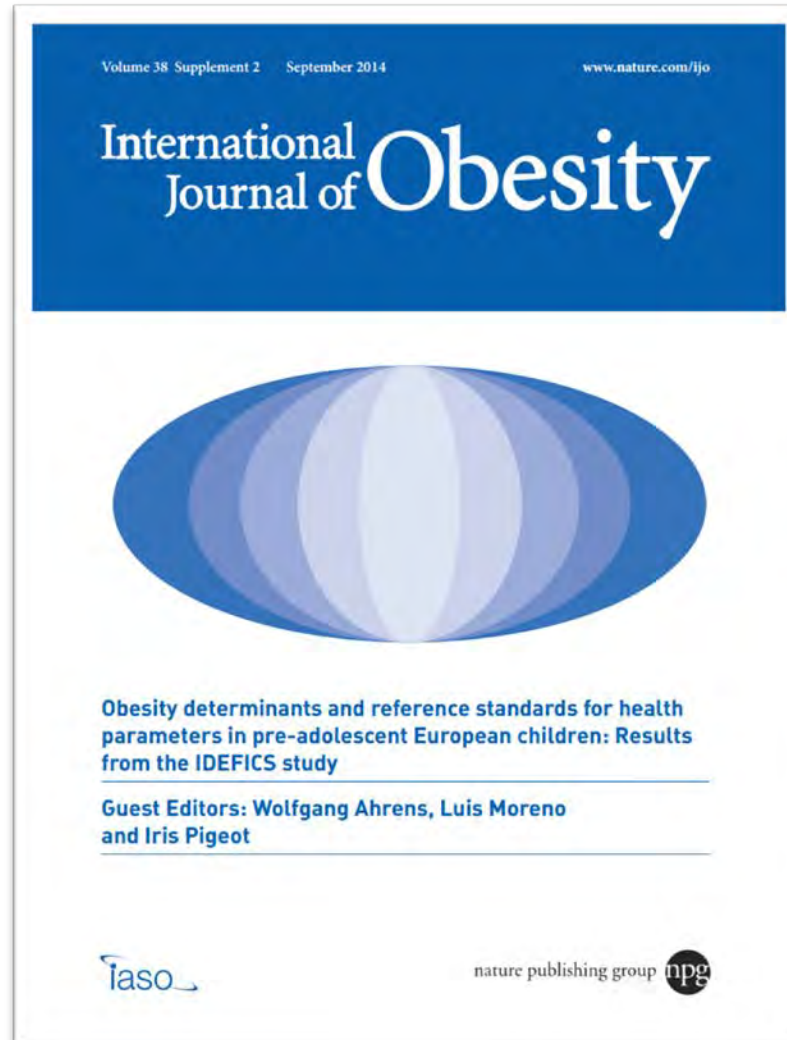


Blood lipids among young children in Europe: results from the European IDEFICS study

*Eva Erhardt MD, PhD
Department of Paediatrics, University of Pécs- HUNGARY*

*Prof. Stefaan De Henauw PhD
Ghent University - BELGIUM
- on behalf of the IDEFICS consortium -*





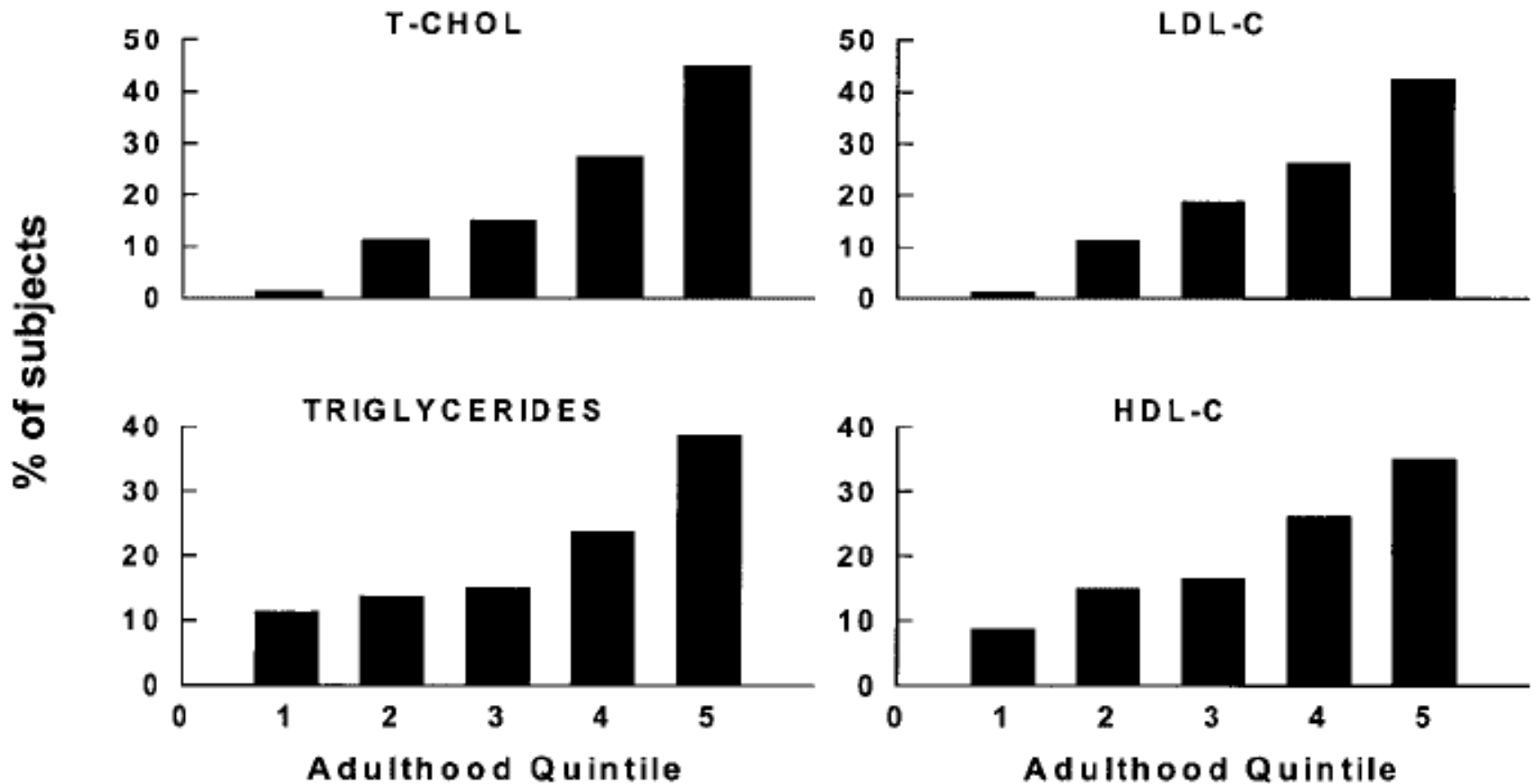
- **Introduction : importance of reference values for blood lipids in children**
- **IDEFICS results for blood lipids**
- **Discussion**

