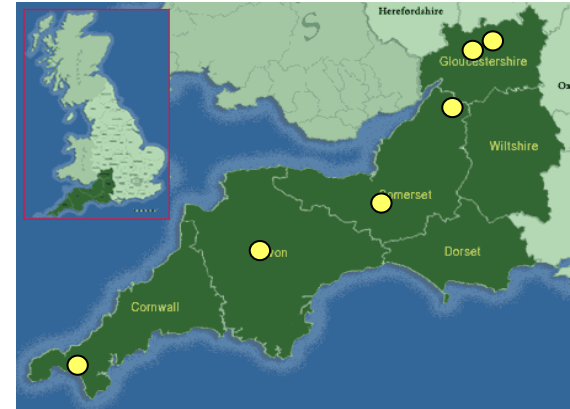


# Current trends in Cervical Ripening and Labour Induction

Professor Tim Draycott  
Consultant Obstetrician  
Health Foundation Improvement Science Fellow

# Keypad Questions 1

# Bristol



## Clifton Suspension Bridge



# Snowy Bristol – March 2013



# One born every minute - Bristol



# UK and Turkey

- Similar obstetric drivers – pressure to reduce CS rates

## TODAYS ZAMAN

HOME NEWS BUSINESS INTERVIEWS FEATURES ARTS & CULTURE TRAVEL COLUMNISTS OP-ED EXPAT ZONE

### Cesarean births restricted to cases of medical necessity

July 04, 2012, Wednesday/ 11:28:00



According to a new law passed in Parliament on Wednesday, cesarean births can now only be carried out in cases of medical necessity.

The Ministry of Health's recent release of statistics for C-section births in Turkey has sparked debate on the topic. In May Prime Minister Recep Tayyip Erdoğan declared himself opposed to C-section births, and described abortion as a crime, following which the new law was passed in order to reduce the number of births by C-section.

The rate of C-sections in 2009 was 39.3 percent of all births in public hospitals, 61.8 percent in private hospitals and 63.2 percent in university hospitals. In 2010 these rates had increased to 40.2 percent, 63.7 percent and 65.2 percent, respectively. By 2011 the rates stood at 36.8 percent of all deliveries in public hospitals, 66.6 percent in private hospitals and 65.9 percent in university hospitals, indicating some increase in C-sections.

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Safer Care **Quality & Value** Building Capability Commissioning Tools Productives Networks Innovation Worldwide

### Quality and Value:

Improving care and efficiency in clinical pathways



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#### Caesarean section - promoting normal birth and reducing caesarean section rates

The Rapid Improvement Programme for caesarean section (CS) began in April 2008. The NHS Institute's CS team worked with NHS maternity services to identify the practices and

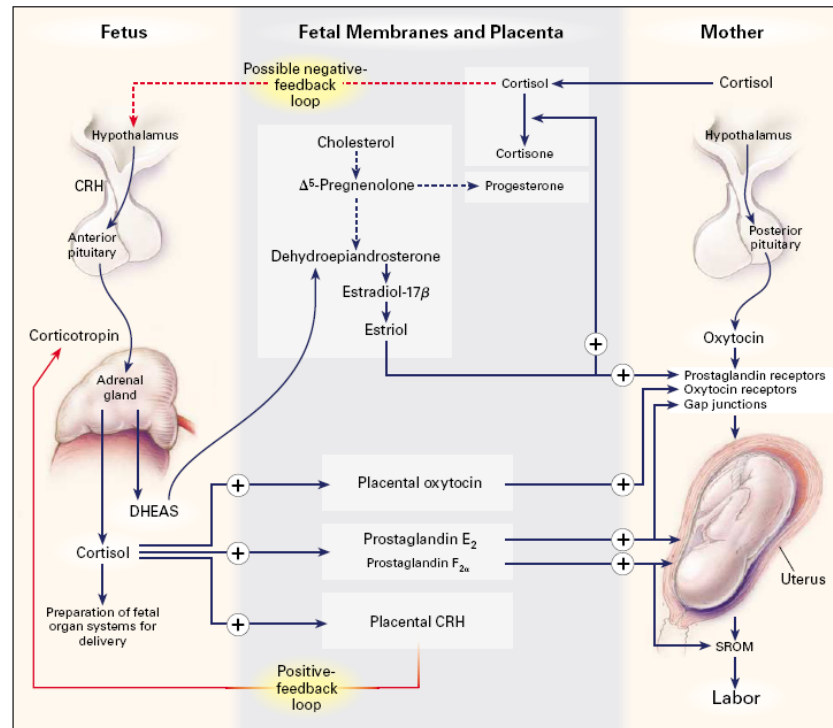
- Organising for Quality and Value
- Ambulatory emergency care (AEC)
- Focus on high volume care
- Improving maternity services
- Toolkits for high volume care pathways
- Case studies - high volume care
- Podcasts - high volume care
- Videos - high volume care
- Rapid improvement programme
- Better care, better value indicators
- Productivity and efficiency
- The Productive Series
- The ebd approach (experience based design)

