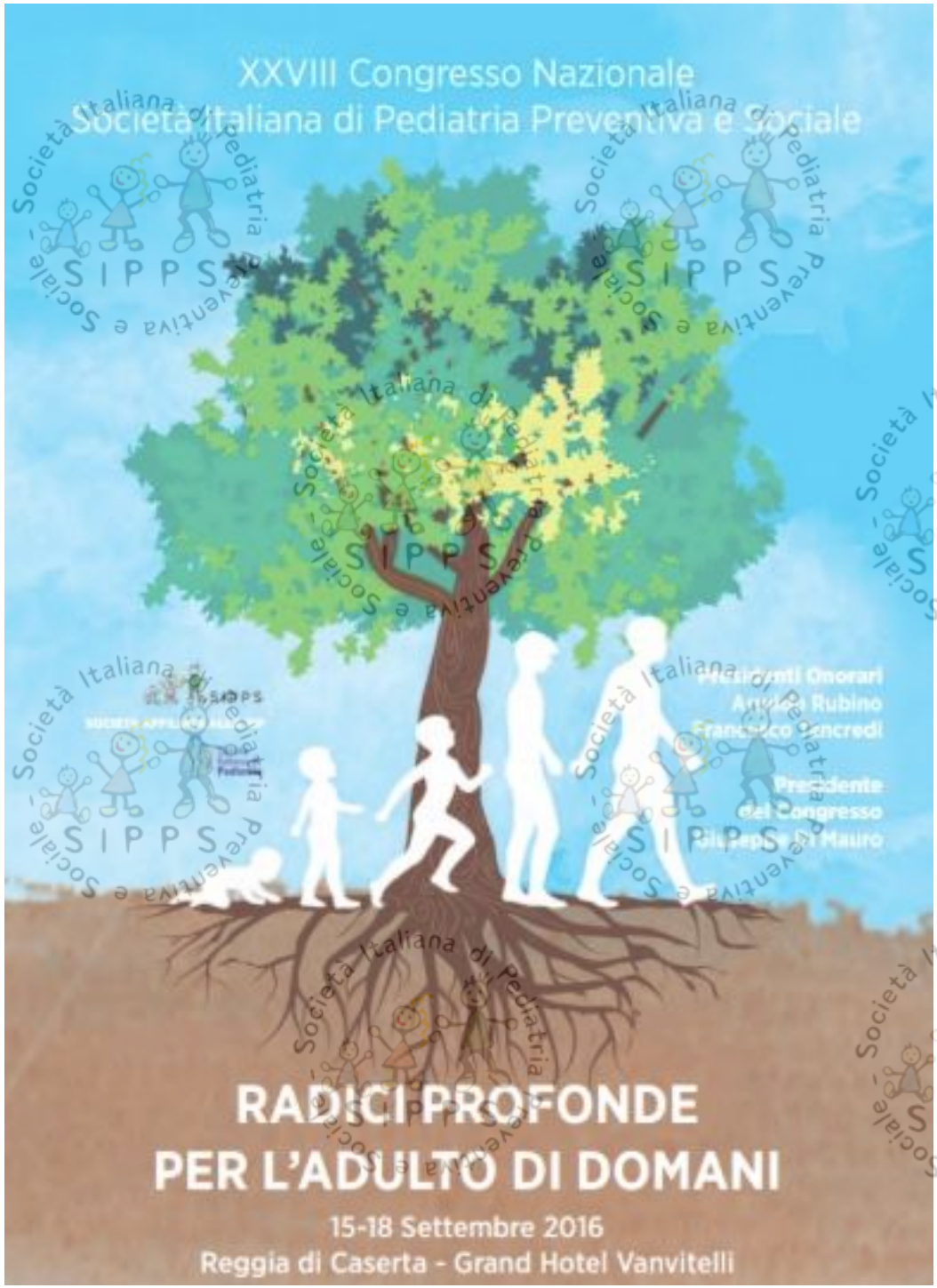


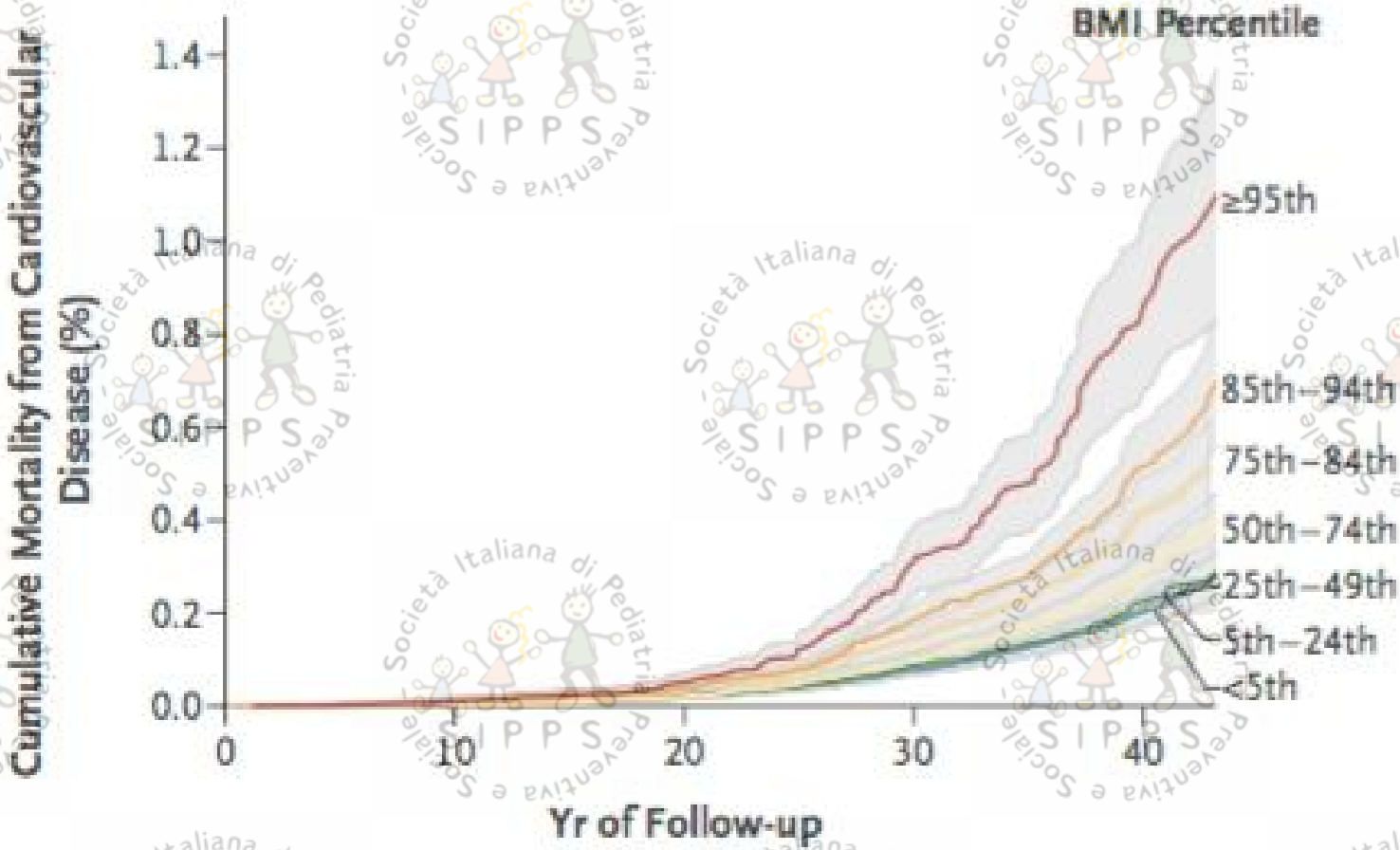
Alimentazione in età scolare e adolescenziale

Claudio Maffeis

UOC Pediatria ad Indirizzo Diabetologico
e Malattie del Metabolismo

Università e Azienda Ospedaliera
Universitaria Integrata Verona

Body-Mass Index in 2.3 Million Adolescents and Cardiovascular Death in Adulthood



No. at Risk				
Participants at risk	1,712,018	1,042,018	540,636	160,145
Cumulative person-yr	17,201,301	30,718,320	38,472,521	41,926,636
Cumulative cardio-vascular deaths	185	609	1,577	2,676

