

Bishop Scores and Labor Inductions

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Labor induction

- Labor is induced when the benefits to either the woman or the fetus outweigh those of continuing the pregnancy

Elective Labor Induction

- Induction of labor for the convenience of the practitioner or the patient in the absence of obstetrical or medical indications
- Major Risks:
 - Increased incidence of C/S rate in nulliparous women
 - Increase risk of iatrogenic prematurity
 - Increased risk of chorioamnionitis
- Increased total hospital costs compared to spontaneous labor

Evaluation Before Labor Induction

- **Maternal Parameters**
 - **Confirm indication for induction**
 - **Review contraindications to labor or vaginal birth**
 - **Assign Bishop score**

Evaluation Before Labor Induction

- **Fetal Parameters**
 - Confirm gestational age
 - Confirm fetal well-being
 - Estimate fetal weight
 - Determine fetal presentation
 - Assess need to document fetal lung maturity status

Indications for Assessing Fetal Maturity

- To prevent iatrogenic prematurity, fetal pulmonary maturity should be confirmed before scheduled delivery at less than 39 weeks of gestation unless fetal maturity can be inferred from any of the following historic criteria:
 - Ultrasound measurement at less than 20 weeks of gestation supports gestational age of 39 weeks or greater.
 - Fetal heart tones have been documented as present for 30 weeks by Doppler ultrasonography.
 - It has been 36 weeks since a positive serum or urine human chorionic gonadotropin pregnancy test result.

Induction of Labor

- **ACOG Practice Bulletin No. 170, August 2009**
 - **“A mature fetal lung test result before 39 weeks of gestation in the absence of appropriate clinical circumstances , is not an indication for delivery”**

Purpose of Labor Induction Review

- **To determine if ACOG Guidelines for Elective Inductions are being adhered.**
 - **Not perform elective inductions before 39 weeks**

Purpose of Labor Induction Review

- **To determine:**
 - **incidence**
 - **indications**
 - **gestational age of inductions**
 - \geq 39 weeks**
 - $<$ 39 weeks**
 - **success of inductions**
 - **neonatal outcomes**

Background

- In September 2008, the OB/GYN Dept. initiated a Quality Improvement Initiative on Scheduled Labor Inductions.
 - Developed a data collection form to obtain data on labor induction
 - Labor and Delivery nursing staff were in-serviced on completion of form for all scheduled inductions
 - Physician Education
- First 6 months of data collection were analyzed to establish practice trends
- The OB/GYN Dept. voted on 2/3/09 to accept the ACOG guidelines for elective labor inductions - “39 week rule”
- At the OB/GYN departmental meeting on 3/3/09, it was voted that all elective inductions prior to 39 weeks would be reviewed by the Peer Review Committee
- Labor Induction data continues to be collected for post-intervention comparison

Cervical Ripening and Induction of Labor Analysis

Patient Name: _____ Age: G: P:
 Induction Date: / / AM LMP: / / PM
 EDC: / / by LMP by US Gestational age at induction: wks days Private Service

Please mark 1 primary reason (P) and all other applicable reasons as secondary (S)

(Please complete Fetal Maturity Criteria for indications with an asterisk*)

A. INDICATIONS BASED ON GESTATION

- P S**
- 41 0/7 - 41 6/7 wks
- > 42 0/7 wks

B. INDICATIONS BASED ON FETAL CONDITION

- P S**
- Fetal anomaly (list): _____
- Severe IUGR (estimated fetal wt < 10th %ile for EGA)
- Fetal Demise
- Isoimmunization
- Other (list): _____

C. INDICATIONS BASED ON ANTE. FETAL TESTING

- P S**
- Non reactive NST
- Spontaneous variable/prolonged decelerations
- Biophysical profile score of
- Decreased variability
- Other (list): _____

D. INDICATIONS BASED ON MEMBRANES/AMNIOTIC FLUID STATUS

- P S**
- Ruptured membranes for hours
- Polyhydramnios AFI: -
- Oligohydramnios AFI: -

E. INDICATIONS BASED ON MATERNAL CONDITION

- P S**
- Chorioamnionitis
- Preeclampsia (BP in office): /
- Gestational HTN (BP): /
- DM (BP): /
- Chronic HTN
- Other (list): _____

F. INDICATIONS BASED ON ELECTIVE/LOGISTIC/OTHER FACTORS

- P S**
- Elective*
- Macrosomia (Specify) EPW US Clinically
- History of rapid labor*
- Distance from hospital*
- Cervical dilatation > 4cm*
- Unstable fetal lie*
- Other* (list): _____

***FETAL MATURITY CRITERIA (Please complete for indications with an asterisk.)**

- Crown-rump length at 6-12 wks supports EGA >=39 wks.
- US scan at 13-20 wks, confirms EGA >=39 wks (hx and physical exam).
- Amniocentesis done Date: / /

Cervical Ripening Agent:

- None
- Cytotec
- Cervidil

BISHOP SCORE: The state of cervix is related to the success of labor induction. When the total cervical score exceeds 8, the likelihood of vaginal delivery subsequent to labor induction is similar to that of spontaneous labor. Induction of labor with a poor cervical score has been associated with failure of induction, prolonged labor, and a high cesarean rate.

