GROW-WI
GATHERING THE RURAL OB WORKFORCE IN WI

Project ECHO®

Gathering the **R**ural **O**B **W**orkforce in **WI**
GROW-WI ECHO Program

How to Join:
https://iecho.org/public/program/PRGM17425658124325CC96FHKX3

For attendance purposes, please text the code QAWVOV to 608-260-7097.

Session Date: October 28, 2025
Facilitator: Rachel Hartline, MD

	Topic	**Presenter**
Case Presentation	Hypertensive Disorders of Pregnancy	**Kristin Graf, MD, FMOB** FM OB Fellow Emplify Health/Gundersen Health, La Crosse, WI
Educational Presentation	Evidence-Based Induction Methods	**Merritt McLean, MD, OBGYN** Medical Director of Inpatient Obstetrics Technology Lead for Inpatient OBGYN Complex Family Planning Kaiser Permanente, San Francisco, CA

Agenda:

7:30 – 7:35 AM – Welcome and Introductions

-Text-in your attendance, even if you do not plan to claim Continuing Education credits.

7:35 – 8:00 AM – Case Presentation

8:00 – 8:30 AM – Educational Presentation

Continuing Education Credits:

To claim CE credit, **you must complete the evaluation form after each session**.
ICEP will email you a link to the evaluation form after texting in for attendance.

Interprofessional
Continuing Education Partnership
UNIVERSITY OF WISCONSIN-MADISON

GROW-WI ECHO (Gathering the Rural OB Workforce in WI)
2025-2026
Evidence-based Induction Methods
October 28, 2025
Merritt McLean, MD – OBGYN; Kristin Graf, MD – FM OB

Provided by the University of Wisconsin–Madison Interprofessional Continuing Education Partnership (ICEP)

Intended Audience:
MD/DO, RN, APRN, Physician Assistants, Certified Nurse Midwives, Students

Objectives:
- Summarize reasons for developing an induction of labor bundle
- Describe evidence basis for key elements of an induction of labor bundle
- Explain the process for implementing an induction of labor bundle

Policy on Disclosure
It is the policy of the University of Wisconsin–Madison Interprofessional Continuing Education Partnership (ICEP) to identify, mitigate and disclose all relevant financial relationships with ineligible companies* held by the speakers/presenters, authors, planners, and other persons who may influence the content of this accredited continuing education (CE). In addition, speakers, presenters, and authors must disclose any planned discussion of unlabeled/unapproved uses of drugs or devices during their presentation. For this accredited continuing education activity, all relevant financial relationships have been mitigated and detailed disclosures are listed below.
** **Ineligible companies** are those whose primary business is producing, marketing, selling, re-selling, or distributing healthcare products used by or on patients. The ACCME does not consider providers of clinical service directly to patients to be ineligible companies.*

Name	Role	Financial Relationship Disclosures	Discussion of unlabeled/unapproved uses of drugs/devices in presentation	COI completion date
Kristin Graf, MD	Presenter	No relevant financial relationships with ineligible companies to disclose.	No	10/9/2025
Merritt McLean, MD	Presenter	No relevant financial relationships with ineligible companies to disclose.	No	10/21/2025
Jillian Landeck, MD	RSS Chair	No relevant financial relationships with ineligible companies to disclose.	NA	3/25/2025
Jenny White	RSS Coordinator	No relevant financial relationships with ineligible companies to disclose.	NA	3/27/2025
Korina Bauer, RN, CPM, LM	Planner	No relevant financial relationships with ineligible companies to disclose.	NA	3/25/2025
Bonnie Brown, MD	Planner	No relevant financial relationships with ineligible companies to disclose.	NA	4/8/2025
Jensena Carlson, MD	Planner	No relevant financial relationships with ineligible companies to disclose.	NA	3/27/2025
Lee Dresang, MD	Planner	No relevant financial relationships with ineligible companies to disclose.	NA	4/17/2025
Rachel Hartline, MD	Planner	No relevant financial relationships with ineligible companies to disclose.	NA	4/15/2025
Ryan Luellwitz, DO	Planner	No relevant financial relationships with ineligible companies to disclose.	NA	3/26/2025
Rebecca Pfaff, MD	Planner	No relevant financial relationships with ineligible companies to disclose.	NA	4/6/2025
Allegra Ponshock, MD	Planner	No relevant financial relationships with ineligible companies to disclose.	NA	3/29/2025
Ryan Spencer, MD	Planner	No relevant financial relationships with ineligible companies to disclose.	NA	3/31/2025
Shannan Stephens, MD	Planner	No relevant financial relationships with ineligible companies to disclose.	NA	4/10/2025

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The University of Wisconsin–Madison ICEP, as a member of the University Professional & Continuing Education Association (UPCEA), authorizes this program for 0.1 CEUs or 1.0 hour.

Welcome!

We will get started shortly.

Feel free to share your name, specialty/role, and practice location in the chat.

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American Nurses Credentialing Center (ANCC)

The University of Wisconsin–Madison ICEP designates this live activity for a maximum of 1 ANCC contact hour.

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- The planning committee has no conflicts of interest to disclose.

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Attendance

- For attendance purposes please text the code QAWVOV to 608-260-7097
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To receive continuing education credit:

1. Log your attendance (as above)
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2. Fill out the session evaluation form to receive credit – **REQUIRED for credit.**
   - A link to the evaluation will be sent after you text the code.

