Family Centered Neonatal Couplet Care:

Scientific Context & Implementation in Practice

”The Karolinska Way”

Neonatal Couplet Care Conference

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Siri Lilliesköld, RN, Björn Westrup, MD Ph D

Karolinska University Hospital

Stockholm, Sweden

Neonatal Family Centred Couplet Care

Continuous improvement & research for neonatology of the future

Changing the future for infants in intensive care

The ultimate objective of neonatology

Can developmental care help us to get there?

Kapellou 2006

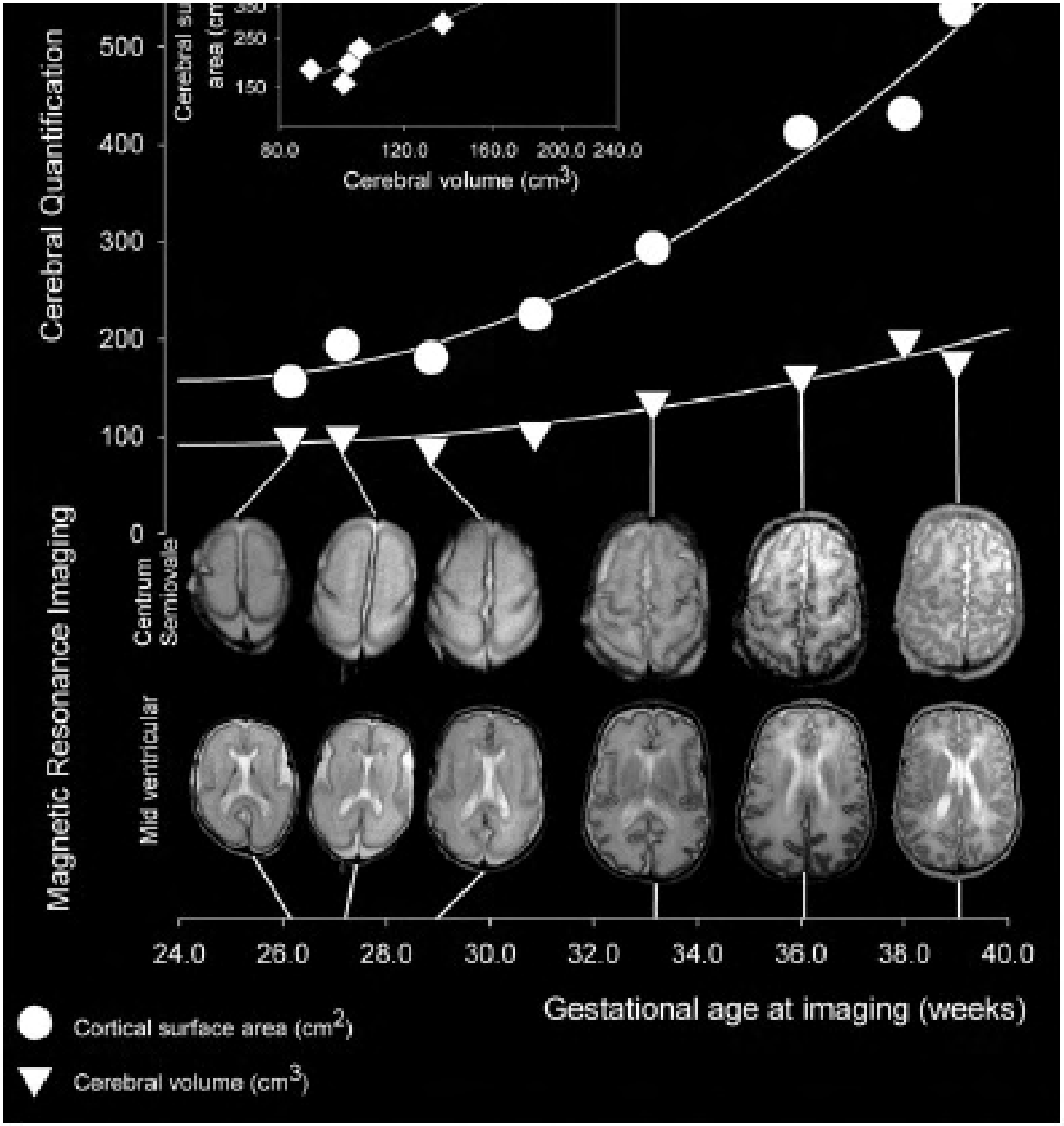


Figure 2. Serial MR Imaging of Brain Growth in a Normal Female Preterm Infant

Impact of rearing conditions during the neonatal period on *adult* brain function

Prematurity associeted with medical conditions in adulthood:

Hypertension

Edstedt Bonamy et al, Pediatric Research 2005
Johansson et al, Circulation 2005

Sympatoadrenal hyperactivity

Johansson et al, J Internal Medicine 2007

Smaller vascular bed (capillary density)