Factor	0	1	2	3	
Fill-in factors present at start of induction	<input type="checkbox"/> Closed	<input type="checkbox"/> 1-2	<input type="checkbox"/> 3-4	<input type="checkbox"/> >5	(On Admission) Total score at start of Induction <input type="text"/> <input type="text"/>
	<input type="checkbox"/> 0-30%	<input type="checkbox"/> 40-50%	<input type="checkbox"/> 60-70%	<input type="checkbox"/> >80%	
Station	<input type="checkbox"/> -3	<input type="checkbox"/> -2	<input type="checkbox"/> -1/0	<input type="checkbox"/> +1/+2	
Consistency	<input type="checkbox"/> Firm	<input type="checkbox"/> Medium	<input type="checkbox"/> Soft	<input type="checkbox"/> ---	
Cervical Position	<input type="checkbox"/> Posterior	<input type="checkbox"/> Mid-position	<input type="checkbox"/> Anterior	<input type="checkbox"/> ---	<input type="text"/> <input type="text"/>
Date of Bishop Score	<input type="text"/> / <input type="text"/> / <input type="text"/> <input type="text"/>		Time of Bishop Score	<input type="text"/> : <input type="text"/>	

Mom's ID Label

Allergies _____
 GBS Pos Neg Unknown

Phone No. _____ Alt No. _____

DOB _____ V/E _____

Physician's Name: _____

Date _____ Ranking _____ Bumped _____ Draft _____

_____ x _____

_____ x _____



Data Analysis

- **Compared data 6 months prior and 6 months after the OB/GYN Dept accepted the ACOG Guidelines for Labor Induction**
- **Pregnancy outcomes determined using Women and Children's Delivery Database**

Induced Labor in West Virginia

Year	Number of Births	Labor-Induced	Percent
2006	21,137	6,973	33.0%
2007	21,917	7,938	36.2%
2008	21,443	7,690	35.9%
2009	21,298	7,173	33.7%
2010	20,755	7,056	34.0%
Total (2006-2010)	106,550	36,830	34.6%

Incidence of Scheduled Inductions

- **Time period of analysis:**
–9/1/08-8/30/09
- **761 scheduled inductions**
- **3052 births**
- **Incidence of Induction = 24.9%**

*US induction average in 2006 was 22% (ACOG; July 21, 2009)

Incidence of Scheduled Inductions

- **Pre-Intervention (9/1/08-2/28/09)**
 - Births 1501
 - Inductions 397
 - Incidence 26.4%*
- **Post-Intervention (3/1/09-8/30/09)**
 - Births 1551
 - Inductions 364
 - Incidence 23.5%*

*US induction average in 2006 was 22% (ACOG, July 21 2009)

Primary Reasons for Induction

	Pre-Intervention n=397		Post-Intervention n=364	
Indication	Number	Percent	Number	Percent
Gestational Age \geq 41	14	3.5%	23	6.3%
Fetal Condition	29	7.3%	17	4.7%
Antenatal Fetal Testing	8	2.0%	12	3.3%
Membranes/Amniotic Fluid Status	20	5.0%	7	1.9%
Maternal Condition	67	16.9%	67	18.4%
Logistic/Other Factors (Elective)	259	65.2%	238	65.4%
TOTAL	397	100%	364	100%

Patient Demographics of Scheduled Inductions

	Pre-Interv All n=397		Post-Interv All n=364		Pre-Interv Elective n=259		Post-Interv Elective n=238		Pre-Interv Elective <39 weeks n=46		Post-Interv Elective <39 weeks n=27	
Maternal Age			p=0.09				p=0.40				p=0.05	
≤19	49	12.3%	60	16.5%	33	12.7%	40	16.8%	2	4.3%	7	25.9%
20-24	101	25.4%	90	24.7%	66	25.5%	61	25.6%	13	28.3%	6	22.2%
25-29	134	33.8%	105	28.8%	83	32.0%	65	27.3%	14	30.4%	3	11.1%
30-34	72	18.1%	83	22.8%	49	18.9%	53	22.3%	13	28.3%	8	29.6%
≥35	41	10.3%	26	7.1%	28	10.8%	19	8.0%	4	8.7%	3	11.1%
Parity			p=.081				p=0.07				p=0.10	
Nulliparous	190	47.9%	198	54.4%	115	44.4%	125	52.5%	9	19.6%	13	48.1%
Provider Type			p=.081				p=0.16				*	
Service	55	13.9%	51	14.0%	42	16.2%	28	11.8%	0	0.0%	0	0.00%
Private	342	86.1%	313	86.0%	217	83.8%	210	88.2%	46	100.0%	27	100.0%

