

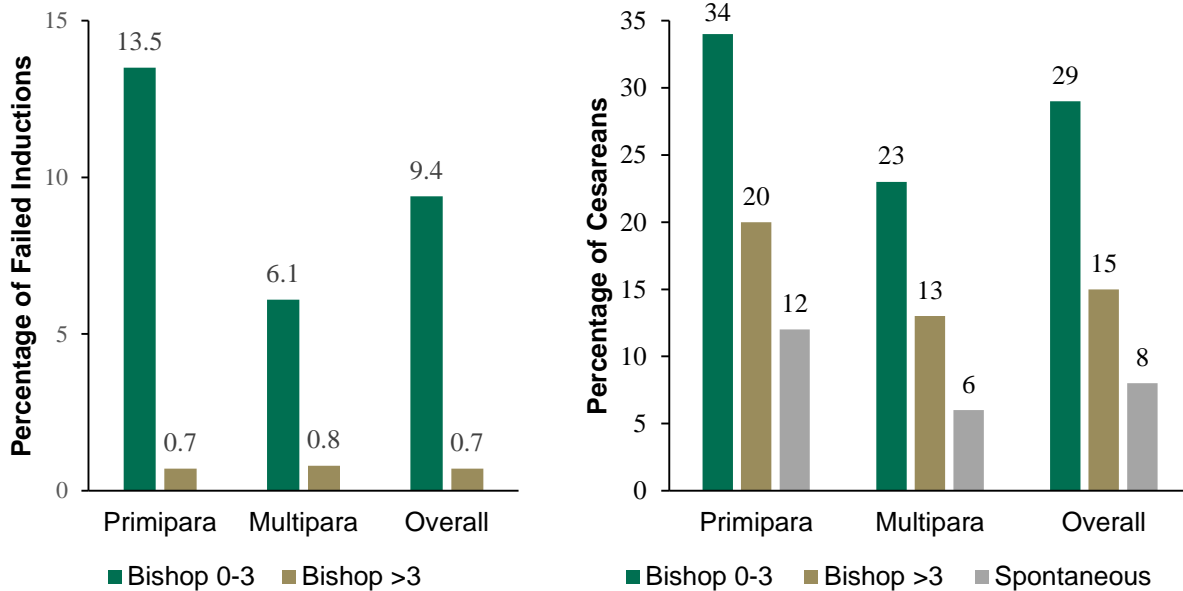
Induction of Labor (IOL) and Failed Induction of Labor

What are inductions of labor and failed induction of labor?

Induction of labor (IOL) is the use of physical or pharmacological methods in a pregnant woman who is not in labor to stimulate uterine contractions and start a vaginal birth in the following 24 to 48 hours.¹⁻³ Indications for IOL can be medical (ie, maternal or fetal) or elective (ie, absence of maternal or fetal indications, like living far away from the hospital).¹⁻³ The indication for an IOL must be convincing, compelling, consented to, and documented.² Rates of IOL have more than doubled since the 1990s, mostly inflated by elective IOL and postterm pregnancies.^{2,4}

Sometimes, for diverse reasons, IOL does not work, and this is known as a failed IOL. Failed IOL can be repeated if there is no indication for immediate delivery or end in a cesarean when there are indications for immediate delivery. The rate of failed IOL in both nulliparous and parous women is higher when the Bishop score is low (ie, 0 to 3; Figure 1).² Institutional factors may also play a role in the rate of failed IOL; women induced at term with low-risk Robson criteria in low induction rate centers had a lower overall failure rate than the high induction rate centers (18% vs. 28%, $P < 0.008$).²

Figure 1. Rates of failed inductions of labor (left) and cesareans (right) in women undergoing induction, stratified by parity and the modified Bishop score at entry.



Modified from Xenakis EM, Piper JM, Conway DL, Langer O. Induction of labor in the nineties: Conquering the unfavorable cervix. *Obstet Gynecol.* 1997;90(2):235-239. doi: 10.1016/S0029-7844(97)00259-7.

Why is it important to measure inductions of labors and failed inductions of labor?

Certain IOL methods can overstimulate the uterus, leading to changes in the fetal heart rate, umbilical cord problems, uterine rupture, infections, fetal death, and increased risk of cesarean birth.¹ Medical problems presenting before pregnancy might contribute to these complications. Frequencies of IOL vary by location, institution, and indications, warranting the importance of its monitoring. The rates of IOL have increased steadily from the 1990s in Canada,² Australia,⁵ and the US.⁶

Rising rates of cesarean deliveries pose important concerns regarding failed IOL, especially with borderline indications.⁴ To meet the expectations of women in their unique circumstances, IOL

Induction of Labor (IOL) and Failed Induction of Labor

should be tailored to these expectations. There should also be clear indications and benefits to either mother or fetus outweighing the potential risks.⁴

How are inductions of labor and failed induction of labor measured?

