



# Providing Placental Blood to Babies at Birth: A network Quality Improvement Project

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Kent, Surrey and Sussex Neonatal Operational  
Network 2018

 brighton and sussex  
medical school

**Brighton & Sussex NHS**  
University Hospitals

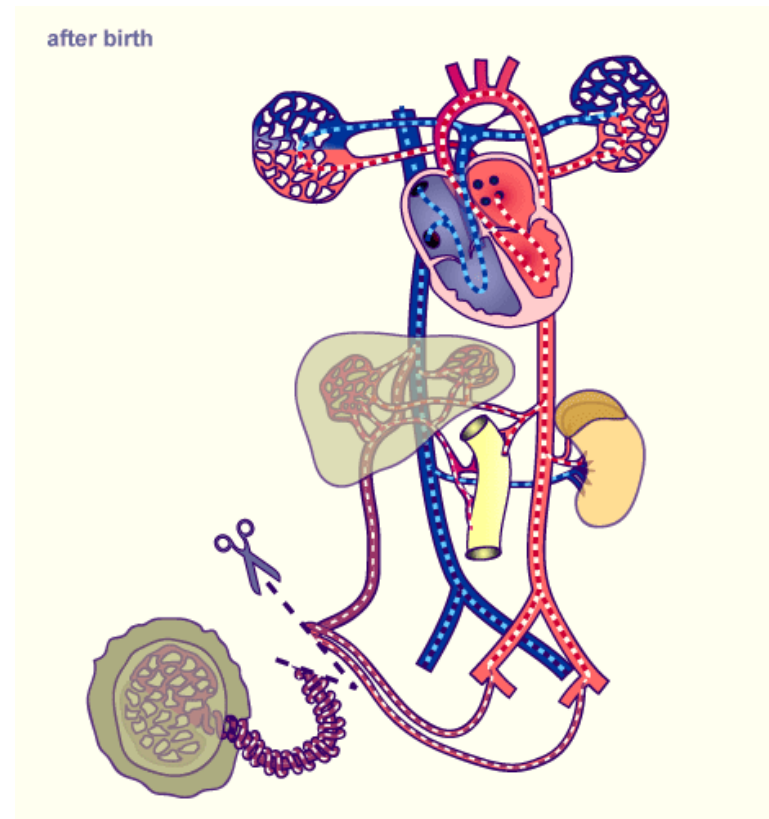
# Resuscitation versus Transfusion?

- Optimal timing for clamping of the umbilical cord at birth is under discussion.
- Early clamping allows for immediate resuscitation of the newborn.
- *Delaying clamping or milking of the cord* facilitates transfusion of blood between the placenta and the baby.



# Postnatal Change of Circulation

- Placental circulation stops
- Fetal shunts should close
- PDA: Change to left-right shunt
- Capillary bed: dilated, resistance decreases