# Introduction

- Current approaches to IOL
  - National guidance
  - Methods
- Latest data from new meta-analyses
  - Induction of labour at term reduces perinatal mortality
  - Induction of labour with some induction agents reduces CS rates
  - Lower threshold for IOL

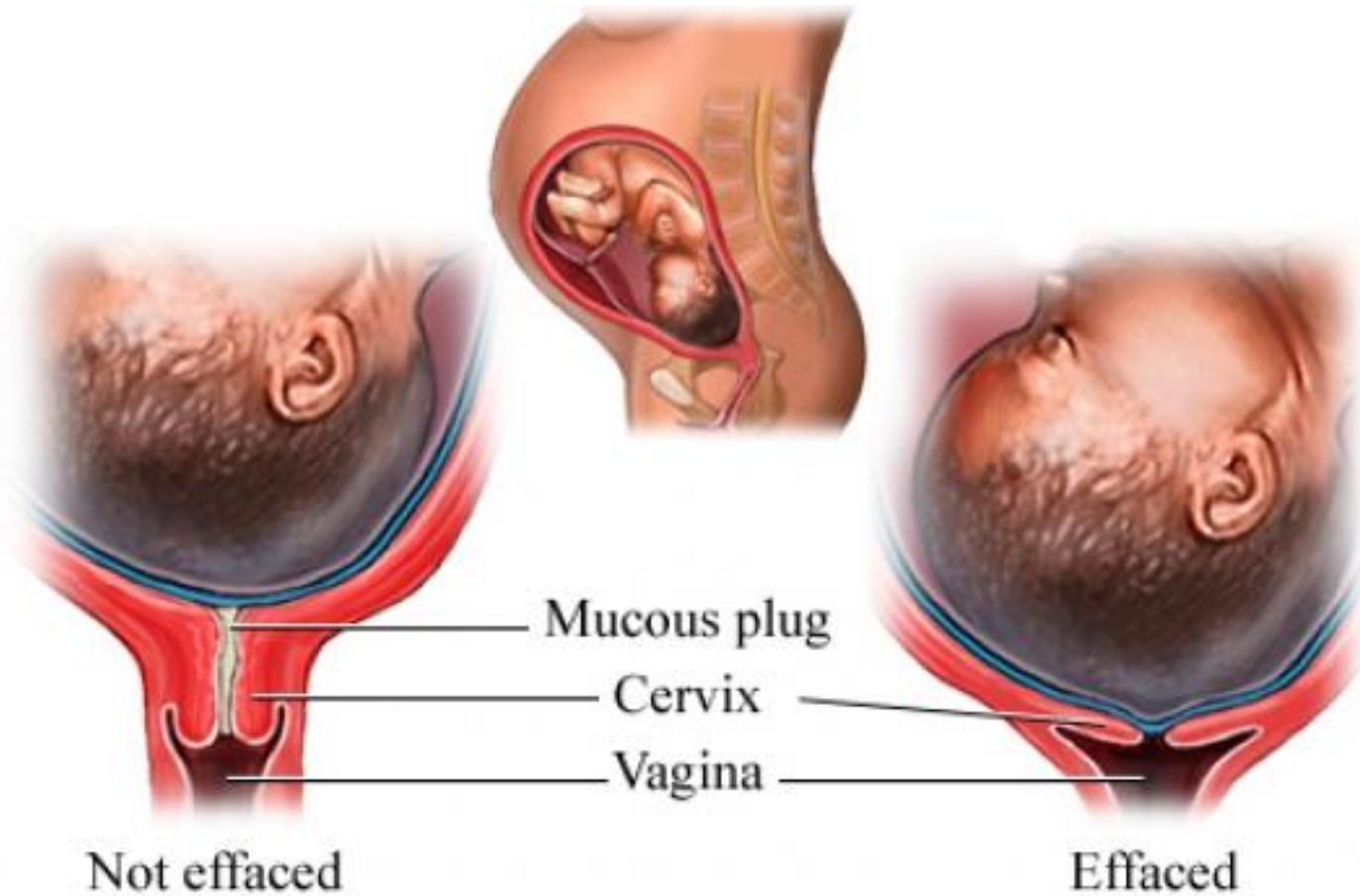
# Labour

- Initiation of labour is a complex process





# Cervical Ripening



# PGE<sub>2</sub> and the Myometrium

- PGE<sub>2</sub>
  - enhances myometrial response to oxytocin
  - accelerates gap junction formation leading to more coordinated contractions
  - stimulates fundal muscle contraction
  - impedes lower segment and cervical smooth muscle
- Note that ripening effects may occur without uterine contractions

Rayburn WF. Obstetrical and Gynecological Survey 2002

# Induction of Labour

- NICE Guideline: Indication for IOL
  - Risks of pregnancy continuing outweigh benefits

*National Collaborating Centre for  
Women's and Children's Health*

**Induction of labour**

**Clinical Guideline**  
July 2008  
Funded to produce guidelines for the NHS by NICE

# Ideal method of labour induction

- Safe for babies
- Safe for mothers
  - Mode of delivery
  - Effect on caesarean rate
- Cost effective

# ARM/Oxytocin vs PGs

- NICE Review
  - Vaginal PGE<sub>2</sub> is less invasive than Oxytocin
  - NB Oxytocin
    - IV access
    - Continuous monitoring
  - Vaginal PGE<sub>2</sub> preferred by women

## Recommendation on amniotomy with intravenous oxytocin

Amniotomy with oxytocin should not be used as a primary method of induction of labour unless there are specific contraindications to the use of vaginal PGE<sub>2</sub>, in particular the risk of uterine hyperstimulation.

# Mechanical Methods

- Balloon vs Foley – no difference
- The Foley catheter is a reasonable and effective alternative for cervical ripening and inducing labor.

