

Childhood obesity in a global perspective. Varying time trends in different countries, areas and social groups

«Towards better health and reducing inequalities in health»

Ljubljana, Slovenia - 24th November 2015

By

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«Why do time trends vary in different countries, areas and social groups?»





Overview

- What has driven the development of (child)obesity?
- Trends in childhood overweight and obesity
 - By country
 - Geographic areas
 - Socioeconomic groups
- Important periods regarding development of overweight/obesity
- Summing up

Health risks of overweight and obesity among children

- Orthopedic – heavy body in growth
- Cardiovascular disease and diabetes, type II
- Psychosocial challenges
- Etc.....



What has driven the development of (child)obesity?

globalisation



globalisation

Free trade
Economic growth
Urbanisation....



physical activity
changed diet
....etc



...furthermore

- double burden of disease
 - malnutrition in the population – at the same time overweight/obesity an increasing challenge
- nutritional transition
 - Obesity-promoting shift from traditional diet to "western diet»

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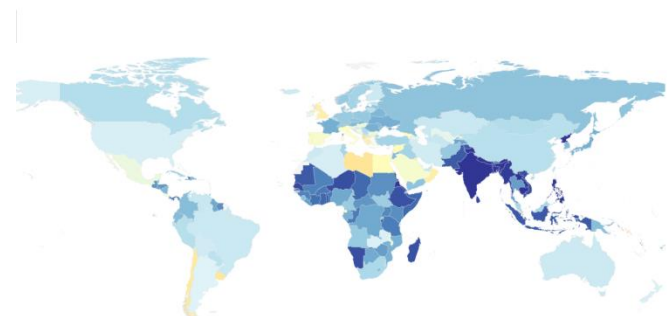
Trends in childhood overweight and obesity

- For the first time in the history of humanity there is a greater proportion of overweight/obesity than underweight (in total)
 - escalated faster among children than grown up
- Globally approximately 43 million children < 5y with overweight/obesity in 2010
 - 35 of 43 million from developing countries

de Onis M, Blössner M, Borghi E. Global prevalence and trends of overweight and obesity among preschool children. Am J Clin Nutr. 2010;92(5):1257-64.
- Challenging to study trends...
 - ... incomplete data
 - ... varying criteria and terminology for «overweight and obesity»

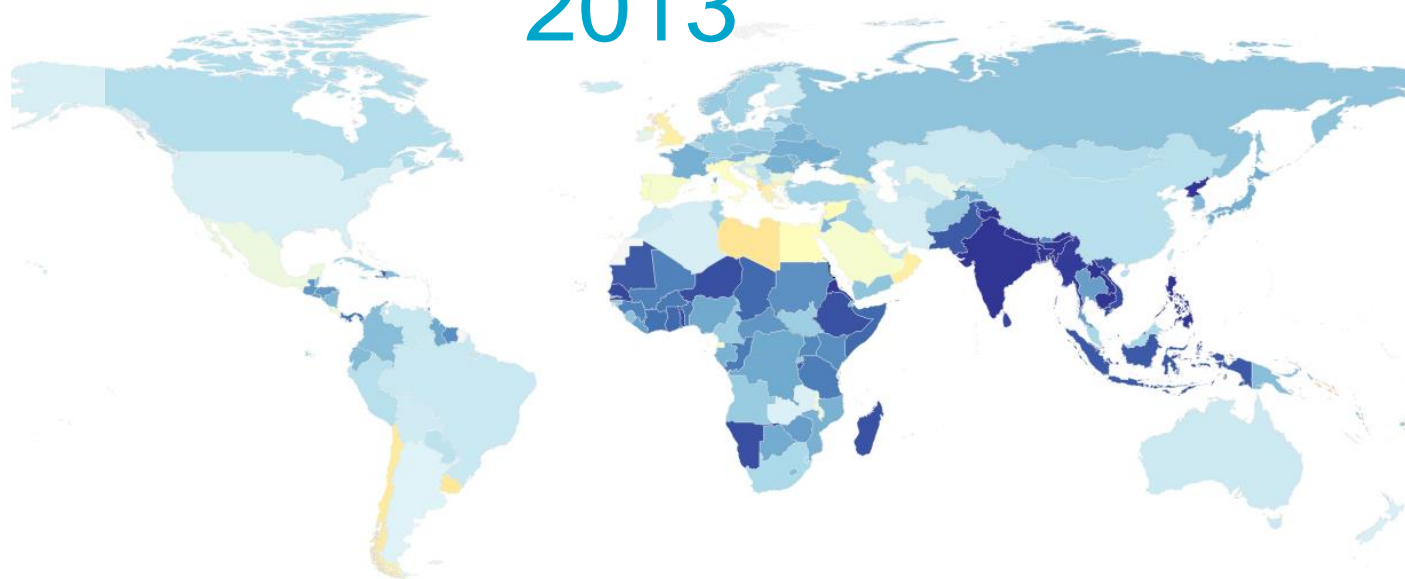
Global Burden of Disease (GBD)

Institute for Health Metrics and Evaluation (IHME), University of Washington



Proportion (%) overweight (incl obesity) – children 5-9 y

2013

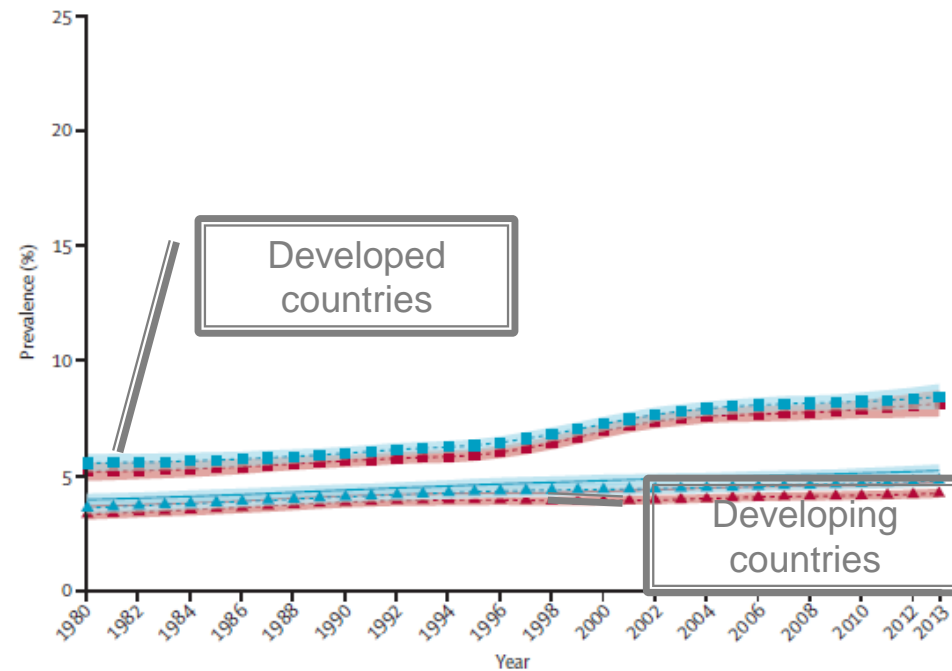
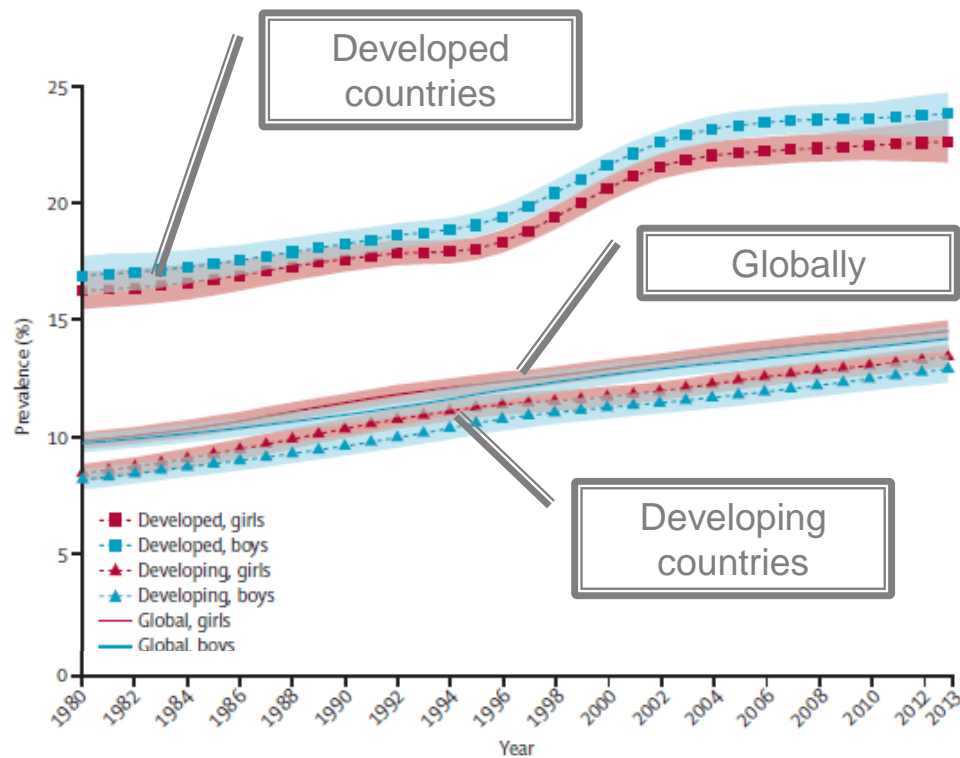


- Institute for Health Metrics and Evaluation (IHME), University of Washington
- Ng M, Fleming T, Robinson M et al. **Global, regional, and national prevalence of overweight and obesity in children and adults during 1980-2013: a systematic analysis for the Global Burden of Disease Study 2013.** Lancet. 2014.

