

XXIV Congresso Nazionale  
Società Italiana di Pediatria  
Preventiva e Sociale

# BAMBINI DI VETRO

12 - 15  
Settembre  
2012  
Grand Hotel  
Vanvitelli  
Caserta



**L'alimentazione ha  
un ruolo  
nella prevenzione**

...

**... dell'ipertensione  
arteriosa?**

**Marco Giussani**



# In Italia:

- **La cardiopatia ischemica è la prima causa di morte (28%)**
- **Gli accidenti cerebrovascolari sono la terza causa di morte (13%)**
- **Ogni anno si stima vengano persi > 300.000 anni di vita in persone < 65 anni di età per malattie cardiocerebrovascolari rispetto alla loro speranza di vita (240.000 per gli uomini, 68.000 per le donne)**
- **La prevalenza di invalidità per malattie cardiocerebrovascolari è pari al 4.4 per mille**
- **Il 23.5% della spesa farmaceutica è per farmaci per il sistema cardiovascolare**

*Centro Nazionale di Epidemiologia, Prevenzione e Promozione della Salute -*

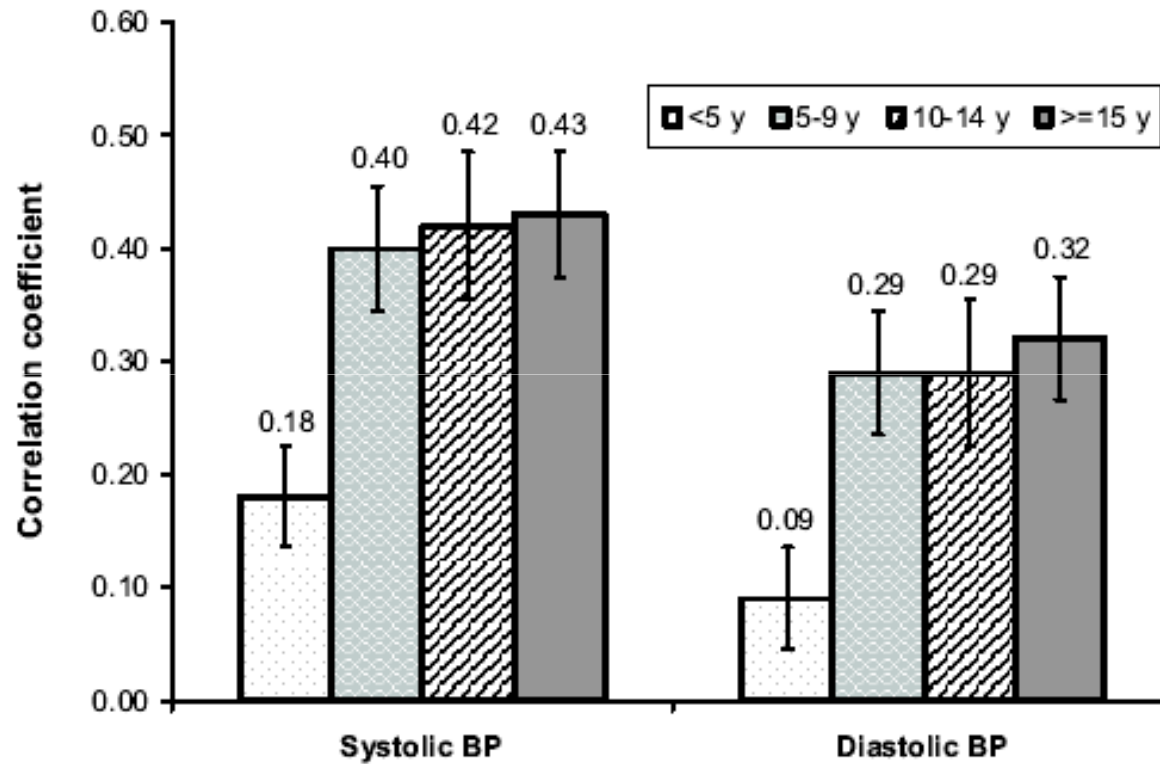
*Istituto Superiore di Sanità Roma*

- **Prevenzione primordiale:** adottare uno stile di vita tale da impedire (o ritardare) l'insorgenza di fattori di rischio cardiovascolare.
- **Prevenzione primaria:** trattare i fattori di rischio prima che si manifesti una patologia cardiovascolare.
- **Prevenzione secondaria:** trattare aggressivamente i fattori di rischio di chi è già andato incontro a una patologia cardiovascolare
- **Prevenzione terziaria:** coincide con il trattamento della malattia cardiovascolare