The American College of Obstetricians and Gynecologists (ACOG)⁷ recommends measuring the percentage of patients in whom gestational age is established by clinical criteria when labor is being induced for logistic or psychosocial indications. As there is no standardized measure of IOL, the Florida Perinatal Quality Collaborative will use the following working definitions:

$$\text{Rate of IOL} = \frac{\text{Non-medically indicated IOL performed to women 39-40}\frac{6}{7} \text{ weeks pregnant}^a}{\text{All singleton, vertex births to women 39-40}\frac{6}{7} \text{ weeks pregnant}}$$

$$\text{Rate of Cesareans (Among IOL)}^a = \frac{\text{Cesareans to women 39-40}\frac{6}{7} \text{ weeks pregnant}}{\text{Non-medically indicated IOL performed to women 39-40}\frac{6}{7} \text{ weeks pregnant}^a}$$

^aWomen were 39- to 40 $\frac{6}{7}$ -week pregnant with singletons in vertex position and had neither previous cesareans nor contraindications to vaginal delivery.

What are the limitations of measuring failed induction of labor?

As demonstrated in the literature review, using the Bishop score is helpful to classify inductions as high risk for failure. However, the Florida data set of maternal discharge records linked to birth certificates cannot account for the Bishop score at induction, making it impossible to stratify failed IOLs by this measure. However, the linked data set does allow for stratification of nulliparous and multiparous women. Also, studies have demonstrated that latent IOL phases as long as 18 hours in nulliparous women do not increase the risk of significant maternal or neonatal morbidity.^{8,9} Using the same linked data set, however, makes it impossible to determine the length of the latent phase for nulliparous women.

There is also controversy on the ability to predict IOL outcomes: a recent systematic review demonstrated that the rates of cesarean deliveries are usually the same in women with IOL compared to those women without IOL.³ Hence, the effect of elective IOL on the frequency of cesarean delivery is a critical uncertainty.³

How can we improve quality based on this indicator?

Understanding of the effect of failed IOL helps clinicians and policymakers determine the benefits and harms, and thus define a reasonable role for elective IOL in current obstetric practice.³ In turn, implementation of elective IOL policies—usually based on ACOG recommendations—results in lower rates of failed IOL, cesareans, operative/instrumental vaginal deliveries, maternal morbidity and neonatal morbidity and mortality.^{3,10} Process improvement through policy implementation has been proven superior to lack of standardization of elective labor induction.¹⁰ Evidence-based policies should be in place for elective IOL to reduce and prevent maternal and neonatal morbidity as well as increased cesarean and failed induction rates.¹⁰ The QI efforts of hospitals reviewing “hard stop” policies, hospital culture, scheduling of staff, and market share issues, positively affect the safety of the women and newborns they serve.^{10,11}

Induction of Labor (IOL) and Failed Induction of Labor

Figure 2. Rate of non-medically indicated induction of labor among singleton, vertex births at 39-40⁶/₇ weeks of gestation in multiparous women in Florida - Hospital X, 2004-2013.