Twig G, *et al.* NEJM 2016

Obiettivo

Apporti = Fabbisogni

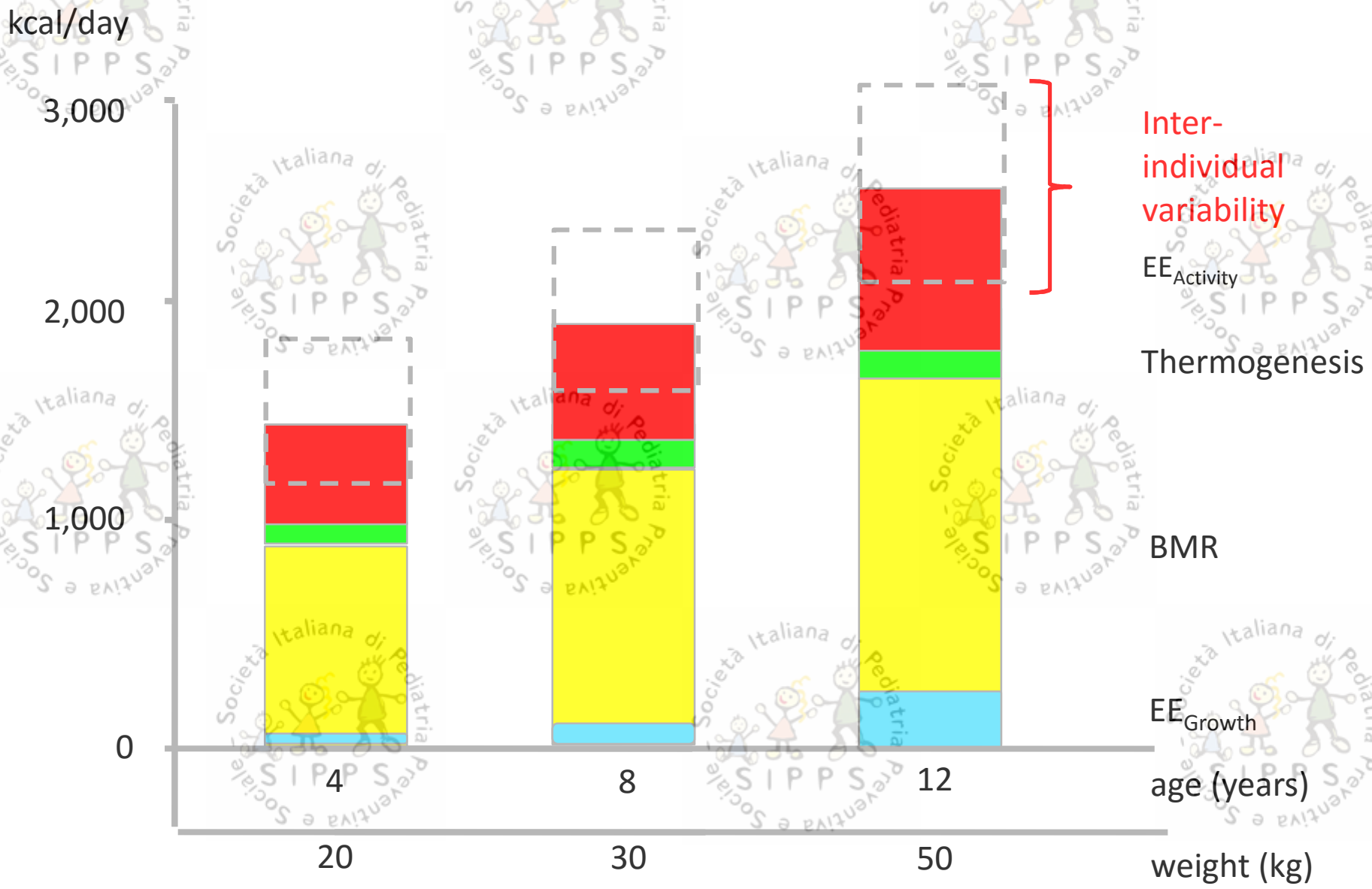
massa magra → Metabolismo basale

composizione dieta → Termogenesi

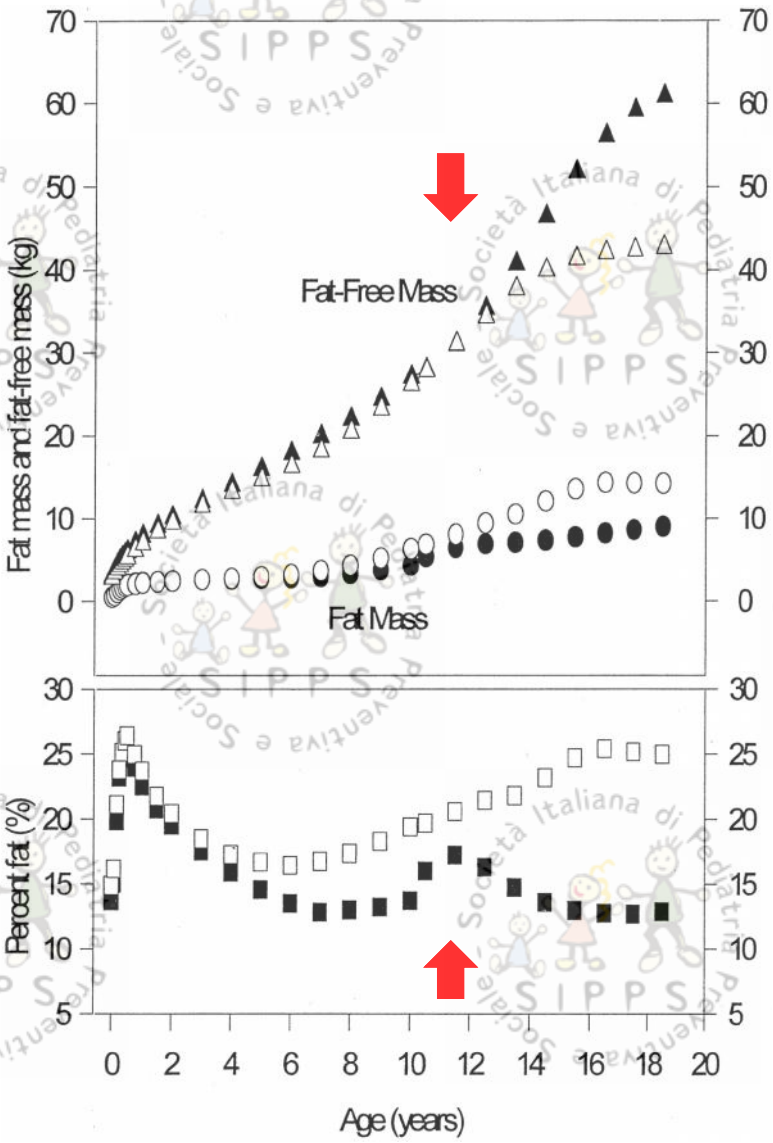
intensità, durata → Attività motoria

età → Accrescimento

components of the total daily energy expenditure at different ages

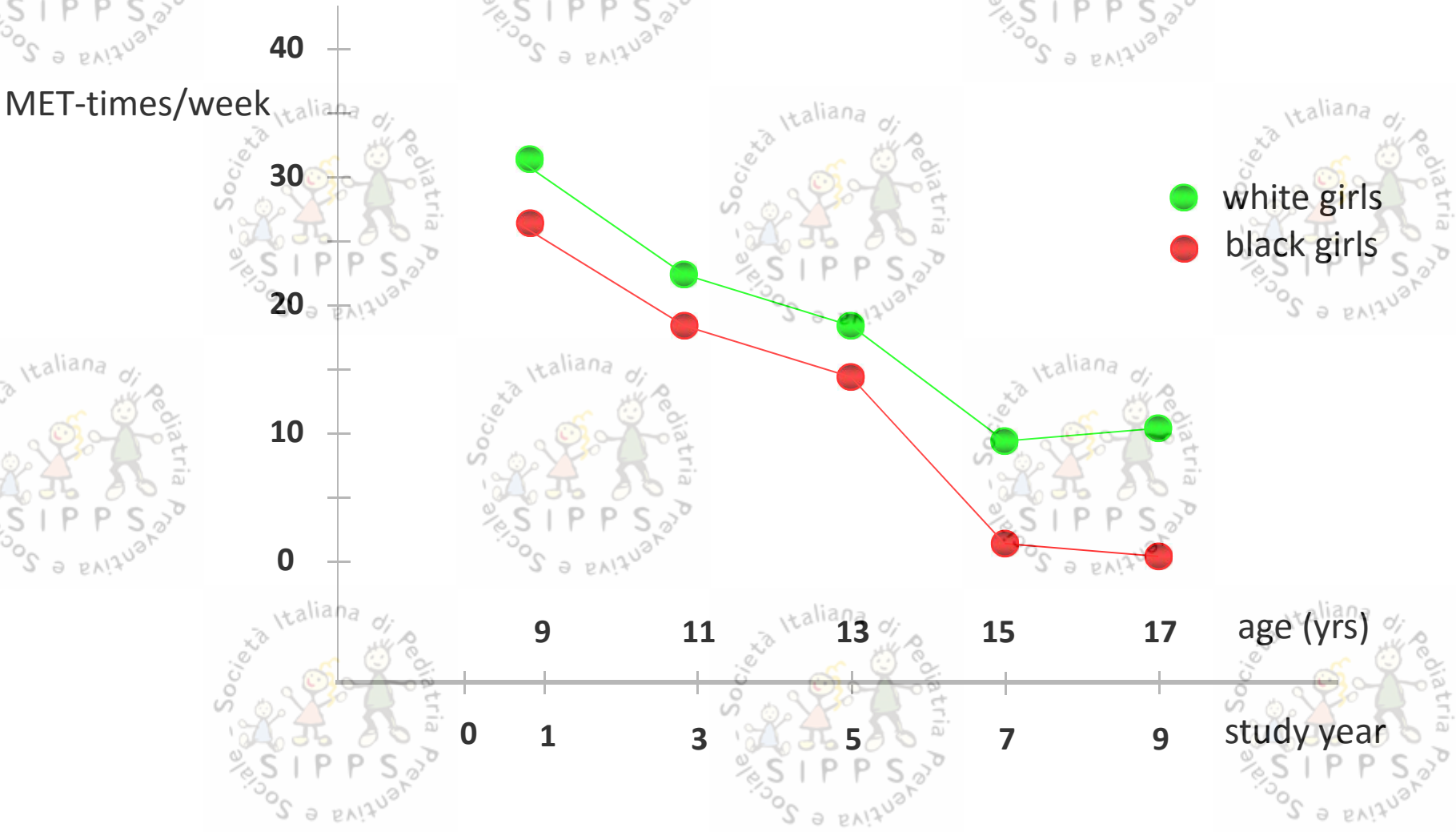


estimates of FFM, FM, and FM percent in European-American boys (closed symbols) and girls (open symbols) from infancy through early adulthood