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Blood lipids reference values in children. What is the relevance?

- **Blood lipids are the result of cumulative interactions between genotype and “environmental” factors (diet, physical activity, sleep, stress, ...)**
- **Blood lipids in youth tend to track (= sustain over time) towards and throughout adulthood**

Distribution of serum lipids after 15 years follow-up in subjects with elevated lipid values (> 80th percentile) at baseline (5-14 years) - The Bogalusa Heart Study



Blood lipids reference values in children. What is the relevance?

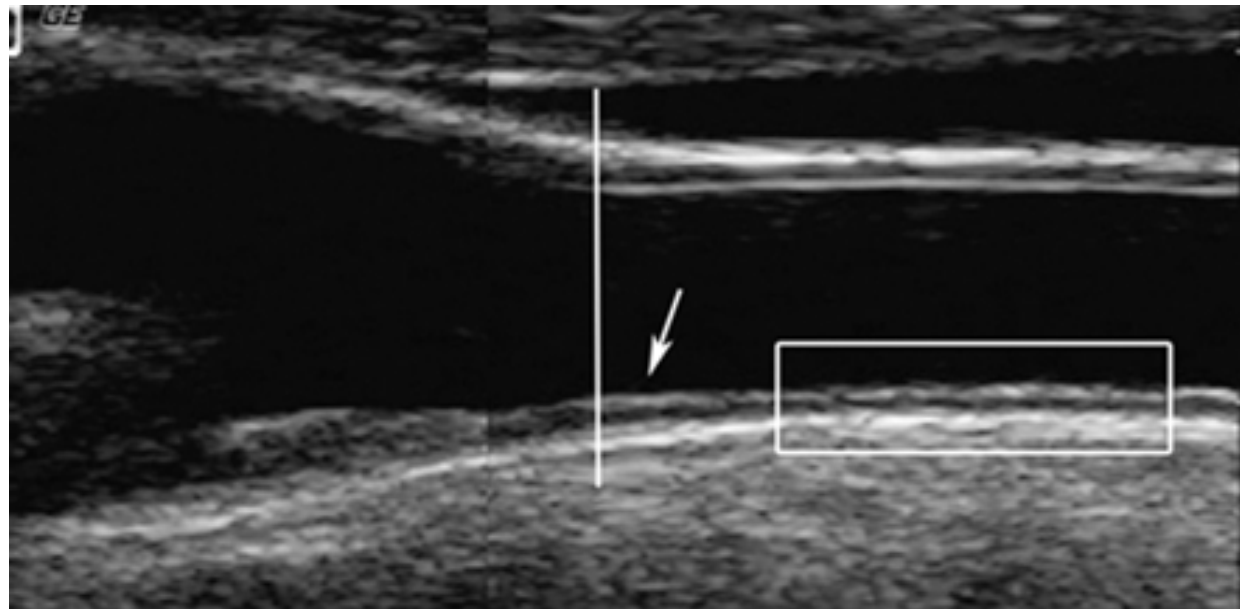
- Blood lipids are the result of cumulative interactions between genotype and “environmental” factors (diet, physical activity, sleep, stress, ...)
- Blood lipids in youth tend to track (= sustain over time) towards and throughout adulthood
- Blood lipids play a role in a number of “disease pathways”

- **Bogalusa Heart Study**

(N=486)