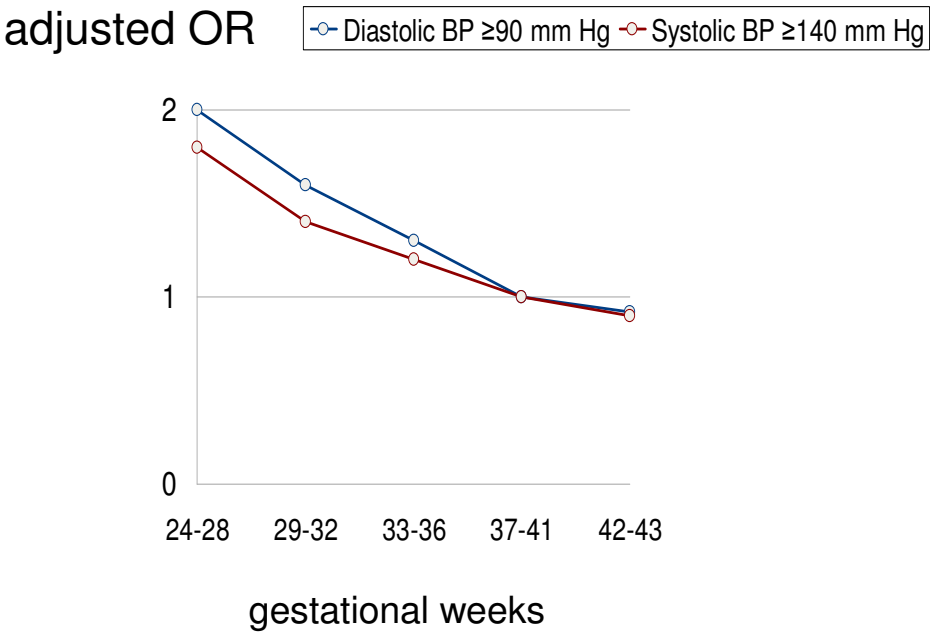
Edstedt Bonamy et al, J Internal Medicine 2007

Smaller aorta

Edstedt Bonamy et al, Pediatric Research 2005
Edstedt Bonamy et al, Acta Paediatrica 2008 (1)
Edstedt Bonamy et al, Acta Paediatrica 2008 (2)

Smaller kidneys (normal GFR)

Rakow et al, Pediatric Nephrology 2008



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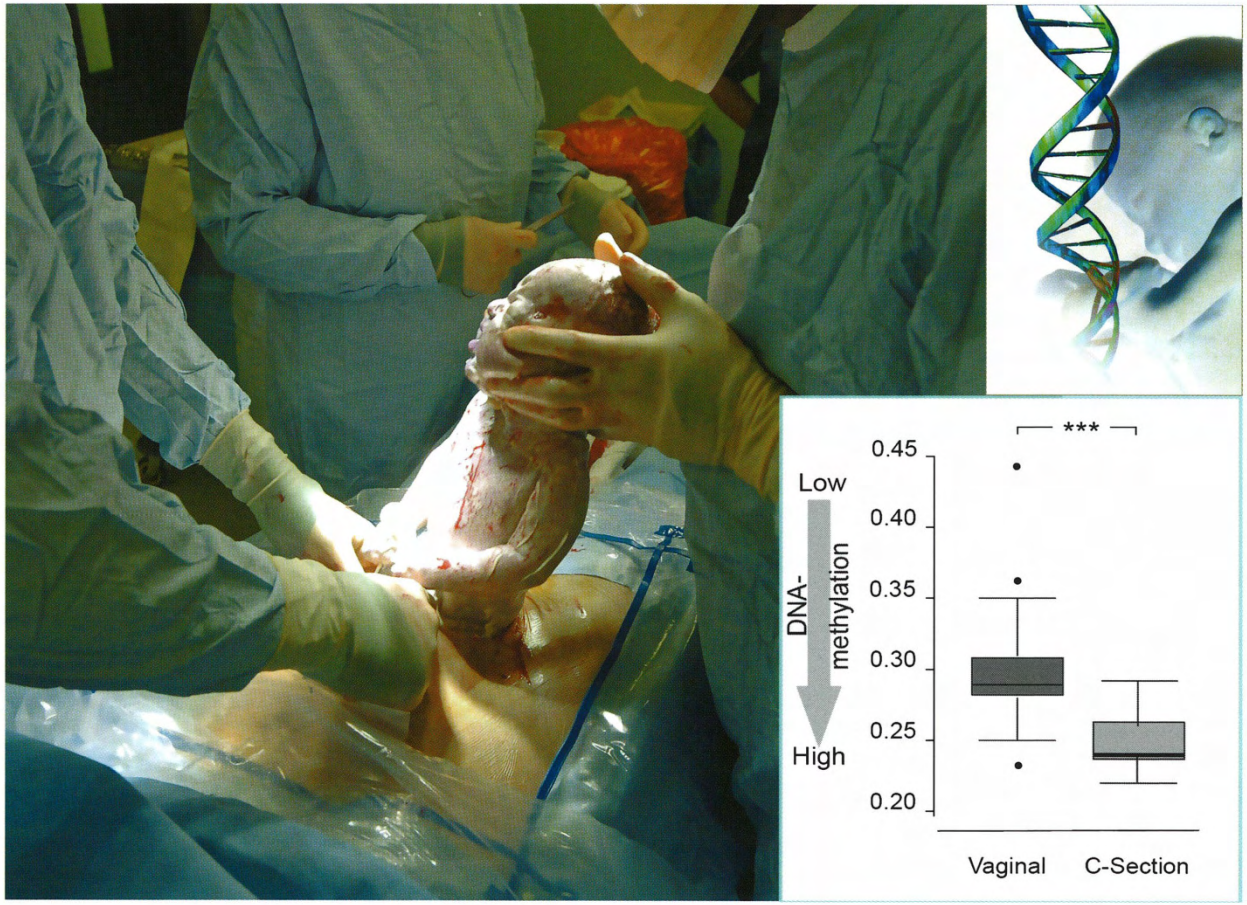
ACTA PÆDIATRICA

