

39 Week Labor Induction versus Expectant Management and Cesarean Section Rates in Low-Risk Multiparous Women

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The ARRIVE Trial



Grobman WA, Rice MM, Reddy UM, et al. Labor Induction versus Expectant Management in Low-Risk Nulliparous Women. *The New England journal of medicine*. 2018;379(6):513-523. doi:10.1056/NEJMoa1800566

Graphic: Prenatal Care. Centers for Disease Control and Prevention [Graphic]. <https://www.cdc.gov/ncbddd/sicklecell/materials/women-with-scd-prenatal-care.html> Published July 3, 2023. Accessed April, 16, 2024.

Study Design, Inclusion Criteria, Outcomes

- Multicenter randomized control trial
- Included > 6000 **low-risk, nulliparous** patients
- Comparison groups: expectant management vs elective induction of labor
- Primary outcome: adverse neonatal outcomes (i.e. perinatal death, infection, respiratory support, etc.)
- No difference in the primary outcome between the 2 groups



Wood R, Freret TS, Clapp M, Little S. Rates of Induction of Labor at 39 Weeks and Cesarean Delivery Following Publication of the ARRIVE Trial. *JAMA Netw Open.* 2023;6(8):e2328274. doi:10.1001/jamanetworkopen.2023.28274

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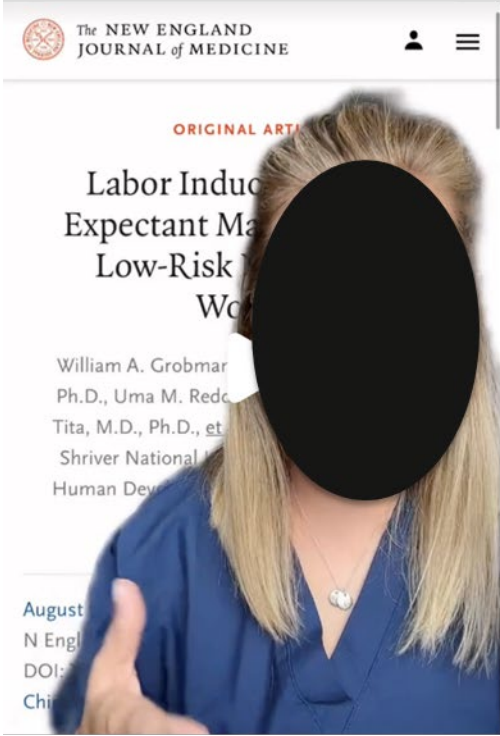
Table 3. Secondary Outcomes.*

Outcome	Induction Group (N=3059)	Expectant- Management Group (N=3037)	Relative Risk (95% CI)	P Value
Neonatal				
Transfusion of blood products — no. (%)	4 (0.1)	5 (0.2)	0.79 (0.20–2.74)	0.75
Hyperbilirubinemia — no. (%) †	145 (4.7)	142 (4.7)	1.01 (0.81–1.27)	0.91
Hypoglycemia — no. (%)	37 (1.2)	35 (1.2)	1.05 (0.66–1.66)	0.84
Admission to neonatal intermediate or intensive care unit — no. (%)	358 (11.7)	394 (13.0)	0.90 (0.79–1.03)	0.13
Maternal				
Cesarean delivery — no. (%)	569 (18.6)	674 (22.2)	0.84 (0.76–0.93)	<0.001 ‡
Operative vaginal delivery — no. (%)	222 (7.3)	258 (8.5)	0.85 (0.72–1.01)	0.07
Hypertensive disorder of pregnancy — no. (%)	277 (9.1)	427 (14.1)	0.64 (0.56–0.74)	<0.001 ‡
Chorioamnionitis — no. (%)	407 (13.3)	429 (14.1)	0.94 (0.83–1.07)	0.35
Third-degree or fourth-degree perineal laceration — no. (%)	103 (3.4)	89 (2.9)	1.15 (0.87–1.52)	0.33
Postpartum hemorrhage — no. (%)	142 (4.6)	137 (4.5)	1.03 (0.82–1.29)	0.81
Postpartum infection — no. (%)	50 (1.6)	65 (2.1)	0.76 (0.53–1.10)	0.15
Admission to ICU — no. (%)	4 (0.1)	8 (0.3)	0.50 (0.13–1.55)	0.26
Death — no. (%)	0	0	NA	NA
Median duration of stay in labor and delivery unit (IQR) — hr ‡	20 (13–28)	14 (9–20)		<0.001 ‡
Postpartum hospital stay — no. (%)				0.01 ‡ ¶
<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)		
Median scores on Labor Agency Scale (IQR) 				
At 6–96 hr after delivery	168 (148–183)	164 (143–181)		<0.001 ‡
At 4–8 wk after delivery	176 (157–189)	174 (154–188)		0.01 ‡
Median labor pain scores (IQR)**				
Worst score	8 (7–10)	9 (8–10)		<0.001 ‡
Overall score	7 (5–8)	7 (5–9)		<0.001 ‡