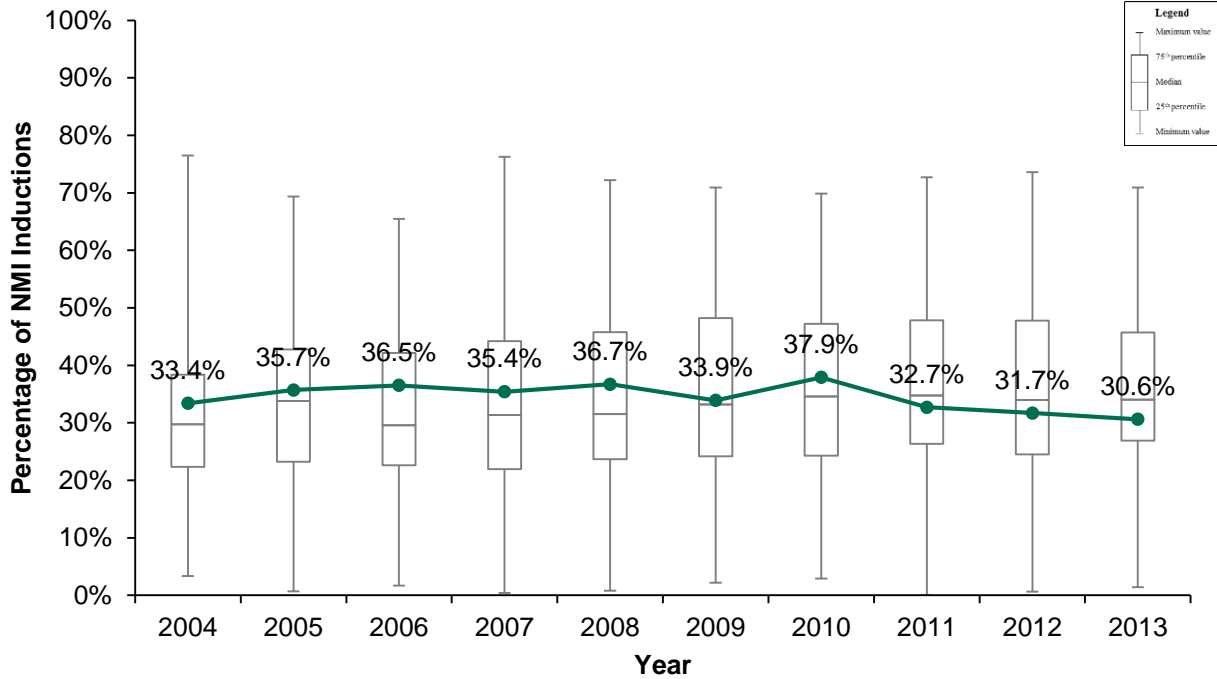
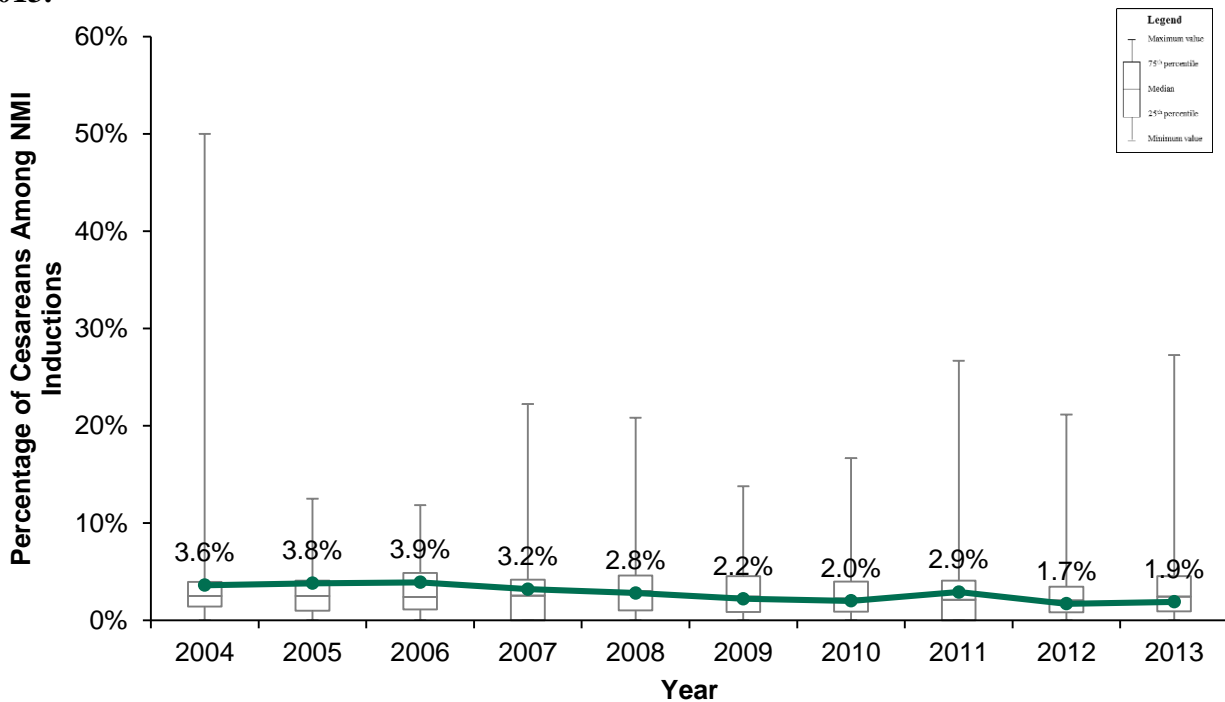


Figure 3. Rate of cesarean delivery among singleton, vertex, non-medically indicated inductions at 39-40⁶/₇ weeks of gestation in multiparous women in Florida - Hospital X, 2004-2013.