PROMOTING CHILD HEALTH

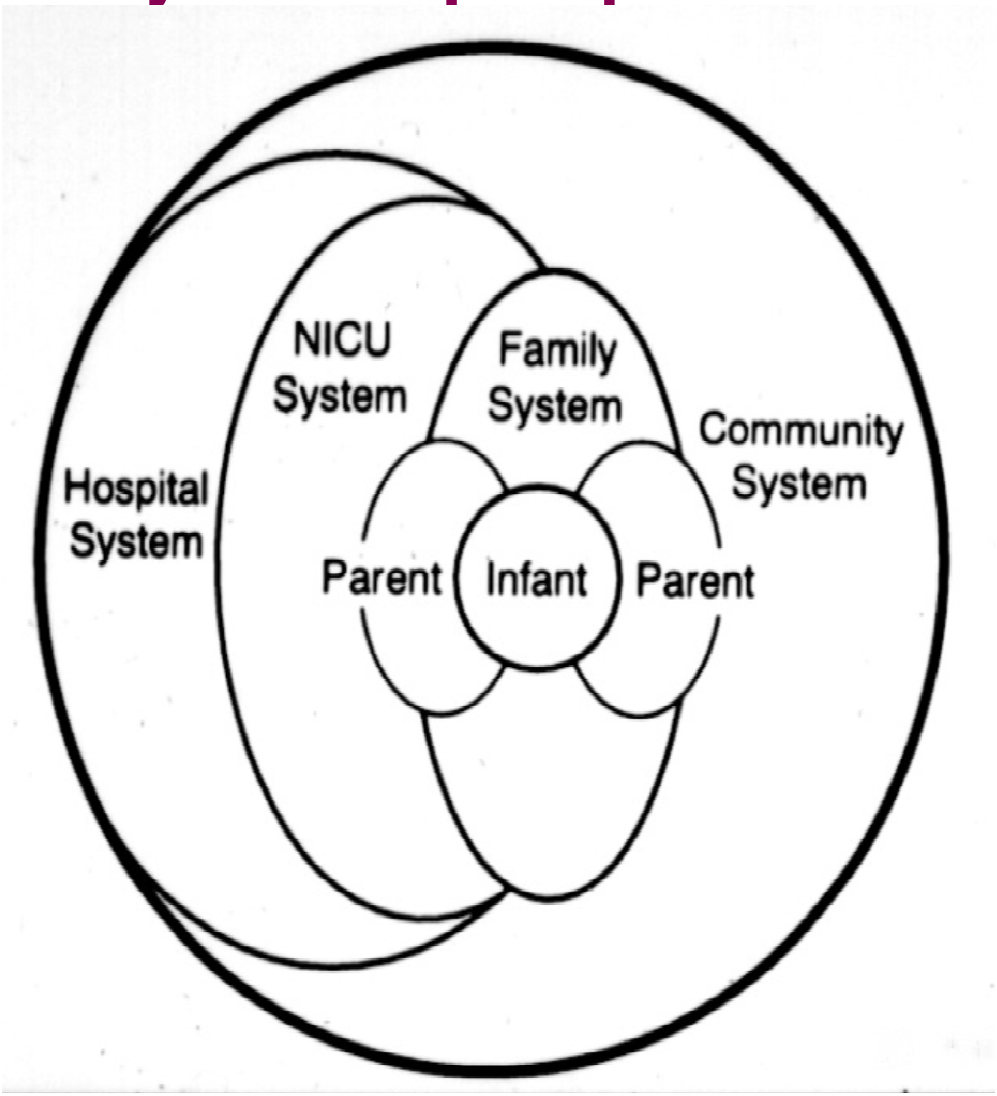


C-Section Affects the Genome

Titus Schlinzig, Mikael Norman et a. Acta Pediatr 98:7, 2009

Synactive Model of Developmental Care

