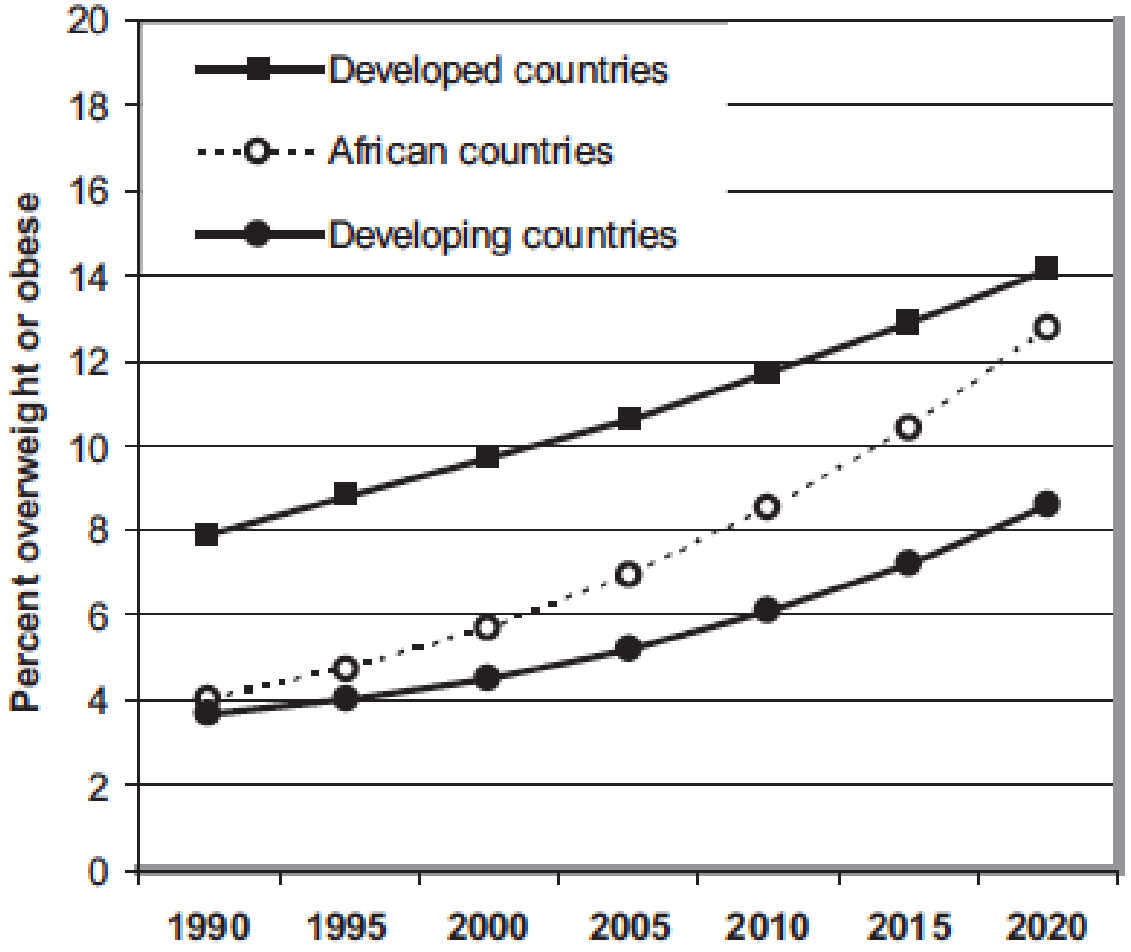
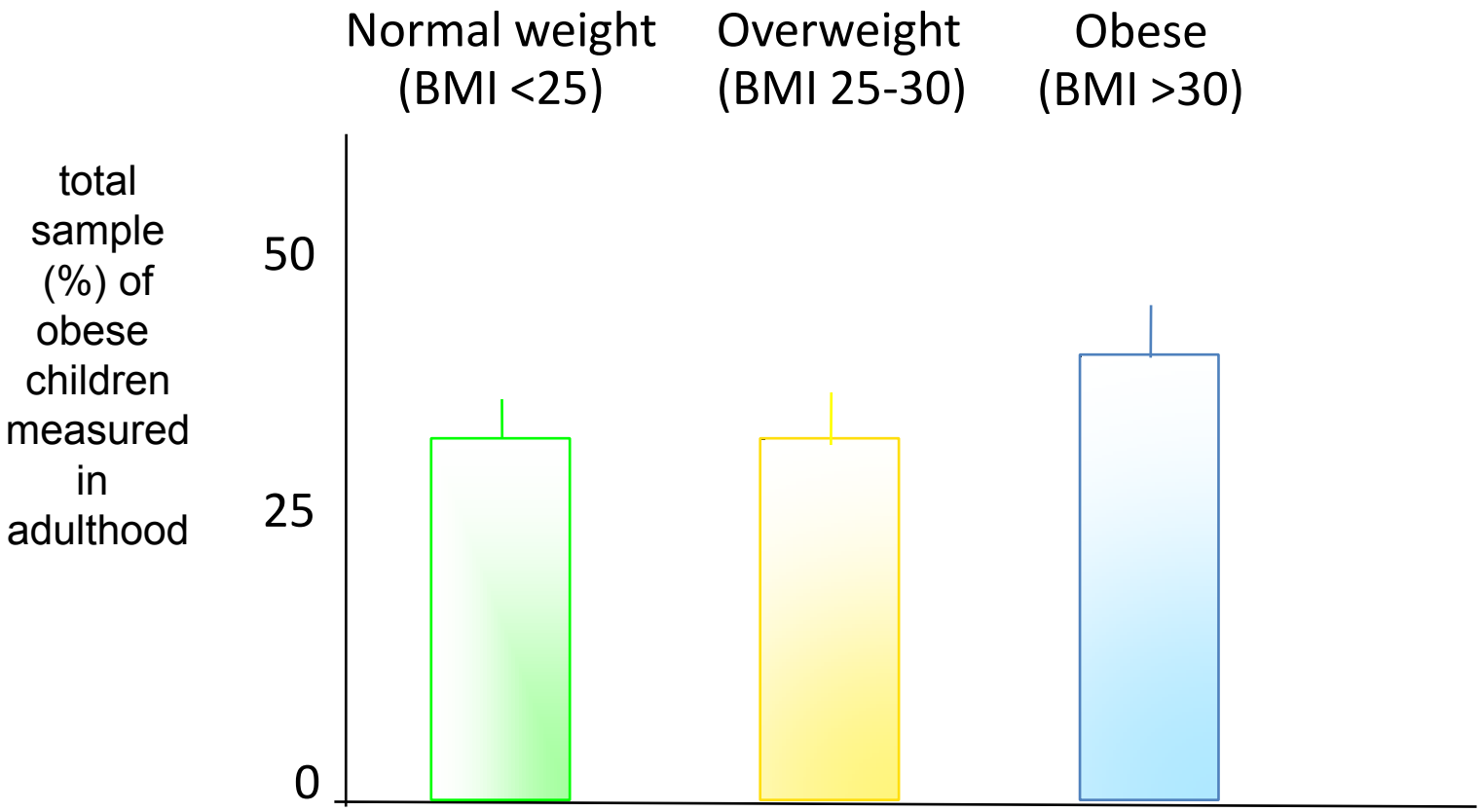
Prevalence and predicted ongoing rise of obesity among preschool children



de Onis M *et al.* Am J Clin Nutr 2010;92:1257-1264

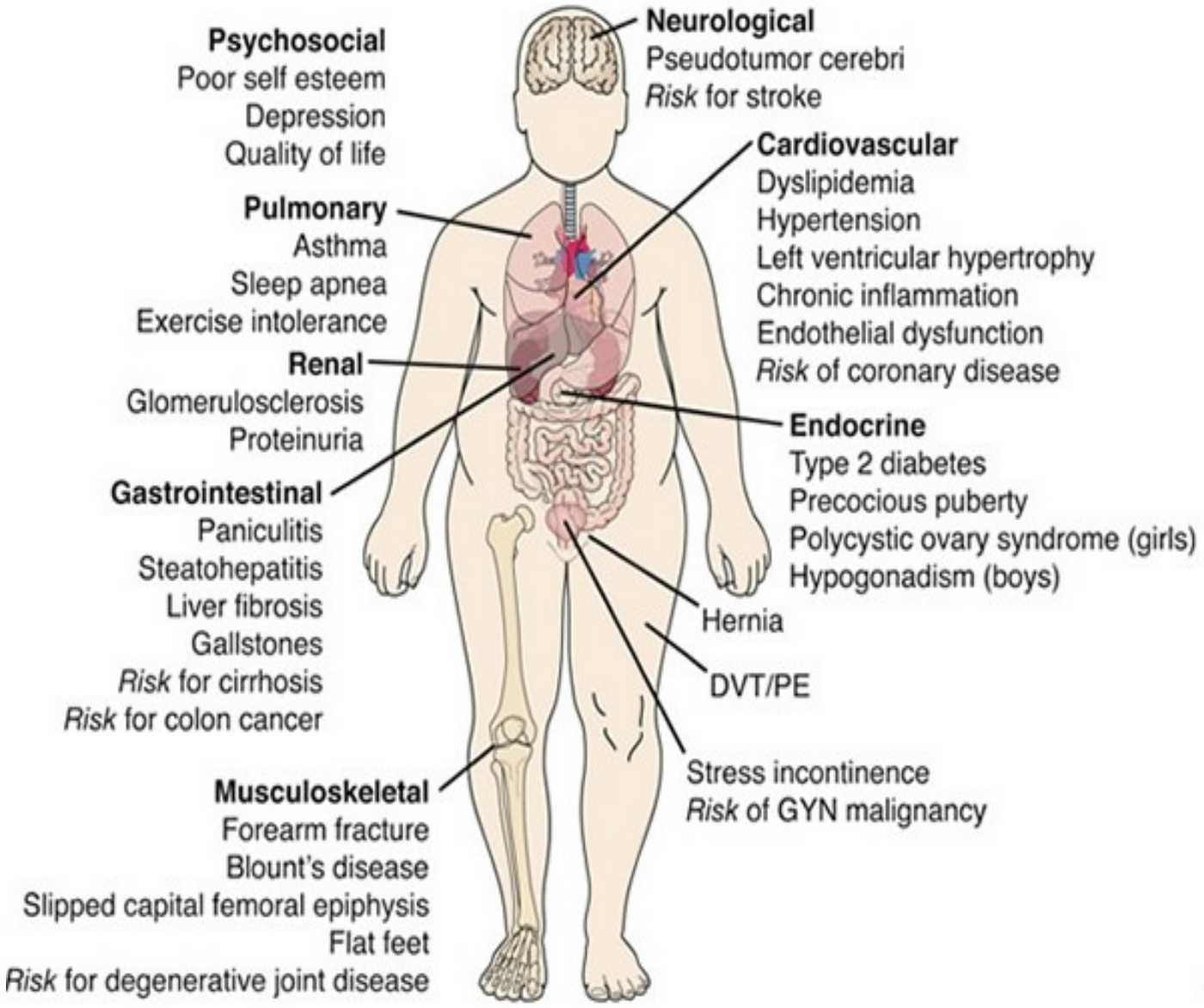
Lakshman R, *et al*. Circulation 2012;126:1770-9.

persistence of obesity from childhood into adulthood



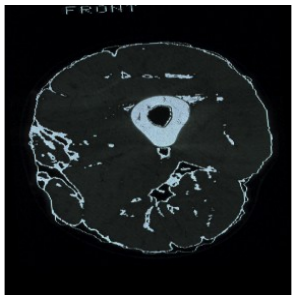
Maffeis C *et al*. J Clin Endocrinol Metab 2002;87:71-76

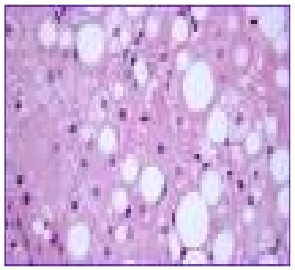
Complications of Childhood Obesity



OBESITY

ECTOPIC FAT ACCUMULATION





Franzese A, Vajro P, et al.

Dig Dis Sci 1997

INSULIN RESISTANCE

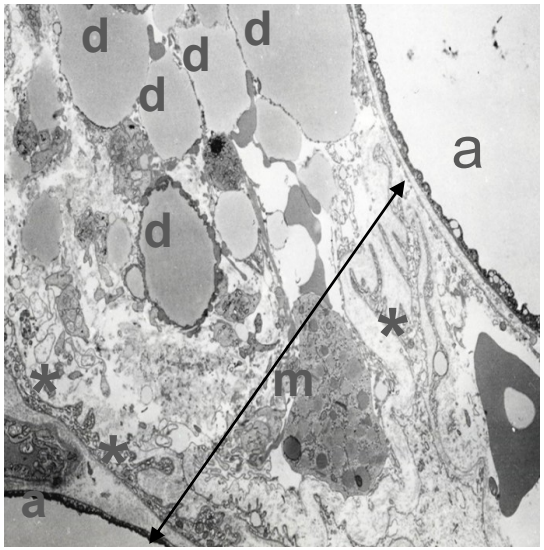
Hypertension

dislipidemia

IGT – T2D

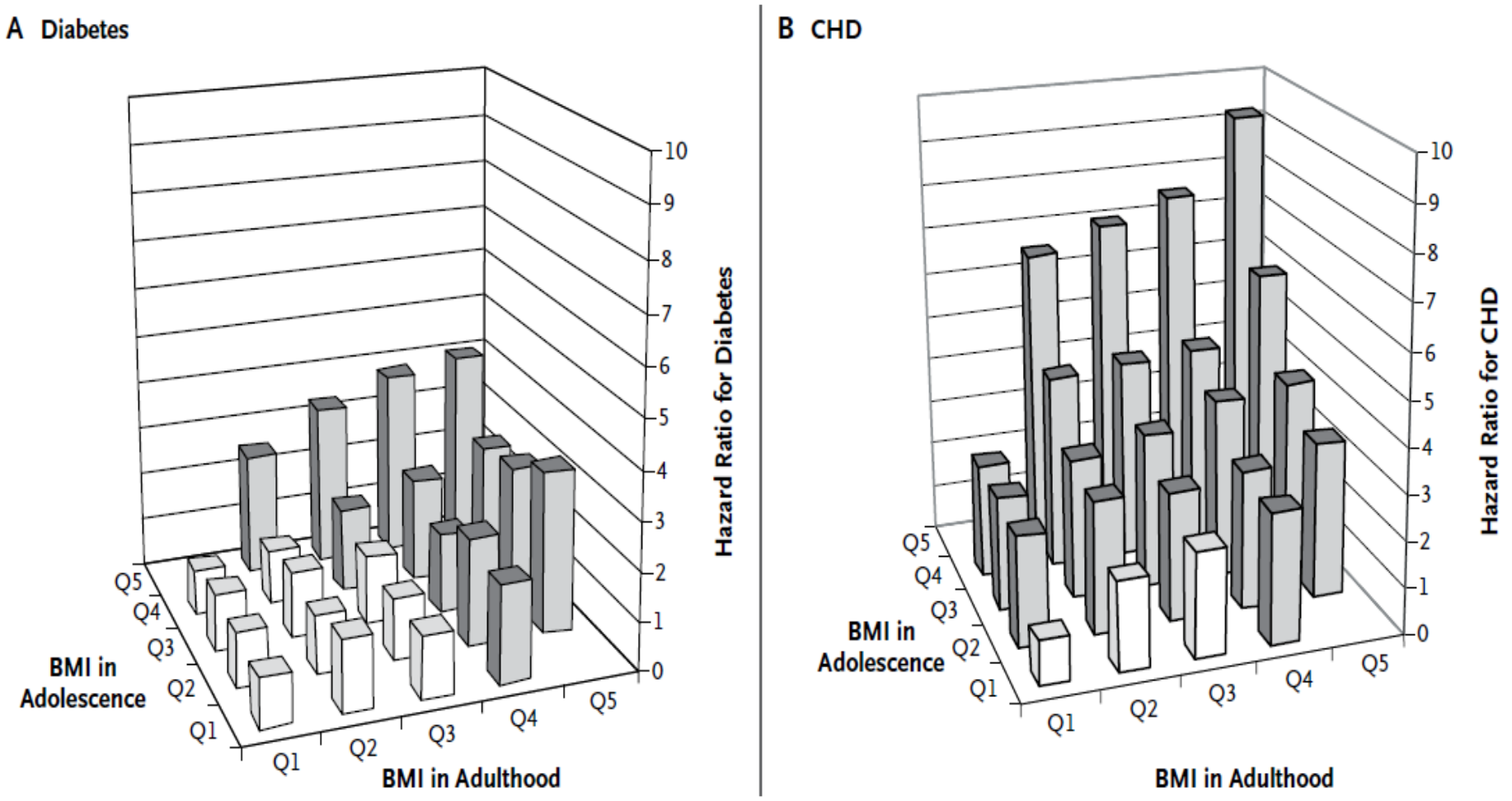
METABOLIC SYNDROME

INFLAMMATION



Maffeis C, et al.
Pediatrics 2006,
J Pediatr 2007

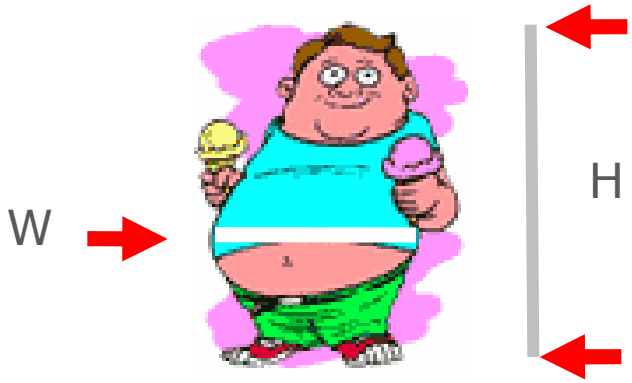
BMI in adolescence and risk of diabetes and coronary heart disease



