

# Ontario Public Health Association Reproductive Health Work Group



Importance of Physiological Labour & Birth and  
Informed Decision-Making

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# OPHA RHWG

- **Workgroup Goal:** To advocate for a comprehensive approach to support individuals in making the best decisions about their reproductive health.
- **Two priority issues:**
  - Preconception Health
  - Labour & Birth
    - Promoting, supporting and protecting physiological birth
    - Informed Decision-Making for Labour & Birth position paper - <http://www.opha.on.ca/Events-News-and-Media/News/Informed-Decision-Making-for-Labour-and-Birth.aspx>

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**Childbirth** Opinion

A good birth experience is more  
than the baby being delivered alive

Joanna Moorhead

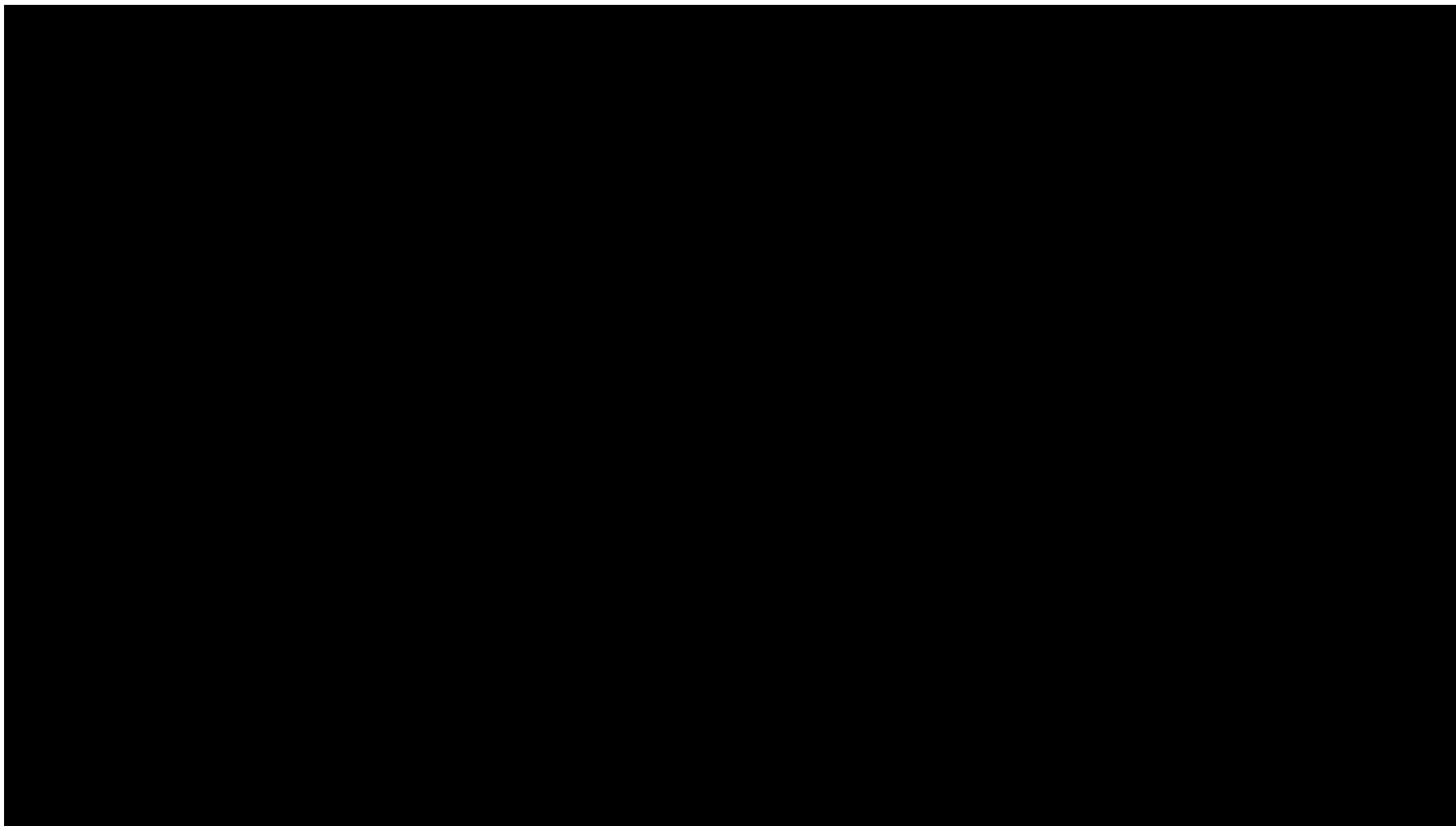


# Presentation Intentions

Our hope is that our presentation will answer the following questions and offer an opportunity for reflection and discussion:

- What is the importance of the hormonal physiology of labour and birth?
- Why is informed decision-making important for labour and birth?
- How does this fit within Public Health?
- How can you incorporate this information into your practice?

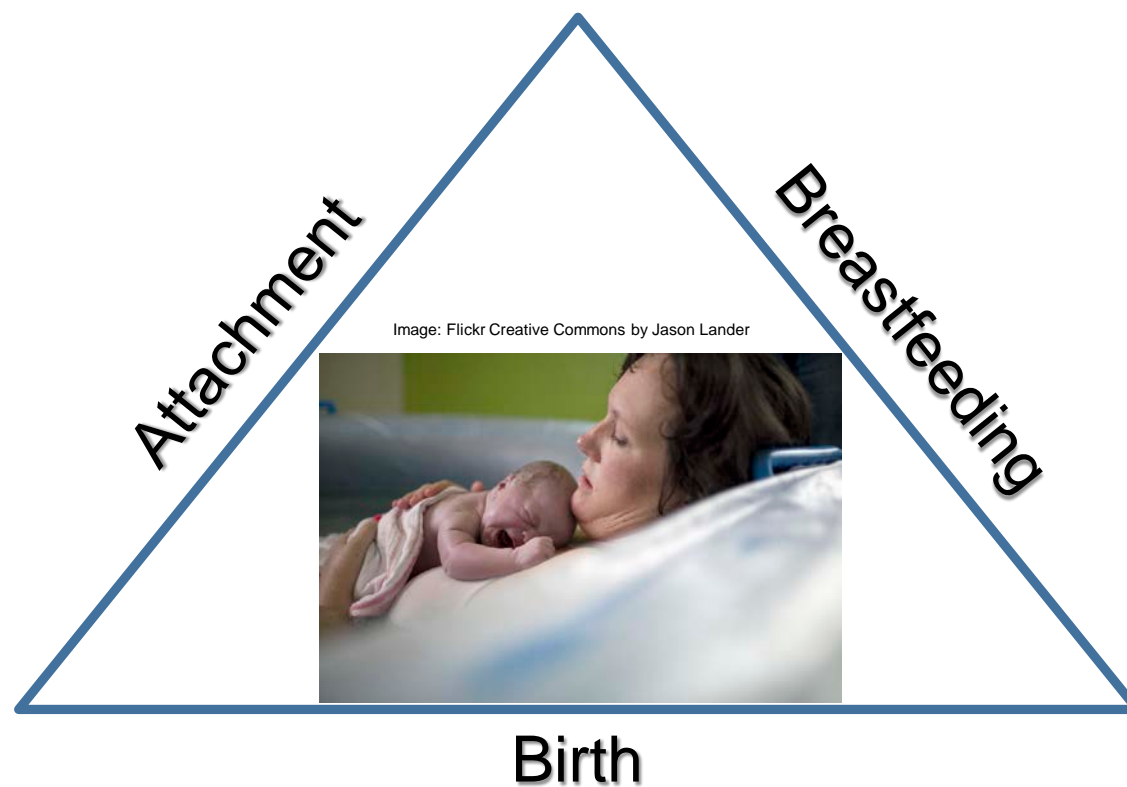
# What's the Issue?