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ARRIVE Trial Criticisms

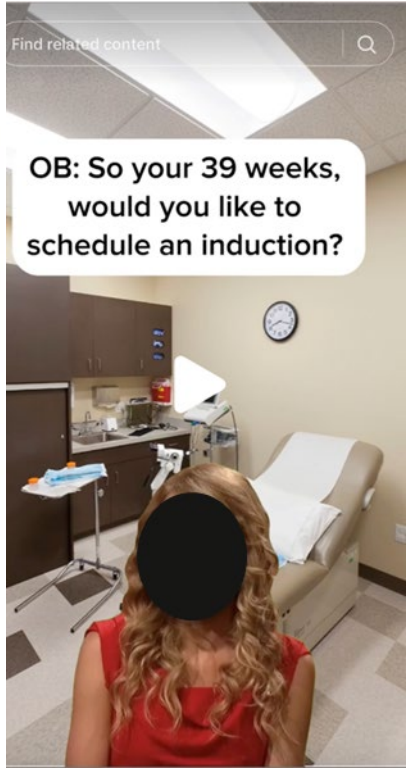
- Limited generalizability
- Selection bias
- Academic centers with high levels of monitoring / intervention
- Cesarean rate was a secondary outcome
- Potential strain on healthcare resources



Check out episode 147 of The [redacted] for...
▶ 12.3K



Am I crazy or did I make the right decision?! #pregnant ...
▶ 477.8K



Elective Induction of Labor on Social Media

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Research Question



1 Population

Multiparous patients who delivered at an HCA hospital between January 1, 2021 and April 30, 2022



2 Intervention or exposure

Elective induction of labor (39.0-39.6 weeks EGA)



3 Comparison

Expectant management of labor (39.0-41.0 weeks EGA)



