

# Socioeconomic inequalities and childhood obesity and related disorders

MRC

Centre for Causal  
Analyses in Translational  
Epidemiology

# 🌟 Why does childhood obesity matter?

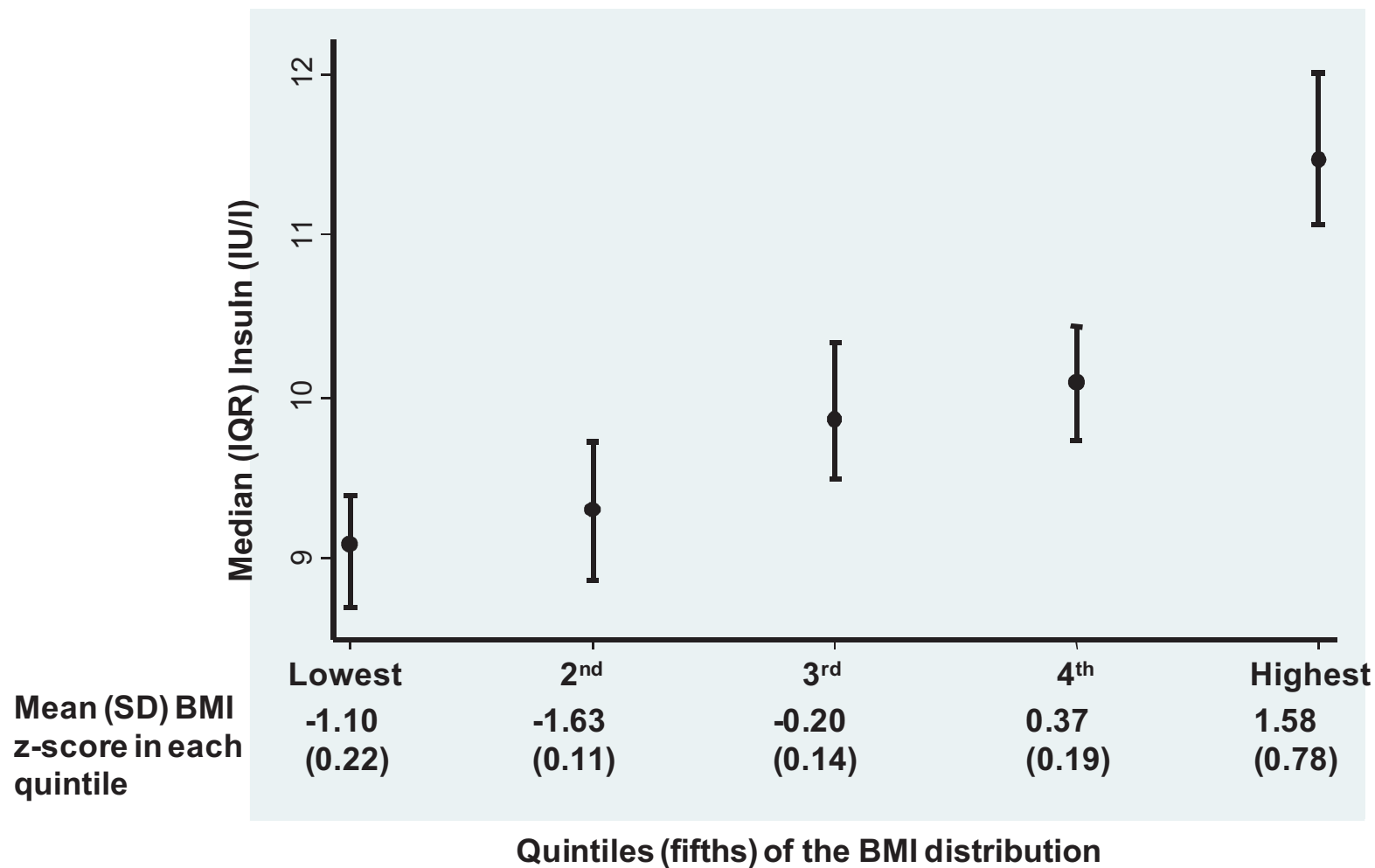
- Graded linear association of childhood BMI from mid-childhood with CHD risk factors and incident events in adulthood
- Overweight/obesity, and other precursors (physiological and behavioural) of CHD present in childhood and track to adulthood
- Type 2 diabetes now seen in children

# 🌿 Prospective association of childhood BMI with adolescent CVD risk factors

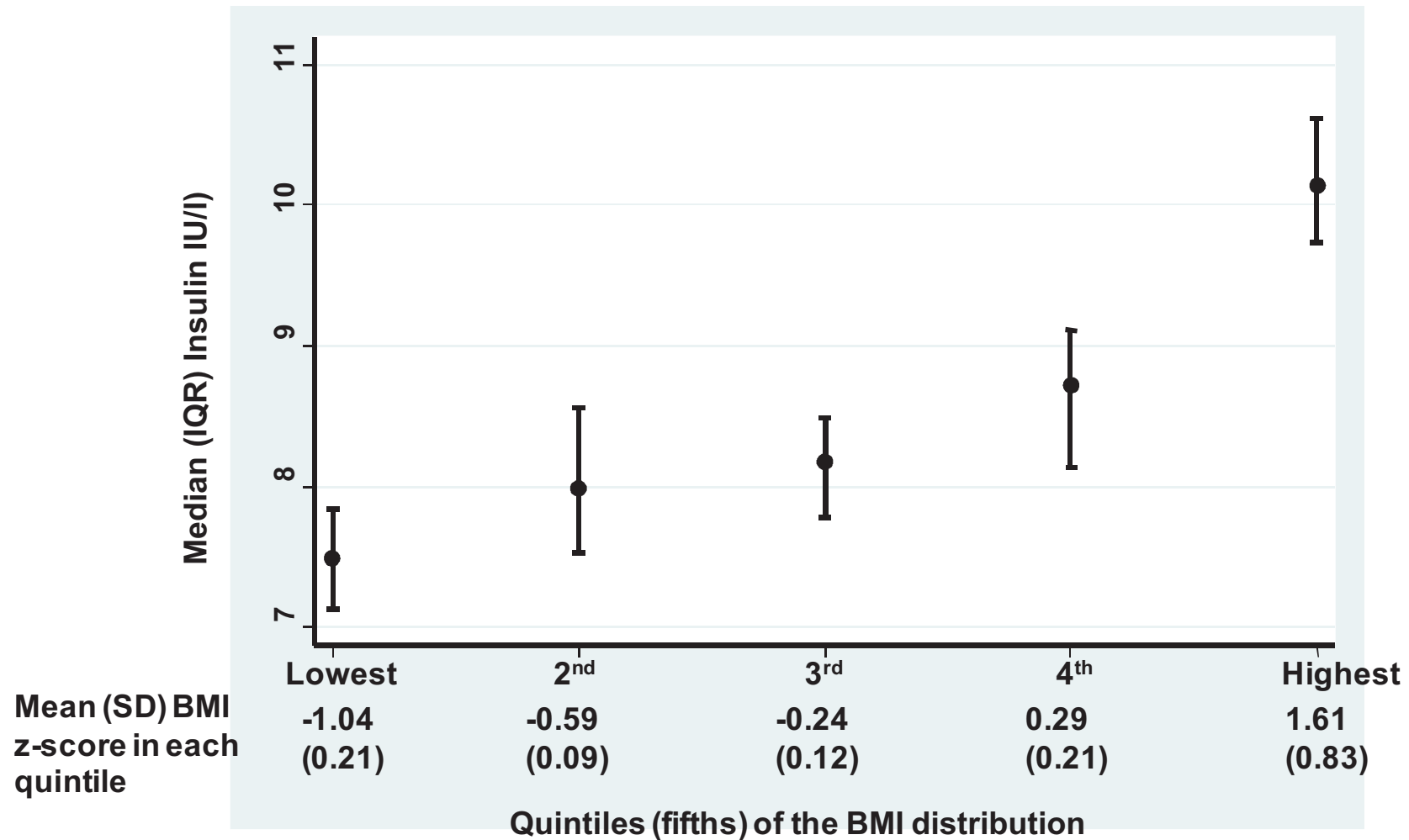
- BMI, WC and total fat mass assessed at age 9-12 are positively associated with cardiovascular risk factors at age 15-16 with similar magnitudes of association
- Females who changed from overweight at age 9-12 to normal by 15-16 had similar levels of CVD risk factors to those who were normal at both ages.
- In males odds of adverse levels of SBP, HDLc, triglycerides and insulin remained higher in this group