- Video: <https://www.youtube.com/watch?v=jACKa9YW2Yg> (7 mins)

# Importance of Physiological Labour & Birth

- Triad of Reproductive Success & impact on lifelong wellness



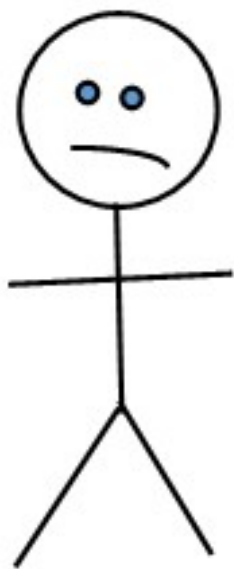
# Importance to Public Health

- Societal and system level benefits of adopting a physiological approach to labour and birth:
  - ↑ breastfeeding initiation and duration rate outcomes.
  - ↑ optimal maternal infant attachment and bonding.
  - ↓ risk of maternal and infant mental illness.
  - ↓ immediate health care costs related to unnecessary interventions and long-term health care costs related to obesity and complex chronic diseases.

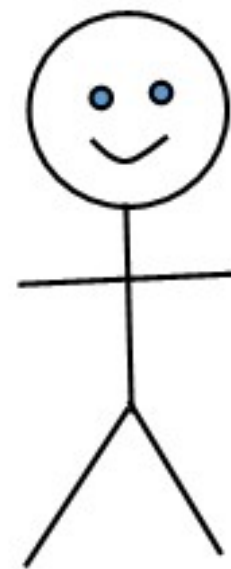
# The Story of Birth Hormones

- Let's compare 2 labour scenarios

Adrenaline



Oxytocin,  
Endorphins

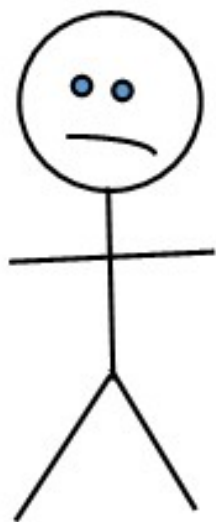




# The Story of Birth Hormones

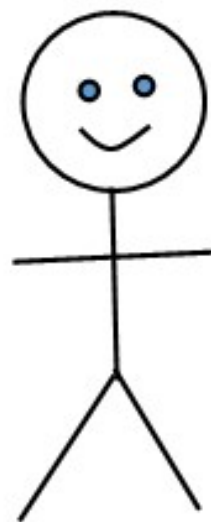
- Let's compare 2 labour scenarios

Adrenaline



Fight or flight

Oxytocin,  
Endorphins



Collect & Protect  
"Love Hormone"

# The Story of Birth Hormones

- Let's compare 2 labour scenarios

## Adrenaline



Muscles tighten  
Energy sent to limbs  
Increased sensitivity to pain

Fight or flight

## Oxytocin, Endorphins



Muscles relax  
Energy sent to uterus  
Decreased sensitivity to / awareness of pain

Collect & Protect  
"Love Hormone"

# The Story of Birth Hormones

- Let's compare 2 labour scenarios

**Adrenaline**

*Causes: Fear, Lack of Control, Feeling Judged*

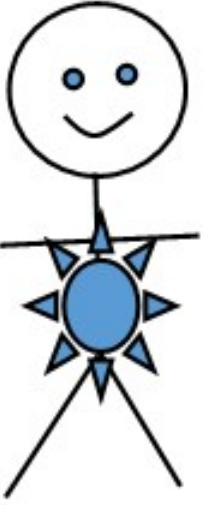


Muscles tighten  
 Energy sent to limbs  
 Increased sensitivity to pain  
 Signs: tension, high pitched voice

**Fight or flight**

**Oxytocin, Endorphins**

*Feeling Loved, Safe, Supported, Skin to Skin Contact, Privacy*



Muscles relax  
 Energy sent to uterus  
 Decreased sensitivity to / awareness of pain  
 Signs: relaxation, rhythm, low husky voice

**Collect & Protect**  
 "Love Hormone"

# How Do Interventions Interrupt Birth Hormones?

We will take a closer look at the evidence for the following:

1. Induction with synthetic oxytocin
2. Epidural
3. Caesarean section

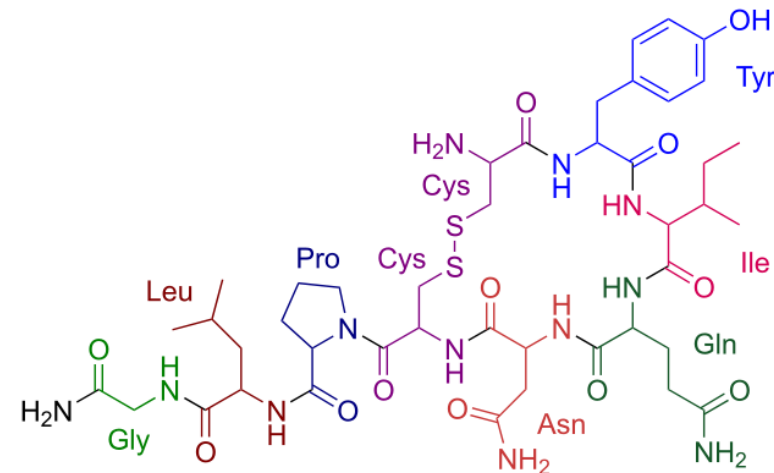


Image Creative Commons from: <https://commons.wikimedia.org/wiki/File:Homebirth.jpg>

# How Do Interventions Interrupt Birth Hormones

## 1. Induction with synthetic oxytocin (synOT):

- Ontario rate: 24.9% (Source: BORN Jan-June 2016)
- Chemically equivalent to endogenous oxytocin (OT), but acts very differently than natural oxytocin: Source: (2)
  - Minimal passage through the “blood-brain barrier”
  - Not pulsatile
  - Higher levels may decrease receptors



# How Do Interventions Interrupt Birth Hormones: *Induction*

- ***Impact:***

- Contractions longer, stronger, and closer together
- Hyper-stimulation in early labour
- Reduces fetal blood/oxygen
- Requires continuous FHR monitoring
- Analgesia likely needed

# How Do Interventions Interrupt Birth Hormones: *Induction*

## ***Adverse effects:***

- Reduces number of uterine oxytocin receptors, increases PPH
- Cascade of interventions

# How Do Interventions Interrupt Birth Hormones: *Induction*

## ***Impact on Breastfeeding:***

- “The more oxytocin infusion the mothers received during labor, the lower their endogenous oxytocin levels were during breastfeeding during the second day postpartum” (Source: (8))
- ↓ breastfeeding in first 4 hours (Source: (4))
- ↓ newborn suckling scores (Source: (5))
- 1.4 x more likely to formula feed (Source: (6))
- 2.3 x more likely to stop breastfeeding at 3 months (Source: (6))