**A.Chiolero, P.Bovet, G.Paradis and F.Paccaud**  
**Has Blood Pressure Increased in Children in Response to the Obesity**  
**Epidemic ?**  
**Pediatrics 2007;119;544-553**

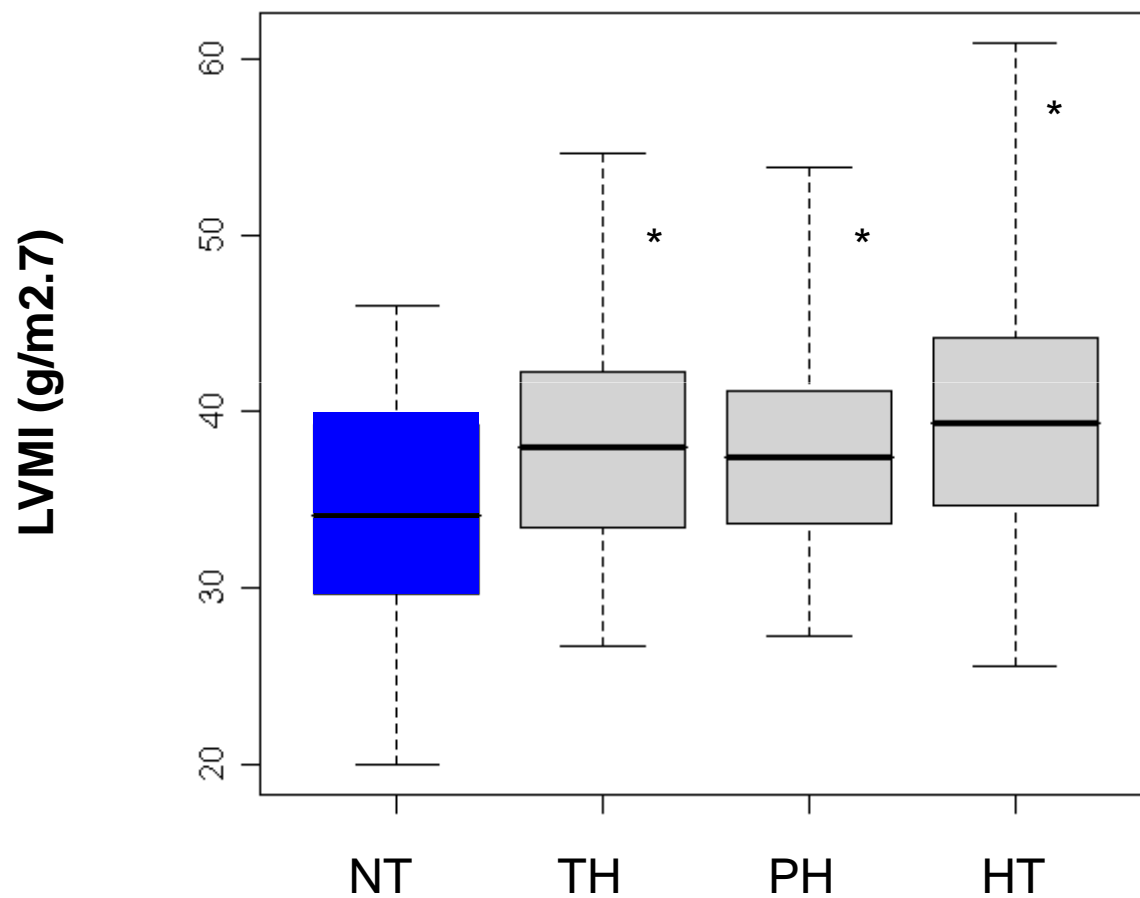
studio	Età	Anno	N	PAS	PAD	PAS e/o PAD
Adrouguè et al. (Minneapolis)	10-15	1986-87	19.542	1°set 2.7% 2°set 0.8%	1°set 2.0% 2°set 0.4%	NA NA
Jafar et al. (Pakistan)	5-14	1990-94	5.641	M 8.7% F 6.2%	M 9.6% F 3.2%	M 13.8% F 8.7%
Paradis et al. (Canada)	9 13 16	1999	3.589	7% 13% 17%	0% 0% 0%	7% 13% 17%
Sorof et al. (Houston)	12-16	2000-01	2.460	1°set 16% 2°set 11%	1°set 2% 2°set 1%	1°set 16.8% 2°set 11.5%
Sorof et al. (Houston)	13±1.7	2002	5.102	NA	NA	1°set 19.4% 2°set 9.5% 3°set 4.5%
Genovesi et al. (Milano)	6-11	2003-04	2.416	NA	NA	1°set 8.8% 2°set 4.2%
Falkner et al. (Delaware)	2-19	2002	18.618	6%	2%	7.2%
Chiolero et al. (Seychelles)	5-16	2002-04	15.612	M 6.1% F 6.0%	M 5.1% F 6.9%	M 9.1% F 10.1%

