



## An overstretched hypothesis?

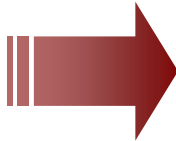
From now on, funding bodies would do well to look, perhaps exclusively, at those research designs that seek to refute the “Barker hypothesis” via the severest of challenges.

*The Lancet*

## Main hypothesis

Critical periods in fetal and early postnatal life are important for health and disease in childhood and adulthood

Early risk factors



Health promotion  
Disease prevention

**Need for cohort initiatives**

**Prospective cohort studies**

**Early fetal life (in-utero) cohorts**

**Birth cohorts**

**Example: Generation R**

# Design Generation R



Prospective cohort study since 2003  
From early fetal life until young adulthood  
10,000 parents and children  
Urban, multi-ethnic population, Rotterdam  
Detailed measurements in total cohort  
Imaging studies  
Genetic studies



# Research projects

## Erasmus Medical Center

Child & Adolescent Psychiatry

Epidemiology & Biostatistics

Obstetrics & Gynaecology

Pediatrics

Public Health

## Erasmus University Rotterdam

Erasmus School of Law

Faculty of Social Sciences

## Municipal Health Service



- Growth & development
- Behaviour & cognition
- Diseases in childhood
- Health & health care

# Prenatal ultrasound measurements



Gestational age at measurement

Early preg.: 12 weeks

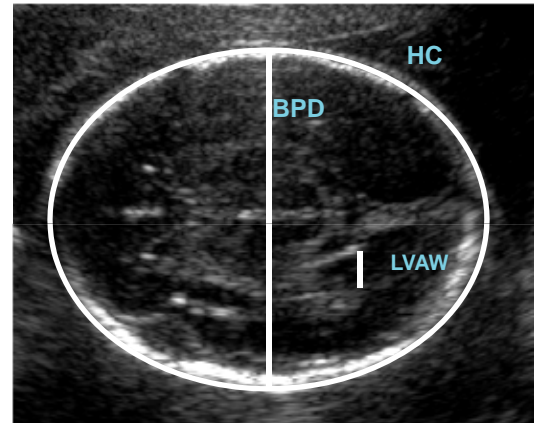
Mid-preg. : 20 weeks

Late preg. : 30 weeks



Measures:

- abdominal circumference
- head circumference, biparietal diameter
- femur length
- estimated foetal weight



# Smoking, alcohol and drugs in pregnancy

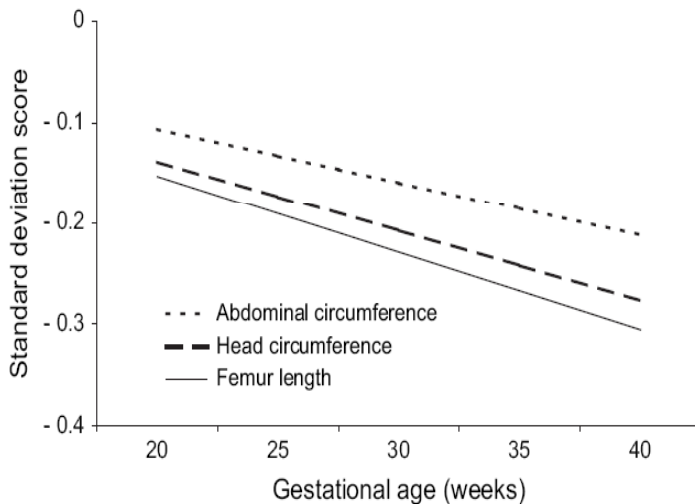


	<b>Not</b>	<b>Until pregnancy was known</b>	<b>During pregnancy</b>
Smoking	75%	8%	17%
Alcohol	49%	14%	37%
Drugs	93%	3%	2%