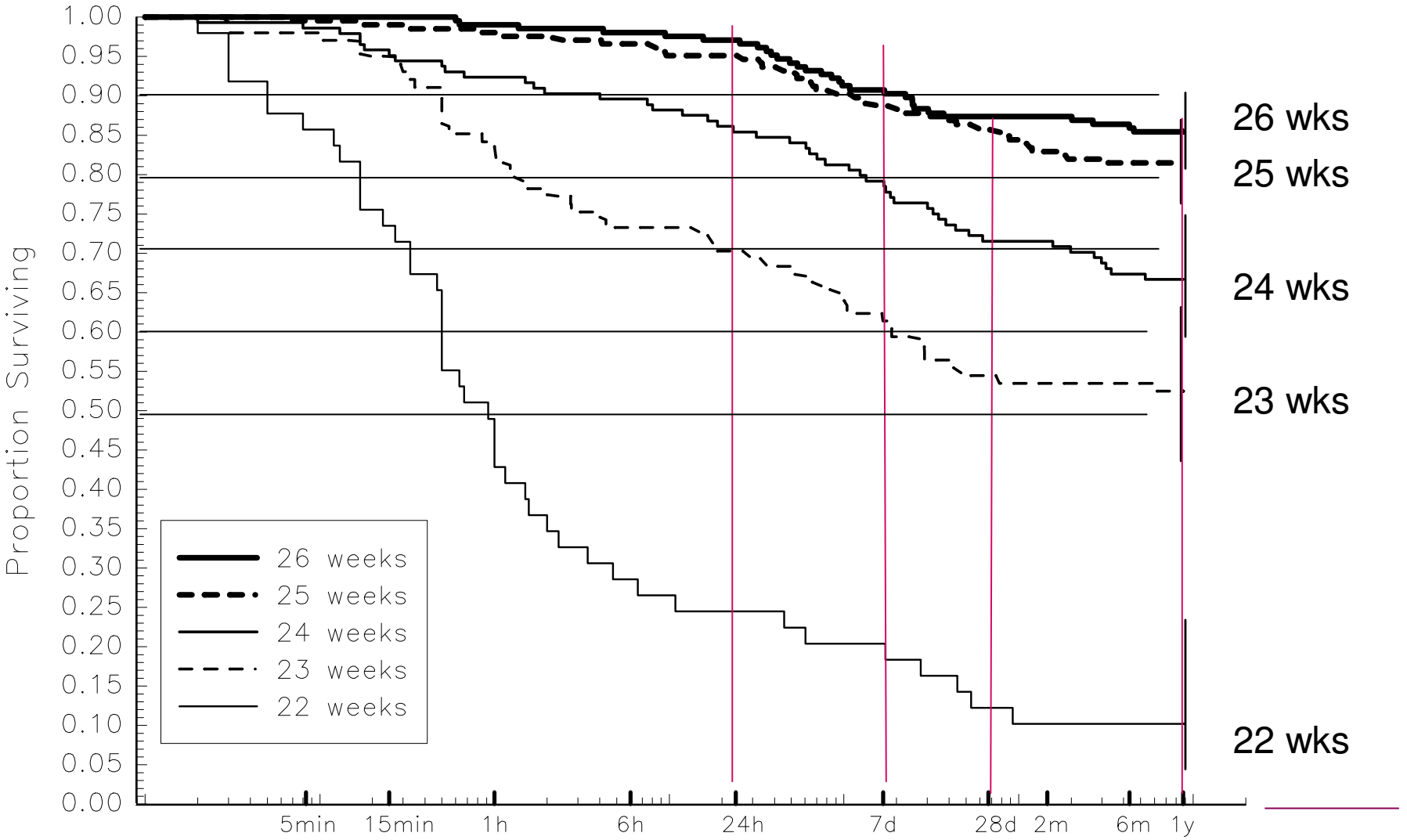
Systems perspective



H. Als

Survival – live-born infants (n = 707)

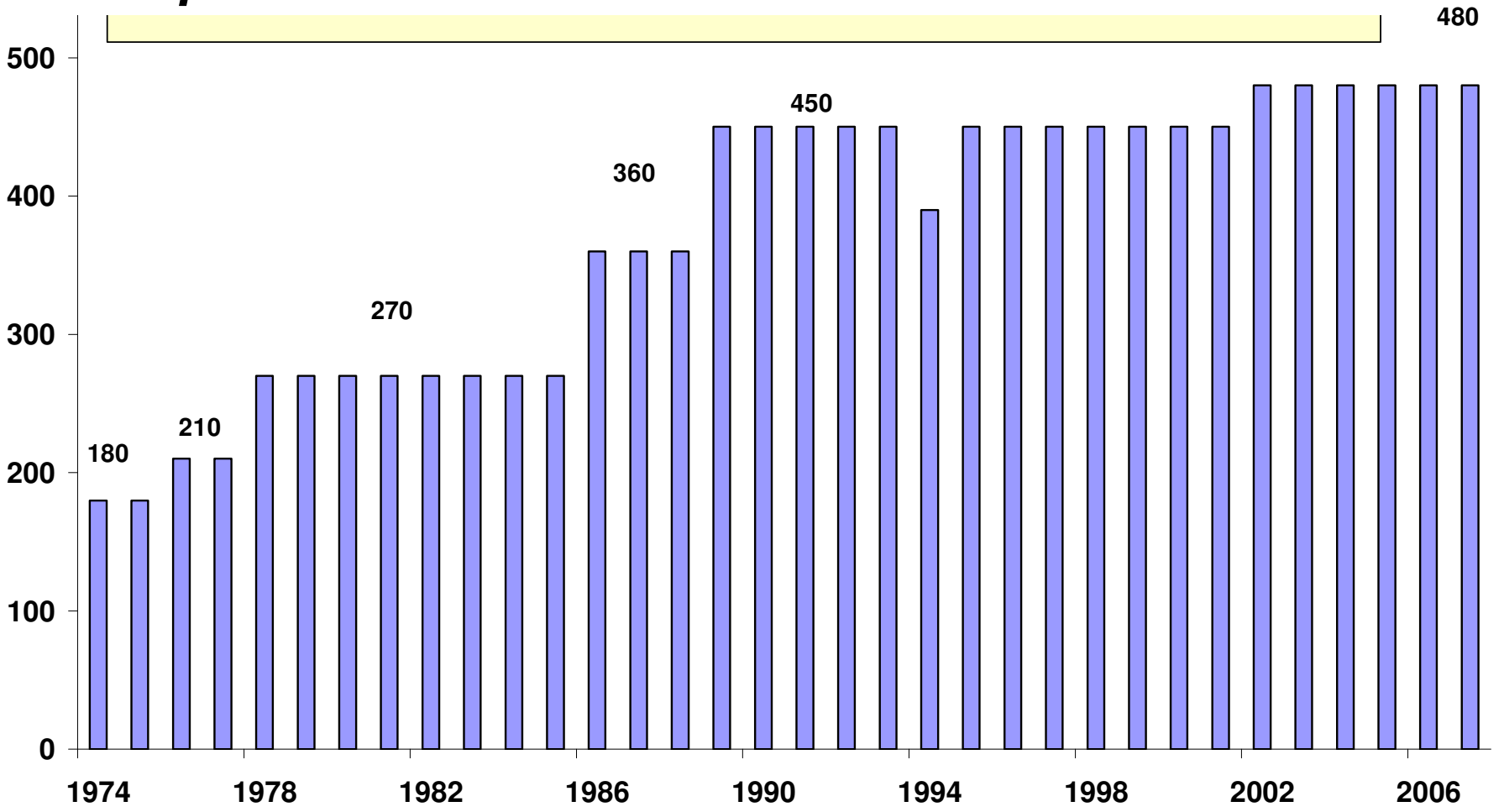
acc. to gestational age at birth JAMA 2009