Induction of Labor (IOL) and Failed Induction of Labor

Figure 4. Rate of non-medically indicated induction of labor among singleton, vertex births at 39-40⁶/₇ weeks of gestation in nulliparous women in Florida - Hospital X, 2004-2013.

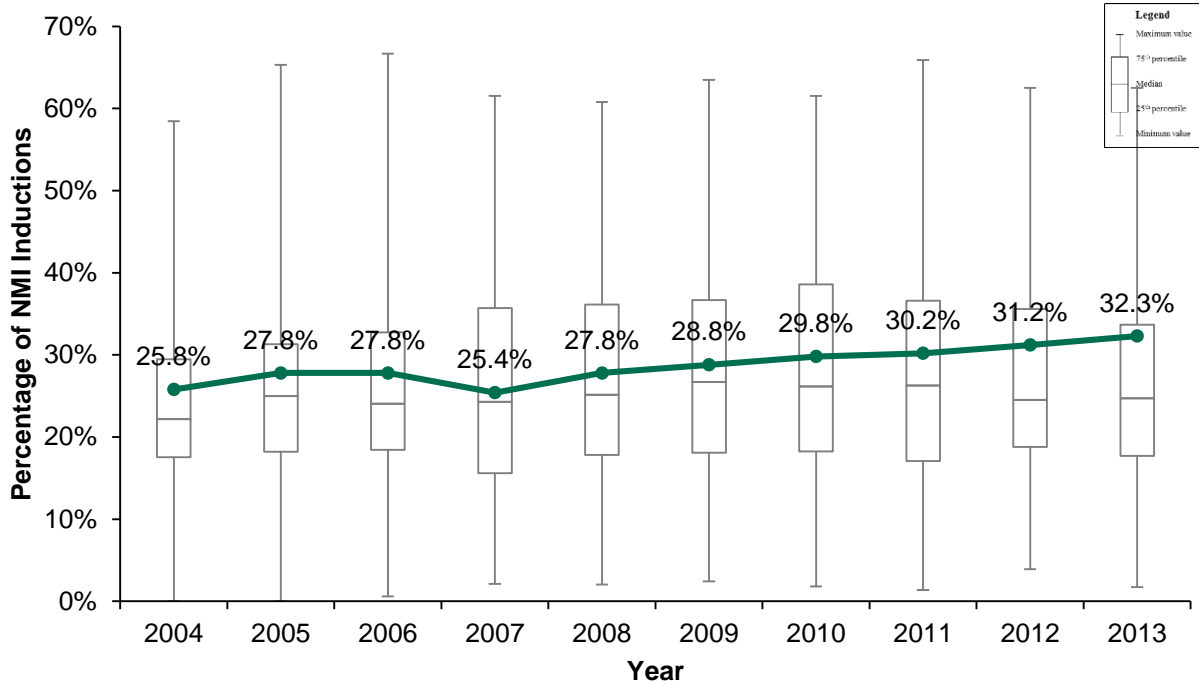
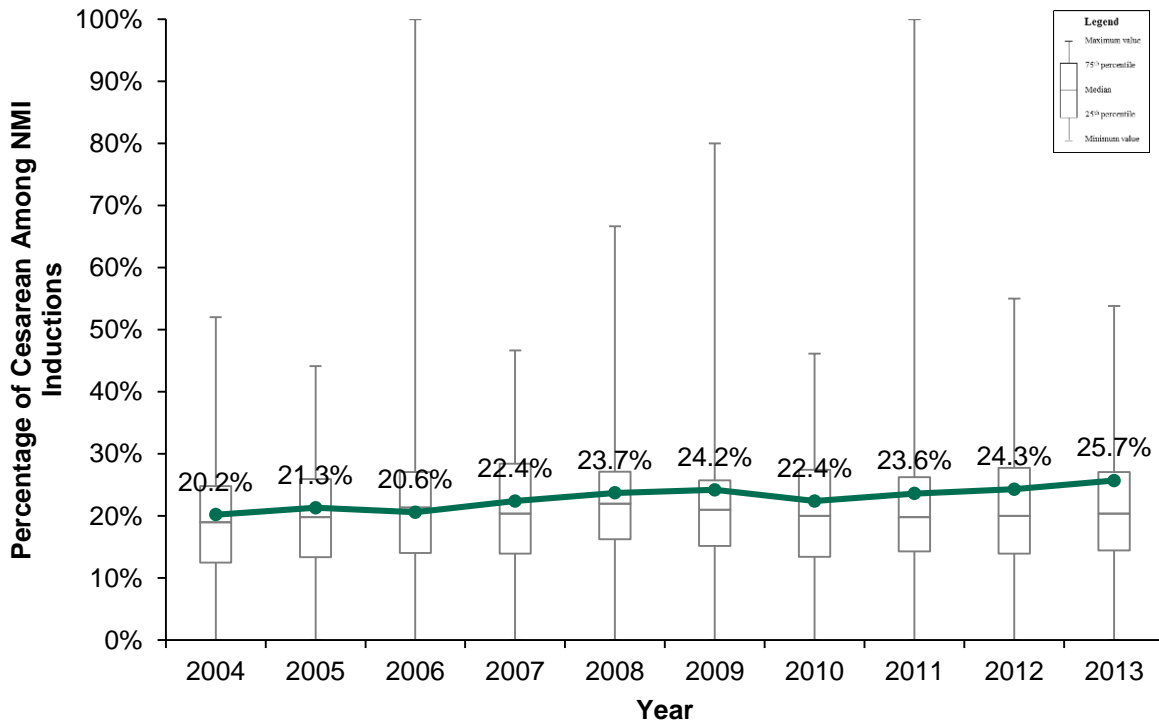