*Lawlor DA, et al. BMJ 2010*

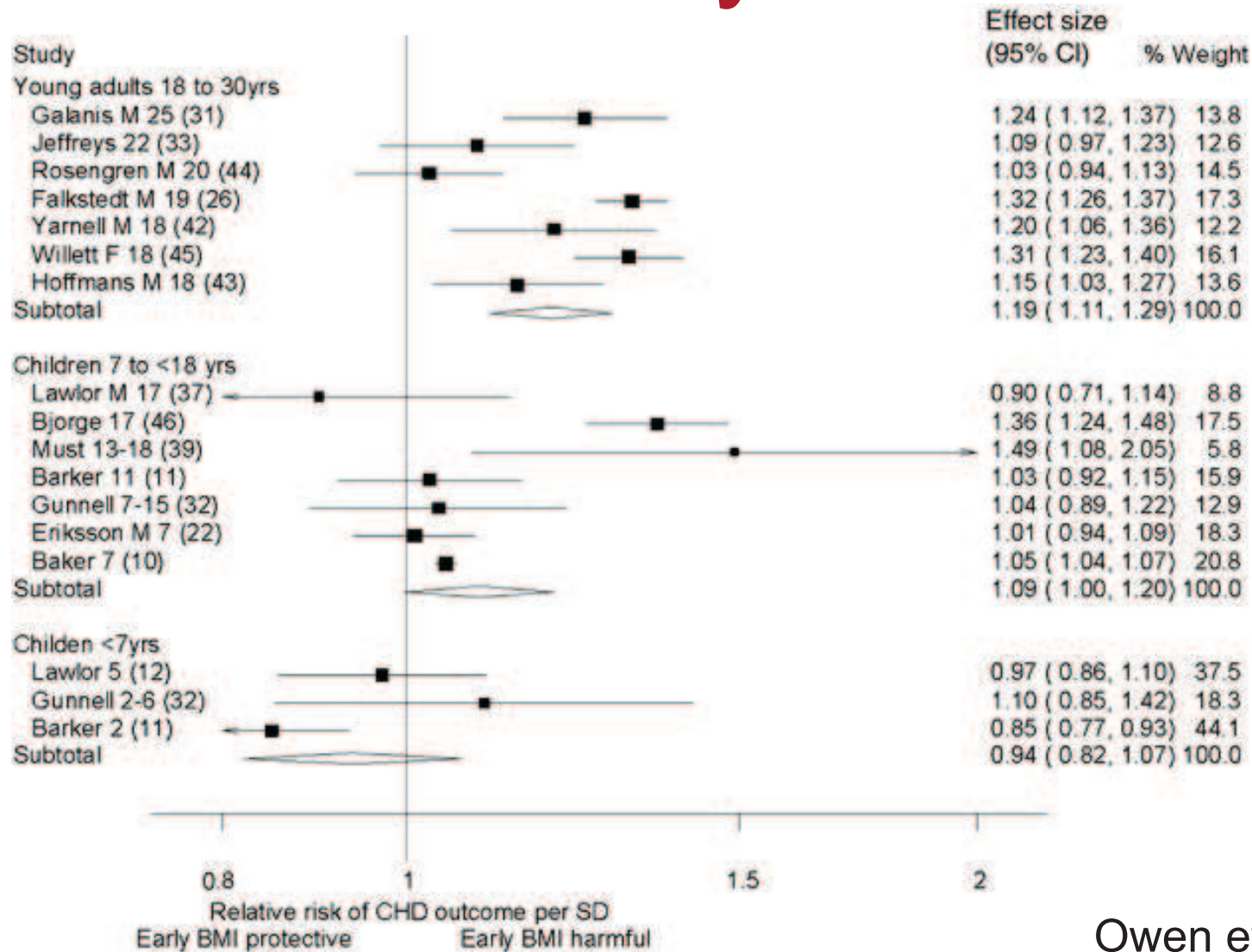
**Web-Figure 1g: Distribution of insulin levels at age 15-16 years across quintiles of BMI measured at age 9-12 years. Females N = 2747**



**Web-Figure 1h: Distribution of insulin levels at age 15-16 years across quintiles of BMI measured at age 9-12 years. Males N = 2488**