*Not enough variability to test

Incidence of Scheduled Elective Inductions

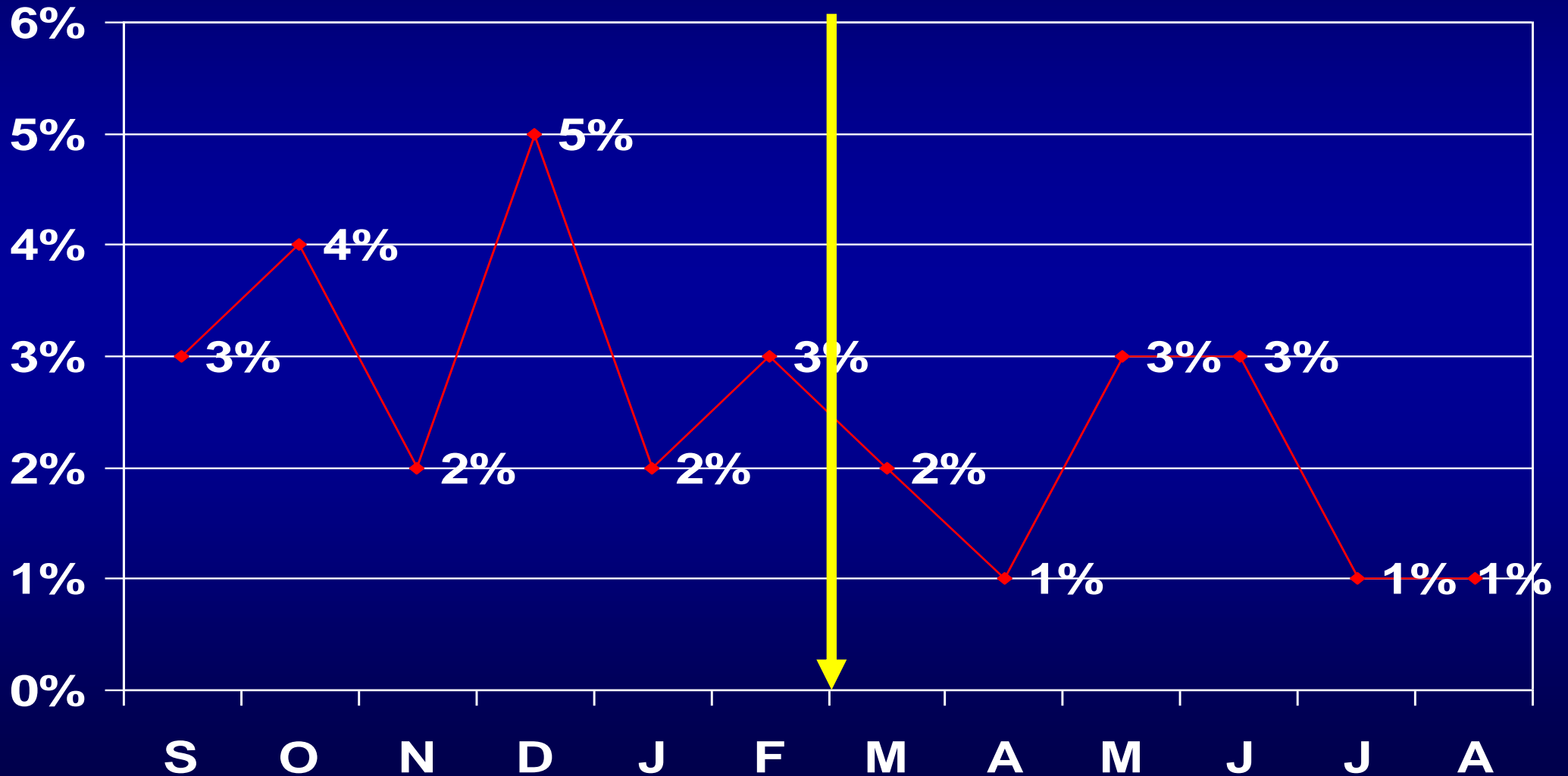
- Pre-Intervention (9/1/08-2/28/09)

		% Inductions	% Births
– Births	1501		
– Inductions	397		(26.4%)
– Elective	259	(65.2%)	(17.3%)
– Elective <39 wks	46	(17.8%)	(3.1%)