# Blood pressure in the Transition Period

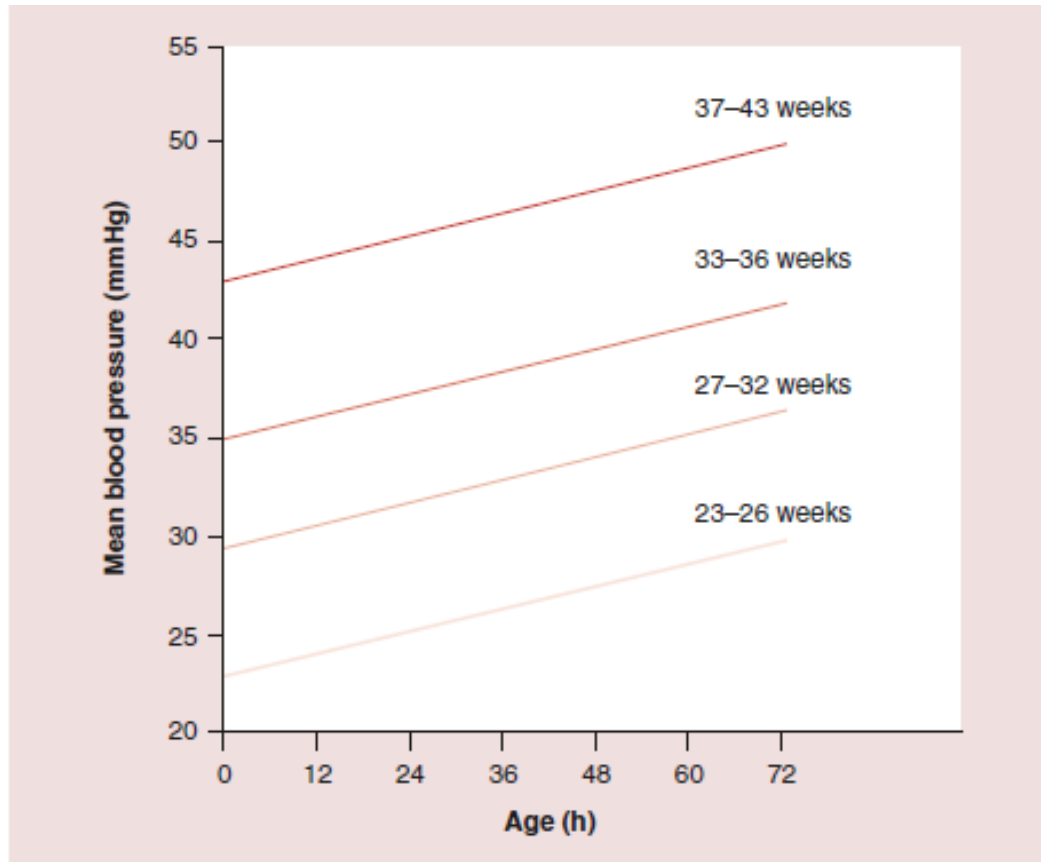
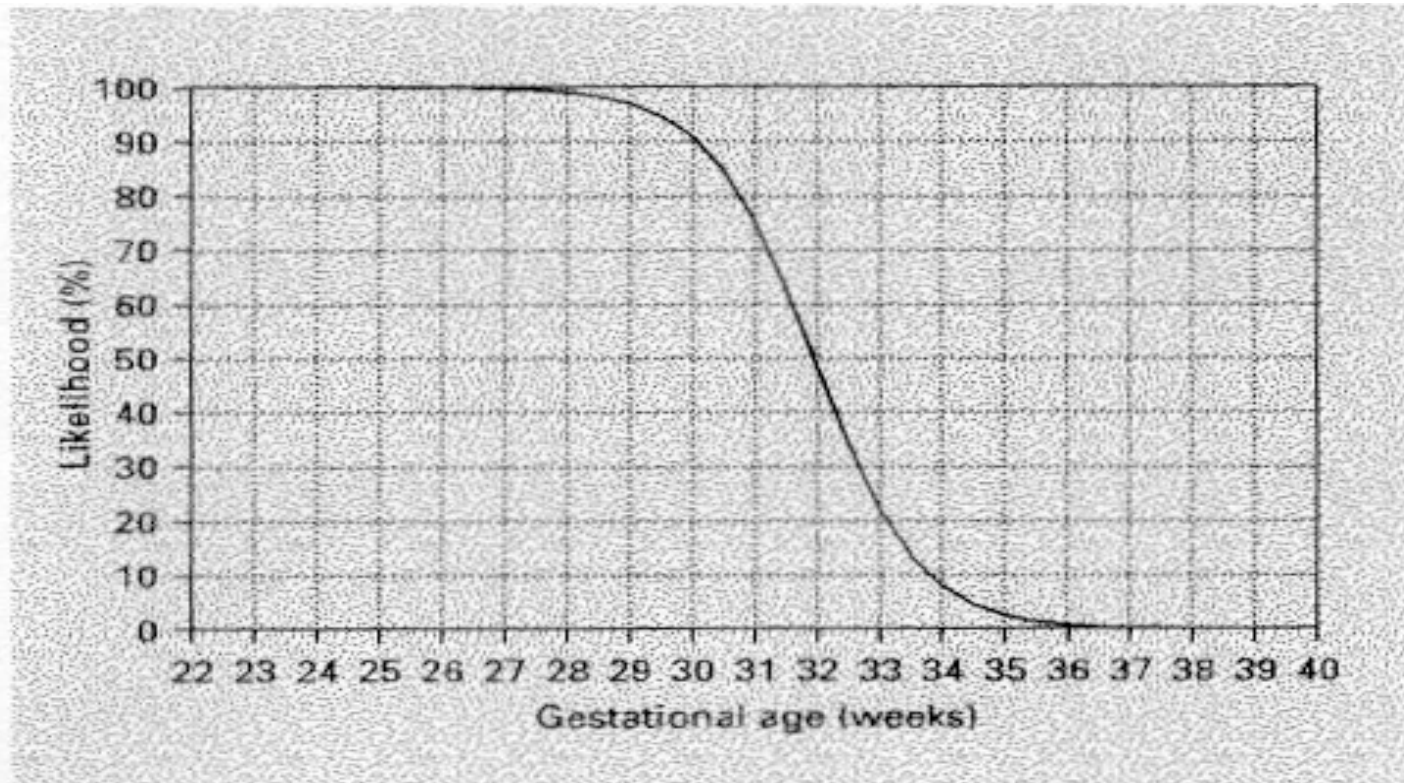


Figure 1. Currently suggested lower and upper limits for normal blood pressure in neonates [2].