## ***Impact on Maternal Mental Health:***

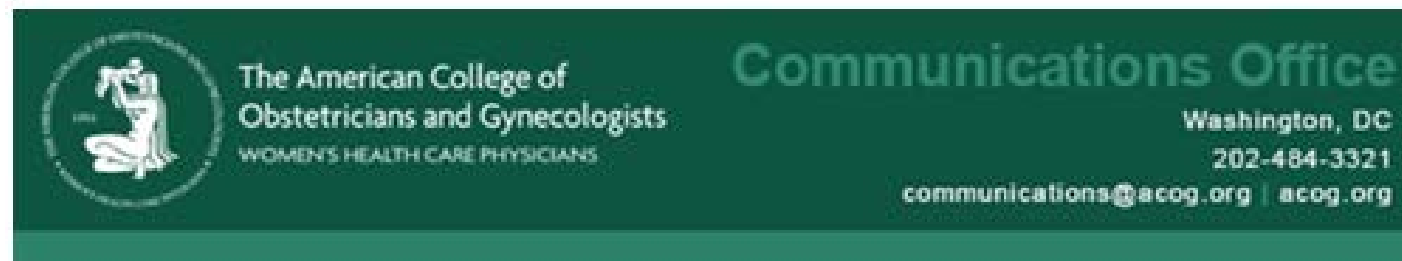
- ↑ maternal depression, anxiety at 2 months (Source: (7))



# How Do Interventions Interrupt Birth Hormones: *Induction*

## ***Impact on Newborn:*** (Source: (9))

- Linked to a higher likelihood of unexpected admission to the neonatal intensive care unit (NICU) for over 24 hours
- A significant risk factor for Apgar scores of less than 7 at five minutes.



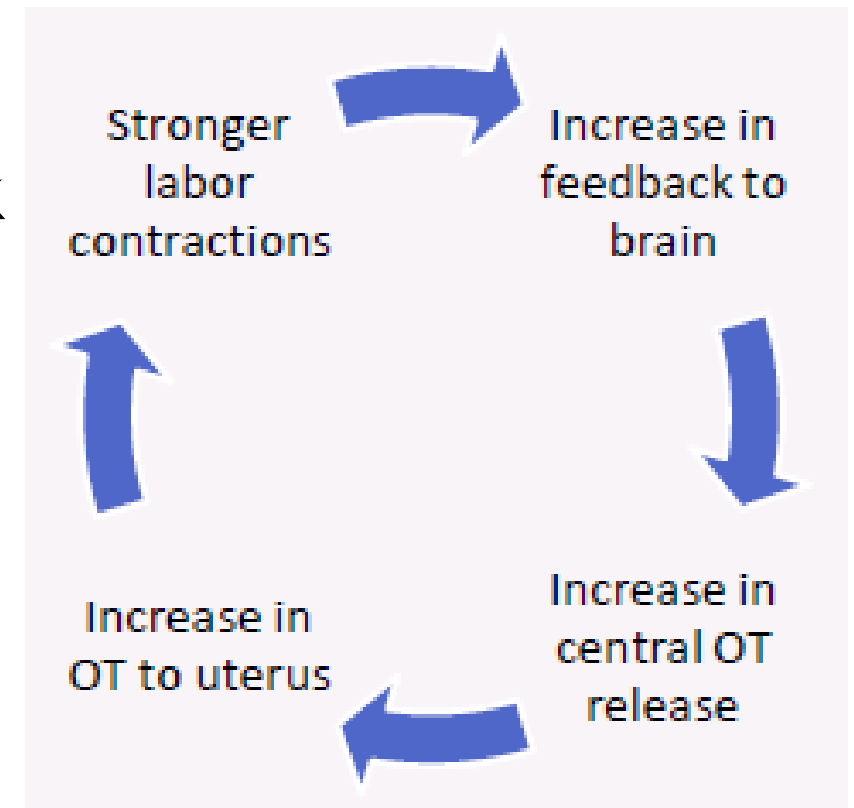
## **Study Finds Adverse Effects of Pitocin in Newborns**

May 7, 2013

# How Do Interventions Interrupt Birth Hormones

## 2. Epidural

- Ontario rate: 58.3% (Source: BORN Jan-June 2016)
- Loss of sensation will reduce feedback in brain, reduce OT release into the body
- Totally abolishes pain sensation
  - Dramatic drop in beta-endorphin (BE) during labour and postnatally as low as 20% of normal levels (Source: Browning 1983)
- Prolactin ↓ at 2h and 24h after birth (Source: (10))



# How Do Interventions Interrupt Birth Hormones: *Epidural*

## ***Effect on Labour:***

- Creates an oxytocin gap: (Source: (11))
  - Prolongs labour, especially 2<sup>nd</sup> stage
  - Increases use of synthetic oxytocin
  - Increases instrumental birth

## ***Effect on Newborn:***

- Bupivacaine half-life 8.1 hours neonate vs 2.7 hours adult (Source: (2))
  - Less alert and less oriented (Source: (12))
  - Control of state problems for 6 weeks (Source: (12))

# How Do Interventions Interrupt Birth Hormones: *Epidural*

## ***Effects on Breastfeeding:***

- Fewer exposed babies suckled the breast within the first 4 hours of life (Source: (4))
- Exposed babies were more often given artificial milk in hospital stay (Source: (4))
- Fewer exposed babies were fully breastfed at discharge (Source: (4))
- Women who had received epidural analgesia with synthetic oxytocin in labour had the lowest endogenous oxytocin levels while breastfeeding day 2 (Source: 13))

# Possibility of Newborn Suckling in the 1<sup>st</sup> Hour

- A small study published in 2015 found an association between Pitocin and Fentanyl epidural with delayed suckling



**Use of Pitocin and  
Fentanyl Epidural**



**Chances of suckling during  
the first hour**

# How Do Interventions Interrupt Birth Hormones: *Epidural*

## ***Effects on Attachment:***

- Mothers spent less time with their babies in hospital, in inverse proportion to the total dose of bupivacaine. (Source: (14))
- Mothers described their babies as “less adaptable, more intense and more bothersome” at 1 month (Source: (15))

# How Do Interventions Interrupt Birth Hormones

## 3. Caesarean:

- Ontario rate: 27.7% (Source: BORN Jan-June 2016)
- *Effects on Mother:* lower or absent hormonal peaks (Source: (2))

# How Do Interventions Interrupt Birth Hormones: *Caesarean*

***Effects on Baby:*** lack of hormonal protection and preparation

- Prelabour caesarean section (PLCS), (elective) vs. in-labour caesarean - no fetal Catecholamine (CA) Surge that occurs at the end of labour
  - 2 x increased mild breathing difficulties (Source: (17))
  - 2-3 x increased ventilation for severe breathing difficulties (Source: (17))
  - 3.5 x increased admission to advanced care (Source: (18))
  - 2.5 – 3 x increased neonatal mortality for PLCS (Source: (19))



# How Do Interventions Interrupt Birth Hormones: *Caesarean*

## ***Effects on Baby:*** (Source: (19))

- NICU for more than 7 days:
  - In-labour CS – 1.9x
  - Prelabour CS – 2.2x
- Neonatal mortality up to hospital discharge:
  - In-labour CS – 1.4x
  - Prelabour CS – 1.8x

Journal

**The Journal of Maternal-Fetal & Neonatal Medicine** >

Volume 29, 2016 - Issue 15

97 | 0 | 1  
Views | CrossRef citations | Altmetric

Original Article

# Does performing cesarean section after onset of labor has positive effect on neonatal respiratory disorders?

Mehmet B. Senturk ✉, Yusuf Cakmak, Mustafa Gündoğdu, Mesut Polat & Halit Atac

Pages 2456-2459 | Received 24 Jul 2015, Accepted 24 Aug 2015, Published online: 18 Sep 2015

*Conclusion:* The onset of labor and related labor pain provide a positive contribution to a reduction in neonatal respiratory disorders. Therefore, it can be considered reasonable to perform a cesarean section after the onset of labor or related pain.