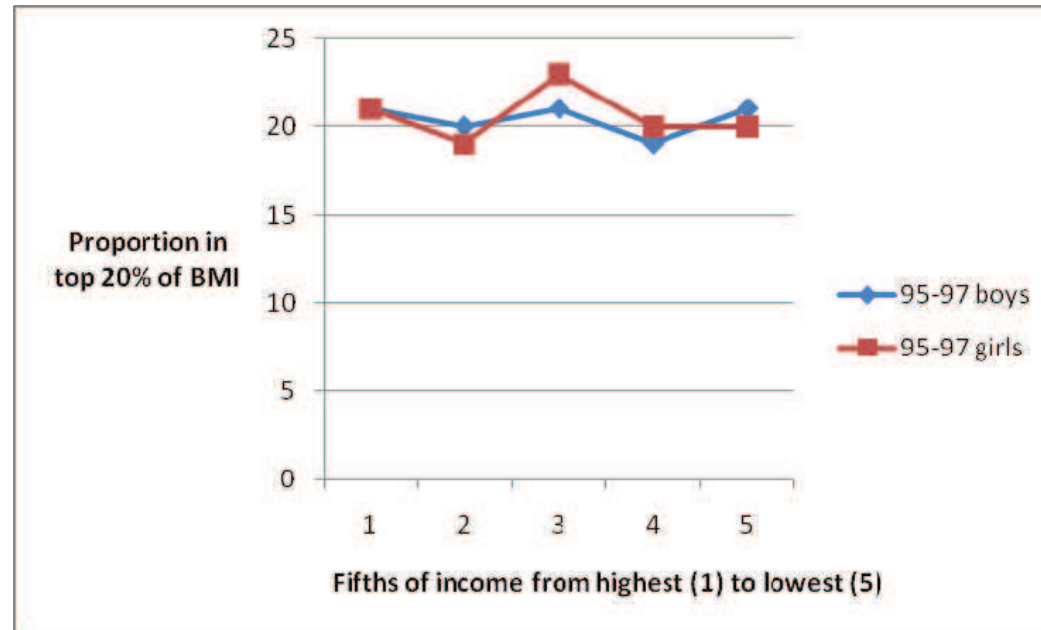


# Child obesity & adult CHD



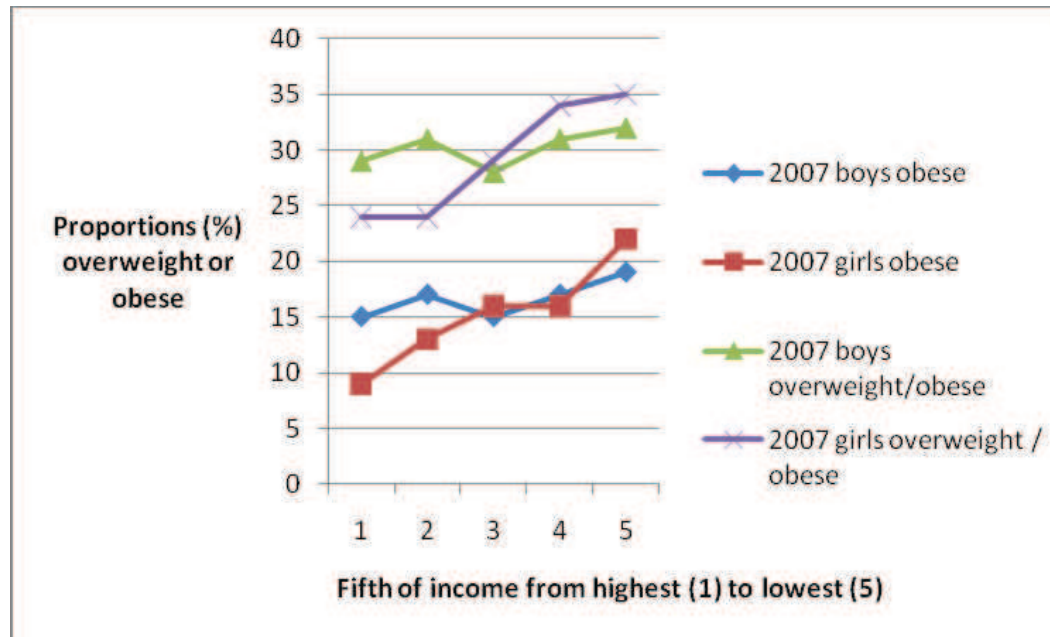
Owen et al. Int J Obesity 2009

# 🌟 Socioeconomic inequalities in childhood obesity: a recent phenomenon in high income countries



Health Survey for England data from 95-97 (children born 1980-95)

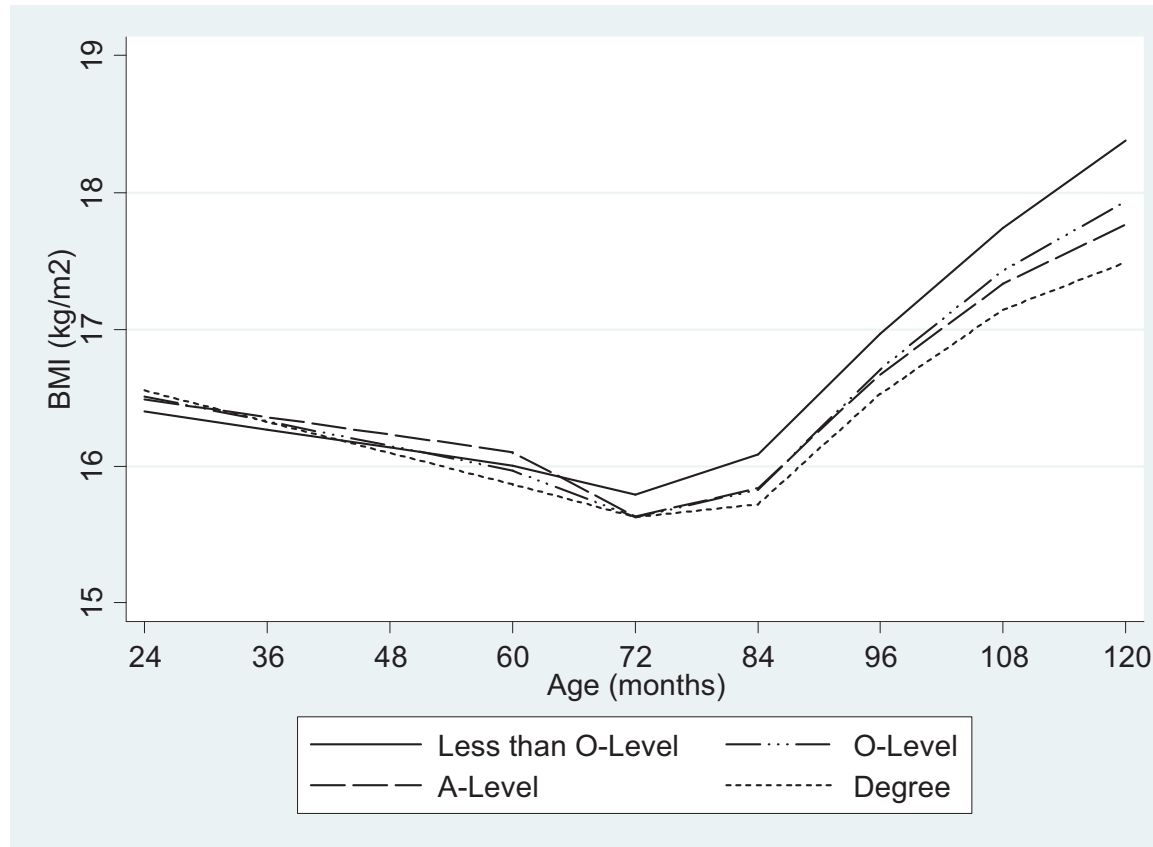
# 🌟 Socioeconomic inequalities in childhood obesity: a recent phenomenon in high income countries