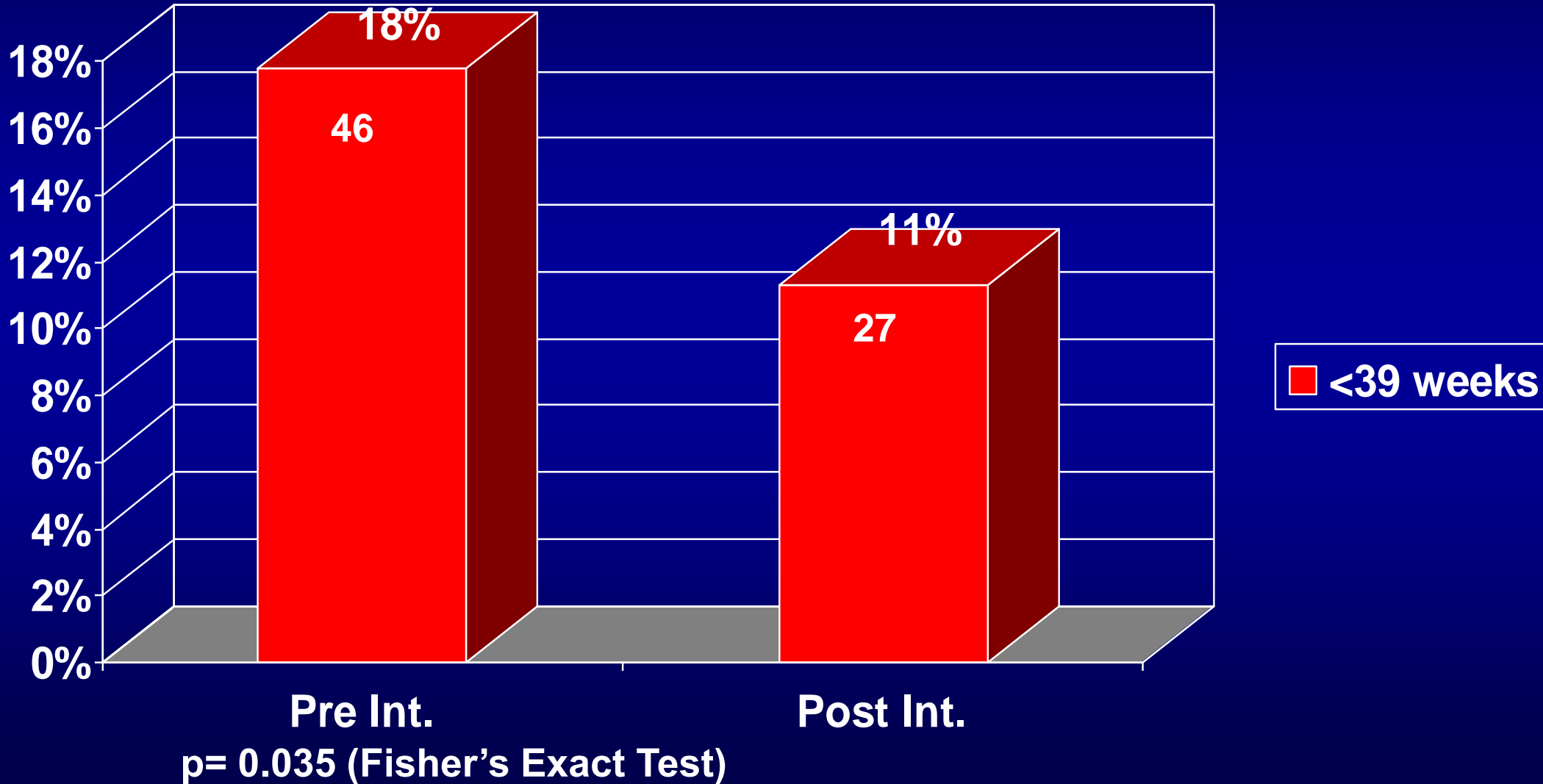
- Post-Intervention (3/1/09-8/30/09)

		% Inductions	% Births
– Births	1551		
– Inductions	364		(23.5%)
– Elective	238	(65.4%)	(15.3%)
– Elective <39 wks	27	(11.3%)	(1.7%)