# How Do Interventions Interrupt Birth Hormones: *Caesarean*

## ***Effects on Breastfeeding:***

- Observational studies show lower breastfeeding rates after caesarean, likely due to:
  - Drugs, drowsiness for mother and baby
  - Delay in maternal-infant reunion after surgery
  - Delayed breastmilk production, transfer

# How Do Interventions Interrupt Birth Hormones: *Caesarean*

## ***Effects on Breastfeeding:***

- Lack of prelabour physiologic preparations
- Hormonal disruption
  - Fewer OT pulses
  - No prolactin during breastfeeding day 2 after PLCS (Source: (21))

# How Do Interventions Interrupt Birth Hormones: *Caesarean*

## ***Effects on Maternal Mental Health:***

- Depressed mood up to 8 months (Source: (22))
- Depressed self-esteem (Source: (23))

## ***Effects on Attachment:***

- May have less activation of maternal brain arousal and reward centres in response to own baby's cry at 2-4w postpartum because of lower or absent hormonal peaks (Source: (24))

# Caesarean Long-Term Impacts

- Differences in hormonal physiology at birth (Source: (25))
- Differences in gut flora colonisation (Source: (26))
- Differences in DNA methylation (epigenetic effect) (Source: (27))
- May be associated with future risks for CS offspring (Source: (28)):
  - Asthma
  - Type 1 diabetes
  - Obesity
  - Autoimmune

# Hormonal Help If Birth Interventions Are Needed

- Environment
  - Creating a warm, safe, undisturbed atmosphere: Dim lighting, private, calm & quiet
- Support
  - Continuous labour support
- Early and frequent: Skin to skin
  - Supports oxytocin, BEs gap
- Breastfeeding
  - Supports oxytocin, BEs, prolactin gap

# Long-term Impacts of Intervention

- Long-term lifelong health impacts have not been well researched
  - According to one systematic review, only 16% of high-quality RCTs followed the children after discharge from hospital to evaluate the effect of a perinatal intervention. Only 5 studies to age 5 or over. (Source: (29))



# Long-term Impacts of Intervention

- Possible pathways for long-term health impacts:
  - Effects on breastfeeding and attachment
  - Developmental origins of health and disease
  - Epigenetics, hormonal imprinting
  - Life course health development
  - Precautionary principle

# Optimising Birth Outcomes

- Consider our evolutionary heritage:
  - Breastfeeding and attachment as critical outcomes
  - Optimizing physiology to support these
- Limit the use of interventions that interfere with hormonal physiology and/or where long-term impact is unknown
- Offer low-technology models of care to low-risk mothers and babies
  - Midwifery care
  - Doula care

# What Affects Intervention Use?

- Provider Effect
- Hospital Effect



# Provider Effect - Models of Care

- **Pathologic or Medical Model:**
  - Paternalistic (historically, but still seen)
  - View birth as risky
- **Physiologic or Midwifery-led Model:**
  - Partners in care
  - View birth as normal physiological process

# Provider Effect – Models of Care



Trusted evidence.  
Informed decisions.  
Better health.



Our evidence

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News and events

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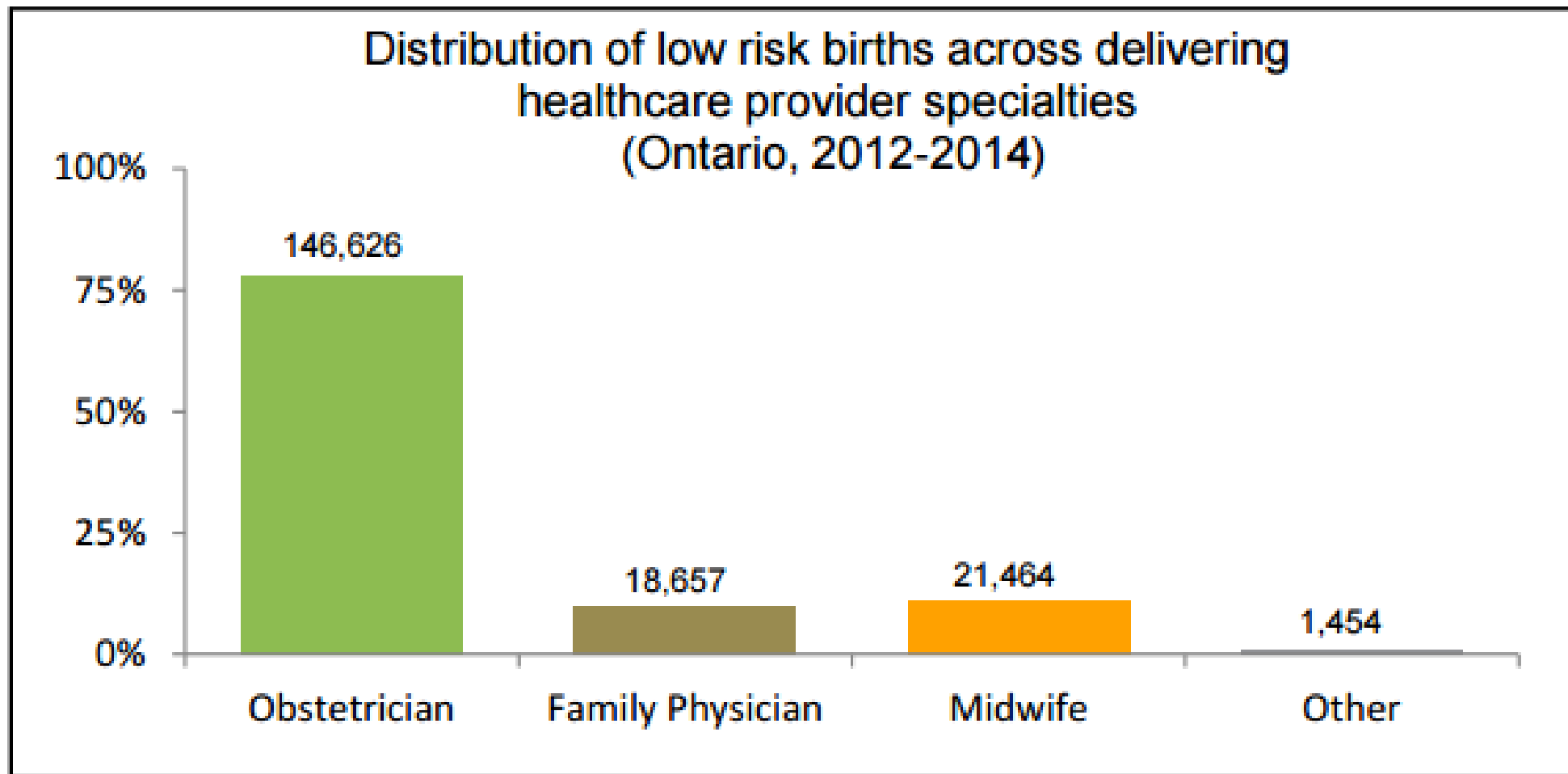


Midwife-led continuity models of care compared with other models of care for women during pregnancy, birth and early parenting

## Authors' conclusions:

This review suggests that women who received midwife-led continuity models of care were less likely to experience intervention and more likely to be satisfied with their care with at least comparable adverse outcomes for women or their infants than women who received other models of care.