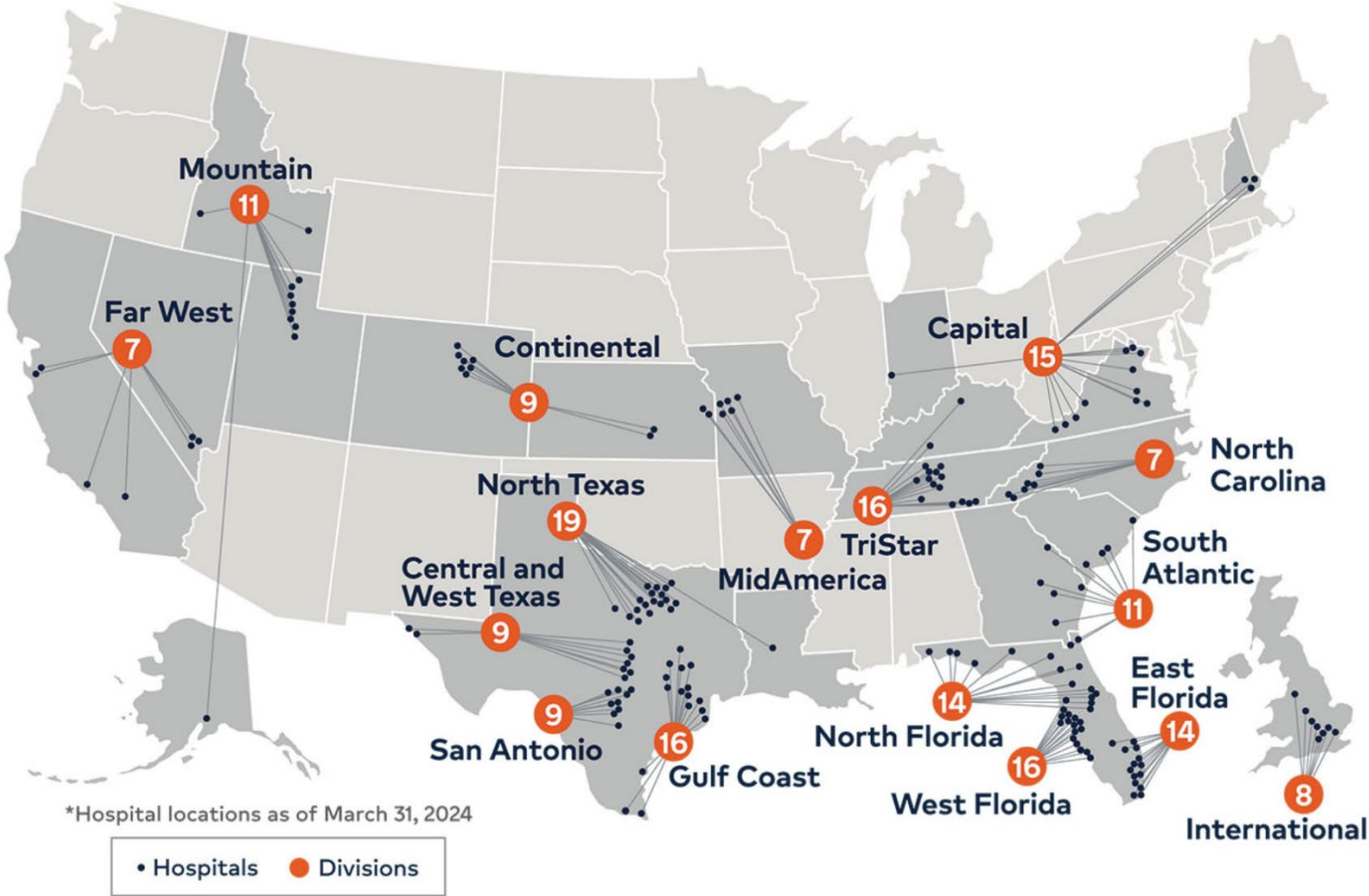
4 Outcome

Primary: cesarean delivery

Secondary: length of stay, shoulder dystocia, failed IOL, operative delivery

Graphic made by A. Tanner Fincher in Canva

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Demographics	ICD-10 Codes
Inclusion Criteria	
Multiparous	Z64.1
Elective induction of labor (Group 1)	Z34.90
Spontaneous labor (Group 2)	O75.82, O80
Exclusion Criteria	
First pregnancy (nulliparous)	Z34.00
History of cesarean delivery	Z98.891, O34.219, Z98.891, O09.90, O34.219, O34.211, O34.212, O66.41, O34.218, O34.219, N85.A, O34.219, O66.41
Fetal malpresentation	O32.9XX0, O32.1XX0, O32.8XX0
Multiple gestation	O30.90, O30.001, O30.041, O30.031, O30.011, O30.109, O30.129, O30.119, O30.139, O30.199, O30.209, O30.239, O30.299, Z38.69, Z38.64, Z38.66
Placenta previa	O44.00
Placenta accreta	O43.219
Vasa previa	O69.4XX0
History of myomectomy	Z98.890, O34.29
Supervision of high-risk pregnancy	O09.90
Oligohydramnios	O41.00X0,
Polyhydramnios	O40.9XX0
Fetal growth restriction	O36.5990, P05.9, Z36.4
Placental insufficiency (abnormal UA doppler)	O36.5190
Maternal red cell alloimmunization	O36.1990
Chronic hypertension affecting pregnancy	O10.919, O10.911, O10.912, O10.913
Gestational hypertension	O13.9, O13.2, O13.3, O14.94, O14.95, O13.4, O13.5
Preeclampsia without severe features	O14.00, O14.04, O14.02, O14.03,
Preeclampsia with severe features	O14.10, O14.12, O14.13, O14.14, O14.15
Pregestational diabetes mellitus	O24.319, O24.119, O24.111, O24.112, O24.113, O24.019, O24.011, O24.012, O24.013
Gestational diabetes	O24.419, O24.415, O24.425, O25.435, O24.429, O24.420, O24.424, O24.439, O24.414, O24.410, O24.430, O24.434
HIV affecting pregnancy	O98.719, O98.711, O98.712, O98.713, Z20.6, O98.72
Cholestasis of pregnancy	O26.619, O26.62, O26.611, O26.612, O26.613, O26.649, O26.641, O26.642, O26.643
PPROM	O42.919, O42.111, O42.112, O42.113, O42.011, O42.012, O42.013