Temporary parental benefit when the child is ill

60 + 60 days/ parent and year, can be extended if there is a life-threatening condition (~< 32+0 wks)

General parental benefit:



What is the scientific support, the level of evidence?

The Stockholm Neonatal Family Centered Care Study:

effects on length of stay and infant morbidity

A Örtenstrand, B Westrup, E Berggren Broström, I Sarman, S Åkerström, T Brune, L Lindberg, U Waldenström

Karolinska Institute, Stockholm Sweden

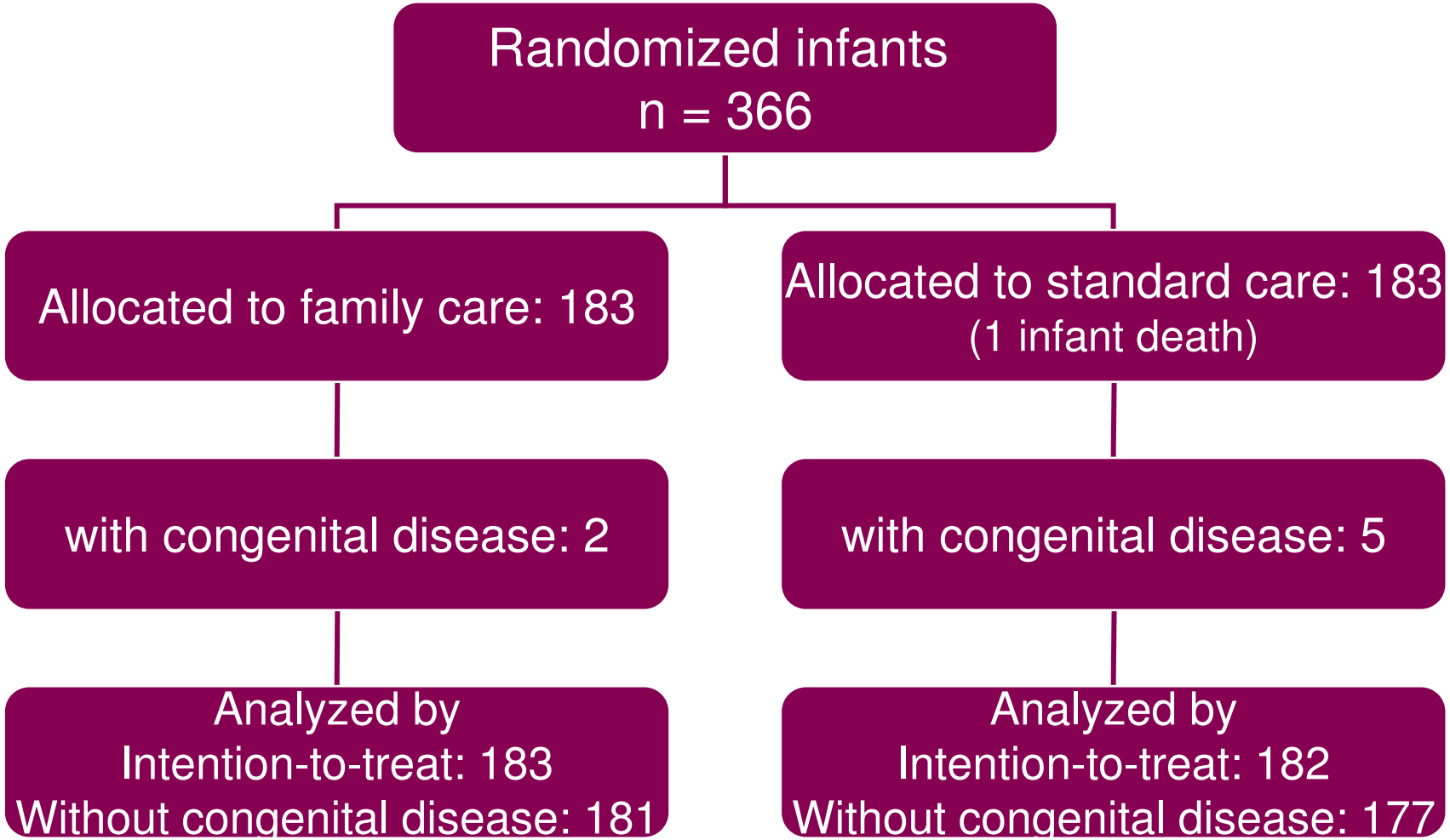
Pediatrics Jan. 2010;125: e278–e285

Intervention:

True (?) family centered care – parents could stay 24 / 7 from admission to discharge

- parents had a separate room in the unit from the first day.
- The infants moved from the “acute” room into the family rooms as soon as they reached a stable state.

Infants randomized into the study



Included infants

	Family care n = 183	Standard care n = 182
Gestational age at birth		
24 – 29, n (%)	28 (15.3)	31 (17.0)
30 – 34, n (%)	102 (55.7)	103 (56.6)
35 – 36, n (%)	53 (29.0)	48 (26.4)
Pair of twins	21	24

Length of stay in hospital

Adjusted for: gestational age at birth[A], non-Swedish-speaking background[A,B], setting[A,B]

	Family care n = 183	Standard care n = 182	difference days
All infants [A], mean	27.4	32.8	-5.3 (p= .05)
By gestational age [B]			
24 – 29 w, mean	56.6	66.7	-10.1 (p= .02)
30 – 34 w, mean	19.2	23.6	-4.4 (p= .16)
35 – 36 w, mean	6.4	7.9	-1.4 (p= .39)

Length of stay in *intensive care* (level II and level III)

Adjusted for: gestational age at birth[A], non-Swedish-speaking background[A,B], setting[A,B]

	Family care n = 183	Standard care n = 182	difference days
All infants [A], mean	13.3	18.0	-4.7 d (p= .02)
By gestational age [B]			
24 – 29 w, mean	32.4	43.1	-10.6 d (p= .04)
30 – 34 w, mean	6.0	8.5	-2.5 d (p= .02)
35 – 36 w, mean	1.5	2.5	-1.0 d (p= .24)

Infant morbidity

Adjusted for: gestational age at birth, non-Swedish-speaking background, setting

	Family care n = 183	Standard care n = 182	OR (95% CI)[A]
Verified Sepsis, %	7.1	9.8	0.68 (0.3-1.6)
Verified NEC, %	2.7	3.3	0.83 (0.2-2.8)
Diagnosed. PDA, %	15.3	16.9	0.90 (0.4-1.9)