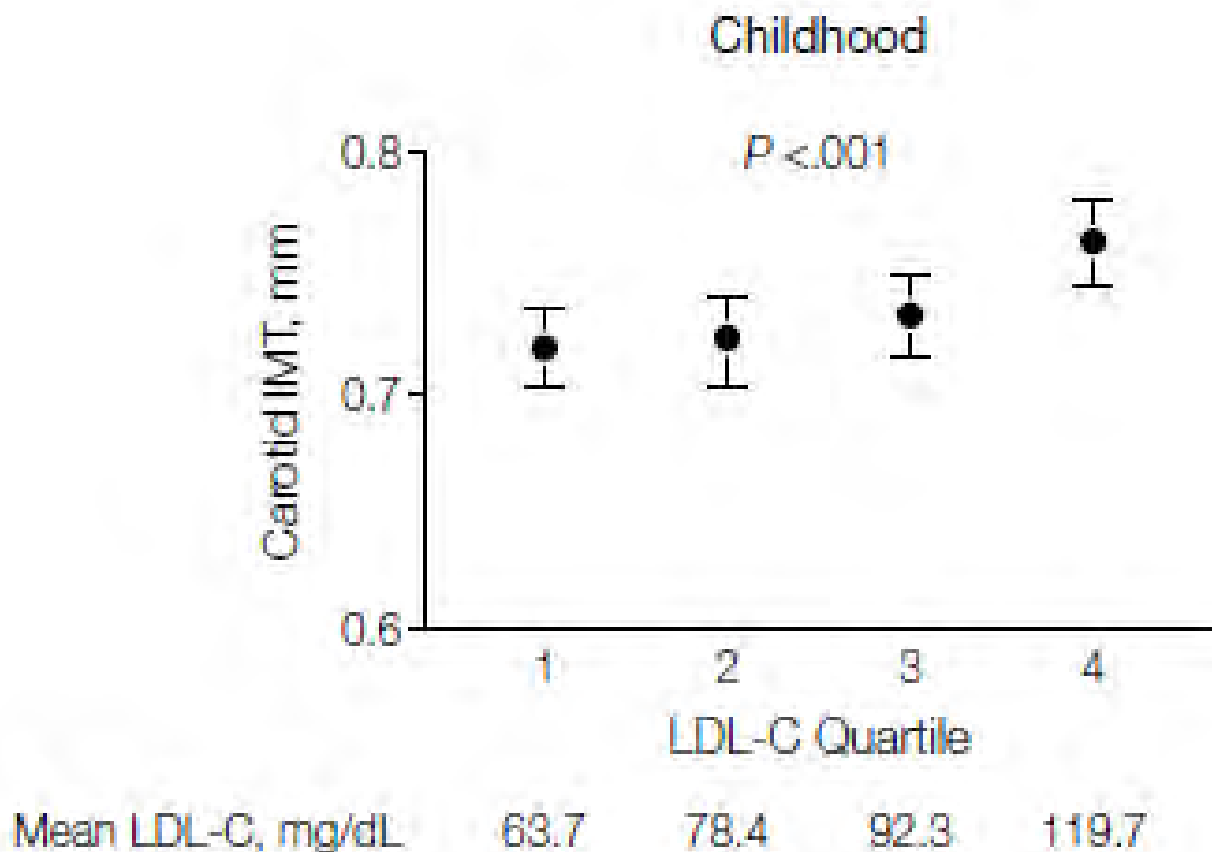
Childhood measurement of LDL-C and BMI predict carotid IMT
(Intima Media Thickness) in young adults

(JAMA.2003;290:2271-2276)



Childhood Cardiovascular Risk Factors and Carotid Vascular Changes in Adulthood

The Bogalusa Heart Study

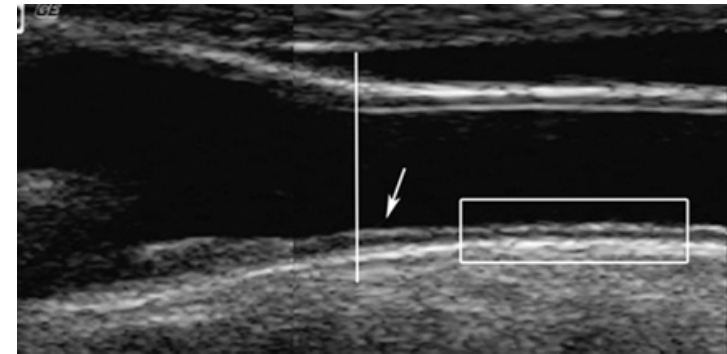


- **Bogalusa Heart Study**

(N=486)

Childhood measurement of LDL-C and BMI predict carotid IMT in young adults

(JAMA.2003;290:2271-2276)



- **The Cardiovascular Risk in Young Finns Study**

(N = 2229)

Risk factor profile assessed in 12-18 year olds predicts adult carotid IMT independently of contemporaneous risk factors.

“Suggesting that exposure to CVD RF early in life may induce changes in arteries that contribute to the development of atherosclerosis”.

(JAMA.2003;290:2277-2283)

MS – IDF criteria

Age group (years)	Obesity* (WC)	Triglycerides	HDL-C	Blood pressure	Glucose (mmol/L) or known T2DM
6–<10	≥90 th percentile	Metabolic syndrome cannot be diagnosed, but further measurements should be made if there is a family history of metabolic syndrome, T2DM, dyslipidemia, cardiovascular disease, hypertension and/or obesity.			
10–<16 Metabolic syndrome	≥90 th percentile or adult cut-off if lower	≥1.7 mmol/L (≥150 mg/dL)	<1.03 mmol/L (<40 mg/dL)	Systolic ≥130/ diastolic ≥85 mm Hg	≥5.6 mmol/L (100 mg/dL) (If ≥5.6 mmol/L [or known T2DM] recommend OGTT)

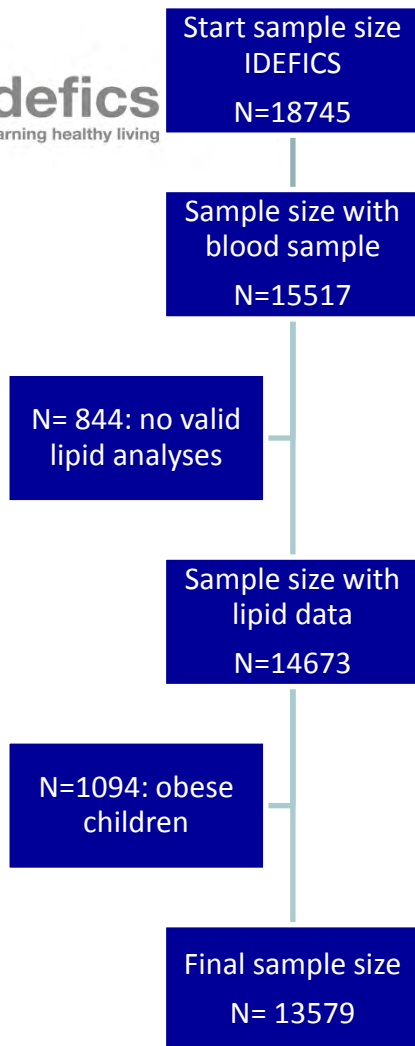
abdominal obesity and the presence of two or more other clinical features

