

XII
INTERNATIONAL CONFERENCE ON KMC
 Workshop and Congress
 November 14-17, 2018 / Bogotá, Colombia



CONGRESS PROGRAM
 November 16, 2018

Kangaroo Mother Care and Neuroprotection of the premature brain

IMMEDIATE KMC STUDY (iKMC)

KMC as a tool for stabilization of the preterm infant immediately after birth: research protocols of a multi-center and multi-country study.



Dr Nils Bergman
 MB ChB, DCH, MPH, MD
 Cape Town, RSA

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UNDERLYING
 SCIENTIFIC
 RATIONALE

Primary determinant of development = PLACE

ENVIRONMENT → ADAPTATION → EXPERIENCE → REPRODUCTIVE FITNESS



ecology

/ˈkɒlədʒi, ɛˈkɒlədʒi/ n

The branch of biology that deals with the relations of organisms to one another and to their physical surroundings.

(from Greek: οἶκος, "house", or "environment"; -λογία, "study of")

The Neuroscience of Birth & Breastfeeding

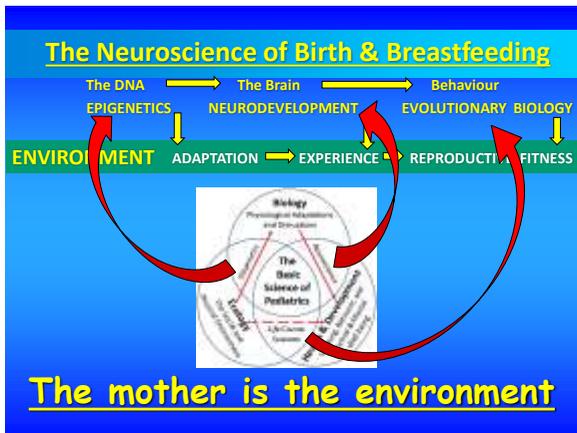


ENVIRONMENT SKIN-TO-SKIN CONTACT



Skin-to-skin contact

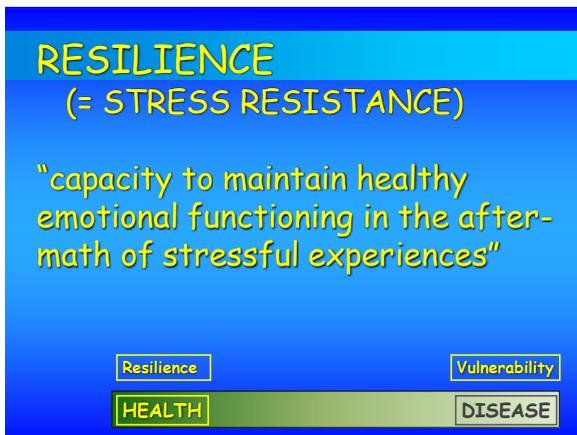
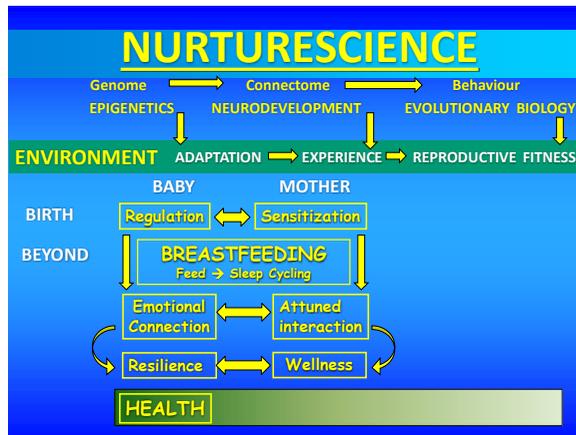
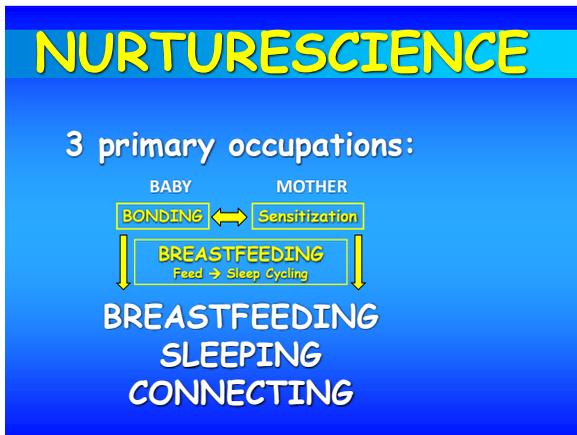
The mother is the environment



The Lifelong Effects of Early Childhood Adversity and Toxic Stress
 Jack P. Shonkoff, Andrew S. Garner, THE COMMITTEE ON PSYCHOSOCIAL ASPECTS OF CHILD AND FAMILY HEALTH, COMMITTEE ON EARLY CHILDHOOD, ADOPTION, AND DEPENDENT CARE, AND SECTION ON DEVELOPMENTAL AND BEHAVIORAL PEDIATRICS, Benjamin S. Siegel, Mary I. Dobbins, Marian F. Earls, Andrew S. Garner, Laura McGuinn, John Pascoe, and David L. Wood
Pediatrics 2012;129:e232; originally published online December 26, 2011; DOI: 10.1542/peds.2011-2663

INTRODUCTION
Of a good beginning cometh a good end
 John Heywood, Proverbs (16:16) Shonkoff 2012

The United States, like all nations of the world, is facing a number of social and economic challenges that must be met to secure a promising future. Central to this task is the need to produce a well-



Stephen Porges -

"NEUROCEPTION"

→ neural process that evaluates risk

safe
dangerous
life threatening



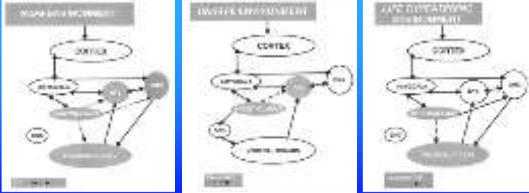
100. A proposed neuroception, autonomic state, evaluation, and action-like signal output via higher brain structures.