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Update on Midwife CEUs

For **Certified Professional Midwife** Continuing Education Credit:

- We are unable to meet MEAC Continuing Education credit requirements.
- The GROW-WI ECHO sessions may be used to meet the NARM Continuing Education Category 2 CEUs.

For **Certified Nurse Midwife** Continuing Education Credit:

- The ACNM Continuing Education Committee accepts AMA PRA Category 1 Continuing Education Credit.
- The GROW-WI ECHO sessions are approved for this.

For **Everyone:**

- To receive any Continuing Education credits, participants must:
  - Create a free ICEP account.
  - Text the attendance code at the time of the session.
  - **Fill out the evaluation** at the end of the session.

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Planning Team

Korina Bauer, RN, CPM, LM – WI Guild of Midwives, Iola, WI

Bonnie Brown, MD – UW DFMCH

Jensena Carlson, MD – UW DFMCH

Lee Dresang, MD – UW DFMCH

Rachel Hartline, MD* – Upland Hills Health, Dodgeville, WI

Jillian Landeck, MD* – UW DFMCH

Ryan Luellwitz, MD – UW OB GYN

Rebecca Pfaff, MD – Forks Community Hosp, Forks, WA

Allegra Ponshock, MD* – Mile Bluff Med Ctr, Mauston, WI

Ryan Spencer, MD – UW OB GYN

Shannan Stephens, MD – Gundersen OB GYN, La Crosse, WI

Jenny White* – UW DFMCH

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* Core Facilitation Team

Friendly Reminders

- Video appreciated
- Use chat function to ask questions or raise hand if able
- Mute microphone when not speaking
- Maintain confidentiality, no PHI
- Didactic will be recorded
- Mission is to empower those working in rural settings
- Our diversity of perspectives, specialties, practice scopes are our strength
- **"Coming together is a beginning. Keeping together is progress. Working together is success." -** Henry Ford

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Announcements

Next Month – November 25

- **Didactic: Labor and Delivery Closure: A summary and case study in rural maternity health**

  Zachary Baeseman, MD – FM OB

  Associate Chief Medical Officer, Leadership Development and Clinical Transformation

  Family Medicine with Operative Obstetrics—Wild Rose and Waupaca

  ThedaCare Physicians

- **Case: Rural Nursing Staffing**

  Brianna Juszczak, RN, BSN

  Mile Bluff Medical Center, Mauston, WI

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Interested in sharing a case?

Email jennifer.white@fammed.wisc.edu

- Slide template shared, 10 min for details of case
- Priority to cases from rural and resource-limited settings
- No PHI
- Include on CV as a state presentation

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Hypertensive disorders of pregnancy
A case review

Kristin Graf, MD, FM-OB Fellow

Gundersen Medical Foundation, La Crosse, WI

10-28-2025

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Disclosures & Disclaimers

- No Disclosures

- PATIENT RELATIONSHIP DISCLAIMER
  - PLEASE NOTE that Project ECHO® case consultations do not create or otherwise establish a provider-patient relationship between any clinician and any patient whose case is being presented in a Project ECHO® setting.

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Case Introduction

- 21yo G1P0 @ 39w0d presented to L&D with a concern for leaking fluid

- Primary question for discussion: hypertensive disorders of pregnancy, management options

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Obstetrical/Prenatal History:

- Routine care
- O+ (ab-), RNI, STI testing negative, H/H 14.6/40.7, A1C 5.3
- IUGR on anatomy u/s - EFW 7% -> antenatal testing
  - EFW @ 32w5d 24% - antenatal testing stopped
  - EFW @ 36w4d 31%
- GBS-

Past Medical History:

- Tonsillectomy 2019

Exam:

@1430 - Triage vitals 143/103, repeats continued in the mild range

- Denied preE symptoms
- Normal FM, denied VB/contractions
- NST reactive, toco w/o contractions
- SSE – mod white discharge, pooling/nitrazine/ferning negative
- SVE 1/15/-3, soft, middle position

Labs & Imaging:

- CBC – no leukocytosis, plt 319, H/H 11.3/32.1 (stable from prenatal labs)
- CMP – electrolytes wnl, normal kidney function (GFR >90), ALT/AST normal, protein/albumin/tBili normal
- Vaginitis panel – negative for candida/gardnerella/trichomonas
- UA – spec grav < 1.005, +LE
- UPCR – elevated at 0.39

Proposed diagnoses/management plan:

- Patient diagnosed with preEclampsia at term
- Admitted for induction of labor

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Timeline/L&D details:

Time	Blood pressure	Events
1430	143/103	Initial L&D triage vitals
1640->1656	154/96	Decision to admit for preE w/o SF, cervix 1/15/-3, dinoprostone = PGE2 gel placed
1800	143/102	Change of resident shift
1911->1939	170/105 -> 156/93	First severe BP -> recheck after 15 minutes 146/96
1942->2008	166/99 -> 157/103	Continued severe BP followed by non-severe
2108	167/108	
2124	155/99	CRB placed with 60/60cc, resident discussed with patient regarding initiation of MgSO4, patient reluctant and asked for time to think -> discussed with attending over the phone
2139	185/100	Magnesium ordered (4g bolus + 2g/hr), patient evaluated with RN to set up gtt, answered patient/spouse questions. Initial Mg check – DTR 3+, no clonus