IVH grade II-III, %	3.3	3.8	0.95 (0.3-3.2)
ROP stage II-V, %	2.7	6.6	0.34 (0.1-1.1)
BPD moderate-severe, %	**1.6**	**6.0**	**0.18 (0.04-0.8)**

Ventilatory assistance and supplemental oxygen

Adjusted for: gestational age at birth, non-Swedish-speaking background, setting

All infants	Family care n = 183	Standard care n = 182	difference
Respiratory support n (%)	90 (49)	109 (60)	OR: 0.65 (0.4-1.0)
Mecanical ventilation days, mean	0.6	1.3	-0.7
CPAP, days, mean	6.5	8.7	-2.2
Supplimental oxygen days, mean	11.0	12.2	-1.3

Family care might operate through the common pathhways of pain and stress

Parents in Family care may have a greater opportunity to co-regulate the caregiving with the needs of the infant

→time the care-giving

→Parental presence/skin-to-skin may contribute to better sleep organization

Conclusion

Family care in a level-II NICU, where parents could stay 24 hours per day from admission to discharge may reduce …

- length of stay for preterm infants
- bronchopulmonary dysplasia

Recent trials on post-discharge interventions

which focus primarily on sensitive and responsive parent-infant interactions, infant development and self-regulation of infant primary functions as autonomic stability, motor and state organization and attention/interactive capacities – to organize the infant behavior in order to gain control over its own body and world around him

- The Norwegian / Tromsö RCT (Kaaresen et al Early Hum Dev 2008 & Pediatrics 2010)
  - Modified Mother Infant Transaction Program
    - 1&2 years: reduced parental stress
    - 5 years: +½ SD in cognition
- The Amstedam IBAIP RCT (Koldewijn K, J of Pediatr)
  - Infant Behavior Assessment Intervention Program (Rodd Hedlund)
    - 2 years: improved motor (PDI) and for the infants with “double risk” (low maternal education and BPD or abnormal cranial ultrasound also improved mental development (MDI).

Results at corrected age of 3 years

Nordhov SM, Rønning JA, Dahl LB, Ulvund SE, Tunby J, Kaaresen PI.
Pediatrics. Early intervention improves cognitive outcomes for preterm infants: randomized controlled trial. 2010 Nov;126(5):e1088-94.

