OBSTETRICS INITIATIVE

Evidence-Based Induction of Labor Clinical Practice Guide

A practical guide for clinicians implementing evidence-based techniques proven to shorten induction time and improve clinical outcomes for mothers and infants.

BACKGROUND

Induction of labor (IOL) is the most commonly performed procedure in obstetrics. Induction is a clinical procedure to stimulate labor before its spontaneous onset due to a medical or elective indication.

In the United States (U.S.), induction rates have risen precipitously over the last 3 decades, from 9.5% in 1990 to over 31% of all births in 2020.[1] **That's 120 inductions per hour, and over 1.1 million women undergoing IOL every year in the United States.**

The duration of IOL in the Obstetrics Initiative (OBI) collaborative is substantially longer than in clinical trials, with a median OBI IOL duration of 22.5 hours **(Fig. 1),** compared to only 16.2-18.0 hours in published studies.[2,3,4]

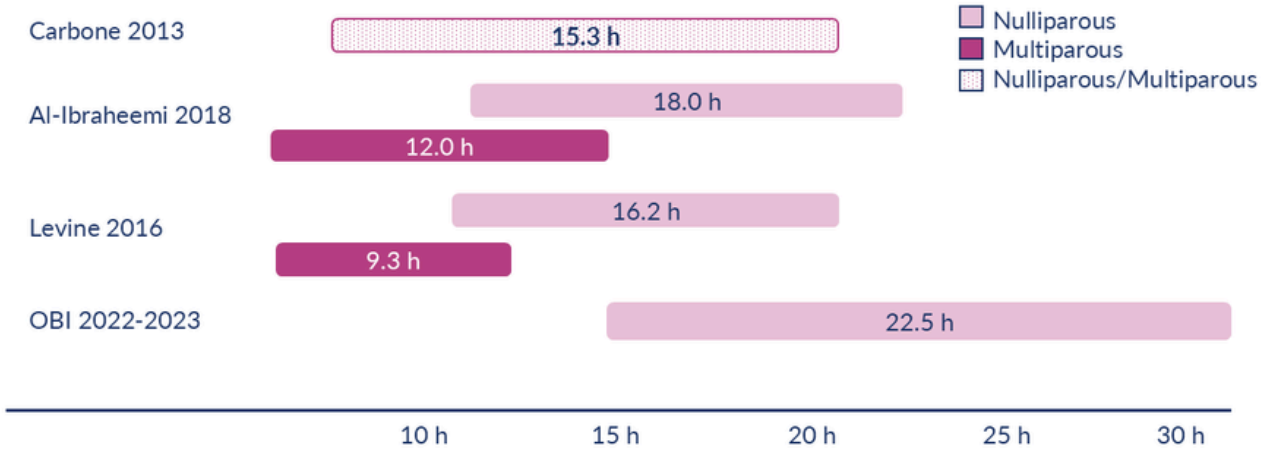


Figure 1. IOL Duration Much Longer in OBI than in Published Studies

Median length of IOL with interquartile range shown in colored bars

IOL Duration Matters for Outcomes

Medical Complications:

Among 29,000 inductions in OBI's registry from 1/2022 to 12/2023, prolonged induction (i.e., lasting >31 hours—the 75th percentile) was significantly associated with increased risk of:

- severe maternal morbidity (4.5% vs. 3.0%)
- severe neonatal morbidity (6.1% vs. 4.0%)
- cesarean birth (50% vs. 28%)
- hemorrhage (19% vs. 10%)
- obstetric infection (10% vs. 5.2%)

Considering patient characteristics, prolonged IOL was associated with a much higher risk of infection, hemorrhage, and morbidity for those with cesarean and vaginal births.[5]

Two other published, single-institution studies have similar findings, demonstrating a higher risk of cesarean and chorioamnionitis among those with longer duration inductions.[6,7]

Hospital Resource Utilization:

Compared to spontaneous labor, IOL requires additional inpatient hospital resources, including capacity and staffing, due to increased length of stay before delivery.[8,9] Among nulliparous patients, maternal intrapartum and delivery care costs were 17% higher for 39-week IOL compared to expectant management, although total costs were similar.[10]

Poor Patient Experience:

Cervical ripening has been associated with less positive childbirth experiences, including lower satisfaction, lower likelihood of feeling that the length of labor was acceptable, and post-traumatic stress disorder.[11,12,13,14]

Given adverse outcomes associated with prolonged IOL, **reducing IOL duration is a key strategy to improve outcomes for families.** For people undergoing IOL, for medical or elective indication, maternity clinicians should strive to provide the most effective induction procedure.