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Timeline/L&D details continued:

Time	Blood pressure	Events
2145		Patient seized, rolled pt on side, O2 facemask placed, pulse palpable
2146		Called attending OB to present emergently, anesthesia called, overhead Code Blue called (to have more nursing staff, OR ready in case, etc), seizure resolved without meds
2150	154/87	FHR unable to be found – noted that wireless monitor battery was displaced, external monitors with difficulty monitoring FHT, 2g Mg pushed by rapid response RN
2155		CRB removed, cervix ~2cm, FSE placed -> not tracing, FHT on external monitor ~110s
2200-2203		OB replaced FSE -> still not tracing, cord replaced -> FHT 130s. 6g Mg bolus requested. Stat LTCS decision with pt and husband.
2208		In OR (general anesthesia)
2215		Incision
2217		Baby delivered Labs notable for K 2.8, Na 132, kidney function and LFTs remain wnl

Timeline/L&D details continued:

Time	Blood pressure	Events
2318	154/76	Out of OR PACU
2324	176/101	Last severe range BP
0008 (Day 2)	141/92	Last BP >140 systolic
0431		CMP repeat – K 2.9, Na 132, kidney function and LFTs remain wnl
2221	129/73	Mg gtt stopped
0414 (Day 3)		CMP with normalized K ~3.4, Na 136, kidney function and LFTs remain wnl, H/H 8.0/23.4
1830	136/89	Discharged from postpartum

Placental pathology:

- Placental weight 425g (3-10% for GA)
- Noted placental infarcts compatible with hypertensive disorder

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Hypertensive disorders of pregnancy:

- Gestational hypertension
  - Blood pressures >140/>90 on two occasions at least 4 hours apart occurring after 20w gestation in a patient with previously normal blood pressures
  - Antenatal testing indicated until induction
    - Serial ultrasounds for growth
    - Weekly antenatal testing
    - Close BP monitoring
    - Weekly lab tests - creatinine, hemoglobin, platelets, LFTs, urine protein:creatinine
  - Induction indicated 37w0d+ or at time of diagnosis

Hypertensive disorders of pregnancy:

- PreEclampsia
  - gHTN plus proteinuria
    - 24h urine protein >300, spot urine protein:creatinine ratio >0.3
    - Although we will diagnose preE with SF even without proteinuria
  - Severe features
    - thrombocytopenia (plt <100)
    - elevated LFTs (2x ULN)
    - severe persistent RUQ/epigastric abdominal pain
    - renal insufficiency (sCR >1.1 or double baseline)
    - pulmonary edema
    - new onset headache unresponsive to APAP

Hypertensive disorders of pregnancy:

- PreEclampsia
  - Without SF – antenatal testing recommended (like gHTN) and 37w induction
  - With SF
    - Expectant management considered if <34 weeks with stable maternal/fetal condition
    - Delivery if diagnosed after 34w0d after maternal stabilization, no delay for steroids

Hypertensive disorders of pregnancy:

- Eclampsia
  - A manifestation of hypertensive disorder of pregnancy
  - New-onset tonic-clonic, focal, or multifocal seizure in the absence of other cause
  - Can be abrupt or with classic signs of pre-eclampsia preceding
  - Delivery recommended 34+ weeks – but can be induction of labor if stable maternal and fetal status

Hypertensive disorders of pregnancy:

- HELLP = Hemolysis, Elevated liver enzymes, Low platelet count
  - LDH elevated to 600+, AST/ALT greater than 2xULN, platelets <100
  - RUQ pain and generalized malaise is the typical presenting symptom
  - Delivery timing – expectant management not recommended >34 weeks

Systems Issues/Area for Improvement:

- Defining what a "code blue" on labor and delivery means
- Stable mom and baby -> didn't need to go emergently for c-section
- Reminder that Magnesium IM exists if having difficulty establishing IV access – 5mg in each buttock for total of 10g bolus dose

Interdisciplinary/interprofessional team successes or areas for improvement:

- Wireless monitor bumped off during seizure – difficult to monitor FHT thereafter
- FSE cord not working, required replacement

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Open Discussion

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Evidence Based Induction of Labor:

Implementing A Standardized Approach

Merritt McLean, MD

Thanks to Kristen Everett, MD

Disclosures

Financial

- None

Personal

- OB Hospitalist
- Large managed care group practice in San Francisco
- Teaching hospital

Objectives

- Review reasons for developing an induction of labor bundle
- Describe evidence basis for key elements of an induction of labor bundle
- Share our process for implementing an induction of labor bundle

Why Develop A Labor Induction Bundle?