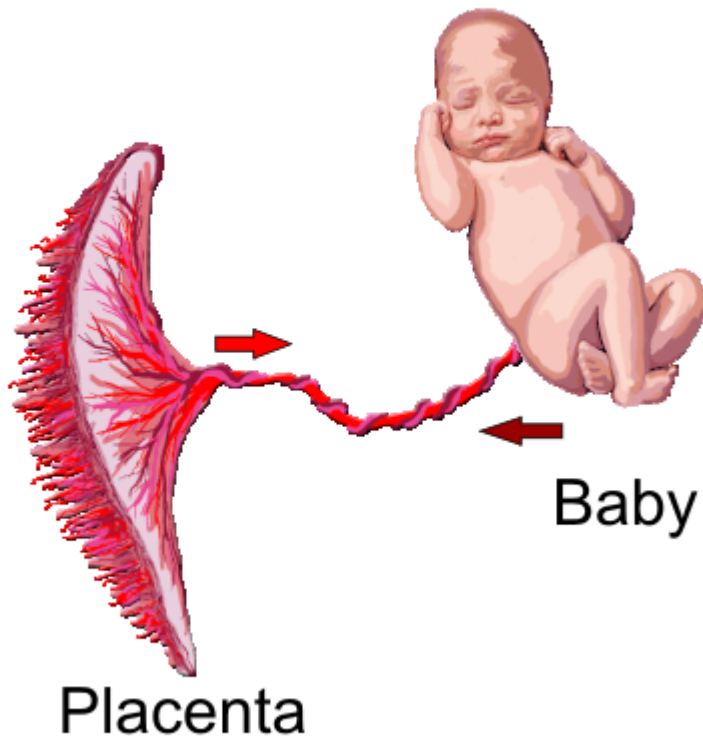
Farrugia Future Cardiol 2013

## Probability of Blood Transfusion in Infants

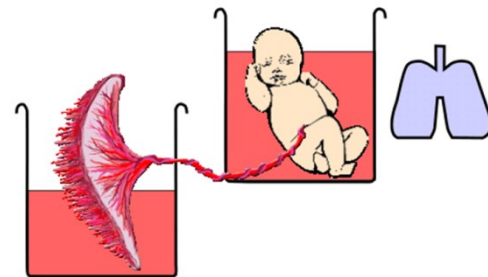


Brune T et al, 2002

# Blood distribution



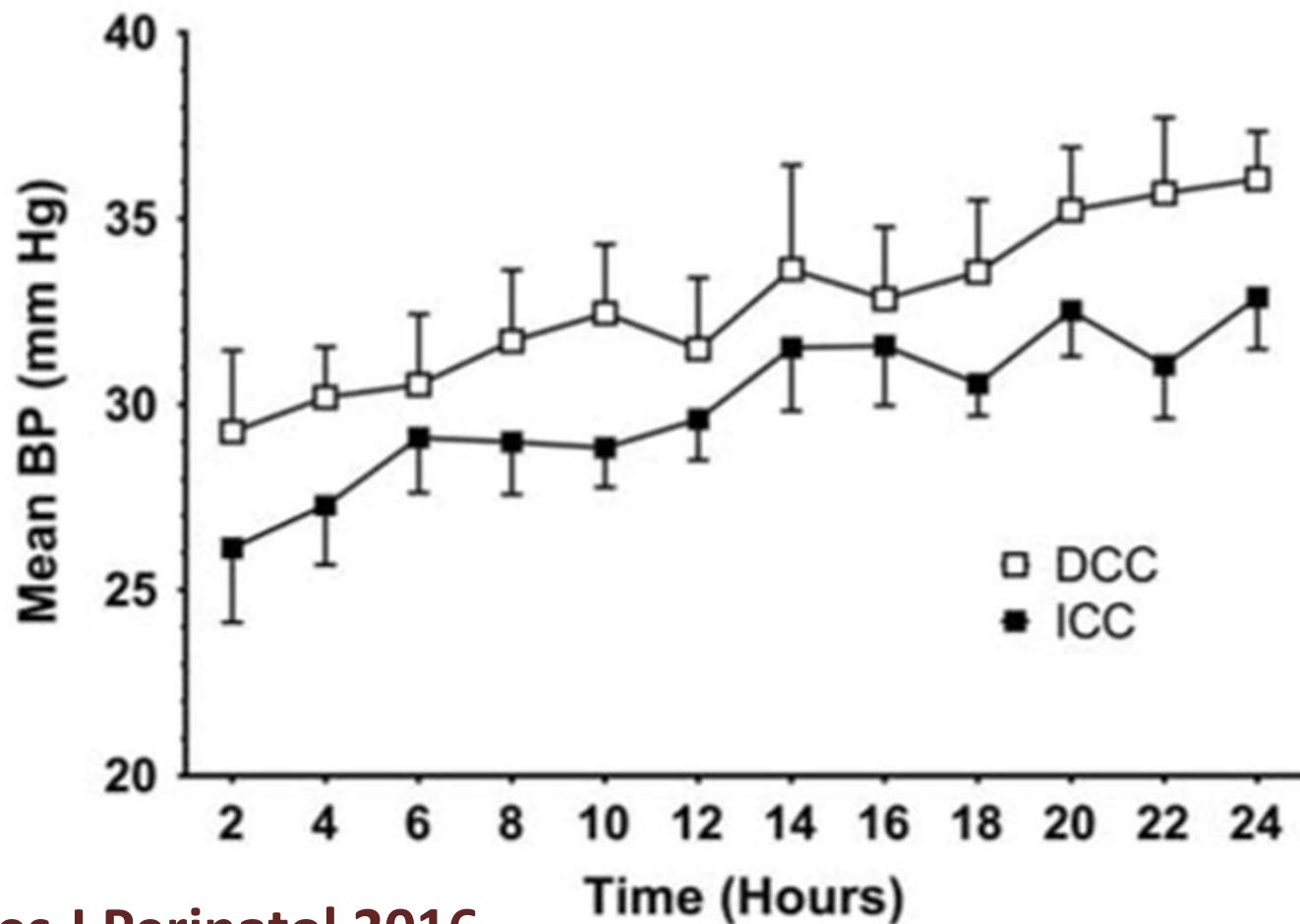
Immediate Cord Clamping



# Enhanced Placental transfusion?



## Improved Circulatory Adaptation: RCT 22-27 GA



Backes J Perinatol 2016

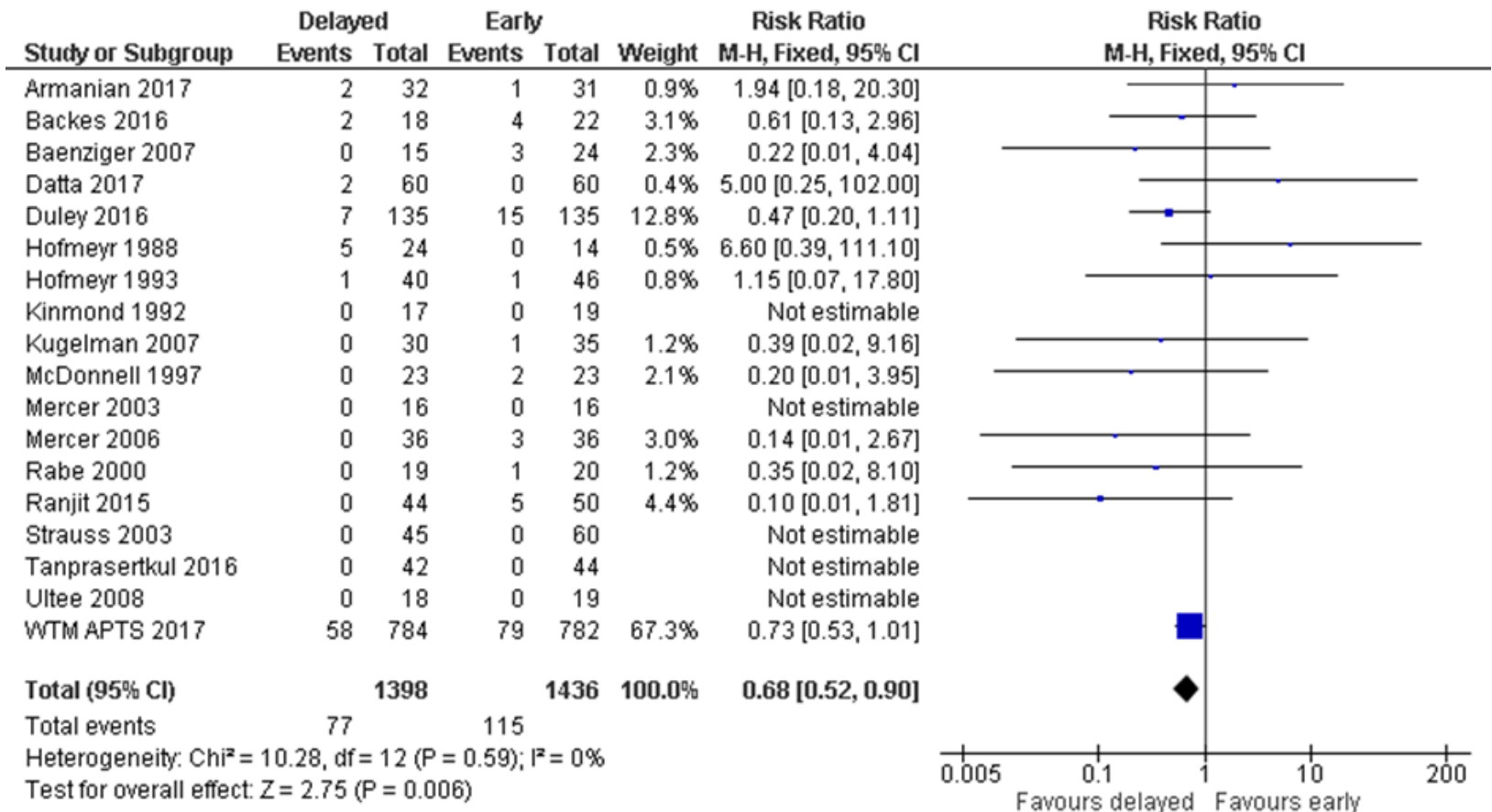


## Reported Benefits from Placental Transfusion Preterm Infants

- *Higher circulating blood volume for 24-48 h*
- *Fewer blood transfusions*
- *Better systemic blood pressure*
- *Reduced need for inotropic support*