Tirosh A, *et al*. NEJM 2011;364:1315-25

Odds ratio to have the metabolic syndrome in subjects with a W/Hr >0.5 within normal-weight, overweight, and obese BMI categories

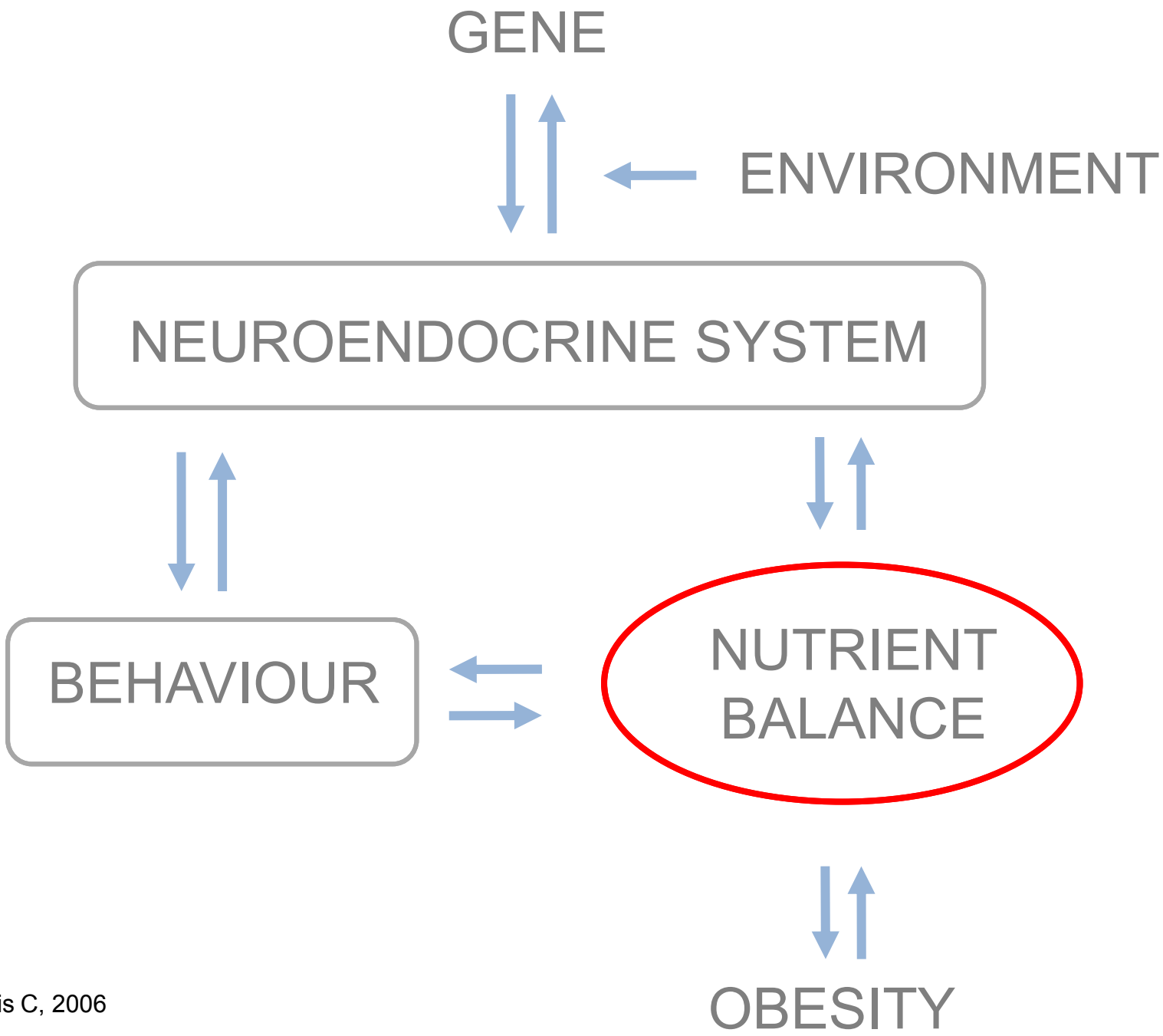
Childhood Obesity Group of the Italian Society of Pediatric Endocrinology & Diabetology



Independent variables	Metabolic syndrome: No	Metabolic syndrome: Yes	Risk to develop metabolic syndrome: OR (95% CI)
Normal weight with W/Hr <0.5	938	22	1
Normal weight with W/Hr >0.5	13	1	4.01 (0.49-32.97)
Over weight with W/Hr <0.5	132	10	3.34 (1.52-7.37) *
Over weight with W/Hr >0.5	72	16	8.16 (3.87-17.23) **
Obese with W/Hr >0.5	208	67	12.11 (7.08-20.71) **

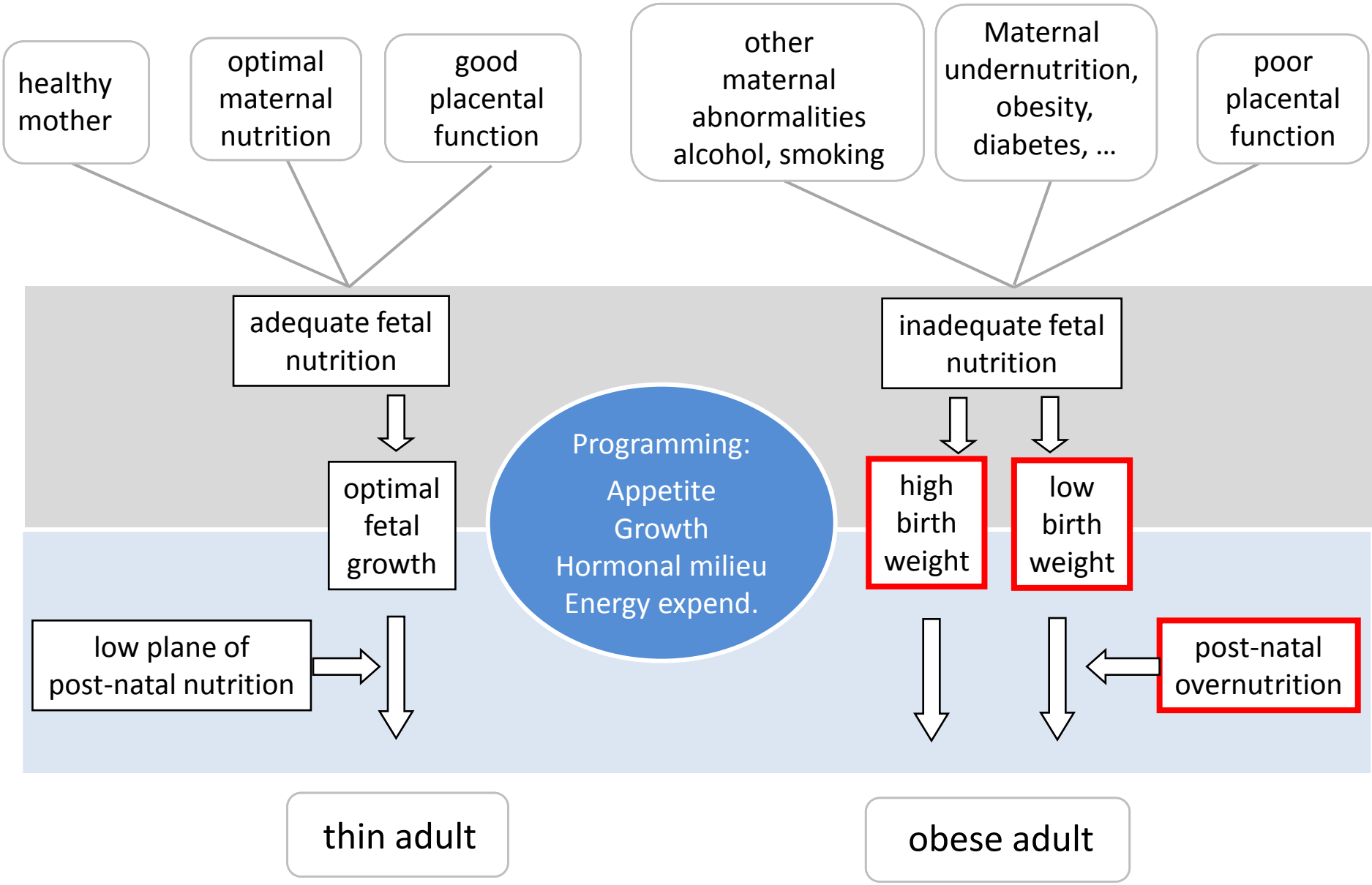
*W/Hr = waist/height ratio * P* < .05. ** *P* < .001.

Maffeis C, *et al.* J Pediatr 2008



Maffeis C, 2006

fetal & perinatal programming



Cripps *et al.* Clin Sci 2005, modified

parental and perinatal factors associated with childhood obesity in north-east Italy

"… When parental and perinatal variables were included as independent variables in a multiple logistic regression model controlling for the effect of age, *parental body mass index* and *children's birth-weight* remained independently associated with childhood obesity. "

Maffeis C, *et al.* Int J Obes 1994;18:301-5.

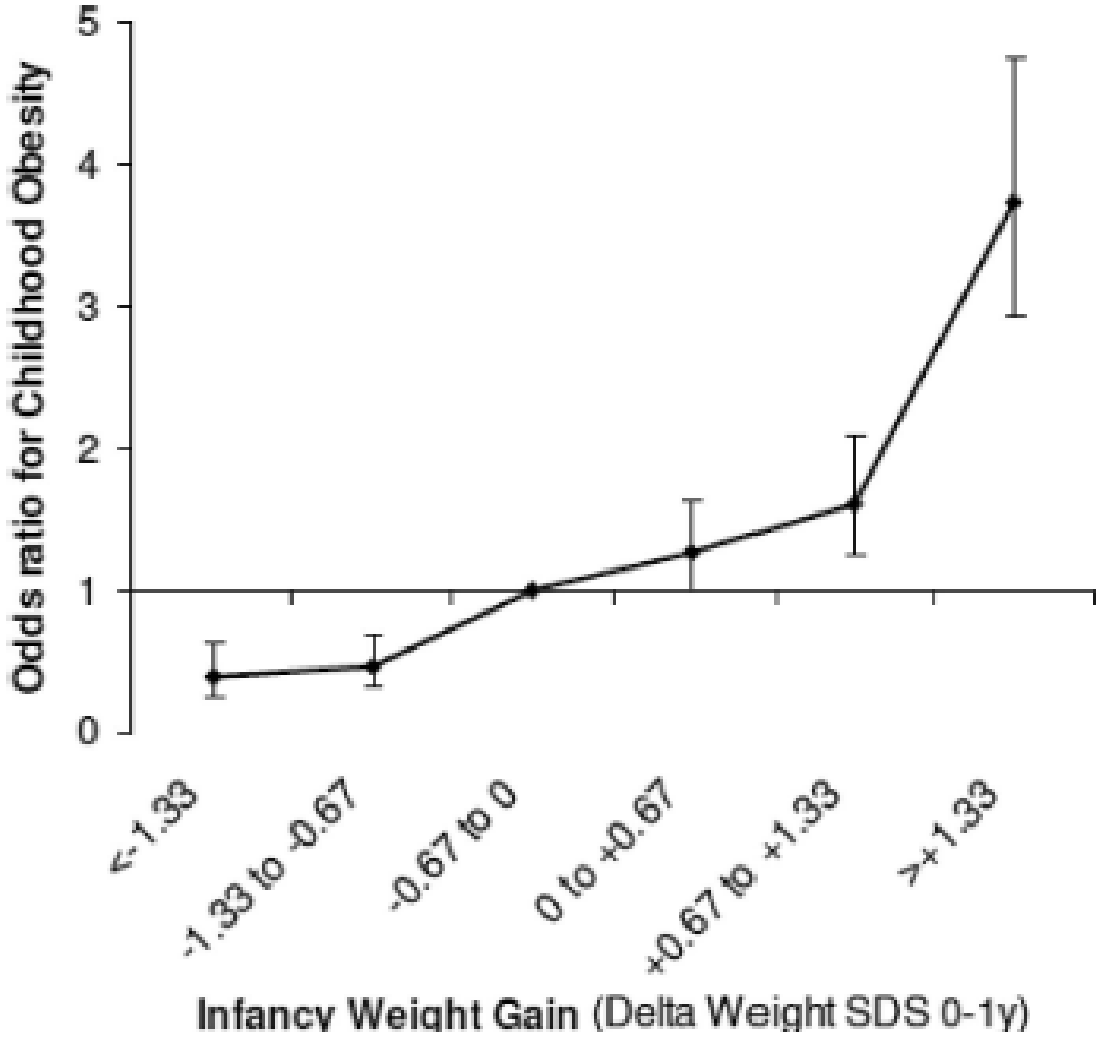
Estimation of Newborn Risk for Child or Adolescent Obesity: Lessons from Longitudinal Birth Cohorts

Table 3. Stepwise multiple logistic models for prediction of obesity phenotypes: ORs and p values associated with predictors, AUROC and P of Hosmer-Lemeshow test in the final models (bold characters) and AUROCs and P of Hosmer-Lemeshow of each step (italic characters).