## Tracking of BP from childhood to adulthood : base-line age



*Chen, Circulation, 2008*

## Variazioni della massa cardiaca per classe pressoria



\* = p < 0.001 vs NT

# Alimentazione e pressione arteriosa

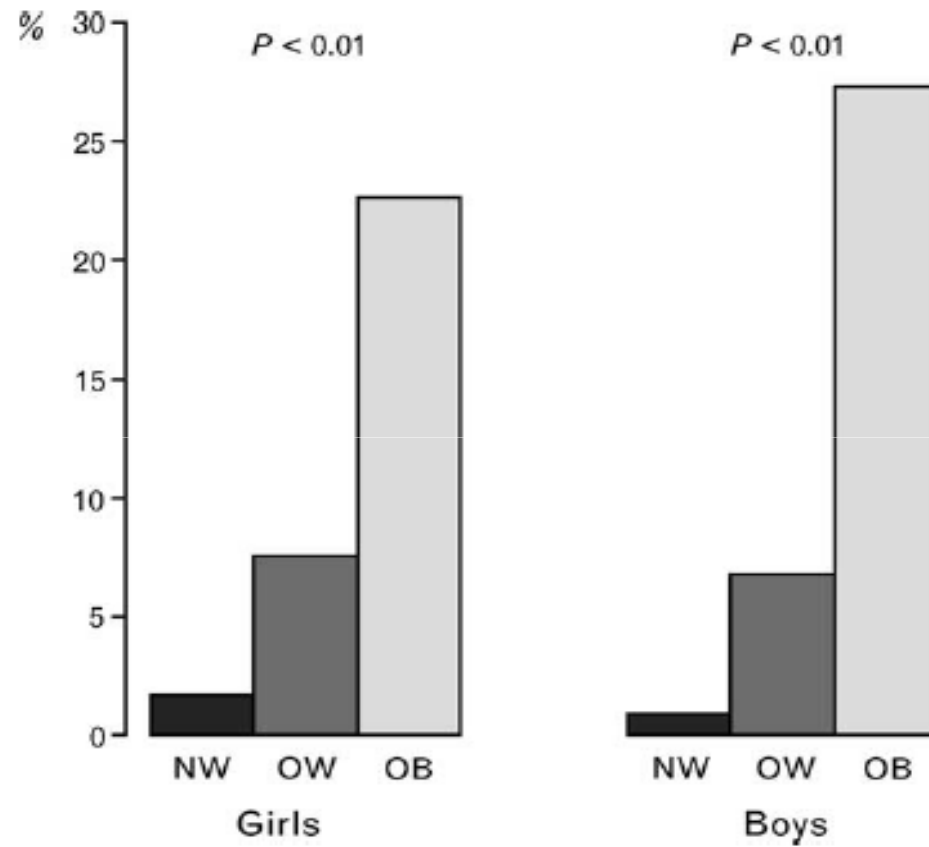
- **Eccesso ponderale**
- **Sodio**
- **Potassio**
- **Calcio**
- **Acido urico**
- **Altro (liquirizia, alcool, caffeina, fumo passivo e attivo, farmaci)**

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**Eccesso ponderale**

## Prevalenza di ipertensione e classe ponderale



*Genovesi, J Hypertension, 2008*

## Results of blood pressure screening in a population of school-aged children in the province of Milan: role of overweight

Simonetta Genovesi<sup>3</sup>, Marco Giussani<sup>0</sup>, Federico Pieruzzi<sup>3</sup>, Federico Vigorita<sup>3</sup>,  
Claudia Arcovio<sup>3</sup> Silvio Cavuto<sup>b</sup> and Andrea Stella<sup>3</sup>

**Objectives** To study the prevalence of high blood pressure (BP) in an Italian paediatric population, and to verify whether in this population elevated BP values are associated with overweight (OW).