# Provider Effect - Ontario Context



# Provider Effect - Nurses

## Variation in Cesarean Birth Rates by Labor and Delivery Nurses

[Joyce K. Edmonds](#)  , [Michele O'Hara](#), [Sean P. Clarke](#), [Neel Shah](#)

### Conclusion

The labor and delivery nurse assigned to a woman may influence the likelihood of cesarean birth. Nurse-level cesarean birth data could be used to design practice improvement initiatives to improve nurse performance. More precise measurement of the relative influence of nurses on mode of birth is needed.

## TWO BIRTH EXPERIENCES IN ONTARIO

### Wide variation

exists in the use of interventions during labour and birth across Ontario hospitals.

Some variation is due to the level of care needed to support safe birth when complications arise. However, for healthy pregnant women with no labour complications, birth experiences should be similar.

**KATIE** and **JULIA** are both expecting their first child, have similar healthy, low-risk pregnancies and give birth in a hospital with over 500 births/year (n=57 in Ontario).

**How different are their births?**

### INDUCTION

Medication and other techniques are sometimes used to initiate contractions when labour doesn't start on its own. In low-risk pregnancies, induction should only be used when the pregnancy continues beyond 41 weeks of gestation.

**Lower rate is better**

### CESAREAN BIRTH (C/S)

A cesarean section is a surgery in which a baby is delivered through an incision in the mother's abdomen. When not medically necessary, cesarean delivery should be avoided to reduce post-surgical complications and reduce the likelihood of needing a cesarean delivery in a future pregnancy.

**Lower rate is better**

### EXCLUSIVE BREASTFEEDING (EB)

Breast milk is the best food for babies. It helps with brain development and helps protect infants from infectious illness. Hospitals should support and encourage new mothers to initiate exclusive breastfeeding so that it is well-established by the time mothers and babies are discharged from the hospital.

**Higher rate is better**



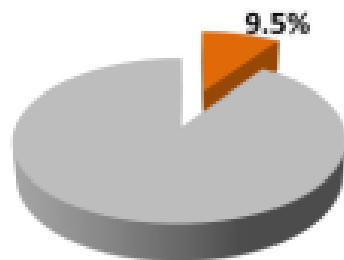
# Hospital Effect - Two Birth Experiences in Ontario

## KATIE: Hospital A

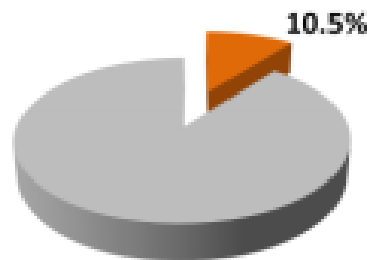


*Top 10% range in performance*

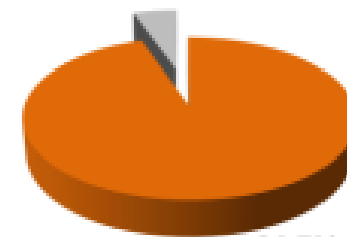
**KATIE** gives birth at the *highest-performing* hospital. The likelihood that she will have these experiences is:



**Induction:** (9.5% to 17.8%)



**C/S:** (10.5% to 14.9%)



**EB:** (86.1% to 94.7%)

# Hospital Effect - Two Birth Experiences in Ontario

## JULIA: Hospital B



*Bottom 10% range in performance*

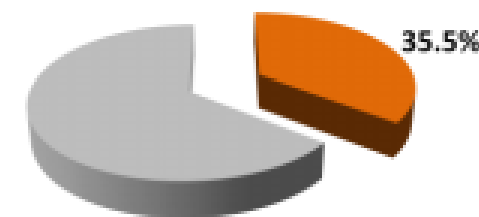
**JULIA** gives birth at the *lowest-performing* hospital. The likelihood that she will have these experiences is:



**Induction:** (31.9% to 42.4%)



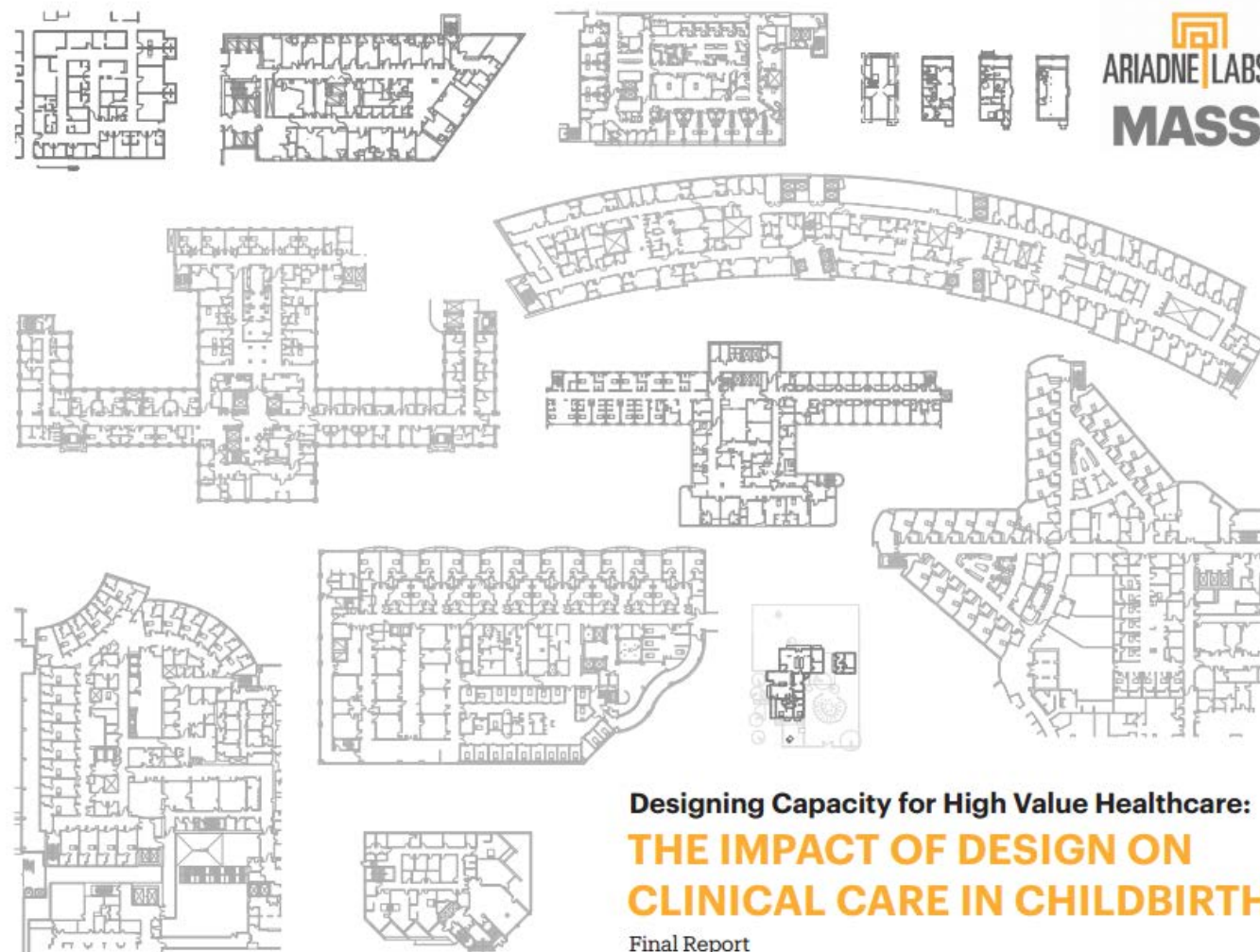
**C/S** (24.0% to 33.0%)