	Intervention	Control	Crude Difference, Mean (95% CI)	*P*	Adjusted Difference, Mean (95% CI)	*P*
	N=67	N=67				
MDI mean *(SD)*	97.9 (11.1)	92.3 (15.6)	5.7 (0.9 - 10.5)	.02	4.5 (-0.3 – 9.3)	.06
≥100 *n* (%)	30 (44)	23 (34)				
85-99 *n* (%)	30 (44)	27 (40)				
84-70 *n* (%)	6 (9)	12 (18)				
<70 *n* (%)	1 (1.5)	5 (4)				
	N=66	N=66				
PDI mean *(SD)*	93.7 (13.6)	92.8 (14.5)	1.2 (-3.8 to 6.5)	.6		
≥100 *n* (%)	23 (35)	23 (35)				
85-99 *n* (%)	34 (51)	31 (47)				
84-70 *n* (%)	6 (9)	7 (11)				
<70 *n* (%)	3 (5)	5 (7)				

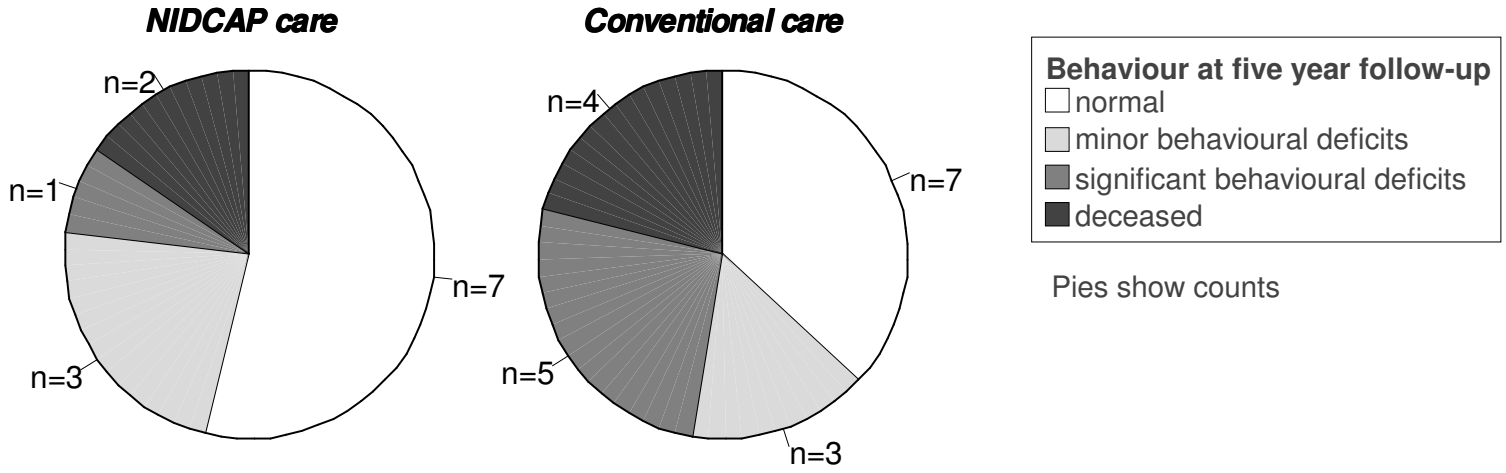
Results at corrected age of 5 years

Nordhov SM, Rønning JA, Dahl LB, Ulvund SE, Tunby J, Kaaresen PI.
Pediatrics. Early intervention improves cognitive outcomes for preterm infants: randomized controlled trial. 2010 Nov;126(5):e1088-94.

	Intervention (N = 66)	Control (N = 65)	Crude Difference, Mean (95% CI)	*P*	Adjusted Difference, Mean (95% CI)	*P*
Full scale IQ *(SD)*	102.3 (13.5)	95.6 (19.2)	7.2 (1.3 to 13.0)	.02	6.4 (0.6 to 12.2)	.03
< 70, *n* (%)	1 (2)	6 (9)				
70 – 84, *n* (%)	2 (3)	11 (17)				
85 – 99, *n* (%)	29 (44)	17 (26)				
≥ 100, *n* (%)	34 (52)	31 (48)				
Verbal IQ *(SD)*	102.4 (14.0)	96.3 (18.1)	6.2 (0.4 to 11.9)	0.04	5.5 (-0.3 to 11.3)	.06
Performance IQ *(SD)*	101.3 (15.8)	95.3 (18.4)	6.9 (0.8 to 13.0)	0.03	6.3 (0.2 to 12.3)	.04

Behaviour and mortality at 5 years

Subtests of the NEPSY test battery: activity and distractibility
Acta Paediatrica 2004;93:1-10