**Study design** Children (1206 males, 1210 females) from the lower-grade public schools (ages 6-11 years) were studied. Body weight, height and BP were measured in each child. Elevated BP was defined if resting systolic and/or diastolic BP values equalled or exceeded the 95th percentile according to gender, age and height, based on the US normative BP tables. Overweight children were identified using four different methods: (1) the classification based on the relative body weight; (2) the French references by Rolland-Cachera *et al.*; (3) the International Obesity Task Force charts; and (4) the Italian charts defined by Cacciari *et al.*

**Results** The prevalence of high BP in our population was 4.2% and was significantly higher in females (65/1210 = 5.4%) than in males (37/1206 = 3.1%),  $P = 0.005$ . The different methods used to define OW provide different estimates of OW prevalence (from 17.0% to 38.6%). The percentage of high BP subjects was significantly higher in OW than in normal-weight children

regardless of the method used for the definition of the weight class ( $P < 0.0001$ ), in both genders. **In addition, for each age range, absolute systolic and diastolic BP values were higher in OW as compared to normal-weight children both in males and in females ( $P < 0.0001$ ).**

**Conclusions** Our study indicates the importance of performing BP screenings in the paediatric population, and to promote interventions that may reduce the prevalence of OW in children. *J Hypertens* 00:000-000 © 2005 Lippincott Williams & Wilkins.

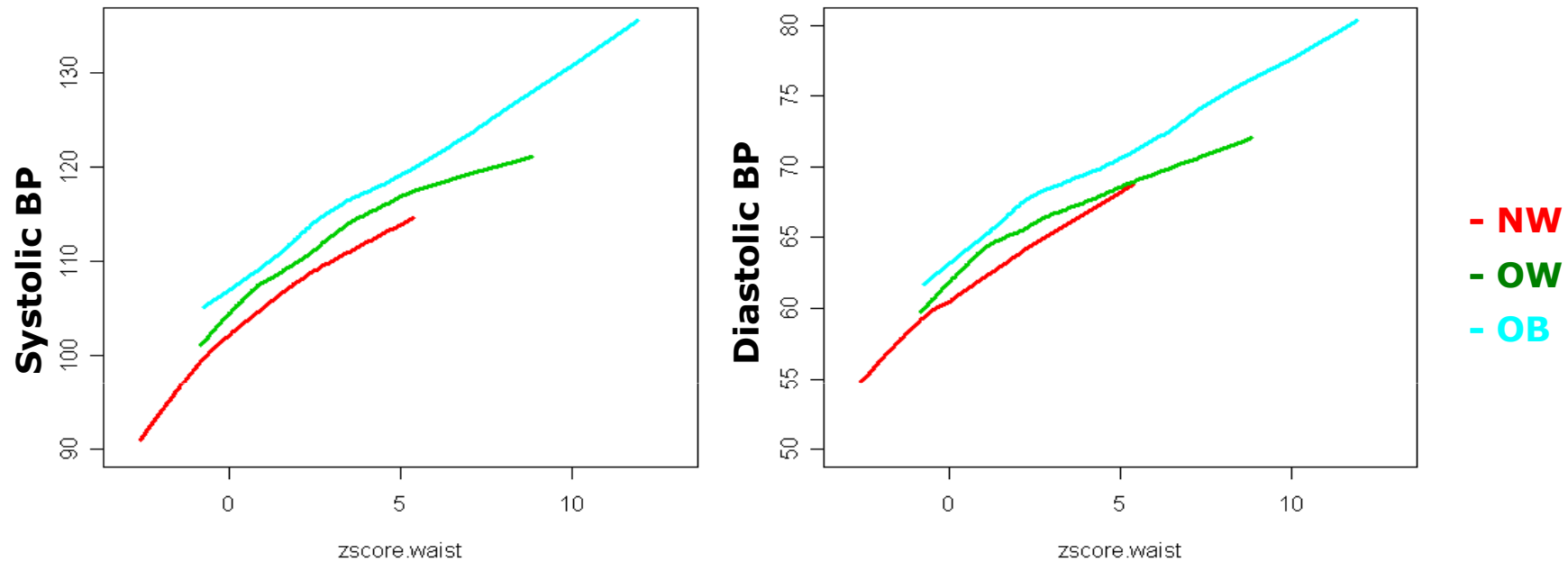
Journal of Hypertension 2005, 00:000-000

Keywords: overweight, blood pressure, children, epidemiology

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# RELATIONSHIP BETWEEN **SBP (DBP) ABSOLUTE VALUES** AND **WAIST Z-SCORES** IN EACH **WEIGHT CLASS**



Linear regression model on **SBP (DBP)** adjusted by gender, age and height

Variable	Systolic BP		Diastolic BP	
	<i>b</i> (95% CI)	p-value	<i>b</i> (95% CI)	p-value
weight class (OW vs NW)	3.79 (2.96, 4.61)	<0.01	2.57 (1.99, 3.16)	<0.01
(OB vs NW)	7.43 (5.60, 8.86)	<0.01	4.96 (3.94, 5.97)	<0.01
W z-score	1.61 (1.31, 1.90)	<0.01	0.83 (0.62, 1.04)	<0.01