Health Survey for England data from 2007 (children born 1992-2005)



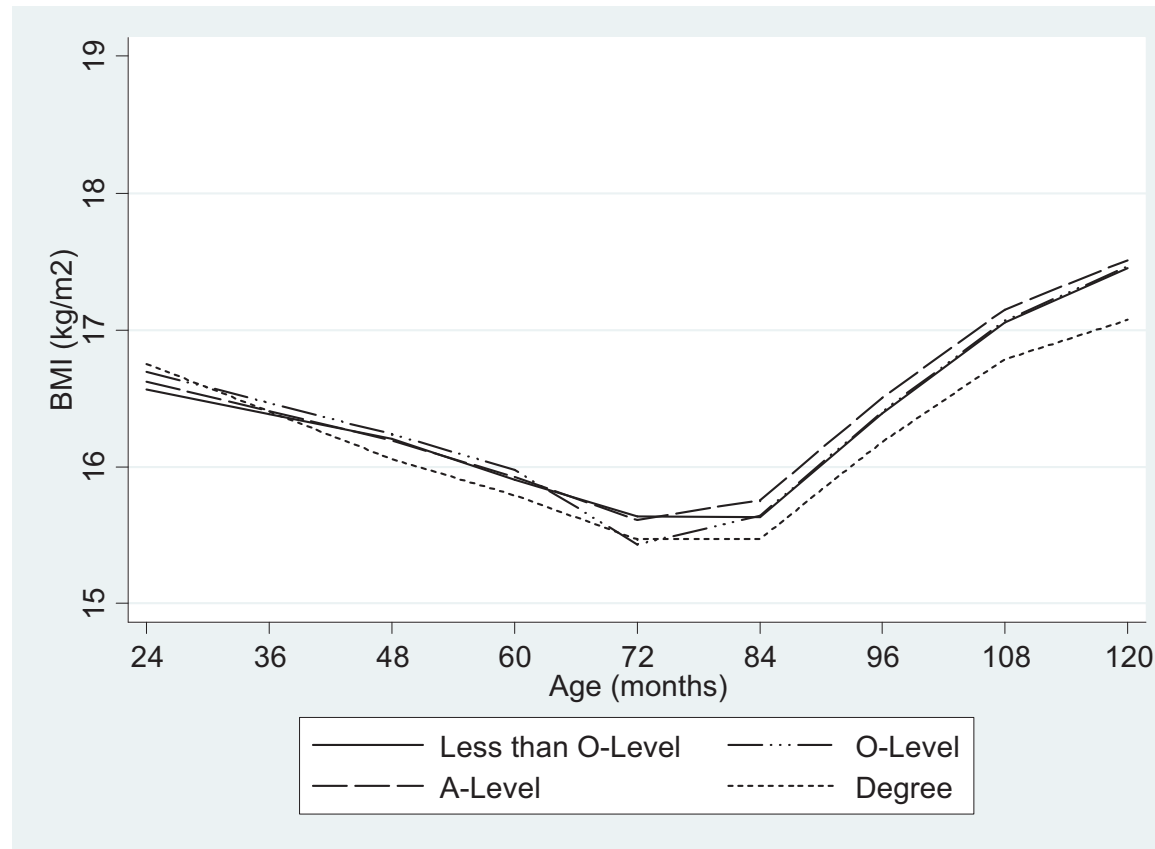
# 🌟 At what age do childhood inequalities emerge in contemporary children?



Howe L, et al. *Int J Ped Obesity* 2010

Mean BMI by mother's education from age 2-10 years in **girls**

# 🌟 When do childhood inequalities emerge in contemporary children?

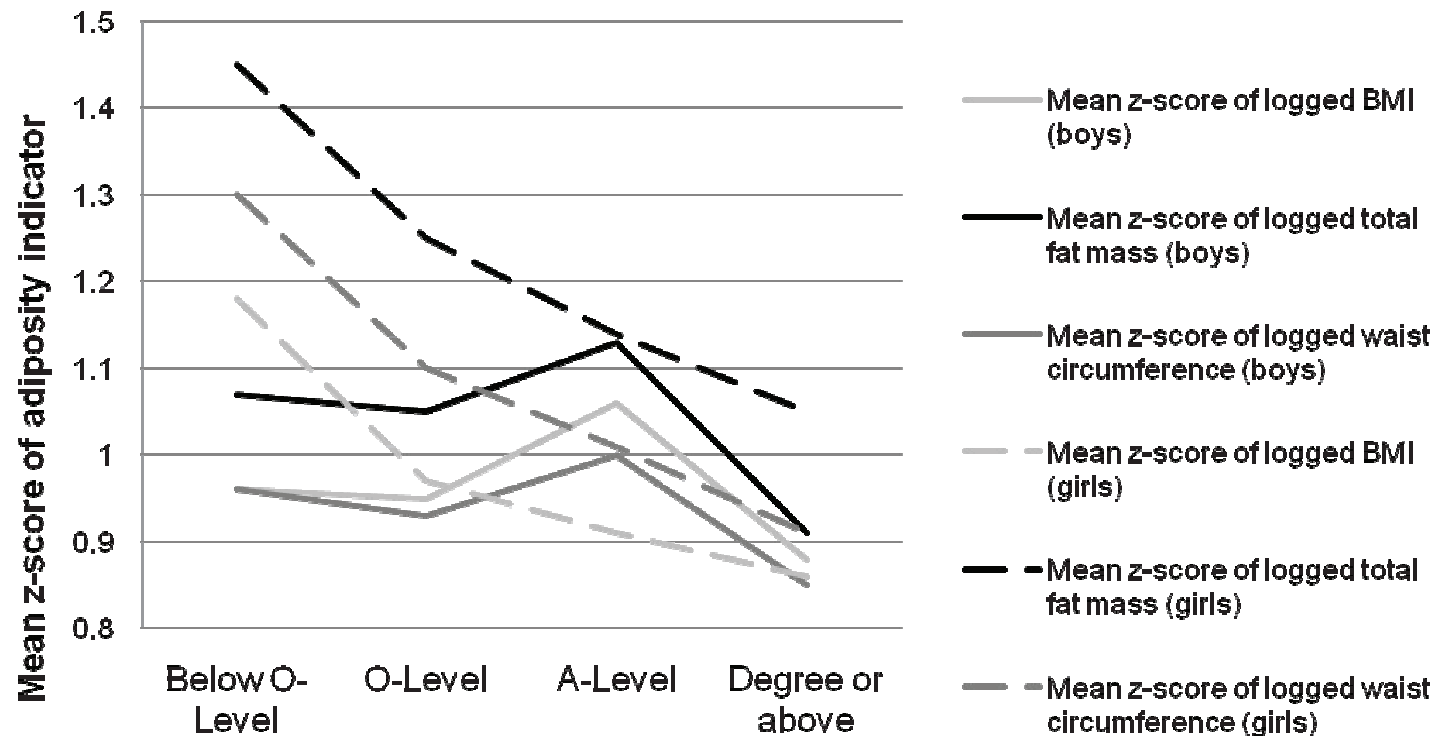


Howe L, et al. *Int J Ped Obesity* 2010

Mean BMI by mother's education from age 2-10 years in **boys**

# 🔥 Socioeconomic inequalities in adiposity in children by age 9-10

Mean levels of adiposity across categories of maternal education, using z-scores of adiposity measures