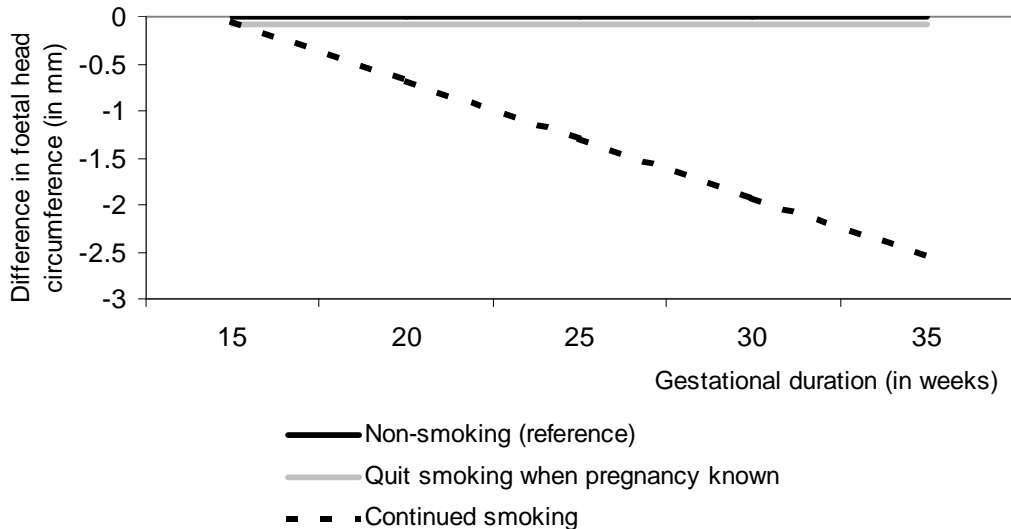
*Jaddoe V, Am J Epidemiol 2007*

*Jaddoe V, Ann Epidemiol 2007*

# Smoking and fetal growth



# Smoking and prenatal head growth

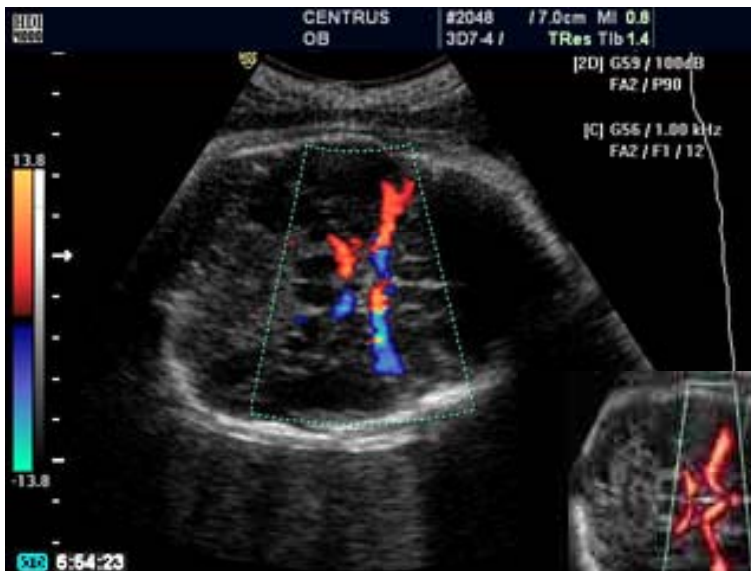


*Children of mothers who continue smoking also have smaller cerebelli and smaller cerebral ventricles*