**Sale**

**Table 1. Estimated Changes in Systolic Blood Pressure Associated with Reductions in Dietary Salt.\***

Group	Salt Reduction, 1 g/day		Salt Reduction, 3 g/day		Reference No.
	Low Estimate of SBP Decrease	High Estimate of SBP Decrease	Low Estimate of SBP Decrease	High Estimate of SBP Decrease	
<i>mm Hg</i>					
Entire U.S. population					
Persons with hypertension†	1.20	1.87	3.60	5.61	3, 15
Persons ≥65 yr old	1.20	1.87	3.60	5.61	17, 19–22
All others	0.60	1.17	1.80	3.51	3, 15
Black subpopulation					
Persons with hypertension†	1.80	3.03	5.40	9.10	3, 17, 19–22
Persons ≥65 yr old	1.20	1.87	3.60	5.61	17, 19–22
All others	1.20	1.87	3.60	5.61	17, 19–22

\* SBP denotes systolic blood pressure.

† Hypertension was defined as a systolic blood pressure of 140 mm Hg or higher, a diastolic blood pressure of 90 mm Hg or higher, or use of an antihypertensive medication.

K. Bibins-Domingo, NEJM 2010

**Table 3. Projected Estimates of Comparative Effect of Various Population Interventions on Annual Reductions in Cardiovascular Events.\***

Intervention	Incidence of CHD	Total MI†	Incidence of Stroke	Death from Any Cause
	<i>reduction in absolute number of events (% change from expected)</i>			
Salt reduction				
1 g/day				
Low estimate	22,000±2000 (2.0)	20,000±1800 (2.6)	13,000±1800 (1.7)	17,000±2400 (0.9)
High estimate	37,000±3300 (3.3)	32,000±2900 (4.2)	20,000±2900 (2.7)	28,000±3800 (1.4)
2 g/day				
Low estimate	44,000±4000 (4.0)	39,000±3500 (5.1)	25,000±3500 (3.4)	34,000±4600 (1.7)
High estimate	71,500±6300 (6.4)	62,500±5400 (8.1)	40,000±5400 (5.3)	55,000±7500 (2.8)
3 g/day				
Low estimate	66,000±5800 (5.9)	58,000±5100 (7.6)	37,000±5100 (5.0)	51,000±7100 (2.6)
High estimate	110,000±9200 (9.6)	92,000±7800 (12.0)	59,000±8100 (7.8)	81,000±11,000 (4.1)
Smoking cessation‡	41,000±10,000 (3.7)	92,000±14,000 (11.9)	32,000±13,000 (4.4)	84,000±9300 (4.3)
Weight loss§	59,000±3500 (5.3)	61,000±3200 (8.0)	5600±600 (0.7)	36,000±2000 (2.0)
Statin therapy for primary prevention¶	52,000±5600 (5.3)	17,000±1800 (2.9)	6600±200 (0.9)	5400±540 (0.3)
Pharmacologic treatment of hypertension	100,000±11,000 (9.3)	100,000±9700 (13.1)	69,000±11,000 (9.3)	80,000±10,000 (4.1)

\* Plus-minus values are means ±SE from the Monte Carlo simulations. CHD denotes coronary heart disease, and MI myocardial infarction.