**EB:** (35.5% to 48.3%)

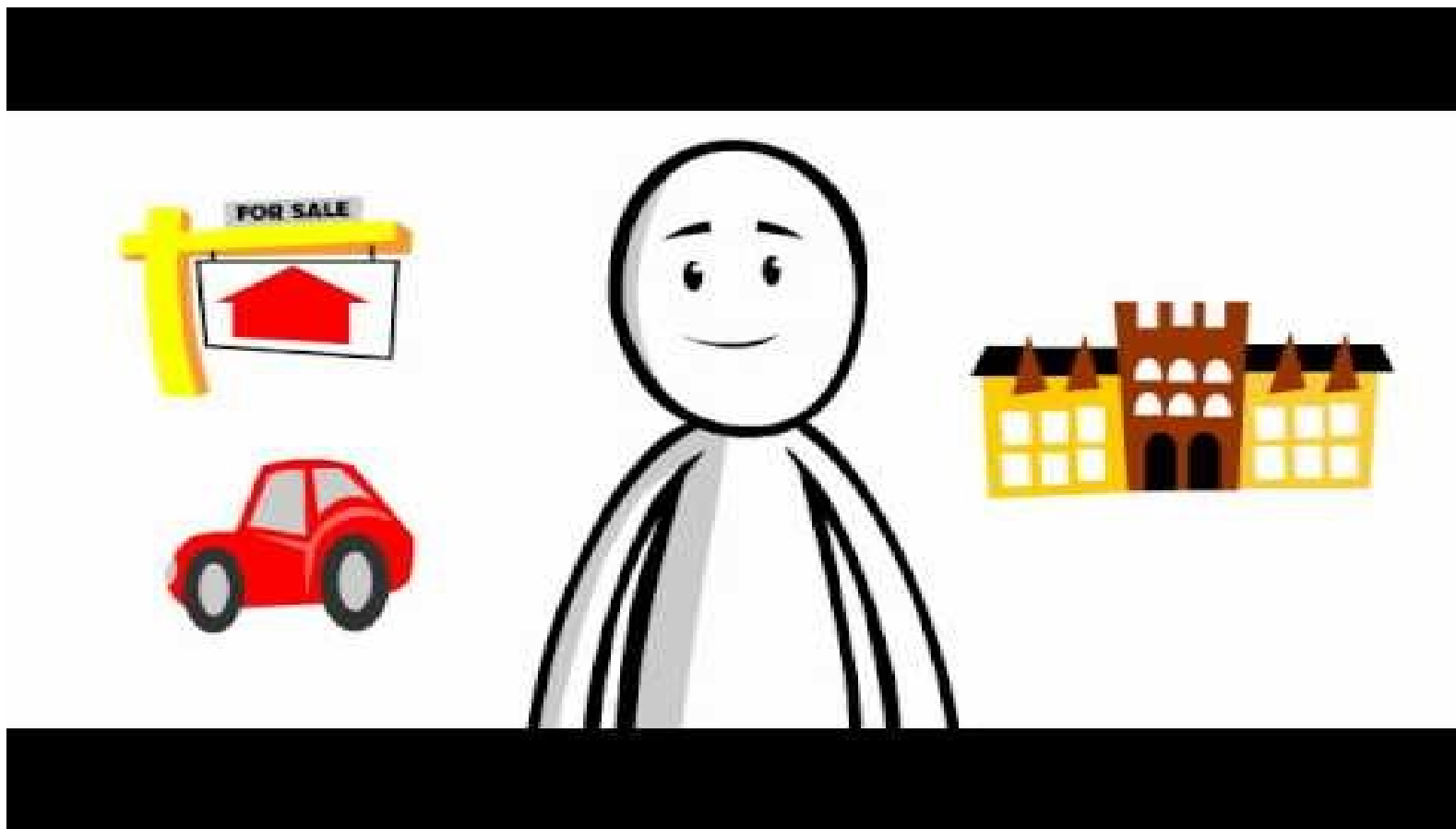
# Hospital Effect – Design & Policies

- Dr. Neel Shah et al.
- Hospital policies may also restrict best practices from being used (eg. eating during labour)



# Informed Decision-Making

- What is it?



- Video: <https://www.youtube.com/watch?v=XPm5iEDEI8Y>

# Components of Informed Decision-Making

Three components necessary to make an informed decision:

- An expert on the evidence (i.e., a HCP) and;
- An expert on which features are the most important (i.e., the patient) and;
- A way to share their views with each other

# Is This Practiced?

- “What may be labeled or intended to be “shared” decision-making is often one-way communication—the caregiver expresses a concern, makes a recommendation, and the laboring person agrees.”  
-Penny Simkin

# Why is Informed Decision-Making Important?

- Client values & preferences considered
- Decreased intervention use overall
- Increased sense of client self-efficacy
- Increased client satisfaction regardless of how labour unfolds

# Tools for Informed Decision-Making

## ▪ BRAIN

- Benefits
- Risks
- Alternatives
- Intuition
- No/Not now

## ▪ Decision Aids

- Unbiased information based on high quality research evidence.
- Non-directive - do not steer the user towards any one option, ensure informed and consistent with personal values.
- Engage increased participation in their care, increased knowledge, and more likely to have realistic expectations and choose an option with features that they value most.



# Who is Responsible for Making Health Decisions?

- “Risks versus benefits of all obstetric interventions need to be considered for each individual woman and her unique situation. The woman herself is best placed to decide, given all the time and information that she requires.”
  - Dr. Sarah Buckley

# Family-Centred Maternity and Newborn Care: National Guidelines

- Chapter 1: Principles of family-centred maternity and newborn care include:
  - Pregnancy and birth are normal, healthy processes
  - Early parent–infant attachment is critical for newborn and child development and the growth of healthy families
  - Family-centred maternal and newborn care is informed by research evidence
  - Family-centred maternal and newborn care requires a holistic approach
  - Women and their families require knowledge about their care
  - Women and their families play an integral role in decision making

<https://www.canada.ca/en/public-health/services/maternity-newborn-care-guidelines.html>

# Table Discussion – 1-2-4-All

How will you incorporate this information into your practice?

- Individual reflection -1 min.
- Paired discussion - 2 min.
- Table group discussion - 4 min. (Choose one idea to share)
- All – Share one idea/table with everyone - 5 min.