Evidence-Based Interventions to Manage Induction

Two empirically proven techniques should be recommended to all eligible patients undergoing induction:

DUAL AGENT RIPENING

Chemical + Mechanical Ripening

EARLY AMNIOTOMY

At or before 4cm dilated, offer amniotomy

Each technique has demonstrated efficacy in randomized controlled trials (RCTs) and meta-analyses at shortening induction time.[2,4,15,16,17] The evidence for IOL management has evolved significantly over the past 10 years. Below, we review the key studies maternity clinicians should rely on to guide management decisions.

Dual Agent Ripening

Which Pharmacologic Method Should I Use?

Literature favors low-dose misoprostol (synthetic PGE1). ACOG recommends the use of either vaginal or oral misoprostol for cervical ripening.[18] See dosing and rationale in the table below. Misoprostol can be given for up to 6 doses or 24 hours. If the birthing person is still in latent labor at that time, initiate oxytocin.

PREFERRED REGIMENS[18,19,20,21]

	Route (Dose)	Frequency	Comment
Misoprostol	Vaginal (25 mcg)	Every 3-4 hours	**Preferred.** Shorter time to delivery than oral misoprostol; more tachysystole, but no difference in cesarean
Misoprostol	Oral • Low dose: 20-25 mcg • Higher dose: 50-100 mcg	• Low Dose: Every 2 hours • Higher Dose: Every 4 hours	No clear consensus on dosing/frequency. • 25 mcg may offer best balance of safety and efficacy May increase gastrointestinal side effects. Consider for those intolerant of exams.

ALTERNATIVE REGIMENS[18,19,20,21]

	Route (Dose)	Frequency	Comment
Misoprostol	Buccal (25 mcg)	Every 3-4 hours	**Not Recommended by OBI.** Longer time to delivery, more cesarean deliveries for fetal heart rate abnormalities compared to vaginal misoprostol.
Dinoprostone	Vaginal • 10 mg pessary • 1-2 mg gel	Every 6-12 hours	**Not Recommended by OBI.** Low value-more expensive, longer time to delivery. Higher risk of adverse maternal outcomes than low-dose vaginal misoprostol.

Dual Agent Ripening

Which Mechanical Method Should I Use?

A **single balloon** is preferred over a double balloon.

Three systematic reviews/meta-analyses show equivalent safety and effectiveness between single and double balloons—but double balloons cause more maternal discomfort and are more expensive.[22,23,24]

Additional considerations:

- **Insufflation:**
  - 60ml may be preferable to 30mL (may be limited by institutional policy)
  - 60mL is associated with a shorter time to delivery
  - No increase in cesarean, maternal or neonatal morbidity
- **Balloon Use with Intact Membranes:**
  - No increased chorioamnionitis risk
  - Safe even in patients with GBS[25]
- **Double Balloon Catheters:**
  - Reasonable option if single balloon use is limited by institutional policy

> "Foley catheter is significantly cheaper, widely available and accessible, has a longer history of use and remains the logical choice over the double-balloon catheter for cervical ripening."[22]

Dual Agent Ripening

What are the Benefits of COMBINED Chemical + Mechanical Ripening?

Robust evidence demonstrates that combined chemical + mechanical ripening leads to shorter induction time and fewer complications than single-agent ripening.[4,15,26] Compared to prostaglandins alone, combined balloon-misoprostol may reduce adverse neonatal outcomes.[15,27]

In a network meta-analysis including over 40,000 participants, the optimal method of cervical ripening was foley combined with vaginal misoprostol.[28] It was the safest and most effective strategy compared to other cervical ripening options based on:

- Lower chance of neonatal intensive care unit admission and low Apgar scores
- Lower chance of tachysystole tachysystole
- Lower chance of cesarean delivery
- The highest chance of vaginal delivery within 24 hours

> "ACOG suggests the use of pharmacologic methods in combination with mechanical methods of cervical ripening to shorten the time from admission to delivery in appropriate candidates."[18]