	OR in the final cumulative model	P	AUROC when term is added	P of H-L test when term is added
Childhood Obesity				
Paternal BMI	**1.19 (1.13–1.27)**	**<0.001**	*0.68 (0.64–0.73)*	*0.39*
Maternal BMI	**1.13 (1.08–1.17)**	**<0.001**	*0.74 (0.70–0.78)*	*0.06*
N of household members	**0.73 (0.63–0.84)**	**<0.001**	*0.77 (0.73–0.80)*	*0.007*
Birth weight (kg)	**2.12 (1.48–3.04)**	**<0.001**	*0.77 (0.73–0.80)*	*0.47*
Maternal occupation	**0.50 (0.31–0.79)**	**0.003**	*0.77 (0.73–0.81)*	*0.57*
Gestational smoking	**1.84 (1.20–2.81)**	**0.005**	**0.78 (0.74–0.82)**	**0.52**
Adolescent Obesity				
Maternal BMI	**1.18 (1.13–1.23)**	**<0.001**	*0.67 (0.63–0.71)*	*0.13*
Paternal BMI	**1.16 (1.10–1.22)**	**<0.001**	*0.70 (0.66–0.74)*	*0.29*
N of household members	**0.83 (0.74–0.92)**	**0.001**	*0.73 (0.69–0.76)*	*0.29*
Maternal occupation	**0.47 (0.32–0.69)**	**<0.001**	*0.74 (0.71–0.78)*	*0.81*
Gestational weight gain (%)	**1.03 (1.01–1.05)**	**0.001**	**0.75 (0.71–0.79)**	**0.69**
Persistent Childhood Obesity				
Paternal BMI	**1.23 (1.13–1.34)**	**<0.001**	*0.69 (0.61–0.76)*	*0.93*
Maternal BMI	**1.14 (1.07–1.21)**	**<0.001**	*0.81 (0.76–0.87)*	*0.32*
Birth weight	**2.30 (1.29–4.08)**	**0.005**	*0.82 (0.76–0.88)*	*0.06*
Maternal occupation	**0.31 (0.16–0.57)**	**<0.001**	*0.84 (0.79–0.89)*	*0.55*
Single parenthood	**4.27 (1.39–13.12)**	**0.011**	**0.85 (0.80–0.90)**	**0.33**

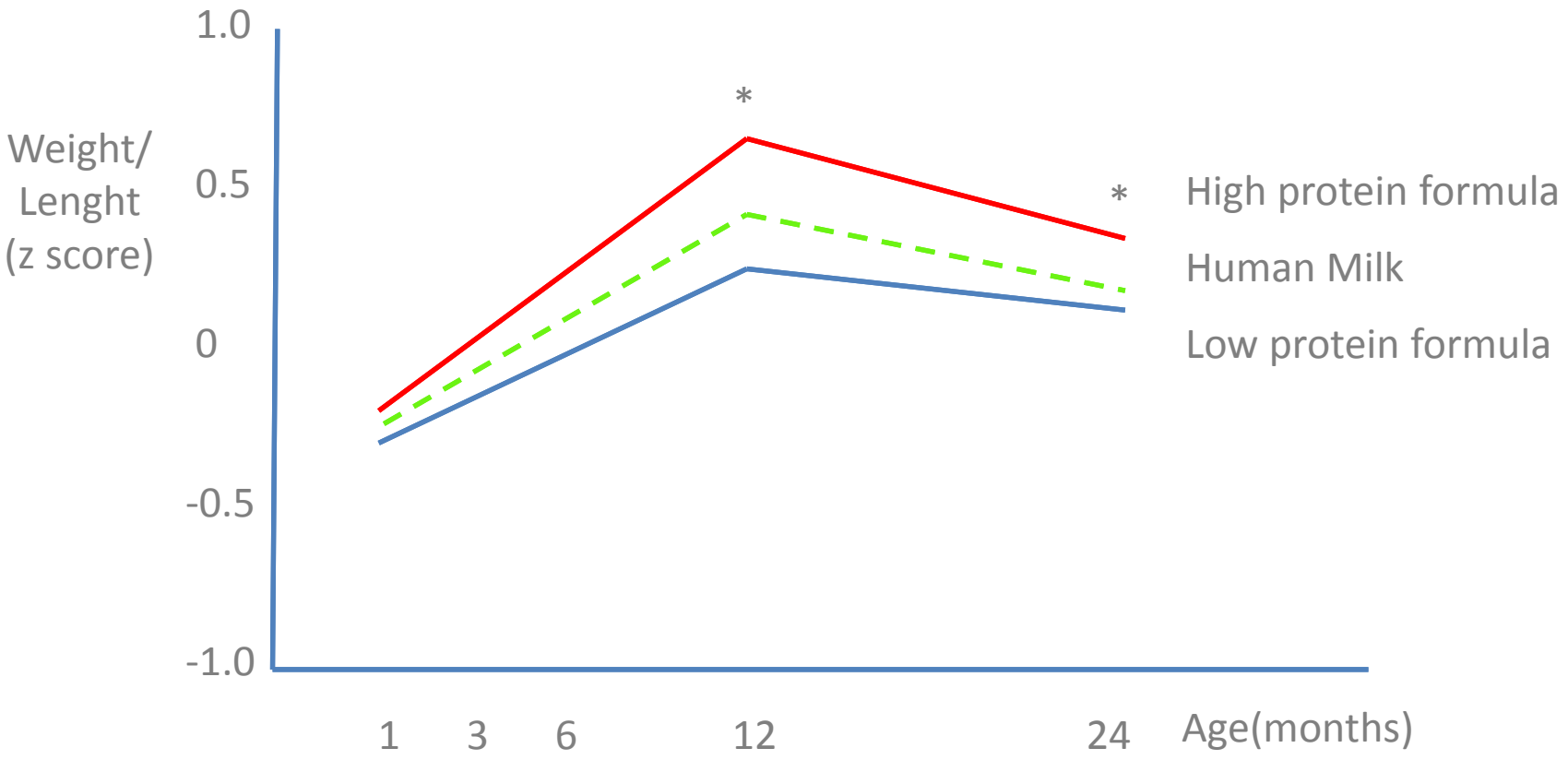
Morandi A, *et al.* PLoS ONE 2012;e49919

Odds ratio for childhood obesity by infant weight gain between 0 and 1 year adjusted for sex, age, a weight



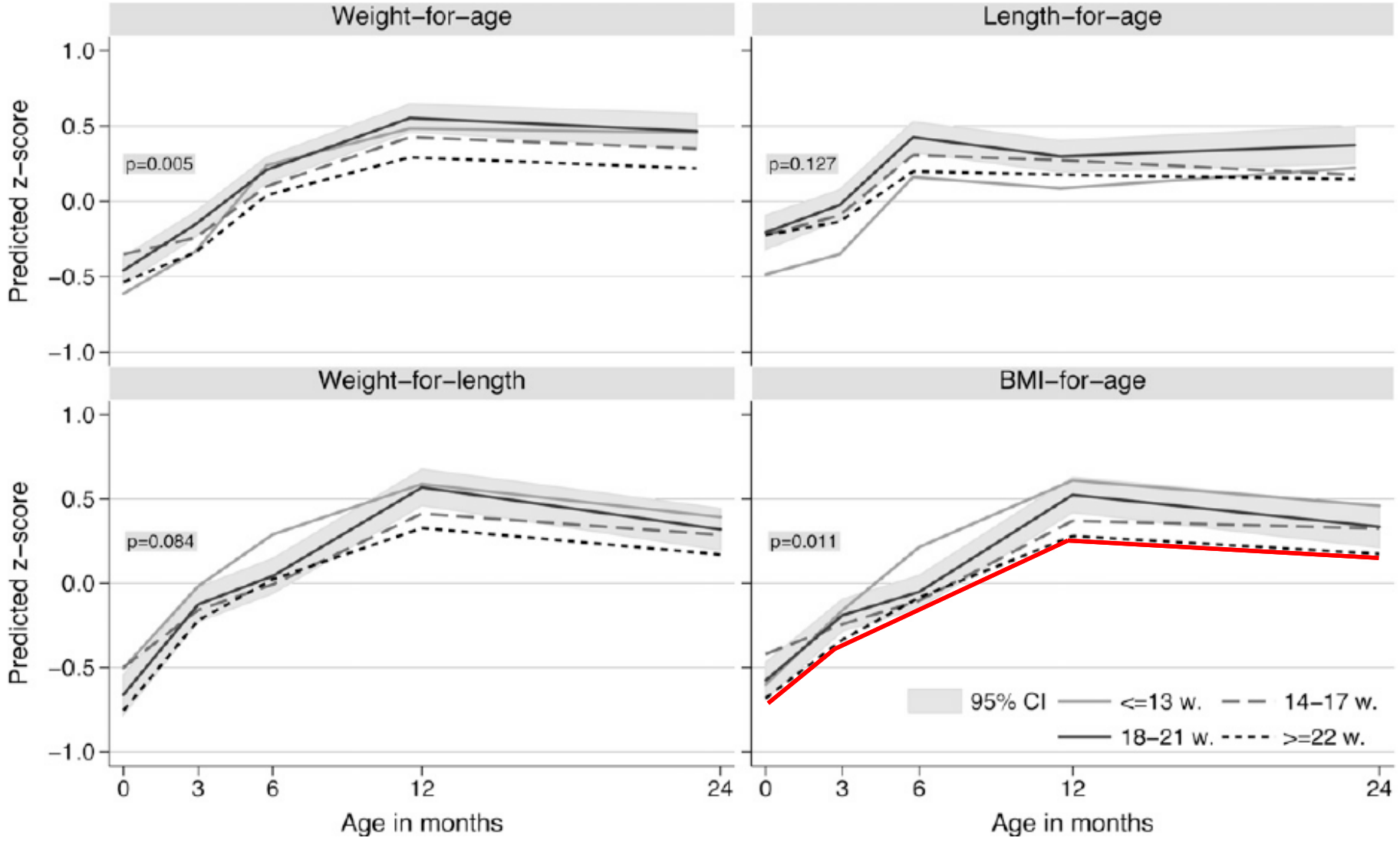
Lakshman R, *et al.* Circulation 2012;126:1770-9.

FORMULA PROTEIN CONTENT AND WEIGHT GAIN
A RANDOMIZED CLINICAL TRIAL



Socha P, et al. Am J Clin Nutr. 2011;94(6 Suppl):1776S-1784S

The introduction of solid food and growth in the first 2 y of life in formula-fed children: analysis of data from a European cohort study



Grote V, *et al.* Am J Clin Nutr 2011;94(suppl):1785S–93S.

Expert Committee Recommendations Regarding the Prevention, Assessment, and Treatment of Child and Adolescent Overweight & Obesity: Summary Report

Barlow SE & the Expert Committee Pediatrics 2007 (suppl.) (modified)

Target behaviors

Breastfeeding

Breakfast

Family meals (fast food)

Balanced macronutrients diet (RDA)

Fruits and vegetables, Fiber

Energy density

Portion size

Sugar-sweetened beverages

(Calcium)

TV other screen exposition

Physical activity

The NEW ENGLAND JOURNAL of MEDICINE
2013;368:446-54.

SPECIAL ARTICLE

Myths, Presumptions, and Facts about Obesity

Krista Casazza, Ph.D., R.D., Kevin R. Fontaine, Ph.D., Arne Astrup, M.D., Ph.D., Leann L. Birch, Ph.D., Andrew W. Brown, Ph.D., Michelle M. Bohan Brown, Ph.D., Nefertiti Durant, M.D., M.P.H., Gareth Dutton, Ph.D., E. Michael Foster, Ph.D., Steven B. Heymsfield, M.D., Kerry McIver, M.S., Tapan Mehta, M.S., Nir Menachemi, Ph.D., P.K. Newby, Sc.D., M.P.H., Russell Pate, Ph.D., Barbara J. Rolls, Ph.D., Bisakha Sen, Ph.D., Daniel L. Smith, Jr., Ph.D., Diana M. Thomas, Ph.D., and David B. Allison, Ph.D.

BREAST-FEEDING AND OBESITY

"…. Although existing data indicate that breast-feeding does not have important antiobesity effects in children, it has other important potential benefits for the infant and mother and should therefore be encouraged. "

long-term weight loss maintenance

Definition: “individuals who have intentionally lost at least 10% of their body weight and kept it off at least one year”.

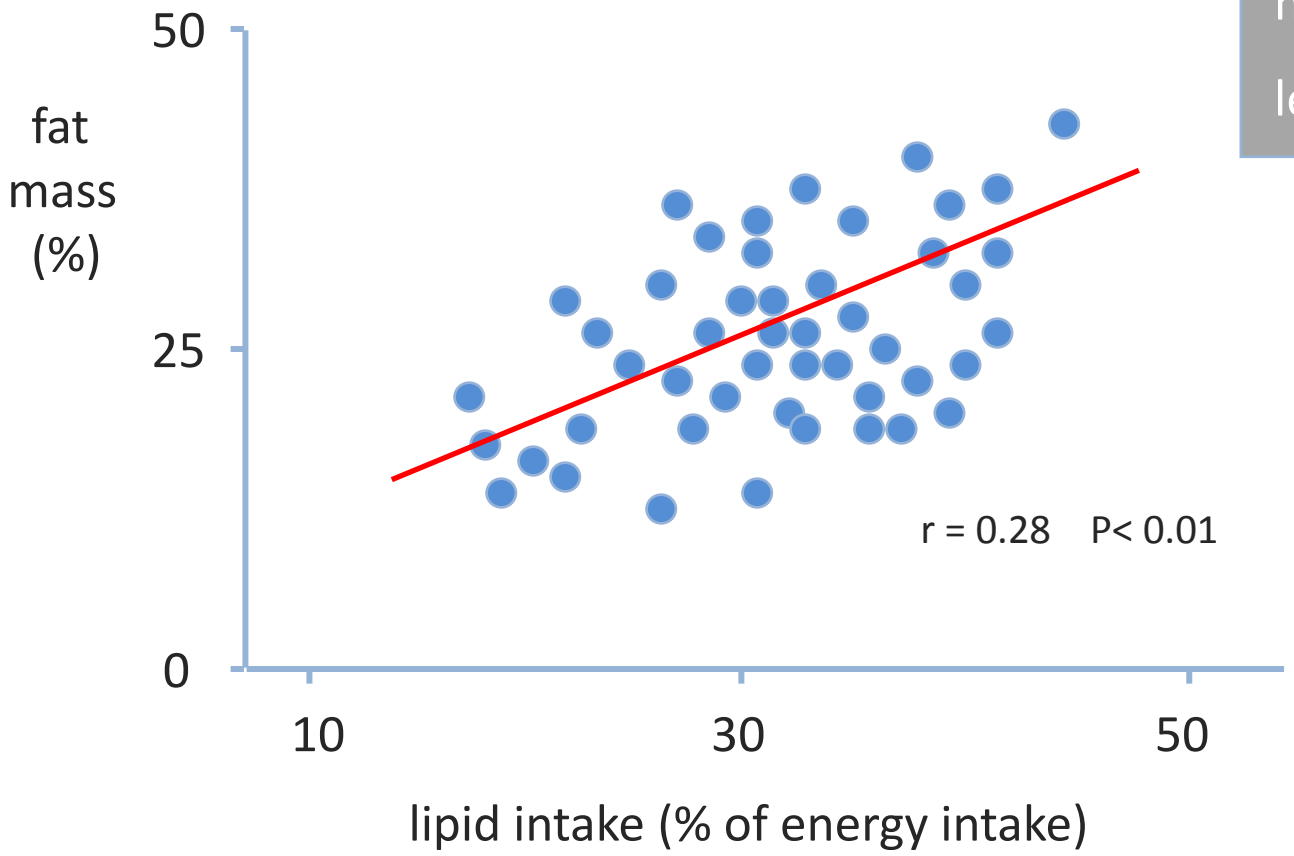
20% of overweight individuals are successful weight losers.