- *Increased blood flow in the superior vena cava*
- *Increased left ventricular output*
- *Reduced necrotizing enterocolitis*
- *Higher cerebral oxygenation index*
- *Lower frequency of any intracranial haemorrhage*
- *No adverse effects on neurodevelopmental outcome at 2 years*
- *Reduction in hospital **deaths** by 30%*

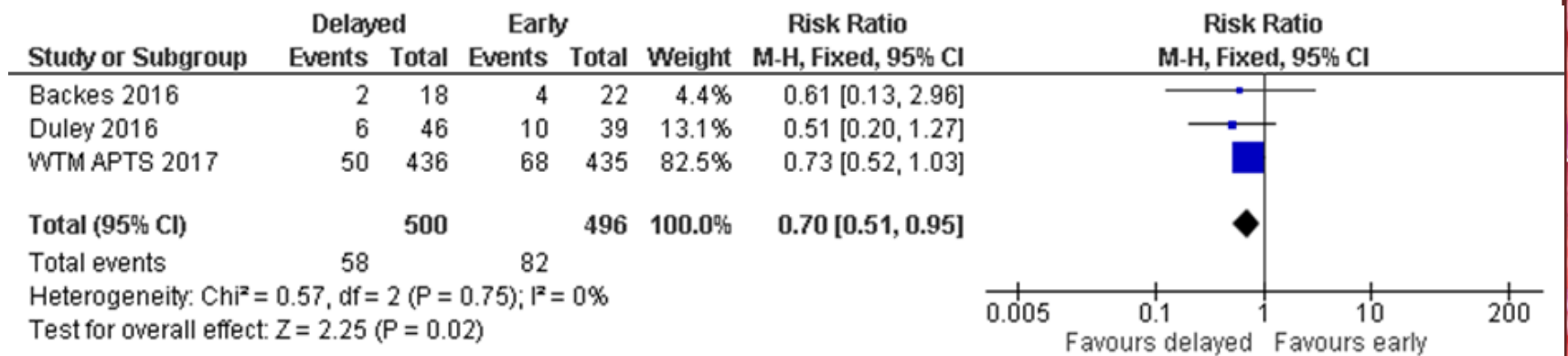
# DCC vs ICC: 18 studies; n=2834 < 37 weeks

## Deaths



Fogarty AJOG 2017

# DCC vs ICC: 3 studies; n=996 ≤ 28 weeks Deaths



Jaundice requiring  
intervention?

Polycythemia requiring  
intervention?

**Risks?**

Delay in commencing  
Resuscitation?