The IDF consensus definition of the metabolic syndrome in children and Adolescents.
IDF Communications, © International Diabetes Federation, 2007 ISBN 2-930229-49-7

- **Blood lipids are the result of cumulative interactions between genotype and “environmental” factors (diet, physical activity, sleep, stress, ...)**
- **Blood lipids in youth tend to track (= sustain over time) towards and throughout adulthood**
- **Blood lipids play a role in a number of “disease pathways”**
- **Blood lipids in children can be considered as early indicators of healthy aging process**
- **Blood lipids reference values in children can be a useful tool for clinical and public health practice**

- **Introduction : importance of reference values for blood lipids in children**
- ***IDEFICS results for blood lipids***
- **Discussion**





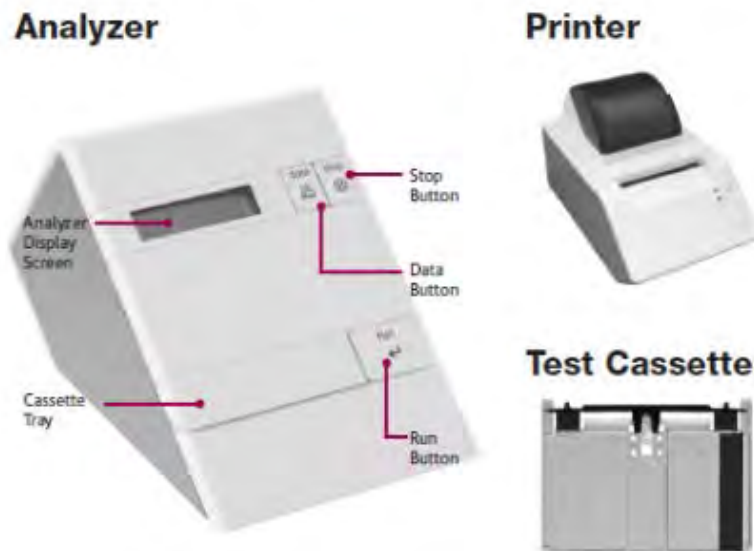
- 13 579 European non-obese children (50.3% boys) aged 2-11 years
- Period : 2007 - 2010
- Standardised methods for field work

Fasting blood: venous or capillary

- HDL-cholesterol (HDL-C)
- LDL-cholesterol (LDL-C - calculated)
- Total cholesterol (TC)
- Triglycerides (TG)
- TC/HDL-C ratio



- **Point-of-care analyser (Cholestech)**



- **Sex- and age-specific reference values with the GAMLSS method in software R**