Rate of Scheduled Elective Inductions <39 wks



Scheduled Elective Inductions <39 weeks



Gestational Age of Scheduled Elective Inductions

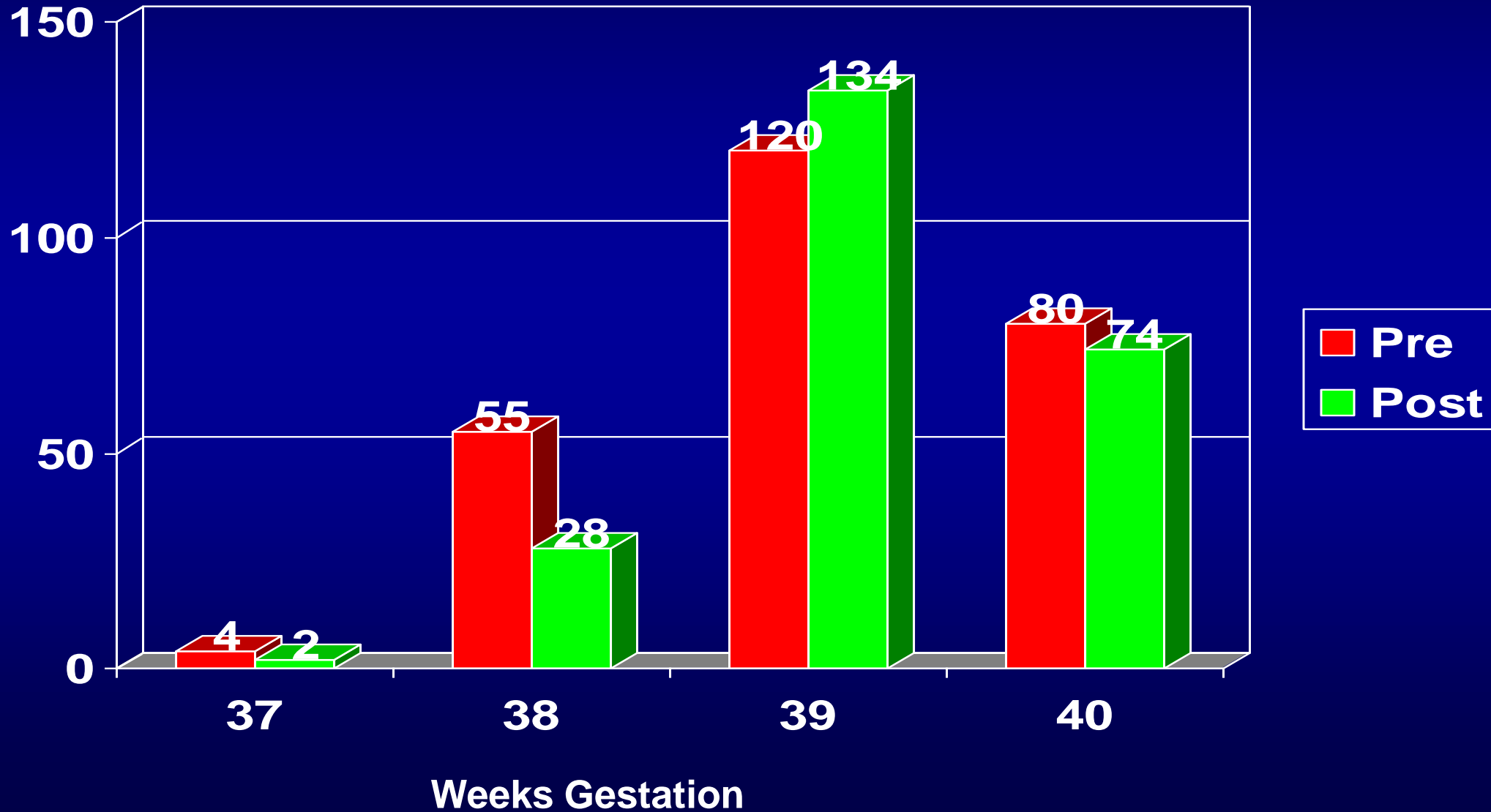
PRE (n=259)

Min	Max	Mean	Std. Deviation
37	40	39.07	.762

POST (n=238)