ACOG. Practice Bulletin. 2009

## Recommendation on mechanical methods

Mechanical procedures (balloon catheters and laminaria tents) should not be used routinely for induction of labour.

NICE. IOL Guideline. 2008

# PROBAAT Study

- Foley vs PGE<sub>2</sub> Gel
  - IOL cephalic, term, unfavourable cervix
  - CS rate – no difference (23% vs 20%)
  - Costs - Mean costs per woman
    - Foley €3297
    - PG E<sub>2</sub> €3075
  - Saving €222 per woman using PGE<sub>2</sub>

Jozwiak et al. BJOG. 2013

# Misoprostol for IOL

- Misoprostol
  - High rates of hyperstimulation
  - Hyperstimulation associated with increase in poor neonatal outcomes
  - No better than vaginal PGE<sub>2</sub>
- UK National Recommendation
  - Misoprostol should only be used for induction of labour for women who have an intrauterine death



# Methods for IOL - NICE

- UK overall recommendation

## Recommendations on vaginal PGE<sub>2</sub>

Vaginal PGE<sub>2</sub> is the preferred method of induction of labour, unless there are specific clinical reasons for not using it (in particular, the risk of uterine hyperstimulation). It should be administered as a gel, tablet or controlled release pessary. Costs may vary over time and trusts/units should take this into consideration when prescribing PGE<sub>2</sub>. For doses, refer to the SPCs. The recommended regimens are:

- one cycle of vaginal PGE<sub>2</sub> tablets or gel: one dose, followed by a second dose after 6 hours if labour is not established (up to a maximum of two doses)
- one cycle of vaginal PGE<sub>2</sub> controlled release pessary: one dose over 24 hours.

# Future Mx of previous CS ?

- USS in 1<sup>st</sup>/2<sup>nd</sup> trimester

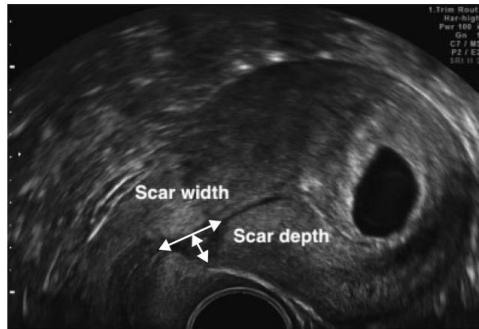


Figure 4 Dimensions of apparent scar 'defect' in the sagittal plane.