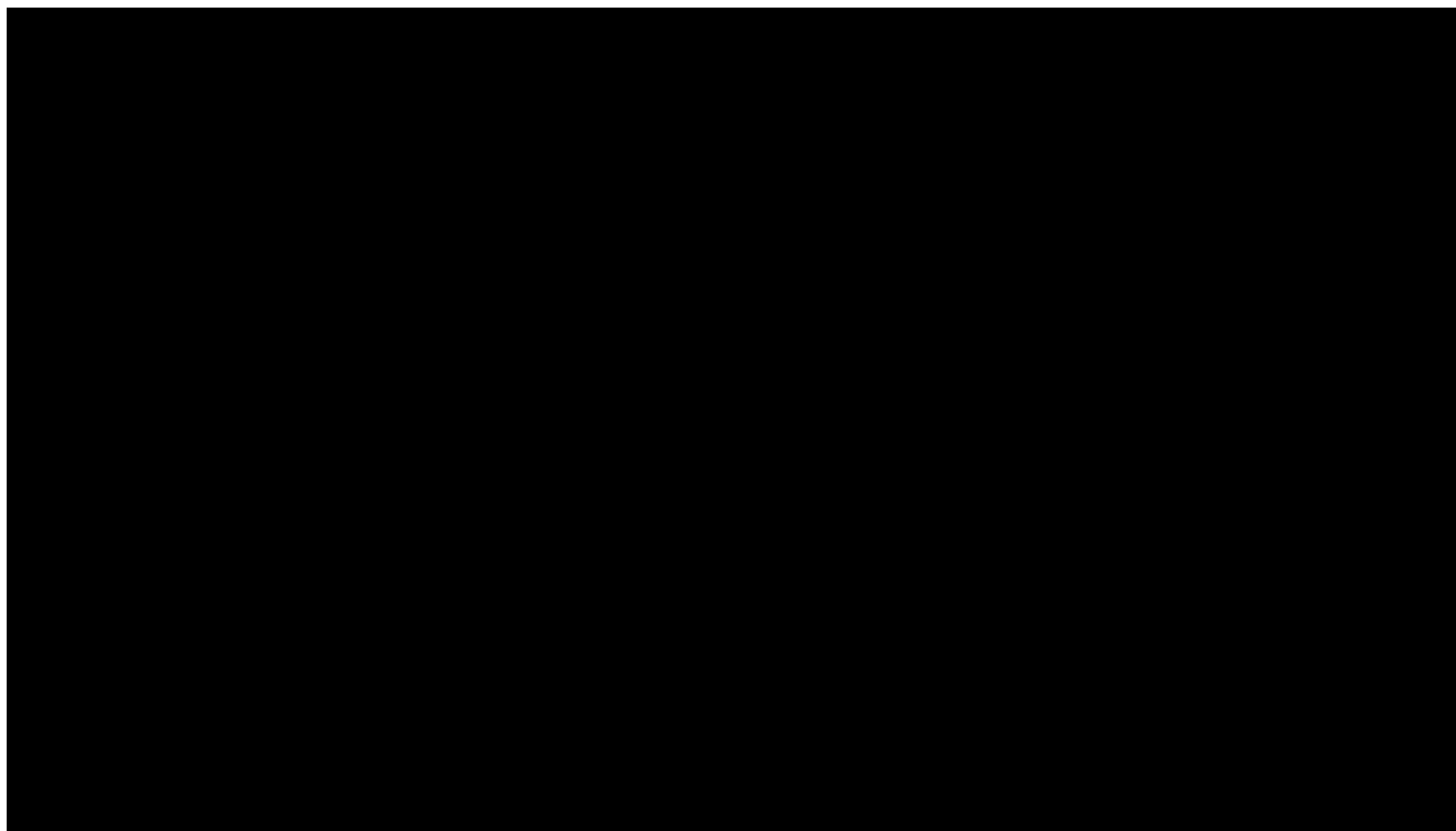
# Opportunities for Public Health

- Advocate for every woman's right to self-determination in labour and birth
- Educate and support skill building for pregnant women and families
- Influence adoption of best practices among all health care providers
- Advocate for system change in maternity care that will affect the health of the next generation and those that follow

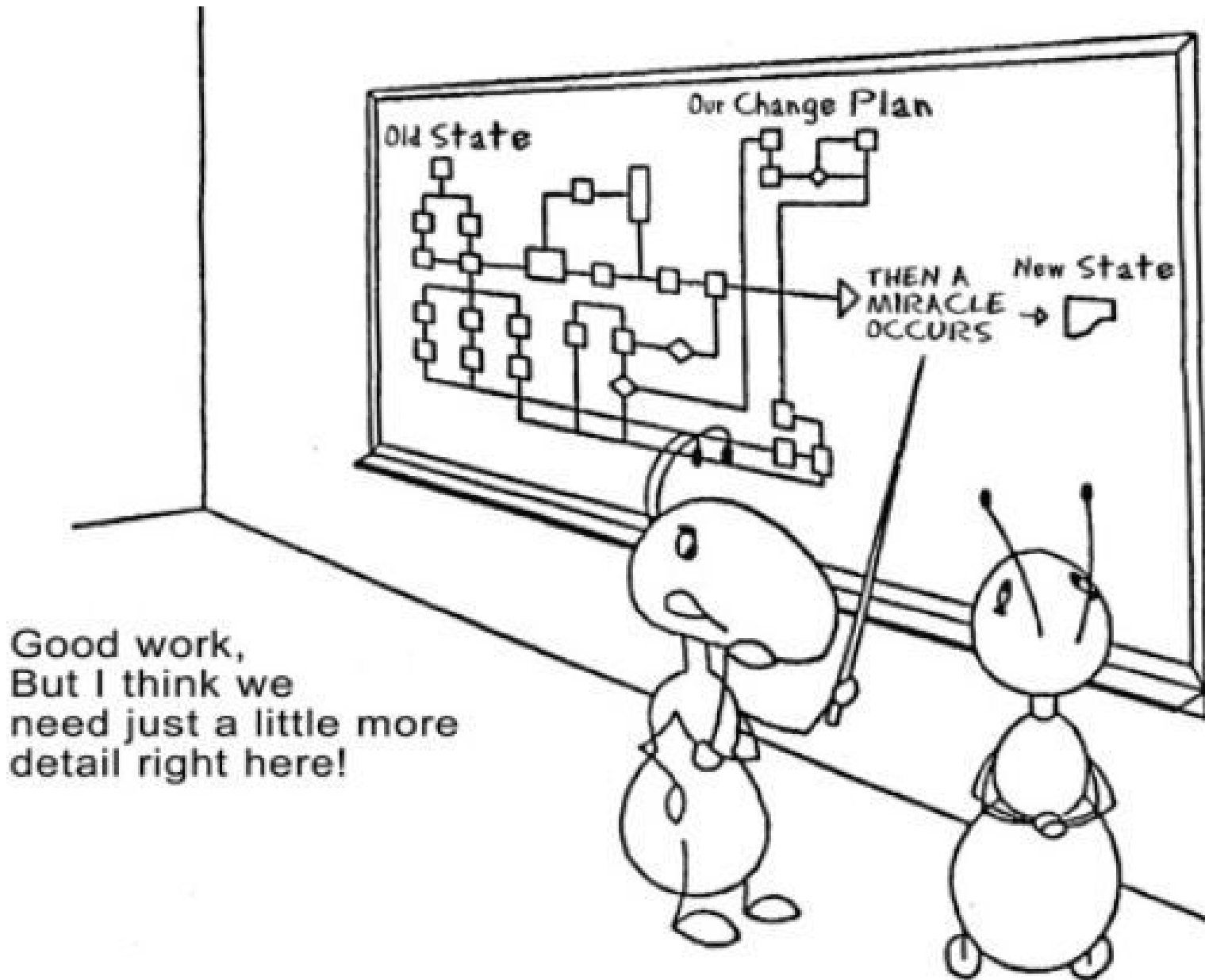
<http://www.opho.on.ca/Events-News-and-Media/News/Informed-Decision-Making-for-Labour-and-Birth.aspx>