101. Neuroception

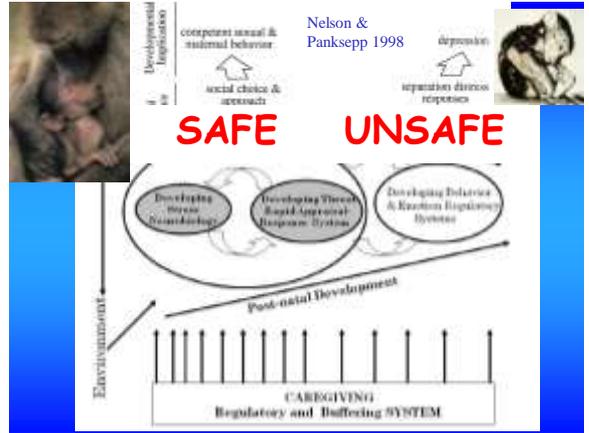
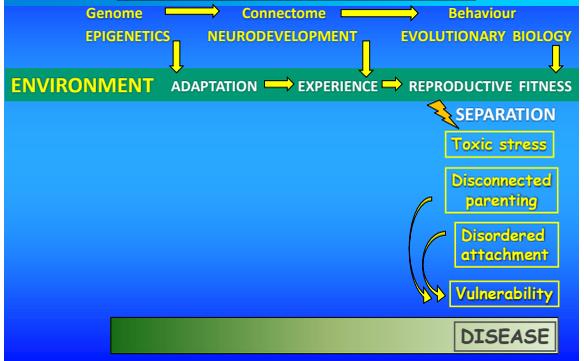
To effectively switch from defensive to social engagement strategies, the autonomic nervous system needs to detect cues in particular processes: (1) Detects risk, and (2) if there is no threat to prevent an attack, to make the most protective bodily reactions that cause fight, flight, or freeze behaviors. The nervous system, through the processing of sensory information from the environment and internally generated evaluations, sense the neural evaluation of risk does not require conscious awareness and may involve subcortical brain structures (e.g., Vervaeke et al., 1998). The term neuroception was introduced to emphasize a neural process, distinct from perception, that is capable of detecting environmental (and internal) features that are either dangerous or life-threatening. In this sense, neuroception...

Porges →
same neural circuitry,
adapted to circumstance

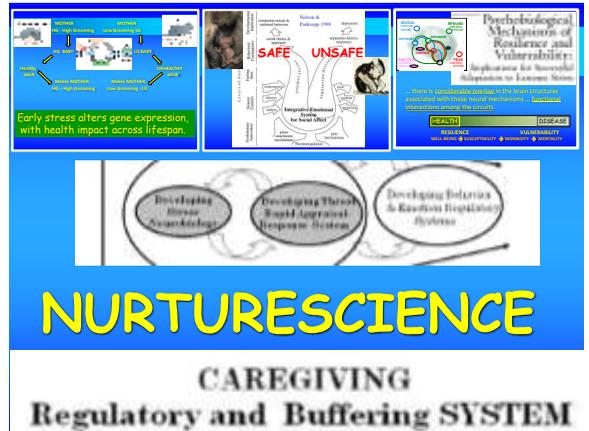
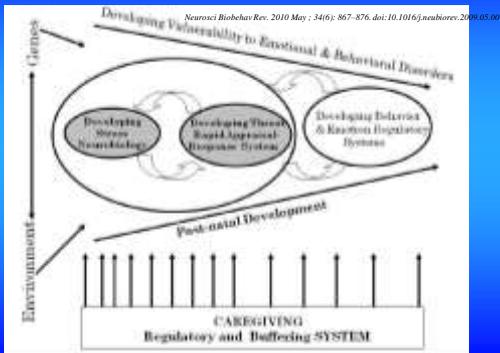
OXYTOCIN VASOPRESSIN CORTISOL



NURTURESCIENCE



Early Experience and the Development of Stress Reactivity and Regulation in Children (Gunnar 2010)

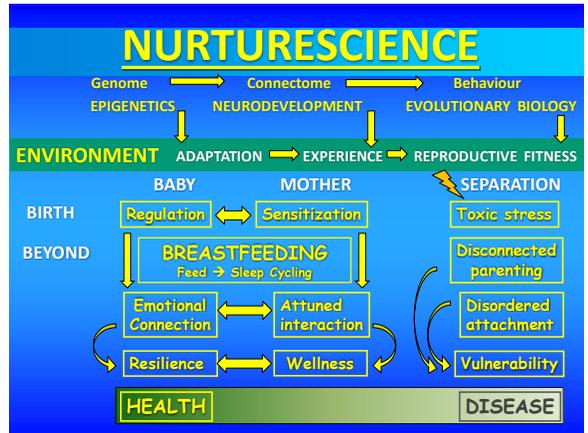


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Kangaroo Mother Care and Neuroprotection of the premature brain

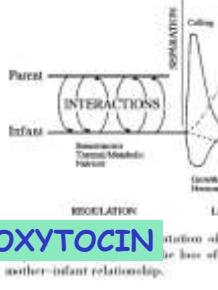
NURTURESCIENCE

CAREGIVING
 Regulatory and Buffering SYSTEM



WHY IS EARLY MATERNAL SEPARATION STRESSFUL?

