Data Sources: We searched PubMed, the Cochrane database, POEMs, and the National Guideline Clearinghouse using the keywords postterm or postdates pregnancy, and included results between 1990 and May 2014. We also used the evidence summary from Essential Evidence Plus. Search dates: September 2012 and May 2014.

This article is one in a series on "Advanced Life Support in Obstetrics (ALSO)," coordinated by Larry Leeman, MD, MPH, ALSO Managing Editor, Albuquerque, N.M.

The authors thank Barbara Olson-Bullis, MA, HealthPartners Institute for Education and Research, for her assistance with the literature search.

The Authors

MARY WANG, MD, is an assistant clinical professor in the Department of Family and Preventive Medicine at the University of California, San Diego.

PATRICIA FONTAINE, MD, MS, is a senior clinical research investigator at the HealthPartners Institute for Education and Research in Bloomington, Minn.

Address correspondence to Mary Wang, MD, University of California, San Diego, 9333 Genesee Ave., #200, San Diego, CA 92121 (e-mail: mjw011@ucsd.edu). Reprints are not available from the authors.

REFERENCES

- Martin JA, Hamilton BE, Ventura SJ, et al. Births: final data for 2009. *Natl Vital Stat Rep*. 2011;60(1):1-70.
- American College of Obstetricians and Gynecologists. ACOG committee opinion no 579: Definition of term pregnancy. *Obstet Gynecol*. 2013;122(5):1139-1140.
- Roos N, Sahlin L, Ekman-Ordeberg G, Kieler H, Stephansson O. Maternal risk factors for postterm pregnancy and cesarean delivery following labor induction. *Acta Obstet Gynecol Scand*. 2010;89(8):1003-1010.
- Arrowsmith S, Wray S, Quenby S. Maternal obesity and labour complications following induction of labour in prolonged pregnancy. *BJOG*. 2011;118(5):578-588.
- Olesen AW, Basso O, Olsen J. Risk of recurrence of prolonged pregnancy. *BMJ*. 2003;326(7387):476.
- Morken NH, Melve KK, Skjaerven R. Recurrence of prolonged and post-term gestational age across generations: maternal and paternal contribution. *BJOG*. 2011;118(13):1630-1635.
- Oberg AS, Frisell T, Svensson AC, Iliadou AN. Maternal and fetal genetic contributions to postterm birth: familial clustering in a population-based sample of 475,429 Swedish births. *Am J Epidemiol*. 2013;177(6):531-537.
- ACOG Committee on Practice Bulletins—Obstetrics. ACOG practice bulletin. Clinical management guidelines for obstetricians-gynecologists. Number 55, September 2004 (replaces practice pattern number 6, October 1997). Management of postterm pregnancy. *Obstet Gynecol*. 2004;104(3):639-646.
- Delaney M, Roggensack A, Leduc DC, et al.; Clinical Practice Obstetrics Committee; Maternal Fetal Medicine Committee. Guidelines for the management of pregnancy at 41+0 to 42+0 weeks. *J Obstet Gynaecol Can*. 2008;30(9):800-823.
- Nielson JP. Ultrasound for fetal assessment in early pregnancy. *Cochrane Database Syst Rev*. 2000;(2):CD000182.
- Hoffman CS, Messer LC, Mendola P, Savitz DA, Herring AH, Hartmann KE. Comparison of gestational age at birth based on last menstrual period and ultrasound during the first trimester. *Paediatr Perinat Epidemiol*. 2008;22(6):587-596.
- Bottomley C, Bourne T. Dating and growth in the first trimester. *Best Pract Res Clin Obstet Gynaecol*. 2009;23(4):439-452.
- Whitworth M, Bricker L, Neilson JP, Dowswell T. Ultrasound for fetal assessment in early pregnancy. *Cochrane Database Syst Rev*. 2010;(4):CD007058.
- Chalouhi GE, Bernard JP, Benoit G, Nasr B, Ville Y, Salomon LJ. A comparison of first trimester measurements for prediction of delivery date. *J Matern Fetal Neonatal Med*. 2011;24(1):51-57.
- Dietz PM, England LJ, Callaghan WM, Pearl M, Wier ML, Kharrazi M. A comparison of LMP-based and ultrasound-based estimates of gestational age using linked California livebirth and prenatal screening records. *Paediatr Perinat Epidemiol*. 2007;21(suppl 2):62-71.

