

Long-term consequences of prematurity

– implications for follow-up

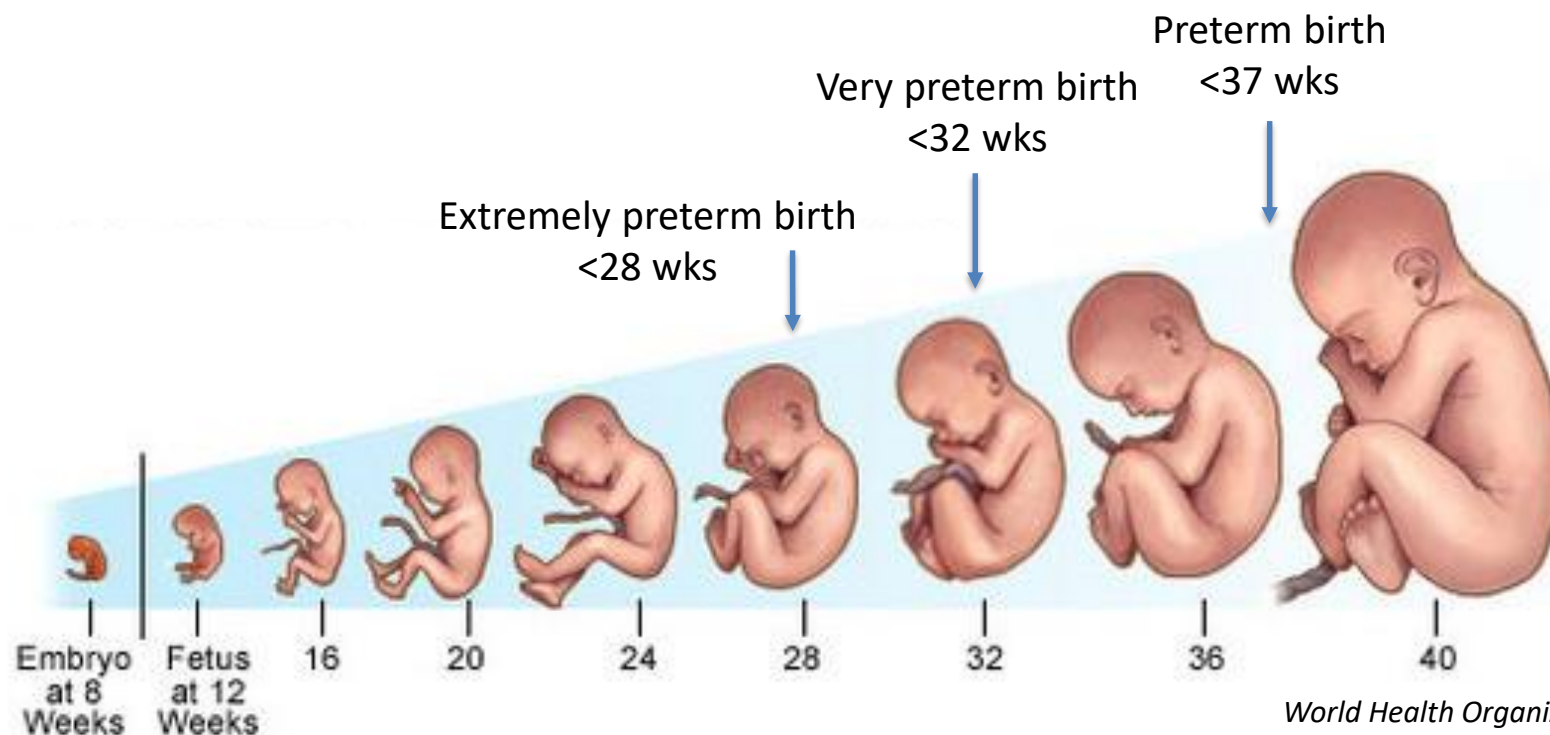


Oslo 13.12.18

Kari Anne I. Evensen

Prematurity and low birth weight

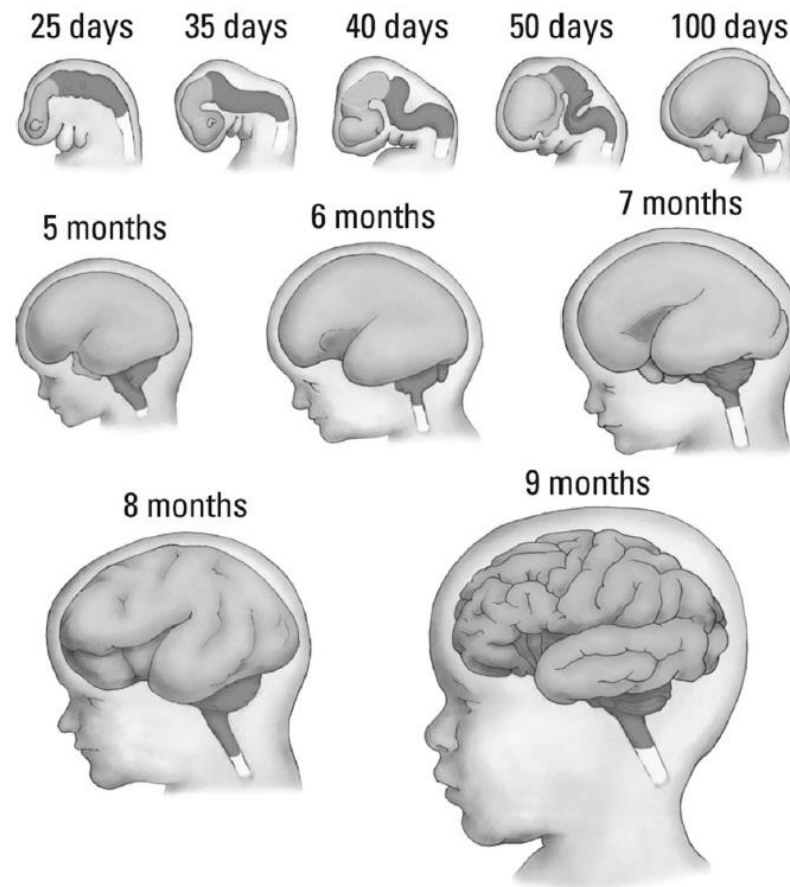
- Low birth weight (LBW) <2500 g ~ <37 wks 5.7%
- Very low birth weight (VLBW) <1500 g ~ <32 wks 0.9%
- Extremely low birth weight (ELBW) <1000 g ~ <28 wks 0.5%



World Health Organization 2004
Medical Birth Registry of Norway 2017

Brain vulnerability

- Rapid brain growth during later pregnancy
- More folding as amount of brain tissue increases
- Structures in rapid development are vulnerable to damage



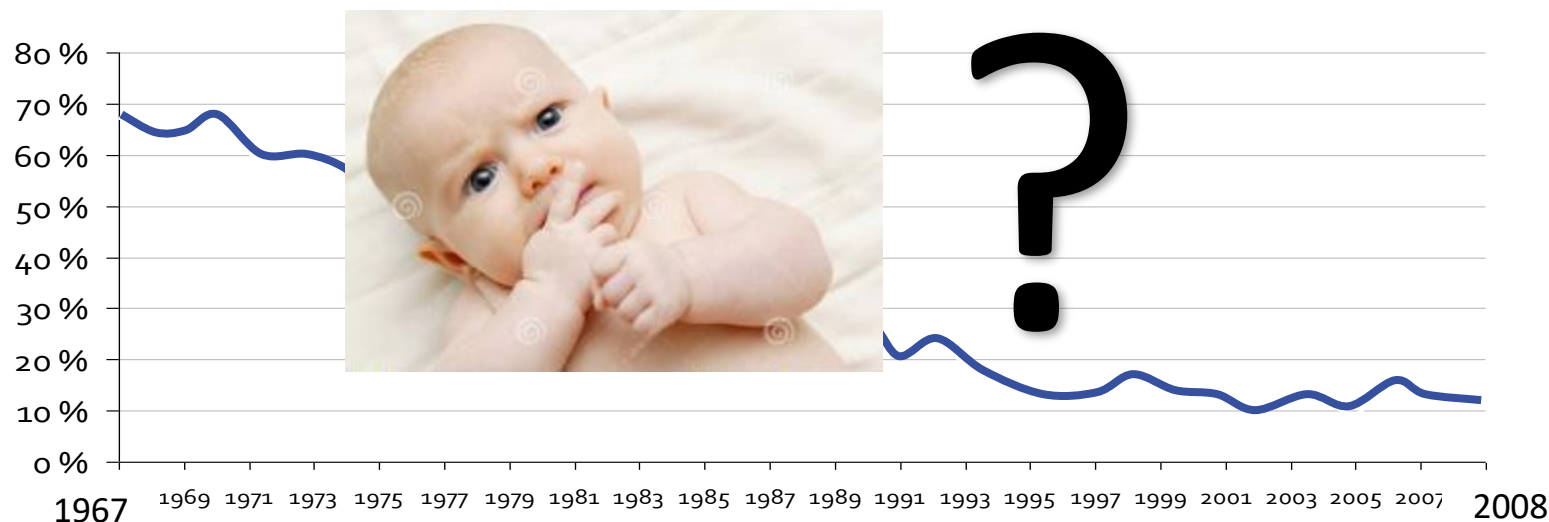
*Kolb & Fantie. Handbook of Clinical Child Neuropsychology 2009
Volpe, Lancet Neurol 2009*

Consequences of prematurity

- High risk for mortality and morbidity
- Advances in peri- and neonatal medicine



mortality in children born with very low birth weight



NTNU Low Birth Weight in a Lifetime Perspective Study (NTNU LBW Life)



- A longitudinal follow-up study of VLBW individuals at NTNU
- Study clinical outcomes and brain correlates across a life span