Poorer temperature control

Jaundice requiring  
intervention?

Polycythemia requiring  
intervention?



Delay in commencing  
Resuscitation?

Poorer temperature control

Jaundice requiring intervention?

Polycythemia requiring intervention?



Warm Room

Hat

Plastic Bags

Warm Towels

Delay in commencing Resuscitation?

Poorer temperature control

Jaundice requiring intervention?

Polycythemia requiring intervention?

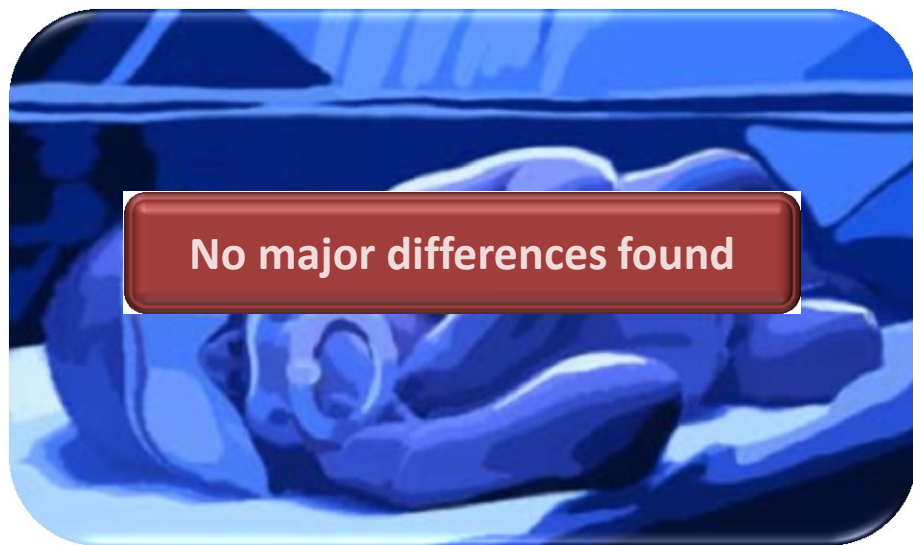


Delay in commencing Resuscitation?

Poorer temperature control

Jaundice requiring  
intervention?

Polycythemia requiring  
intervention?



**No major differences found**

Delay in commencing  
Resuscitation?

Poorer temperature control



# Benefits of Delayed Cord Clamping for Term Babies

McDonnell Cochrane Review 2013

## Body Weight

↑ Heavier 60-100 g

## Skin

↑ Cutaneous perfusion

↑ Peripheral temperature

## Cardiovascular

↑ BP

↓ Vascular resistance

↑ Cardiovascular stabilization

↑ RBC flow to brain (18%)

↑ RBC flow to gut (15-20%)

## Respiratory

↑ Pulmonary vasodilatation

↑ RVO, pulmonary BV

## Renal

↑ Renal blood flow

↑ Urine output

↓ Sodium excretion

## Hematologic

↑ RCV, Hct, Hb

↓ Hypovolemia

## Iron Stores

↑ Ferritin (4-6 months)

↑ Total Body Iron (6-12 months)