16. Joseph KS. The natural history of pregnancy: diseases of early and late gestation. *BJOG*. 2011;118(13):1617-1629.
17. Nakling J, Backe B. Pregnancy risk increases from 41 weeks of gestation. *Acta Obstet Gynecol Scand*. 2006;85(6):663-668.
18. Bruckner TA, Cheng YW, Caughey AB. Increased neonatal mortality among normal-weight births beyond 41 weeks of gestation in California. *Am J Obstet Gynecol*. 2008;199(4):421.e1-e7.
19. Gülmezoglu AM, Crowther CA, Middleton P, Heatley E. Induction of labour for improving birth outcomes for women at or beyond term. *Cochrane Database Syst Rev*. 2012;(6):CD004945.
20. Hussain AA, Yakoob MY, Imdad A, Bhutta ZA. Elective induction for pregnancies at or beyond 41 weeks of gestation and its impact on stillbirths: a systematic review with meta-analysis. *BMC Public Health*. 2011;11(suppl 3):S5.
21. Olesen AW, Westergaard JG, Olsen J. Perinatal and maternal complications related to postterm delivery: a national register-based study, 1978-1993. *Am J Obstet Gynecol*. 2003;189(1):222-227.
22. Vayssière C, Haumonte JB, Chantry A. Prolonged and post-term pregnancies: guidelines for clinical practice from the French College of Gynecologists and Obstetricians (CNGOF). *Eur J Obstet Gynecol Reprod Biol*. 2013;169(1):10-16.
23. Cheng YW, Nicholson JM, Nakagawa S, Bruckner TA, Washington AE, Caughey AB. Perinatal outcomes in low-risk term pregnancies: do they differ by week of gestation? *Am J Obstet Gynecol*. 2008;199(4):370e1-e7.
24. Wennerholm UB, Hagberg H, Brorsson B, Bergh C. Induction of labor versus expectant management for post-date pregnancy: is there sufficient evidence for a change in clinical practice? *Acta Obstet Gynecol Scand*. 2009;88(1):6-17.
25. Sanchez-Ramos L, Olivier F, Delke I, Kaunitz AM. Labor induction versus expectant management for postterm pregnancies: a systematic review with meta-analysis. *Obstet Gynecol*. 2003;101(6):1312-1318.
26. Ehrenstein V, Pedersen L, Holsteen V, Larsen H, Rothman KJ, Sørensen HT. Postterm delivery and risk for epilepsy in childhood. *Pediatrics*. 2007;119(3):e554-e561.
27. Moster D, Wilcox AJ, Vollset SE, Markestad T, Lie RT. Cerebral palsy among term and postterm births. *JAMA*. 2010;304(9):976-982.
28. Caughey A, Scotland NE, Washington AE, Escobar GJ. Maternal and obstetric complications of pregnancy are associated with increasing gestational age at term. *Am J Obstet Gynecol*. 2007;196(2):155.e1-e6.
29. Hannah ME, Hannah WJ, Hellmann J, Hewson S, Milner R, Willan A. Induction of labor as compared with serial antenatal monitoring in post-term pregnancy. A randomized controlled trial. The Canadian Multicenter Post-term Pregnancy Trial Group [published correction appears in *N Engl J Med*. 1992;327(5):368]. *N Engl J Med*. 1992;326(24):1587-1592.
30. Boulvain M, Stan C, Irion O. Membrane sweeping for induction of labour. *Cochrane Database Syst Rev*. 2005;(1):CD000451.
31. Chauhan SP, Ananth CV. Induction of labor in the United States: a critical appraisal of appropriateness and reducibility. *Semin Perinatol*. 2012;36(5):336-343.
32. Mandruzzato G, Alfirevic Z, Chervenak F, et al.; World Association of Perinatal Medicine. Guidelines for the management of postterm pregnancy. *J Perinat Med*. 2010;38(2):111-119.
33. ACOG practice bulletin. Antepartum fetal surveillance. Number 9, October 1999 (replaces technical bulletin number 188, January 1994). Clinical management guidelines for obstetrician-gynecologists. *Int J Gynaecol Obstet*. 2000;68(2):175-185.
34. Johnson DP, Davis NR, Brown AJ. Risk of cesarean delivery after induction at term in nulliparous women with an unfavorable cervix. *Am J Obstet Gynecol*. 2003;188(6):1565-1569.
35. Uyar Y, Erbay G, Demir BC, Baytur Y. Comparison of the Bishop score, body mass index and transvaginal cervical length in predicting the success of labor induction. *Arch Gynecol Obstet*. 2009;280(3):357-362.
36. Martin JA, Hamilton BE, Osterman MJK, Curtin SC, Mathews TJ. Births: final data for 2012. *Natl Vital Stat Rep*. 2013;62(9):1-27.
37. Caughey AB, Sundaram V, Kaimal AJ, et al. Systematic review: elective induction of labor versus expectant management of pregnancy. *Ann Intern Med*. 2009;151(4):252-263.