THE NATIONAL WEIGHT CONTROL REGISTRY

diet + physical activity: 89%
diet: 10%
physical activity: 1%

strategies very consistently reported:

consuming a low-calorie (1800 kcal/day), low-fat (25%) diet
doing high levels of physical activity (3000 kcal/week)
weighing themself frequently
consuming breakfast daily



fatty food

more palatable

high energy density

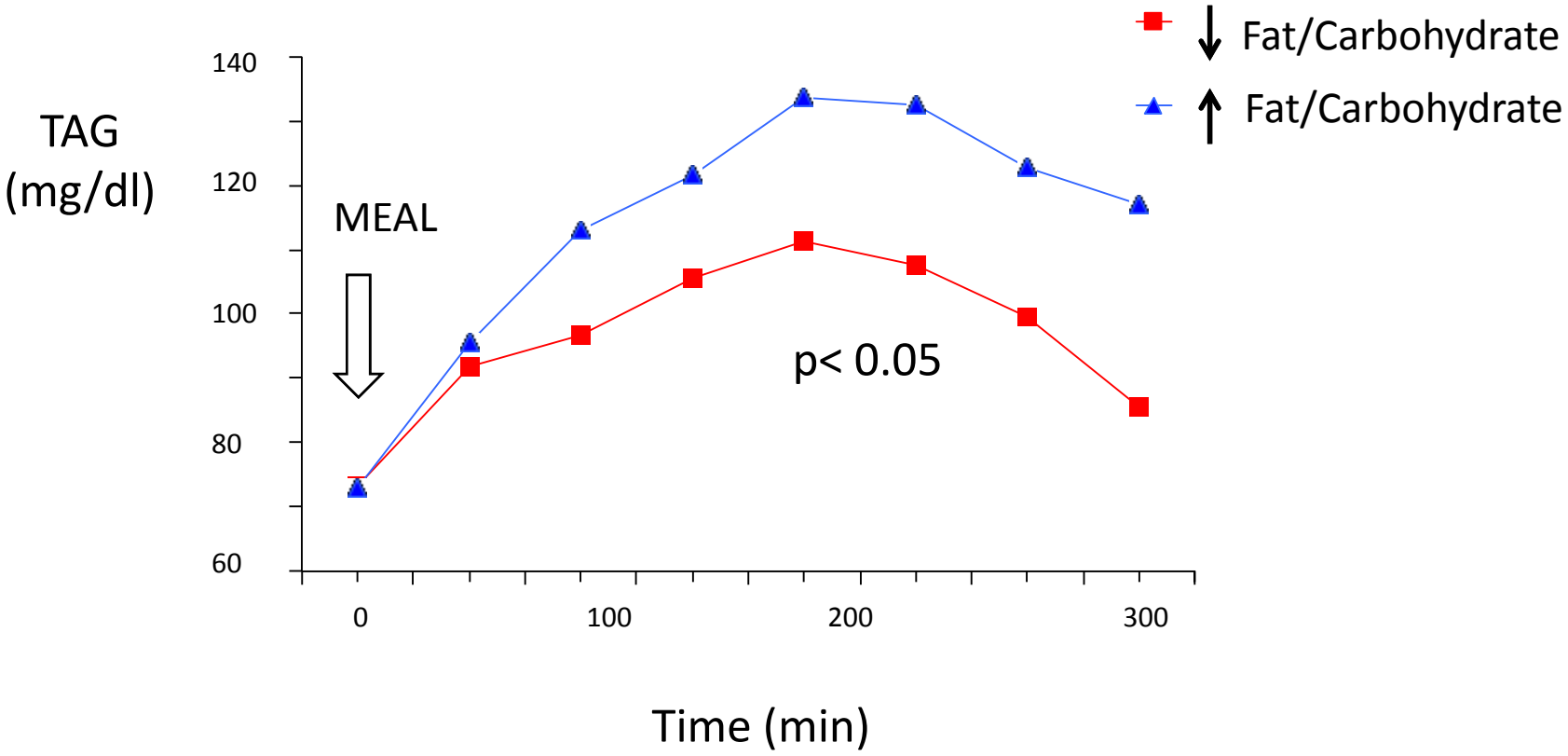
less satiating

Klesges RC *et al.* AJCN '94

Gazzaniga JM, *et al.*AJCN '93

Maffeis C *et al.* Int J Obes '96

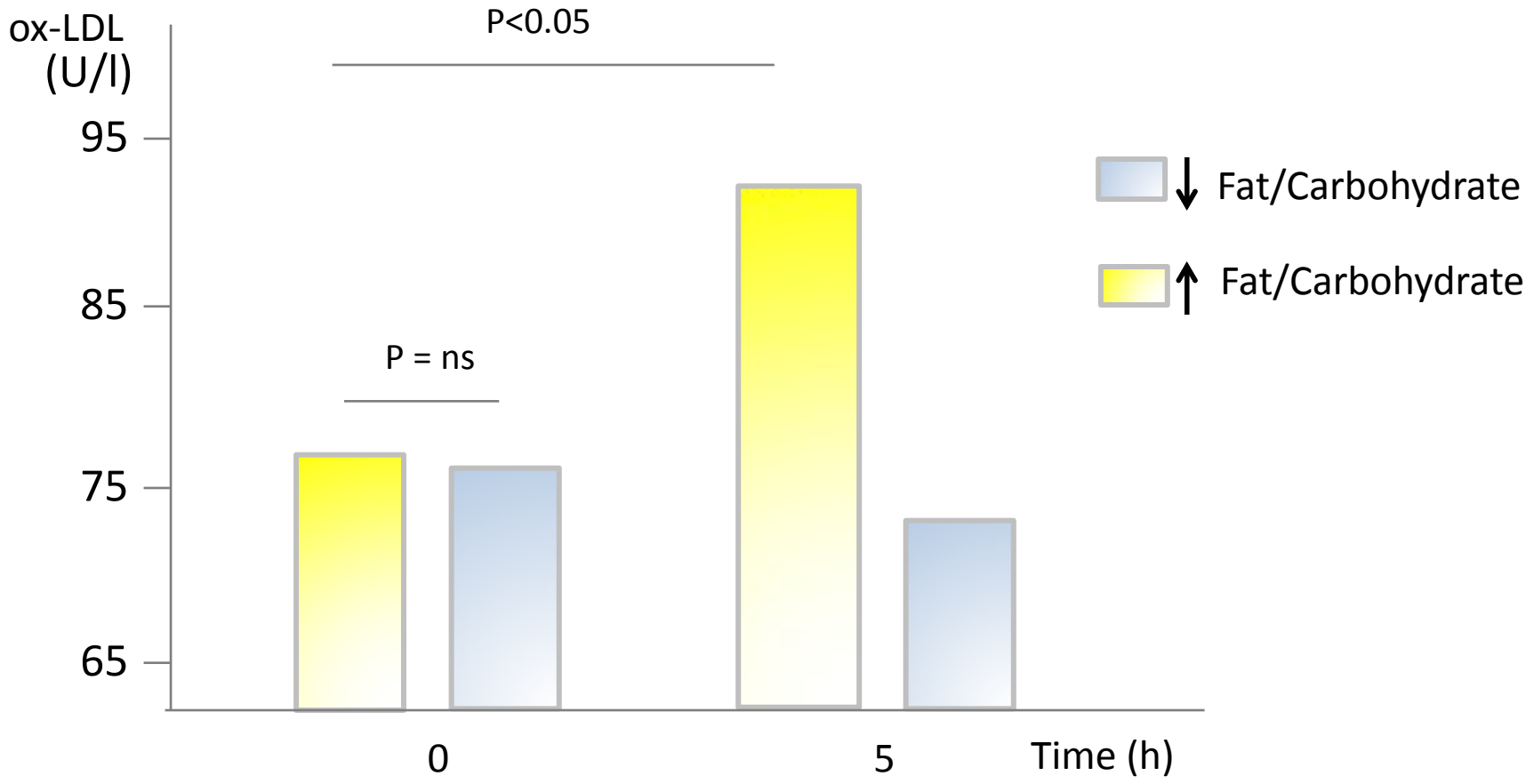
Postprandial triacylglycerol profile after two meals with the same energy and protein content but a different fat and carbohydrate content



Maffeis C, *et al*. Obesity 2010

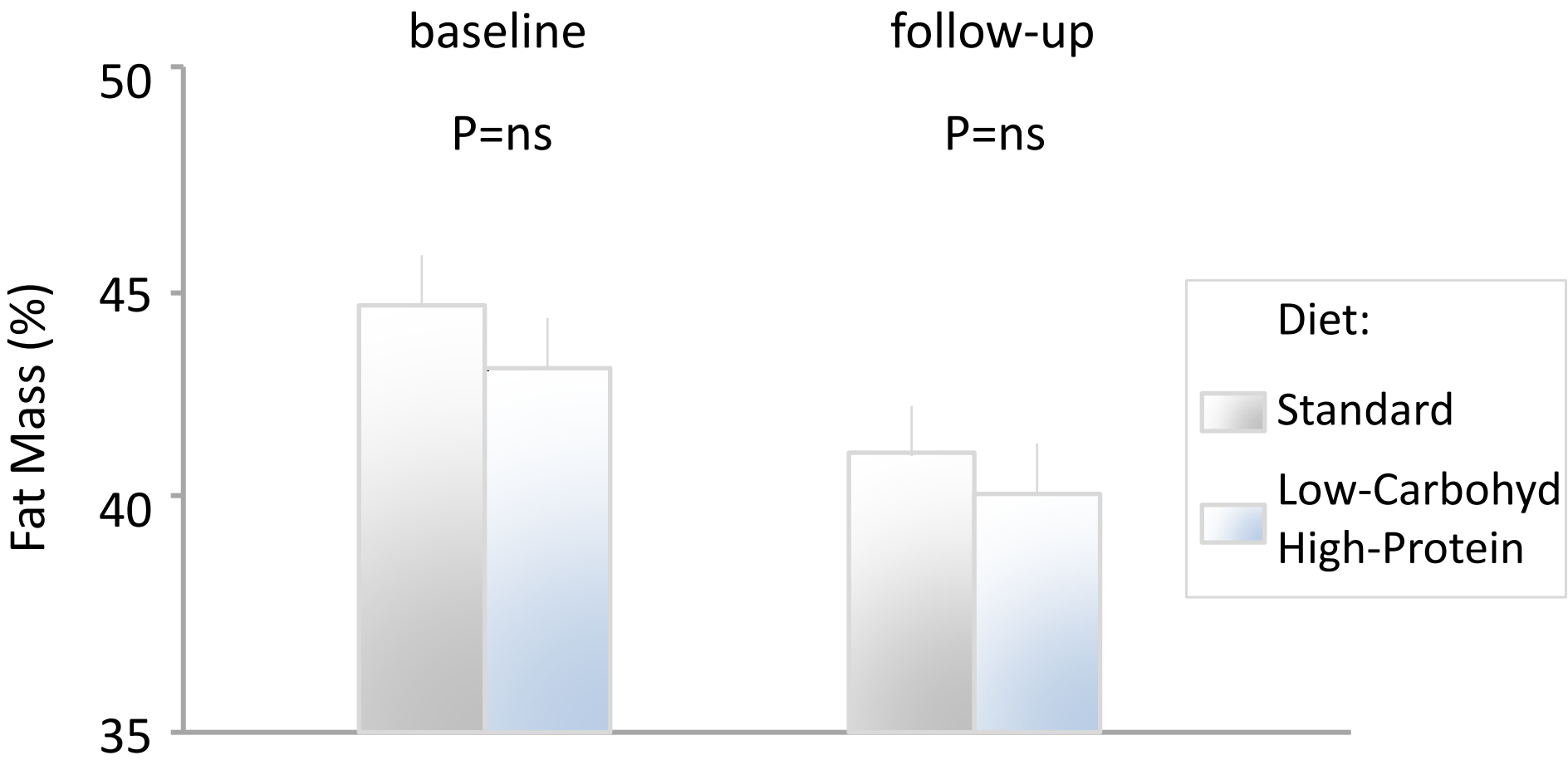
POSTPRANDIAL PRO-ATEROGENIC PROFILE

change of oxidized lipoprotein concentration in obese children after two meals with the same energy and protein but a different fat and carbohydrate content



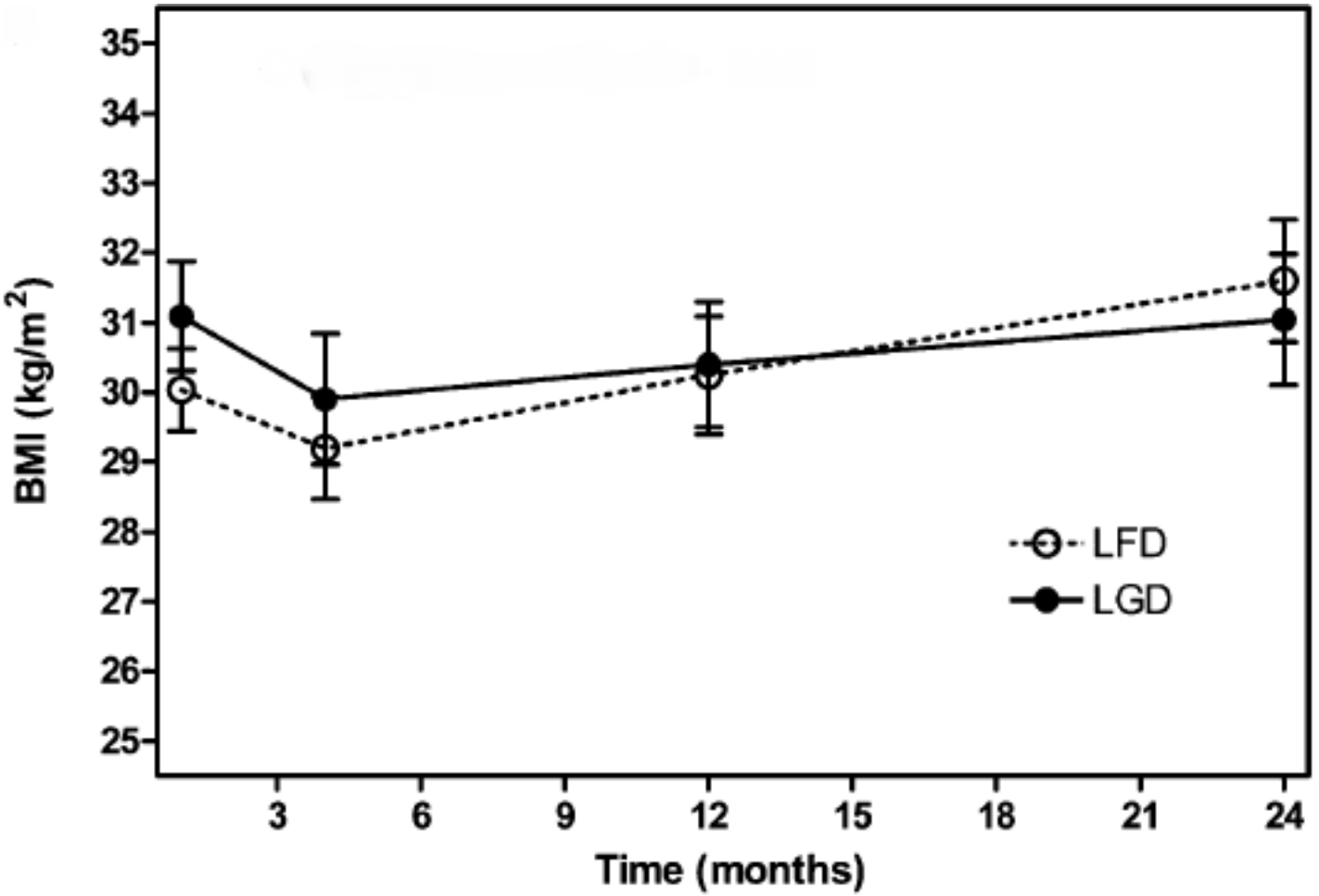
Maffeis C, *et al.* Nutr Metab Cardiovasc Dis 2011

Randomized controlled trial of a High-protein Low-Carbohydrate Diet on Hunger Motivation and Weight-loss in Obese Children