Inclusions & Exclusions

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Table made by A. Tanner Fincher



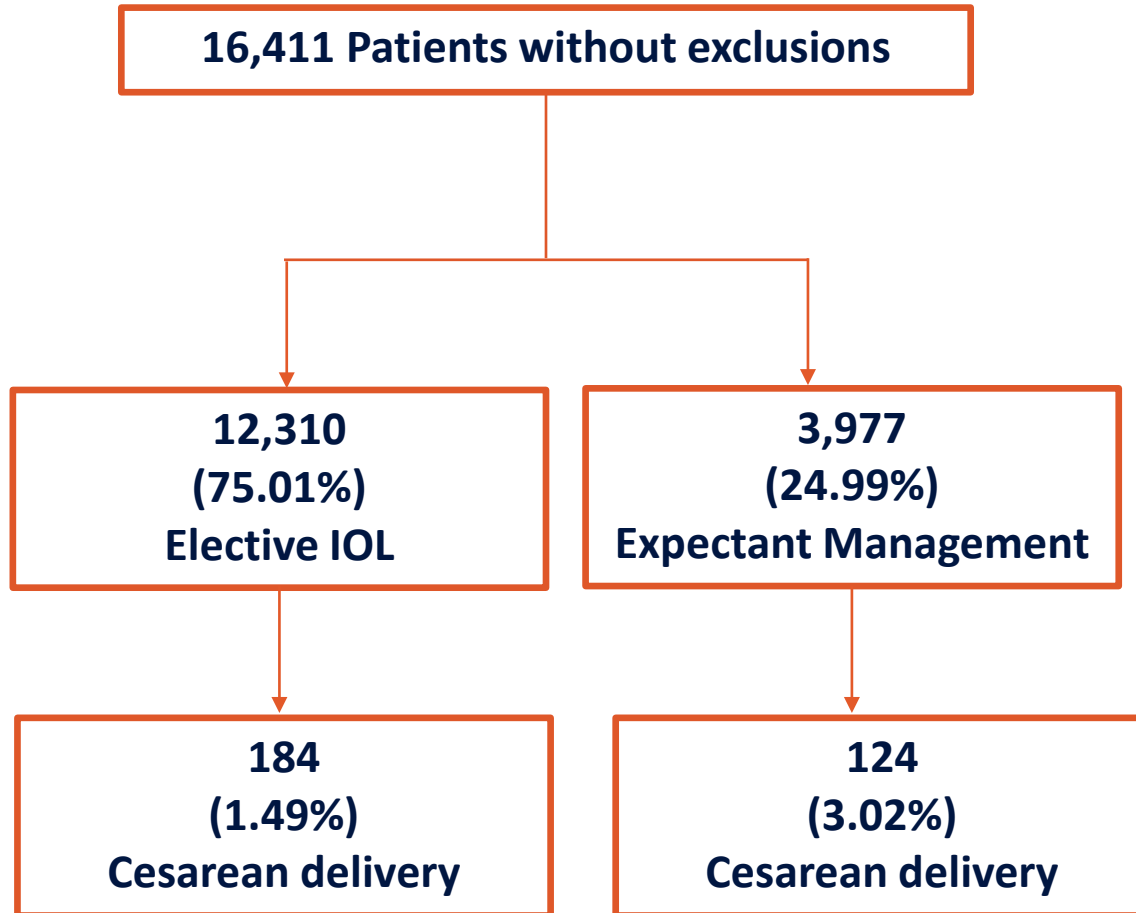


Table 1. Baseline Characteristics			
	EIOL (N=12,310)	Expectant management (N=4,101)	Total (N= 16,411)
Age			
Median (IQR)	29 (26-33)	29 (25-33)	29 (26-33)
Range	18-47	18-45	18-47
Race			
Asian	448 (3.64%)	178 (4.34%)	626 (3.81%)
Black	1,164 (9.46%)	539 (13.14%)	1,703 (10.38%)
Multiracial/Other	2,361 (19.18%)	833 (20.31%)	3,194 (19.46%)
White	8,337 (67.73%)	2,551 (62.20%)	10,888 (66.35%)
Previous Gravida			
Median (IQR)	3 (2-4)	3 (2-4)	3 (2-4)
Range	1-20	1-14	1-20

Table made by A. Tanner Fincher

Table 2. C-Section Logistic Regression				
	Odds ratio	95% Confidence Interval		p-Value
Expectant management V EIOL	2.62	2.07	3.32	<0.001
Bishop Score (per additional point)	0.79	0.75	0.83	<0.001
Gravida (per additional birth)	0.95	0.88	1.03	0.221
Asian V White	1.16	0.68	2.00	0.581
Black V White	0.76	0.49	1.17	0.205
Multiracial/Other V White	1.01	0.76	1.35	0.954
Age (per additional year)	1.04	1.01	1.06	0.002

Table made by A. Tanner Fincher

Table 3. Other labor complications

	EIOL (N=12,310)	Expectant management (N=4,101)	Total (N= 16,411)	p-Value
Induction Failure	14 (0.11%)	3 (0.07%)	17 (0.10%)	0.588
Forceps-Assisted Delivery	12 (0.10%)	5 (0.12%)	17 (0.10%)	0.779
Vacuum-Assisted Delivery	7 (0.06%)	3 (0.07%)	10 (0.06%)	0.718