NTNU LBW Life



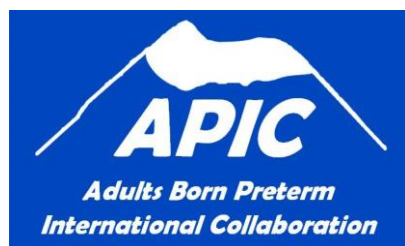
57 international publications



16 PhD theses



International network



EU project



<https://recap-preterm.eu/>



Study population



- Three counties in Central Norway
- Born 1986-88

Nord- and Sør-Trøndelag
+ some children from
Møre and Romsdal

Trondheim



VLBW



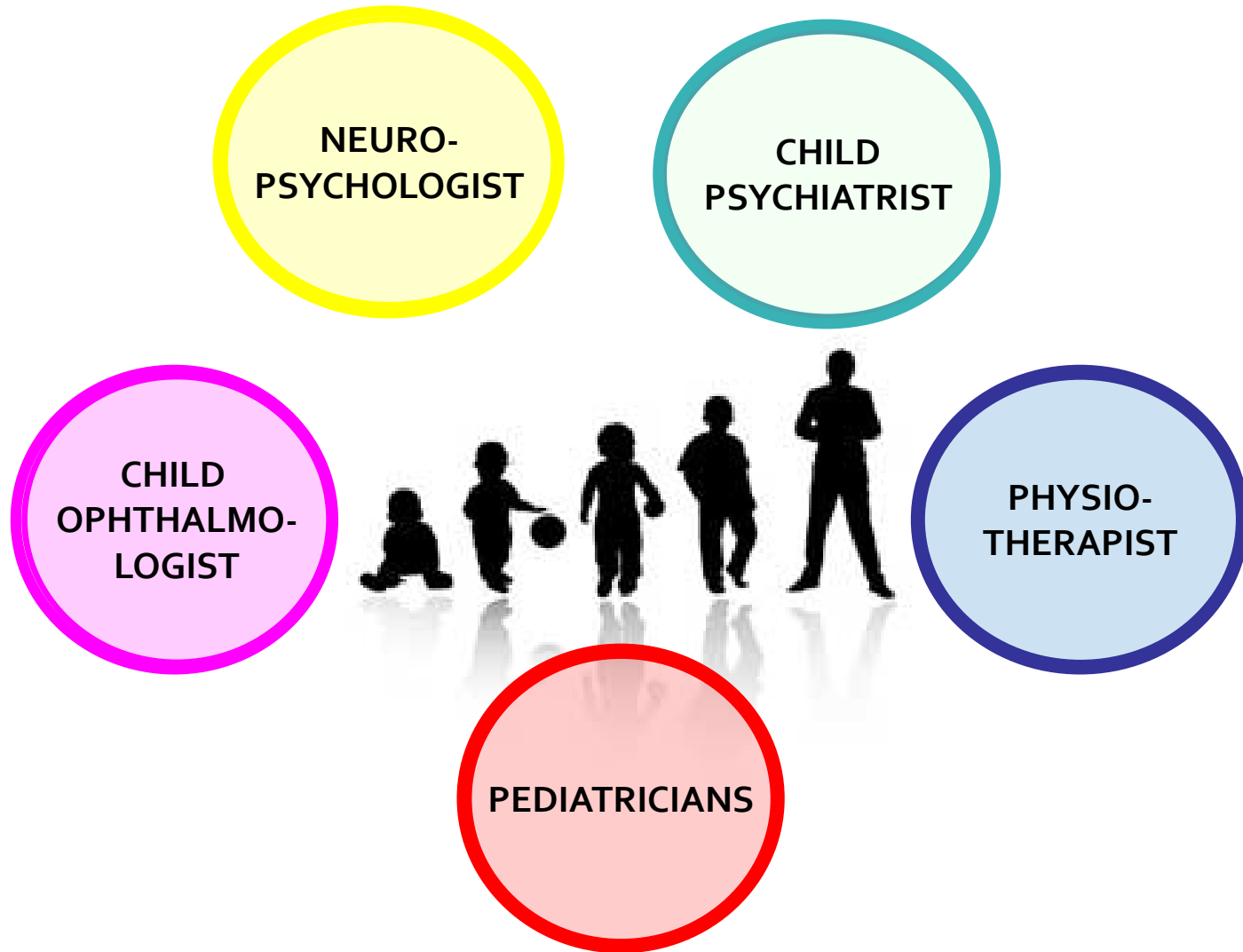
“very low birth weight”
children born preterm with
birth weight below 1500 g
(n=55-64)

Control



“normal birth weight”
children born at term with birth
weight above the 10th centile
(n=81-90)

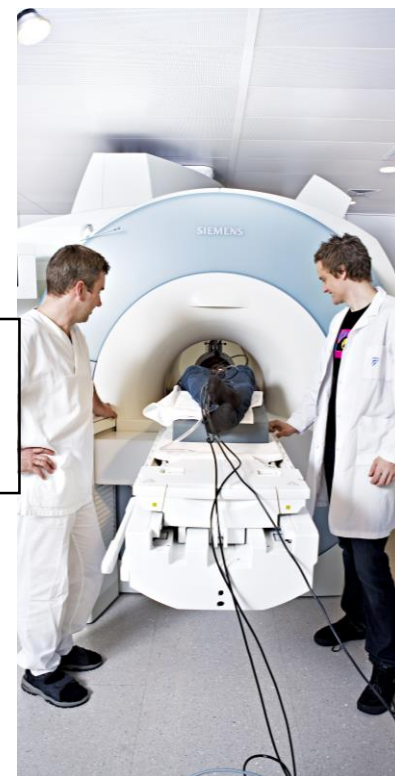
Multidisciplinary research



Assessments from childhood to adult age

- 1 yr: Motor and cognitive skills
- 5-6 yrs: Motor and cognitive skills
- 14 yrs: Motor and cognitive skills, vision, mental health and quality of life
- 18-19 yrs: Cognitive and executive skills, mental and physical health, quality of life
- 23 yrs: Motor skills, mental health and quality of life
- 26-28 yrs: Cognitive skills, mental and physical health and quality of life