Reason #1: Rates of Labor Induction Have Increased

Rates of Induction of Labor in the United States over the Last Decade, 2013 to 2022
Simpson, Kathleen Rice
MCN: The American Journal of Maternal/Child Nursing49(5):297, September/October 2024.
doi: 10.1097/NMC.0000000000001027

Reason #2: When Labor is Induced, Patients Spend Longer on L&D

- ARRIVE Trial:
  - More time on L&D in IOL group: 20 vs 14 hrs
  - Less time on postpartum unit
- My hospital's experience:
  - When having a vaginal birth: 1.22 days pre-delivery if IOL vs 0.64 days if spontaneous labor
  - When having a cesarean birth: 1.66 days pre-delivery if IOL vs 1.02 days if spontaneous labor

Outcome	Induction Group (N=3059)	Expectant-Management Group (N=3037)
Median duration of stay in labor and delivery unit (IQR) — hr§	20 (13–28)	14 (9–20)
Postpartum hospital stay — no. (%)		
<2 days	322 (10.5)	317 (10.4)
2 days	2191 (71.6)	2084 (68.6)
3 days	399 (13.0)	452 (14.9)
4 days	130 (4.2)	166 (5.5)
>4 days	17 (0.6)	18 (0.6)

Grobman et al. Labor Induction versus Expectant Management in Low-Risk Nulliparous Women. N Engl J Med. 2018 Aug 9;379(6):513-523. doi: 10.1056/NEJMoa1800566. PMID: 30089070; PMCID: PMC6186292.

Induction of labor protocols

↑ Adhere to industry best practices

↓ Decrease disparities

↓ Decrease neonatal morbidity

↓ Decrease Cesarean rates

OBSTETRICS

A standardized labor induction protocol: impact on racial disparities in obstetrical outcomes

Rebecca F. Hamm, MD; Sindhu K. Srinivas, MD, MSCE; Lisa D. Levine, MD, MSCE

CONCLUSION: A standardized induction protocol is associated with reduced cesarean delivery rate and neonatal morbidity in black women undergoing induction. Further studies should determine whether implementation of induction protocols in diverse settings could reduce national racial disparities in obstetrical outcomes.

Evaluating the impact of a standardized induction protocol to reduce adverse perinatal outcomes: a prospective cohort study

Conclusion: Utilization of a standardized induction protocol was associated with a significant reduction in neonatal morbidity without increasing the risk of cesarean or maternal morbidity.

Improving induction of labour - a quality improvement project addressing Caesarean section rates and length of process in women undergoing induction of labour

Sabrina O'Dwyer, Caterina Raniolo, Janice Roper, Manish Gupta
Barts Health NHS Trust, United Kingdom

We collected pre and post-intervention data of the following outcome measures: time taken to administer prostaglandin after arrival, time taken to achieve established labour, mode of delivery, and user satisfaction scores. Our introduction of a dedicated IOL Suite, promotion of out-patient IOL, use of a single administration prostaglandin (as opposed to traditional six hourly prostaglandin), widespread staff engagement and rolling audit has resulted in positive change in the maternity unit. CS rates for women undergoing IOL have been reduced from 29% to 22% (p=0.05), time taken to administer the induction medication has decreased from 6.3h to 2.7h (p=0.0001), and out-patient induction rates have increased from 3% to 33% (p=0.001).

We have achieved a reduction in the overall length of in-patient stay. We have also received positive feedback from both staff and patients. We used a bottom-up approach, engaging frontline staff in problem identification and pathway design. Our staff engagement questionnaire showed other benefits such as increased staff morale as a result.

› Am J Perinatol. 2022 Nov;39(15):1622-1632. doi: 10.1055/a-1877-8996. Epub 2022 Jun 16.

Novel Evidence-Based Labor Induction Algorithm Associated with Increased Vaginal Delivery within 24 Hours

Kfier Kuba [1], Fatima Estrada-Trejo [1], Calvin Lambert [1], Kavita Vani [1], Ruth Eisenberg [1], Lisa Nathan [1], Peter Bernstein [1], Francine Hughes [1]

Conclusion: Our IOL algorithm may offer an opportunity to standardize care, improve the rate of vaginal delivery within 24 hours, shorten time to delivery, and reduce the CD rate for patients undergoing IOL.

Induction Of Labor Bundle Elements

- Bishop Score to guide decision about cervical ripening
- Membrane sweeping
- Dual agent cervical ripening
- Cervical balloon checks every 6 hours
- Timely amniotomy
- Regular contractions using fast(er) titration of oxytocin
- Patience
- Shared decision making