Trends in developed vs. developing countries (2 -19 year-olds)

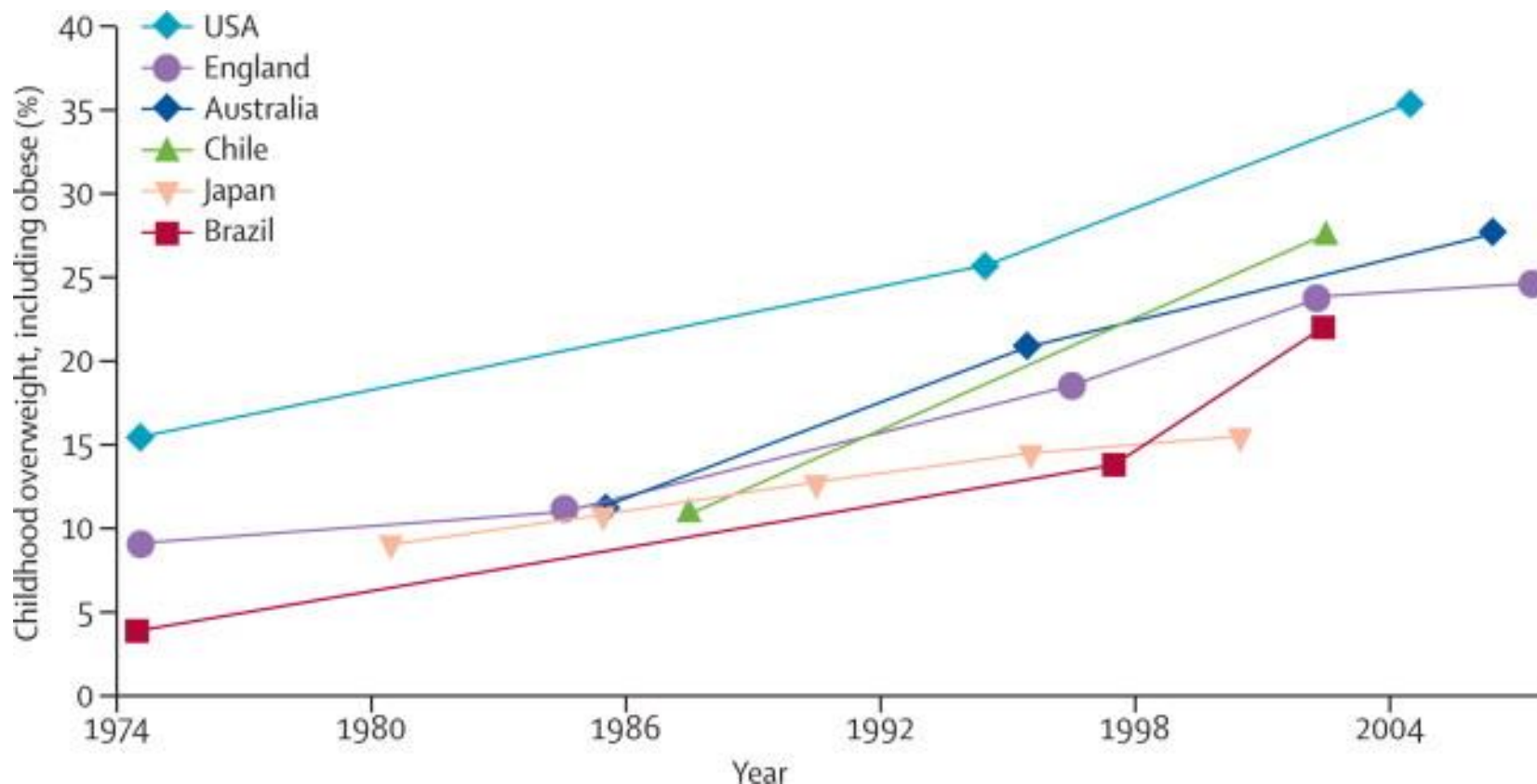
Overweight (incl obesity) (%)

Obesity (%)



- Ng M, Fleming T, Robinson M et al. **Global, regional, and national prevalence of overweight and obesity in children and adults during 1980-2013: a systematic analysis for the Global Burden of Disease Study 2013.** Lancet. 2014.
- Institute for Health Metrics and Evaluation (IHME), University of Washington

Trends in proportion (%) overweight (incl. obesity)

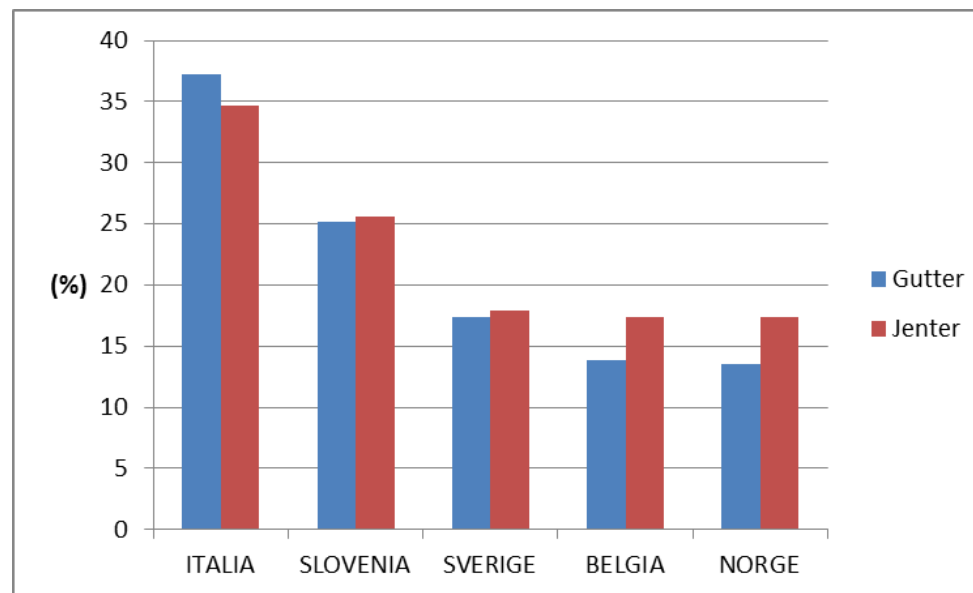


- **Illustration** from: Swinburn BA, et al. The global obesity pandemic: shaped by global drivers and local environments. *Lancet*. 2011;378(9793):804-14
- **Based on data from:** Wang Y, Lobstein T. Worldwide trends in childhood overweight and obesity. *Int J Pediatr Obes*. 2006;1(1):11-25

Europe

- Surprisingly **LITTLE** comparable data
- WHO's initiative to collect data of height and weight among school children (COSI).

Proportion (%) overweight (incl obesity), in 2008 - 8-year-olds



- WHO Europe COSI, modified by:
- Wijnhoven TMA et al. WHO European Childhood Obesity Surveillance Initiative 2008: weight, height and body mass index in 6-9-year-old children. *Pediatric Obesity*. 2013;8(2):79-97

Trends Europe

- Children 2-5 y:
 - Only 5 EU countries repeated measurements
 - Increase of obesity only in England 1995-2002
- Youth:
 - Increase of obesity in most countries
 - France – reported non significant increase 1998-2007

- Cattaneo A et al. Overweight and obesity in infants and pre-school children in the European Union: a review of existing data. *Obes Rev.* 2010;11(5):389-98
- Lien N et al. Availability of data assessing the prevalence and trends of overweight and obesity among European adolescents. *Public Health Nutr.* 2010;13(Special Issue 10A):1680-7
- Peneau, et al. Prevalence of overweight in 6- to 15-year-old children in central/western France from 1996 to 2006: trends toward stabilization. *Int J Obes.* 2009;33(4):401-7.

North America

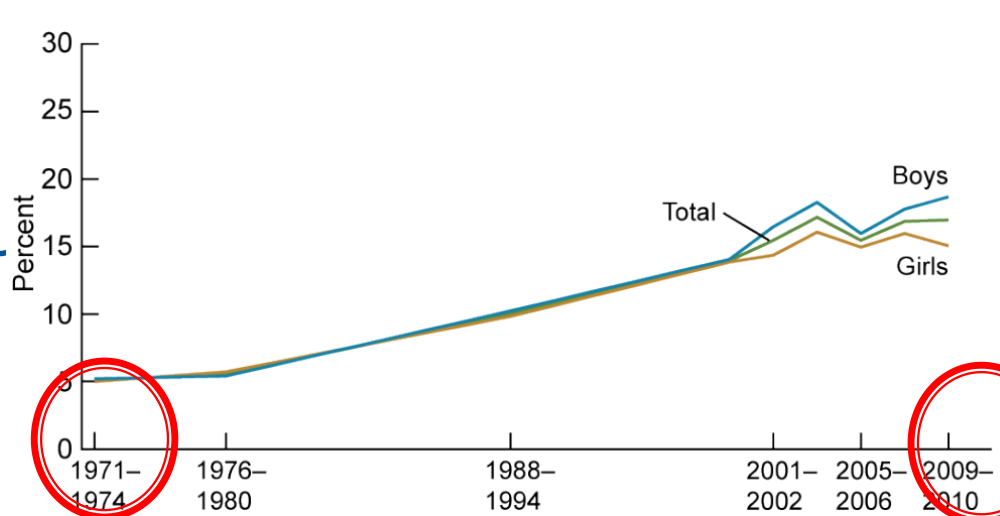
USA one of the countries highest proportion:

- Tripling of proportion obesity among children the last 30 y
- 1/3 overweight (incl obesity)
- 1/6 obesity

Canada:

- Lower proportion than the U

Trend proportion (%) obesity 2-19 y. in USA



• Ogden CL, Carroll MD, Kit BK, Flegal KM. Prevalence of obesity and trends in body mass index among US children and adolescents, 1999-2010. JAMA. 2012;307(5):483-90

• Fryar, C.D., Carroll, M.D., Ogden, C. Prevalence of Obesity Among Children and Adolescents: United States, Trends 1963-1965 Through 2009-2010. Health E-Stat; 2012.