MRI



LONG-TERM CONSEQUENCES



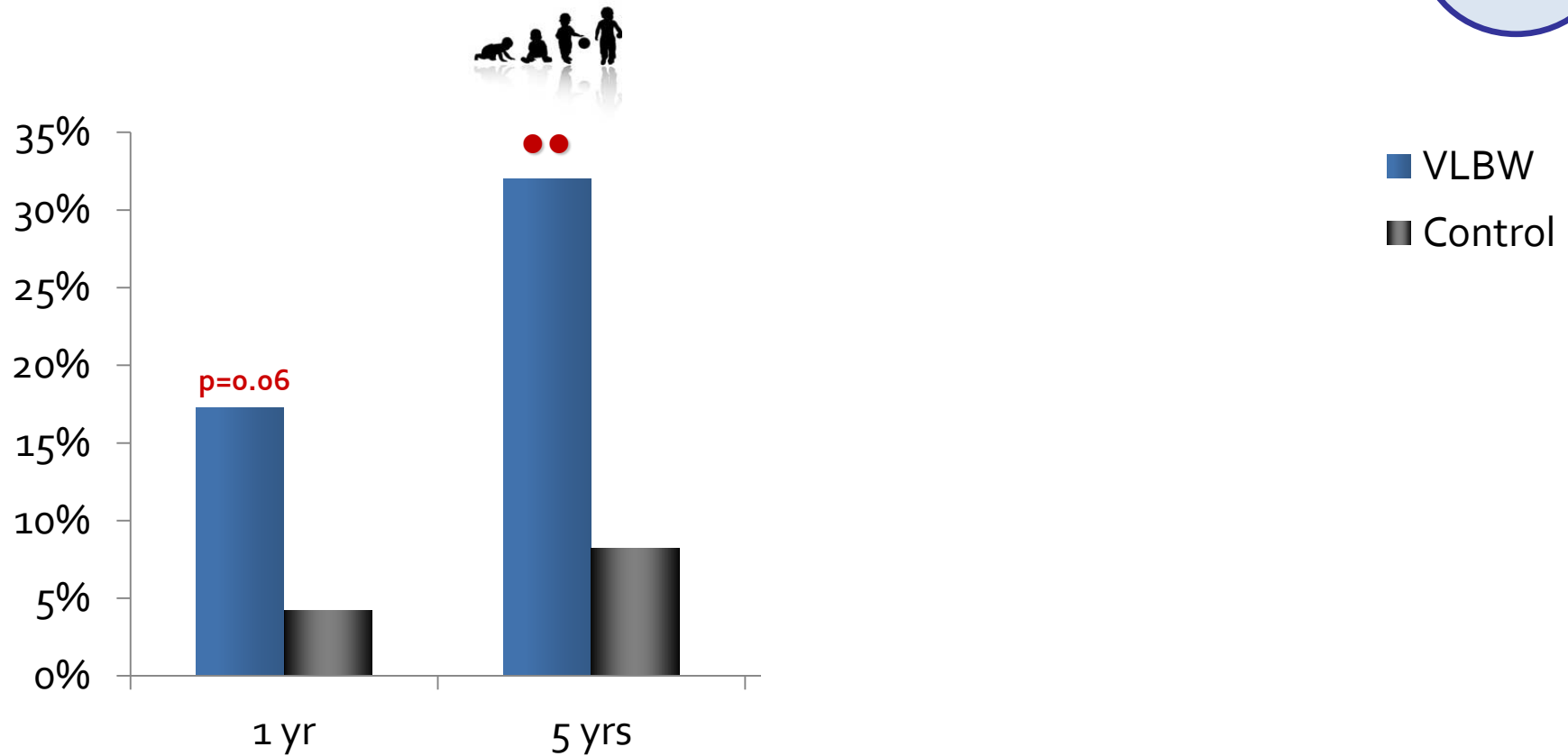
Motor problems in VLBW children

MOTOR



Motor problems in VLBW children

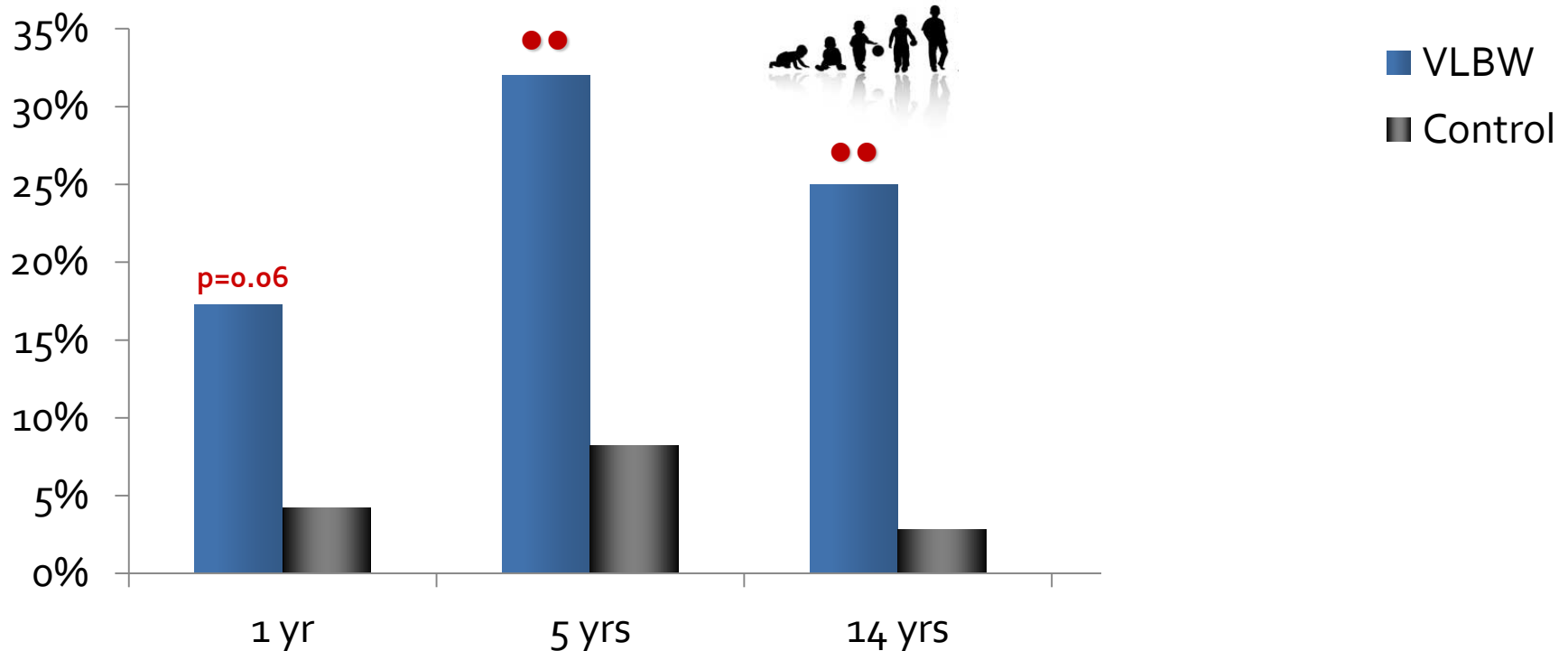
MOTOR



●● $p < 0.01$ vs. Control

Motor problems in VLBW adolescents

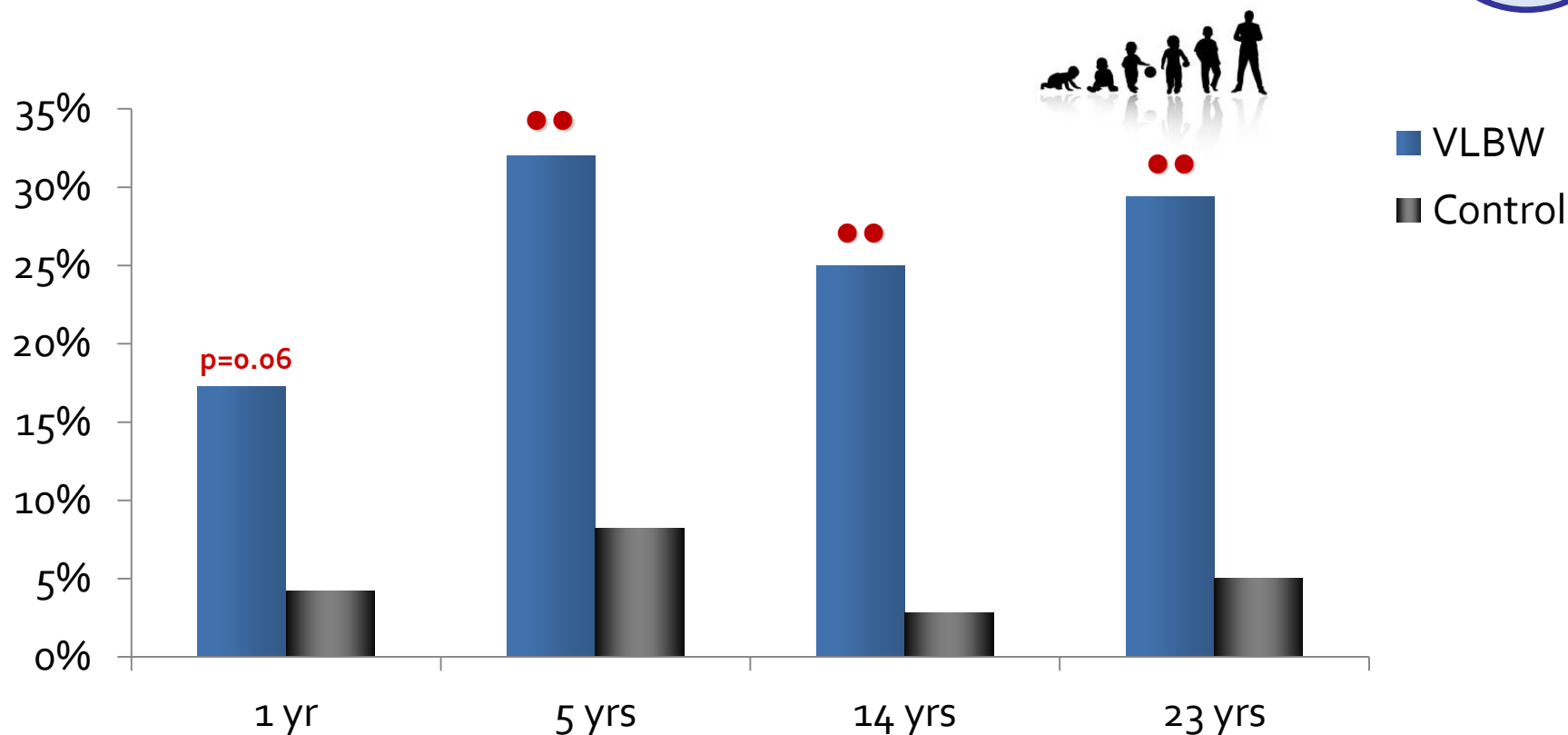
MOTOR



●● $p<0.01$ vs. Control

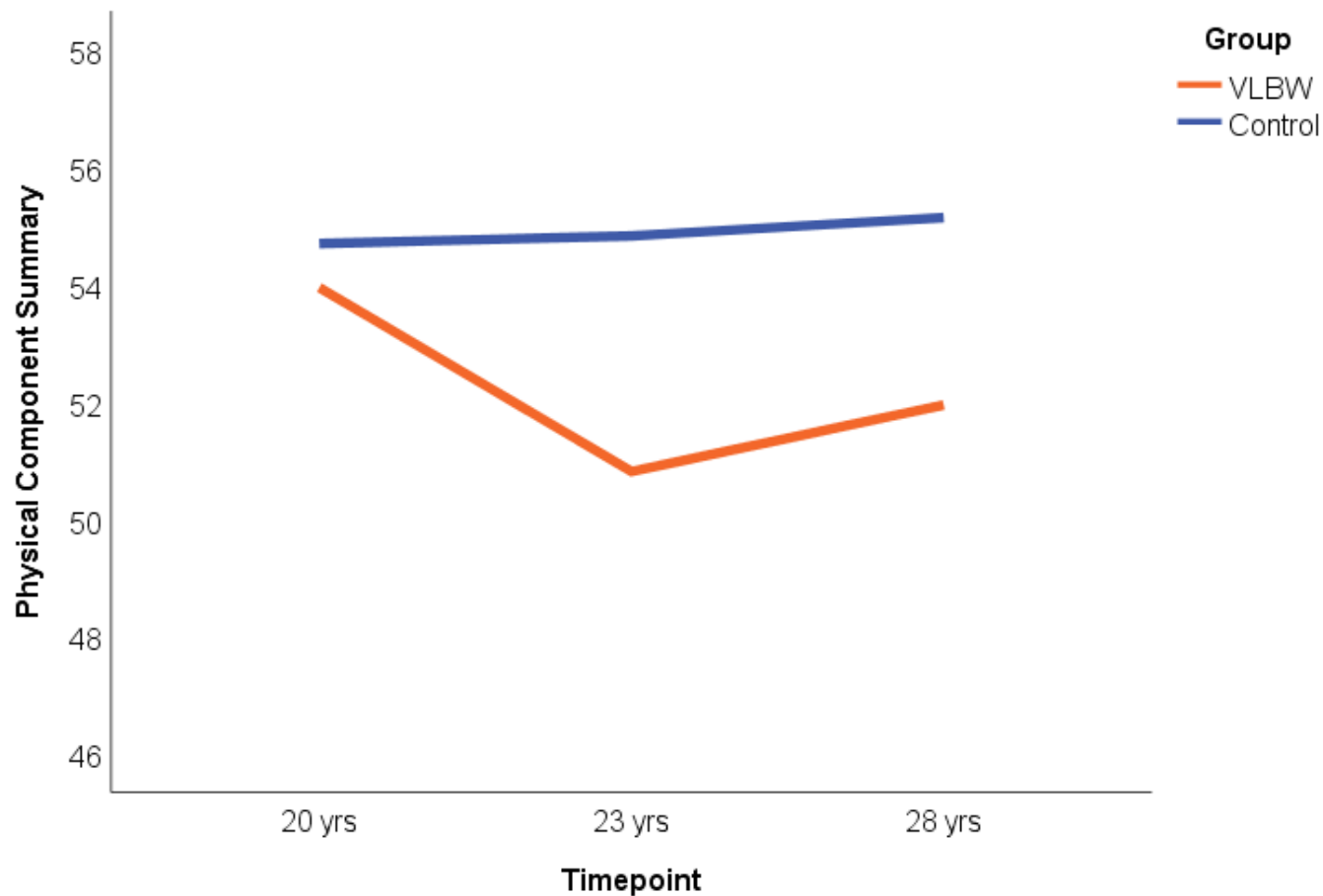
Motor problems in VLBW young adults

MOTOR



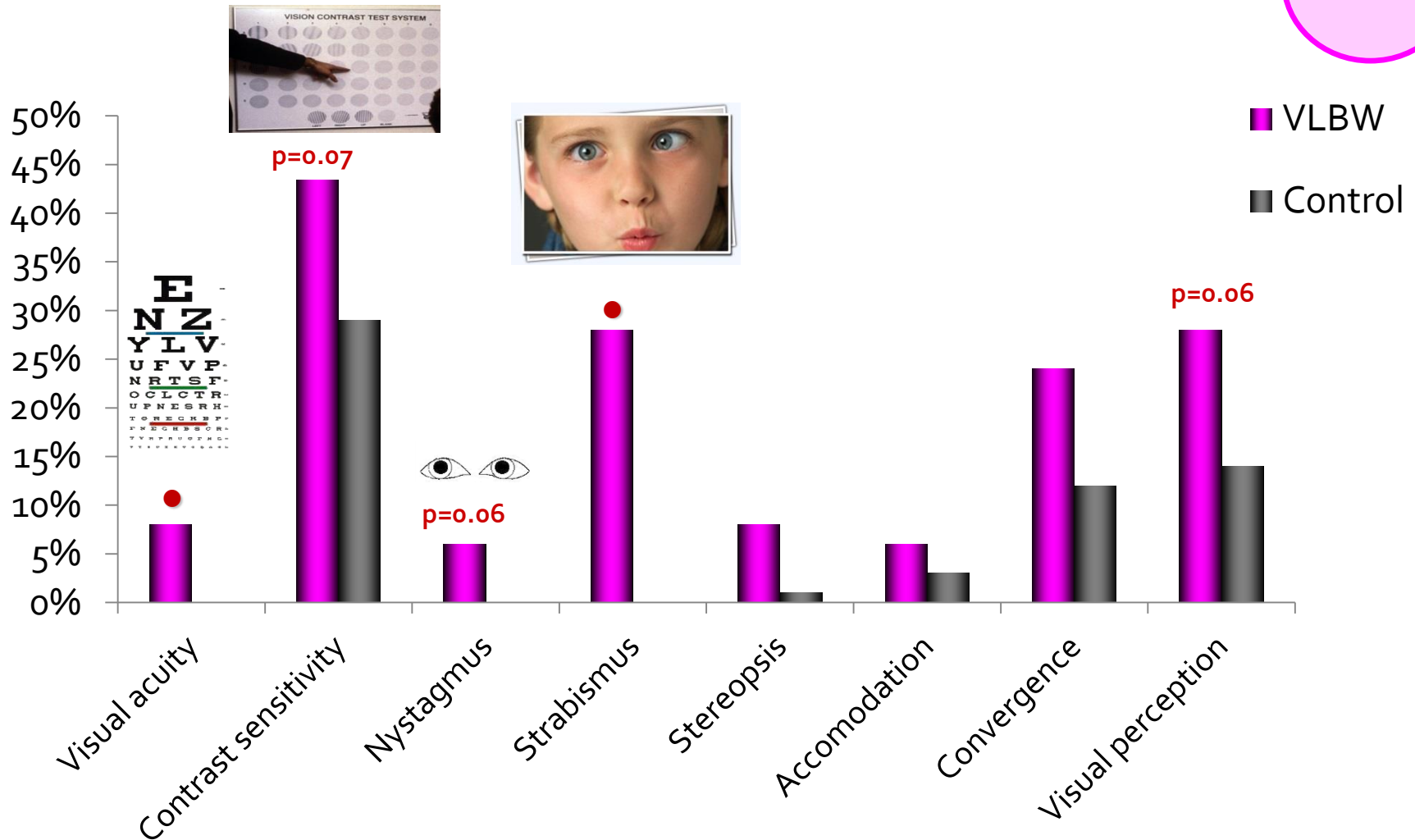
●● $p<0.01$ vs. Control

Physical health-related quality of life



Visual problems in VLBW adolescents

VISION



● p < 0.05 vs. Kontroll

Evensen et al. 2009

IQ in VLBW children

COGNITION

Mean score

120

100

80

60

40

20