Effective Cervical Ripening Promotes Successful Induction

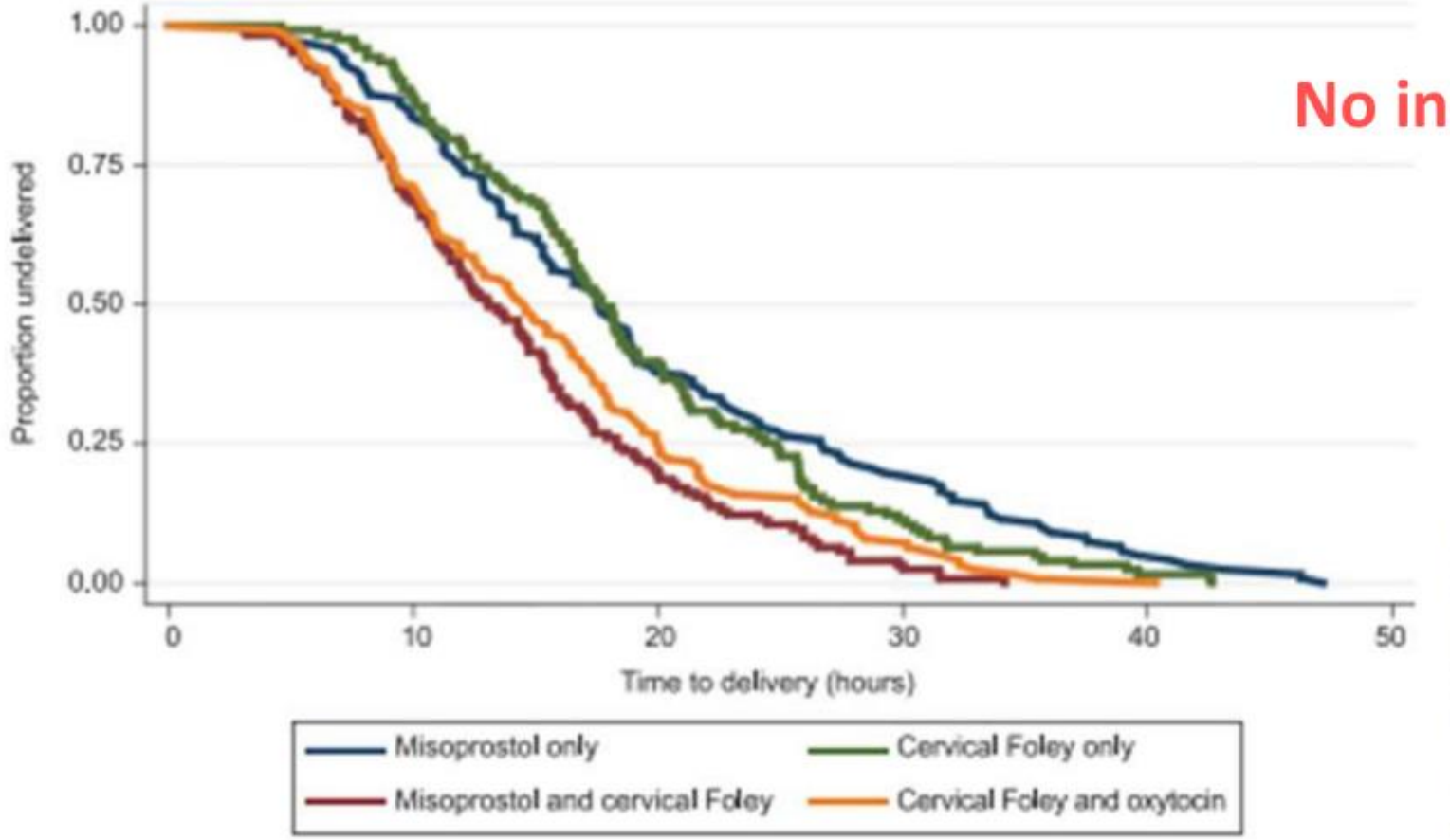
Include A Membrane Sweep!

- Membrane sweep confers a 32% increase in spontaneous vaginal birth within 48 hours in nulliparous patients (Liu et al. 2018)

Use The Bishop Score

- “Women undergoing induction of labor without a favorable cervix (Bishop score less than 6 for multiparous women, less than 8 for nulliparous women) should receive cervical ripening prior to starting oxytocin.” CMQCC SVB Toolkit

Dual agent ripening decreases time to delivery



No increased risk of Cesarean

Fig. 2. Estimated time to delivery by study group. This figure displays the Kaplan-Meier survival curves for time to delivery for the four induction method groups, $P<.001$.

Levine. Randomized Trial of Four Induction Methods. Obstet Gynecol 2016.

Levine, FOR MOMI trial

Misoprostol dose: Less is more!

OBSTETRICS

Evidence-based labor management: induction of labor (part 2)

Vincenzo Berghella, MD; Federica Bellussi, MD, PhD; Corina N. Schoen, MD

Misoprostol. Titrated low-dose (eg, 25 μg initially, followed by 25 μg every 2–4 hours or 50 μg every 4–6 hours) oral misoprostol solution seems to have one of the lowest risks of cesarean delivery or failed vaginal delivery in 24 hours and less hyperstimulation compared with vaginal misoprostol, oral misoprostol, and dinoprostone slow-release pessaries (meta-analysis: 611 RCTs, n≥100,000).[17] High-dose vaginal or oral dosing (>50 μg) does not significantly reduce cesarean delivery rate or failure to delivery in 24 hours and increases the rate of uterine hyperstimulation and therefore should be avoided.[29] Contra-

Mifepristone & Misoprostol Dosing Chart
Recommended Regimens 2023

FIGO

Induction of Labor

Misoprostol 25-50μg every 4 hours PV[7]

OR

Misoprostol 25-50μg every 2 hours PO[6,7]

Misoprostol frequency: Shorter for oral!

Route	Peak	Declines	Consistency	Recommended dosing
Oral	30 minutes	Rapidly over 2hrs	Highly consistent	q2h
Vaginal	75 minutes	Slowly over 6hrs	Variable	Q4-6

Tang et al 2007

Lower dose misoprostol – goal of reduction in tachysystole, less delays in dosing, more cumulative misoprostol able to be given

Misoprostol Orders

- Misoprostol 25mcg orally every 2 hours
- Misoprostol 25mcg vaginally every 4 hours

Why vaginal?