Trends USA

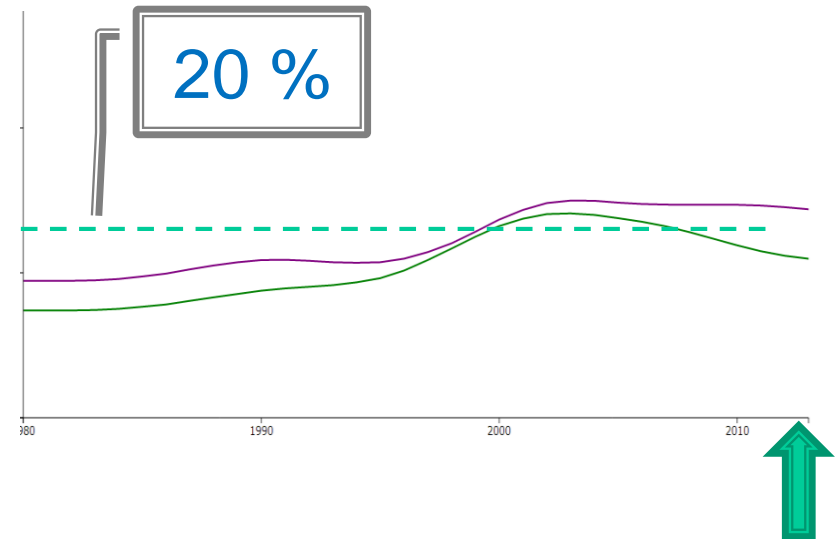
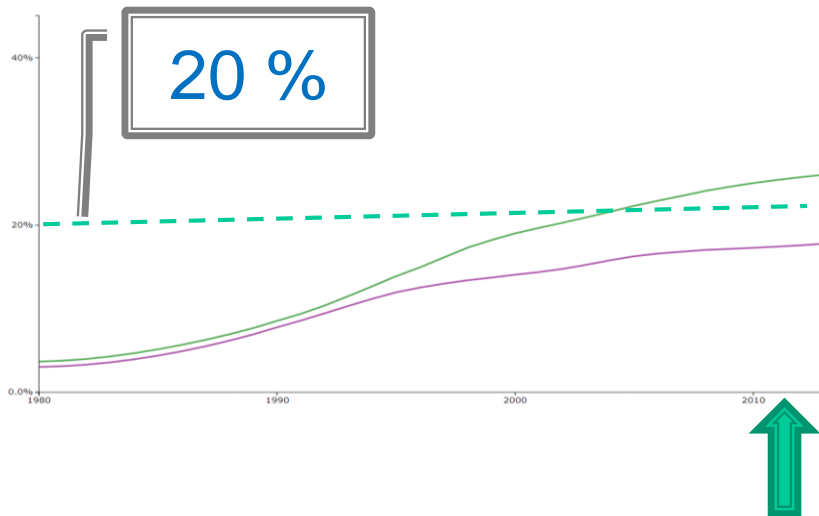
- 2-19 year-olds:
 - Non-significant increase of obesity 2003 – 2012
- 2-5 year-olds:
 - Significant reduction of obesity 2003 – 2012

- GREAT variation
- Central Asia
 - High prevalence of overweight/obesity among children
- South Asia
 - “Double burden of disease”
 - Low prevalence of overweight/obesity – large population  many individuals
- Increased health risk at lower level of BMI – possible underestimation

Trend in overweight (incl obesity), children 5-9y. proportion (%)

China 1980-2013

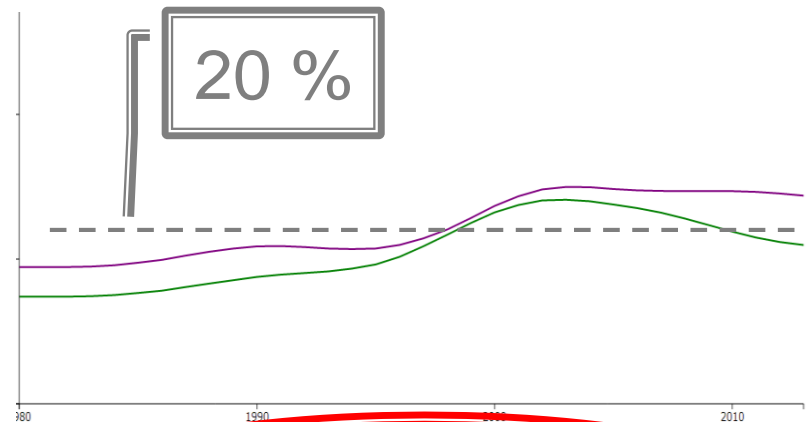
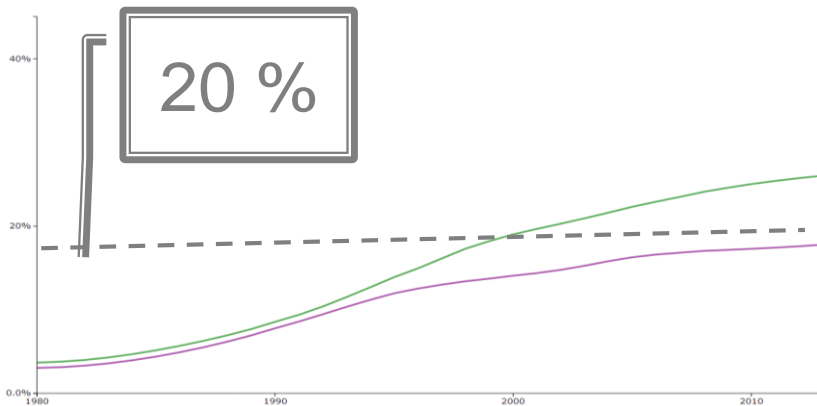
USA 1980-2013



Number (N) of children overweight (incl obesity) children 5-9 years

China, 1980-2013

USA, 1980-2013



N (China 2013) = >10 mill.

N (USA 2013) = 2.5 mill.

South America

Africa

Oceania



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Urban and rural areas and patterns in overweight/obesity

Urban – rural	
Developing countries	Developed countries
URBAN - high prevalence overweight/obesity	RURAL – high prevalence overweight/obesity

- Paciorek CJ et al. Children's height and weight in rural and urban populations in low-income and middle-income countries: a systematic analysis of population-representative data. *The Lancet Global Health*. 2013;1(5):e300-e9.
- Neuman M, et al. Urban-rural differences in BMI in low- and middle-income countries: the role of socioeconomic status. *Am J Clin Nutr*. 2013;97(2):428-36

Socioeconomic background and patterns in overweight/obesity

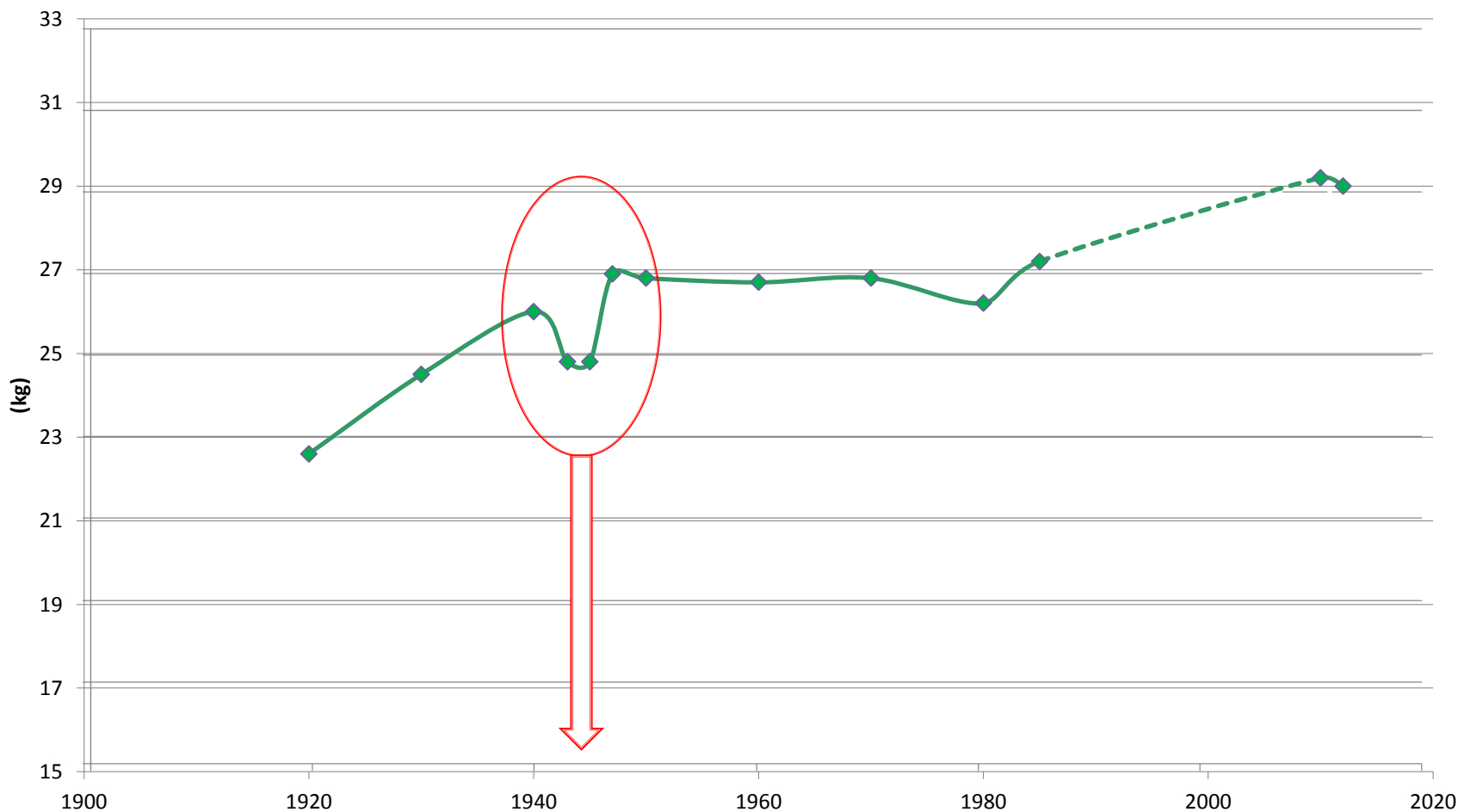
Socioeconomic background	
Developing countries	Developed countries
HIGH SEP* – HIGH prevalence overweight/obesity	LOW SEP* – HIGH prevalence overweight/obesity