SEPARATION



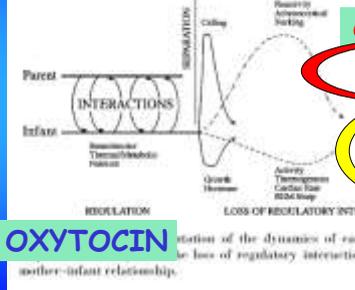
absence

SEPARATION

OXYTOCIN

WHY IS EARLY MATERNAL SEPARATION STRESSFUL?

SEPARATION DYSREGULATES



CORTISOL

absence

SEPARATION

Toxic stress

OXYTOCIN

Toxic Stress

- Strong and prolonged activation of the body's stress management systems, the absence of the buffering protection of adult support.
- Disrupts brain architecture and leads to stress management systems that respond at relatively lower thresholds, thereby increasing the risk of stress-related physical and mental illness.

Slide by: Jack P. Shonkoff, M.D.

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KMC as a tool for stabilization of the preterm infant immediately after birth: research protocols of a multi-center and multi-country study.



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Clinical evidence

2015



Effectiveness of Skin-to-Skin Contact to stabilize low birth weight infants at birth.

Luong Kim Chi, Nguyen Tien Long, Huynh Thi Duy
Huong, Nils Bergman

2015

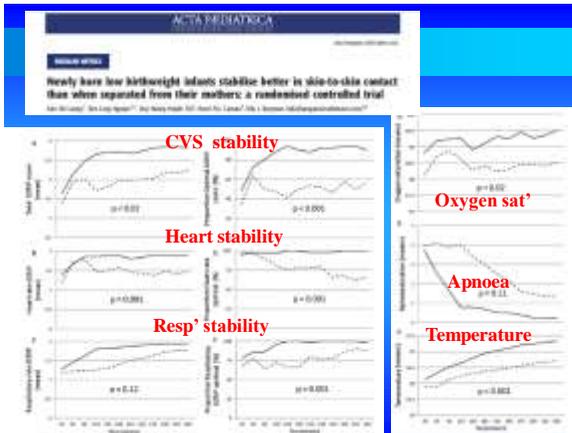
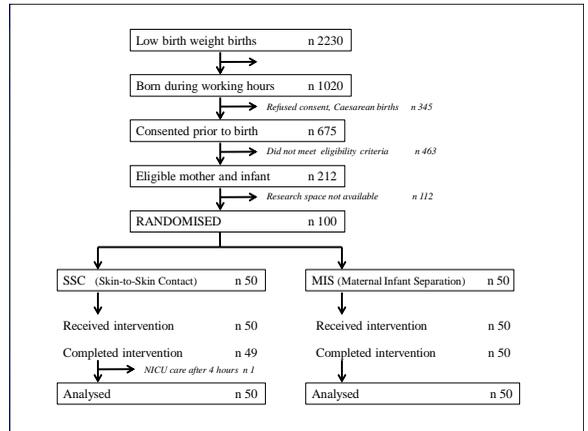
Ho Chi Minh CITY, Vietnam
60,000 deliveries per year
Obstetric beds: 1200
Neonatal beds: 180
16,200 neonatal cases /year 2012 in
neonatal department
Low birth weight rate Vietnam 9%,
this hospital 12,5 %



Heart rate, SpO2 good and stable with SSC



Kmcc feeding



IMMEDIATE KMC STUDY (iKMC)
 KMC as a tool for stabilization of the preterm infant immediately after birth: research protocols of a multi-center and multi-country study.

UNDERLYING SCIENTIFIC RATIONALE

IMMEDIATE KMC STUDY (iKMC)
 KMC as a tool for stabilization of the preterm infant immediately after birth: research protocols of a multi-center and multi-country study.

EXISTING CLINICAL EVIDENCE

IMMEDIATE KMC STUDY (iKMC)

KMC as a tool for stabilization of the preterm infant immediately after birth: research protocols of a multi-center and multi-country study.



CURRENT RESEARCH PROTOCOLS

PRETERM BIRTH

TRANSITION SEPARATION FAILS

CASCADE OF DYSREGULATION

INSTABILITY

INFECTION

Hypothermia

Bradycardia

Hypoglycemia

Hypoxia



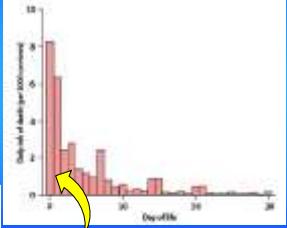
PRETERM BIRTH

TRANSITION SEPARATION FAILS

INSTABILITY

Excluded from KMC studies

MORTALITY



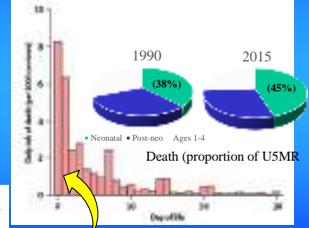
PRETERM BIRTH

TRANSITION SEPARATION FAILS

INSTABILITY

Excluded from KMC studies

MORTALITY



PRETERM BIRTH

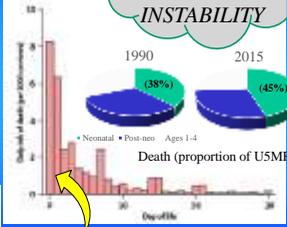
TRANSITION SEPARATION FAILS

INSTABILITY

Excluded from KMC studies

MORTALITY

Skin-to-skin STABILIZES & PREVENTS INSTABILITY



'Kangaroo mother care' to prevent neonatal deaths due to preterm birth complications