## Brain

↑ Better Neurodevelopment Outcome at 4 years of age

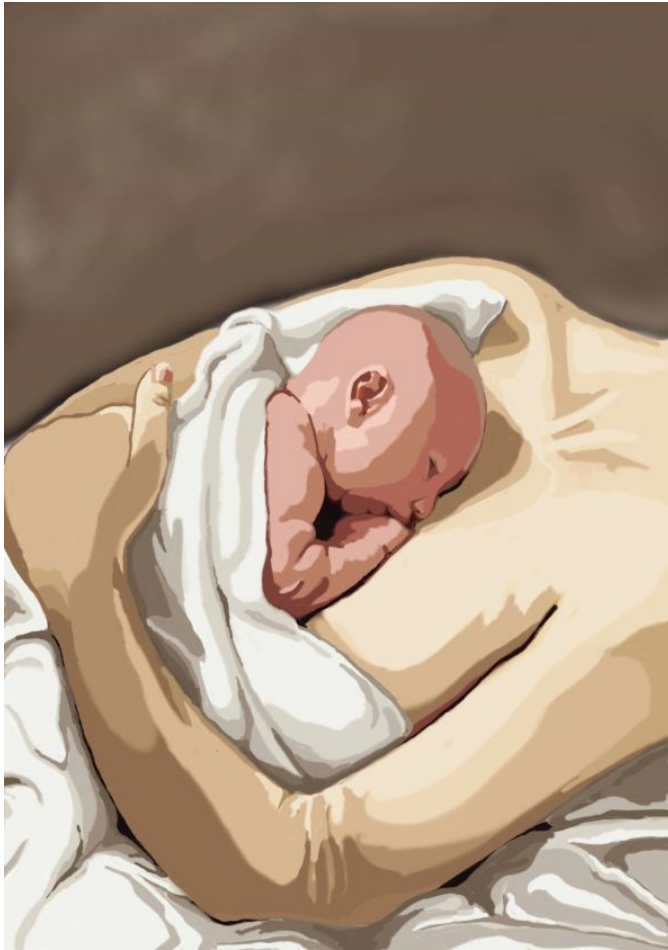
# WHO Pathway after the Birth



Drying

Assess Baby

# WHO Pathway after the Birth



Drying

Assess Baby

Skin to Skin

Oxytocin



# WHO Pathway after the Birth



Drying

Assess Baby

Skin to Skin

Oxytocin

Cut Cord



# WHO Pathway after the Birth



Drying

Assess Baby

Skin to Skin

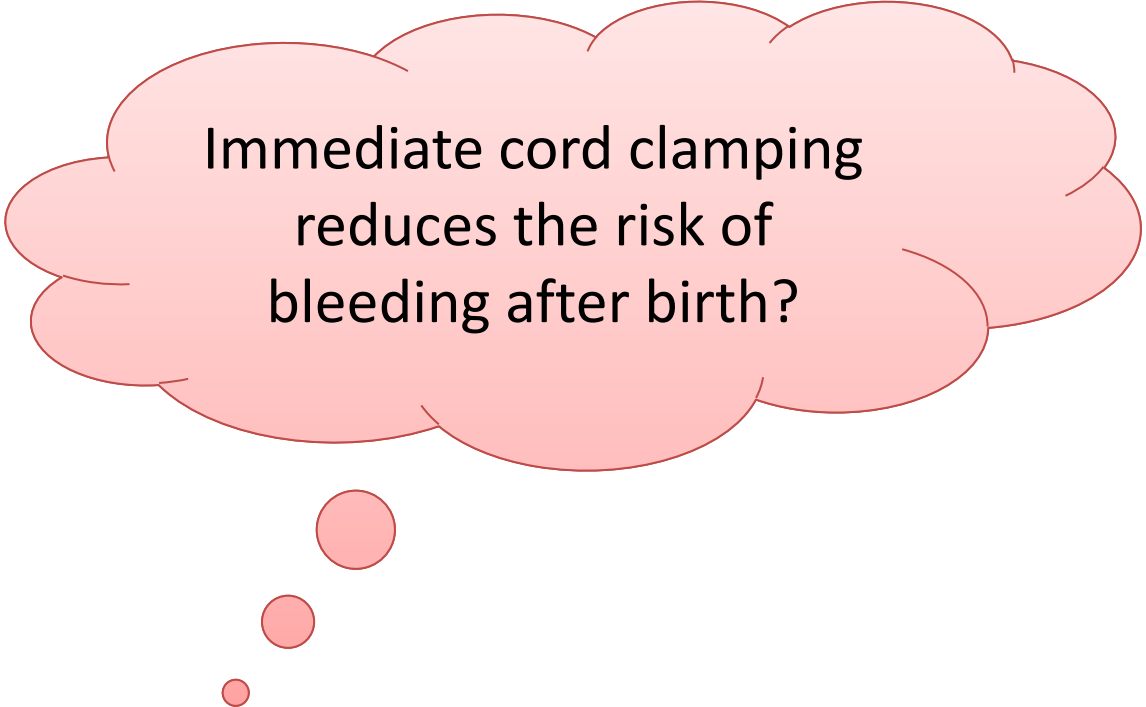
Oxytocin

Cut Cord

Breastfeed



**WHO 2016**



Immediate cord clamping  
reduces the risk of  
bleeding after birth?

**So why do we clamp the  
cord immediately?**

**WHO 2016: *Immediate cord clamping  
is contra-indicated***

Immediate cord clamping  
reduces ~~the~~ risk of  
bleeding after birth?

**So why do we clamp the  
cord immediately?**

# Milking of the Cord

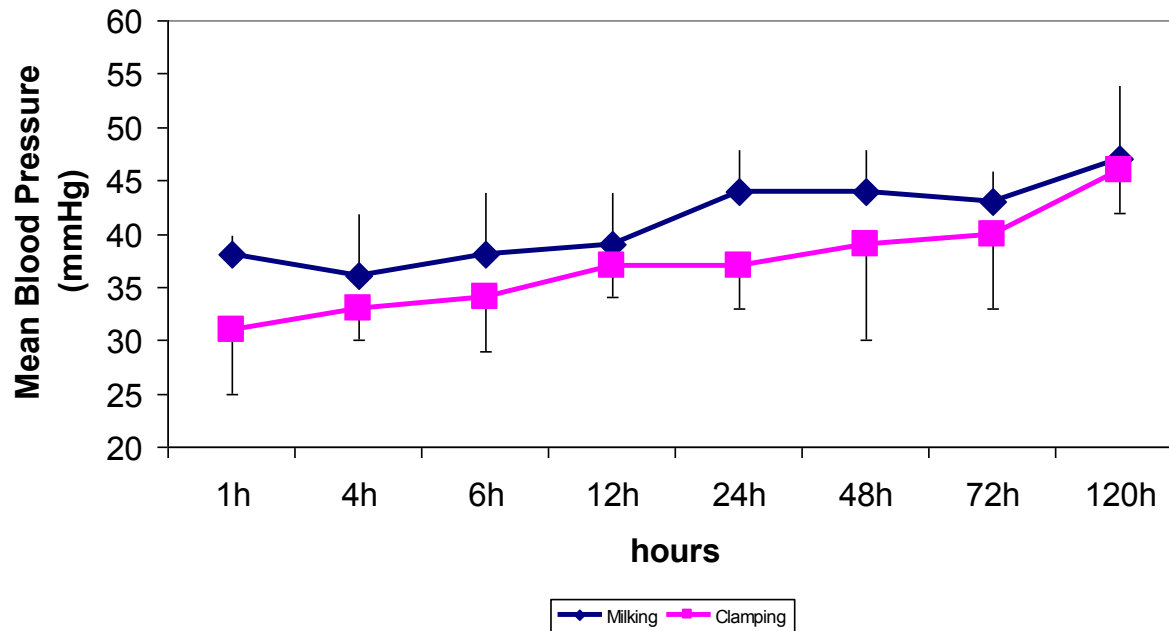
- Baby at/or below placental level
- Gentle milking of the cord towards baby
- Studies with 2-4 times done
- **Keep cord intact**