0

VLBW

Control

Full IQ

Verbal IQ

Performance IQ

● $p < 0.05$, ●● $p < 0.01$ vs. Control

IQ in VLBW adolescents

COGNITION

Mean score

120

100

80

60

40

20

0

VLBW

Control

Estimated IQ
2 subscalesEstimated IQ
4 subscales

Vocabulary

Arithmetic

Block design

Picture arrangement

●● $p < 0.01$ vs. Control

IQ in VLBW young adults

COGNITION

Mean score

120

100

80

60

40

20

0

VLBW

Control

Full scale IQ

Verbal IQ

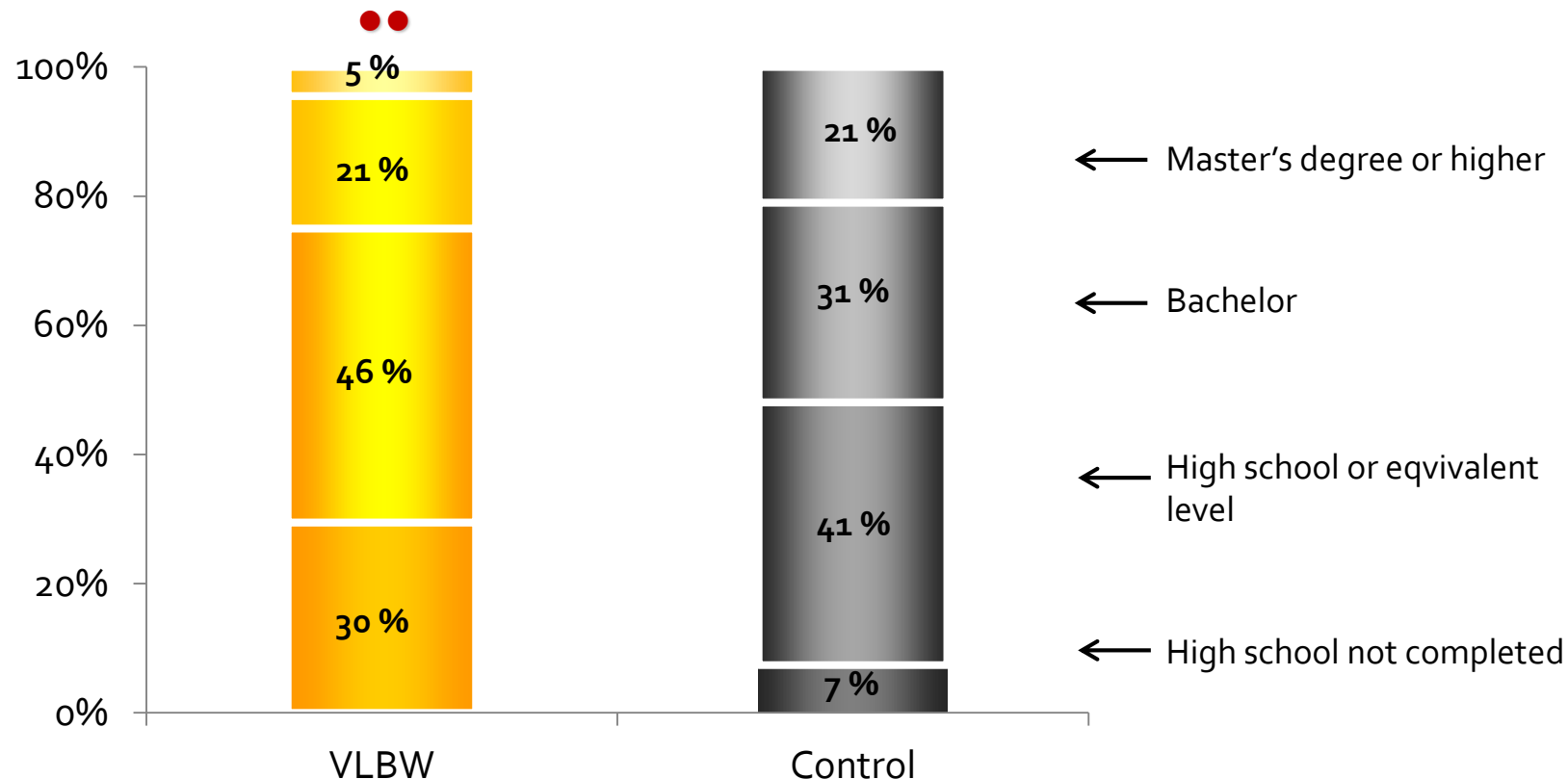
Performance IQ

●●● $p \leq 0.001$ vs. Control

Løhaugen et al. 2010

Education in VLBW young adults

COGNITION



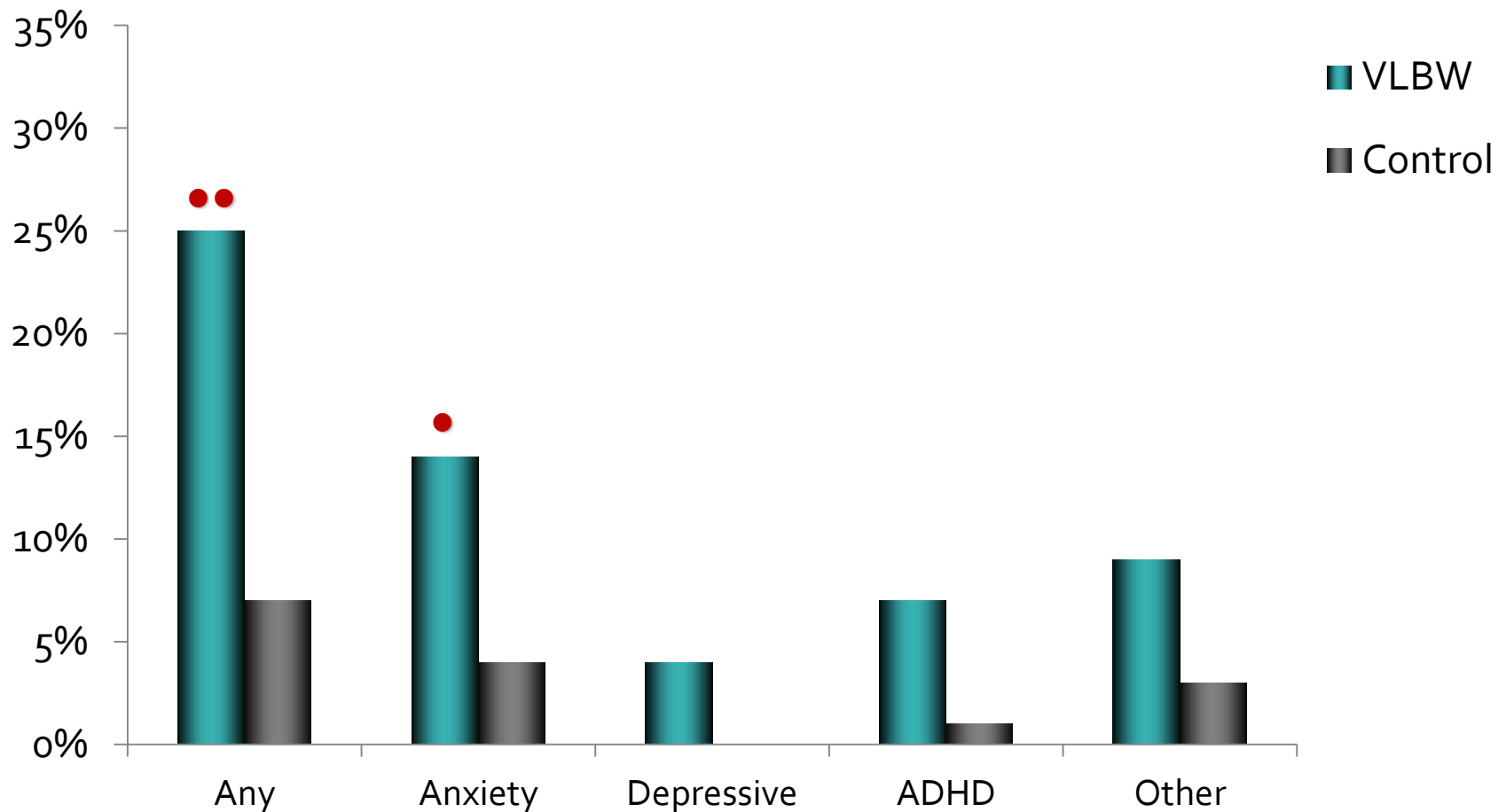
Unemployed or disability benefit:
19% VLBW vs. 5% Control