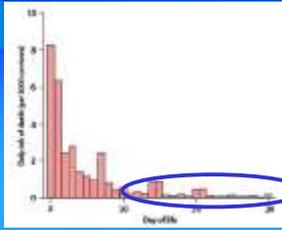
Joy E. Lawn,^{1,2} Judith Mwanza-Kamukamba,^{1,3} Bernardo L. Barua,⁴ Fernando C. Barros⁵ and Simon Cousens⁶

¹Maternal Healthcare Unit, The Children's Hospital, Cape Town, South Africa; ²Health Systems Strengthening Unit, Medical Research Council, Cape Town, South Africa; ³Department of Public Health, Faculty of Health Sciences, University of Cape Town, Cape Town, South Africa; ⁴Perinatal Programme in Epidemiology, Universidade Federal de Pelotas, Pelotas, Brazil and ⁵Infection Diseases Epidemiology Unit, London School of Hygiene and Tropical Medicine, Keppel Street, London, UK.

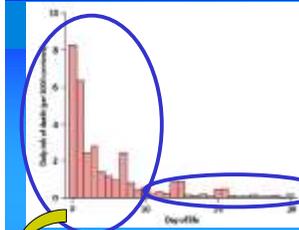
Conclusion: This is the first published meta-analysis showing that KMC substantially reduces neonatal mortality amongst preterm babies (birth weight <2000g) in hospital, and is highly effective in reducing severe morbidity, particularly from infection. However, KMC remains unfeasible at-scale in most low-income countries.

- This evidence is sufficient to recommend the routine use of KMC for all babies <200 g as soon as they are stable. Up to half a million neonatal deaths due to preterm birth complications could be prevented each year if this intervention were implemented at scale.

half a million deaths ... could be prevented



KMC on stable babies: 11000 babies per year.



KMC on stable babies: 11000 babies per year.

400 000 deaths ... could be prevented ... ONLY IF ... KMC starts at birth

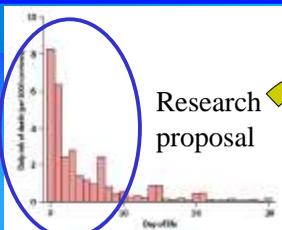
SCIENTIFIC SUMMARY:

1. There is necessary stress at birth
2. Maternal skin-to-skin contact is primary physiological stabilizer
3. Separation delays stabilization, may also cause harm - 'toxic stress'
4. Preterm infants have less resilience; tolerate separation even less

400 000 deaths ... could be prevented ... ONLY IF ... KMC starts at birth

IMMEDIATE KMC STUDY Immediate Parent-Infant Skin-TO-Skin Study (IPISTOSS)

Dr Nils Bergman
Karolinska Institute Consultants
Team: Bjorn Westrup, Jill Bergman,
Siren Rettedal and Agnes Linner



Research proposal

2008-2018...

IPISTOSS
Immediate Parent-Infant Skin-TO-Skin

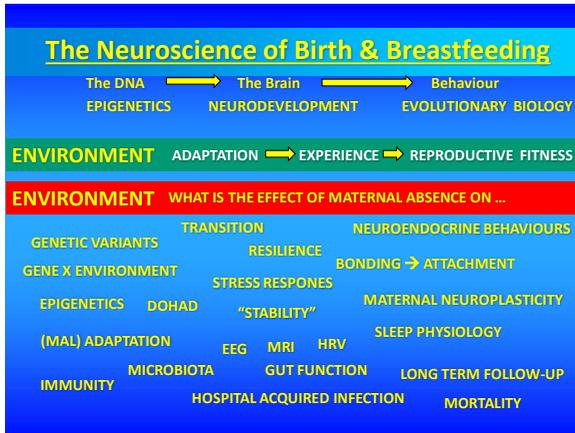
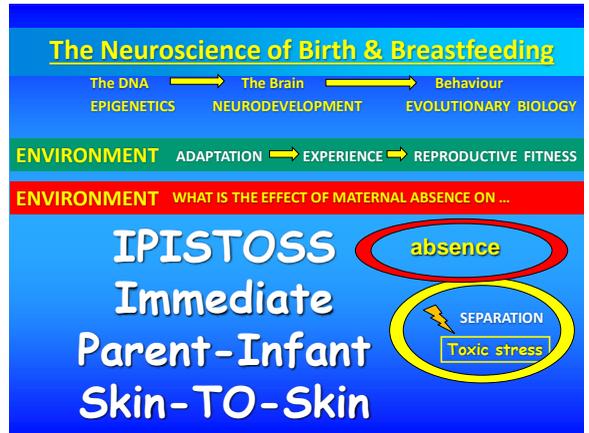
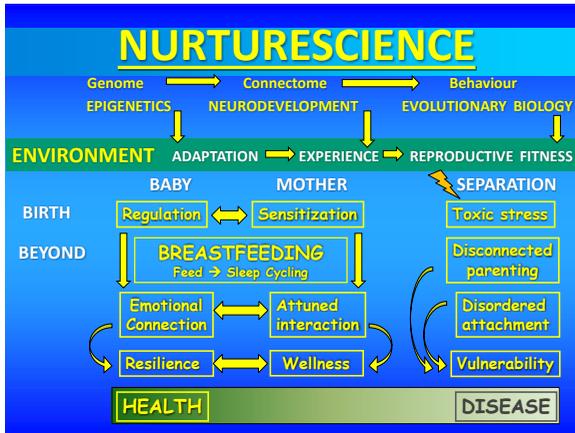