***) SEP – Parents'
SocioEconomic Position**

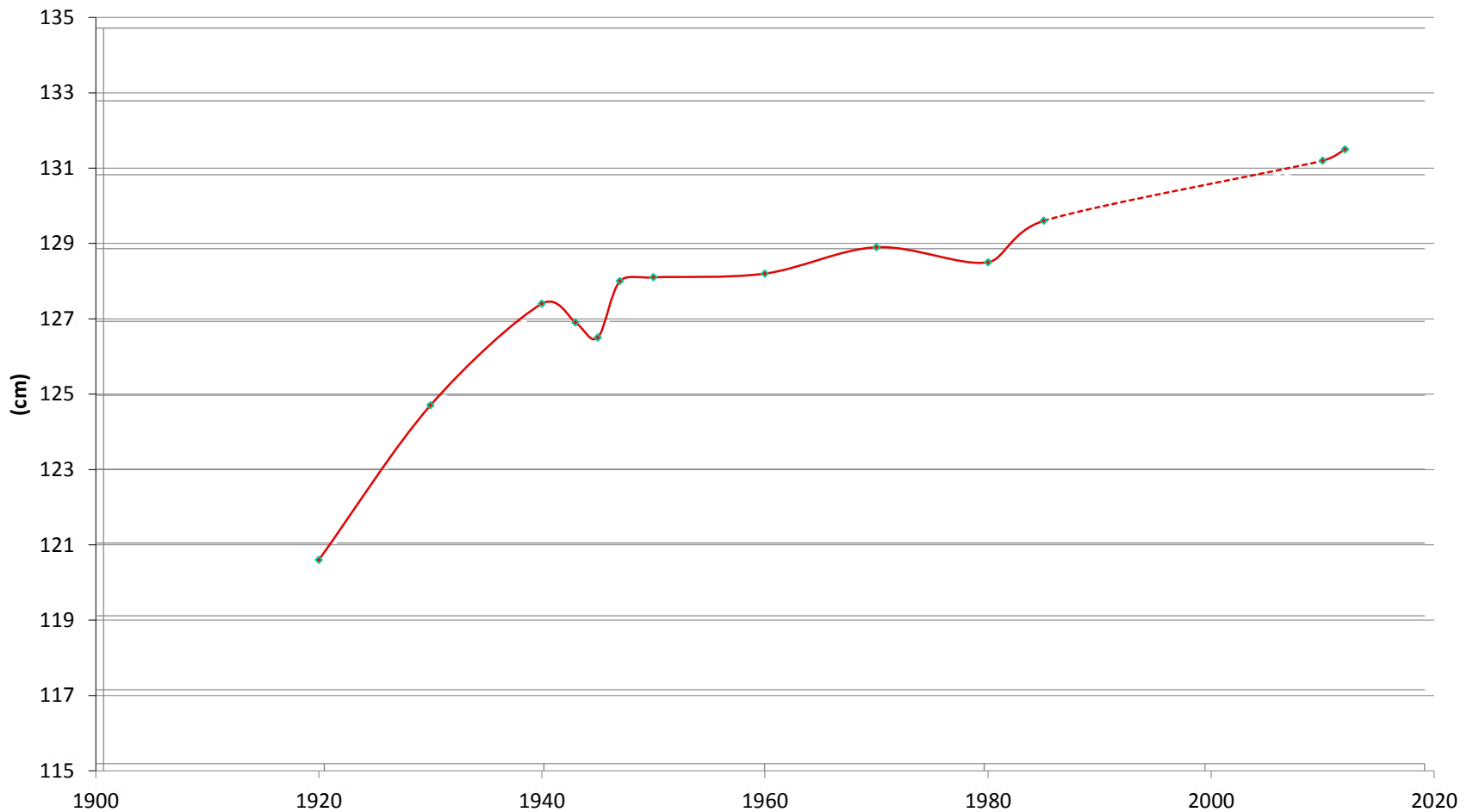
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...and Norway

The development of **weight** of 8 year-olds, 1920 - 2012



The development of height of 8 year-olds, 1920 – 2012



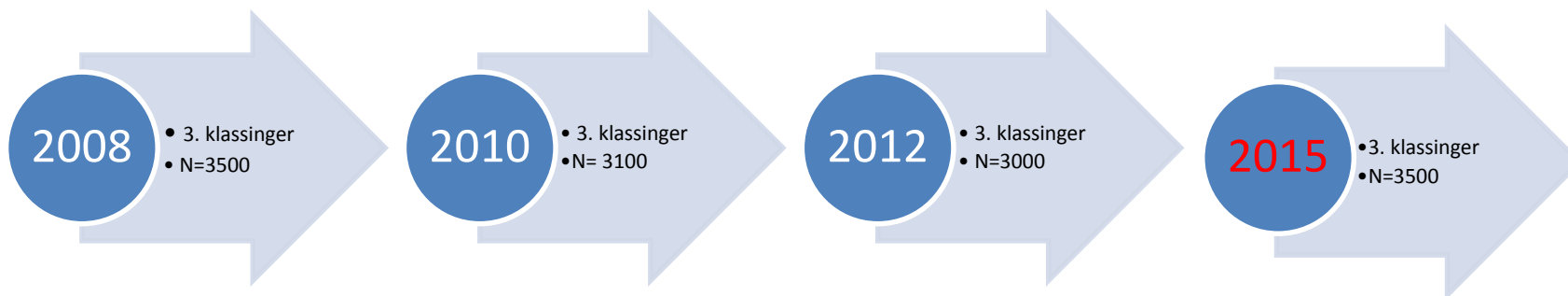


1st round

2nd round

3rd round

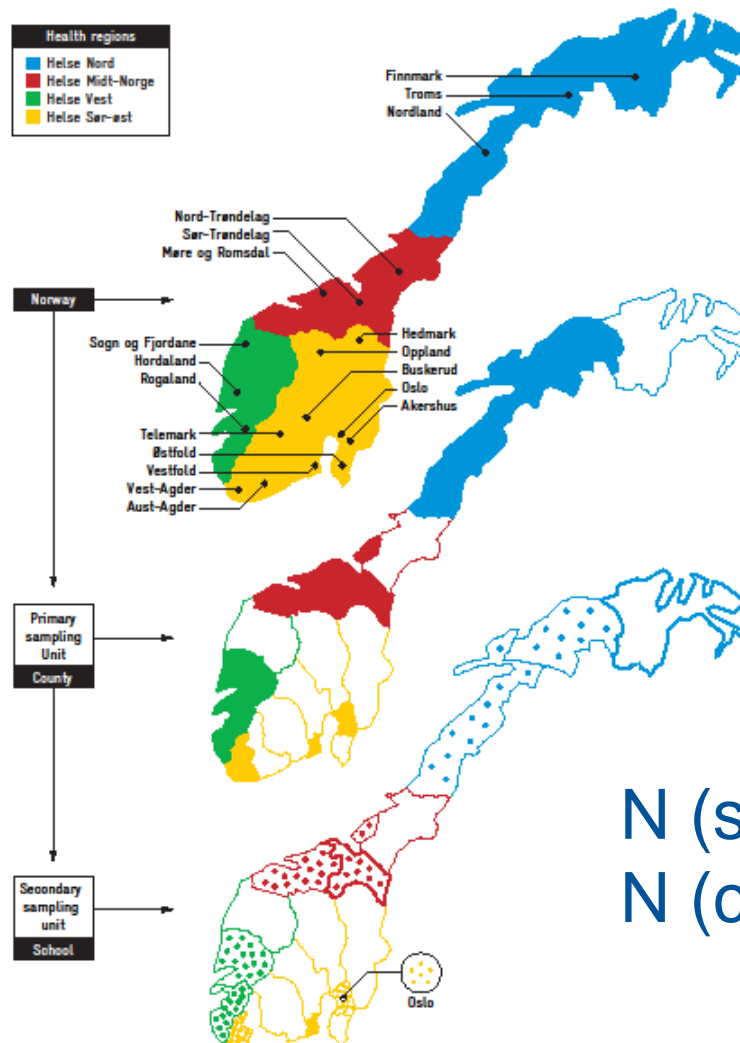
4th round



Btw 3000 - 3500 8 year-olds participated each round
A total of approximately 14 000 children