Min	Max	Mean	Std. Deviation
37	40	39.18	.658

Scheduled Elective Inductions and Gestational Age

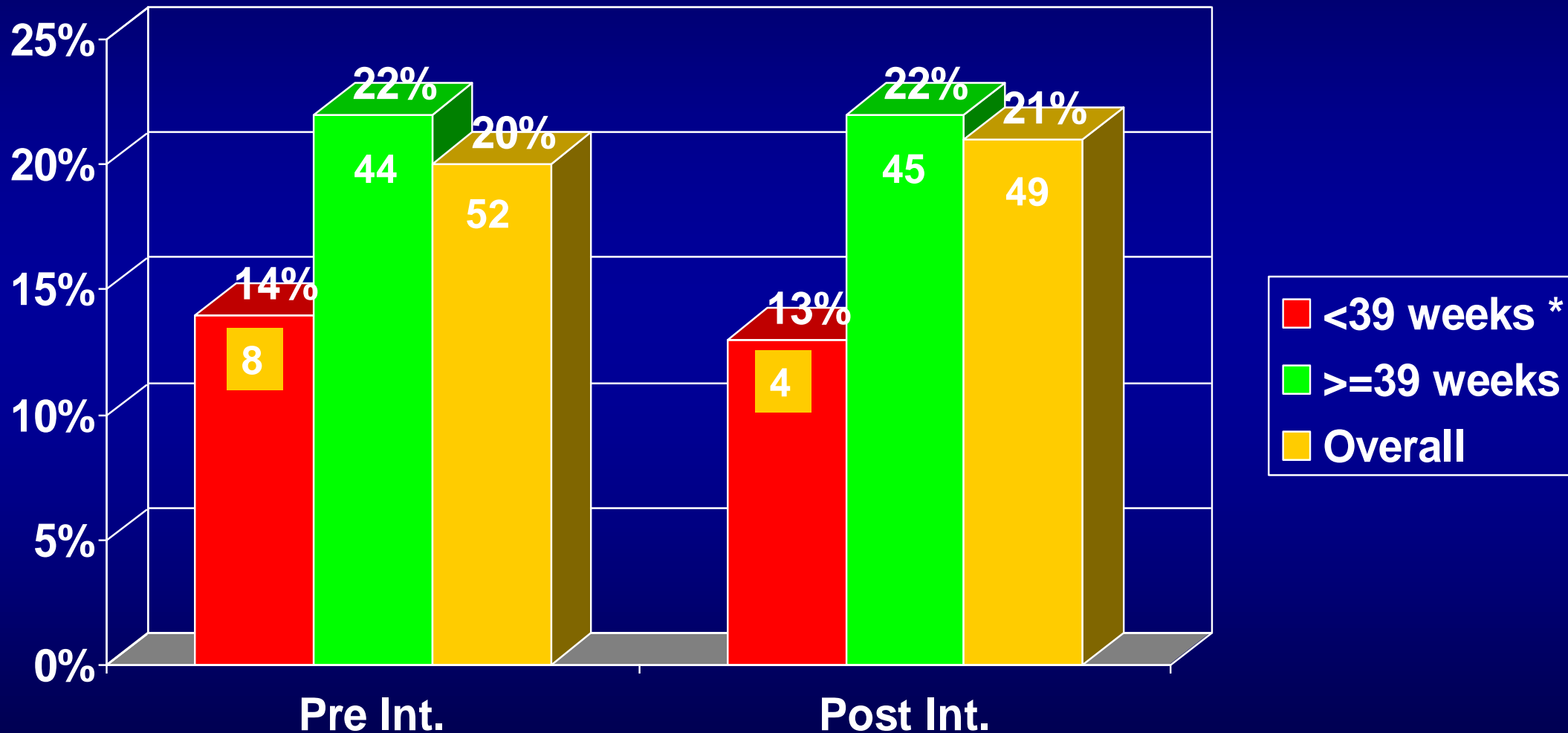


Bishop Scoring System

Score	Dilation (cm)	Effacement (%)	Station	Cervical Consistency	Cervical Position
0	Closed	0-30	-3	Firm	Posterior
1	1-2	40-50	-2	Medium	Mid
2	3-4	60-70	-1	Soft	Anterior
3	≥ 5	≥ 80	+1, +2	----	---

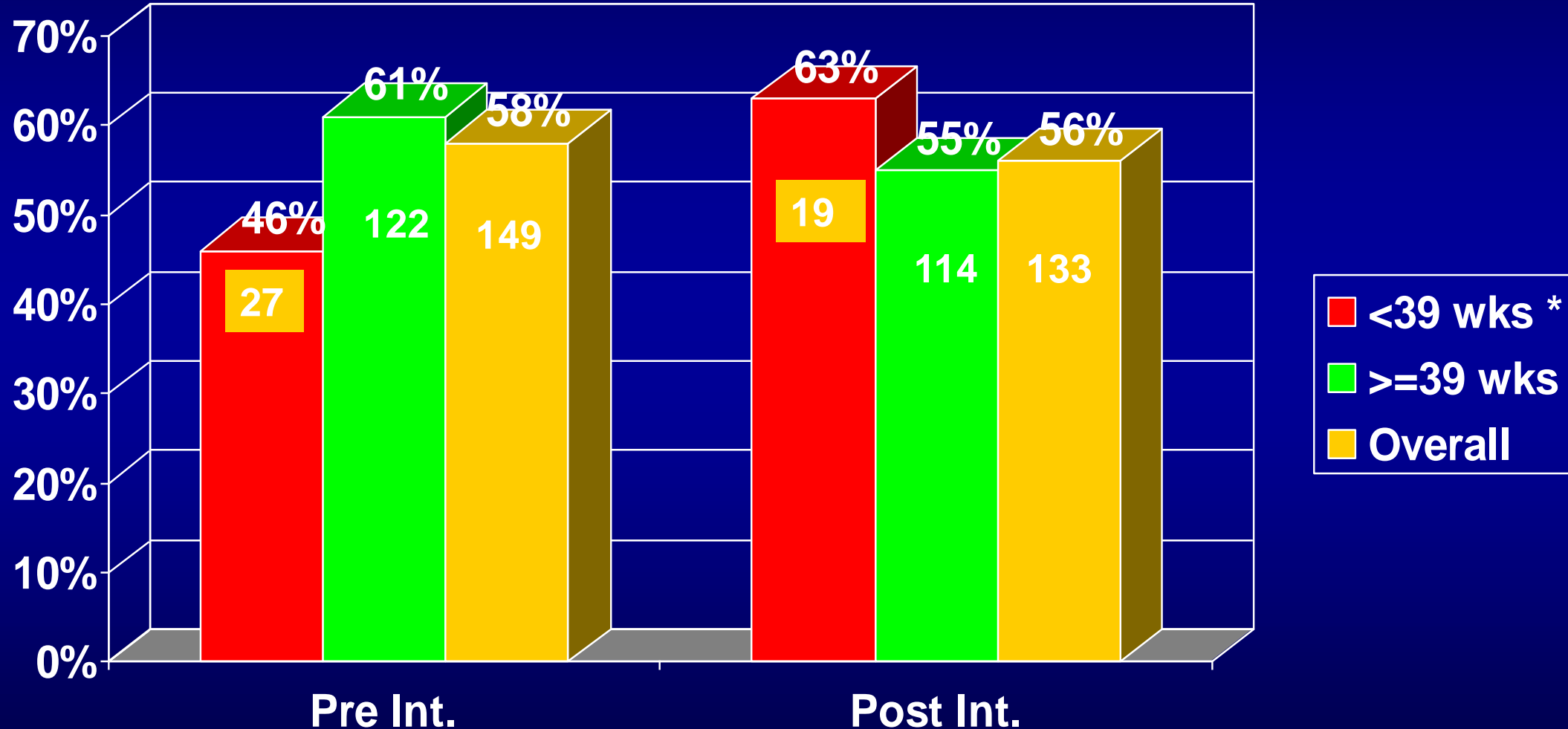
Induction to active labor successful with a score of 7 or greater, less successful with lower scores.