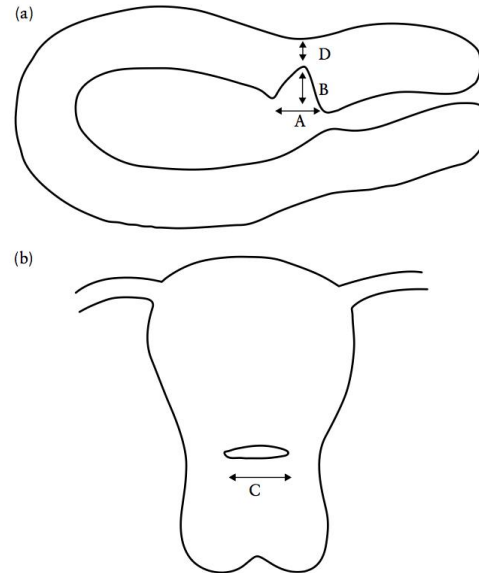


Figure 6 Schematic diagram showing Cesarean scar dimensions in the sagittal (a) and transverse (b) planes. A, width of hypoechoic part of scar (apparent 'defect') on the sagittal plane; B, depth of hypoechoic part of scar (apparent 'defect') on the sagittal plane; C, length of hypoechoic part of scar (apparent 'defect') on the transverse plane; D, residual myometrial thickness on sagittal plane.

# Predictive clinical value ?

- Meta-analysis - occurrence of defect vaginal birth after CS
- Myometrium thickness
  - 2.1- 4.0mm – strong negative predictor
  - 0.6-2.0mm – strong positive predictor
- Future prospective observational studies required

N. Kok et al. Ultrasound O&G. 2013

# Previous CS

- NICE 2008

## Recommendation on previous caesarean birth

If delivery is indicated, women who have had a previous caesarean section may be offered induction of labour with vaginal PGE<sub>2</sub>,\* caesarean section or expectant management on an individual basis, taking into account the woman's circumstances and wishes. Women should be informed of the increased risks with induction of labour:

- increased risk of need for emergency caesarean section
- increased risk of uterine rupture.

- .....overall - Prostaglandins

The GDG also considered the comfort, convenience and acceptability of vaginal PGE<sub>2</sub> to the woman undergoing induction of labour. Vaginal PGE<sub>2</sub> is less invasive than amniotomy and oxytocin, with the latter requiring intravenous access and continuous EFM, thus reducing women's mobility during induction. On balance, the GDG reached a consensus that a vaginal PGE<sub>2</sub> regimen is the preferred method of induction of labour for women with a history of previous caesarean section.

# Previous CS

- The use of misoprostol in women with prior cesarean delivery or major uterine surgery has been associated with an increase in uterine rupture and, therefore, should be avoided in the third trimester.

ACOG. Obstet Gynecol. 2009

# Latest data about Labour Induction

- What do women want ?
- Outcomes after induction of labour
  - Induction of labour at term reduces perinatal mortality
  - Induction of labour with some induction agents reduces CS rates
  - Lower threshold for IOL

# What do women want ?

- Women preferred induction of labor to serial antenatal monitoring

*Acta Obstetrica et Gynecologica*. 2007; 86: 950–956

**informa**  
healthcare

ORIGINAL ARTICLE

## **Women's experiences and attitudes towards expectant management and induction of labor for post-term pregnancy**

RUNA HEIMSTAD<sup>1,2</sup>, PÅL R. ROMUNDSTAD<sup>3</sup>, JON HYETT<sup>4</sup>, LARS-ÅKE MATTSSON<sup>5</sup>  
& KJELL Å. SALVESEN<sup>1,2</sup>

<sup>1</sup>Department of Obstetrics and Gynecology, St. Olavs Hospital, Trondheim University Hospital, <sup>2</sup>Department of Laboratory Medicine, Children's and Women's Health, Norwegian University of Science and Technology, <sup>3</sup>Department of Public Health and General Practice, Norwegian University of Science and Technology, Trondheim, Norway, <sup>4</sup>Department of Fetal Maternal Medicine, Royal Brisbane Women's Hospital, Brisbane, Australia, and <sup>5</sup>Department of Obstetrics and Gynecology, Sahlgrenska Academy, Göteborg, Sweden

# Outcomes of elective IOL ?

- New data


BMJ

BMJ 2012;344:e2838 doi: 10.1136/bmj.e2838 (Published 10 May 2012)