- Evidence that vaginal misoprostol may be more effective than oral for cervical ripening in obese patients (Sonni 2020), with the mean time-interval from the start of induction to attainment of 3-cm dilatation of 10.5 hours in the vaginal group vs 17.2 hours in the oral group

Soni S, Pappas K, Lesser ML, Blitz MJ, Augustine SA, Rochelson B. Is vaginal misoprostol more effective than oral misoprostol for cervical ripening in obese women? J Matern Fetal Neonatal Med. 2020 Oct;33(20):3476-3483. doi: 10.1080/14767058.2019.1575684. Epub 2019 Feb 10. PMID: 30741048.

OBSTETRICS

Six versus twelve hours of single-balloon catheter placement with oxytocin administration for labor induction: a randomized controlled trial

Sarah C. Lassey, MD; Hilary R. Haber, MD; Alexa Kanbergs, MD; Julian N. Robinson, MD; Sarah E. Little, MD, MPH

CONCLUSION: Induction of labor with a single-balloon catheter and oxytocin with planned removal of the catheter at 6 hours rather than 12 hours results in a shorter time from insertion to delivery without increasing the rate of cesarean delivery. Decreasing the length of time a single-balloon catheter is in place should be considered in clinical protocols.

More is not necessarily **better**

Consider shorter duration, or at least check the balloon q6 hours!

Double-Balloon Device for 6 Compared With 12 Hours for Cervical Ripening

A Randomized Controlled Trial

Inna Bleicher, MD, Elena Dikopoltsev, MD, PhD, Einav Kadour-Ferro, MD, Rami Sammour, MD, Ron Gonen, MD, Shlomi Sagi, MD, Aya Eshel, MSN, Liraz Nussam, BSN, and Dana Vitner, MD

CONCLUSION: Insertion-to-delivery interval is shorter after 6 compared with 12 hours for both nulliparous and parous women. Cervical ripening with a double-balloon device may be achieved in 6 hours. The longer time was associated with a higher rate of intrapartum fever. Six hours should be considered as standard placement time for double-balloon catheters.

Cervical Ripening Destination: 3cm or Bishop score of ≥5

One of the largest meta-analyses on timely amniotomy defined “successful” cervical ripening as:

- dilation of 3 cm
- or Bishop score of ≥5

Timely Amiotomy

Amniotomy Once The Cervix Is Favorable

- Early amniotomy* reduces the time to delivery by 5 hours and does NOT increase the risk of Cesarean delivery, chorioamnionitis, or adverse perinatal outcomes
- Meta-analysis: 4 RCTs, n=1273
- *After successful cervical ripening defined as achievement of >3cm or Bishop’s score >5

OBSTETRICS

Early vs delayed amniotomy following transcervical Foley balloon in the induction of labor: a randomized clinical trial

Marissa Berry, MD; Kelly Lamiman, MD; Megan N. Slan, MD; Xue Zhang, MD; Daphne D. Arena Goncharov, MD; Yihharn P. Hwang, MD; Jennifer A. Rogers, MD; Luis D. Pacheco, MD; George R. Saade, MD; Antonio F. Saad, MD

"Early" amniotomy within 2 hours *vs* "delayed" >4 hours from CRB removal

Active labor 1.5 times faster after CRB insertion (p=.02)

Vaginal delivery 1.5 times faster after CRB removal (p=.03)

Less risk of postpartum hemorrhage (0% vs 9.5%; P=.01)

No significant differences in the cesarean delivery rates, length of hospital stay, maternal infection, or neonatal outcomes

Concerns With Timely AROM

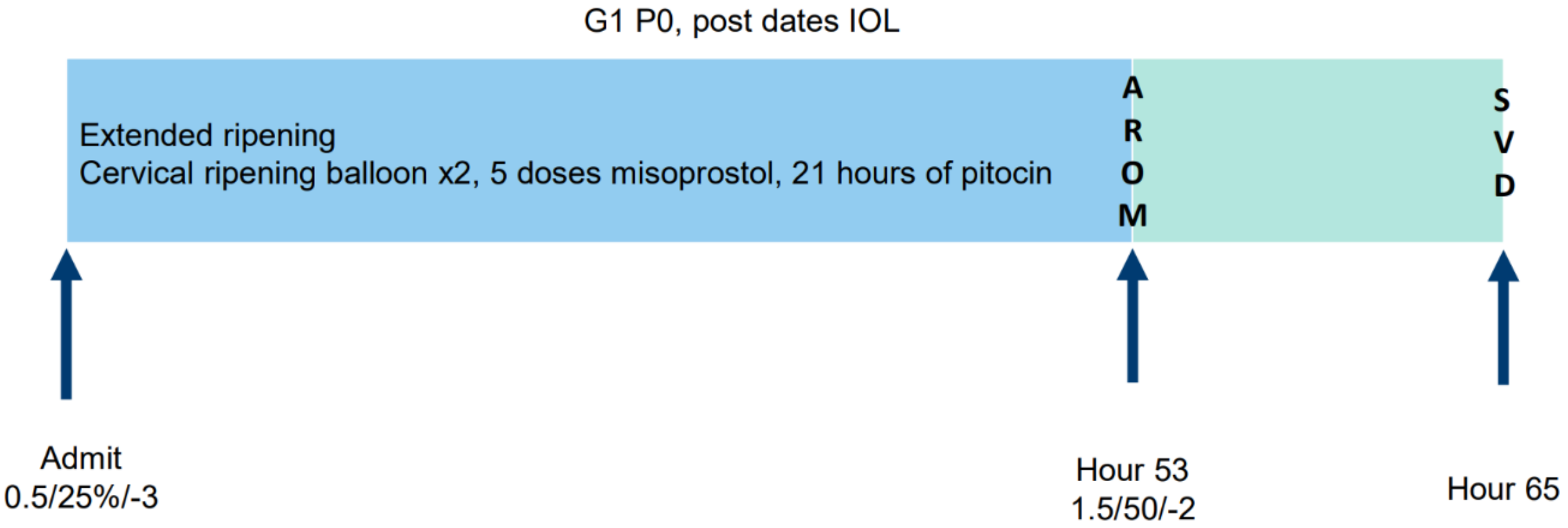
Fetal station

- A particular station is not required for AROM
- Engagement in the pelvis is the determining factor
- Many fetuses are well engaged at higher stations