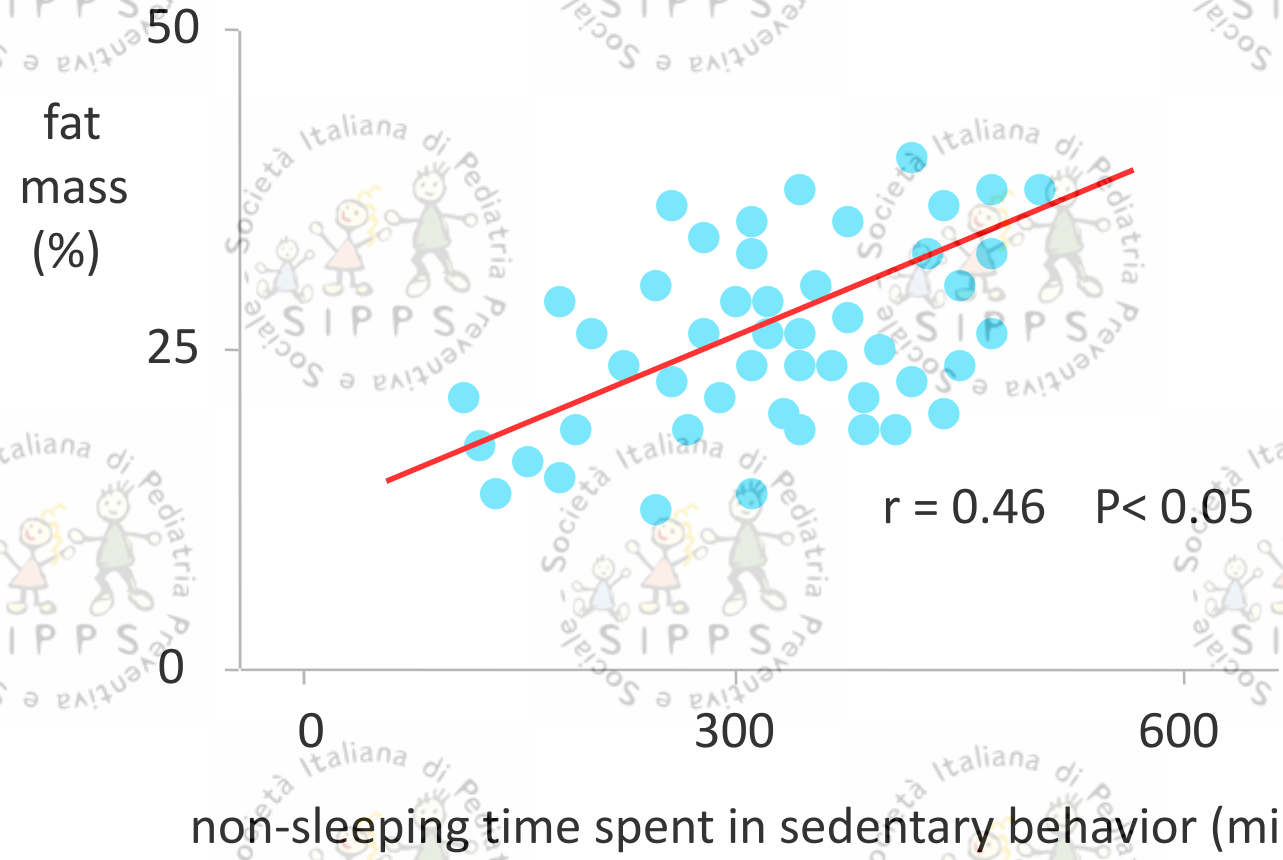


Veldhuis JD, *et al*. Endocr Rev 2005

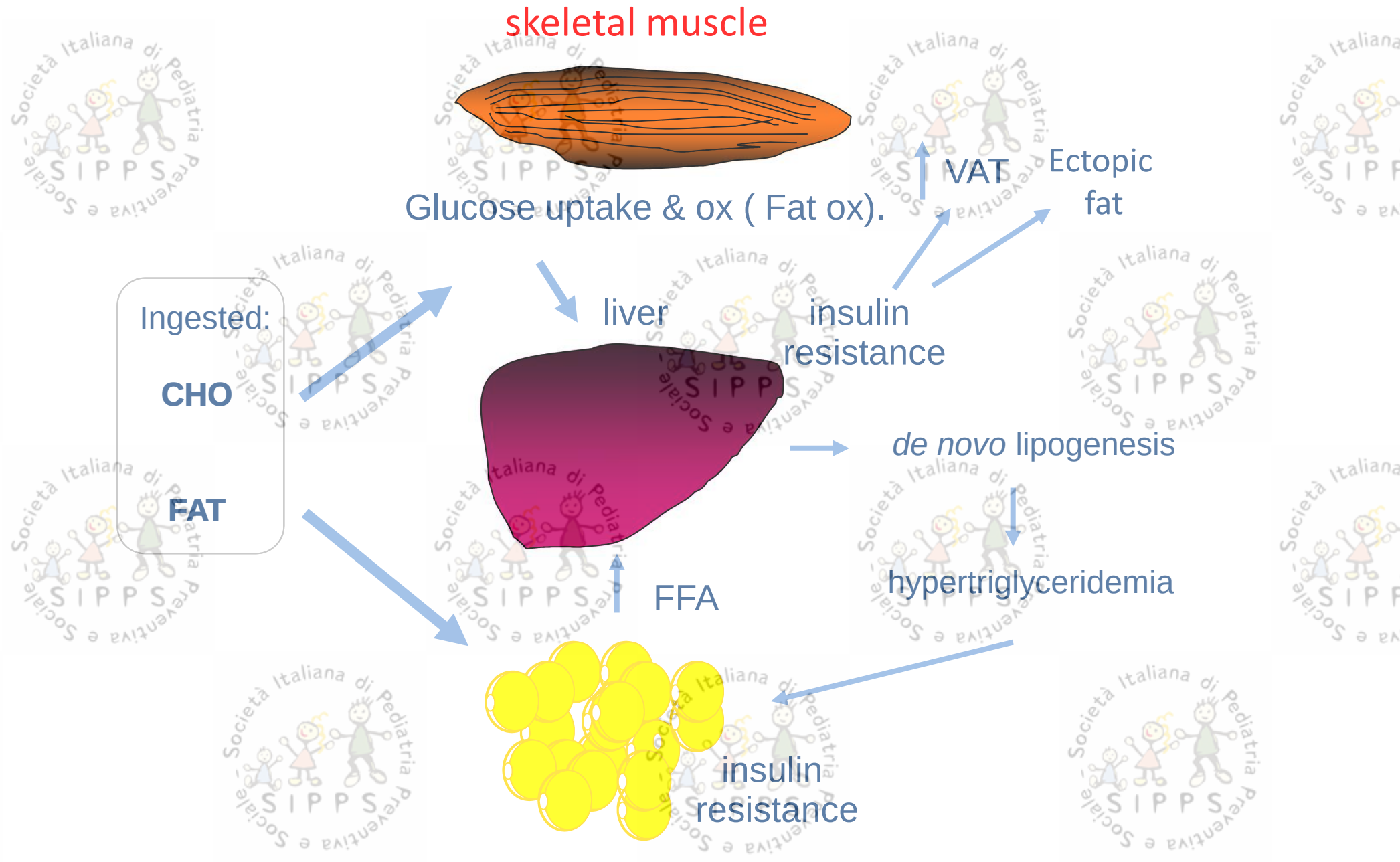
Decline in physical activity during adolescence



Kimm SYS, et al. N Engl J Med 2002



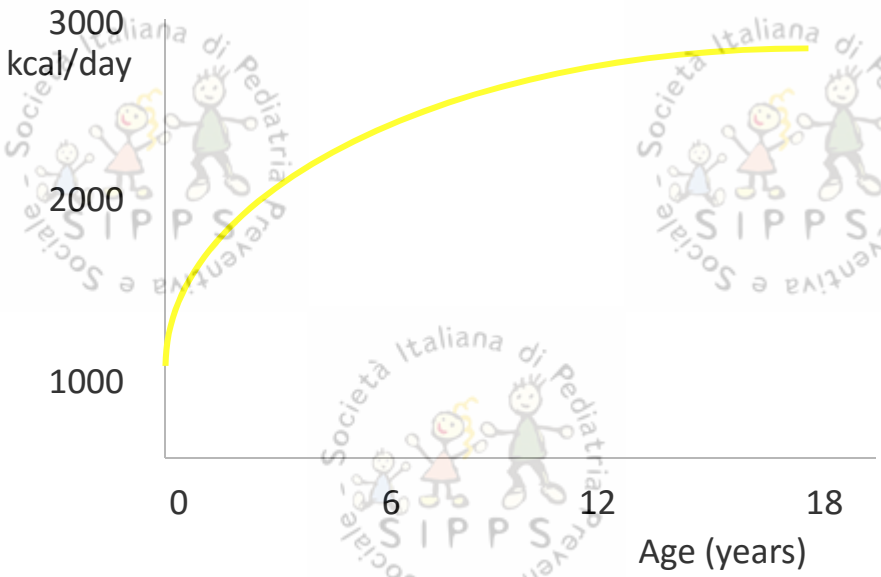
Maffeis C *et al.* J Pediatr '97

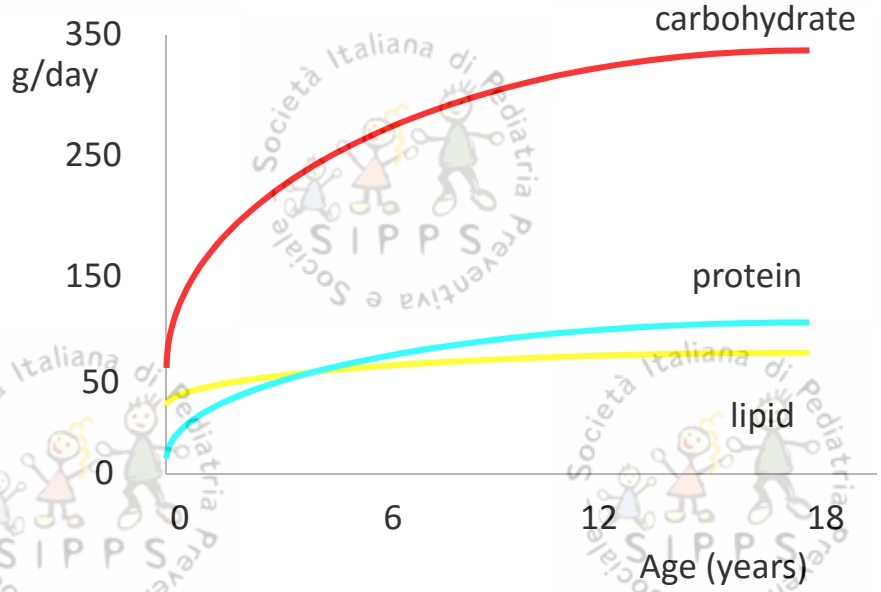

skeletal muscle
Glucose uptake & ox (Fat ox).
VAT
Ectopic fat
Ingested:
CHO
FAT
liver
insulin resistance
de novo lipogenesis
hypertriglyceridemia
FFA
insulin resistance