Page 1 of 13

## RESEARCH

### Outcomes of elective induction of labour compared with expectant management: population based study

 OPEN ACCESS

Sarah J Stock *clinical lecturer and subspecialty trainee in maternal fetal medicine*<sup>1</sup>, Evelyn Ferguson *consultant obstetrician*<sup>2</sup>, Andrew Duffy *information analyst*<sup>3</sup>, Ian Ford *professor of biostatistics*<sup>4</sup>, James Chalmers *consultant in public health medicine*<sup>3</sup>, Jane E Norman *professor of maternal and fetal health*<sup>1</sup>

<sup>1</sup>Tommy's Centre for Maternal and Fetal Health, MRC Centre for Reproductive Health, University of Edinburgh, Queen's Medical Research Institute, Edinburgh EH16 4SA, UK; <sup>2</sup>NHS Lanarkshire, Wishaw General Hospital, Wishaw, UK; <sup>3</sup>Information Services Division, NHS National Services Scotland, Edinburgh; <sup>4</sup>University of Glasgow Robertson Centre for Biostatistics, Glasgow, UK



# Elective IOL

- Associated with reduced perinatal mortality
  - OR 0.39 at 40 weeks gestation
- PPH and anal sphincter injuries reduced
  - OR 0.74 & 0.82 respectively
- Spontaneous vertex delivery rates not affected

# IOL to improve birth outcomes

## Induction of labour for improving birth outcomes for women at or beyond term (Review)

Gülmezoglu AM, Crowther CA, Middleton P, Heatley E



This is a reprint of a Cochrane review, prepared and maintained by The Cochrane Collaboration and published in *The Cochrane Library* 2012, Issue 6





# IOL and Perinatal Death

## Analysis 1.1. Comparison 1 Labour induction versus expectant management by gestational age (all trials), Outcome 1 Perinatal death.

Review: Induction of labour for improving birth outcomes for women at or beyond term

Comparison: 1 Labour induction versus expectant management by gestational age (all trials)

Outcome: 1 Perinatal death

Study or subgroup	Induction n/N	Expectant n/N	Risk Ratio M-H,Fixed,95% CI	Risk Ratio M-H,Fixed,95% CI
1 39-40 weeks				
<b>Subtotal (95% CI)</b>	<b>415</b>	<b>395</b>		<b>0.32 [ 0.03, 3.09 ]</b>
2 41 weeks				
<b>Subtotal (95% CI)</b>	<b>501</b>	<b>497</b>		<b>0.33 [ 0.03, 3.17 ]</b>
3 > 41 weeks				
<b>Subtotal (95% CI)</b>	<b>2814</b>	<b>2785</b>		<b>0.30 [ 0.09, 0.99 ]</b>
<b>Total (95% CI)</b>	<b>3730</b>	<b>3677</b>		<b>0.31 [ 0.12, 0.81 ]</b>






# IOL and CS

## Analysis 1.10. Comparison 1 Labour induction versus expectant management by gestational age (all trials), Outcome 10 Caesarean section.

Review: Induction of labour for improving birth outcomes for women at or beyond term

Comparison: 1 Labour induction versus expectant management by gestational age (all trials)

Outcome: 10 Caesarean section

Study or subgroup	Induction n/N	Expectant n/N	Risk Ratio M-H,Fixed,95% CI	Weight	Risk Ratio M-H,Fixed,95% CI
1 37-39 weeks					
<b>Subtotal (95% CI)</b>	<b>481</b>	<b>235</b>		<b>2.6 %</b>	<b>0.58 [ 0.30, 1.11 ]</b>
2 39-40 weeks					
<b>Subtotal (95% CI)</b>	<b>415</b>	<b>395</b>		<b>2.4 %</b>	<b>0.74 [ 0.38, 1.41 ]</b>
4 41 weeks					
<b>Subtotal (95% CI)</b>	<b>501</b>	<b>497</b>		<b>13.6 %</b>	<b>0.74 [ 0.58, 0.96 ]</b>
5 > 41 weeks					
<b>Subtotal (95% CI)</b>	<b>3004</b>	<b>2990</b>		<b>78.9 %</b>	<b>0.91 [ 0.82, 1.00 ]</b>
<b>Total (95% CI)</b>	<b>4515</b>	<b>4234</b>		<b>100.0 %</b>	<b>0.89 [ 0.81, 0.97 ]</b>