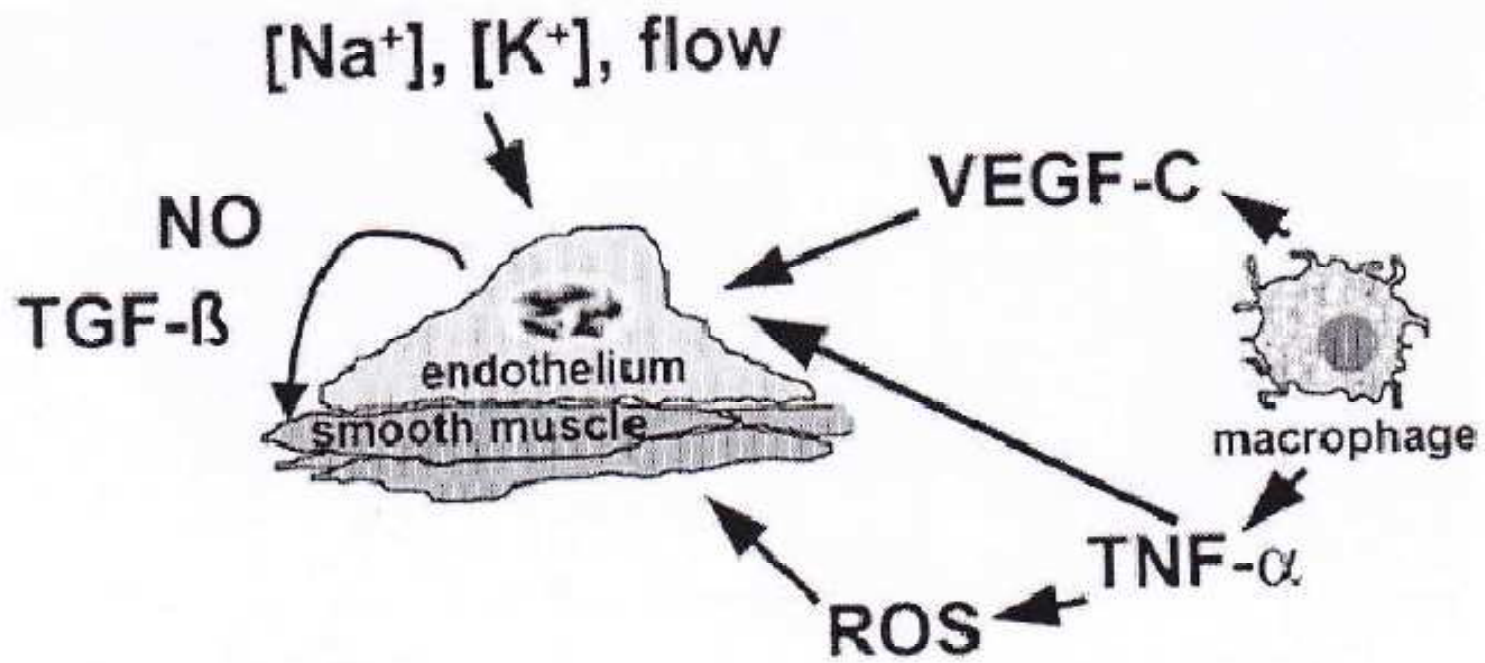
† Total myocardial infarction includes new and recurrent myocardial infarctions.

‡ Smoking cessation was defined as elimination of 50% of use of or exposure to tobacco.

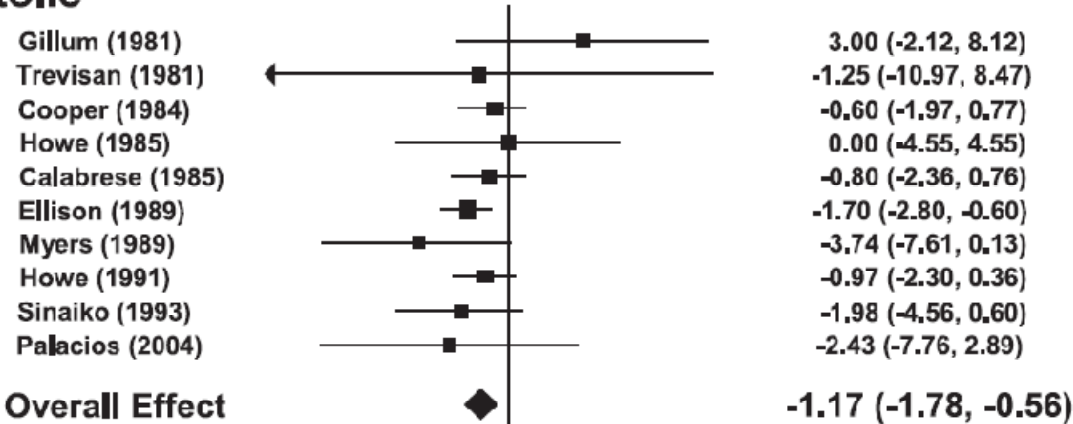
§ Weight loss was defined as a 5% reduction in body-mass index in an obese adult.

¶ Cholesterol treatment for primary prevention was defined according to the National Cholesterol Education Program Adult Treatment Panel III guidelines as treatment with statins in persons with a 10-year risk of CHD of less than 20%.

|| Pharmacologic treatment of hypertension was defined on the basis of treatment of all persons with hypertension to the degree described in the Antihypertensive and Lipid-Lowering Treatment to Prevent Heart Attack Trial.<sup>24</sup>