The Neuroscience of Birth & Breastfeeding

The DNA → The Brain → Behaviour
EPIGENETICS NEURODEVELOPMENT EVOLUTIONARY BIOLOGY

ENVIRONMENT ADAPTATION → EXPERIENCE → REPRODUCTIVE FITNESS





XII

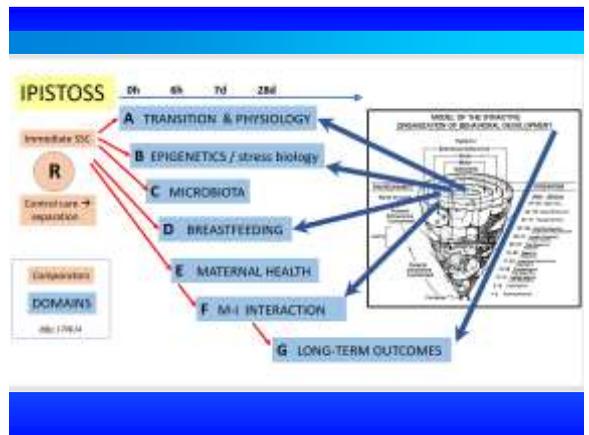
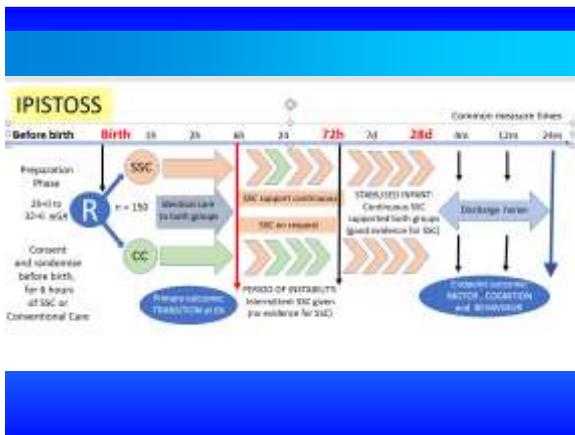
INTERNATIONAL CONFERENCE ON KMC

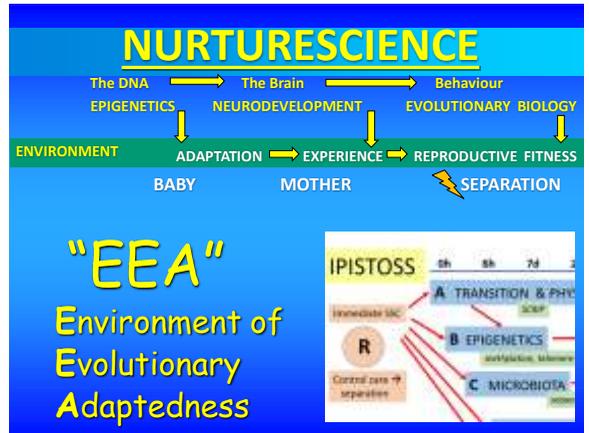
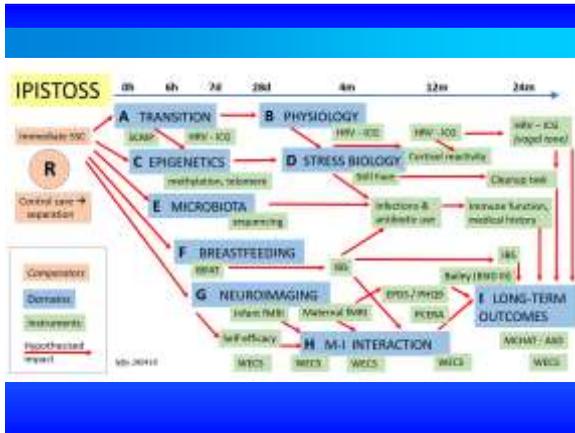
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Elvin,
30 min old.
1354g,
w28+2

Stabilized with his aunt, after cesarean, since the father did not make it from work. Peripheral line inserted SSC. At term age the boy still sleeps very well in his aunt's arms.

Huddinge, Stockholm, SWEDEN
Twins after caesarean, grandma.

Stavanger, Norway; launched May 2017

Siren Rettedal

Experiences from the Scandinavian
iKMC study (IPISTOSS)

Siren Rettedal, Head of Neonatal Intensive Care Unit, Stavanger, Norway
Sponsored by Laerdal Foundation



Video Clip

- AVOID early cord clamping
- Immediate WARM CHAIN
- Immediate CPAP
- Immediate MONITORING
- PARENTS are present / central
- Immediate CONNECTION



Immediate

Thea, born at
GA 29+4,
BW 1180 g



Breastmilk should be collected early.



Continuous >20 h/day

Thea, 48h old
On CPAP,
Phototherapy,
IV lines
Trophic feeds
etc



Procedures can be done skin to skin



Procedures can be done skin to skin

Clinical care must be the same –
only place of care differs



Thea, born at
GA 29+4,
BW 1180 g

Here (180417)
12 months

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Cape Town, RSA



Planning grant from
Bill & Melinda Gates Foundation.