energy and nutrient requirements

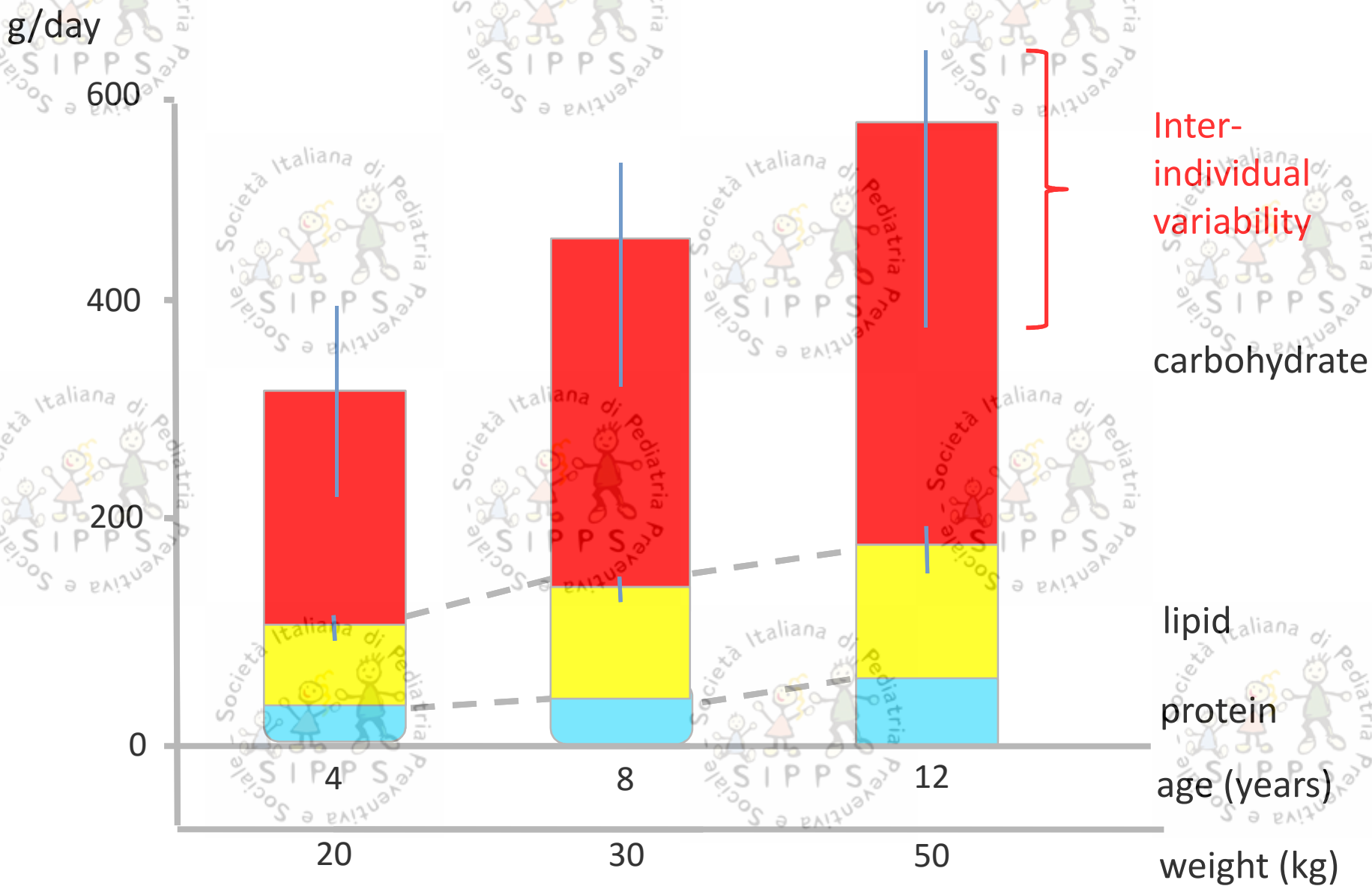
energy

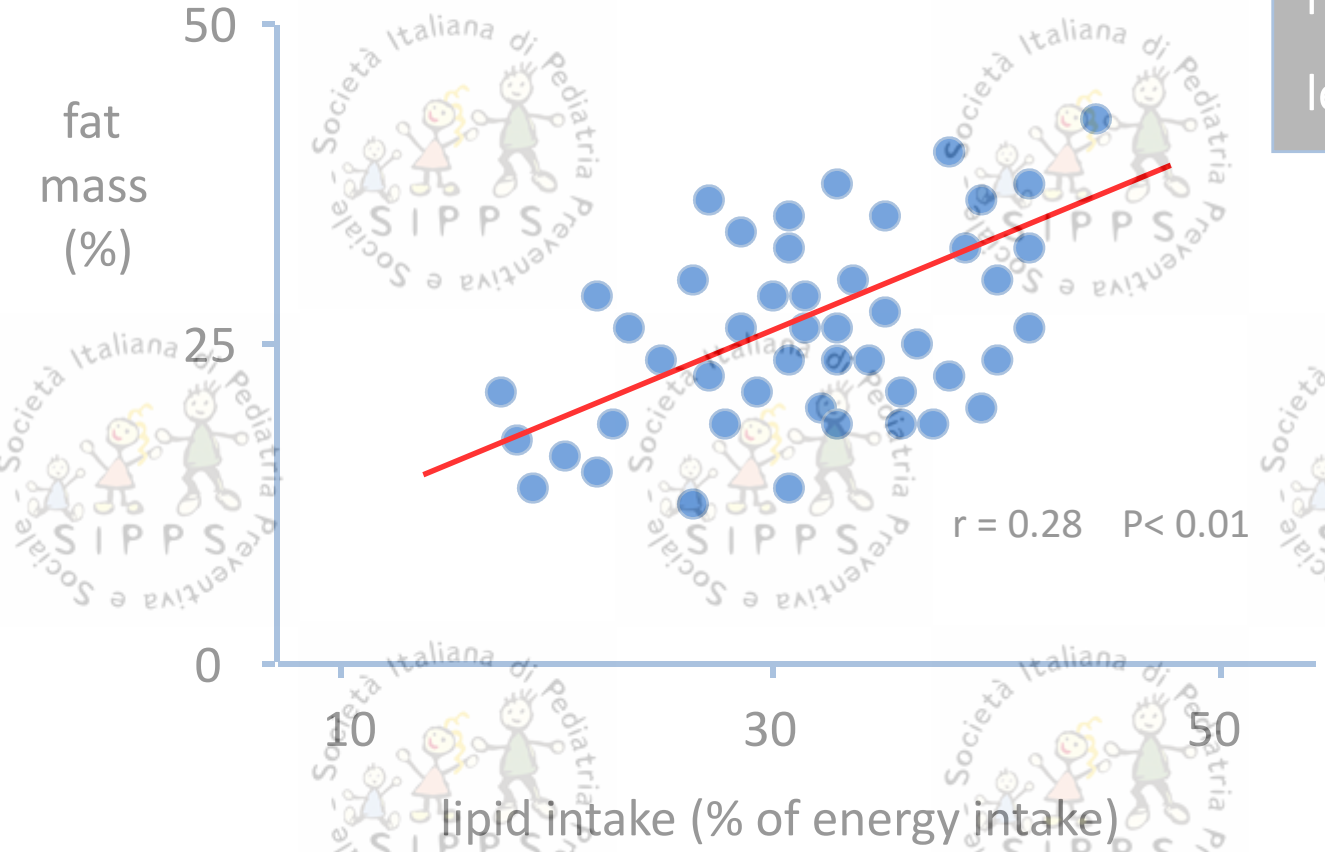
nutrients





Nutrient requirements at different ages





fatty food

more palatable

high energy density

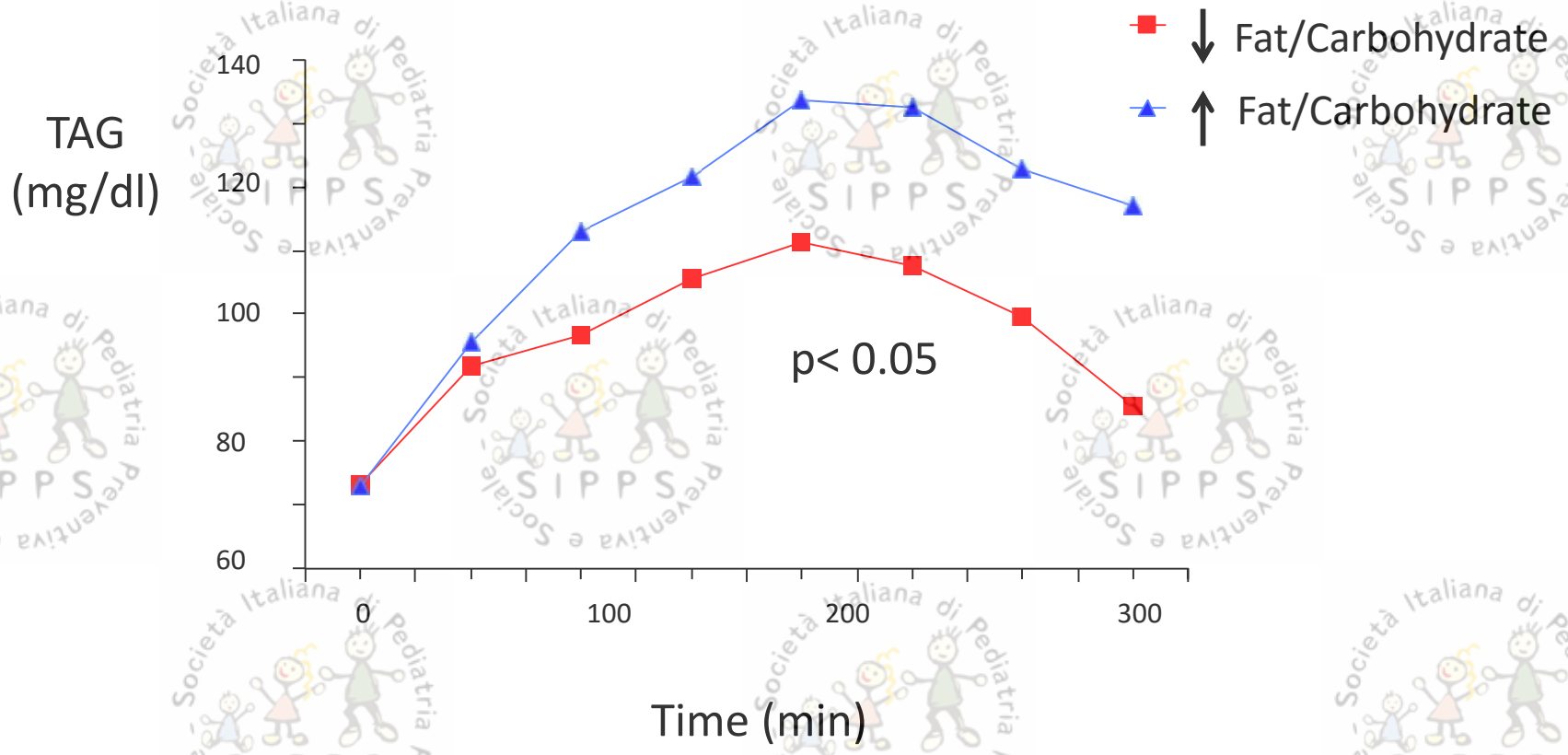
less satiating

Klesges RC *et al.* AJCN '94

Gazzaniga JM, *et al.* AJCN '93

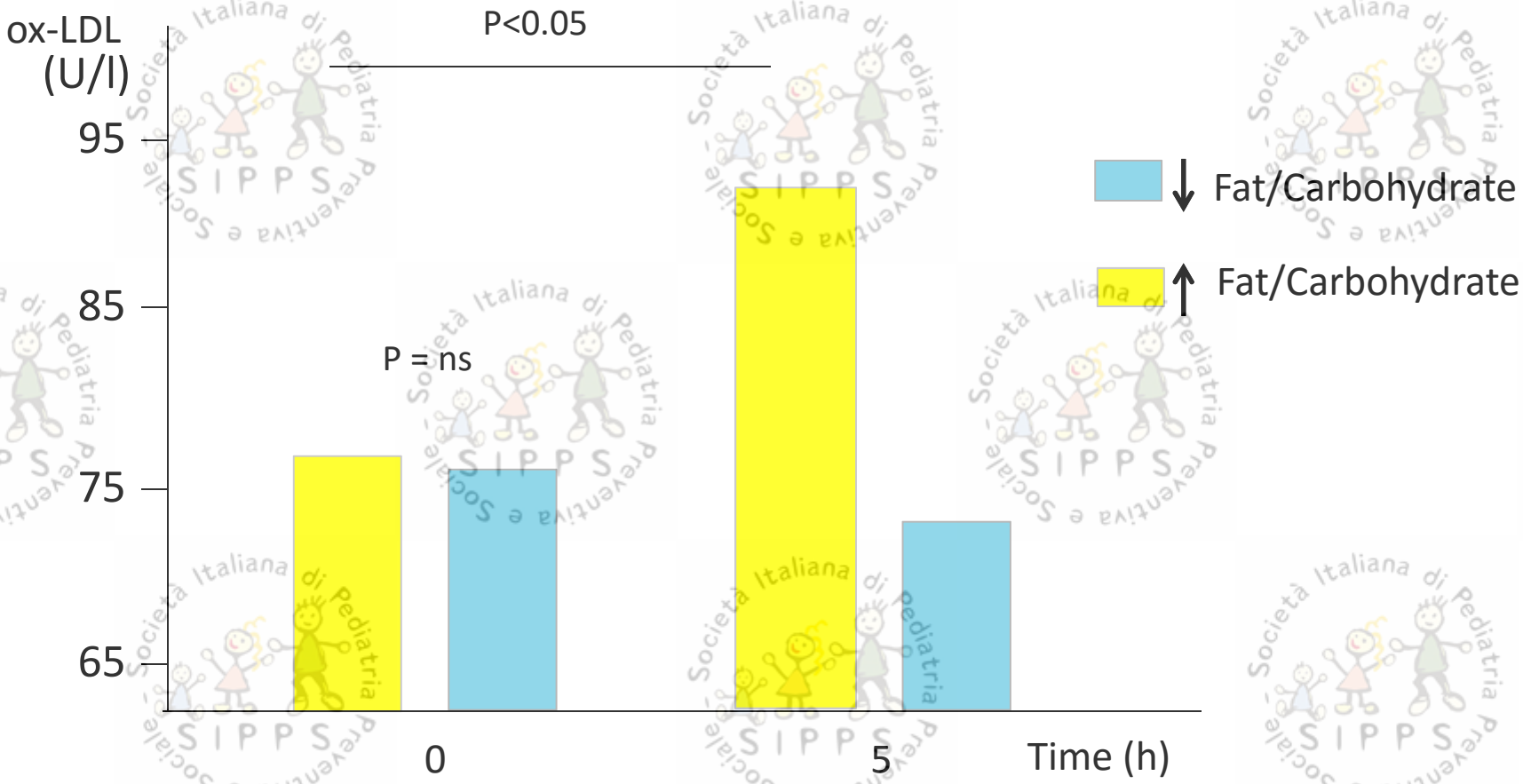
Maffeis C *et al.* Int J Obes '96

Postprandial triacylglycerol profile after two isocaloric, isoproteic meals with different fat and carboidrate content in obese children



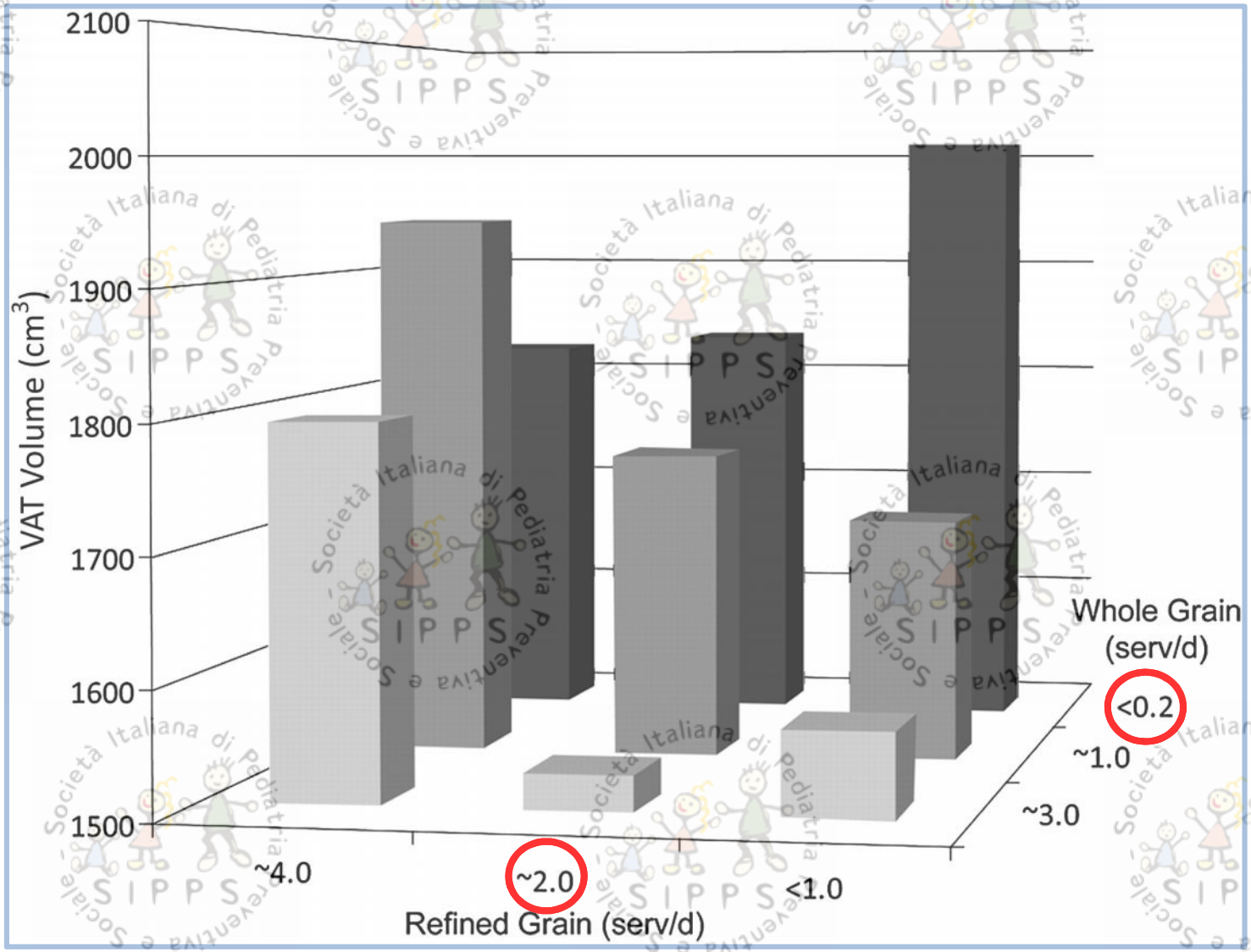
Maffeis C, *et al*. Obesity 2010

POSTPRANDIAL PRO-ATEROGENIC PROFILE:
change of oxidized lipoprotein concentration in obese children after two isocaloric, isoproteic meals with a different fat and carbohydrate content



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

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

Added Sugars and Cardiovascular Disease Risk in Children

A Scientific Statement From the American Heart Association

	Age, y	n*	Added Sugars, teaspoons†							