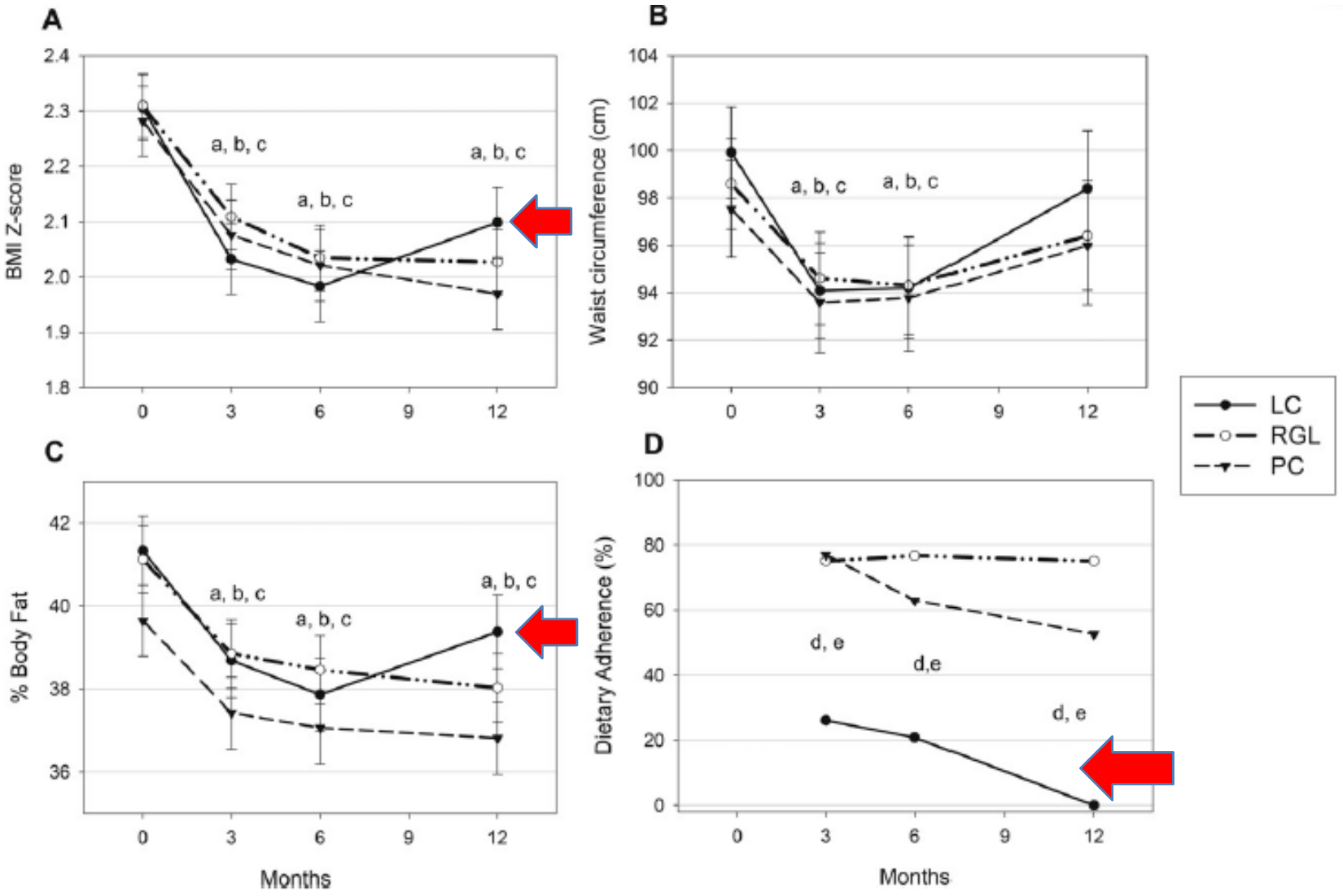
Duckworth LC, *et al.* Obesity 2009;17:1808

Effects of a low glycemic load or a low-fat dietary intervention on body weight in obese Hispanic American children and adolescents: a randomized controlled trial



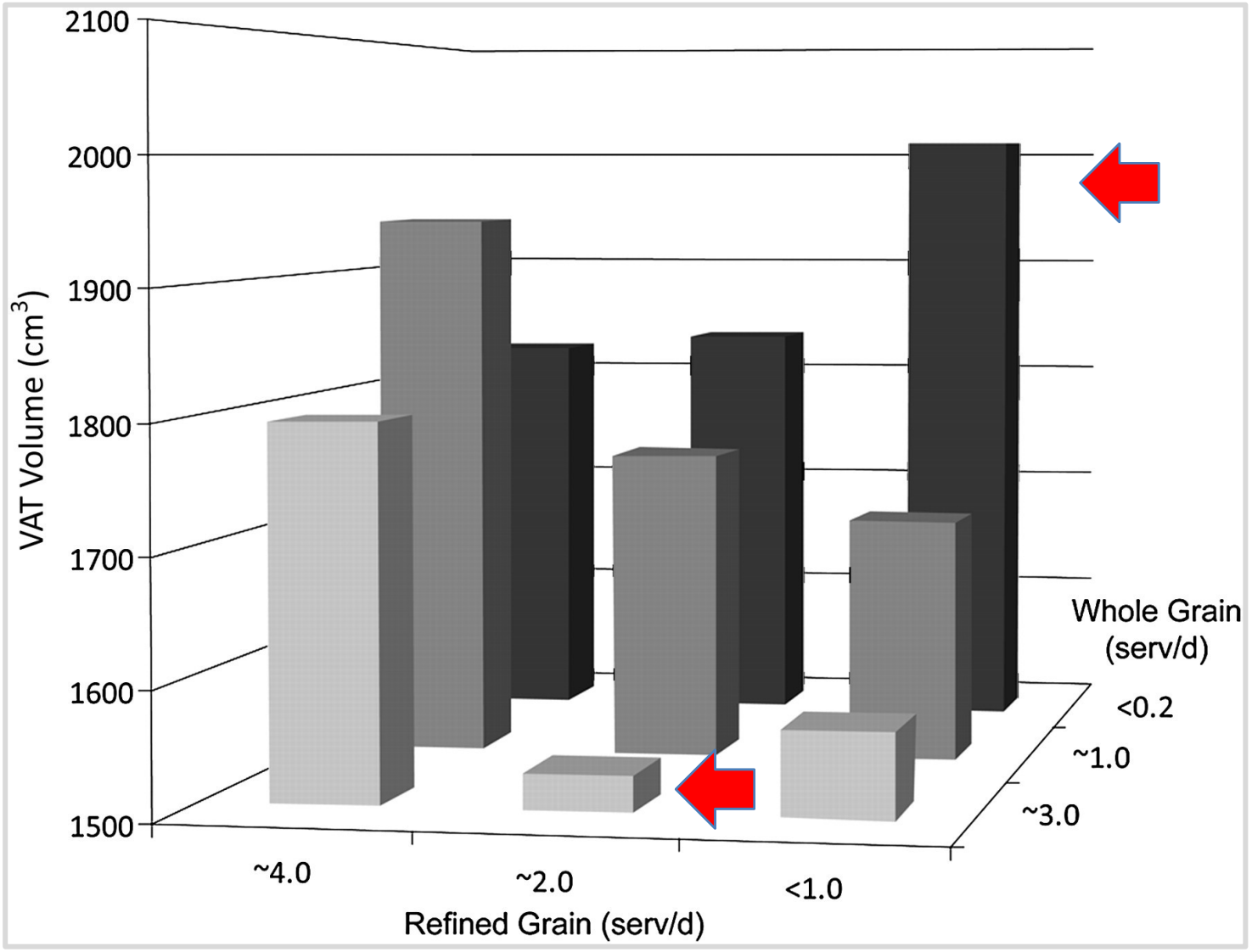
Mirza NM, *et al.* Am J Clin Nutr 2013;97:276–85

Role of Carbohydrate Modification in Weight Management among Obese Children: A Randomized Clinical Trial



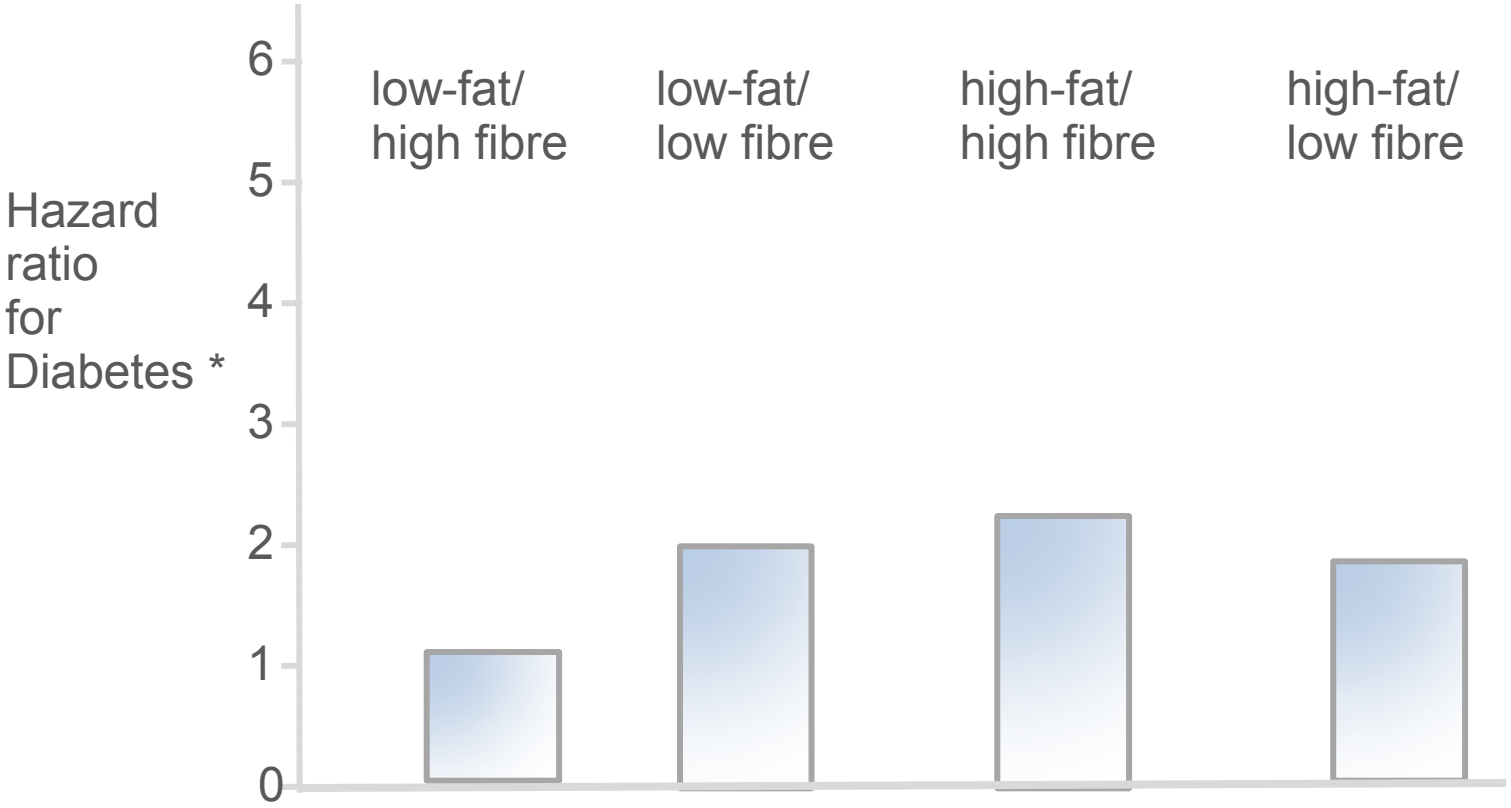
Kelley S, *et al.* J Pediatr 2012;161:320-7.

Joint classification of whole- and refined-grain intake on visceral adipose tissue (VAT) volume.



McKeown N M et al. Am J Clin Nutr 2010;92:1165-1171

high-fibre, low-fat diet predicts long-term weight loss and decreased type 2 diabetes risk: the Finnish Diabetes Prevention Study

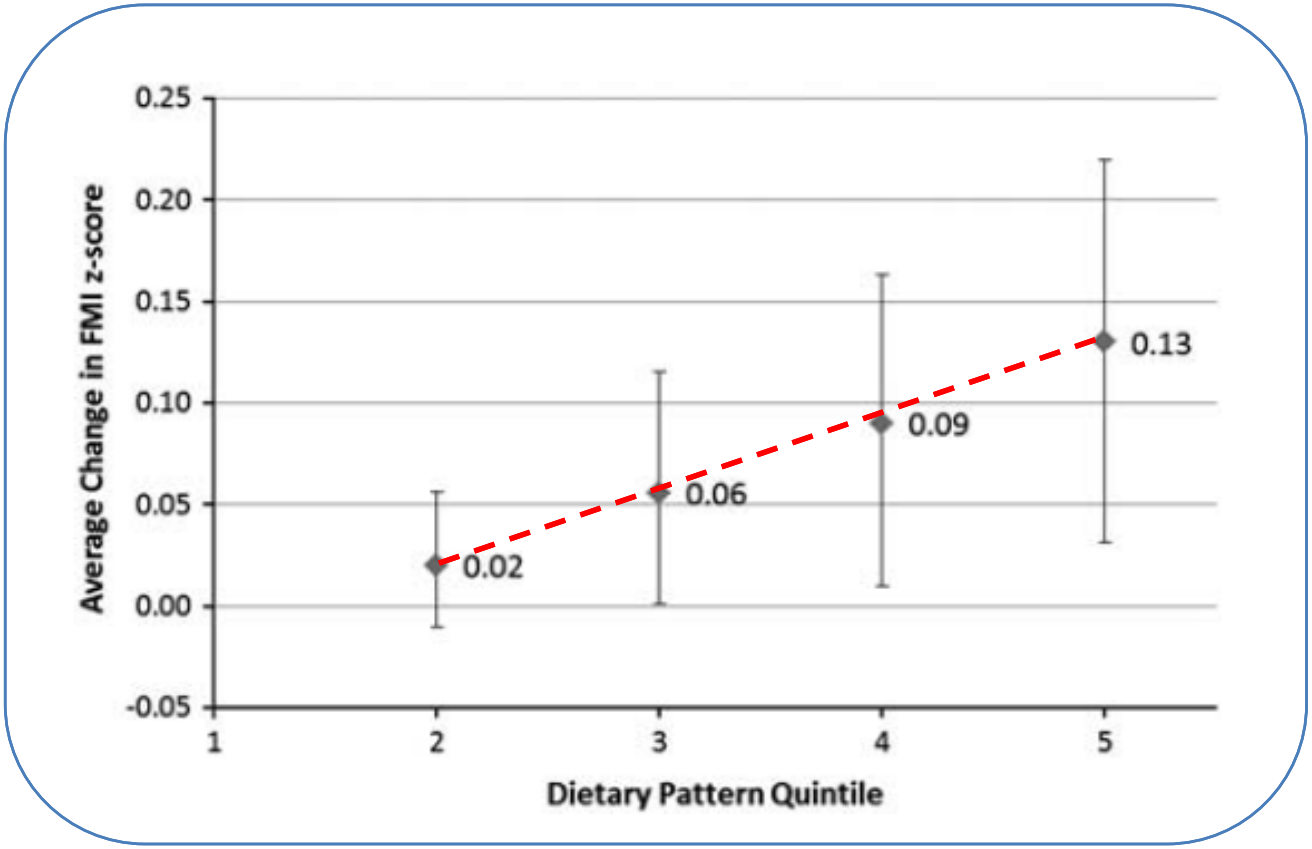


•Adjusted for: group assignment, age, sex, baseline BW, fat & fibre intake, baseline 2-h glucose, baseline and follow-up period physical activity, weight change