LOE: EARLY PARENT INFANT SKIN-TO-SKIN CONTACT FROM BIRTH
A WAY TO IMPROVE STABILIZATION AND SURVIVAL OF LOW BIRTH WEIGHT INFANTS

Internal Advisory Meeting

16 Nov 2016

James Patterson

Funded by (\$6m)
Bill & Melinda Gates Foundation.



16 November 2016
KMC:
Evidence, gaps and ongoing research

Department of Maternal, Newborn, Child and Adolescent
Health
WHO, Geneva

Sponsored & conducted by
WHO (Rajiv Bahl).



KMC:

Evidence, gaps and ongoing research

RAJIV BAHL

Department of Maternal, Newborn, Child and Adolescent
Health
WHO, Geneva



KMC:

Evidence, gaps and ongoing research

RAJIV BAHL

Department of Maternal, Newborn, Child and Adolescent

Support team:

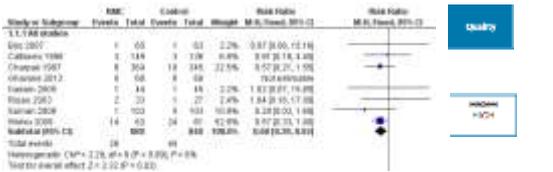
Sachiyo



Suman

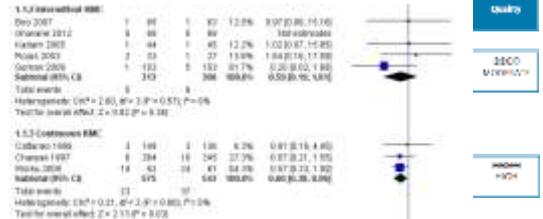
Evidence: mortality

KMC improves survival of small babies by 40% compared with conventional newborn care



Evidence: mortality

Survival benefit clear for continuous KMC. Insufficient evidence for intermittent KMC.



Note trend in favour of CONTINUOUS

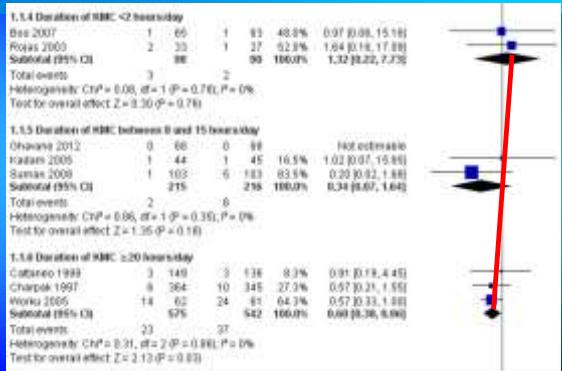
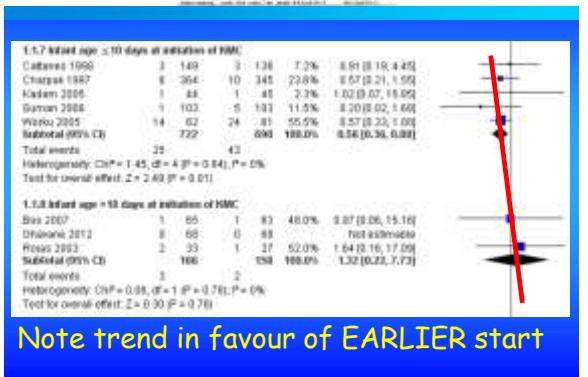
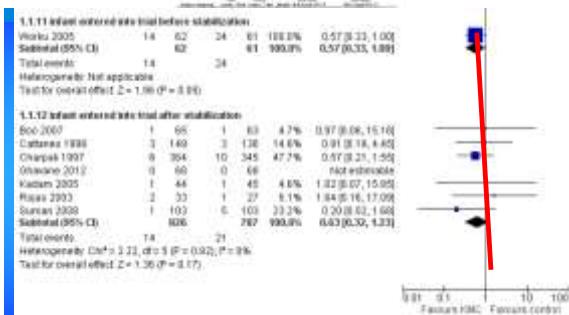


Figure 1. Forest plot of comparison: 1 Kangaroo mother care versus conventional neonatal care, outcome: 1.1 Mortality at discharge or 40-41 weeks' postmenstrual age.



Note trend in favour of EARLIER start

Figure 1. Forest plot of comparison: 1 Kangaroo mother care versus conventional neonatal care, outcome: 1.1 Mortality at discharge or 40-41 weeks' postmenstrual age.



Note trend in favour of UNSTABLE

WHO recommendations

7.0. Kangaroo mother care is recommended for the routine care of newborns weighing 2000 g or less at birth, and should be initiated in health-care facilities as soon as the newborns are clinically stable.	Strong recommendation based on moderate-quality evidence.
7.1. Newborns weighing 2000 g or less at birth should be provided as close to continuous Kangaroo mother care as possible.	Strong recommendation based on moderate-quality evidence.
7.2. Intermittent Kangaroo mother care, other than conventional care, is recommended for newborns weighing 2000 g or less at birth, if continuous Kangaroo mother care is not possible.	Strong recommendation based on moderate-quality evidence.

Evidence gaps: key research priorities



- How can facility based initiation of effective KMC for stable small babies be scaled up?
- Can community-based initiation of KMC reduce neonatal mortality of clinically stable small babies?
- Does initiation of KMC immediately after birth, even for unstable babies, improve survival?