●● p<0.01 vs. Control

Lærum et al. 2017

Psychiatric diagnoses in VLBW adolescents

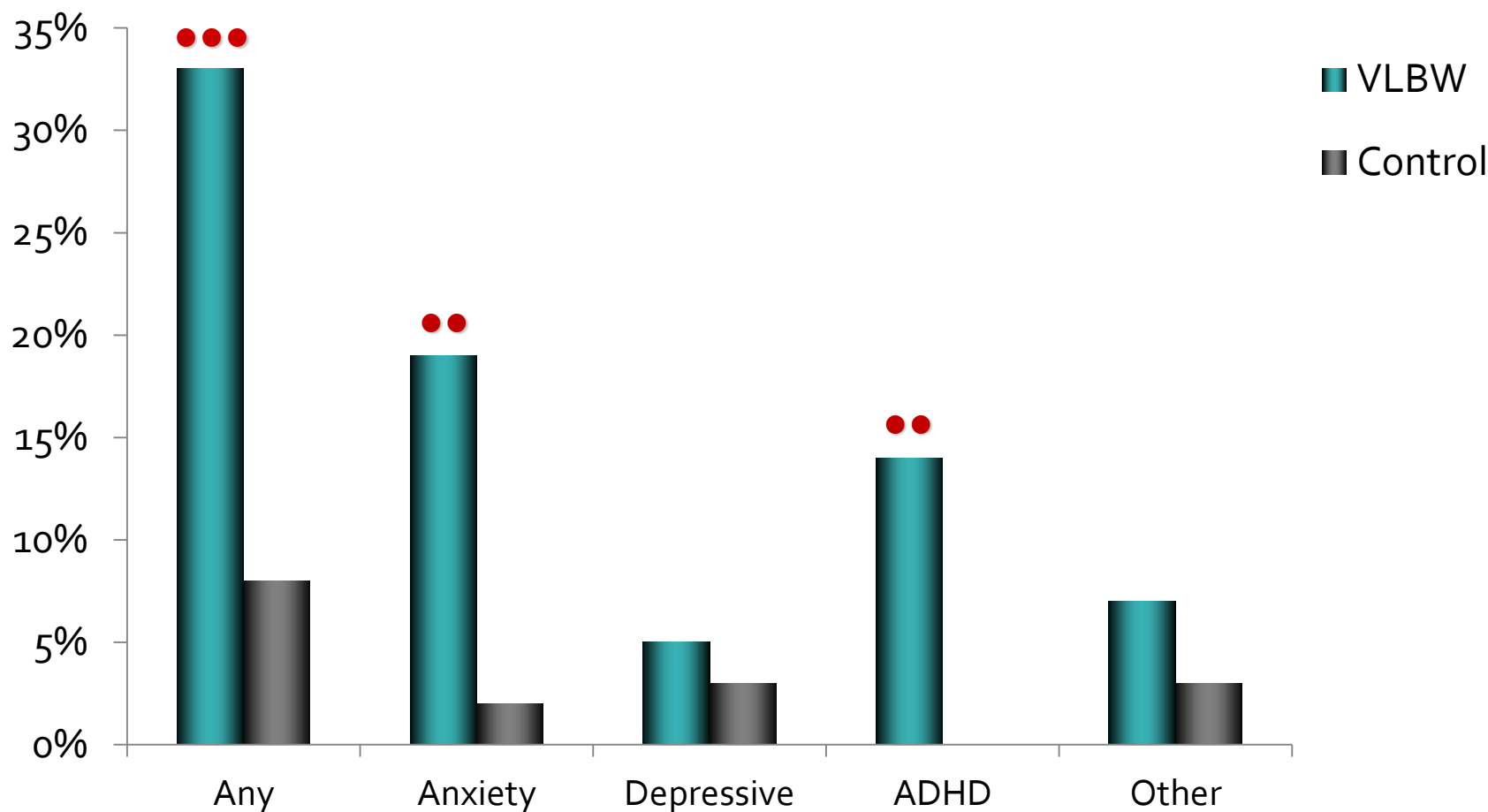
MENTAL
HEALTH



● p < 0.05, ●● p ≤ 0.01 vs. Control

Indredavik et al. 2004

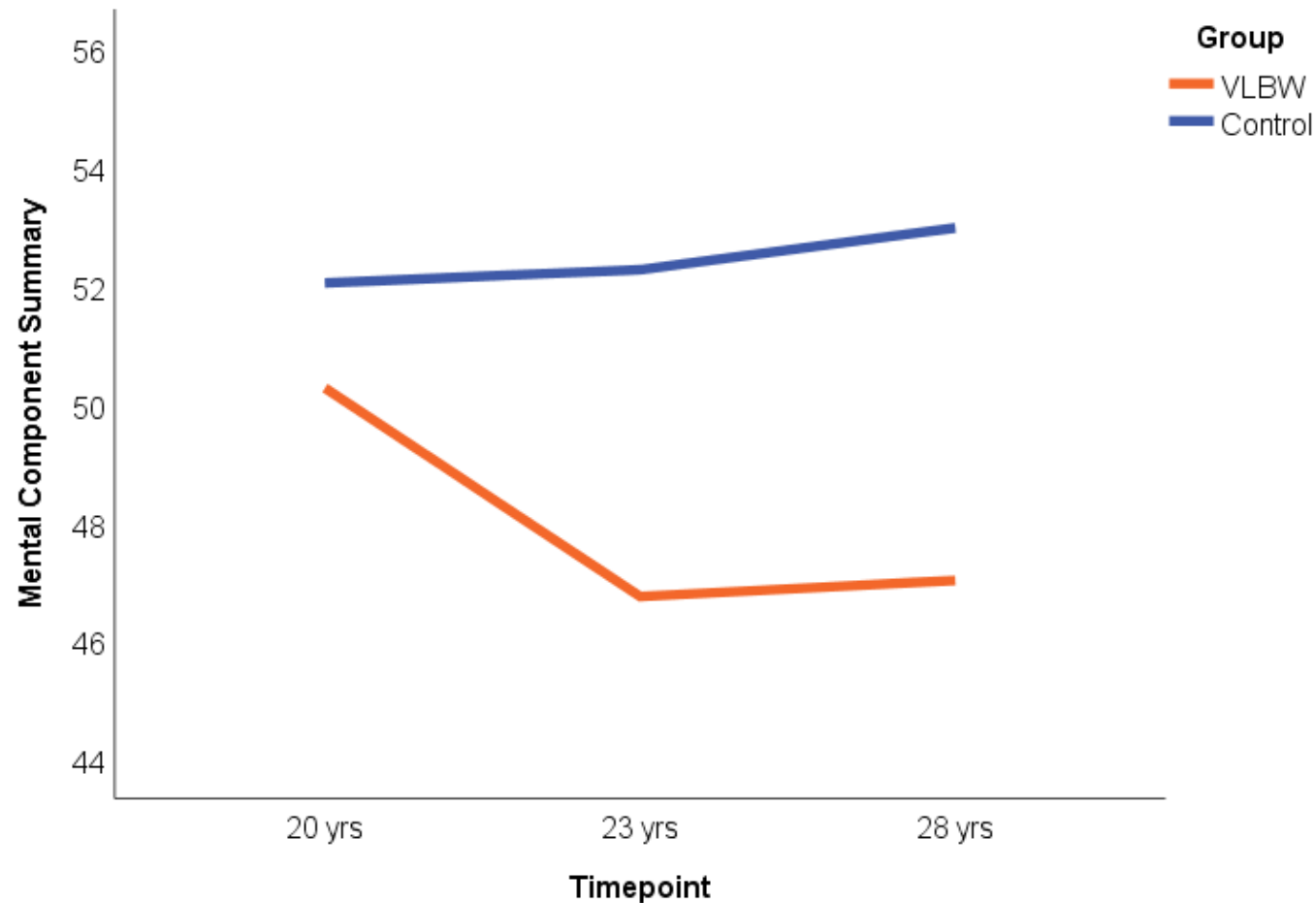
Psychiatric diagnoses in VLBW young adults

MENTAL
HEALTH

●● p < 0.01, ●●● p ≤ 0.001 vs. Control

Lund et al. 2011

Mental health-related quality of life



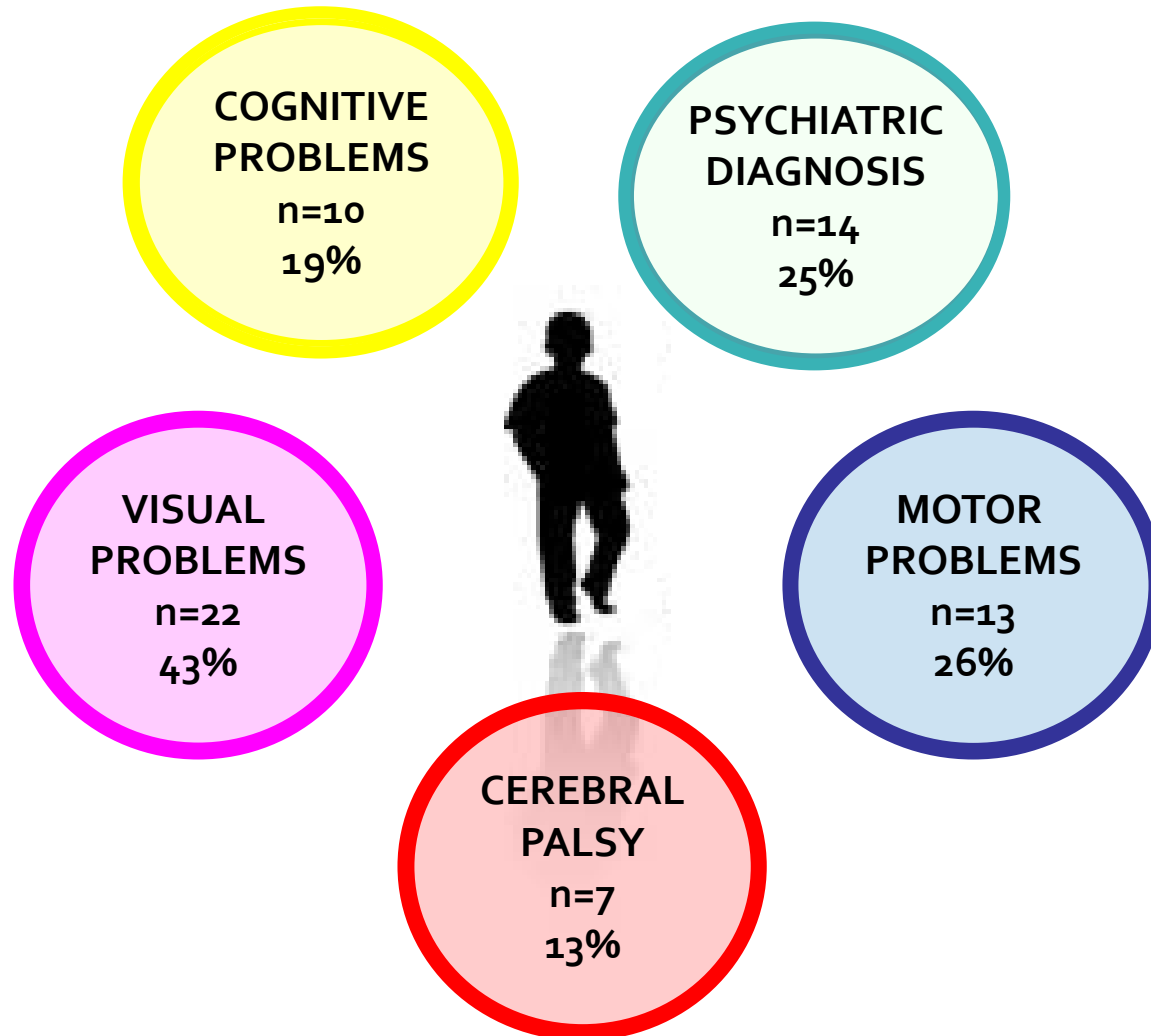
Preterm children have increased risk of motor, visual, cognitive and psychiatric problems lasting into adulthood