Figure 5. Rate of cesarean delivery among singleton, vertex, non-medically indicated inductions at 39-40⁶/₇ weeks of gestation in nulliparous women in Florida - Hospital X, 2004-2013.



References

Induction of Labor (IOL) and Failed Induction of Labor

1. American College of Obstetricians and Gynecologists (ACOG). Frequently asked questions: Labor, delivery, and postpartum care (FAQ154). Retrieved from <http://www.acog.org/~/media/For%20Patients/faq154.pdf?dmc=1&ts=20140904T1535581722>. Last accessed September 4, 2014.
2. Leduc D, Biringir A, Lee L, Dy J; Society of Obstetricians and Gynaecologists of Canada. Induction of labour. *J Obstet Gynaecol Can.* 2013;35(9):840-860.
3. 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, W53-W63. doi: 10.7326/0003-4819-151-4-200908180-00007.
4. Talaulikar VS, Arulkumaran S. Failed induction of labor: strategies to improve the success rates. *Obstet Gynecol Surv.* 2011;66(11):717-728. doi: 10.1097/OGX.0b013e31823e0c69.
5. Mealing NM, Roberts CL, Ford JB, Simpson JM, Morris JM. Trends in induction of labour, 1998-2007: a population-based study. *Aust N Z J Obstet Gynaecol.* 2009;49(6):599-605. doi: 10.1111/j.1479-828X.2009.01086.x.
6. Caughey AB, Sundaram V, Kaimal AJ, et al. Maternal and neonatal outcomes of elective induction of labor. *Evid Rep Technol Assess (Full Rep).* 2009;(176):1-257.
7. ACOG Committee on Practice Bulletins -- Obstetrics. ACOG Practice Bulletin No. 107: Induction of labor. *Obstet Gynecol.* 2009;114(2 Pt 1):386-397. doi: 10.1097/AOG.0b013e3181b48ef5.
8. Bayrampour H, Heaman M. Advanced maternal age and the risk of cesarean birth: A systematic review. *Birth.* 2010;37(3):219-226. doi: 10.1111/j.1523-536X.2010.00409.x.
9. Rouse DJ, Weiner SJ, Bloom SL, et al.; Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD) Maternal-Fetal Medicine Units Network (MFMU). Failed labor induction: Toward an objective diagnosis. *Obstet Gynecol.* 2011;117(2 Pt 1):267-272. doi: 10.1097/AOG.0b013e318207887a.
10. Simon CE, Grobman WA. When has an induction failed? *Obstet Gynecol.* 2005;105(4):705-709. doi: 10.1097/01.AOG.0000157437.10998.e7
11. Akinsipe DC, Villalobos LE, Ridley RT. A systematic review of implementing an elective labor induction policy. *J Obstet Gynecol Neonatal Nurs.* 2012;41(1):5-16. doi: 10.1111/j.1552-6909.2011.01320.x.
12. Moore J, Low LK. Factors that influence the practice of elective induction of labor: what does the evidence tell us? *J Perinat Neonatal Nurs.* 2012;26(3):242-50. doi: 10.1097/JPN.0b013e31826288a9.