Importantly, the goal should be concurrent placement of a balloon and a chemical agent. **The optimal strategy is to place a balloon at the same time (i.e., within 30 minutes) of starting a chemical agent.** This is based on the above-cited RCTs, which call for concurrent placement, and observational data that show higher neonatal and maternal risks with misoprostol followed by subsequent Foley placement.[29]

Early Amniotomy

Early amniotomy has been variously defined, but in general refers to amniotomy at 4 cm or less when it is feasible. Early amniotomy has consistently been shown to reduce time in labor during IOL without increasing the risk of cesarean.[16]

There is emerging data from RCTs that amniotomy shortly after balloon expulsion is also safe and effective.[17,30,31] Early amniotomy in this setting is typically performed within 1-2 hours of foley balloon expulsion.

Many clinicians may be concerned about the adverse effects of early amniotomy. However, there is reassuring data that early amniotomy **does not** increase the risk of:

- Chorioamnionitis
- Cord prolapse
- Neonatal sepsis
- Neonatal intensive care unit admission[16]

5 Hours Less Time in Labor

No Difference in Cesarean

Best Practices to Consider[32,33,34,35,36,37,38,39,40,41]

Membrane Sweep	
Evidence Summary	• Increased chance of vaginal birth, especially for nulliparous patients (RR 1.32 [95% CI 1.18–1.48]) • No added risks (meconium, NICU admission, operative vaginal birth)
Clinical Takeaway	• If feasible, offer membrane sweep at induction start or when scheduling • Safe even for GBS patients (limited data)
Cessation of Futile Interventions	
Evidence Summary	• Limit misoprostol doses to 6, or to 24 hours • Remove foley balloon at 12 hours if not expelled
Clinical Takeaway	• Consider foley removal earlier (6 hours vs. 12 hours) as this may improve chance of vaginal birth • Move on to oxytocin and/or amniotomy if 6 doses of misoprostol have been given
Cervical Exams	
Evidence Summary	• Exams every **2–4 hrs (early labor)** and **1–2 hrs (active labor)** may lower neonatal morbidity • Frequent exams (1–2 hrs, active labor) linked to lower cesarean risk • No added risk of fever with shorter exam intervals, considering time in labor
Clinical Takeaway	• Recommend regular, scheduled cervical exams during induction
Second Stage Management	
Evidence Summary	• No benefit to delayed pushing for spontaneous vaginal birth • Delayed pushing increases risk of chorioamnionitis & postpartum hemorrhage
Clinical Takeaway	• Recommend immediate pushing in second stage

Area with Less Certainty: Oxytocin Management

Despite several large, well-controlled studies on IOL, there continue to be areas of management that have less consensus.

There is limited data on optimal oxytocin dosing for the induction of labor.[42,43] Trials and observational studies have used varied protocols:

	Low-Dose Oxytocin	High-Dose Oxytocin
Initial Dose	0.5-2 milliunits/min	⩾4 milliunits/min
Titration	1-2 milliunits/min every 15 - 40 min	3-6 milliunits/min every 15-40 min

Oxytocin Management	

Evidence Summary	• Limited data; protocols vary (see above table)
	• High-dose oxytocin:[43]
	  ◦ No increased cesarean or neonatal risks
	  ◦ Lower postpartum hemorrhage risk

Clinical Takeaway	• No specific oxytocin regimen can be recommended at this time

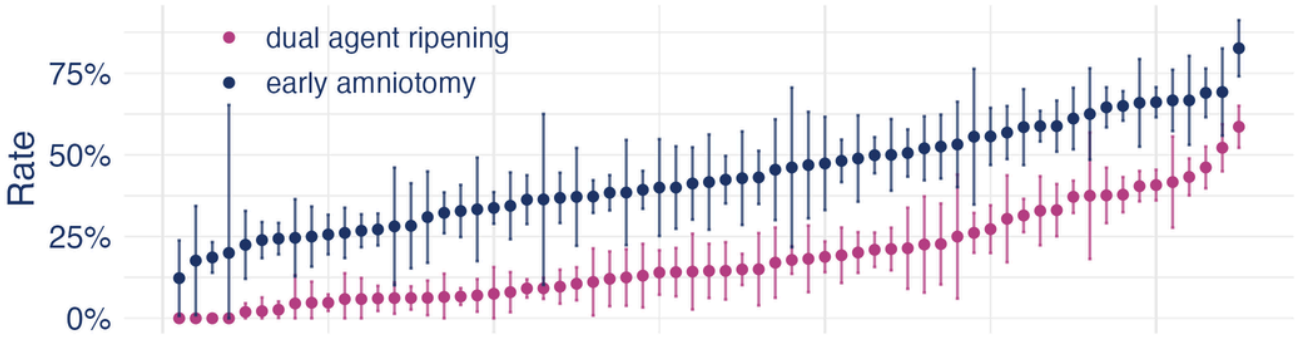
It is also notable that most studies of IOL cited in this practice guideline use time in labor as a primary outcome, not mode of delivery. We have limited data to suggest the best IOL practices to promote vaginal birth, although combined ripening with foley and misoprostol is promising.