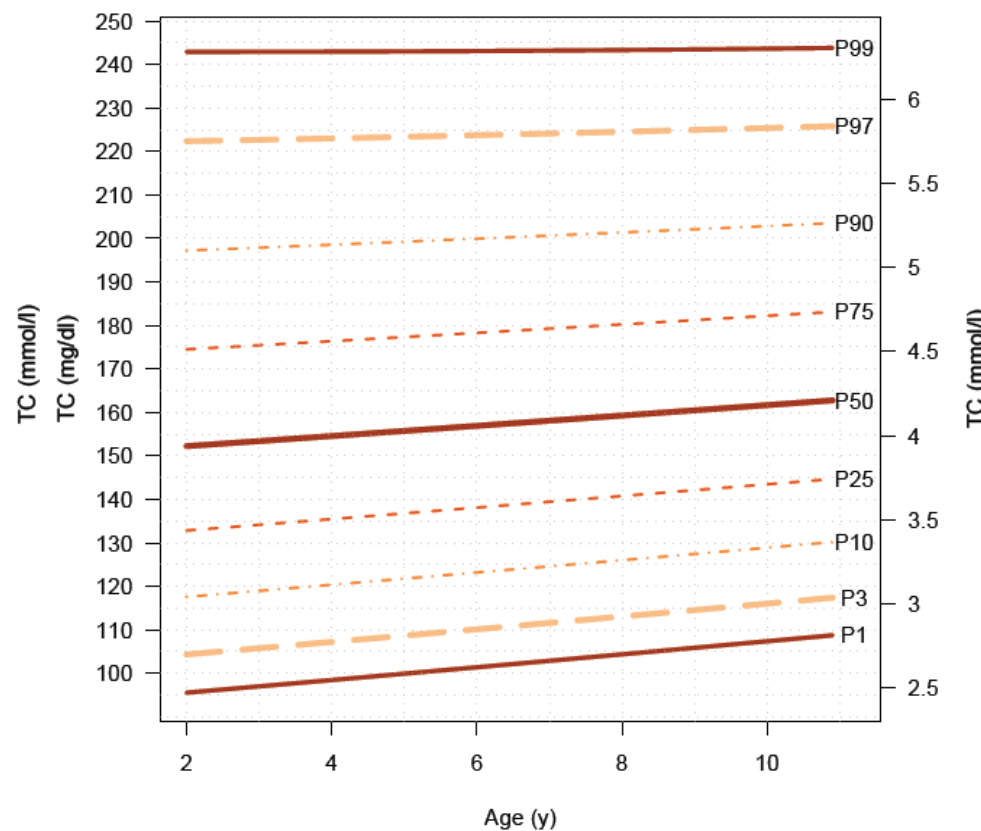
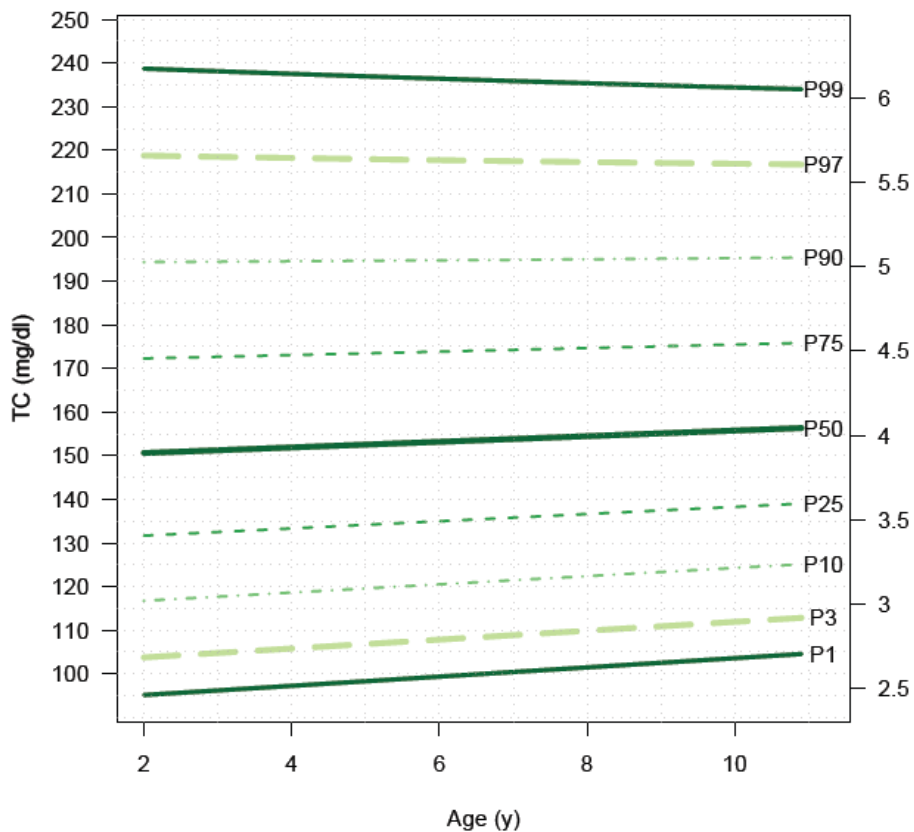
→ Taking into account the dispersion, skewness and kurtosis of the distribution