GBS positive patients

- ACOG guides “obstetrics interventions…should not be delayed solely to provide 4 hours of antibiotic administration before birth,” and these patients are candidates for timely amniotomy
- Reasonable to start antibiotics before balloon removal if AROM at balloon removal is planned

AROM is the pivotal step in induction



Unpublished data from UCSF indicates that time from AROM to delivery during an induction is stable regardless of when it occurs:

- 15.3 hours for nullips
- 7 hours for multips

Amniotomy performed greater than 8 hours after initiation of oxytocin increased the risk of Cesarean

High BMI patients at greatest risk

The association between delayed amniotomy and adverse outcomes in labor induction

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Table 3
Multivariable logistic regression of maternal and neonatal outcomes with delayed amniotomy, compared to no delayed amniotomy.

	Delayed amniotomy Odds ratio (95 % CI)	Delayed amniotomy Adjusted odds ratio* (95% CI)
Cesarean delivery†		1.17 (0.82–1.66)
Representative BMI values for continuous BMI effect modification		1.58 (1.24–2.03)
BMI 20 kg/m²	1.47 (1.06–2.04)	2.15 (1.45–3.21)
BMI 30 kg/m²	2.06 (1.65–2.59)	2.93 (1.54–5.57)
BMI 40 kg/m²	2.89 (2.01–4.18)	1.26 (0.93–1.70)
BMI 50 kg/m²	4.06 (2.23–7.37)	0.92 (0.59–1.44)
Postpartum hemorrhage	1.29 (0.98–1.69)	2.16 (1.20–3.88)
Infectious morbidity†	1.07 (0.71–1.61)	1.12 (0.83–1.51)
Neonatal 5-min Apgar <7	2.37 (1.37–4.10)	
Neonatal intensive care unit admission	1.37 (1.07–1.76)	

Regular Contractions

Our Approach To Oxytocin

- Oxytocin guidelines to guide management
  - Emphasizes team communication
  - Guidance for managing tachysystole
  - Guidance for managing concerning fetal heart tracings
- Goal is to achieve the correct dose of oxytocin!
  - Too much oxytocin has risk: tachysystole, fetal intolerance of labor, cesarean for fetal concerns, uterine rupture
  - Too little oxytocin has risk: chorioamnionitis, cesarean or operative vaginal birth for labor dystocia, prolonged labor, hemorrhage

Oxytocin Dose Regimens | Update with Evidence-Based Practice

Literature review highlighted that efforts from 10-20 years ago to use less oxytocin led to unexpected side effects—increases in chorioamnionitis, Cesarean for dystocia and time prior to delivery

Unintended Clinical Consequences of the Implementation of a Checklist-Based, Low-Dose Oxytocin Protocol

Amanda E. Rohn, MD[1] Jamie A. Bastek, MD, MSCE[1] Mary D. Sammel, ScD[2] Eileen Wang, MD[1]
Sindhu K. Srinivas, MD, MSCE[1]

Modern evidence has highlighted the benefits of efficiency in achieving correct dose of oxytocin with "high dose" regimens with faster titration – decreases in chorioamnionitis and time to delivery have been noted, WITHOUT increase in Cesarean or adverse fetal outcomes

Original Research

High-Dose Compared With Standard-Dose Oxytocin Regimens to Augment Labor in Nulliparous Women

A Randomized Controlled Trial

Moeun Son, MD, MSCI, Archana Roy, MD, MPH, Bethany T. Stetson, MD, Nancy Tunney Grady, MS, Mary Clare Vanecko, MS, Nicole Bond, MS, Kate Swanson, MD, William A. Grobman, MD, MBA, Emily S. Miller, MD, MPH, and Alan M. Peaceman, MD

Oxytocin Guidelines Revision | Update with Evidence-Based Practice

ACOG has endorsed the availability of having regimens with faster titration (2024 Practice Guideline)

Table 3. Low-Dose and High-Dose Oxytocin Infusion Protocols

Regimen	Starting Dose (mU/min)	Incremental Increase (mU/min)	Dosage Interval (min)
Low-Dose	0.5–2	1–2	15–40
High-Dose	4 or higher	3–6	15–40

Abbreviations: mU/min, milliunits per minute; min, minutes.

Reprinted from: Myers ER, Sanders GD, Coeytaux RR, McElligott KA, Moorman PG, Hicklin K, et al. Labor dystocia. Comparative effectiveness review No. 226. AHRQ publication no. 29. Agency for Healthcare Research and Quality. 2020. doi: 10.23970/AHRQEPCCER226.