# Labour induction at term

DOI: 10.1111/1471-0528.12328

[www.bjog.org](http://www.bjog.org)

Systematic review

## Does induction of labour increase the risk of caesarean section? A systematic review and meta-analysis of trials in women with intact membranes

**S Wood,<sup>a,b</sup> S Cooper,<sup>a</sup> S Ross<sup>a,b</sup>**

<sup>a</sup> Departments of Obstetrics and Gynaecology, University of Calgary, Calgary, AB, Canada <sup>b</sup> Community Health Sciences, University of Calgary, Calgary, AB, Canada

*Correspondence:* Dr S Wood, Department of Obstetrics and Gynaecology, University of Calgary, 4th Floor, North Tower, Foothills Medical Centre, 1441 – 29th Street NW, Calgary, AB, T2N 4J8, Canada. Email [Stephen.wood@albertahealthservices.ca](mailto:Stephen.wood@albertahealthservices.ca)

*Accepted 8 February 2013. Published Online 3 July 2013.*

# Effect on CS

- IOL reduces the rate of CS

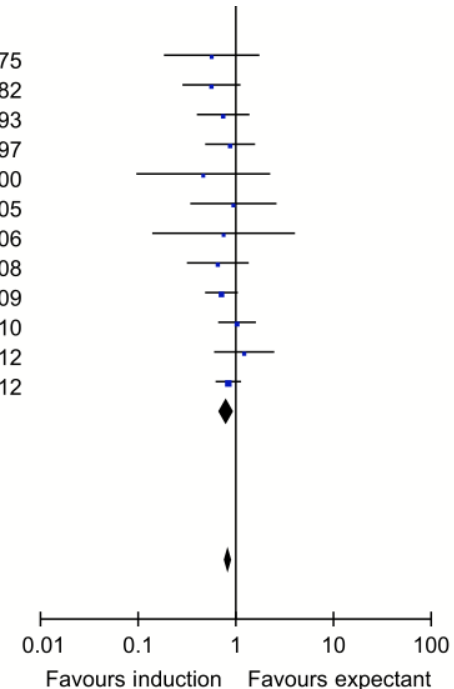
## 2.1.2 Other Indications

Cole 1975	5	111	9	117	0.9%	0.57 [0.18, 1.74]	1975
Breart 1982	19	481	16	235	2.2%	0.56 [0.28, 1.12]	1982
Kjos 1993	25	100	31	100	2.4%	0.74 [0.40, 1.38]	1993
Gonen 1997	26	134	30	139	2.5%	0.87 [0.49, 1.58]	1997
Suzuki 2000	3	17	6	19	0.5%	0.46 [0.10, 2.25]	2000
Nielsen 2005	8	116	8	110	0.8%	0.94 [0.34, 2.61]	2005
Van den Hove 2006	3	16	4	17	0.3%	0.75 [0.14, 4.04]	2006
Nicholson 2008	14	136	20	134	1.9%	0.65 [0.32, 1.36]	2008
Koopmans 2009	54	377	72	379	6.5%	0.71 [0.48, 1.05]	2009
Boers 2010	45	321	45	329	4.0%	1.03 [0.66, 1.61]	2010
Dodd 2012	22	71	21	78	1.5%	1.22 [0.60, 2.48]	2012
Boulvain 2012	114	407	130	410	9.8%	0.84 [0.62, 1.13]	2012
<b>Subtotal (95% CI)</b>		<b>2287</b>		<b>2067</b>	<b>33.3%</b>	<b>0.81 [0.69, 0.95]</b>	

Total events 338 392  
 Heterogeneity:  $\text{Chi}^2 = 5.38$ ,  $\text{df} = 11$  ( $P = 0.91$ );  $I^2 = 0\%$   
 Test for overall effect:  $Z = 2.52$  ( $P = 0.01$ )

**Total (95% CI)** 6248 5918 100.0% 0.83 [0.76, 0.92]

Total events 1054 1184  
 Heterogeneity:  $\text{Chi}^2 = 27.04$ ,  $\text{df} = 30$  ( $P = 0.62$ );  $I^2 = 0\%$   
 Test for overall effect:  $Z = 3.77$  ( $P = 0.0002$ )  
 Test for subgroup differences:  $\text{Chi}^2 = 0.19$ ,  $\text{df} = 1$  ( $P = 0.66$ ),  $I^2 = 0\%$