Results: Total cholesterol

Linear upward age-related trends in both sexes
Higher in girls

Boys

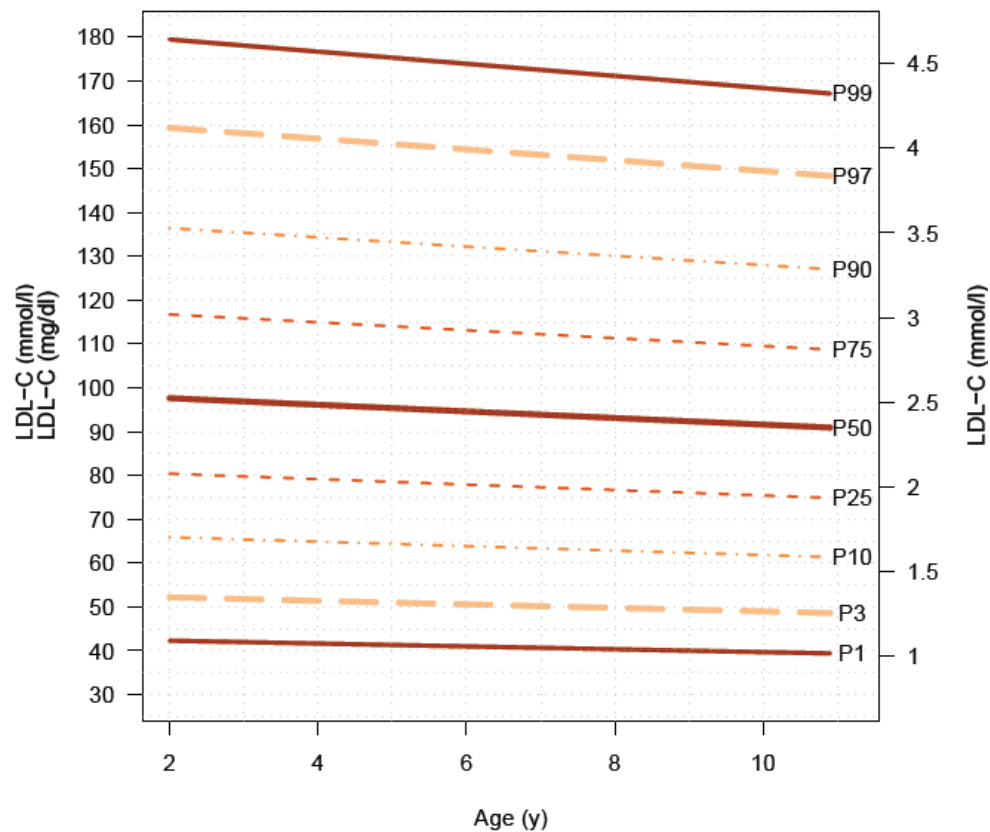
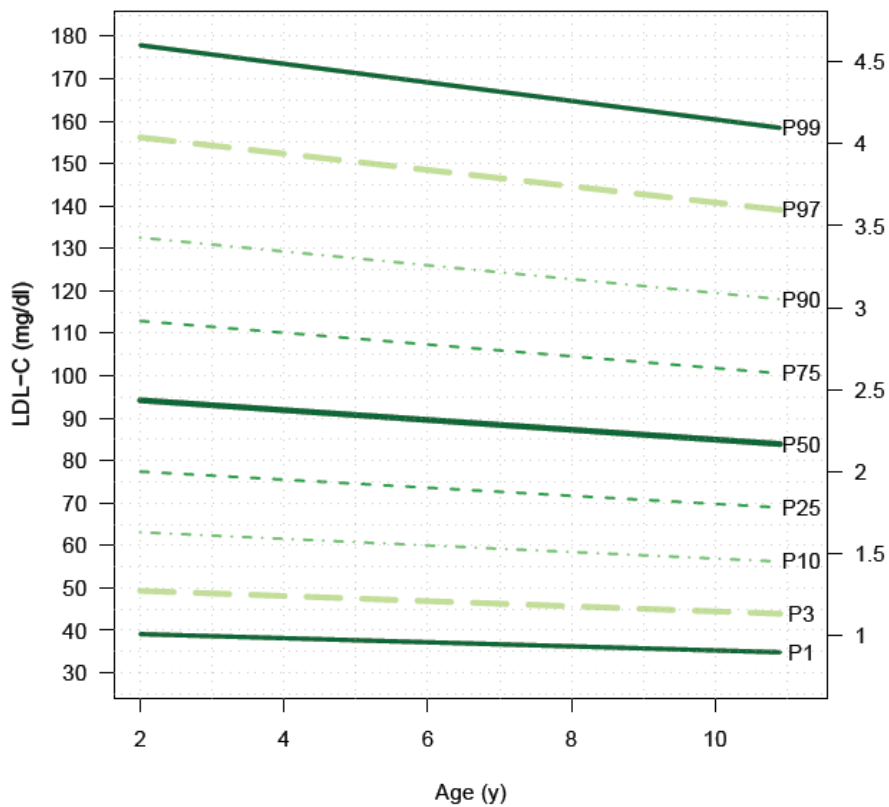
Girls