# BSUH RCT: 4x Milking vs 30 sec Delay: Blood Pressure in Postnatal Adaptation

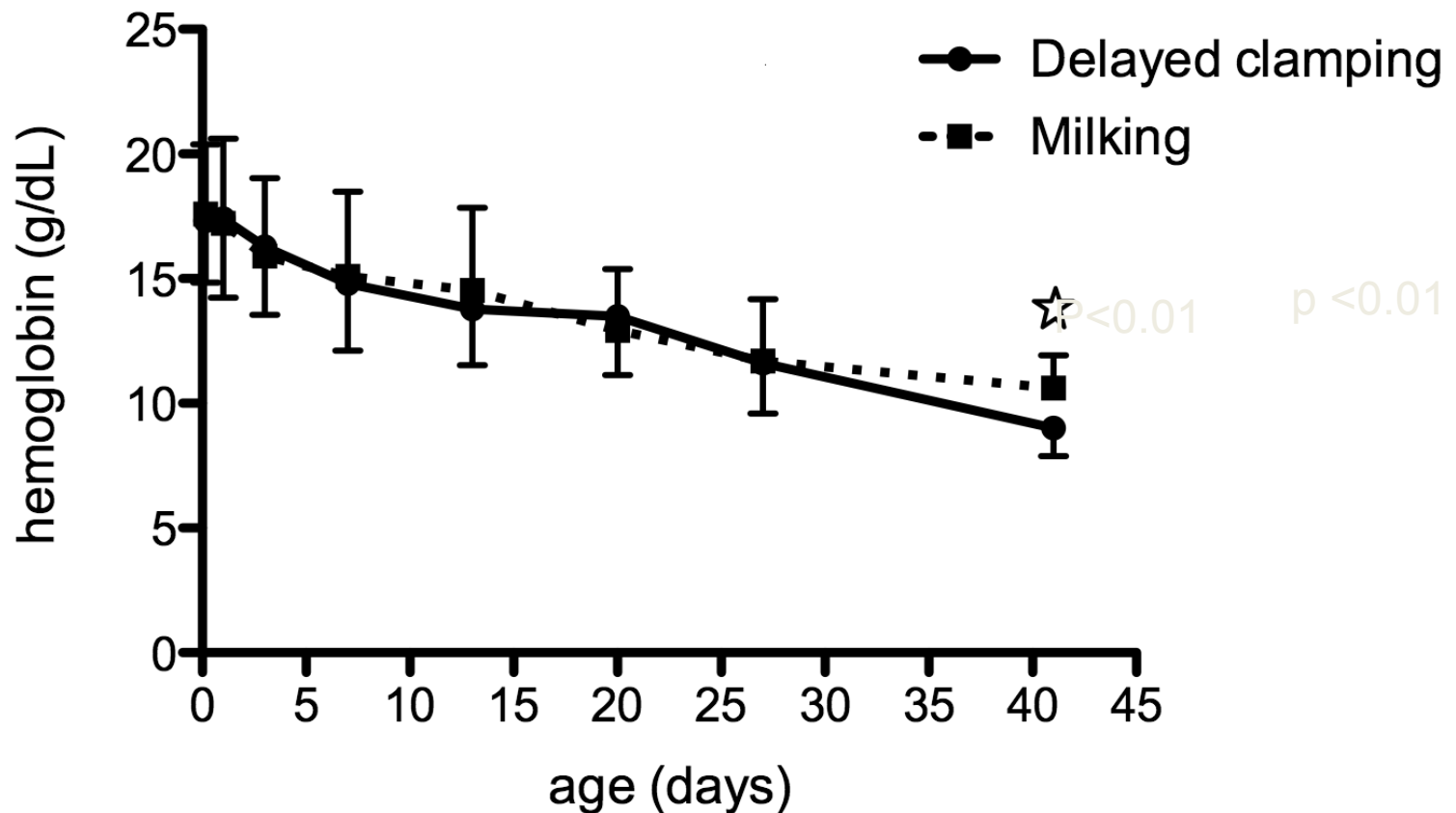
Blood pressure in first 120 h of life



Rabe et al Obstet Gynecol 2011; 117:205-211

# RCT: 4x Milking vs 30 s Delay: Haemoglobin

Blood hemoglobin levels during the first 6 weeks of life



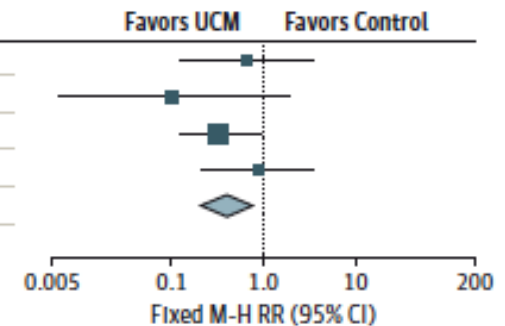
# Meta-Analysis: Cord Milking (Al-Wassia JAMAPediatrics 2015)

## O2 at 36 w

Source	UCM group		Control group		Weight, %	Fixed M-H RR (95% CI)
	No. of Events	Total	No. of Events	Total		
Alan et al, <sup>16</sup> 2014	2	19	3	19	12.9	0.67 (0.13-3.55)
Hosono et al, <sup>11</sup> 2008	0	18	4	17	19.8	0.11 (0.01-1.82)
Katheria et al, <sup>15</sup> 2014	4	30	12	30	51.4	0.33 (0.12-0.92)
Rabe et al, <sup>14</sup> 2011	3	27	4	31	16.0	0.86 (0.21-3.51)
Total	9	94	23	97	100.0	0.42 (0.21-0.83)