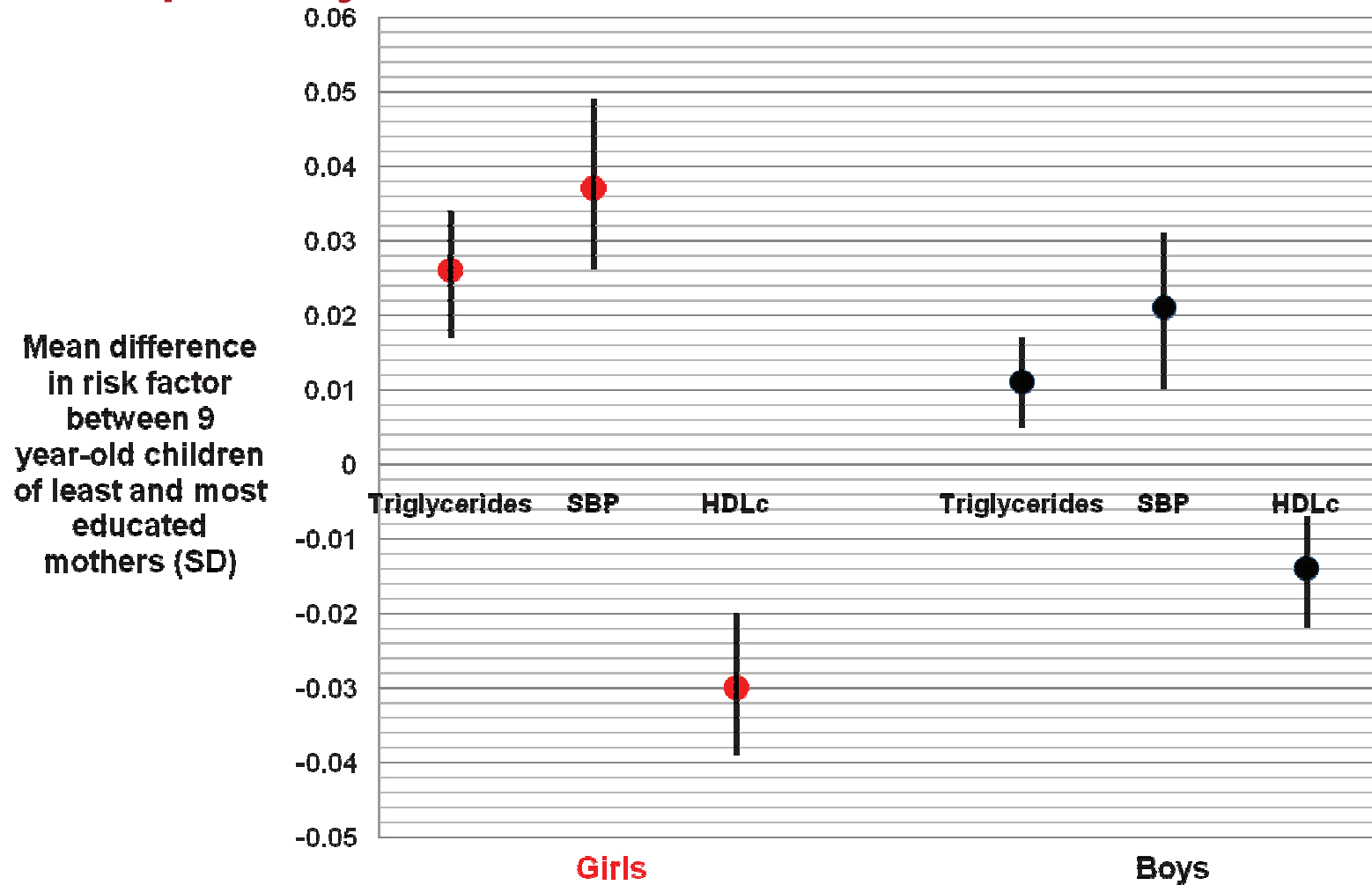


By age 10 mean difference in BMI comparing top to bottom maternal education category:  
 Girls: 0.89 Kg/m<sup>2</sup>  
 Boys: 0.38 Kg/m<sup>2</sup>