# Should human rights in childbirth be discussed in high-income countries?

- Final thought from Dr. Neel Shah:



- Video: <https://www.youtube.com/watch?v=PXQ3oCPALZU&feature=youtu.be>



# Questions?

# Slide Deck Sources:

1. <https://www.theguardian.com/commentisfree/2013/oct/16/good-birth-experience-baby-alive-mumsnet>
2. <http://opha.on.ca/getmedia/9ea9c93c-ed52-4af3-8bce-40216d86149c/OPHA-Buckley-Birth-Wellbeing-Handout.pdf.aspx?ext=.pdf>
3. <https://transitiontoparenthood.wordpress.com/2016/02/13/labor-hormones-in-under-10-minutes/>
4. <https://www.ncbi.nlm.nih.gov/pubmed/17980469>
5. <https://www.ncbi.nlm.nih.gov/pubmed/22452314>
6. <https://www.ncbi.nlm.nih.gov/pubmed/24289796>
7. <https://www.ncbi.nlm.nih.gov/pubmed/26554749>
8. <https://www.ncbi.nlm.nih.gov/pubmed/19210132>
9. <https://www.acog.org/About-ACOG/News-Room/News-Releases/2013/Study-Finds-Adverse-Effects-of-Pitocin-in-Newborns> (link now broken). More info here: <http://www.medicaldaily.com/pitocin-may-have-adverse-effects-newborn-babies-245641>
10. <https://www.ncbi.nlm.nih.gov/pubmed/19080512>
11. <https://www.ncbi.nlm.nih.gov/pubmed/22161362>
12. [https://archive.org/stream/cumulativeeffect00sepk/cumulativeeffect00sepk\\_djvu.txt](https://archive.org/stream/cumulativeeffect00sepk/cumulativeeffect00sepk_djvu.txt)



# Slide Deck Sources:

13. <https://www.ncbi.nlm.nih.gov/pubmed/19210132>
14. <https://www.ncbi.nlm.nih.gov/pubmed/1451936>
15. <https://www.ncbi.nlm.nih.gov/pubmed/7238154>
16. <http://pubmedcentralcanada.ca/pmcc/articles/PMC5057303/>
17. <https://www.ncbi.nlm.nih.gov/pubmed/20156904>
18. <https://www.ncbi.nlm.nih.gov/pubmed/15902129>
19. <http://www.bmj.com/content/335/7628/1025>
20. <http://www.tandfonline.com/doi/abs/10.3109/14767058.2015.1087499?journalCode=ijmf20>
21. <https://www.ncbi.nlm.nih.gov/pubmed/8842644>
22. <https://www.ncbi.nlm.nih.gov/pubmed/11702839>
23. <http://journals.sagepub.com/doi/abs/10.3109/00048679709062687>
24. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2695737/>

# Slide Deck Sources:

25. <https://www.ncbi.nlm.nih.gov/pubmed/21815988>
26. <https://www.ncbi.nlm.nih.gov/pubmed/27475754>
27. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4690495/pdf/ddv456.pdf>
28. <https://www.ncbi.nlm.nih.gov/pubmed/21815988>
29. <http://onlinelibrary.wiley.com/doi/10.1111/j.1471-0528.2012.03465.x/full>
30. [http://www.cochrane.org/CD004667/PREG\\_midwife-led-continuity-models-care-compared-other-models-care-women-during-pregnancy-birth-and-early](http://www.cochrane.org/CD004667/PREG_midwife-led-continuity-models-care-compared-other-models-care-women-during-pregnancy-birth-and-early)
31. [http://en.beststart.org/sites/en.beststart.org/files/u4/K4\\_PCMCH\\_Best\\_Start\\_Conference\\_Presentation9Feb2016.pdf](http://en.beststart.org/sites/en.beststart.org/files/u4/K4_PCMCH_Best_Start_Conference_Presentation9Feb2016.pdf)
32. [http://www.jognn.org/article/S0884-2175\(17\)30259-9/abstract](http://www.jognn.org/article/S0884-2175(17)30259-9/abstract)
33. <https://www.bornontario.ca/assets/documents/Fact%20Sheets/TWO%20BIRTH%20EXPERIENCES%20IN%20ONTARIO.pdf>
34. [https://massdesigngroup.org/sites/default/files/file/2017/170223\\_Ariadne%20Report\\_Final.pdf](https://massdesigngroup.org/sites/default/files/file/2017/170223_Ariadne%20Report_Final.pdf)
35. <http://onlinelibrary.wiley.com/doi/10.1111/birt.12306/full?platform=hootsuite>
36. <https://www.canada.ca/en/public-health/services/maternity-newborn-care-guidelines.html>

# Additional Resources

- OPHA position paper – Informed Decision-Making for Labour & Birth: <http://www.opha.on.ca/Events-News-and-Media/News/Informed-Decision-Making-for-Labour-and-Birth.aspx>
- Childbirth Connection Hormonal Physiology of Childbearing Report: <http://transform.childbirthconnection.org/reports/physiology/>
- Hormonal Physiology of Childbearing, an Essential Framework for Maternal–Newborn Nursing: <http://www.sciencedirect.com/science/article/pii/S0884217515000520>
- OPHA Webinar - Impact of Labour and Birth on Lifelong Health and Wellbeing with Dr. Sarah Buckley Recording and Presentation Slides: <http://opha.on.ca/Events/OPHA-Webinar-Impact-of-Labour-and-Birth-on-Long-te.aspx>
- Childbirth Connection: <http://www.childbirthconnection.org/giving-birth/>
- Lamaze Healthy Birth Practices: <http://www.lamaze.org/healthybirthpractices>
- Evidence Based Birth Videos 1, 2, & 3: <http://evidencebasedbirth.com/wp-content/uploads/2016/video-1.html>
- Evidence Based Birth: <https://evidencebasedbirth.com/article-topics/>
- Evidence Based Birth Natural Labour Induction Series: <https://evidencebasedbirth.com/natural-labor-induction-series/>
- CBC article: ['Stop! Stop!': Canadian women share stories of alleged mistreatment in the delivery room](#)
- International MotherBaby Childbirth Organization: [www.imbco.weebly.com](http://www.imbco.weebly.com)
- CMQCC Toolkit to Support Vaginal Birth: <https://www.cmqcc.org/node/3147>
- Human Rights in Childbirth – Right to Informed Consent: <http://www.humanrightsinchildbirth.org/right-to-informed-consent/>
- White Ribbon Alliance – Respectful Maternity Care: <http://www.whiteribbonalliance.org/resources/>