INCORPORATING EVIDENCE INTO PRACTICE

Many OBI hospitals are underutilizing evidence-based techniques to manage inductions **(Fig. 2)**.

- Dual agent ripening median: 10.2% (range: 0 - 47.6%)
- Early amniotomy median: 45.0% (range: 9.1 - 84.5%)
- <8% of OBI inductions utilized both methods

Wide Variation in IOL Management Across OBI Hospitals



Based on data from 2025-01-01 to 2025-09-30. Aligned data points may not be from same site.

Figure 2. IOL Variation

Multiple observational studies have now shown that patients receiving standardized, evidence-based IOL management, compared to induction managed at provider discretion, have better outcomes:

- Decrease duration of induction[44,45]
- Decrease rates of complications
  - Chorioamnionitis[46]
  - Maternal morbidity[47]
  - Neonatal morbidity[47]

Therefore, **OBI hospitals' underutilization of evidence-based induction management techniques is a missed opportunity to improve clinical outcomes for mothers and infants.**

When institutions increase the use of evidence-based practices, the length of induction is shortened, and obstetric infections (chorioamnionitis, endometritis) and unanticipated complications can be reduced without increasing cesarean births.[33,44,46]

Notably, in these studies, adherence to recommended practices was still not optimized, suggesting further outcome improvements may be possible if higher adherence is achieved.

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OBSTETRICS INITIATIVE

OBI'S EVIDENCE-BASED INDUCTION INITIATIVE

Guiding Principles:

- **Induction is a Medical Procedure:** We should recommend the most effective procedural steps.
- **Reduce Unwarranted Variation:** Standardizing induction management leads to better birth outcomes.
- **Universal Opportunity:** All Michigan maternity clinicians can offer evidence-based induction management.

Eligible Clinical Population

- At term (⩾ 37 weeks), scheduled for labor induction
- Singleton pregnancy
- Baby in head-down (cephalic) position
- Membranes intact (no rupture)
- Cervix ⩽ 2cm and needs ripening

Exclusions (rationale)

- Prior cesarean birth (ineligible for prostaglandin)
- Prelabor rupture of membranes (PROM) (ineligible for dual agent, amniotomy)

Member-Driven Initiative Development

In 2025, OBI laid the foundation for a **statewide Induction of Labor (IOL) Initiative** to launch in Summer 2026 through close collaboration with members across Michigan.

We convened three focus groups representing hospitals statewide to inform project design and make sure frontline voices shaped every step. **Member feedback directly shaped more than 10 new resources for clinicians and QI leaders and led to the development of approximately 35 brand new registry variables—a first-in-kind, statewide dataset for assessing induction practices.**

These innovations ensure that OBI's IOL toolkit and measurement strategies are truly responsive to frontline needs, empowering care teams to drive meaningful improvement across the state.

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The Obstetrics Initiative (OBI) is a statewide quality improvement initiative that collects clinically credible data and shares best practices across 65 hospitals to optimize maternity care experiences and health outcomes for Michigan families. Support for OBI is provided by Blue Cross and Blue Shield of Michigan and Blue Care Network as part of the BCBSM Value Partnerships program. Although Blue Cross Blue Shield of Michigan and the Obstetrics Initiative work collaboratively, the opinions, beliefs, and viewpoints expressed by the author do not necessarily reflect the opinions, beliefs and viewpoints of BCBSM or any of its employees. Learn more at obstetricsinitiative.org.