High participation rate - 89 -90% each round

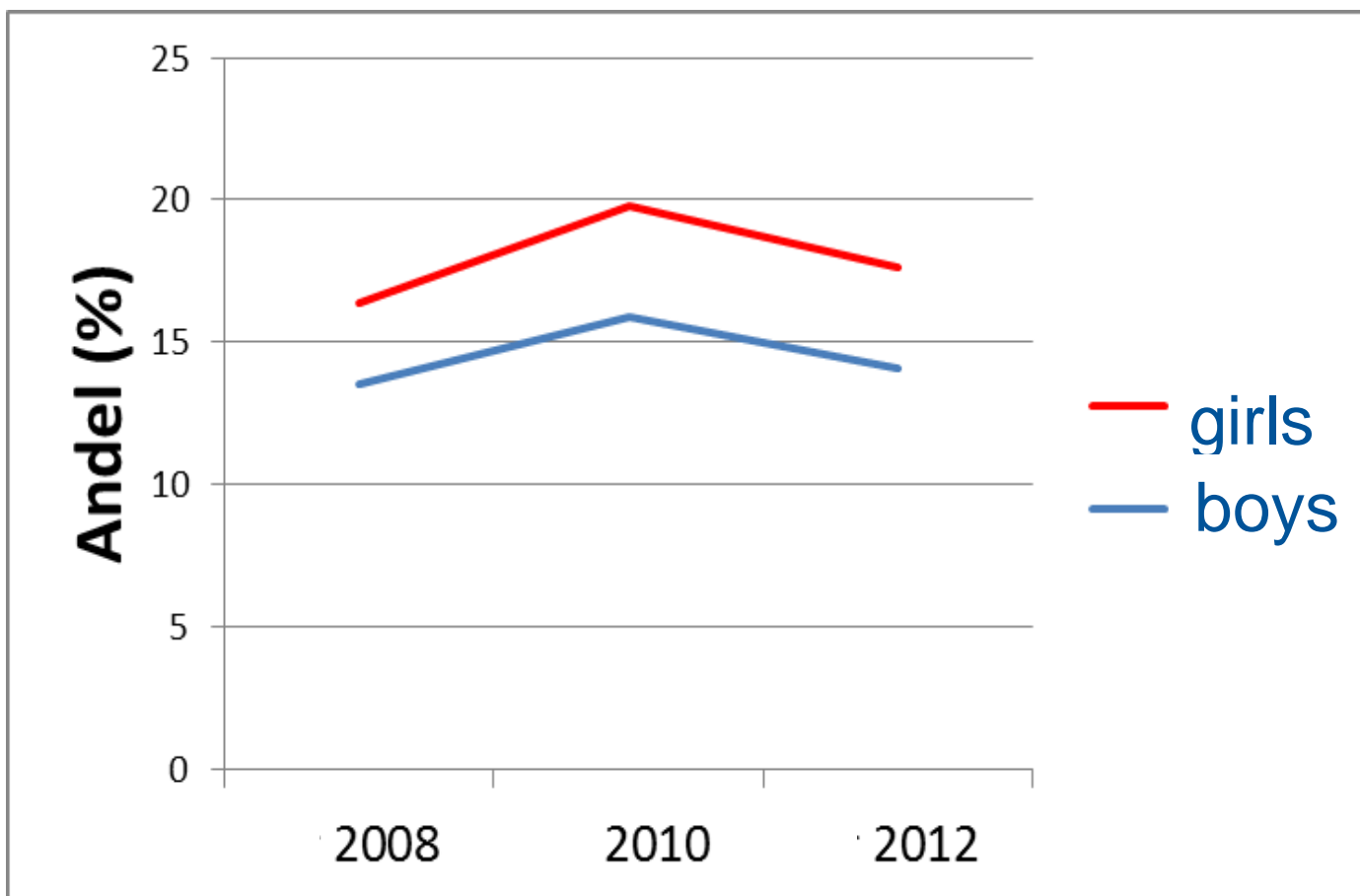
Two-stage sampling methodology - → nationally representative sample



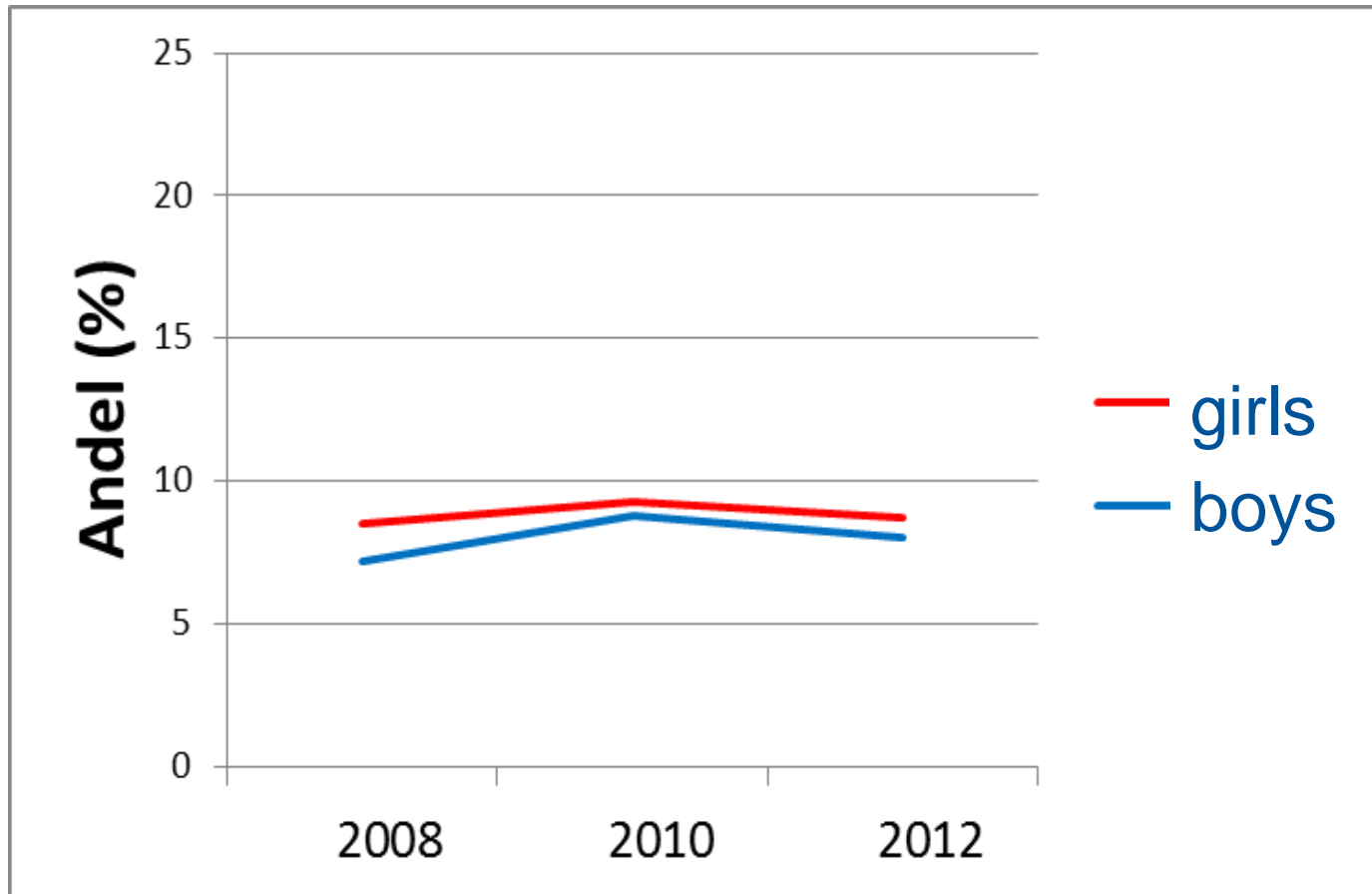
N (schools) = 125
N (children) = 3000/3500

- General overweight and obesity - based on BMI
 - BMI = weight/height² (kg/m²)
- Abdominal obesity – based on waist circumference
 - waist circumference (WC)/height
 - Abdominal obesity - WC/height > 0.5