## Systolic



## Diastolic

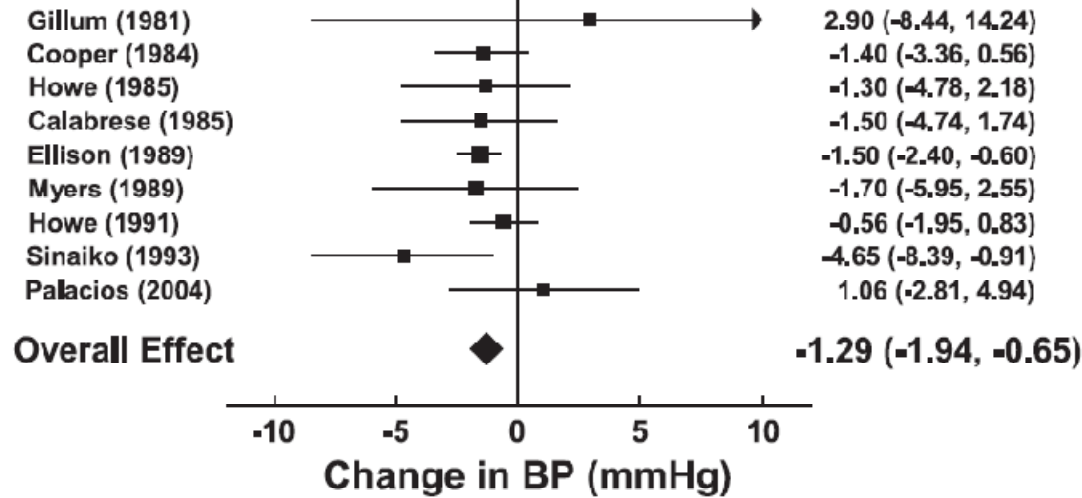
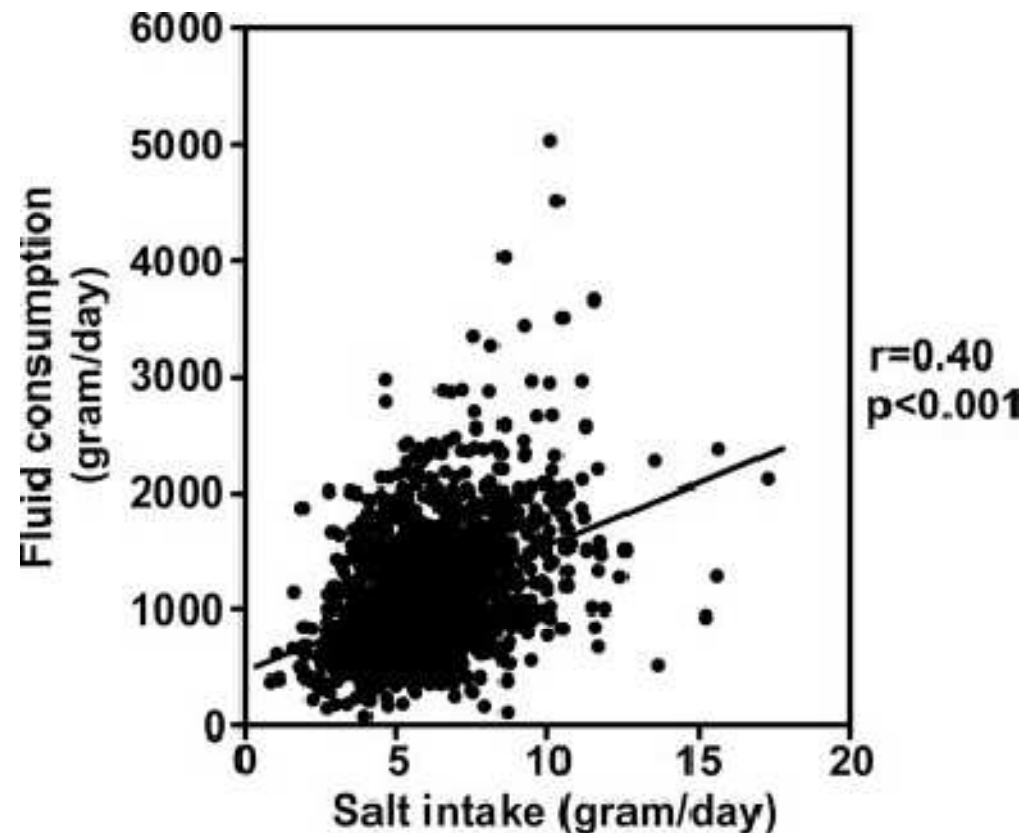


Figure 2. Mean net change in BP and corresponding 95% CI in individual trials included in the meta-analysis. The overall effect represents the pooled estimate of mean net change in BP. The size of the symbol is in proportion to the weight (ie, inverse of the variance of the net change in BP) of the trial.