Similar patterns if waist or directly assessed fat mass used

Howe L, et al. *Int J Ped Obesity* 2010 & *Int J Obesity* 2010

# What is the effect of inequalities in adiposity on cardiovascular risk factors?



Howe L, et al.  
*Int J Obesity*  
2010

# Global inequalities

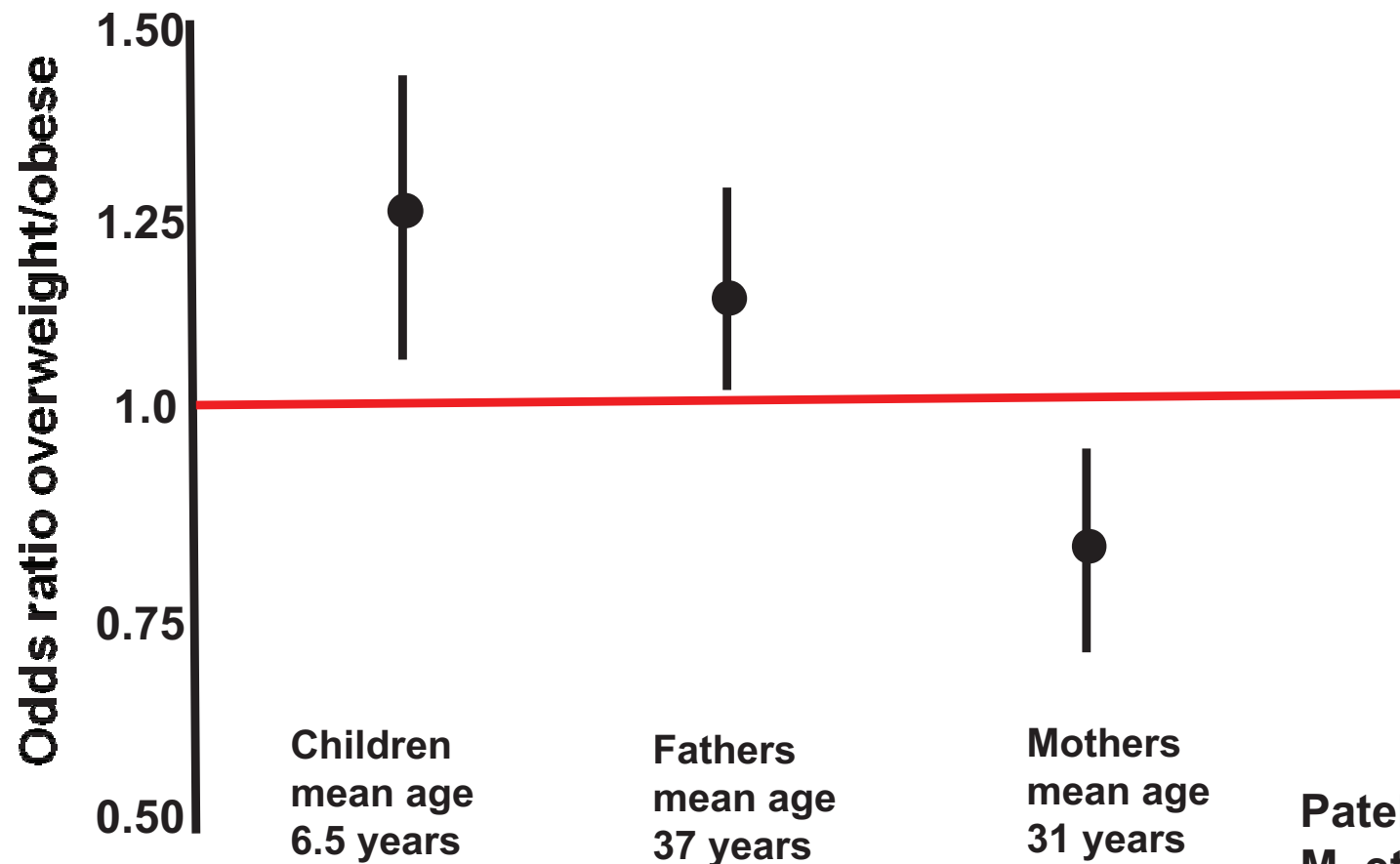
- Increasing prevalence of overweight/obesity in Eastern Europe, Latin America, India, China and some areas of Africa; along side massive undernutrition and communicable diseases
- Currently those from higher socioeconomic groups in these countries more likely to be overweight / obese
- ‘Transfer of our failure’

“Low-cost and highly effective solutions for the prevention of chronic diseases are readily available; the failure to respond is now a political, rather than a technical issue.”

Geneau R, et al. Lancet 2010; 376:1689-98

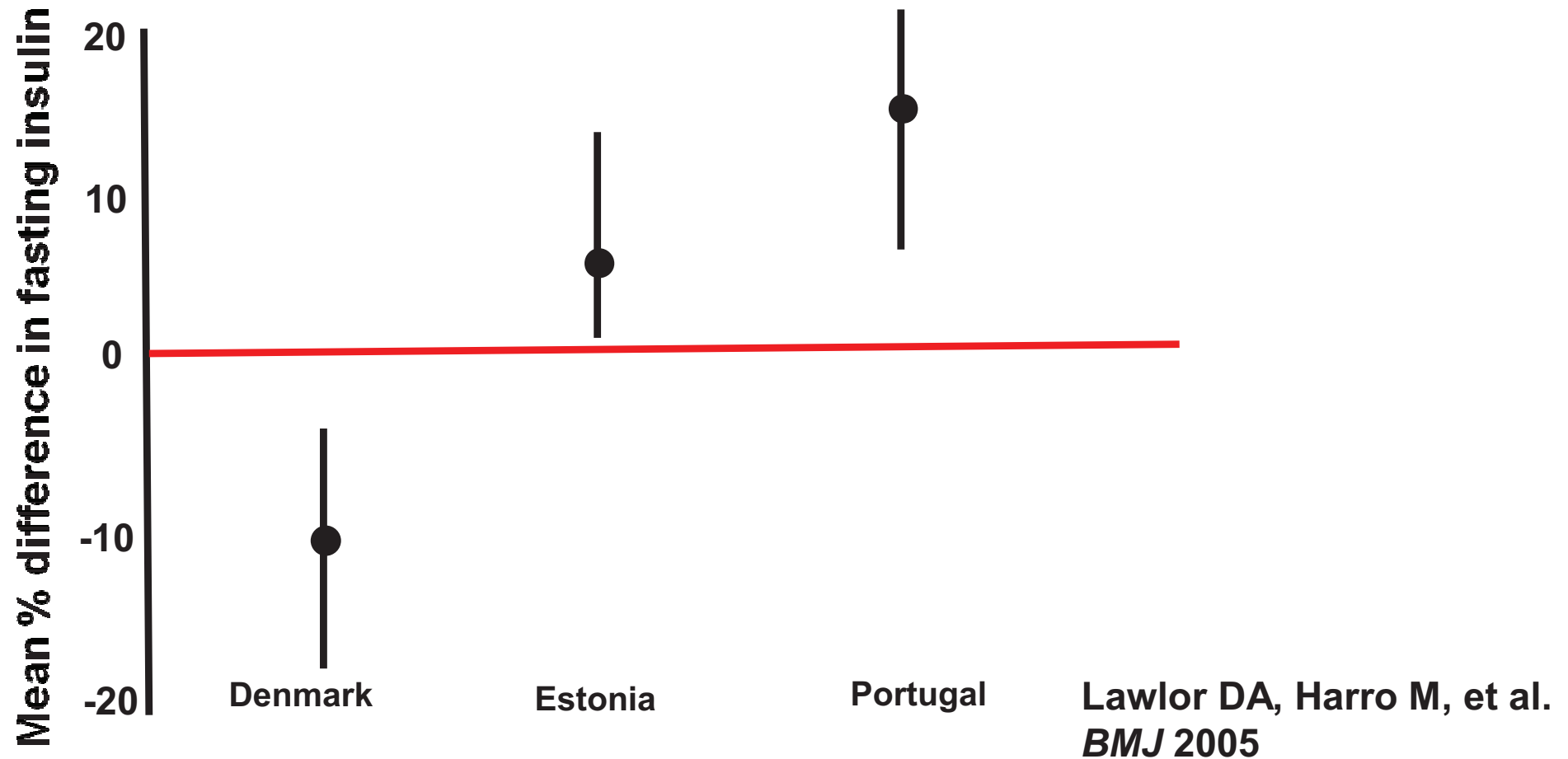


# ✦ Odds ratio overweight/obesity comparing non-manual to manual social classes in children (6.5 years) and their parents from Belarus