The Norwegian Child Growth study – proportion (%) **overweight (incl obesity)**



The Norwegian Child Growth study – proportion (%) **abdominal obesity**

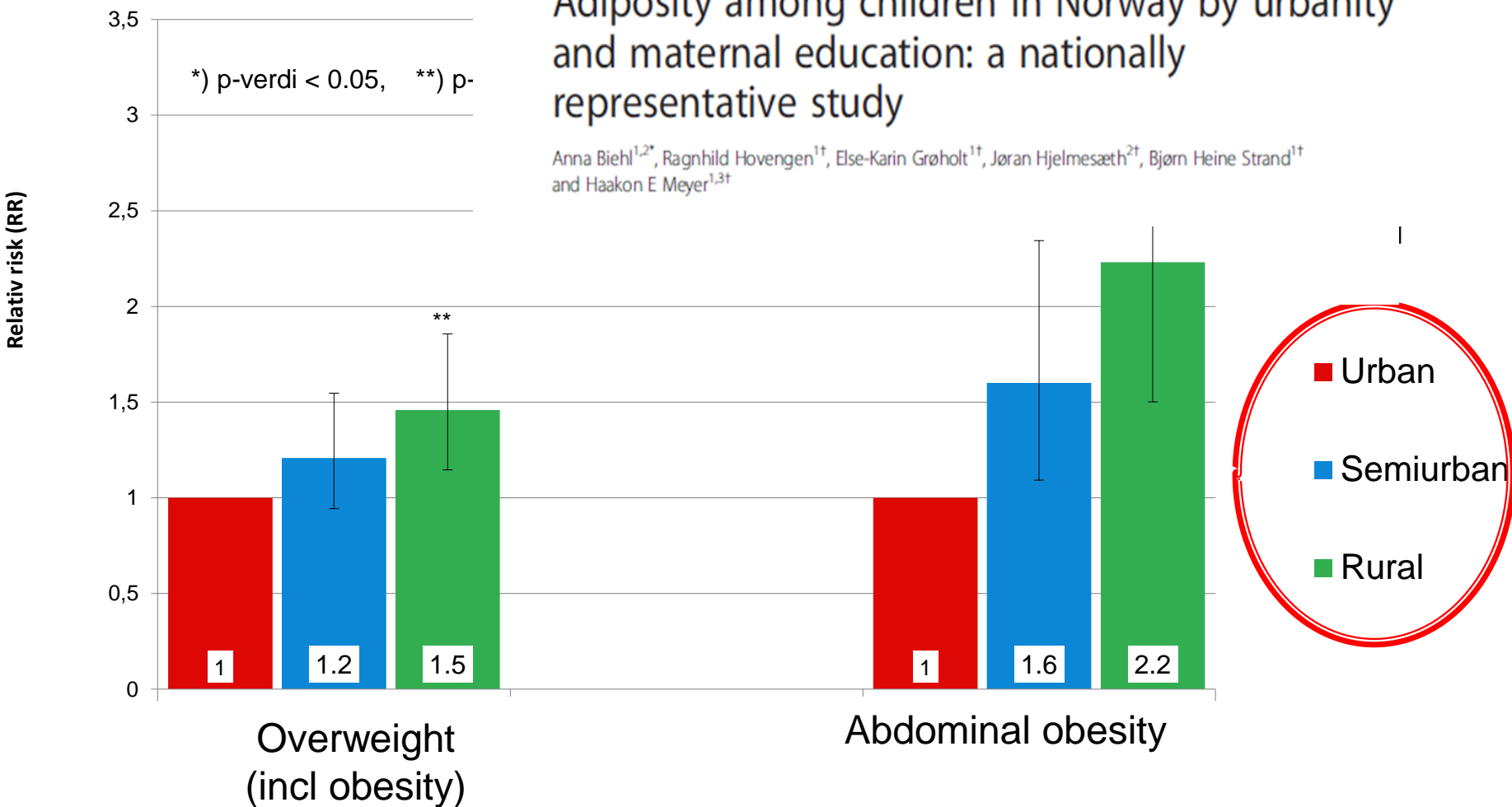


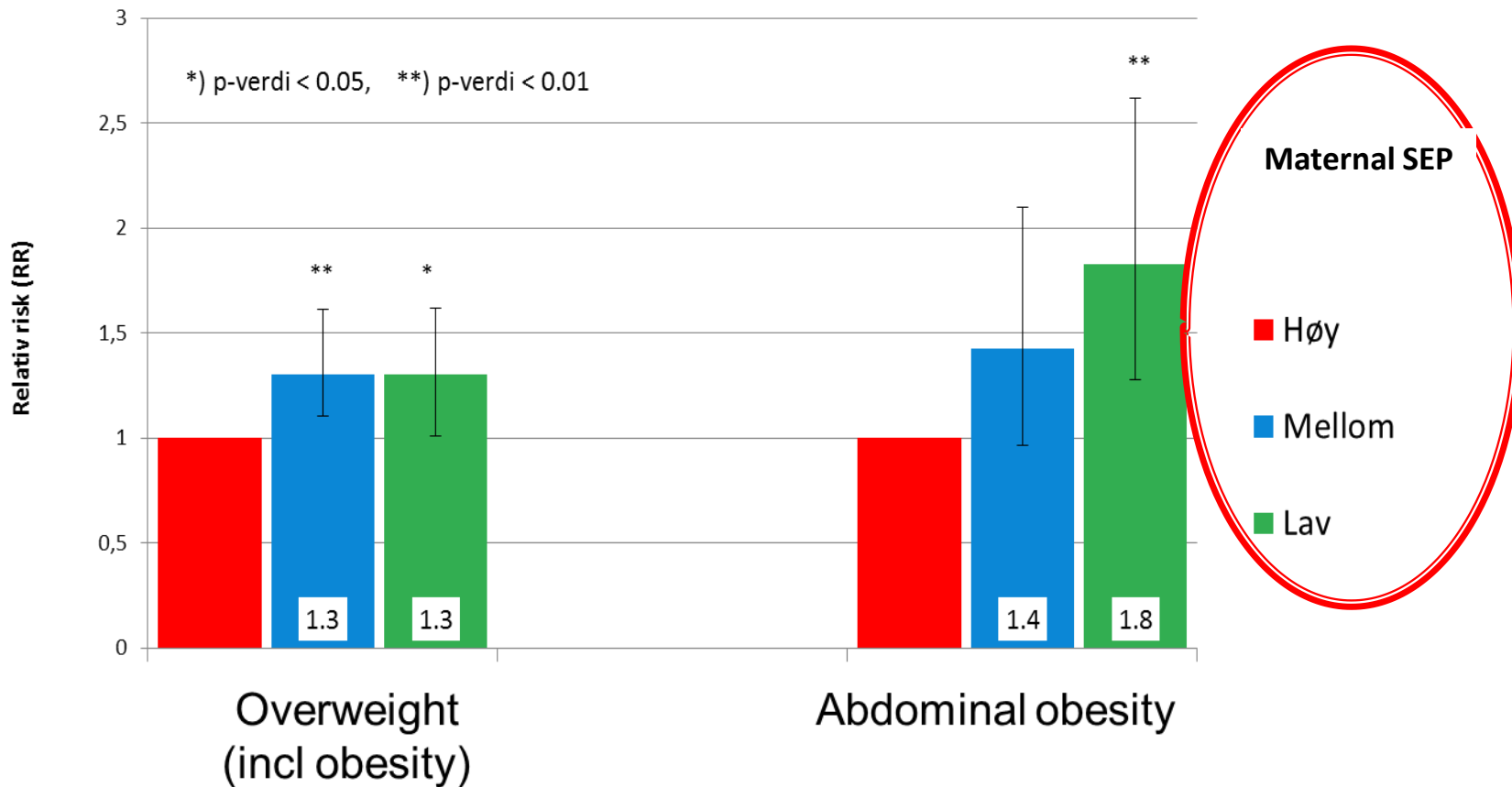
RESEARCH ARTICLE

Open Access

Adiposity among children in Norway by urbanity and maternal education: a nationally representative study

Anna Biehl^{1,2*}, Ragnhild Hovengen^{1†}, Else-Karin Grøholt^{1†}, Jøran Hjelmesæth^{2†}, Bjørn Heine Strand^{1†} and Haakon E Meyer^{1,3†}





marriage



cohabitation



divorce

living apart

BMJ Open Parental marital status and childhood overweight and obesity in Norway: a nationally representative cross-sectional study

Anna Biehl,^{1,2} Ragnhild Hovengen,¹ Else-Karin Grøholt,¹ Jøran Hjelmæsæth,^{2,3} Bjørn Heine Strand,¹ Haakon E Meyer^{1,4}

- The proportion of children with general overweight and obesity was **50 % higher** among children with divorced parents
... compared to children with married parents.
- The proportion of children with abdominal obesity was **80 % higher** among children with divorced parents
... compared to children with married parents.

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Norwegian Child Growth Study (NCG)

2008

2010

2012

2015

Third graders
(born 2000)

Third graders
(born 2002)

Third graders
(born 2004)

Third graders
(born 2007)