			Mean (SE)‡	5% (SE)	10% (SE)	25% (SE)	50% (SE)	75% (SE)	90% (SE)	95% (SE)
Boys	1–3	774	9.4 (0.31)	3.1 (0.17)	4.1 (0.19)	5.9 (0.24)	8.6 (0.29)	12.0 (0.39)	15.7 (0.51)	18.2 (0.62)
	4–8	1001	15.7 (0.56)	6.5 (0.31)	7.9 (0.34)	10.9 (0.41)	14.8 (0.53)	19.6 (0.70)	24.6 (0.91)	28.1 (1.07)
	9–13	850	21.5 (0.46)	5.9 (0.30)	8.0 (0.31)	12.5 (0.36)	19.3 (0.43)	27.9 (0.62)	37.9 (0.91)	44.8 (1.19)
	14–18	808	24.6 (0.74)	7.3 (0.39)	9.7 (0.43)	14.7 (0.53)	22.2 (0.69)	31.9 (0.95)	42.8 (1.36)	50.2 (1.73)
Girls	1–3	715	8.4 (0.27)	2.7 (0.17)	3.5 (0.20)	5.2 (0.23)	7.7 (0.28)	10.8 (0.33)	14.3 (0.41)	16.7 (0.45)
	4–8	894	14.3 (0.37)	5.7 (0.27)	7.1 (0.30)	9.7 (0.33)	13.4 (0.37)	17.9 (0.44)	22.6 (0.57)	25.9 (0.68)
	9–13	867	17.8 (0.44)	6.0 (0.29)	7.7 (0.31)	11.2 (0.35)	16.3 (0.42)	22.7 (0.55)	29.8 (0.77)	34.7 (0.96)
	14–18	727	17.5 (0.54)	5.8 (0.34)	7.5 (0.37)	10.9 (0.43)	16.0 (0.52)	22.4 (0.65)	29.5 (0.90)	34.3 (1.10)

*Number of people in sample.
†One teaspoon of added sugars equals the same amount of total sugars as 1 teaspoon (4 g) of table sugar (sucrose).
‡Standard errors (*df*=32).
Data derived from Usual Dietary Intakes: Food Intakes, US Population, 2007–2010.[20]