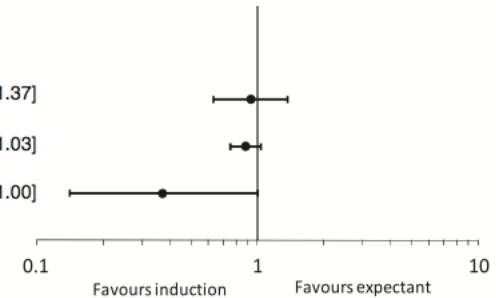
# Perinatal effects

- Reduces rate of perinatal death for women – OR 0.37

## Neonatal outcomes

APGAR <7 (5 min)	18	48	4113	52	4137	0.93 [0.63, 1.37]
NICU admission	15	337	4041	379	3958	0.88 [0.75, 1.03]
Perinatal death*	30	1	6194	10	5860	0.37 [0.14, 1.00]

\*excluding anomaly



# Latest data published this month

- Agrees with other systematic reviews
  - There were benefits for the fetus
  - The risk of cesarean delivery was lower for women whose labour was induced than those managed expectantly in term and post-term gestations.

CMAJ

RESEARCH

## Use of labour induction and risk of cesarean delivery: a systematic review and meta-analysis

Ekaterina Mishanina MBBS, Ewelina Rogozinska MSc, Tej Thatthi, Rehan Uddin-Khan MBBS, Khalid S. Khan MBBS MSc, Catherine Meads MBChB PhD

### ABSTRACT

**Background:** Induction of labour is common, and cesarean delivery is regarded as its major complication. We conducted a systematic review and meta-analysis to investigate whether the risk of cesarean delivery is higher or lower following labour induction compared with expectant management.

**Methods:** We searched 6 electronic databases for relevant articles published through April 2012 to identify randomized controlled trials (RCTs) in which labour induction was compared with placebo or expectant management among women with a viable singleton pregnancy. We assessed risk of bias and obtained data on rates of cesarean delivery. We used regression analysis techniques to explore the effect of patient characteristics, induction methods and study quality on risk of cesarean delivery.

was 12% lower with labour induction than with expectant management (pooled relative risk [RR] 0.88, 95% confidence interval [CI] 0.84–0.93;  $I^2 = 0\%$ ). The effect was significant in term and post-term gestations but not in preterm gestations. Meta-regression analysis showed that initial cervical score, indication for induction and method of induction did not alter the main result. There was a reduced risk of fetal death (RR 0.50, 95% CI 0.25–0.99;  $I^2 = 0\%$ ) and admission to a neonatal intensive care unit (RR 0.86, 95% CI 0.79–0.94), and no impact on maternal death (RR 1.00, 95% CI 0.10–9.57;  $I^2 = 0\%$ ) with labour induction.

**Interpretation:** The risk of cesarean delivery was lower among women whose labour was induced than among those managed expectantly in term and post-term gestations. There

**Competing interests:** None declared.

This article has been peer reviewed.

**Correspondence to:** Khalid Khan, k.s.khan@qmul.ac.uk  
CMAJ 2014, DOI:10.1503/cmaj.130925



# Benefits for the baby

**Table 1: Risk of adverse outcomes associated with labour induction versus expectant management**

Outcome	Relative risk (95% CI)	I <sup>2</sup> value, %	No. of trials
Fetal death	0.50 (0.25–0.99)	0	60
Admission to NICU	0.86 (0.79–0.94)	0	55

CMAJ

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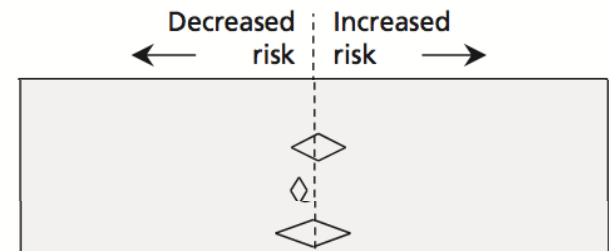
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CMAJ 2014; DOI:10.1503/cmaj.130925

# Method of induction – different effects

- PGE<sub>2</sub> preparations reduce CS rates
- Oxytocin and balloon catheters do not

Variable	No. of trials	Relative risk (95% CI)	I <sup>2</sup> value, %
<b>Method of induction</b>			
Oxytocin	15	1.03 (0.83–1.28)	0.0
Prostaglandin E2	67	0.90 (0.84–0.96)	0.0
Mechanical	4	1.01 (0.75–1.35)	0.0



CMAJ

RESEARCH

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# Clinical advantages Propess