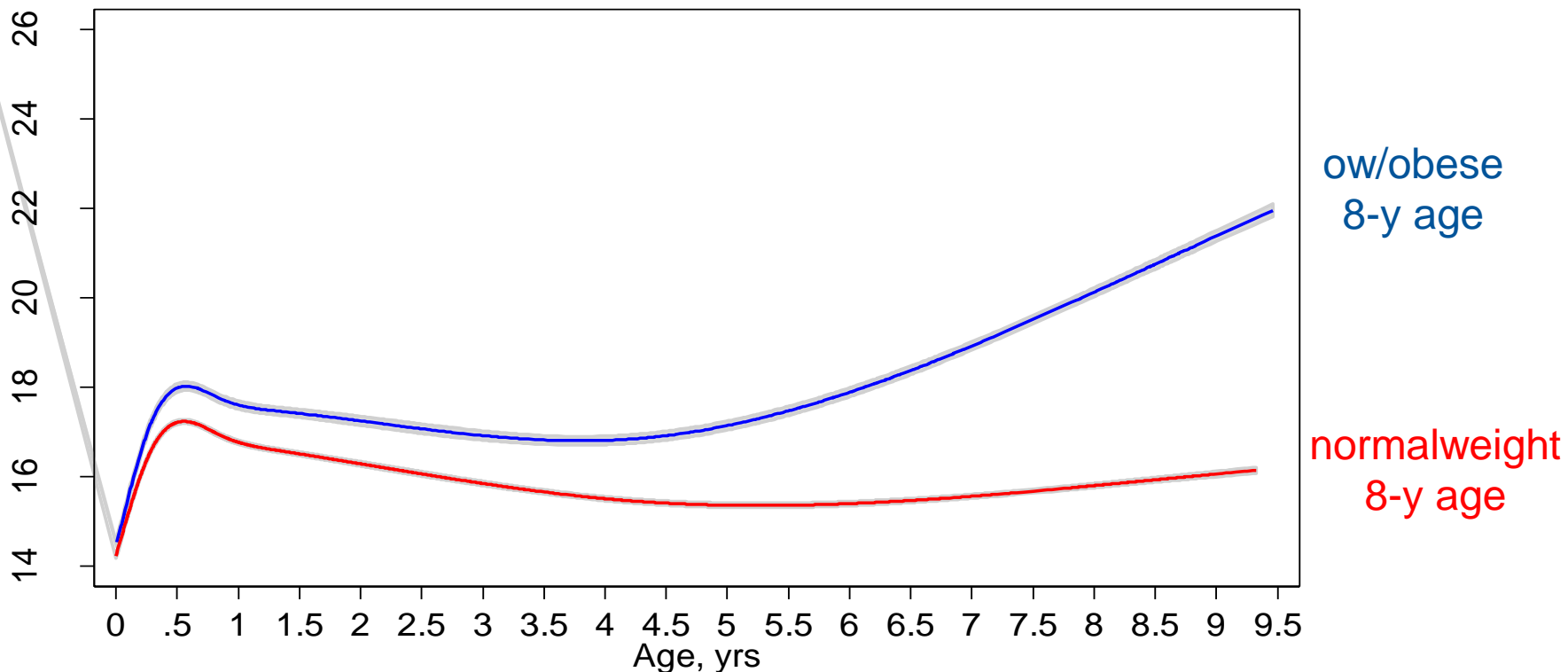


Height+weight
0 - 8 years

Height+weight
0 - 8 years

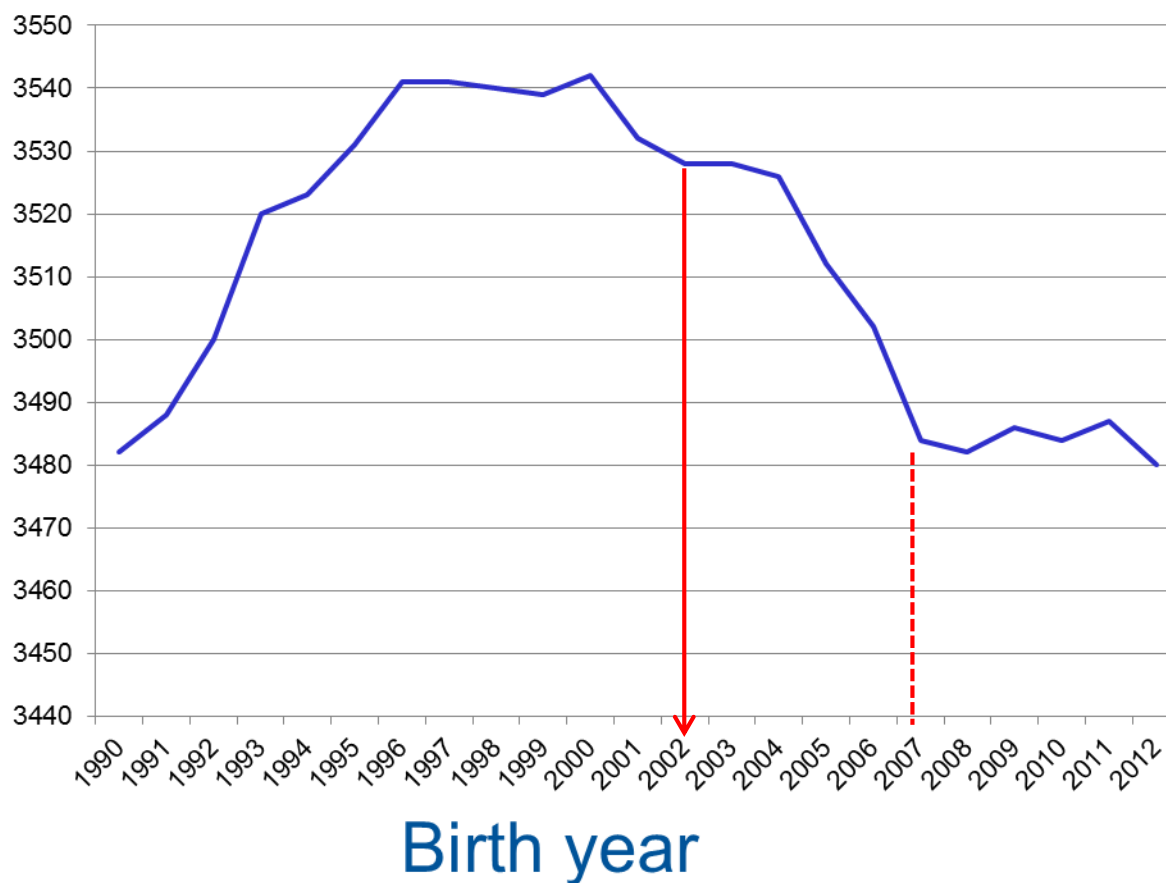
Weight curves for 8 year olds, overweight/obese vs. normal weight

BMI growth analysed using GEE and Cubic-Splines with 6 knots
Shaded area is 95%CI