C-Sections and Scheduled Elective Inductions



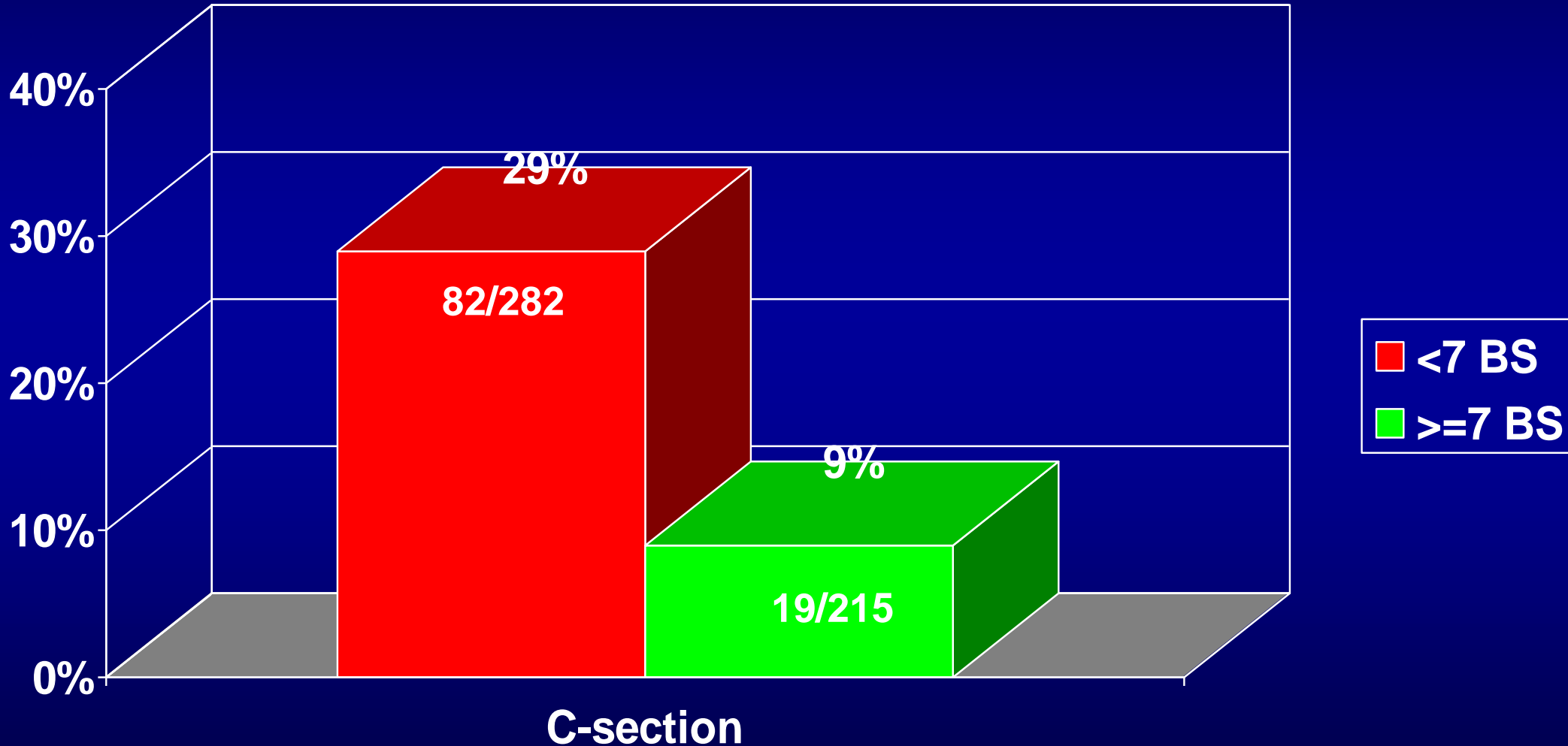
*p= 0.735 (Fisher's Exact Test)