KMC scale up study



- In Ethiopia and India, 7 populations of about a million each in different geographic regions
- Understanding barriers to implementation and addressing them systematically
- Accurate weighing of all newborns, referral, implementing KMC in health facilities, supporting continued KMC at home
- Independent population-based evaluation of coverage

Home-initiated KMC study

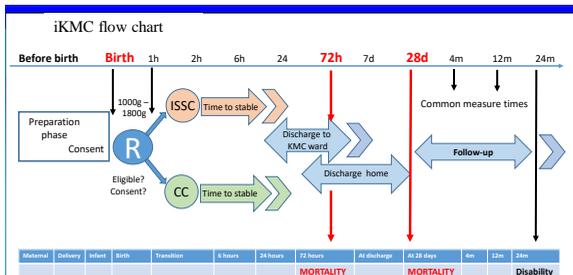


- Individually randomized controlled trial in India. Sample size 10,500
- Low birth weight infants <48 hours old, born at home or discharged from health facilities without KMC
- Families allocated to intervention group supported to provide skin to skin contact, exclusive breastfeeding
- Primary outcome mortality to 1 and 6 months of age
- Early learnings: almost universal acceptance, average KMC duration about 9.5 hours per day achieved.

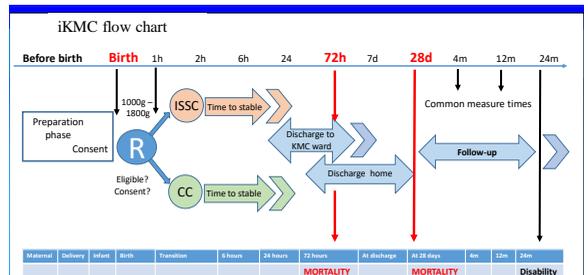
Immediate KMC study



- Individually randomized controlled trial: hospitals in Ghana, India, Malawi, Nigeria and Tanzania. Sample size 4,200
- Newborns <1.8 kg will be allocated to intervention or control group
- Those allocated to intervention receive skin to skin care starting immediately after birth, and continued thereafter
- Those allocated to control receive conventional care until considered stable, KMC initiated after that
- Primary outcome neonatal mortality



Immediate Kangaroo Mother Care Study (iKMC) –
 A Multicenter Randomized Controlled Trial Comparing Skin-to-Skin Contact Initiated Within First 60 Minutes of Life and Continued Until Stabilization with Separation (Conventional Care) in Neonates with Birth Weight of 1000-1800g.



Immediate Kangaroo Mother Care Study (iKMC) –
 A Multicenter Randomized Controlled Trial Comparing Skin-to-Skin Contact Initiated Within First 60 Minutes of Life and Continued Until Stabilization with Separation (Conventional Care) in Neonates with Birth Weight of 1000-1800g.

Link for KMC training video
<http://ultra-early-intervention.creo.tv/i/AhC8hUX8DHjFXInaKLZiw>

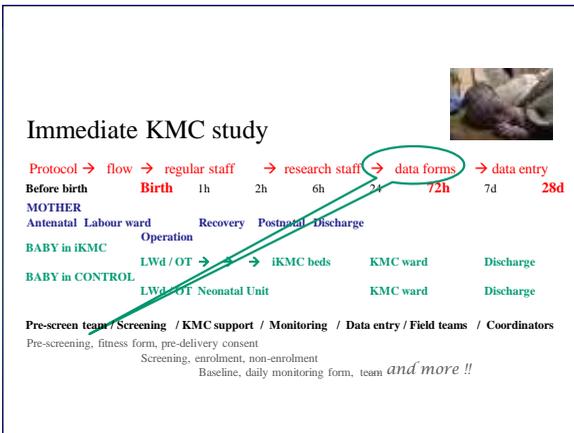
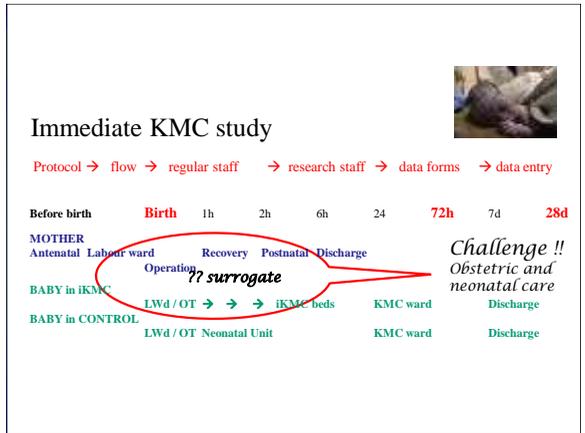
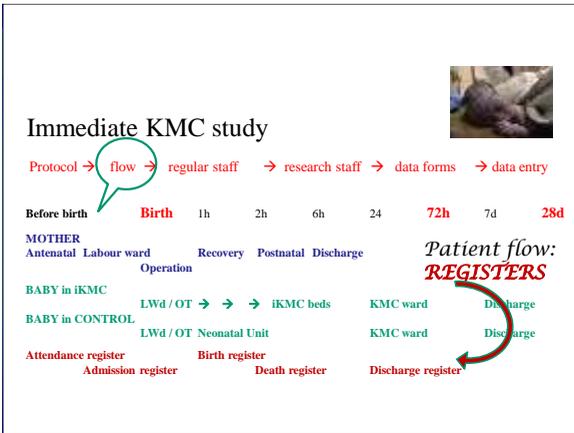