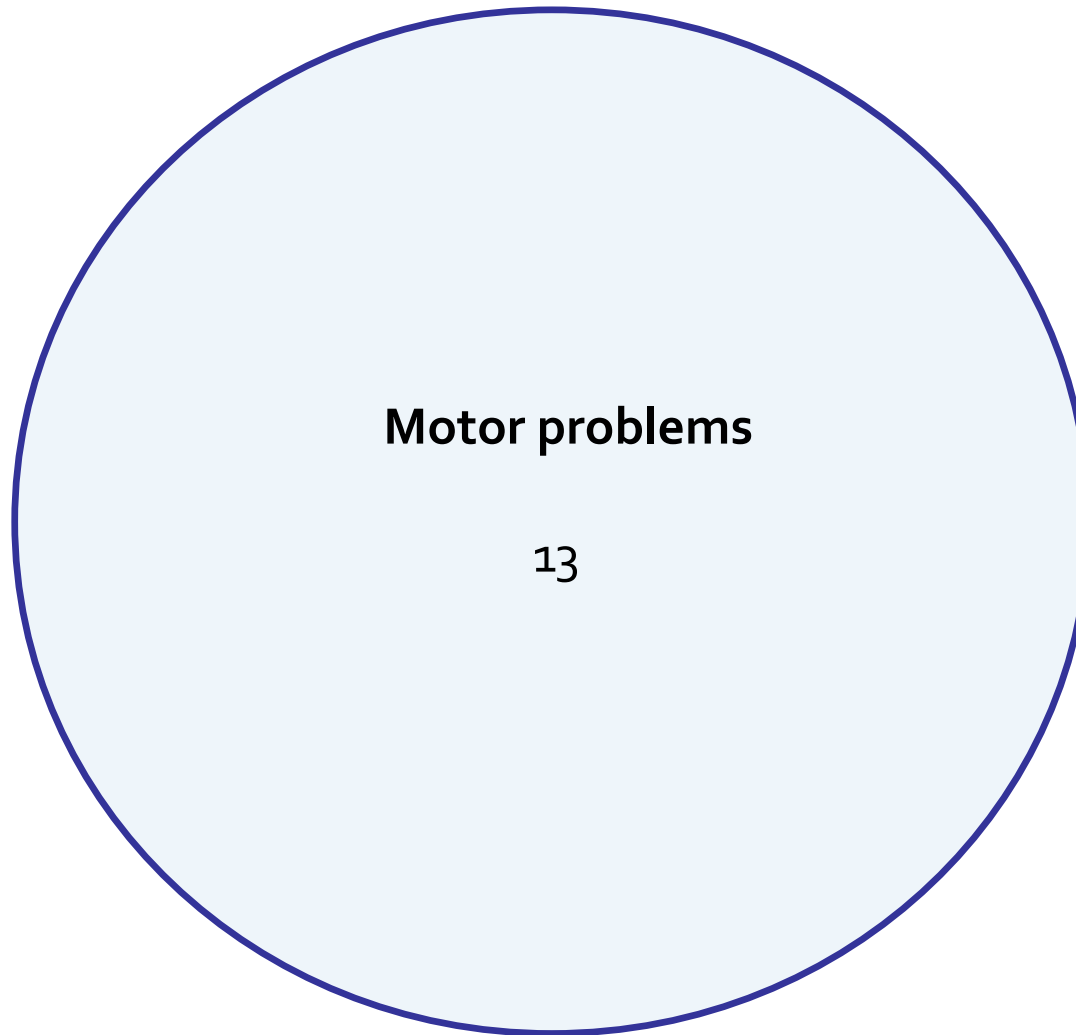
IMPLICATIONS FOR FOLLOW-UP



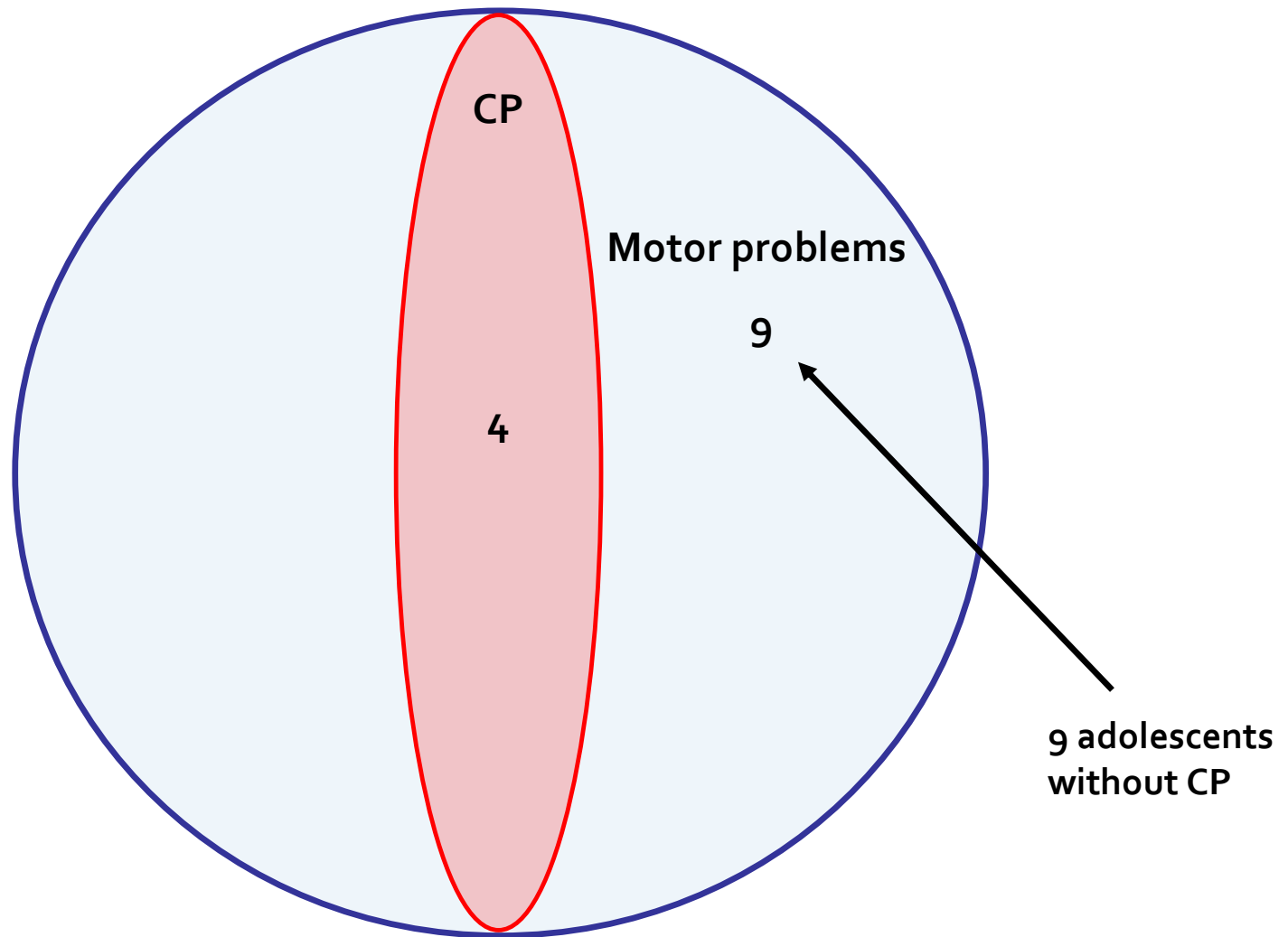
Comorbidity in VLBW adolescents



Comorbidity in VLBW adolescents

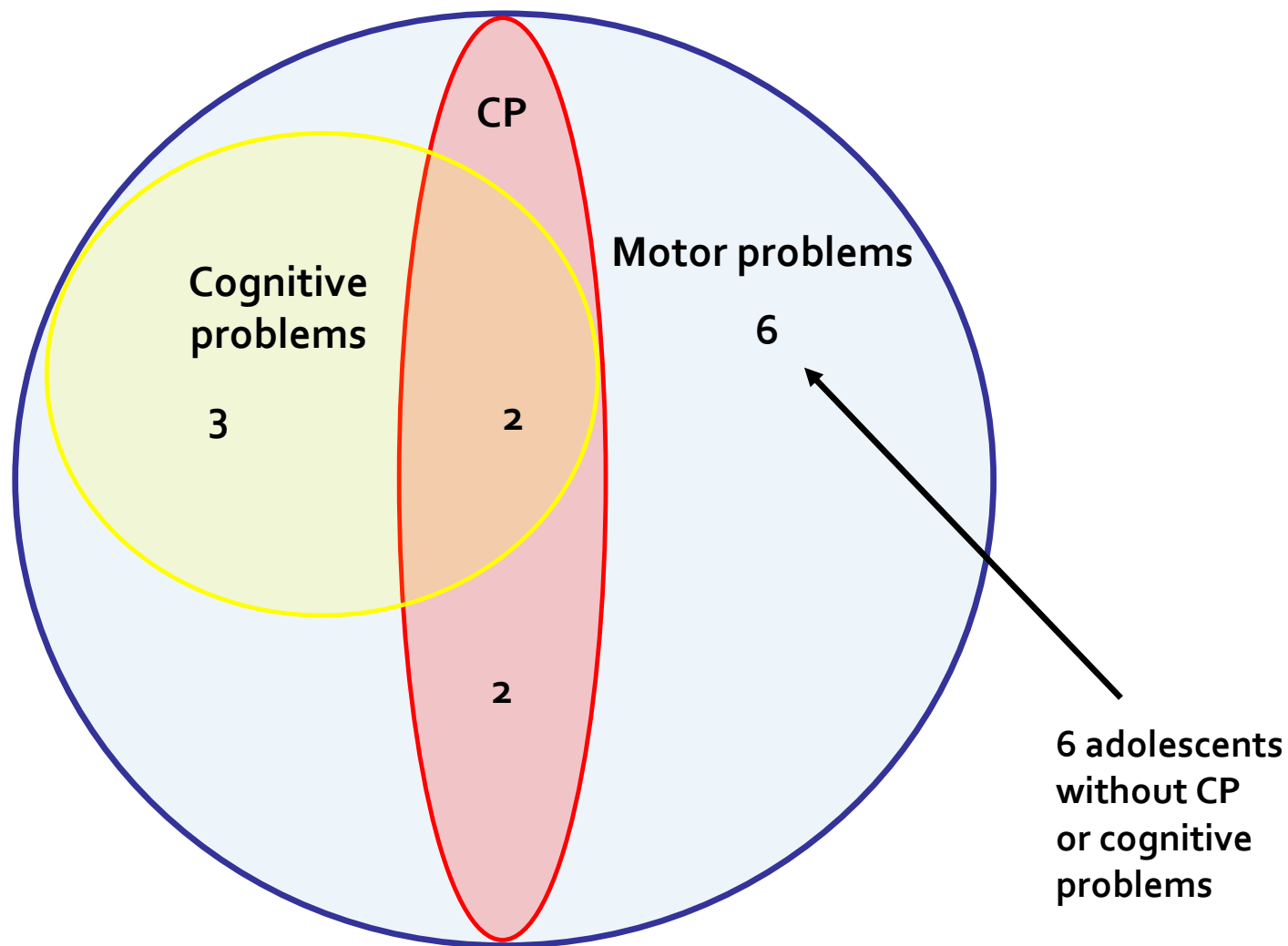


Comorbidity in VLBW adolescents

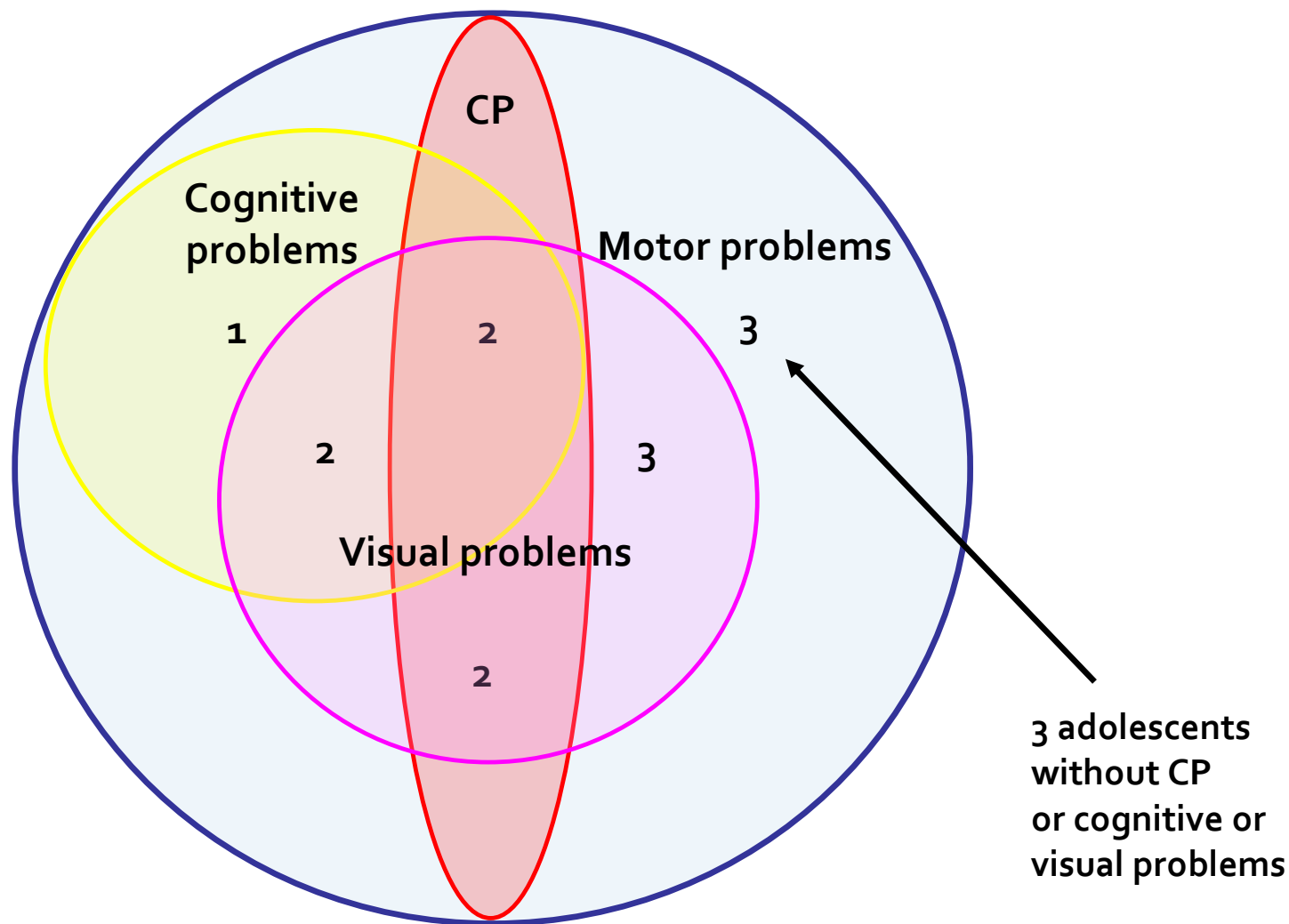


Evensen, Doctoral thesis NTNU 2010

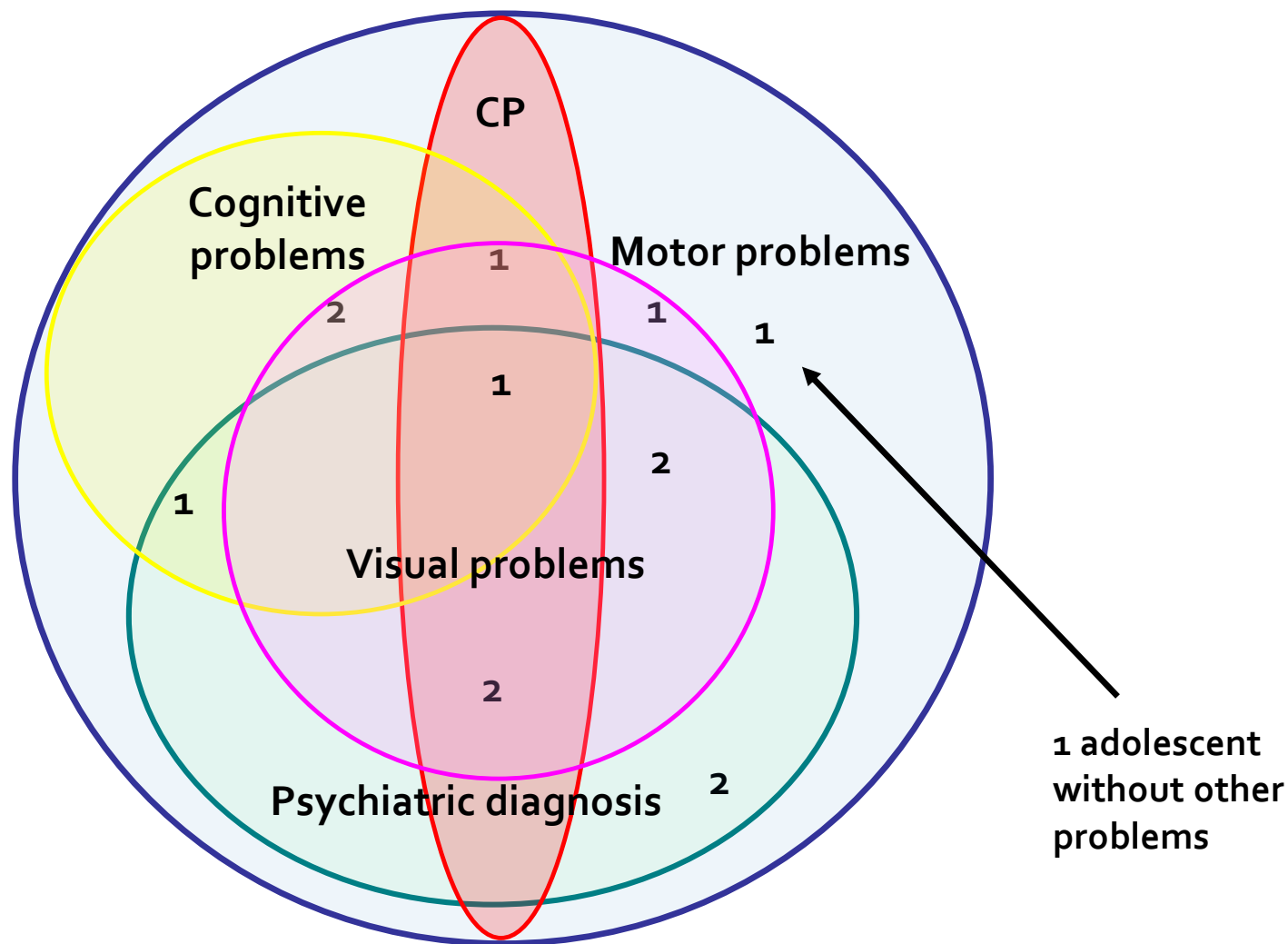
Comorbidity in VLBW adolescents



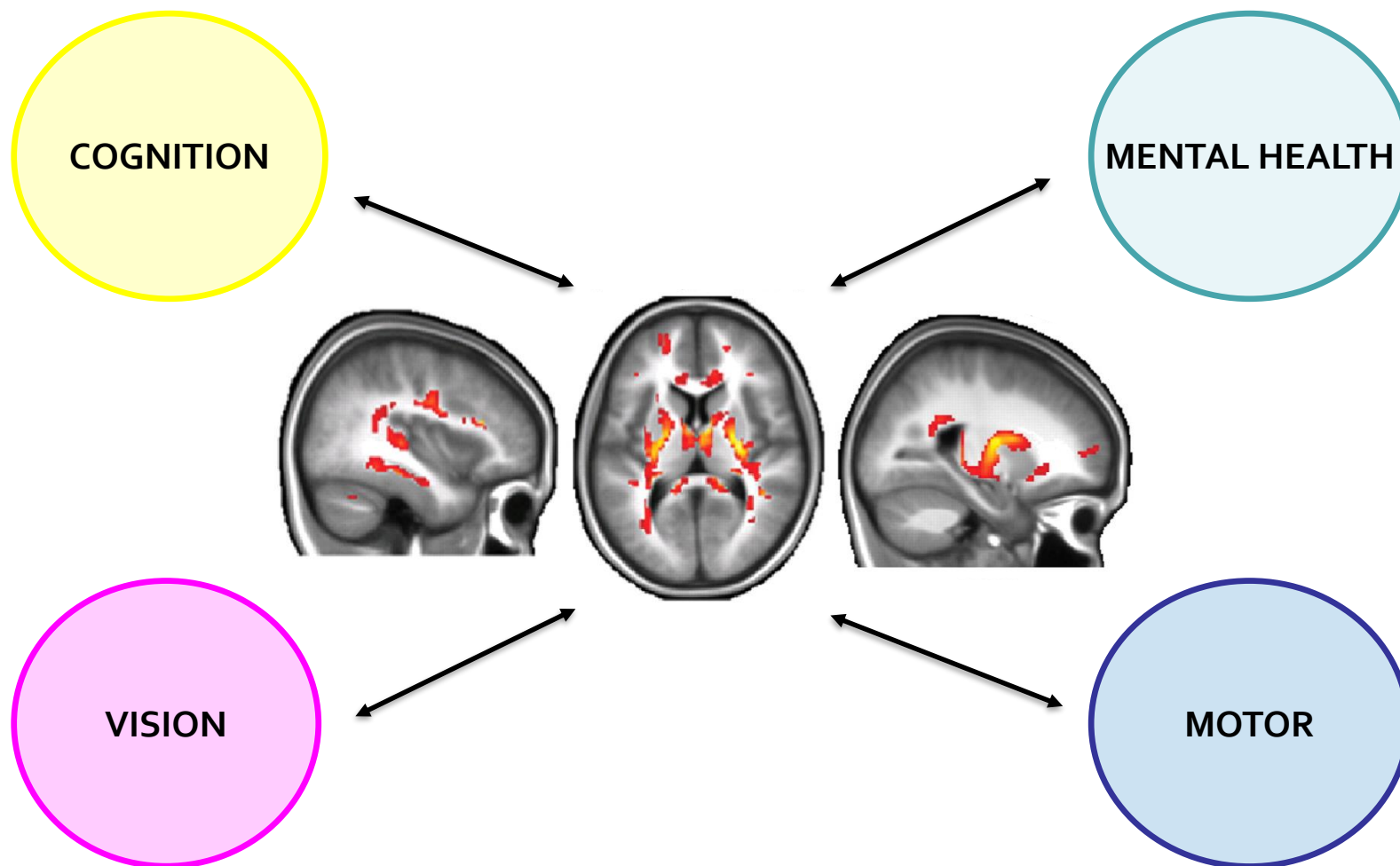
Comorbidity in VLBW adolescents



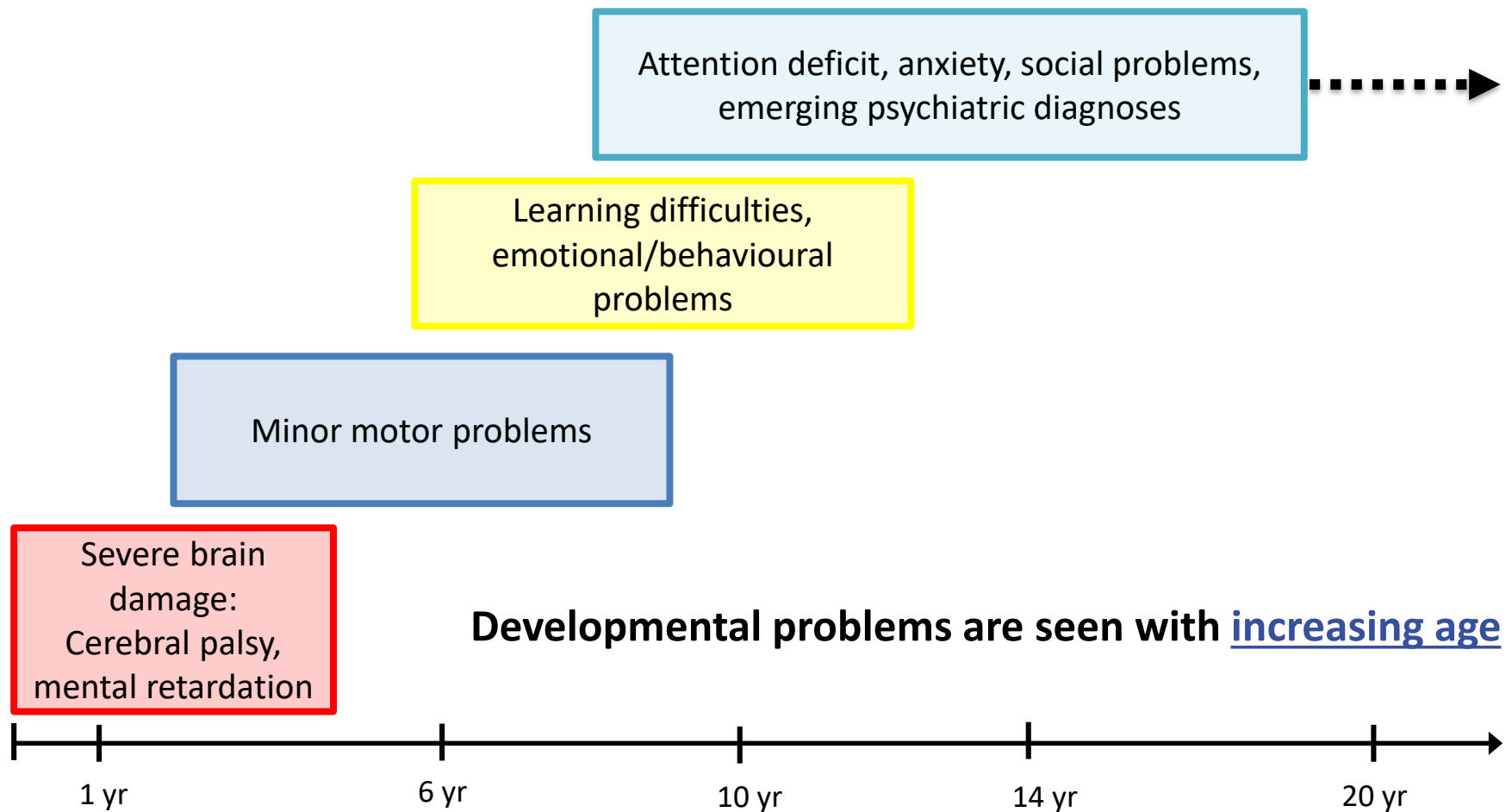
Comorbidity in VLBW adolescents



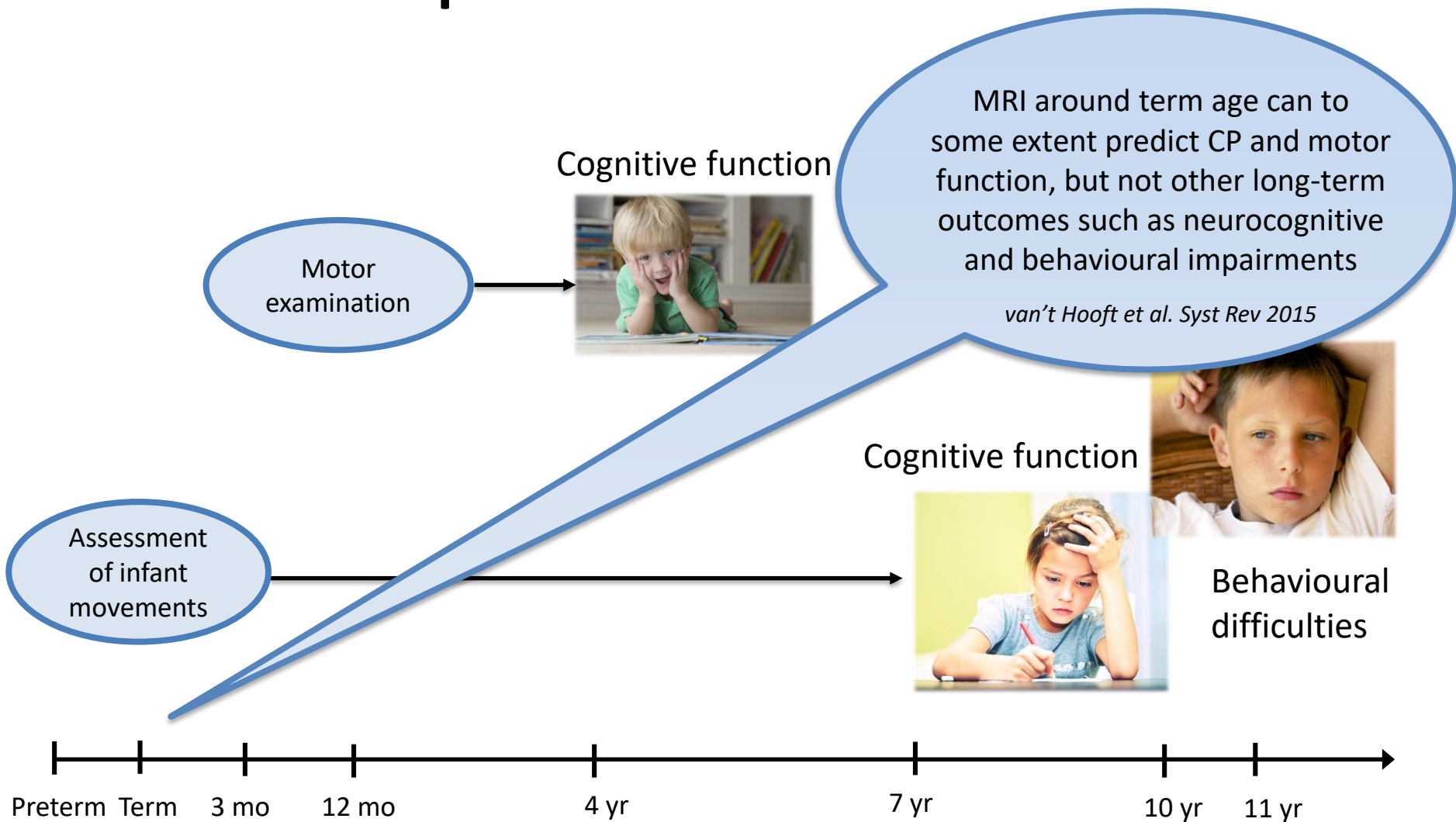
Comorbidity in VLBW adolescents



When do problems appear?



Prediction of problems