Vos MB, *et al.* Circulation 2016 (in press)

CONCLUSIONS

Our comprehensive review of the available evidence found that associations with increased CVD risk factors are present at levels far below US children's current added sugars consumption levels. Current evidence supports the associations of added sugars with increased energy intake, increased adiposity, increased central adiposity, and increased dyslipidemia, all of which are demonstrat
of ad
harmf
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RACCOMANDAZIONI

1. < 8 once di bevanda zuccherata/settimana
2. < 25 g (100 kcal; 6 zucchiaini da the di zucchero/die)
3. No zucchero aggiunto prima dei 2 anni di età

Vos MB, *et al.* Circulation 2016 (in press)

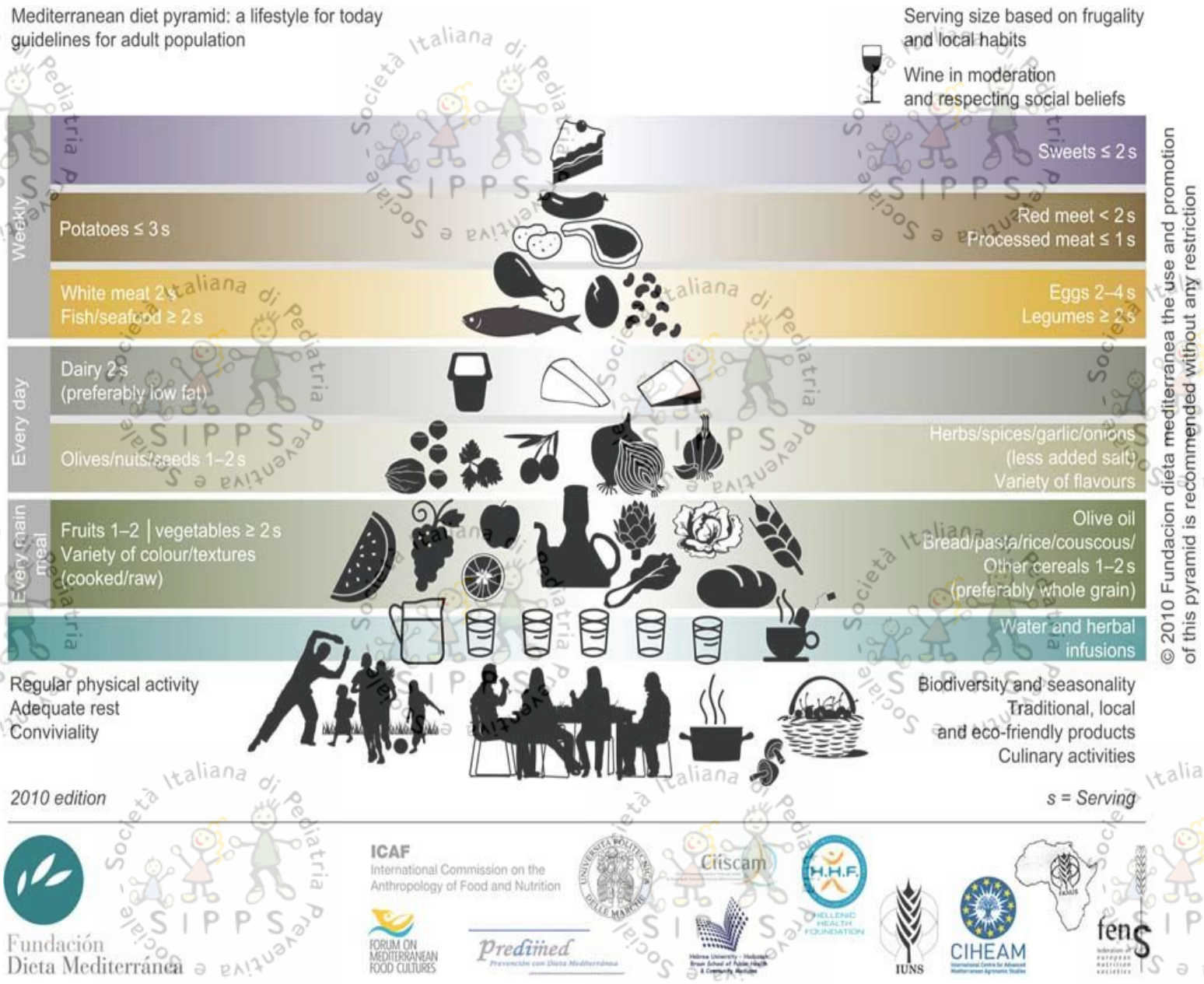
fast-food and obesity in children and adolescents

Children who eat fast-food, compared with those who do not, consume more total energy, total fat, total carbohydrates, added sugars, sugar-sweetened beverages and less fiber, milk, fruit and non-starchy vegetables.

Bowman SA, et al. Pediatrics 2004.

Overweight adolescents are less likely to compensate for the extra energy in fast-food, by adjusting energy intake throughout the day,
than their lean counterpart.

Ebbeling CB, et al. JAMA 2004.



Bach-Faig A, Serra-Majem L, *et al* Public Health Nutr 2011

SINU
SOCIETÀ ITALIANA DI NUTRIZIONE UMANA

SICS

LARN

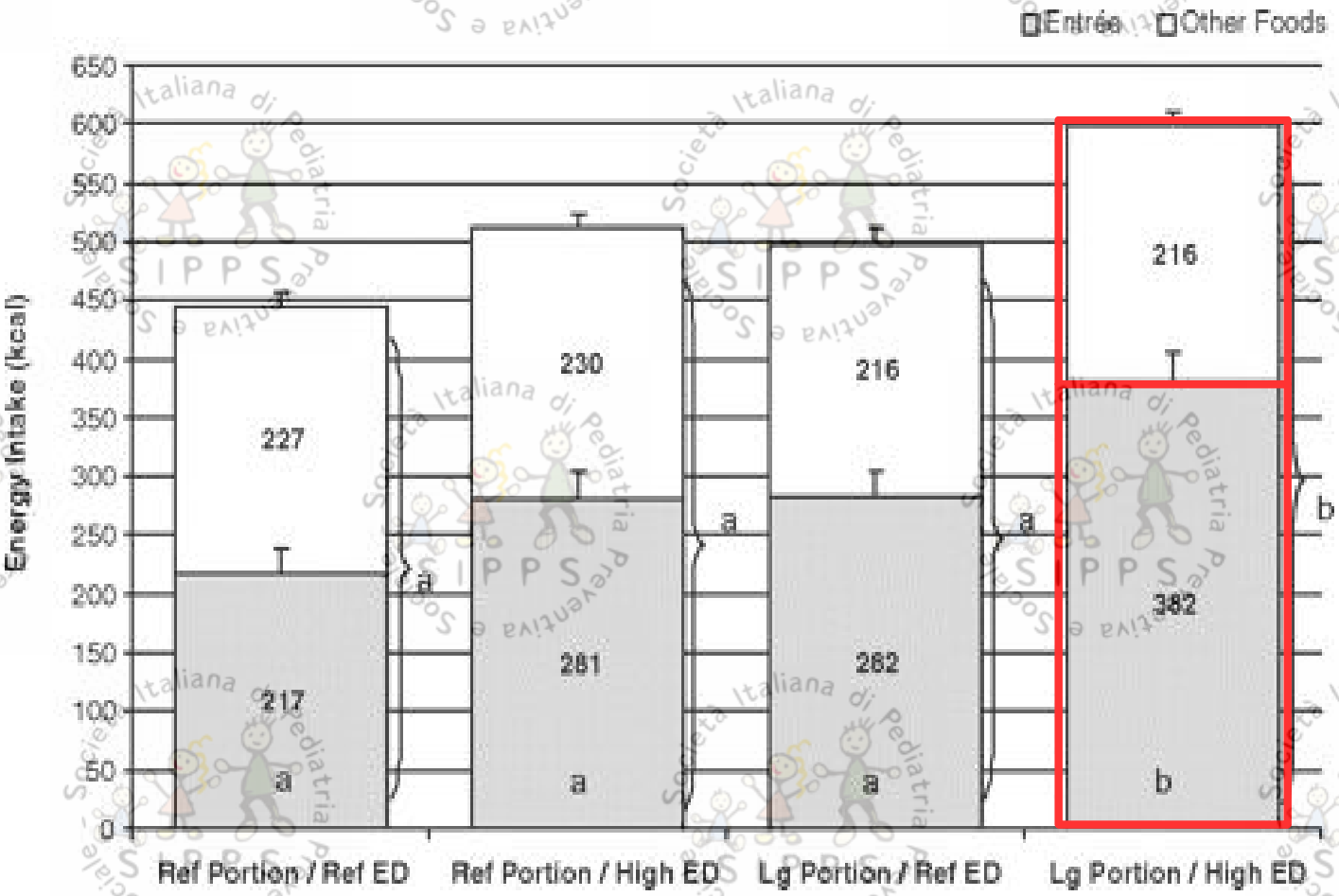
Livelli di Assunzione di Riferimento di Nutrienti ed energia per la popolazione italiana