Lindstrom J, *et al*. Diabetologia 2006

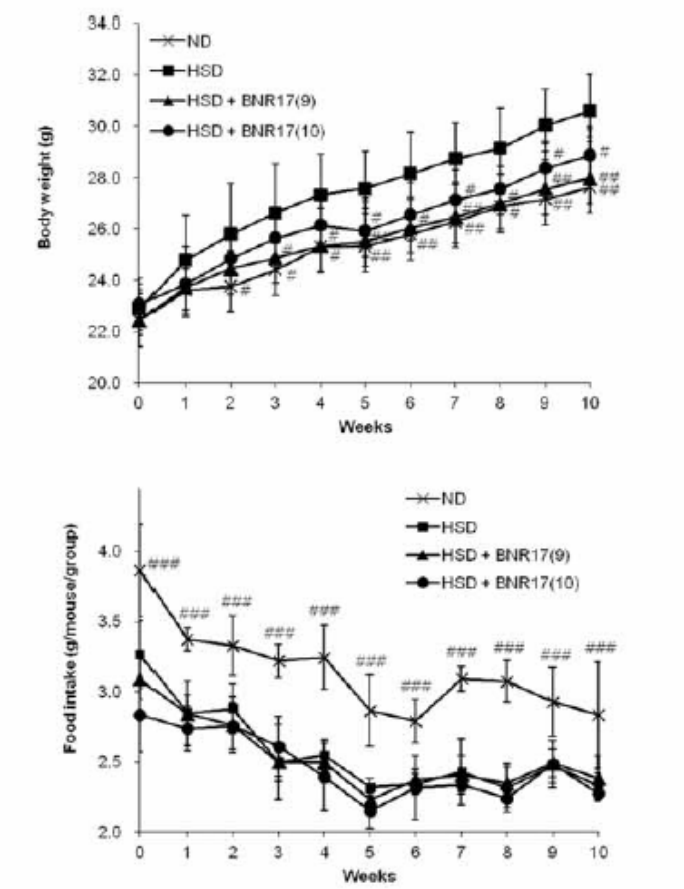
dietary pattern prospectively associated with increased adiposity during childhood and adolescence

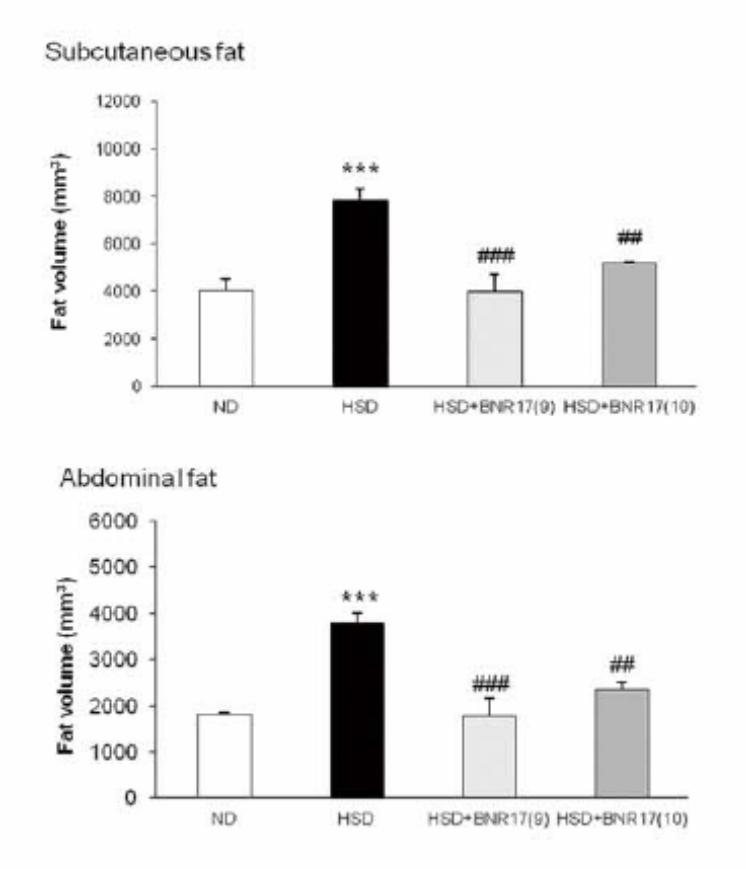
High Risk Dietary Pattern
Energy-dense High-fat Low-fiber



Ambrosini GL, *et al.* Int J Obes 2012;36:1299-1305

Anti-Obesity Effect of Lactobacillus gasseri BNR17 in High-Sucrose Diet-Induced Obese Mice



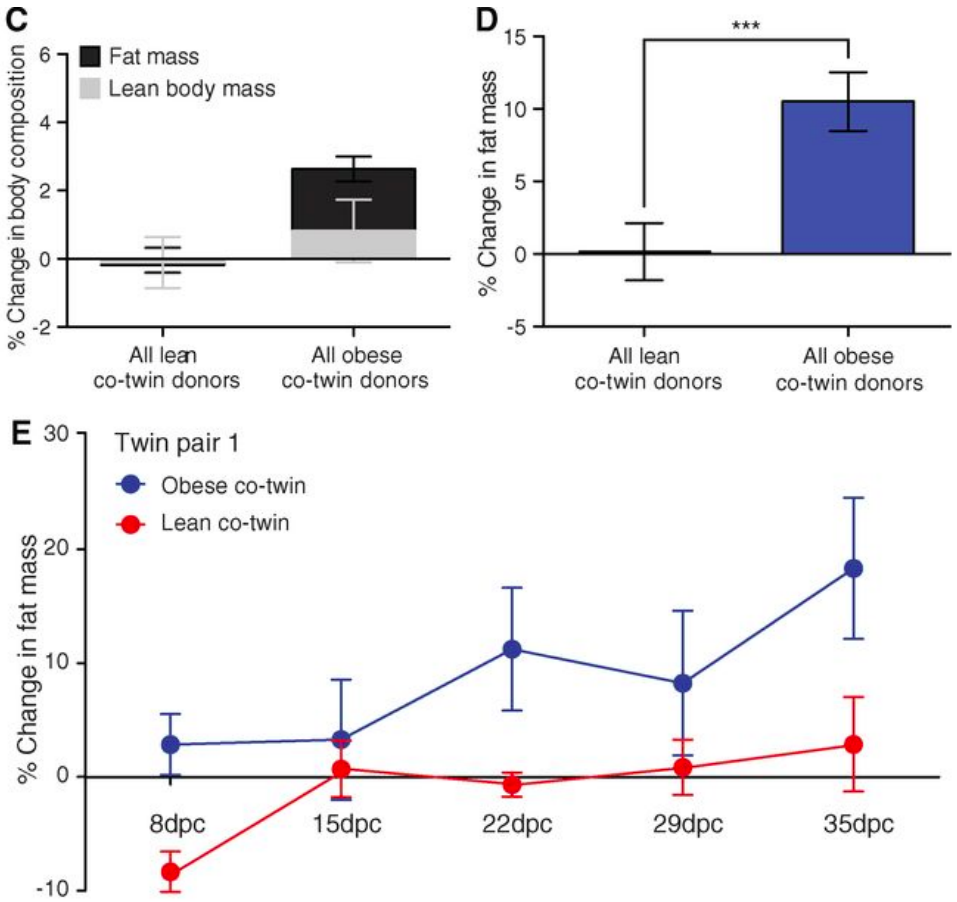


The anti-obesity actions of L. gasseri BNR17 can be attributed to elevated expression of fatty acid oxidation-related genes and reduced levels of leptin.

The anti-diabetes activity of L. gasseri BNR17 may be to due elevated GLUT4 and reduced insulin levels.

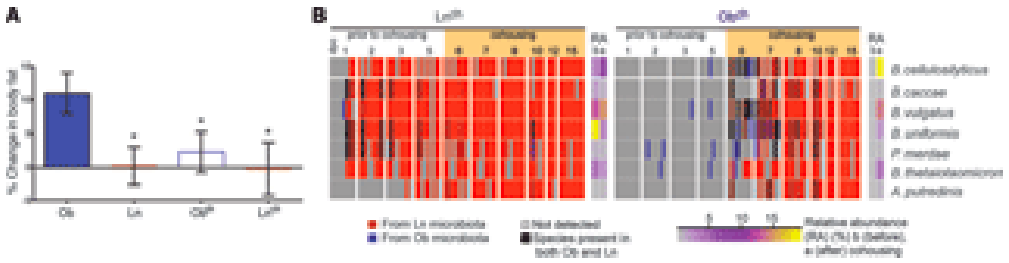
Kang JH, *et al*. PLoS ONE 2013;8(1): e54617

Gut Microbiota from Twins Discordant for Obesity Modulate Metabolism in Mice



Weight gain in “germ free” mice colonized by flora of obese humans

Ridaura VK, *et al.* Science 2013;341:1241214

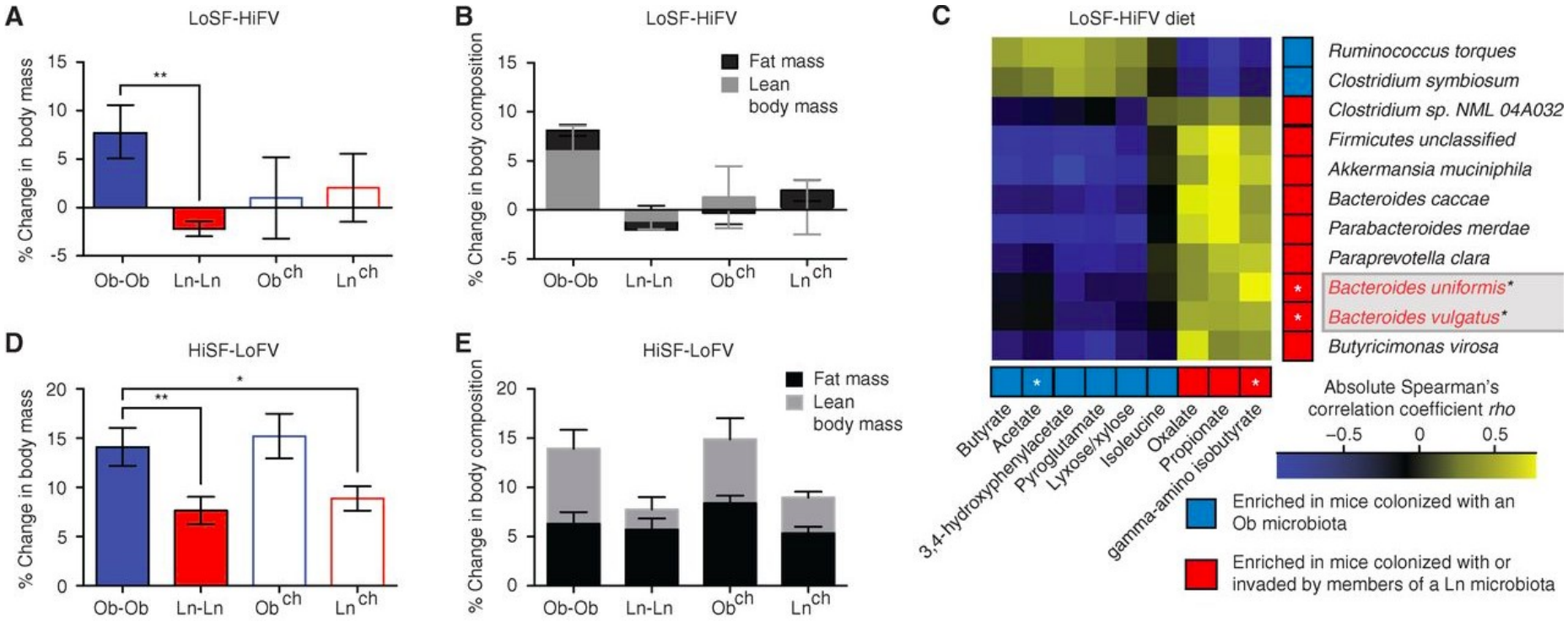


Cohousing Ln and Ob mice prevents increased adiposity in Ob cage mates (Ob). (**A**) Adiposity change after 10 days of cohousing. $*P < 0.05$ versus Ob controls (Student's *t* test). (**B**) Bacteroidales from Ln microbiota invade Ob microbiota. Columns show individual mice.

Differences in fermentation of SCFA (increased in Ln), metabolism of branched-chain AA (increased in Ob), and microbial transformation of bile acid species (increased in Ln and correlated with down-regulation of host farnesoid X receptor signaling).

Transformed obese mice microbiota's metabolic profile to a leanlike state. Transformation correlated with invasion of members of Bacteroidales from Ln into Ob microbiota.

Ridaura VK, *et al.* Science 2013;341:1241214



Invasion and phenotypic rescue were diet-dependent and occurred with the diet representing the lower tertile of U.S. consumption of saturated fats, and upper tertile of fruits and vegetables, but not with the diet representing the upper tertile of saturated fats, and lower tertile of fruit and vegetable consumption.

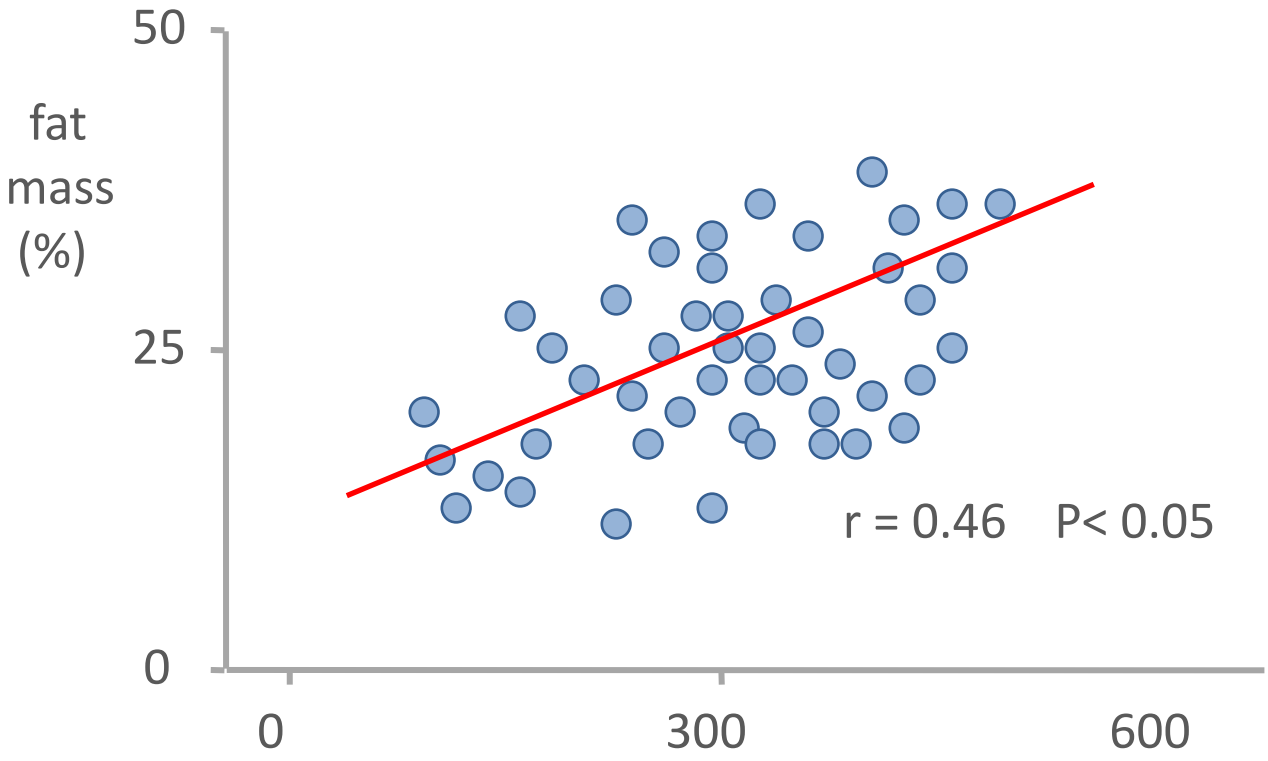
Ridaura VK, *et al.* Science 2013;341:1241214

let's go to the beach!!