Linear downward age-related trends in both sexes
Higher in girls

Boys

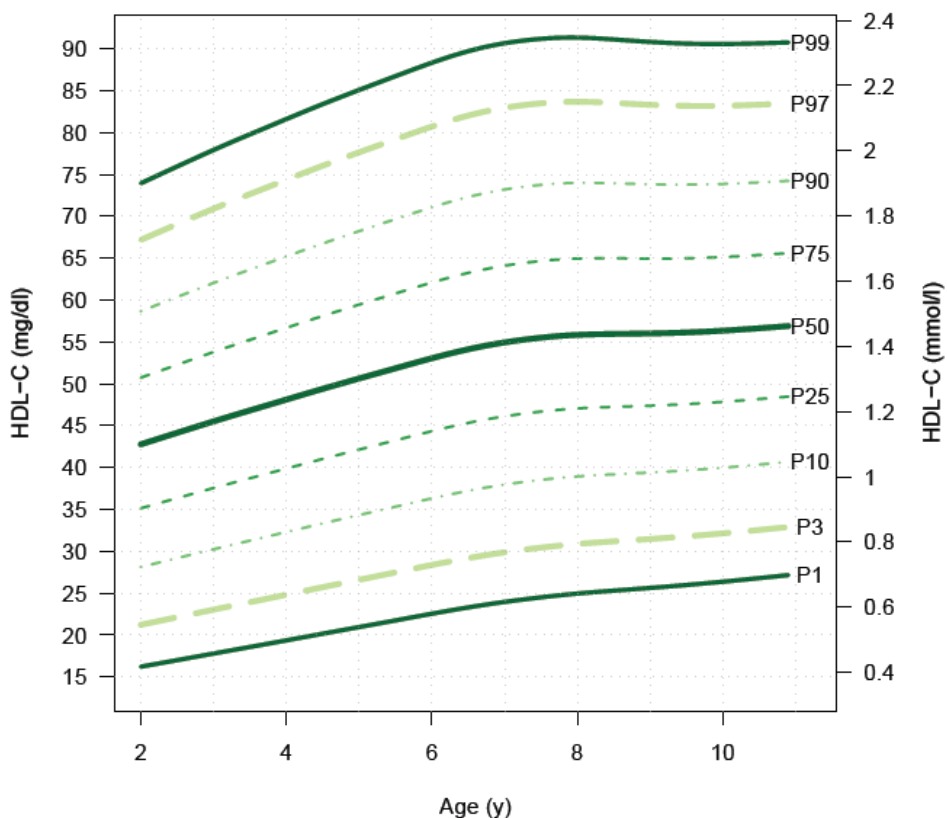
Girls



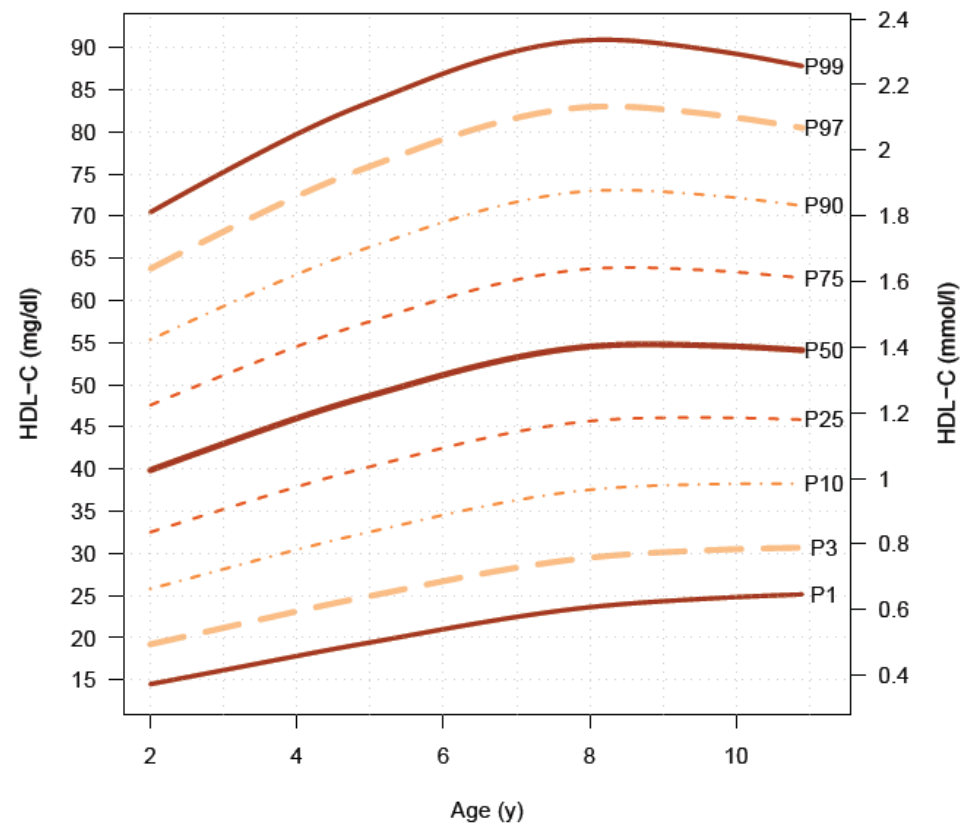
Results: HDL

Positive trend with age but relatively stable above 7y
Higher in boys

Boys



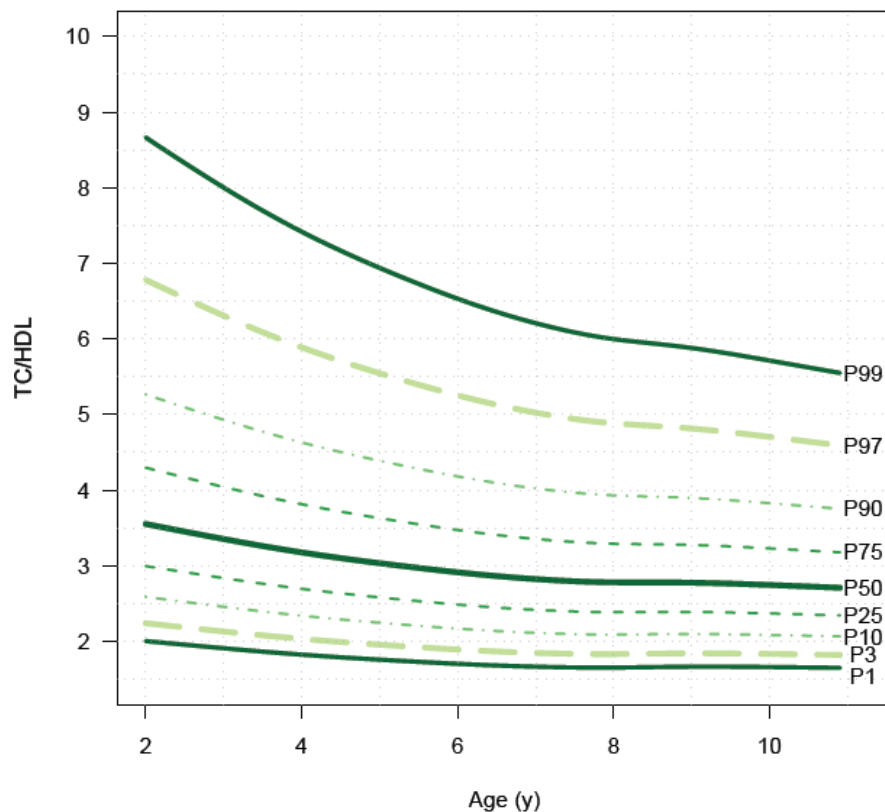
Girls



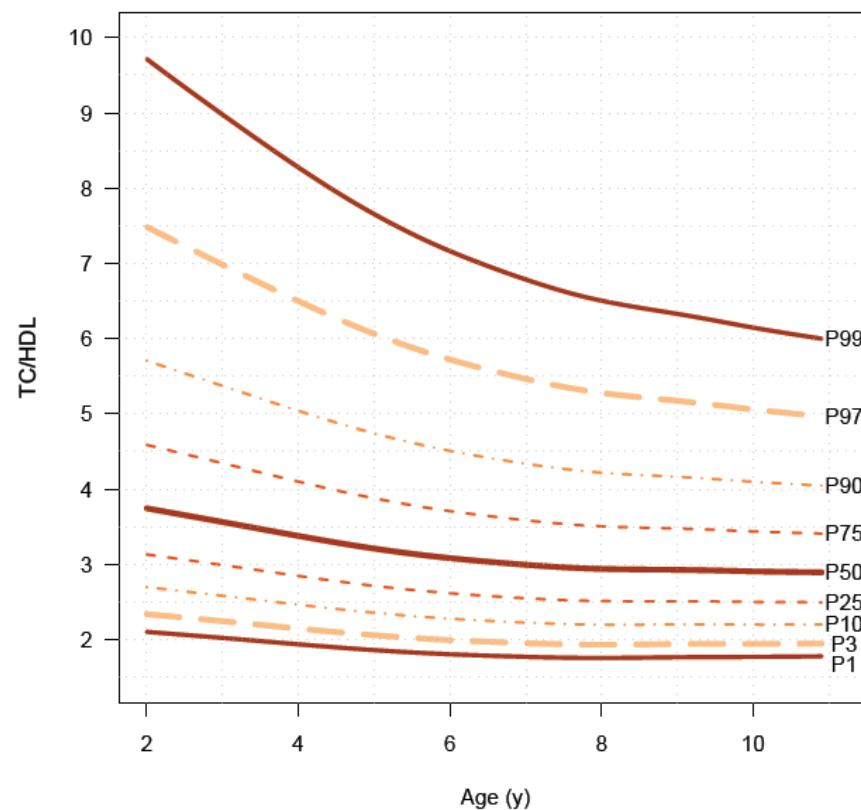
Results: TC/HDL

Gradual negative trend 2-6y, then relatively stable
Higher in girls

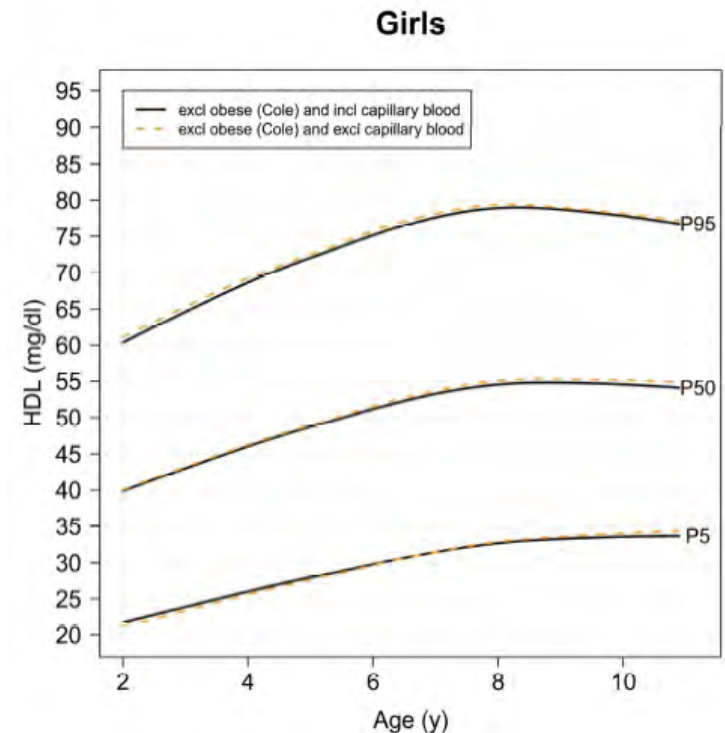
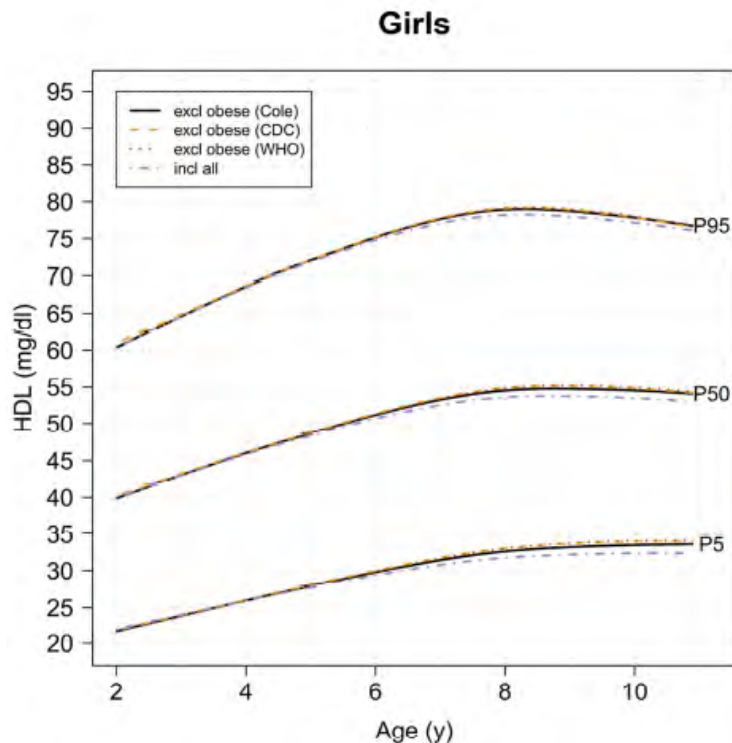
Boys



Girls



- **Triglycerides: no significant age trend; higher in girls.**
- **Sensitivity analyses: no real differences when excluding obese children or capillary blood samples**



- **Significant ($P < 0.001$) correlations between blood lipids and age for all lipid fractions except TG**
Positive correlations for TC and HDL-C
Negative correlations for LDL-C and the ratio TC/HDL-C
- **Significant sex differences:**
HDL-C higher in boys
TC, LDL-C, ratio TC/HDL-C and TG higher in girls

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- **Standardised methodology for all centres (SOP's)**
- **Centrally trained technicians**
- **Extensive quality control procedures at different levels**
- **Unique large recent database**
- **GAMLLS generally accepted as standard technique for generating reference values for human biological data**

- **Non-responder bias**
- **Representative for target population : disease free European (mostly Caucasian) children aged 2-11 years
EWNS representation**
- **Mixture of venous / capillary blood**
- **Familial dyslipidaemias**
- **Sensitivity analyses**

Thank you !