IV Revisione

DIETA MEDITERRANEA

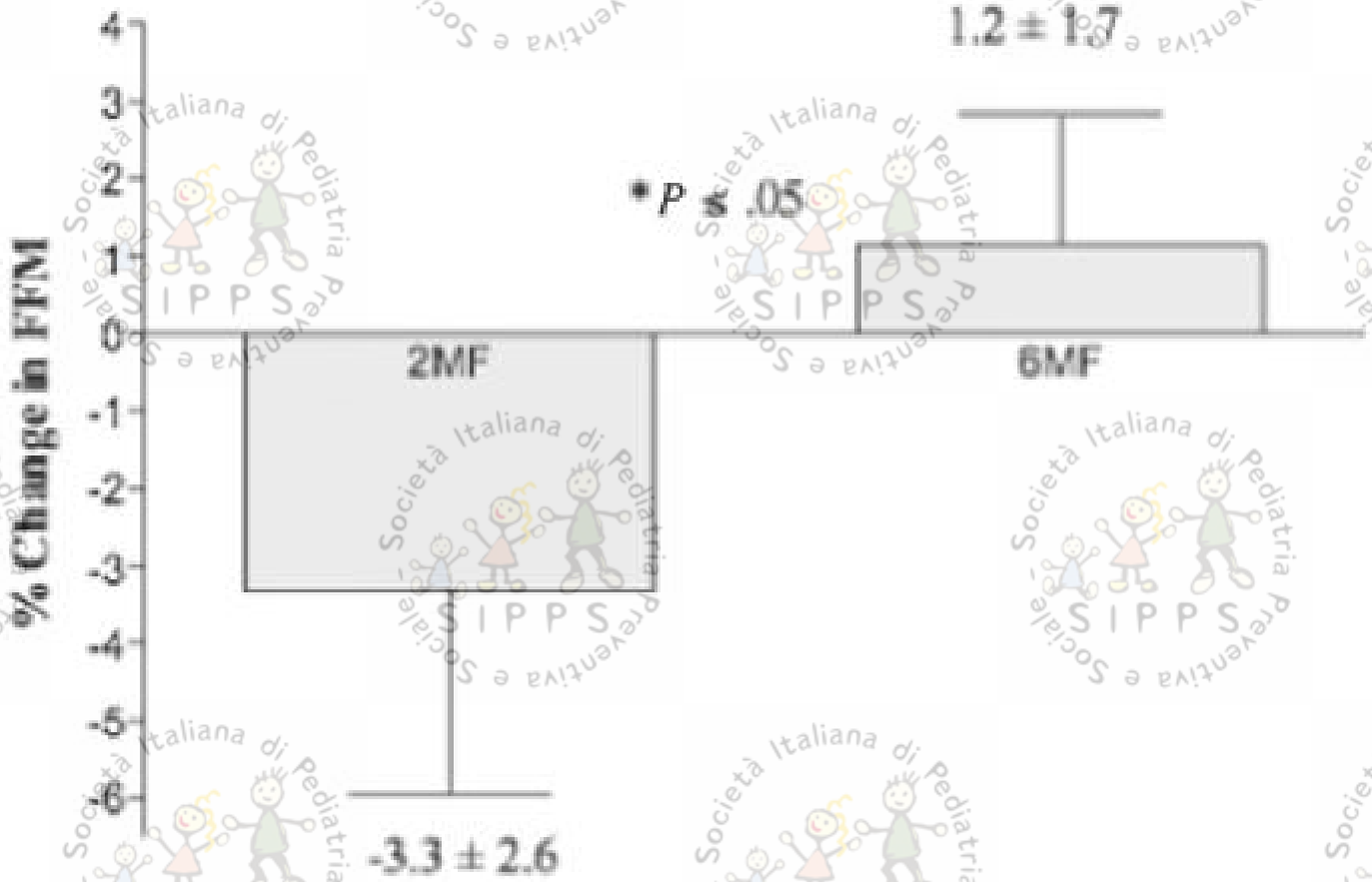
PORZIONI VARIETA' NUMERO E COMPOSIZIONE PASTI

Effects of portion size and energy density on young children's intake at a meal



Fisher JO et al, AJCN 2007

Increased meal frequency attenuates fat-free mass losses and some markers of health status with a portion-controlled weight loss diet



Alencar MK, *et al*. Nutr Res 2015

Rapporto Eurispes Italia 2014

Vegetariani

3,8 milioni (6,5% della popolazione)

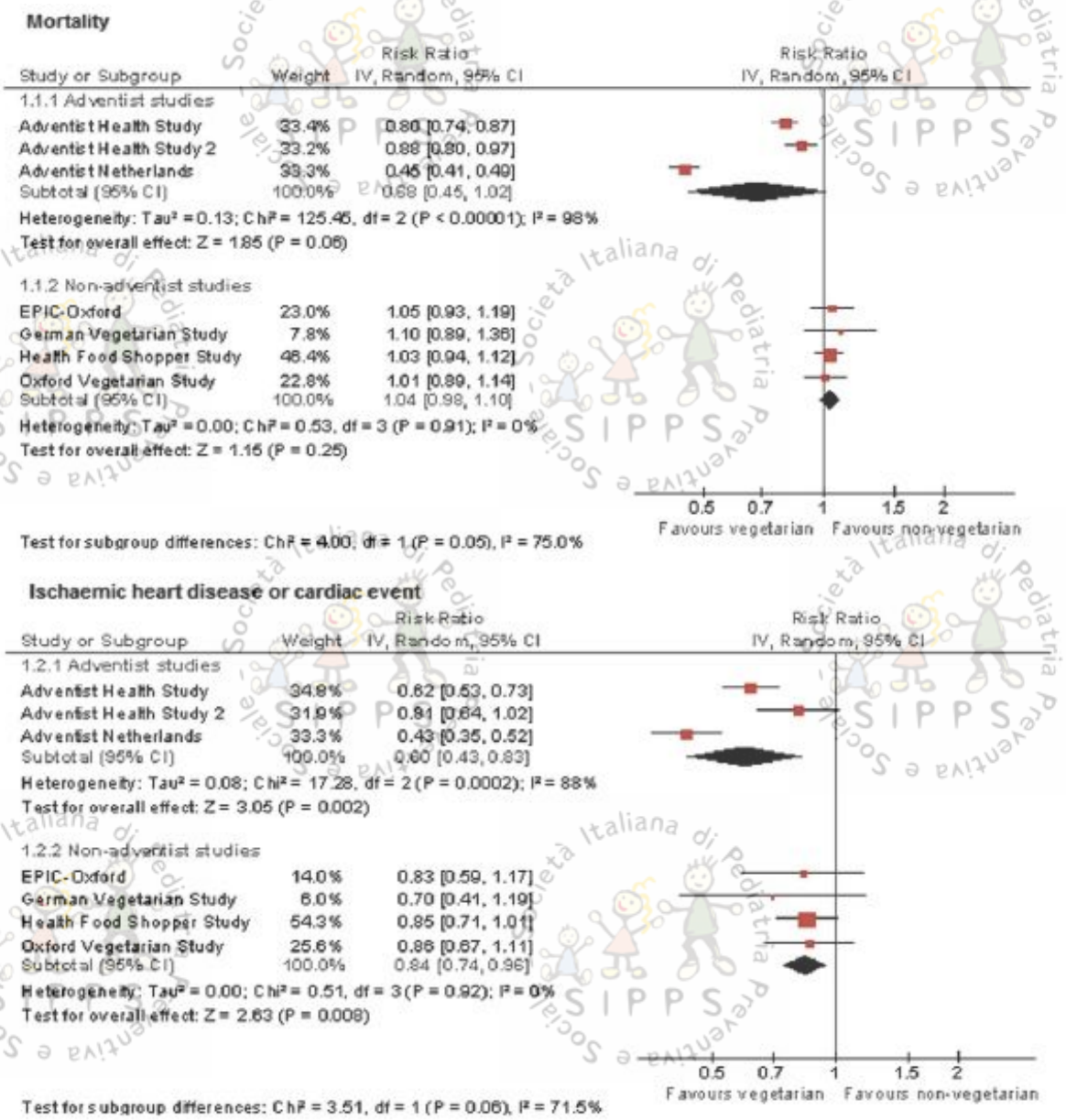
+ 25% rispetto al 2013

Vegani

400.000 (0,6% della popolazione)

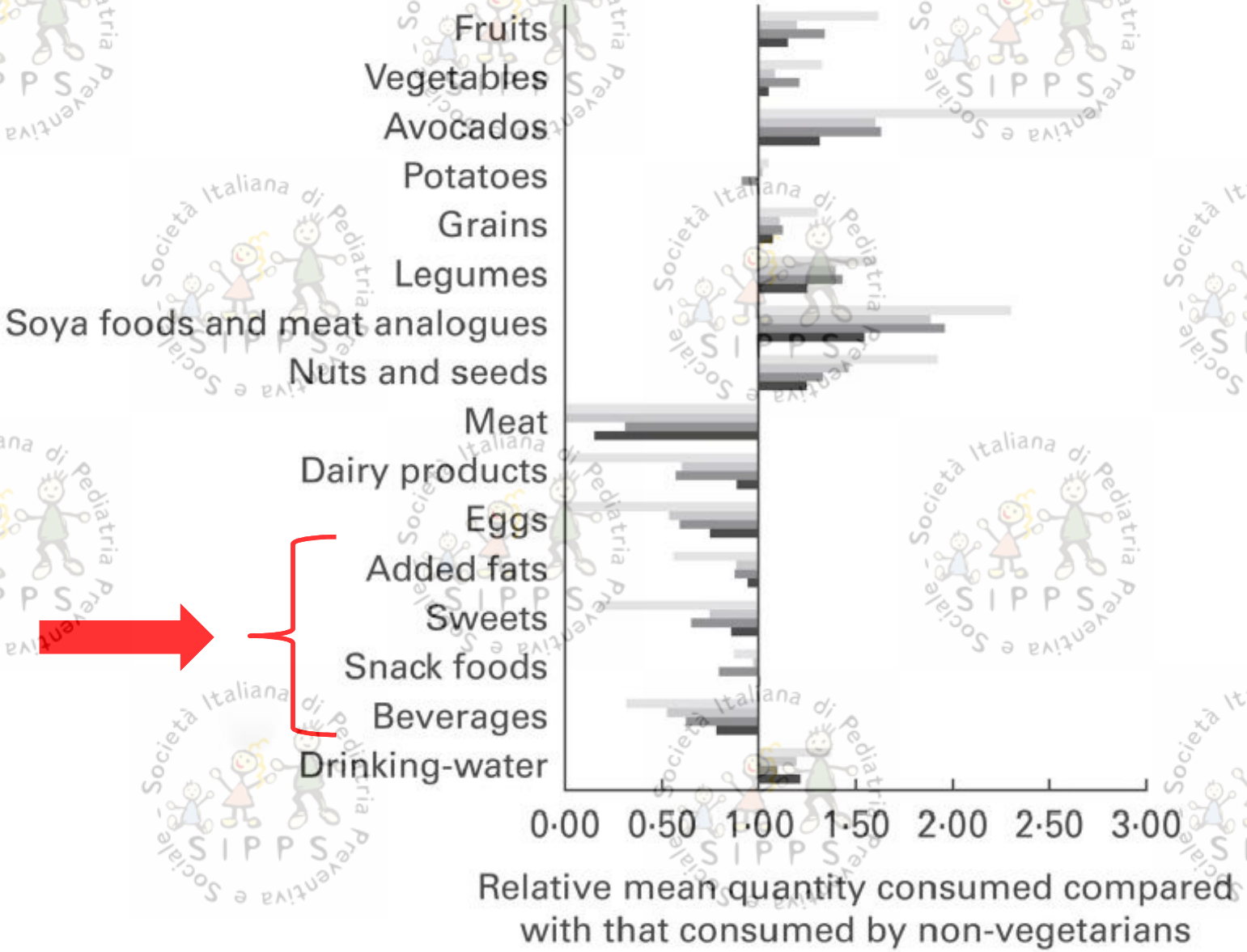
- 55% rispetto al 2013

Vegetarian diet, Seventh Day Adventists and risk of cardiovascular mortality: A systematic review and meta-analysis



Kwok CS, *et al.* Int J Cardiol 2014;176:680-6.