1952

2012

Adiposity and sedentary behavior in prepubertal children



Maffeis C *et al.* J Pediatr '97

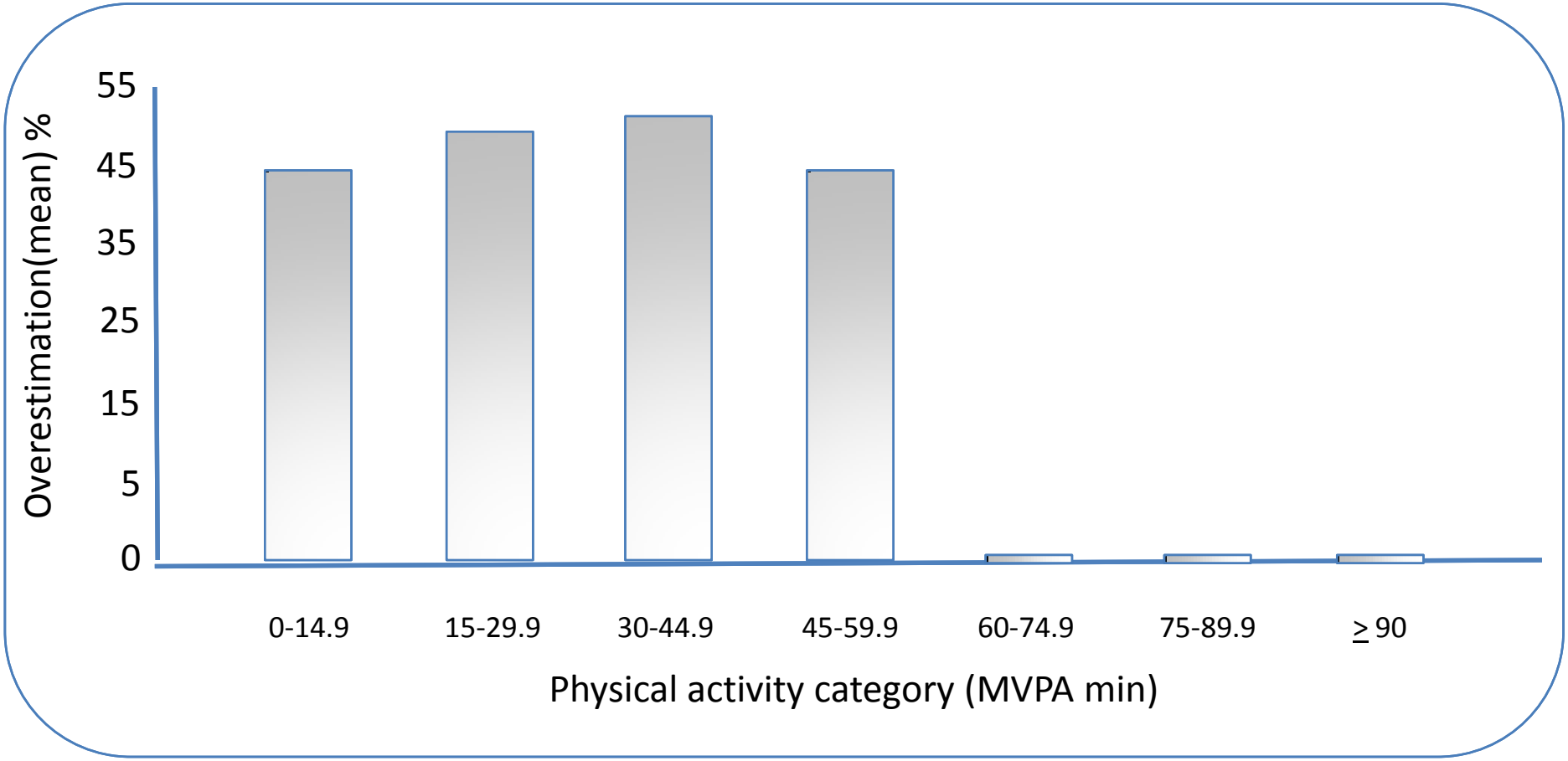
TV viewing, TV in the bedroom and overweight risk

For each additional hour per day of TV/video viewed (adjusted for age, sex, parental education, race) the odds ratio of children having a BMI > 85th percentile was 1.06.

Almost 40% of children had a TV set in their bedroom (OR 1.31)

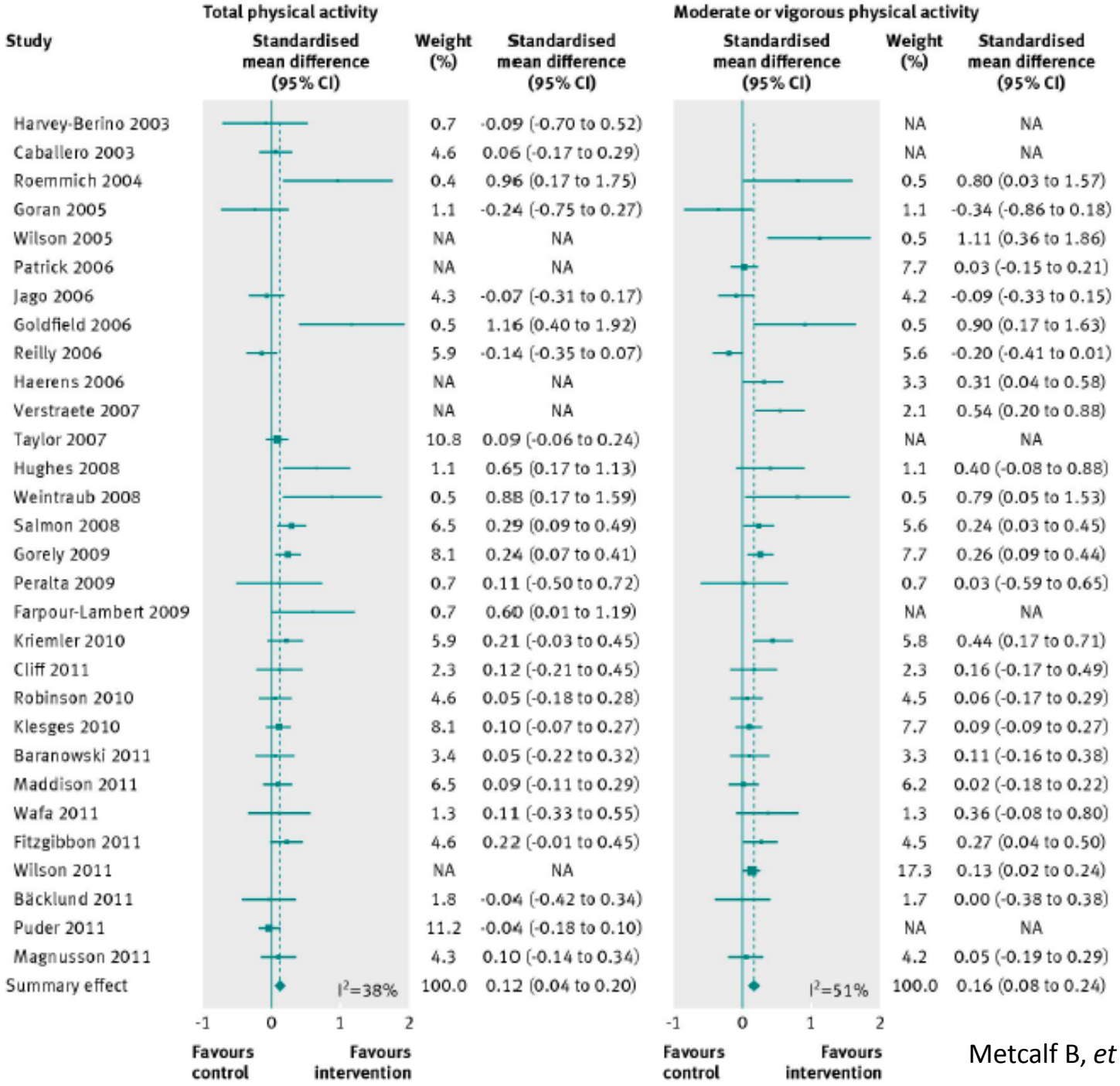
Dennison BA, et al.Pediatrics 2002

Parent awareness of young children's physical activity



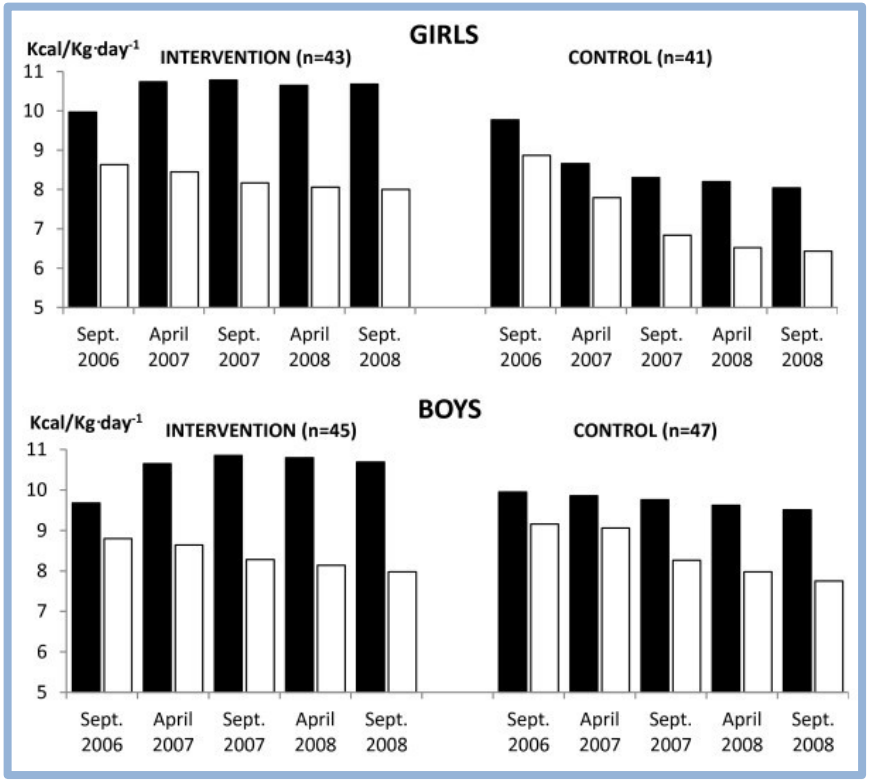
"Most parents incorrectly classified their child as active when their child was inactive".

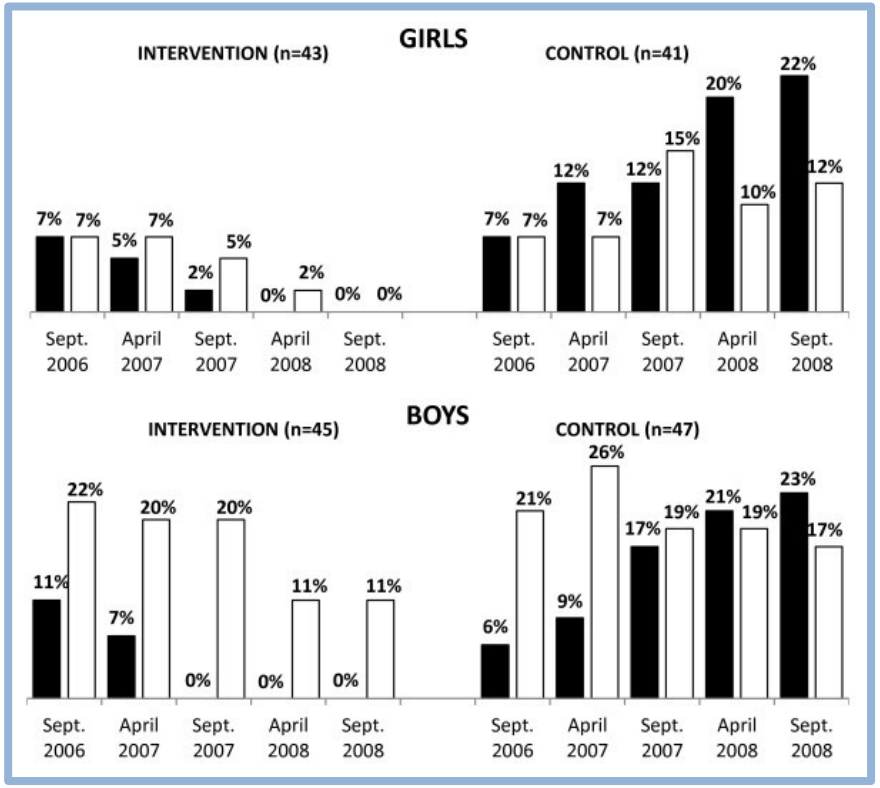
Corder K, *et al.* Prev Med 2012;55:201-5



Metcalf B, *et al.* BMJ, 2012

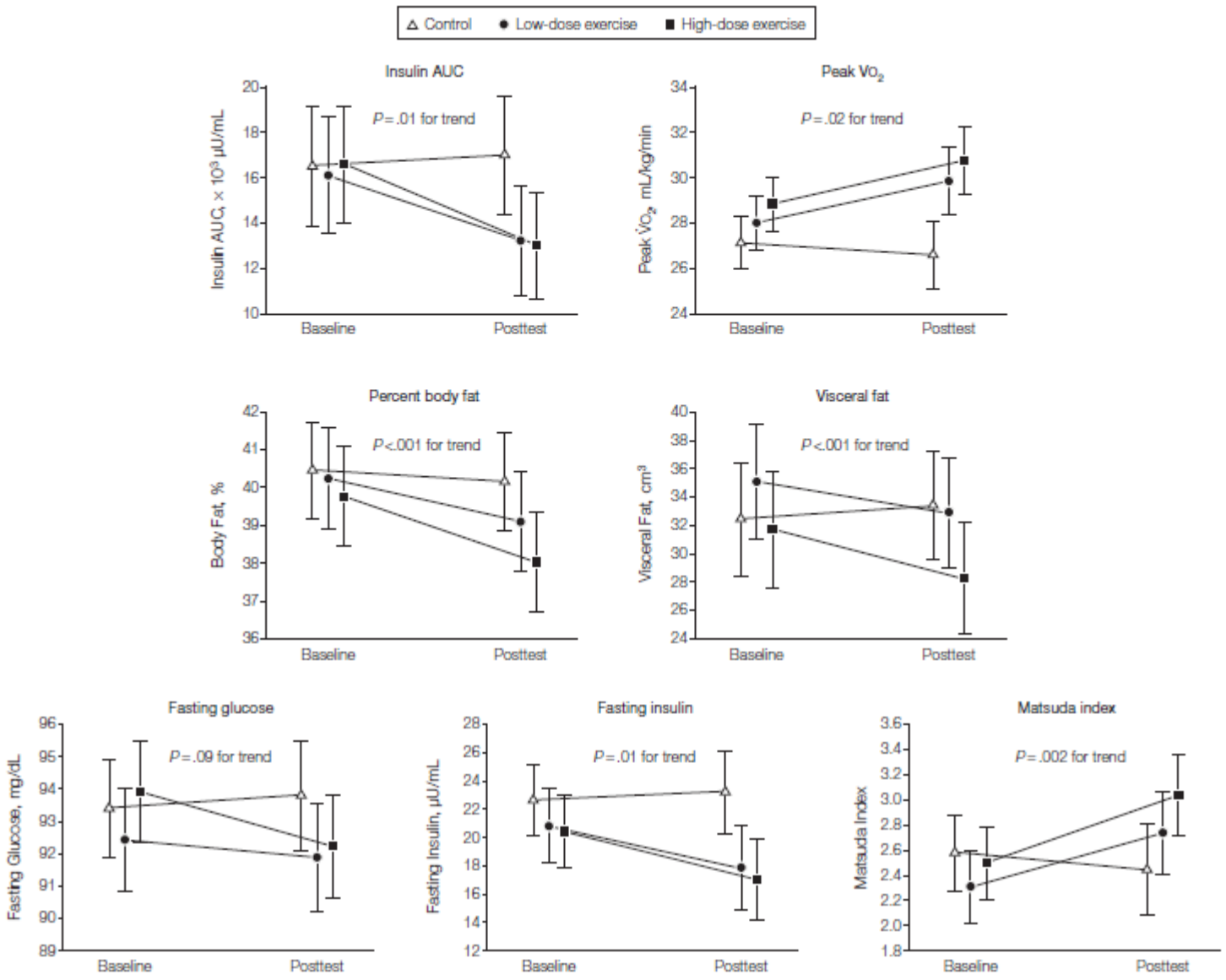
Does school-based physical activity decrease overweight and obesity in children aged 6-9 years? A two-year non-randomized longitudinal intervention study in the Czech Republic.