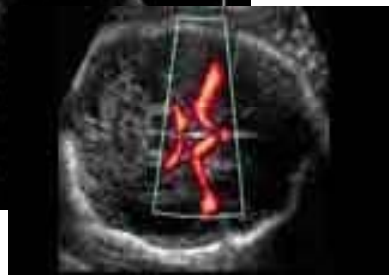
*Roza et al., Eur Neuroscience 2007*

# Pre and early postnatal brain imaging

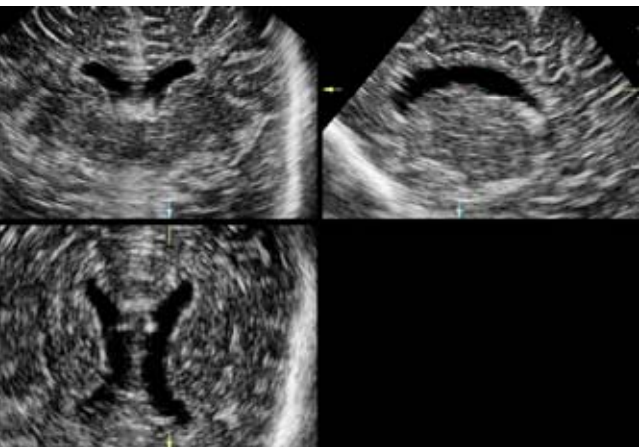
## Foetal blood flow measurements



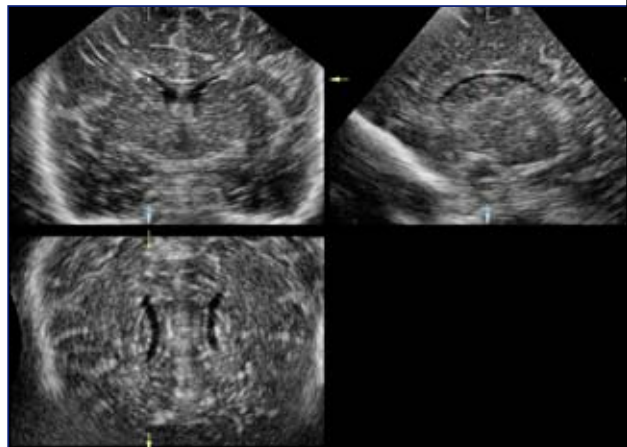
- PI a.cerebri media
- PI a. cerebri anterior
- PI a. umbilicalis
- 'Brain-sparing' effect



# Postnatal 3D-brain ultrasound



*Large ventricles*



*Small ventricles*



*Age 6 weeks*

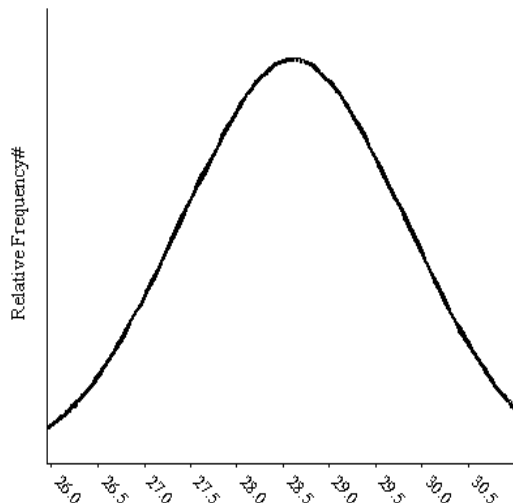
# Foetal size in late pregnancy and infant alertness at 3 months