Burns et al. 2004, Butcher et al. 2009, Bruggink et al. 2010, Fjørtoft et al. 2013, Fjørtoft et al. 2015

Motor, visual, cognitive and psychiatric problems occur together – and motor problems may be an early marker



Follow-up in Trondheim Municipality

- Collaboration between public health nurses, doctors and physiotherapists in Trondheim Municipality and St. Olavs Hospital
- All children born before week 32 and/or with birth weight below 1500g
- Based on national clinical guidelines for follow-up of preterm children (Helsedirektoratet 2007)
- Systematic reviews and meta-analyses last 10 years



TRONDHEIM KOMMUNE



Follow-up in Trondheim Municipality

- Multidisciplinary
- Family-centered and home-based
- Standardised screening tools as recommended in national and international guidelines and literature:
 - Early and continuous motor evaluations
 - Continuous screening of general and socio-emotional development
 - Screening of language at 2-3 and 4 years of age



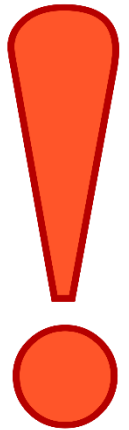
TRONDHEIM KOMMUNE



Summary



- Preterm children have increased risk for neurodevelopmental problems lasting into adulthood
- There are associations between motor, visual, cognitive and psychiatric problems as well as brain findings – and early motor problems may be a marker
- Follow-up should be multidisciplinary as well as home-based, family-centered and standardised



Thank you for your attention!

Center for early brain development

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