Patterns of food consumption among vegetarians and non-vegetarians



Orlich MJ, *et al.* Br J Nutr 2014; 112:1644-53

Possibili carenze nutrizionali con dieta vegetariana

Nutriente	Alimenti ad alto contenuto del nutriente
Ferro	Legumi, carne (fegato), pesce
Calcio	Latte e latticini, soia, mandorle, cavolo, pesce (sardine, crostacei, salmone), uovo, acqua
Zinco	Carne, pesce, semi oleosi, frutta secca, (legumi, cereali integrali)
Iodio	Pesce, sale, latte, uova
Vitamina B12	Carne, pesce
Vitamina D	Pesce, (uovo)
Ac. Grassi omega 3	Pesce, frutta secca, semi oleosi, olii (lino)
Amminoacidi essenziali	Alimenti di origine animale, legumi, cereali

LA STAMPA SALUTE

SEGUICI SU ACCEDI

Per longevità e salute prova la dieta «quasi-digiuno»

CORRIERE DELLA SERA / NUTRIZIONE

ABITUDINI ALIMENTARI

Il digiuno fa bene. E non lo dicono solo le religioni

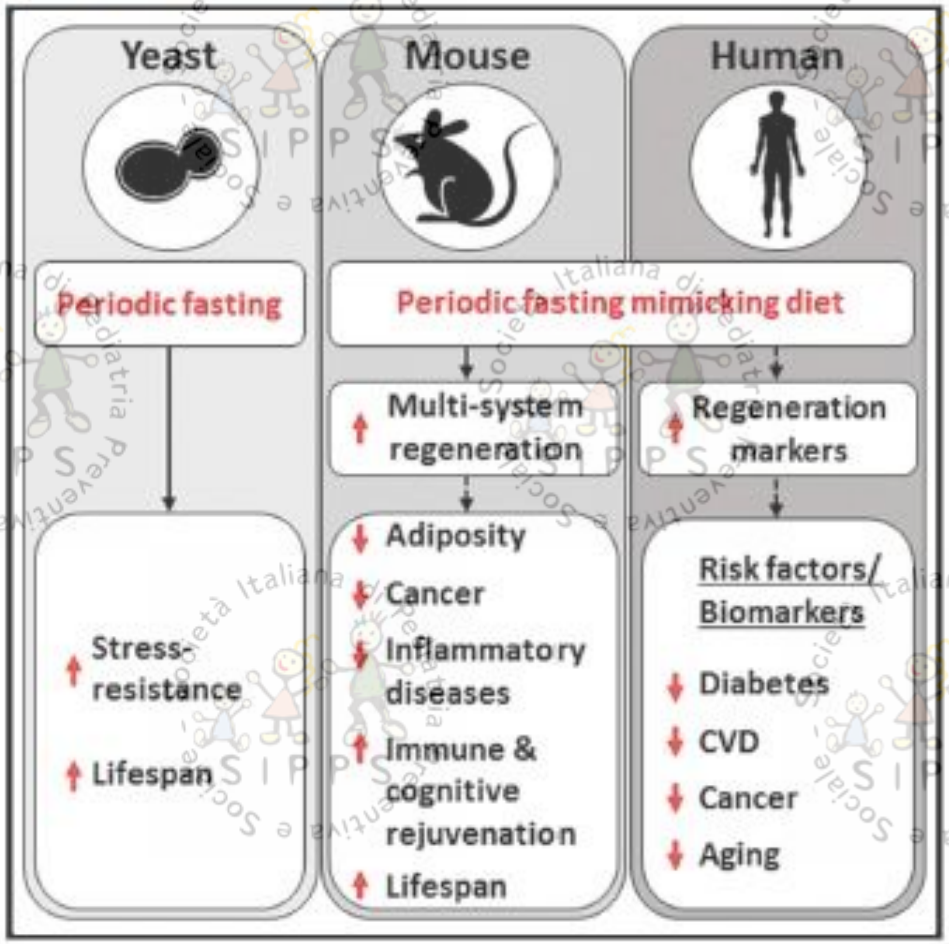
Quando ci si astiene dal cibo per 24 ore nel cervello si formano nuovi neuroni e mangiare poco sarebbe un toccasana per chi ha problemi di cuore

Clinical and Translational Report

Cell Metabolism

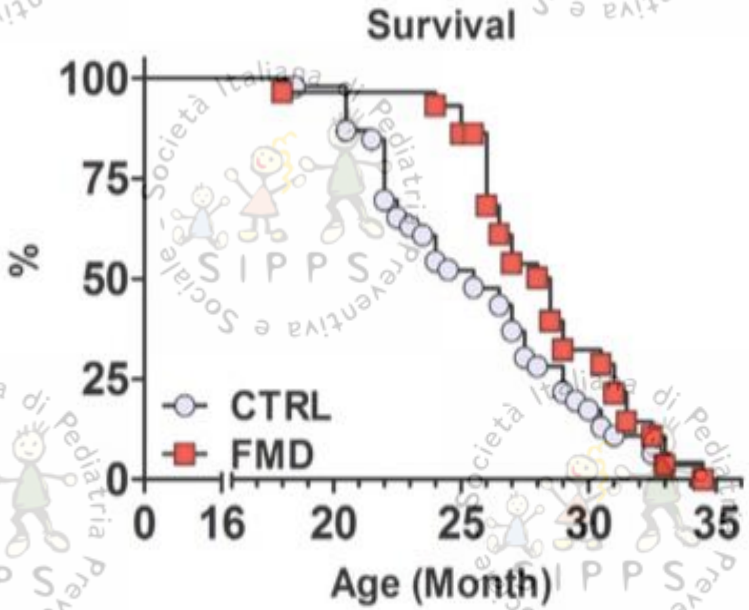
A Periodic Diet that Mimics Fasting Promotes Multi-System Regeneration, Enhanced Cognitive Performance, and Healthspan

Graphical Abstract



Authors

Sebastian Brandhorst, In Young Choi, Min Wei, ..., Todd E. Morgan, Tanya B. Dorff, Valter D. Longo



Effects of intermittent fasting on body composition and clinical health markers in humans

Tinsley & La Bounty. Nutr Rev 2015

Examples of food intake schedules of different categories of intermittent fasting protocols

Type of protocol	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Alternate day fasting	*Ad libitum*	25% kcal	*Ad libitum*	25% kcal	*Ad libitum*	25% kcal	*Ad libitum*
Time-restricted feeding	16–20 h of fasting, 4–8 h of feeding	16–20 h of fasting, 4–8 h of feeding	16–20 h of fasting, 4–8 h of feeding	16–20 h of fasting, 4–8 h of feeding	16–20 h of fasting, 4–8 h of feeding	16–20 h of fasting, 4–8 h of feeding	16–20 h of fasting, 4–8 h of feeding
Whole-day fasts	*Ad libitum*	*Ad libitum*	*Ad libitum*	*Ad libitum* or 24-h fast[a]	*Ad libitum*	*Ad libitum*	24-h fast

[a]Some programs utilize nonconsecutive fasting days, while others place multiple fasting days in succession.

Expert Committee Recommendations Regarding the Prevention, Assessment, and Treatment of Child and Adolescent Overweight & Obesity (Barlow SE *et al*, Pediatrics)

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

LARN 2014 lipidi

Età (anni)		Obiettivo nutrizionale per la prevenzione	Livello adeguato di assunzione	Intervallo di riferimento per l'assunzione di nutrienti
0,5 – 1	Lipidi totali		40% En.	
	SFA	< 10% En.		
	PUFA			5-10% En.
	PUFA n-6			4-8% En.
	PUFA n-3		EPA-DHA 250 mg + DHA 100 mg	0,5-2% En.
	Ac. grassi trans	Il meno possib.		
1 – 17	Lipidi totali			1-3 aa. 35-40% En. >4aa. 20-35% En.
	SFA	< 10% En.		
	PUFA			5-10% En.
	PUFA n-6			4-8% En.
	PUFA n-3		EPA-DHA 250 mg +1-2 aa. + DHA 100 mg	0,5-2% En.
	Ac. grassi trans	Il meno possib.		

LARN 2014 carboidrati e fibra

Obiettivo nutrizionale per la prevenzione		Intervallo di riferimento per l'assunzione di macronutrienti
Carboidrati totali	Prediligere alimenti a basso GI Limitare gli alimenti in cui la riduzione del GI è ottenuta aumentando il contenuto di fruttosio o lipidi	45-60% energia totale
Zuccheri	< 15% dell'energia totale Limitare uso del fruttosio come dolcificante (anche bevande contenenti sciroppo di mais)	nd
Fibra alimentare	Preferire cibi naturalmente ricchi in fibra (cereali integrali, legumi, frutta, verdura)	8,4 g/1000 kcal (assunzione adeguata)

Nutriente	Assunzione raccomandata	Assunzione adeguata	Livello massimo tollerabile
Vitamina D			
Lattante	-	10 ug (400 UI)	40 ug (1600 UI)
1 – 3 anni	15 ug (600 UI)	-	65 ug (2600 UI)
Ca			
Lattante	-	260 mg	nd
1 – 3 anni	600 mg	-	nd
Na			
Lattanti	-	400 mg	nd
1 – 3 anni	-	700 mg	nd
Fe			
Lattanti	11 mg	-	nd
1 – 3 anni	8 mg	-	nd
Zn			
Lattanti	3 mg	-	nd
1 – 3 anni	5 mg	-	7 mg

conclusioni

- L'alimentazione di ogni bambino deve essere personalizzata e basata sui suoi reali fabbisogni.
- Gran parte dei bambini italiani è esposta ad un eccesso di assunzione di energia e sodio ma, al contempo, a carenze dell'assunzione di nutrienti (ad es.: vit. D, Fe e fibra alimentare).
- I Livelli di assunzione di riferimento di nutrienti ed energia per la popolazione italiana (LARN) costituiscono un importante strumento di consultazione per il pediatra.