Heterogeneity  $\chi^2 = 2.41$  ( $P = .49$ );  $I^2 = 0\%$

Test for overall effect:  $z = 2.50$  ( $P = .01$ )



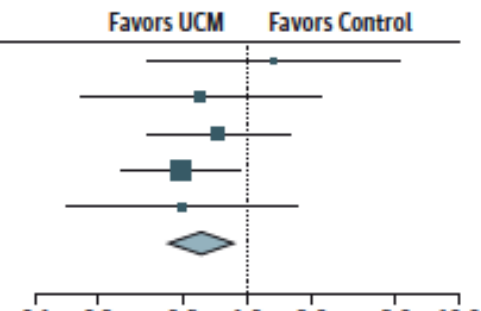
## IVH of all grades<sup>a</sup>

## IVH all grades

Source	UCM Group		Control Group		Weight, %	Fixed M-H RR (95% CI)
	No. of Events	Total	No. of Events	Total		
Alan et al, <sup>16</sup> 2014	4	22	3	22	6.7	1.33 (0.34-5.28)
Hosono et al, <sup>11</sup> 2008	3	20	5	20	11.2	0.60 (0.17-2.18)
Katheria et al, <sup>15</sup> 2014	8	30	11	30	24.6	0.73 (0.34-1.55)
March et al, <sup>12</sup> 2013	9	36	20	39	42.9	0.49 (0.26-0.93)
Rabe et al, <sup>14</sup> 2011	3	27	7	31	14.6	0.49 (0.14-1.72)
Total	27	135	46	142	100.0	0.62 (0.41-0.93)

Heterogeneity  $\chi^2 = 2.03$  ( $P = .73$ );  $I^2 = 0\%$

Test for overall effect:  $z = 2.50$  ( $P = .01$ )



# Cord Milking: Benefits and Risks

- Cord Milking provides placental transfusion:
  - higher initial hemoglobin
  - increased blood pressure
  - improved systemic blood flow
  - Improved urine output
- Cord Milking may be preferential in preterm babies delivered by C/S
- Cord Milking shows same benefits with regard to IVH
- Cord Milking is **not reported to cause strokes or PVL**
- Neurodevelopmental outcome similar

# Implementation Katheria 2016

*Placental blood is available at no cost!*

- T** Tell the team what you plan to do (Time Out)
- R** Request supplies (e.g., two warm sterile towels)
- A** Assign roles (e.g., timekeeper)
- N** Note time of birth
- S** Start timer
- F** Fetal transfusion period (announce time every 15 sec)
- stim **U** Uplift the baby
- S** Stop and clamp the cord
- E** Evaluate baby

# KSS Quality Improvement Project

- Use of DCC or UCM in term and preterm babies
- Retrospective audit and survey about current practice
- Stepwise introduction
- Regular reviews
- Feedback about barriers
- Use of steppcard at deliveries?

*Safety*  
**S.T.E.P.P**  
*card*

**START HERE**

**S**ituation checks

- Nurse in charge aware
- Senior Clinician aware
- Other Emergencies covered
- Team well-being

**T**hink Problems

- Predicted difficulties?
- Help available and how to contact ?

Date: 01/05/2018 Version 3.  
TMBU human factors team

## High Risk Delivery

**E**quipment checks

Monitor

- Saturation probe
- EtCO2
- Stethoscope

Resuscitaire

- Heater
- Neopuff/BVM
- Correct Mask size/type
- Suction device
- Oxygen/Air supply

Airway kit

- ETT (size +/-1)
- Laryngoscope
  - Bulb check
  - Blade size
- Stylet

Resuscitation Trolley

- Locate trolley
- Identify drawers

Brighton and Sussex  
University Hospitals  
NHS trust  
Trevor Mann  
BABY UNIT

**P**repare

Patient

- Gestation/Antenatal specific
- **Cord clamping delay/milking**
- Temperature Control

People (allocate names to roles!)

- Team Leader
- Airway
- Assisting/Monitoring
- Heart rate/Compressions
- Timing or Scribing

Plan & ongoing care

- Verbalise Plan A
- What is Plan B and C?
- Team agree to proceed?

**P**roceed

Please Safety Pause  
& update parents afterwards

# Suggested KSS Pathway

## GIVE A PLACENTAL TRANSFUSION TO ALL NEWBORN BABIES\*

### **CORD MILKING**

(SLOWLY "STRIP" THE  
INTACT CORD X 4  
TOWARDS BABY)

- BABY < 32 WEEKS
- BABY REQUIRING  
ADDITIONAL  
STABILISATION /

### **DELAYED CORD CLAMPING**

DO NOT CLAMP THE CORD  
FOR 1 MINUTE

- BABY ≥ 32 WEEKS
- ABLE TO STABILISE /  
RESUSCITATE WITH  
INTACT CORD

**DOCUMENT: TIME OF DELIVERY AND  
CORD MILKED (number of strips) or TIME CORD CLAMPED**

### **PLACENTAL TRANSFUSION:**

- DOES NOT DELAY "RESUSCITATION" – IT IS PART OF IT
- STABILISES THE VASCULAR CIRCULATION
- GIVES IRON, RED CELLS, STEM CELLS & OTHER FACTORS
- REDUCES MORTALITY AND MORBIDITY IN PRETERM BABY

\* RECIPIENT TWIN FROM TTTS SHOULD NOT RECEIVE A PLACENTAL TRANSFUSION

# Thank You

To all the Parents, Babies and Staff involved in this  
Quality Improvement Project



- [www.cordclamping.org/EXPLAIN](http://www.cordclamping.org/EXPLAIN)



# Let the Baby breathe Katheria 2016