Patel R, Lawlor DA, Kramer M, et al. *EJPH* 2011

✦ Fasting insulin comparing children (9 and 15 years) whose parents were the most, to those who were the least, educated





# Consequences of rural-urban migration

## Diet



## Physical activity



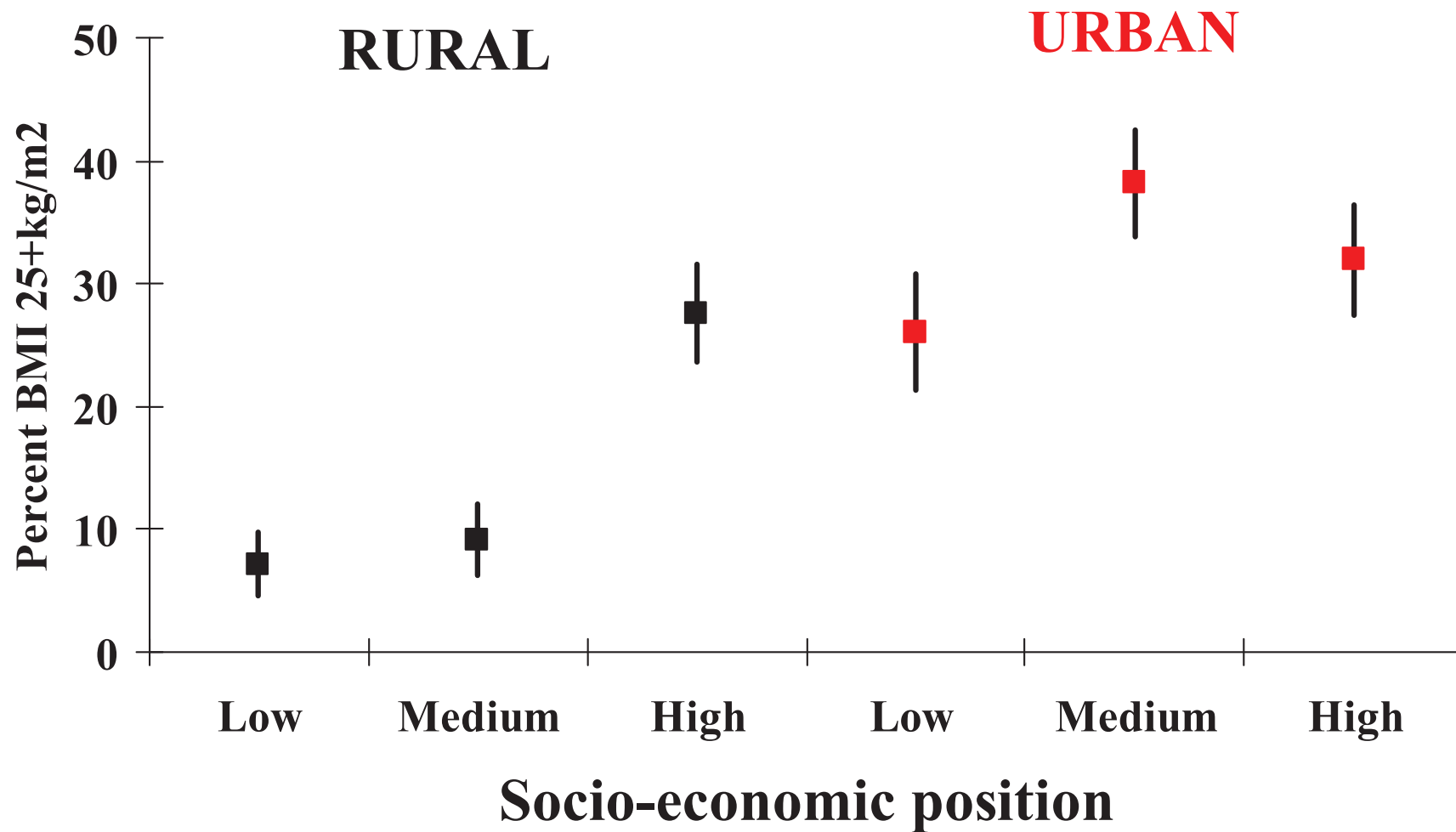
## Economic development in India

- GDP growth > 7% annually
- Rural-Urban migration 1.5-2 million / year
- Urban population > 290 million

# Indian Migrants Study

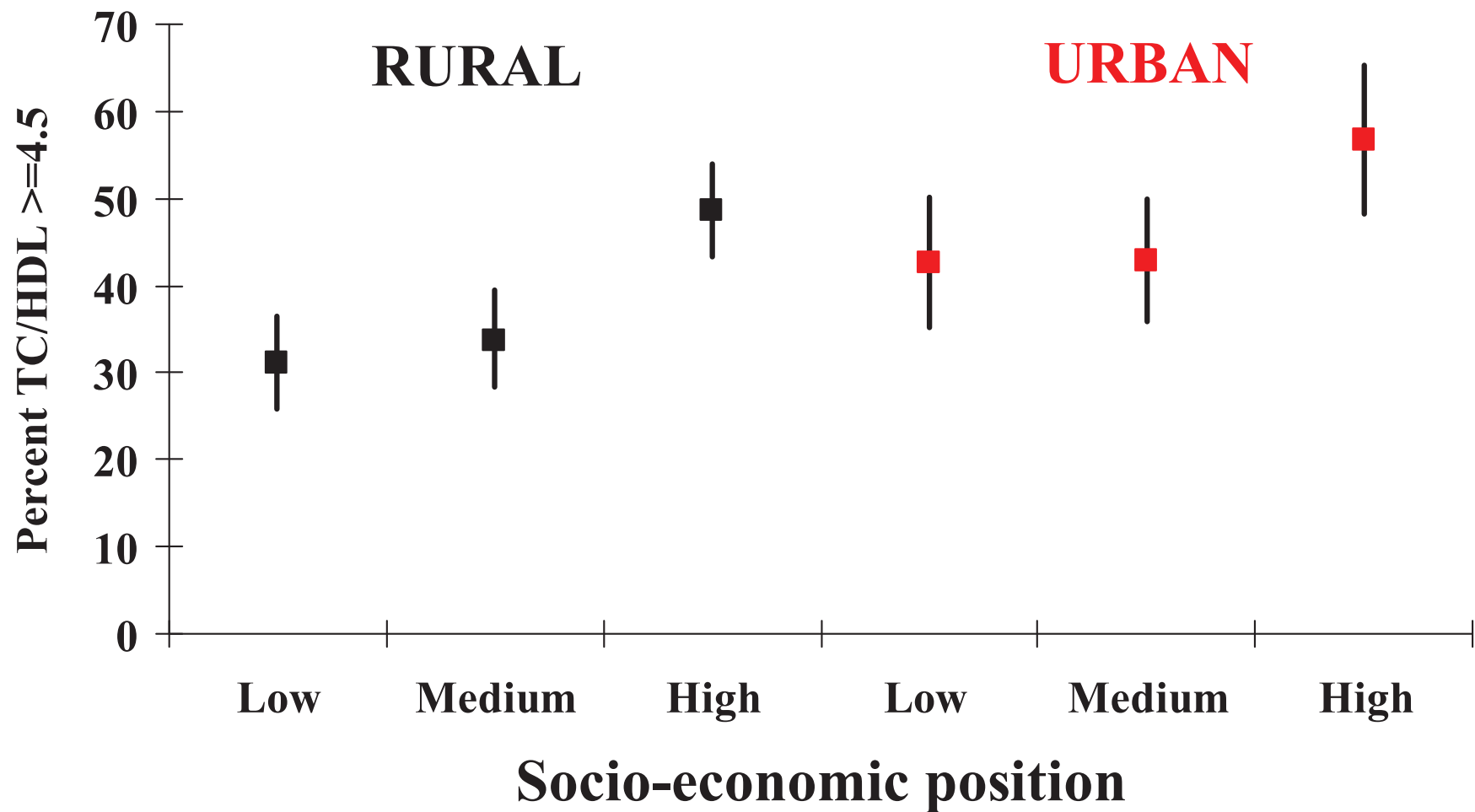
	Rural	Urban	Difference
Overweight (%)	20	46	26 (22, 28)
Fasting glucose (mmol/l)	5.2	5.5	0.3 (0.1, 0.3)
LDLc (mmol/l)	3.0	3.2	0.2 (0.0, 0.3)
Triglyceride (mmol/l)	1.45	1.53	0.06 (0.00, 0.17)
Diabetes (%)	3.1	9.0	5.0 (3.4, 6.6)