- Propess in clinical practice
  - Reduced requirement for oxytocin Augmentation after IOL
  - Reduced requirement for ventouse/forceps

Kelly et al. Cochrane review. 2012
- Therefore Propess better for obstetricians as well as women

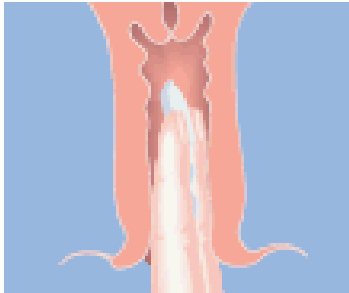
# Bristol practice

- Propess for all Indications for induction of labour
- Standardisation
  - Advantages for our service
    - Single administration
    - Single CTG
    - Time saving
  - Review after 24 hours by senior member of the team if not in labour

# How we use Propess

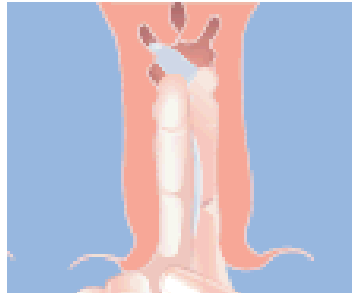
- Start of IOL
  - Antenatal assessment
  - 30 minute CTG
- Insert Propess
  - Further 30 minute CTG should be performed to confirm fetal well being

# Insertion of Propess



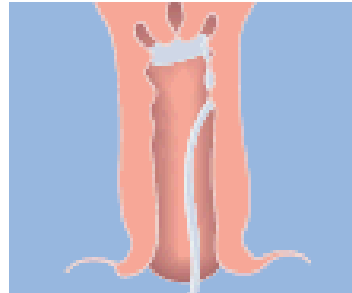
## 1. Insertion

Holding the PropessØ insert between the index and middle fingers of the examining hand, insert it high into the vagina towards the posterior vaginal fornix using only small amounts of water soluble lubricants.



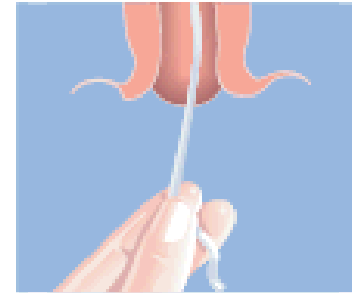
## 2. Positioning

The index and middle fingers should now be twisted a quarter turn clockwise, pushing the Propess insert higher up, behind the posterior fornix and turning it through 90° so that it lies transversely in the posterior fornix.



## 3. After positioning

Carefully withdraw the fingers leaving the PropessØ insert in the position shown in this diagram where it should remain *in situ*. After insertion ensure that the patient remains recumbent for 20 -30 minutes to allow time for the PropessØ insert to swell. Again, this will help it to remain in place for the duration of the treatment. Allow sufficient tape to remain outside the vagina to permit easy retrieval.



## 4. Removal

To stop prostaglandin E2 release, gently pull the retrieval tape and remove the Propess insert.

# Next

- If CTG normal
- No further monitoring is required unless SRM or painful tightenings/contractions
- Selected low risk patients can return home for 6 hours

# And then

- When/if the woman reports painful tightenings/contractions
- If regular tightenings/contractions palpated
  - Vaginal examination should be performed
  - Remove Propess (irrespective of any cervical change)
  - Transfer to labour ward



# Cautions

- Remove Propess if:
  - Maternal side effects (rare)
  - Uterine hyperstimulation
    - Commence CTG
    - Palpate contractions
  - Abnormal FHR/CTG

# Keypad Questions 2

# Methods for IOL

- Mechanical methods
  - Equal efficacy
  - Possibly higher overall cost
  - Not recommended by NICE
- Misoprostol
  - Localise to setting - minimum dose
  - Not for previous CS
  - IUFD

# Prostaglandins

- Prostaglandins
  - Gold standard for almost all indications for IOL
- Propress
  - Advantages for women and obstetricians
    - Reduces requirement for additional oxytocin and/or instrumental birth after IOL
    - Only single CTG and insertion
    - Standardisation of service

# Conclusion

- Latest data from new meta-analyses
  - Induction of labour at term reduces perinatal mortality
  - Induction of labour with some induction agents reduces CS rates
  - Propress may have additional benefits
  - Lower threshold for IOL
  - Consider effects on system

# Queen's Anniversary Prize - 2014



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# Thankyou

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