Jill Bergman, KMC trainer



India Ghana Nigeria Nigeria
 Malawi Ghana Tanzania Tanzania

Launch training in Delhi



Minimal package of care for a newborn baby

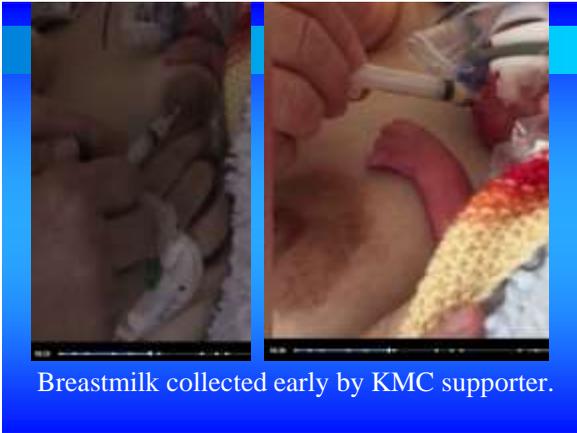
- Preparation for birth and newborn resuscitation
- Thermal care
- Breastfeeding and assisted feeding
- Fluid management
- Respiratory distress, oxygen, CPAP and monitoring
- Infection
- Monitoring of newborn baby
- Prevention of infection

2 weeks training BEFORE study starts



- **WHO «Minimum package of care for small babies»**
- Study sites harmonized, both control and intervention patients receive WHO «minimal package of care for small babies».
- Any difference in the two study arms may not be attributed to a lack of standard care.





KMC by definition has several components,
includes breastfeeding support.

All subjects (intervention and control)
get early milk expression.

Intervention subjects support is:
'put at breast' - recorded once an hour
Actual breastfeeding is an outcome



"MOTHER-NICU" Ghana
 All get same INTENSIVE level of care (L2)



Ward for "unstable continuous" KMC.



"MOTHER-NICU" Malawi
 Cases and controls in same ward
 (identical staffing levels)



KATH, Kumasi, GHANA
 Surrogate starts, mother takes over.




India
 Continuous

KMC Ward for "stable continuous" KMC.

India
 Continuous



KMC garment for continuous KMC.

KMC supporter
 To achieve IMMEDIATE KMC
 AND CONTINUOUS
 all sites have round the clock *KMC supporter*



NOVEL HEALTH CADRE
KANGAROULA

KANGAROO Mother Care
 plus DOULA care

LIC **MIC**
 Tanzania Malawi Ghana Nigeria India

iKMC
 (Immediate – till stable)
 ~ 4200 babies

Mortality reduction ↔

WHO
 Bill & Melinda
 Gates Foundation

LIC **MIC**
 Tanzania Malawi Ghana Nigeria India

iKMC
 (Immediate – till stable)
 ~ 4200 babies

Mortality reduction

WHO
 Bill & Melinda
 Gates Foundation

↔

Enrolment started
 December 2017
 (now ~ 40%)

To be completed
 December 2019

Results EARLY 2020

Follow-up for 2 years
 funding committed.

LIC **MIC**
 Tanzania Malawi Ghana Nigeria India

iKMC
 (Immediate – till stable)
 ~ 4200 babies

Mortality reduction ↔

WHO
 Bill & Melinda
 Gates Foundation

Smaller but similar
 studies ongoing in
 The Gambia
 Uganda

Immediate KMC on
 temperature (India)
 Zambia 2018

LIC **MIC**
 Tanzania Malawi Ghana Nigeria India

iKMC
 (Immediate – till stable)
 ~ 4200 babies

Mortality reduction ↔

WHO
 Bill & Melinda
 Gates Foundation

LIC **MIC** **HIC**
 Tanzania Malawi Ghana Nigeria India (Vietnam & RSA) Norway Sweden

iKMC
 (Immediate – till stable)
 ~ 4200 babies

Mortality reduction ↔

WHO
 Bill & Melinda
 Gates Foundation

IPISTOSS
 (Immediate – till stable)
 ~ 1200 babies

Mechanisms research

Karolinska, Sweden
 Laerdal, others
 BabyBjorn ...

LIC	MIC	HIC
Tanzania Malawi Ghana Nigeria India		Vietnam & RSA Norway Sweden
iKMC (Immediate – till stable) ~ 4200 babies		IPISTOSS (Immediate – till stable) ~ 1200 babies
Mortality reduction	↔	Mechanisms research
SURVIVE		THRIVE

Kangaroo Mother Care and Neuroprotection of the premature brain

LIC	MIC	HIC
Tanzania Malawi Ghana Nigeria India		Vietnam & RSA Norway Sweden
iKMC (Immediate – till stable) ~ 4200 babies		IPISTOSS (Immediate – till stable) ~ 1200 babies

NOTE: not a LIC solution,
not a third world, third rate solution
Intervention is state of art neonatal care
(**IPISTOSS precedes iKMC**)

Kangaroo Mother Care and Neuroprotection of the premature brain

LIC	MIC	HIC
Tanzania Malawi Ghana Nigeria India		Vietnam & RSA Norway Sweden
iKMC - Three continents		
		

Kangaroo Mother Care and Neuroprotection of the premature brain

LIC	MIC	HIC
Tanzania Malawi Ghana Nigeria India		Vietnam & RSA Norway Sweden
		
iKMC		
		
<p>Every baby is born with one guardian angel: Its mother</p>		

Kangaroo Mother Care and Neuroprotection of the premature brain