# Indian Migrant Study: BMI



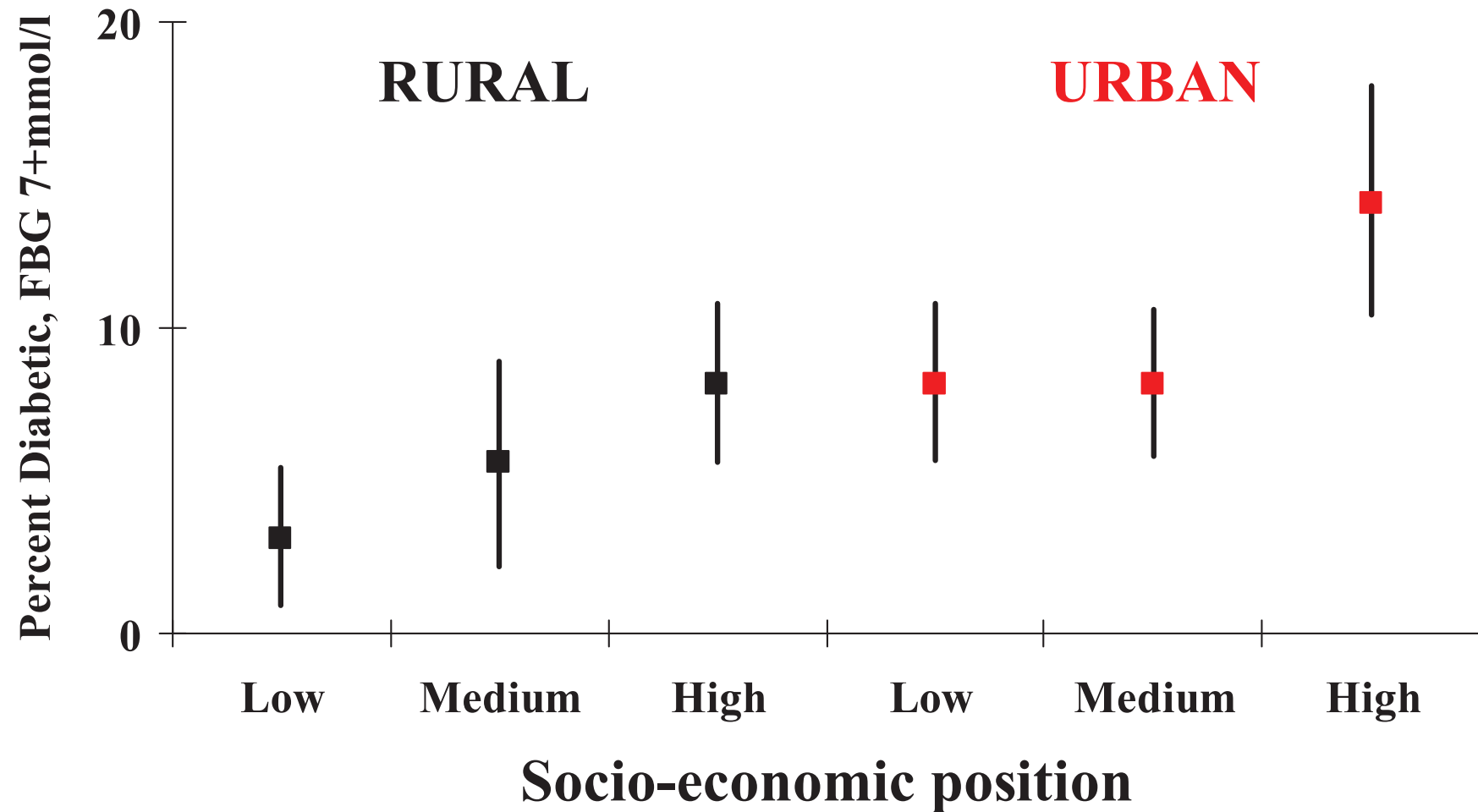
Kinra S, et al *BMJ* 2010

# 🌿 Indian Migrant Study: TC/HDL $\geq 4.5$



Kinra S, et al *BMJ* 2010

# 🌿 Indian Migrant Study: Diabetes



Kinra S, et al *BMJ* 2010

# Conclusions 1: HIC

- Socioeconomic inequalities in childhood adiposity / obesity have recently emerged in high income countries (low SEP = increased risk) & appear to be getting stronger in more contemporary children
- These inequalities already result in more adverse cardiovascular risk factors in those in the lowest SEP groups
- These may contribute to an increase in inequalities in cardiovascular disease and diabetes as this generation of children age

## Conclusion 2: LMIC

- SEP inequalities in LMIC tend to be in the opposite direction to those in HIC (lower SEP = less overweight/obesity)
- BUT along side extreme undernutrition and associated major consequences (including infant mortality) in the poorest
- Urban migration related to some of these patterns
- Globally political action slow / non-existent

# Acknowledgements

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