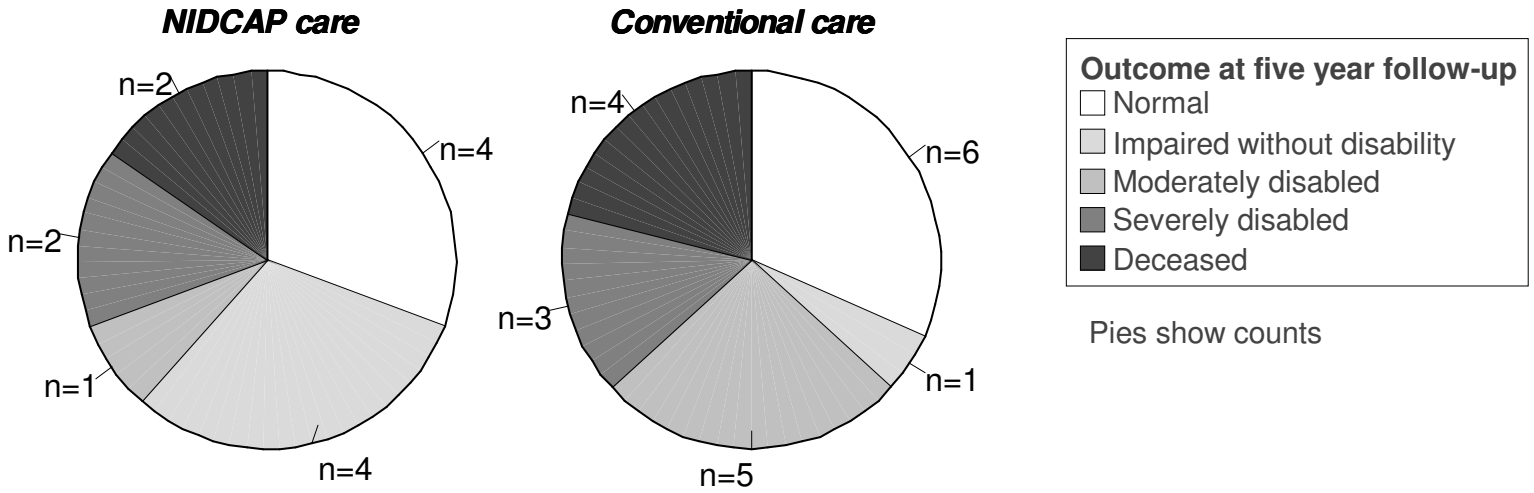


Odds Ratio for surviving … (95% CI)	**NIDCAP / Control**	P-value
with normal behavior	19.9 (1.1 – >100)	0.04

Exact logistic regression correcting for *gender*, *gest age, relative birth-weight, education of parents*

Disability and mortality at 5 years

Acta Paediatrica 2004;93:1-10



Odds Ratio for surviving … (95% CI)	**NIDCAP** / **Control**	P-value
without disability	14.7 (0.8 – >100)	0.08

Exact logistic regression correcting for *gender*, *gest age, relative birth-weight, education of parents*

Family centered *developmentally supportive* couplet care at Karolinska

NIDCAP
is the foundation and standard of practice

NIDCAP

Newborn

Individualized

Developmental

Care and

Assessment

Program

Family centered couplet care

- Minimize separation
- Support the parent's confidence
- Facilitate bonding and attachment

Delivery and maternity at Karolinska-Danderyd

- Approx 10,000+ deliveries / year
  - →230 twins, 3 triplets
  - →400 born prematurely – 4.7%
- Planned C-sections: 16 beds for 26 c-sections/week
  - →LOS: two days
  - →week-ends closed
- Maternity and prenatal care: 24 beds
- Patient Hotel; 24 beds
  - →Uncomplicated delivery admitted after 2-6 hours after delivery
  - →Midwifes on each shift

Karolinska-Danderyd

- Level II +
- Infants ≥ 27 gestational weeks
- INSURE (Intubation, Surfactant, Extubation), CPAP, chest tubes, catheters etc
- 24 beds for infants
- 8 beds for mothers in need of medical care – Couplet Care
- 12-14 infants in the Home Care Program

Karolinska-Danderyd

- 870 admissions – 8.5%
  - →7.1% in the neonatal unit
  - →1.4% in the maternity wards
    - jaundice, hypoglycemia, Down's Syndrome …
- 54 referred to Level III (6% of admitted, 5.3‰ of all born)
  - →12 for mechanical ventilation (1.3% / 1.2‰ of all born)
  - →6 for cooling (0.7% / 0.6‰ of all born)
- Perinatal mortality: 2.2 ‰
  - stillbirths and deceased during first week
- Neonatal mortality: 0.3 ‰ (national 1.6 ‰)
  - Live-born infants deceased during the first 28 days

Opportunities

- Minimized separation mother/father – infant
- Early skin-to-skin care
- Early parental involvement
- Early bonding
- Parents feel confident caring for their child → parents as primary care givers
- Parent's presence enables more prompt responses / tuning in on the signals of the infant
- Positive effect on breastfeeding

Opportunities

- Parents feel secure/confident at discharge from hospital
- Early discharge → nurse visits in the home / home care
- A stimulating workplace: challenging and inspiring → staff satisfaction → staff continuity

Challenges

- A new way of working!
- ”Swapped” roles → parents as primary care givers
- The role of coaching instead of being the ”doer” → *relationship based care*
- Being flexible, willing to question routines
- Confidence in the monitoring system
- More time-consuming care??
- Integrity of the family

Challenges

- Extra need of planning one's work
- Team communication
- How sick mothers can we care for?

Neonatal Family Centred Couplet Care

Continuous improvement & research for neonatology of the future

Changing the future for infants in intensive care

Opening symposium, Karolinska-Danderyd, 18 November 2009

http://web22.abiliteam.com/ability/show/khcichp/abbott_20101118/speed.asp

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In English at
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