Low Bishop Score (<7) and Scheduled Elective Inductions



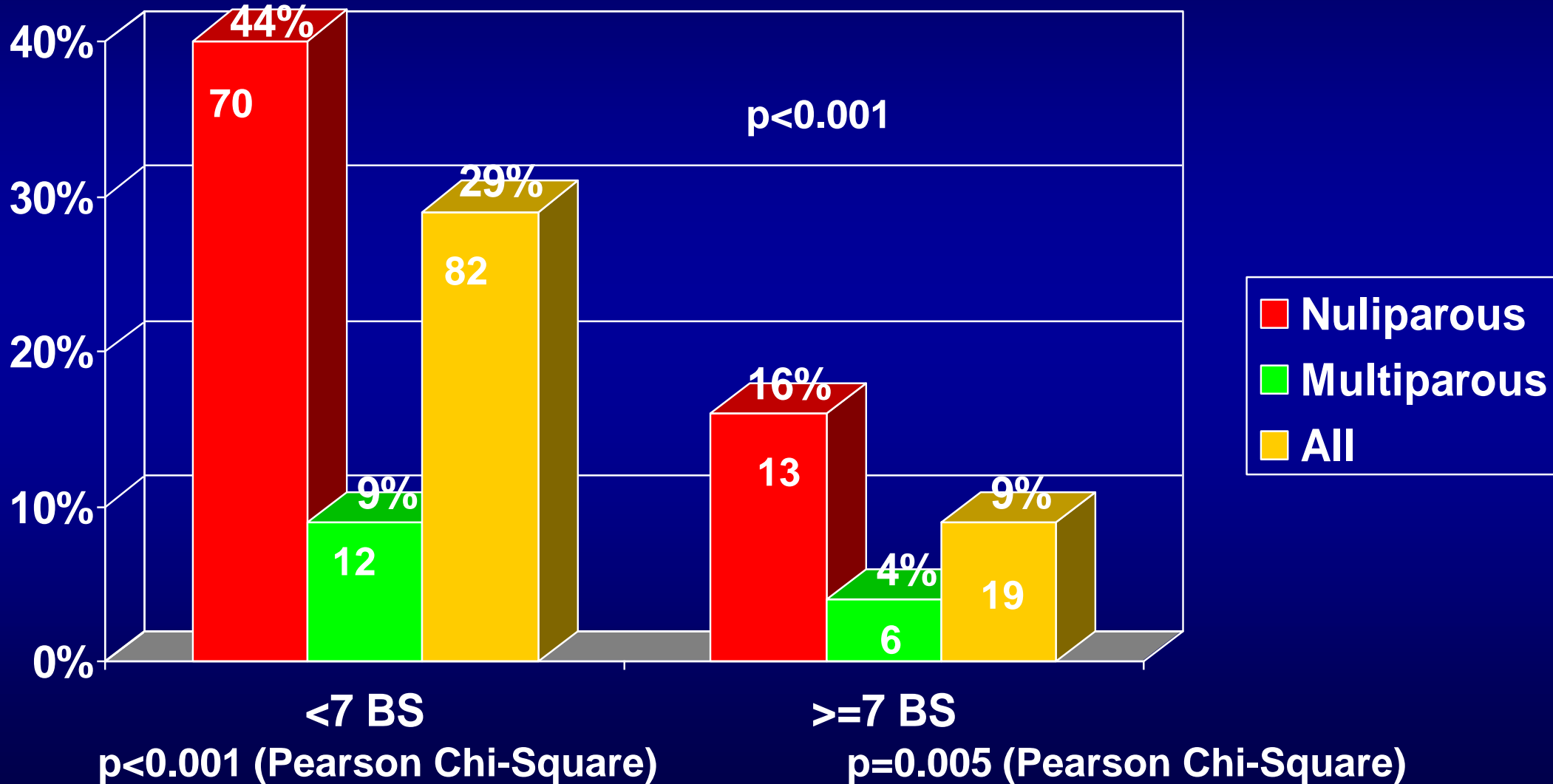
*p= 0.089(Fisher's Exact Test)

Bishop Score and C/S rate in Scheduled Elective Inductions



*p<0.001 (Fisher's Exact Test)

C/S Rate by Bishop Score and Parity in Scheduled Elective Inductions



Nulliparity and Bishop Score for Scheduled Elective Inductions

- Out of the 497 Elective Inductions:
- 240 (48.3%) performed on nulliparous patients
 - 160 (67%) had unfavorable cervix (<7 BS)
 - 70 (44%) with unfavorable cervix had C/S
 - 80 (33%) had a favorable cervix (≥ 7 BS)
 - 13 (16%) with favorable cervix had C/S
- Of all electively induced nulliparous patients, 83 (35%) had C/S

1 Year Follow-Up

- **Post-Intervention – (3/1/09-8/30/09)**

		% Inductions	% Births
– Births	1551		
– Inductions	364		(23.5%)
– Elective	238	(65.4%)	(15.3%)
– Elective <39 wks	27	(11.3%)	(1.7%)

- **1 Year Follow-up (9/1/09-8/30/10)**

		% Inductions	% Births
– Births	3249		
– Inductions	707		(21.8%)
– Elective	490	(69.3%)	(15.1%)
– Elective <39 wks	22	(4.5%)	(0.7%)

Does Labor Induction Increase the Risk of Amniotic Fluid Embolism?

- AFE incidence rate in USA: 1/20,000 to 1/30,000 live births
- Retrospective population based study in Canada (3M hospital births - 12 years) to assess the association between AFE and Induction of Labor
- AFE singleton rate: 6/100,000 deliveries (fatal: 0.8/100,000)
- AFE total rate OR = 2 (1.5-2.8); fatal rate OR = 3.5 (1.5-8.4) after labor induction
- AFE adjusted (other risk factors) rate OR = 1.8 (1.3-2.7)

Kramer MS, et al Lancet 2006; 368: 1444-48

Does Labor Induction Increase the Risk of Cerebral Palsy?

- Registry based cohort of all children born in Norway 1996-1998
- 176,591 children surviving neonatal period
- 373 children had CP; 241 had detailed data available
- Prevalence Rate: 2 per 1,000 live births
- Labor induction: 24.1% CP children vs. 13.4% no CP children ($p < 0.001$)