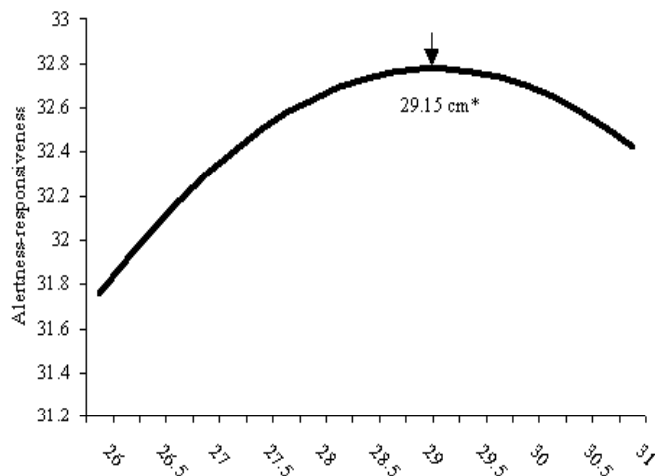
*Head circumference*

*in relation to*

*infant alertness*

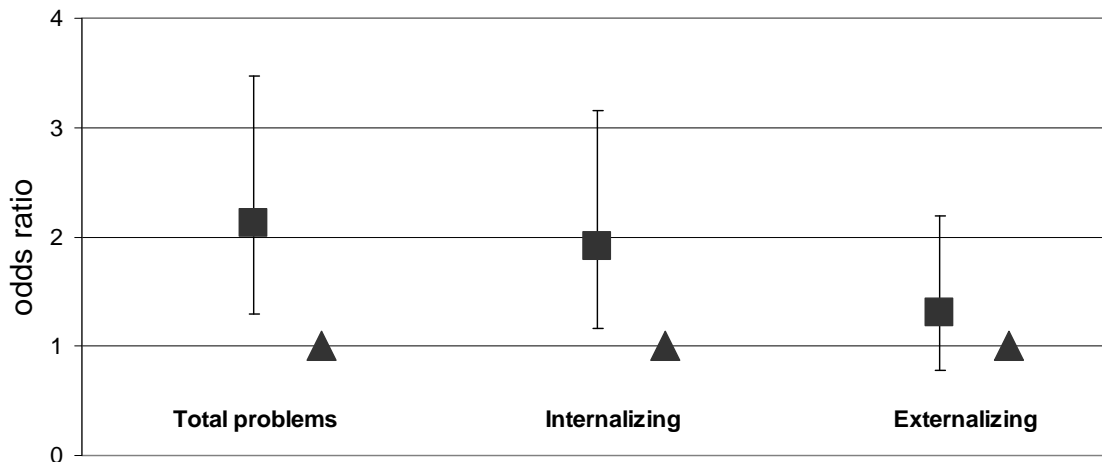


Head circumference in late pregnancy; Mean: 28.57 cm (SD: 1



Head circumference in late pregnancy (cm)

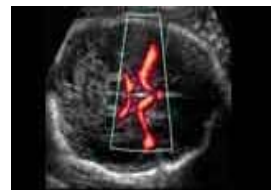
# Foetal blood flow and behavioural problems



■ fetal circulatory redistribution

▲ no fetal circulatory redistribution

*Effects of emotional-reactive  
and attention problems*



Roza et al., Am J Epi 2008

# New projects: MRI brain scanning

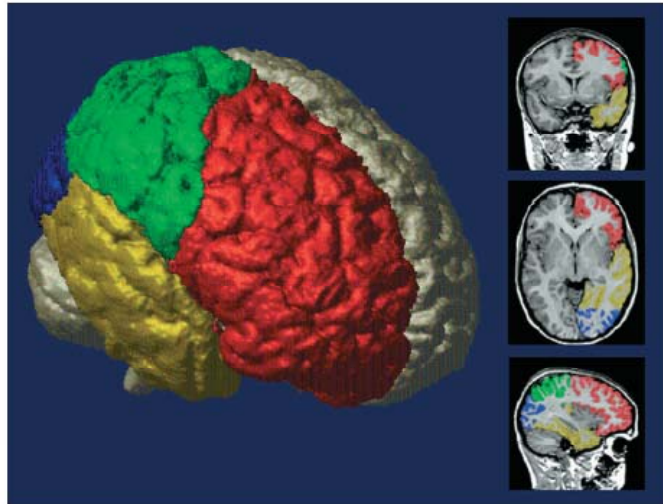


The phantom or  
mock scanner



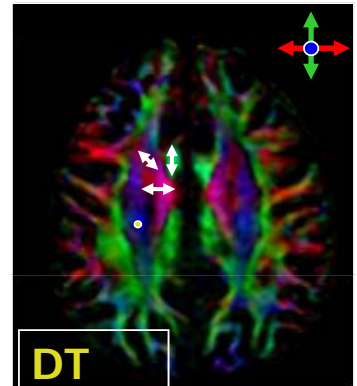
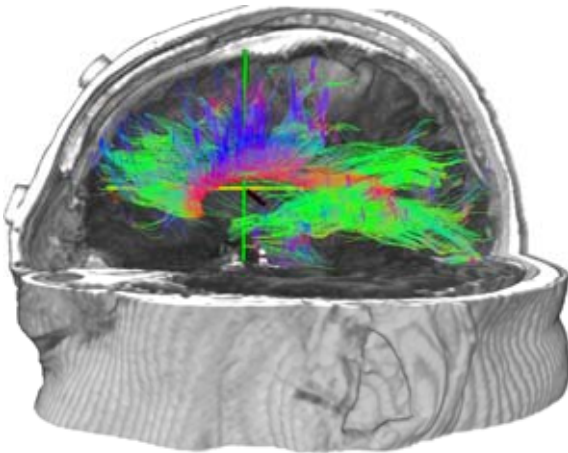
# Prenatal nicotine and the child brain

- is there an effect of prenatal nicotine exposure on brain development of 6 year-old children?



# Cognition and white matter development

- Children with a high level of cognitive functioning will have a different growth trajectory of white matter than children with a low level of cognitive functioning.



DT  
MRI

Erasmus MC  
*Erasmus*

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## Principal investigators

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Epidemiology, Internal Medicine, Public Health

## Clinical fellows, PhD students, junior post-docs



Thank you

