Comparative Effectiveness of Two Labor Induction Approaches at Two Institutions in Arizona

Meredith Casella Jean-Baptiste, CNM; Stefanie Boyles, BSN, RN; Lily Woods, MA, LAC; Erin George, PhD, CNM; Elise Erickson, PhD, CNM, FACNM

COLLEGE OF MEDICINE TUCSON
Physiology

NIH *Eunice Kennedy Shriver* National Institute of Child Health and Human Development

Background

- Common cervical ripening approaches include mechanical (e.g., Foley, Cook's balloon) and pharmacological methods (e.g., oxytocin, misoprostol).
- Induction rates in the US have significantly increased since the results of the ARRIVE trial, with no appreciable difference in cesarean section rates.
- Improving approaches to induction may reduce cesarean rates, which would significantly decrease maternal morbidities and yield substantial healthcare cost savings.

Methods

This study is part of the **Predicting Adequate Response to Oxytocin (PARTO) study**, a larger, ongoing investigation examining oxytocin use in labor in two institutions in Arizona.

We compared the outcomes of 426 pregnant individuals undergoing labor induction with two cervical ripening approaches:

Mechanical + Pharmacologic

-**Foley and/or Cook's balloon catheters** + Misoprostol and/or Cervidil and/or Oxytocin

Pharmacologic

-**Misoprostol and/or** Cervidil and/or Oxytocin

Bivariate, chi-square, and logistic regression analyses were conducted.

Table 1: Sample Characteristics by Mode of Delivery

Variables n (%)	Vaginal birth 349 (81.9%)	Cesarean 77 (18.1%)	Total 426 (100.0%)	P-Value
Maternal age at admit: mean (SD)	29.0 (5.8)	28.9 (5.5)	29.0 (5.8)	0.844
Parity - after this delivery	2.0 (1.2)	1.3 (0.8)	1.8 (1.2)	<0.001**
Dilation at admission	1.7 (1.3)	0.9 (1.1)	1.5 (1.3)	<0.001**
Length membranes ruptured	8.0 (7.4)	13.0 (9.8)	8.9 (8.1)	<0.001**
Length active pushing	0.8 (1.1)	4.2 (1.2)	1.0 (1.3)	<0.001**
IOL Groups: Foley or Cooks plus misoprostol and/or oxytocin n (%)	126 (36.1%)	40 (51.9%)	166 (39.0%)	0.010**
Oxytocin and/or misoprostol/ cervidil n (%)	223 (63.9%)	37 (48.1%)	260 (61.0%)	
Site of Enrollment:				
BUMC-Phoenix n (%)	222 (63.6%)	43 (55.8%)	265 (62.2%)	0.203
BUMC- Tucson n (%)	127 (36.4%)	34 (44.2%)	161 (37.8%)	

Note: no significant differences found among other sample characteristics

The purpose of this study is to determine which cervical ripening method is most effective at reducing cesarean delivery rates and to assess whether clinical outcomes differ based on institution and/or patient characteristics.

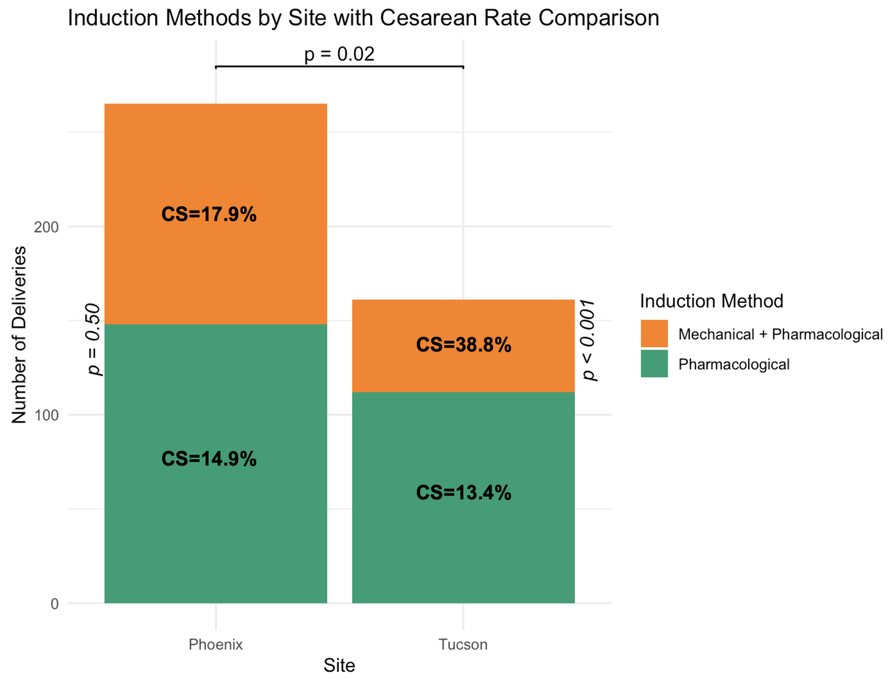


Figure 1. Stacked bar graph shows total deliveries by induction type at Phoenix and Tucson. Colors indicate induction method. Cesarean section (CS) rates are labeled within each group. P-values reflect differences in CS rates between induction methods within each site (sides) and between sites overall (top), using Chi-square tests and unadjusted logistic regression.

Table 2. Adjusted Model for Cesarean Delivery with Interaction (Site x IOL)

Predictor	OR [95% CI]
IOL Method (Pharm vs. Mechanical + Pharm)	1.37 [0.67, 2.83]
Site (Tucson vs. Phoenix)	**2.53 [1.15, 5.59]**
Interaction (IOL x Site/Tucson)	0.36 [0.12, 1.11]
Parity	**0.50 [0.32, 0.78]**
Dilation (cm, at start of induction)	**0.61 [0.45, 0.83]**

Table 3. Adjusted Models for Cesarean Delivery by Study Site

Predictor	Phoenix (OR [95% CI])	Tucson (OR [95% CI])
Parity	0.64 [0.37, 1.10]	0.37 [0.17, 0.81]
Dilation (cm, at start of IOL)	**0.36 [0.21, 0.60]**	0.94 [0.65, 1.36]
IOL Method	1.54 [0.72, 3.27]	0.35 [0.14, 0.90]

Results

- Maternal age, delivery BMI, and gestational age (GA) were not significant predictors of CS delivery (Table 2).
- In the combined analysis, among participants in the mechanical + pharmacological induction group, the Tucson site had **150% greater odds of CS delivery** compared to Phoenix (OR: 2.53, Table 2).
- An interaction between site and induction method approached significance (p=0.075) when adjusting for age, parity, delivery BMI, GA, and dilation at admission, indicating that the **effect of induction method on CS risk differed by site**. Models controlling for reason for IOL did not materially alter the odds for CS.
- Phoenix often initiated induction in the outpatient setting, whereas Tucson conducted all inductions inpatient.
- In site-specific analysis, **pharmacologic-only induction in Tucson reduced cesarean odds by 65%** compared to combined methods, while no significant effect was observed in Phoenix (Table 3).
- Greater cervical dilation at the start of induction was protective at both sites.

Discussion

- This ongoing clinical research study has enrolled and collected biospecimens from 656 participants, with a target enrollment of 1,000.
- Ongoing analysis aims to identify strategies to enhance individualized care, optimize maternal outcomes, and improve resource utilization, with future work focused on translating findings into clinical guidelines.

References Funding MuMH Lab