A recent secondary analysis of a large randomized trial did not show significant differences in maternal or fetal outcomes based in patients who were on doses of oxytocin greater than 20 mu/min

- No maximum dose in this study, in which staff was blinded to the dose patient was receiving—titrated based on contraction pattern/clinical status
- Range of oxytocin in this study was 2-90 mu/min

Maximum Dose Rate of Intrapartum Oxytocin Infusion and Associated Obstetric and Perinatal Outcomes

Moeun Son, MD, MSCI, Archana Roy, MD, MPH, William A. Grobman, MD, MBA, Emily S. Miller, MD, MPH, Annie Dude, MD, PhD, Alan M. Peaceman, MD, and Bethany Stetson, MD

Oxytocin Orders

- Oxytocin “4x4”: start with 4 mU/min and increase by 4 mU/min every 30 minutes to maximum dose of 30
- Oxytocin “2x2”: start with 2 mU/min and increase by 2 mU/min every 30 minutes to maximum dose of 30

Patience!

Remember to be patient!

96% of women will be in active labor within 15 hours after amniotomy when combined with oxytocin

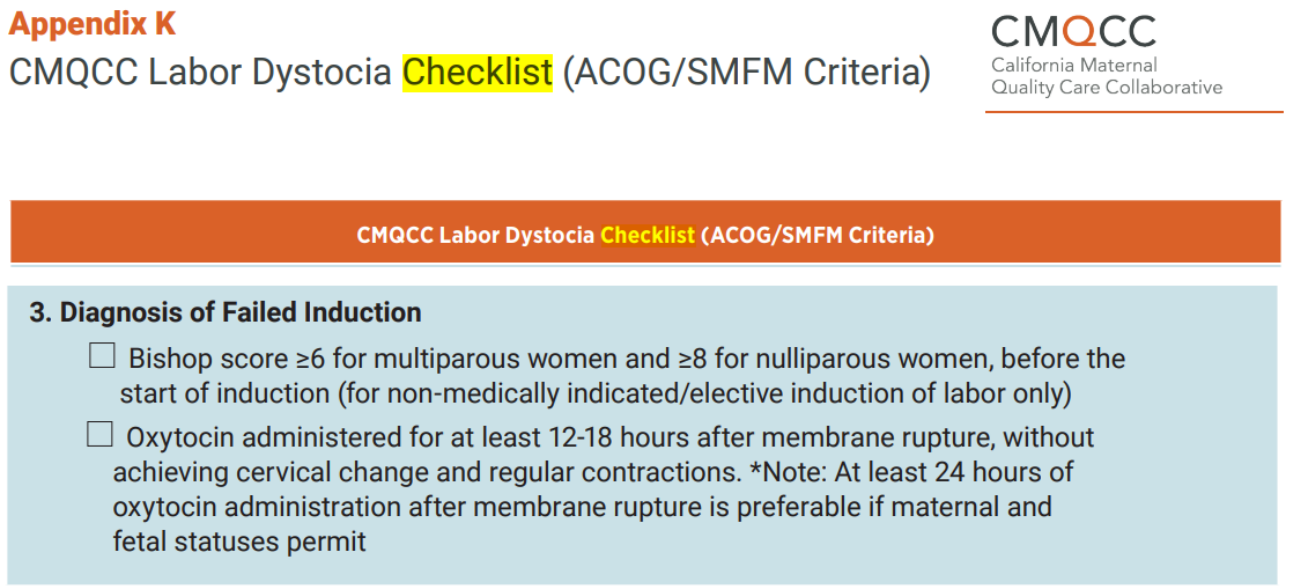
Of women who take 18 hours or more to enter active labor after amniotomy when combined with oxytocin,

40% achieve a vaginal delivery

Simon et al 2005
Grobman et al 2018

Failed Induction of Labor Definition

- California Maternal Quality Care Collaborative (CMQCC) recommends cesarean birth only if there have been 12-24 hours of rupture of membranes plus oxytocin if no cervical change
  - 24 hours preferable if patient and fetal statuses permit



Appendix K

CMQCC Labor Dystocia Checklist (ACOG/SMFM Criteria)

CMQCC
California Maternal
Quality Care Collaborative

CMQCC Labor Dystocia Checklist (ACOG/SMFM Criteria)

3. Diagnosis of Failed Induction

- ☐ Bishop score ≥6 for multiparous women and ≥8 for nulliparous women, before the start of induction (for non-medically indicated/elective induction of labor only)
- ☐ Oxytocin administered for at least 12-18 hours after membrane rupture, without achieving cervical change and regular contractions. *Note: At least 24 hours of oxytocin administration after membrane rupture is preferable if maternal and fetal statuses permit

Vbirth-Toolkit-with-Supplement_Final_11.30.22.pdf

Implementing An Induction Bundle

Our Journey

- Monthly meeting of a “Supporting Vaginal Birth” group consisting of nurses, doctors and hospital leaders
- Regional bundle consisting of one-page algorithm, FAQ and teaching sessions
- Twice daily local huddle messages with an induction of labor pearl for 1.5 months prior to roll out
- Chit chat!
- Continue to review process measures for opportunities for improvement

Our Results

Our NTSV cesarean rate for patients undergoing an induction of labor is <23.6%

Our length of stay has decreased by 2.5 hours

Thanks!