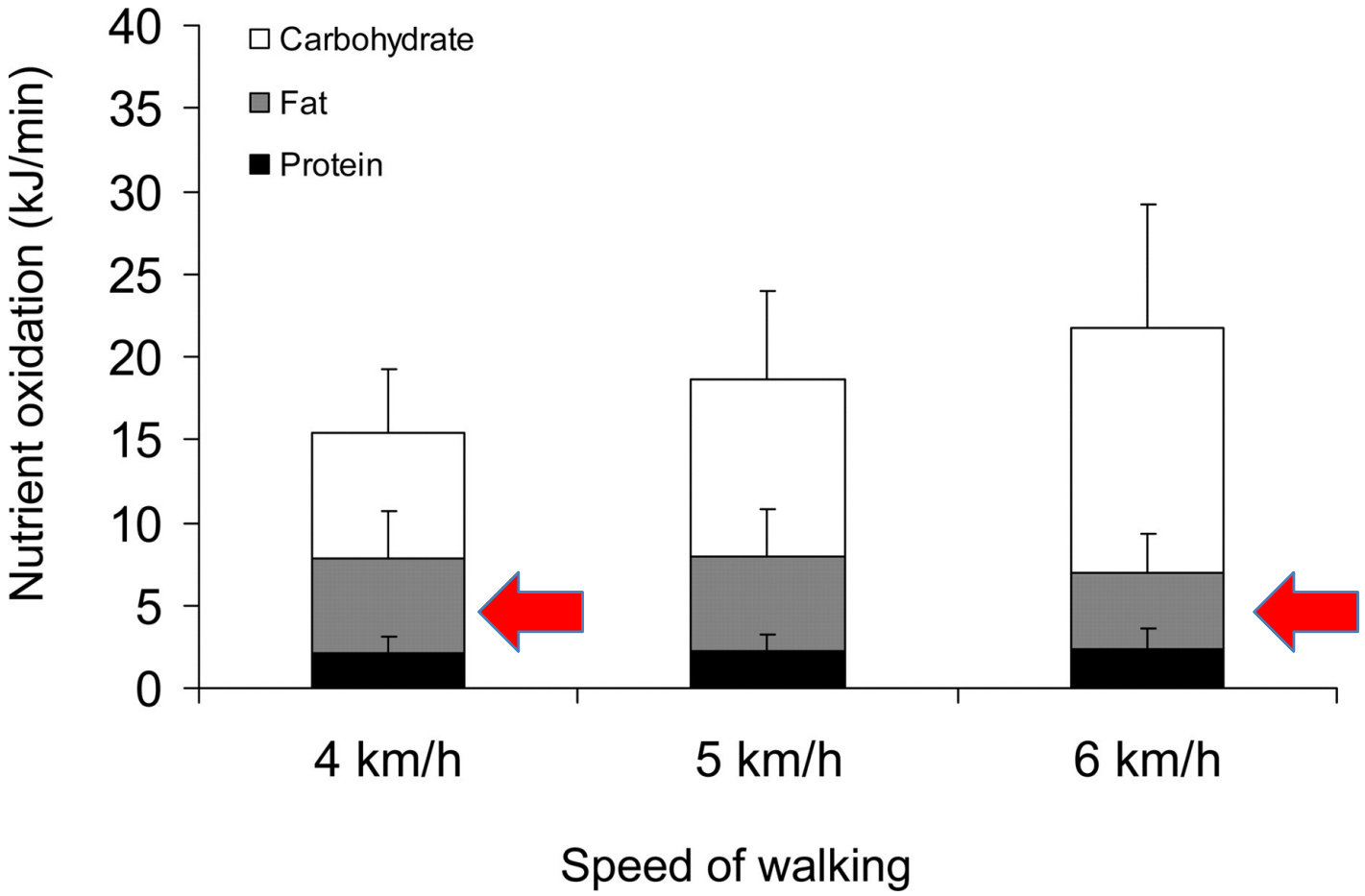
Sigmund E, *et al.* BMC Public Health, 2012

Exercise Dose and Diabetes Risk in Overweight and Obese Children
A Randomized Controlled Trial



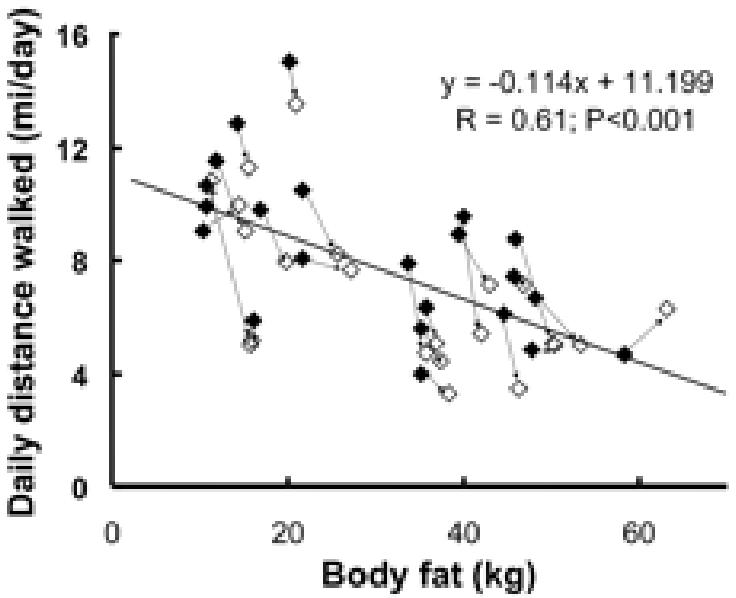
Davis CL, *et al.* JAMA 2012;308:1103-12

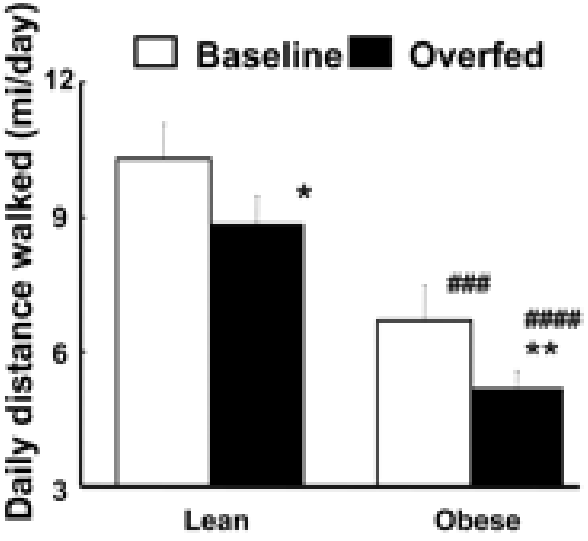
Nutrient oxidation measured during walking at speeds of 4, 5, and 6 km/h, respectively, in a group of obese prepubertal children

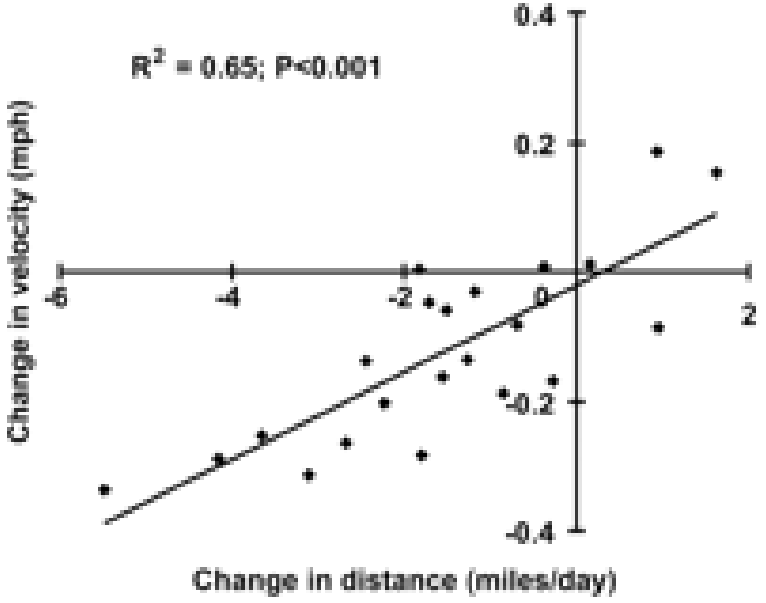


Maffeis, C. *et al.* J Clin Endocrinol Metab 2005;90:231-236

the role of free-living daily walking in human weight gain and obesity

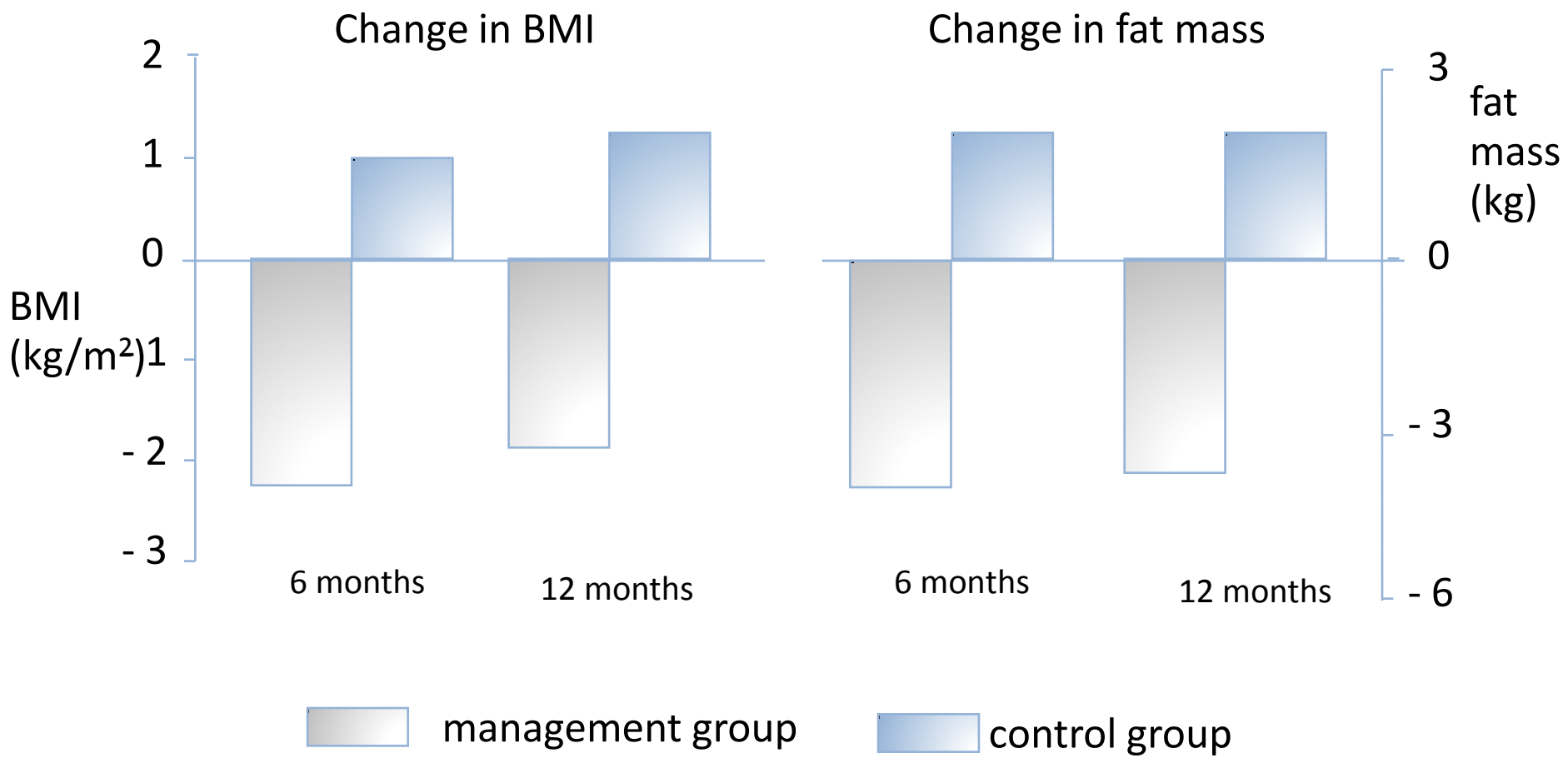






Levine JA *et al*. Diabetes 2008

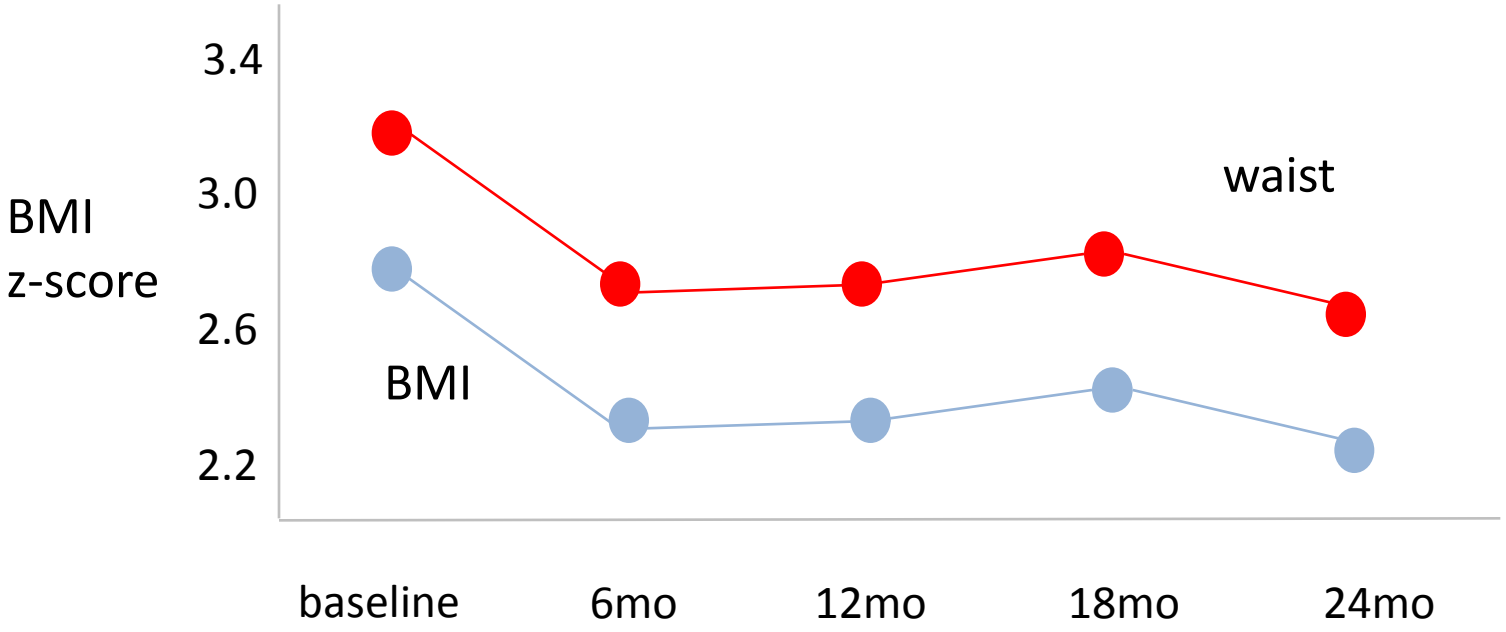
changes in BMI & body composition outcomes for weight management and control group at 6 and 12 months



Savoye M, *et al.* JAMA 2007

A parent-led family-focused tretment program for overweight children aged 5 to 9 years: the PEACH RCT

Intervention: 6 months: 12 90-120-min group sess. (parents) + 4 teleph. sess.



Magarey AM, *et al*. Pediatrics 2011

Childhood and Adolescence Obesity: Principles of Treatment

Main Target → Change of behavior → Diet Exercise

drugs (?) surgery (?)

Open questions:	Motivation Adherence Efficacy Maintenance

Take home message

- Prevention should start in pregnancy
- Early nutrition play a role in obesity prevention
- Early diagnosis is crucial
- Maintain a frequent follow-up of at-risk infants and children
- Lifestyle modification is effective