Shoulder Dystocia	340 (2.76%)	89 (2.17%)	429 (2.61%)	0.042

Table 4. Shoulder Dystocia Logistic Regression

	Odds ratio	95% Confidence Interval		p-Value
Expectant management V EIOL	0.81	0.63	1.03	0.082
Bishop Score (per additional point)	0.99	0.94	1.03	0.553
Gravida (per additional birth)	0.95	0.89	1.02	0.174

Table made by A. Tanner Fincher

Table 5. Length of Stay Poisson Regression				
	Incidence Rate Ratio	95% Confidence Interval		p-Value
Expectant management V EIOL	0.95	0.92	0.98	0.002
Cesarean V Vaginal Birth	1.53	1.42	1.65	<0.001
Bishop Score (per additional point)	0.97	0.97	0.98	<0.001
Age (per additional year)	1.01	1.00	1.01	<0.001
Elixhauser Comorbidity Index (per additional point)	1.03	1.01	1.04	<0.001
Gravida (per additional birth)	0.99	0.98	1.00	0.002

Table made by A. Tanner Fincher

Conclusions

- The primary outcome, cesarean delivery, occurred in 1.49% of the induction group and 3.02% of the expectant management group (OR 2.62; 95%, CI 2.07-3.32, p-value < 0.001).
- Shoulder dystocia was slightly higher in the EIOL group but not because of EIOL alone.
- Other factors, besides EIOL, have a greater influence on hospital length of stay.

Limitations

- Retrospective
- Possible incorrect diagnosis codes

Strengths

- Large sample size
- Multi-center
- Generalizable

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Questions?