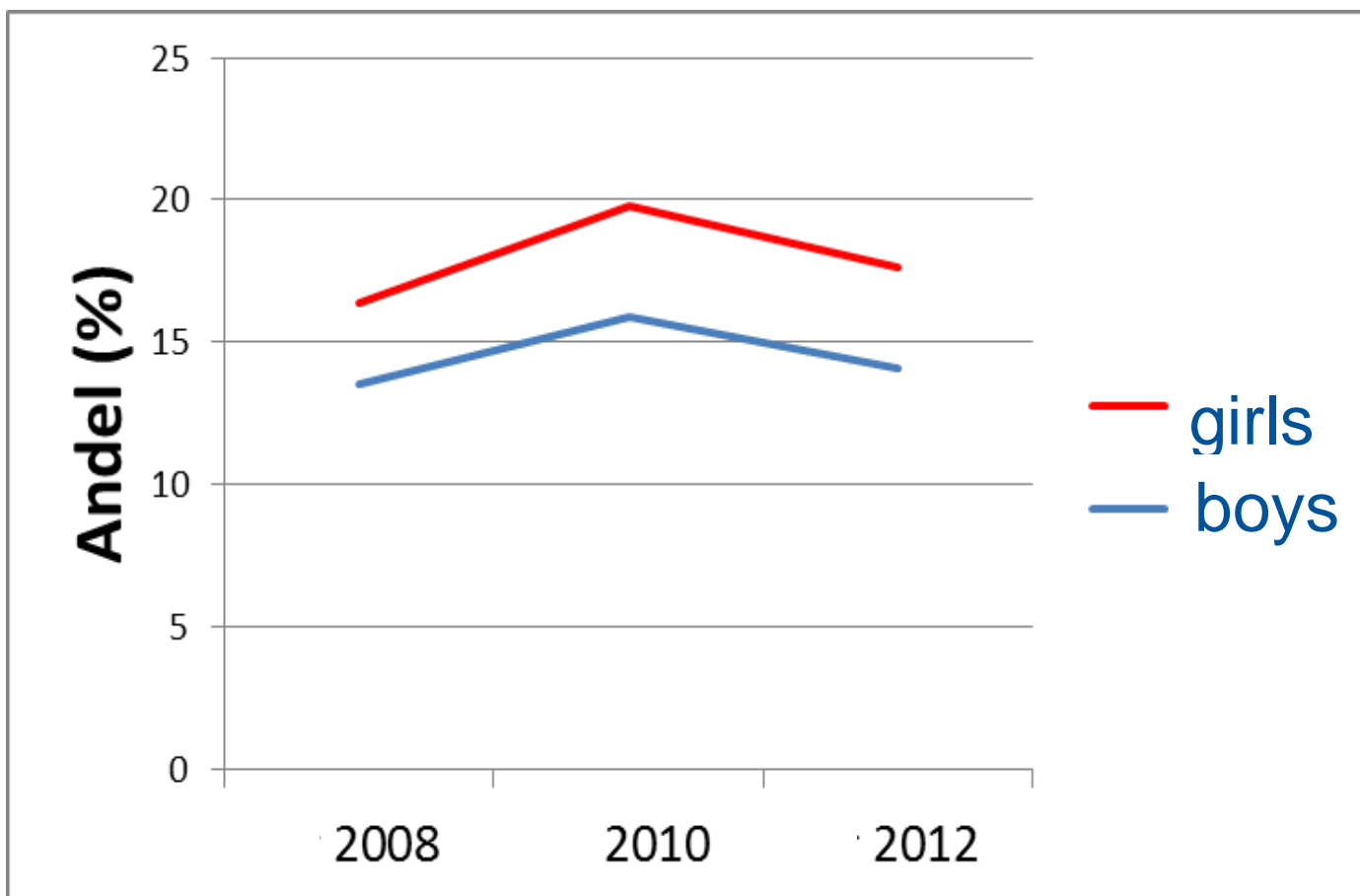


— Overweight at age 7-9.5
— Not overweight at age 7-9.5

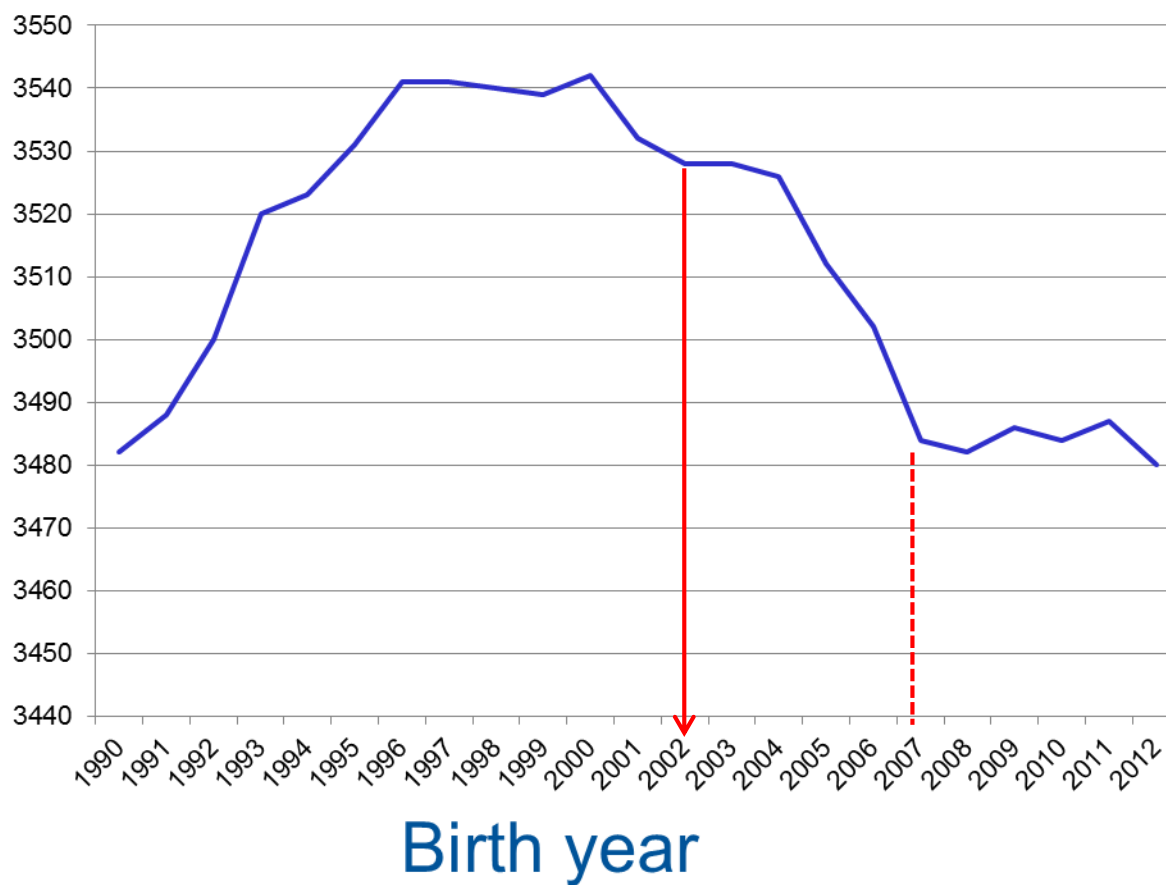
Average birth weight for the cohorts



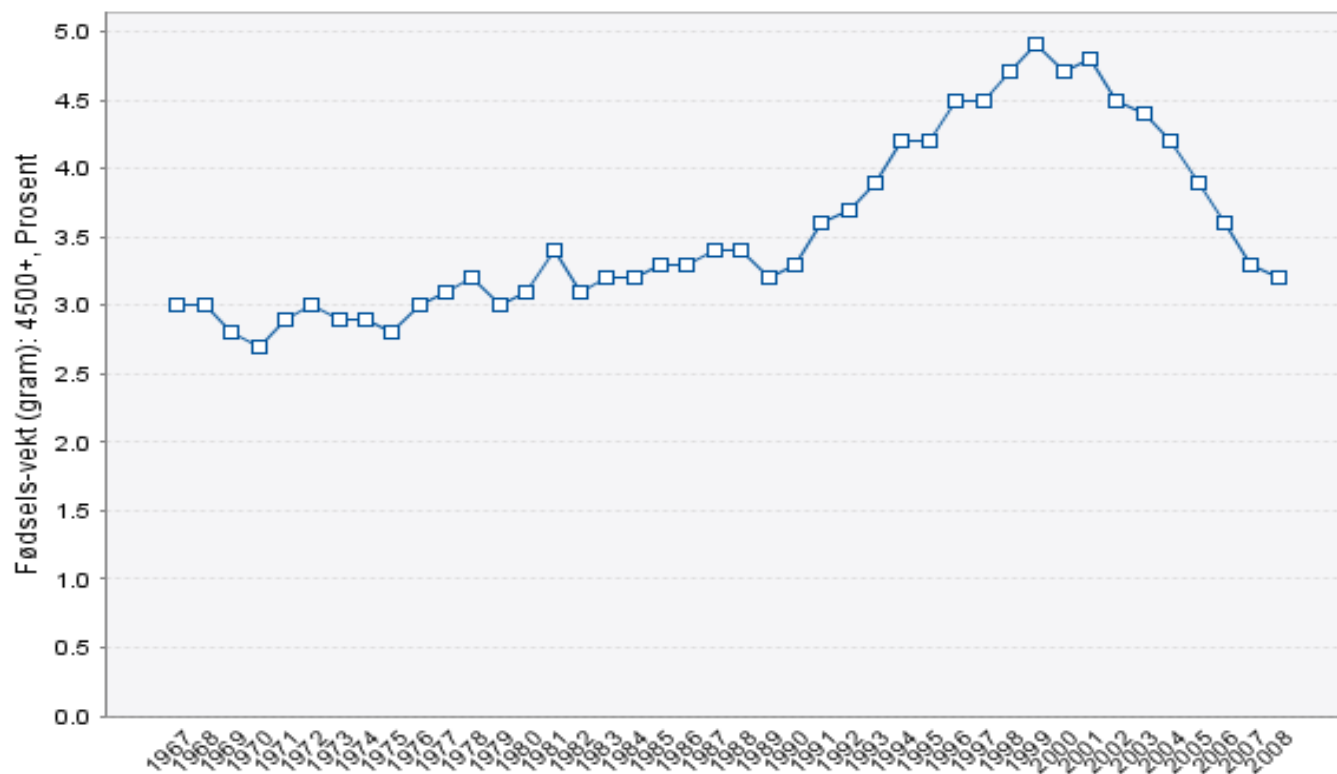
Overweight (incl obesity) (%) – 2008-2010-2012



Average birth weight for the cohorts



Proportion (%) children, birthweight >4500g



—■— Norge, Alle fødestedstyper

Birth year

Summing up

- Childhood overweight/obesity is increasing, globally
 - Steeper increase in developing countries
 - Possible levelling off - maybe reduction - in developed countries
- Urban – rural areas
 - Different patterns in developed and developing countries
- Socioeconomy
 - Different patterns in developed and developing countries

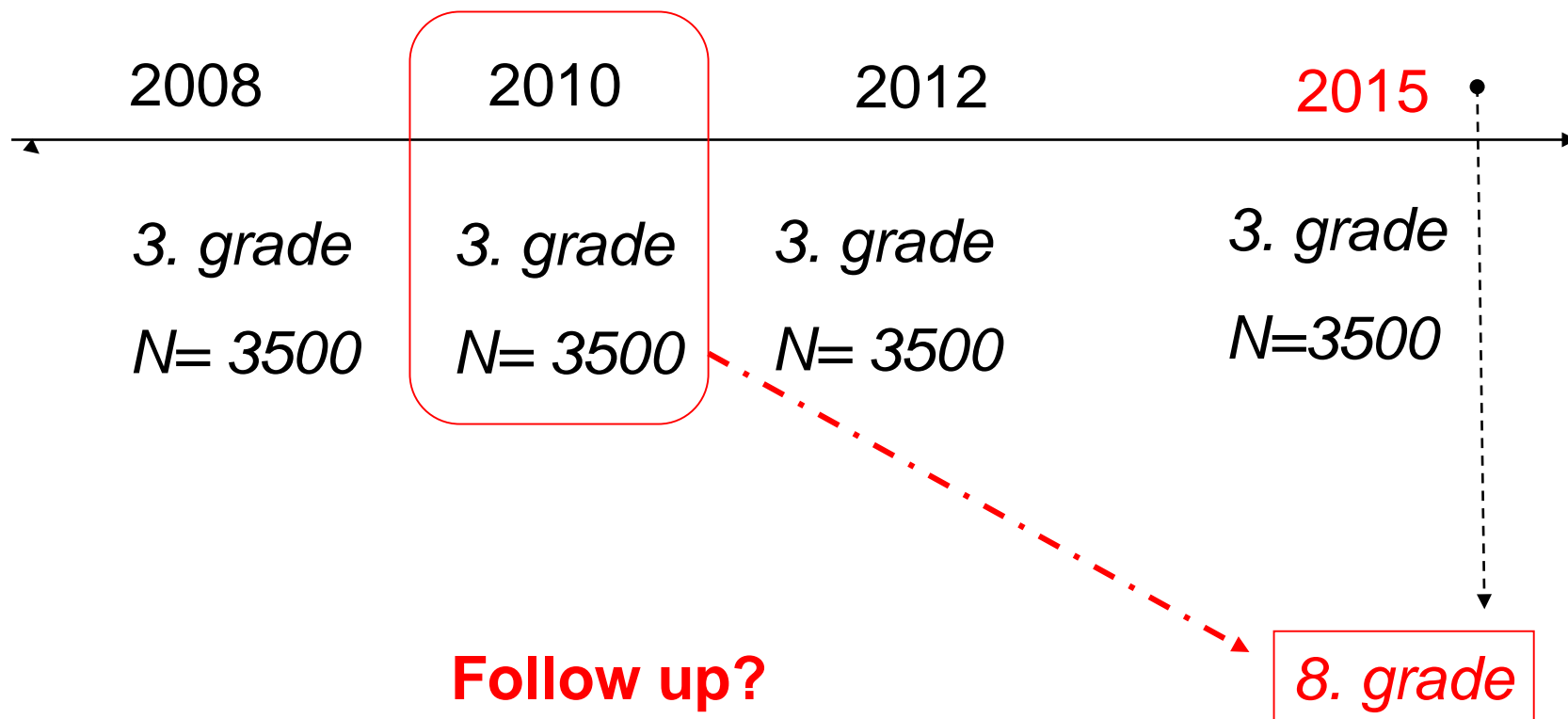
Cont. Summing up

- Different growth patterns appear early
...which implies that prevention must start **VERY** early.

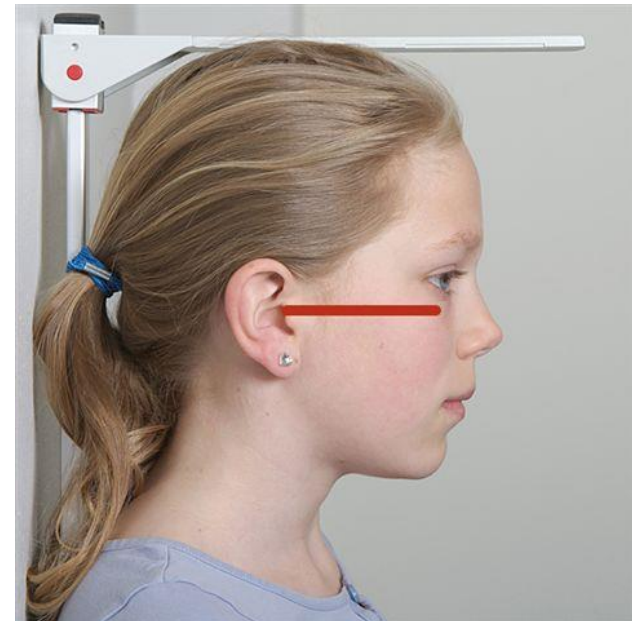


Thank you for listening!

Cross sectional – with a follow up?



Height



Waist circumference