- **Nella stessa metanalisi vengono citati tre studi, di cui due su neonati e uno su lattanti di tre mesi, che dimostravano una minor SBP (3 mm Hg) nei soggetti con alimentazione a più basso contenuto di sodio.**
- **Un gruppo di soggetti, arruolati in uno di questi studi, rivalutati dopo 15 anni, hanno dimostrato dei valori più bassi di SBP (3.6 mm Hg) e DBP (2.2 mm Hg) rispetto ai controlli.**

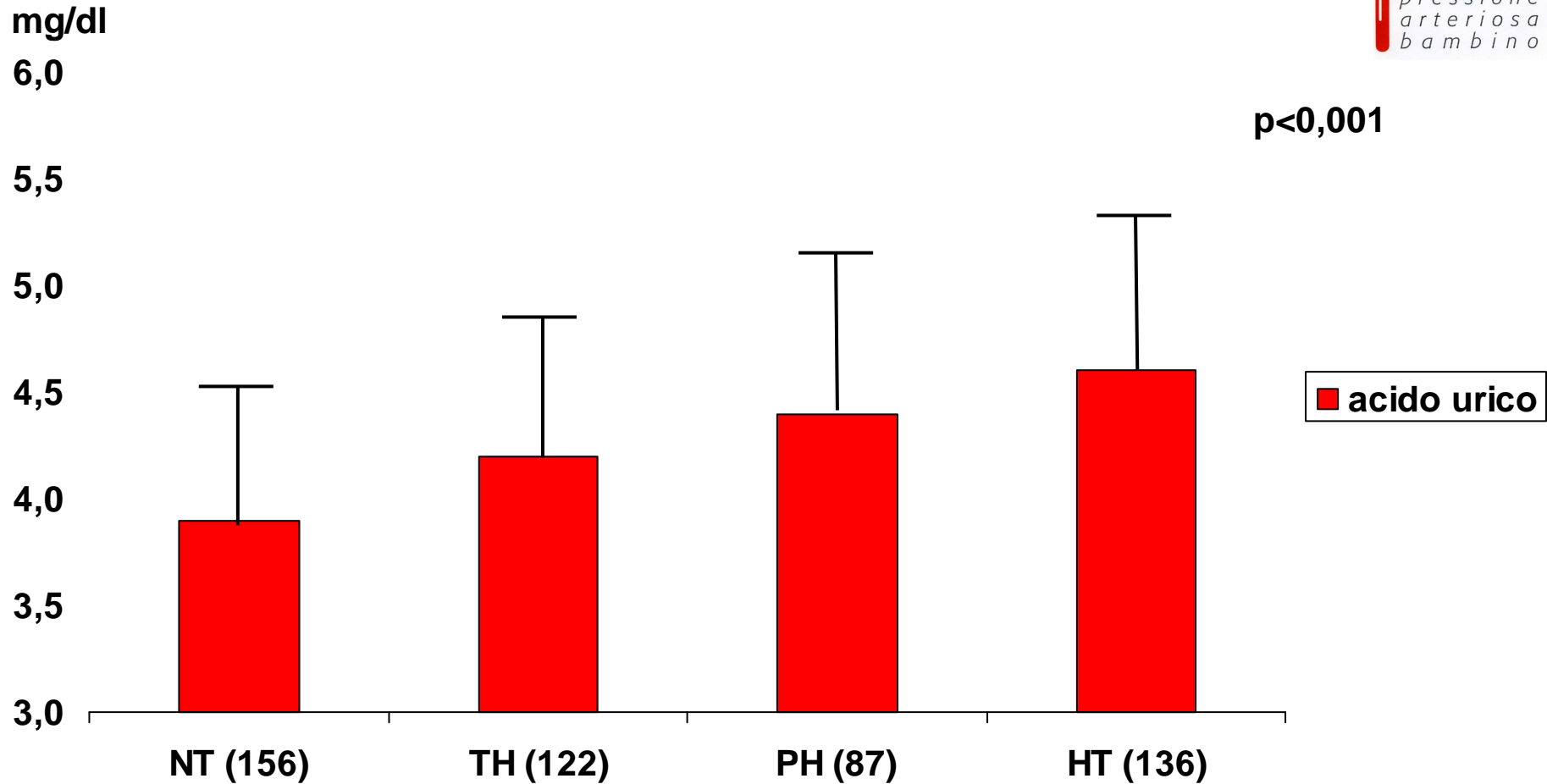
J.M. Geleijnse BMJ 1990



He et al. Hypertension 2008

# **Acido urico**

# Uricemia vs categorie pressorie (n=501 bambini, età 10,8±2,4 aa)



**Phase 1: Reversible Vasoconstriction**



Uric Acid  
→  
Increased renin  
Decreased NO



Remains uric acid dependent  
Sodium resistant

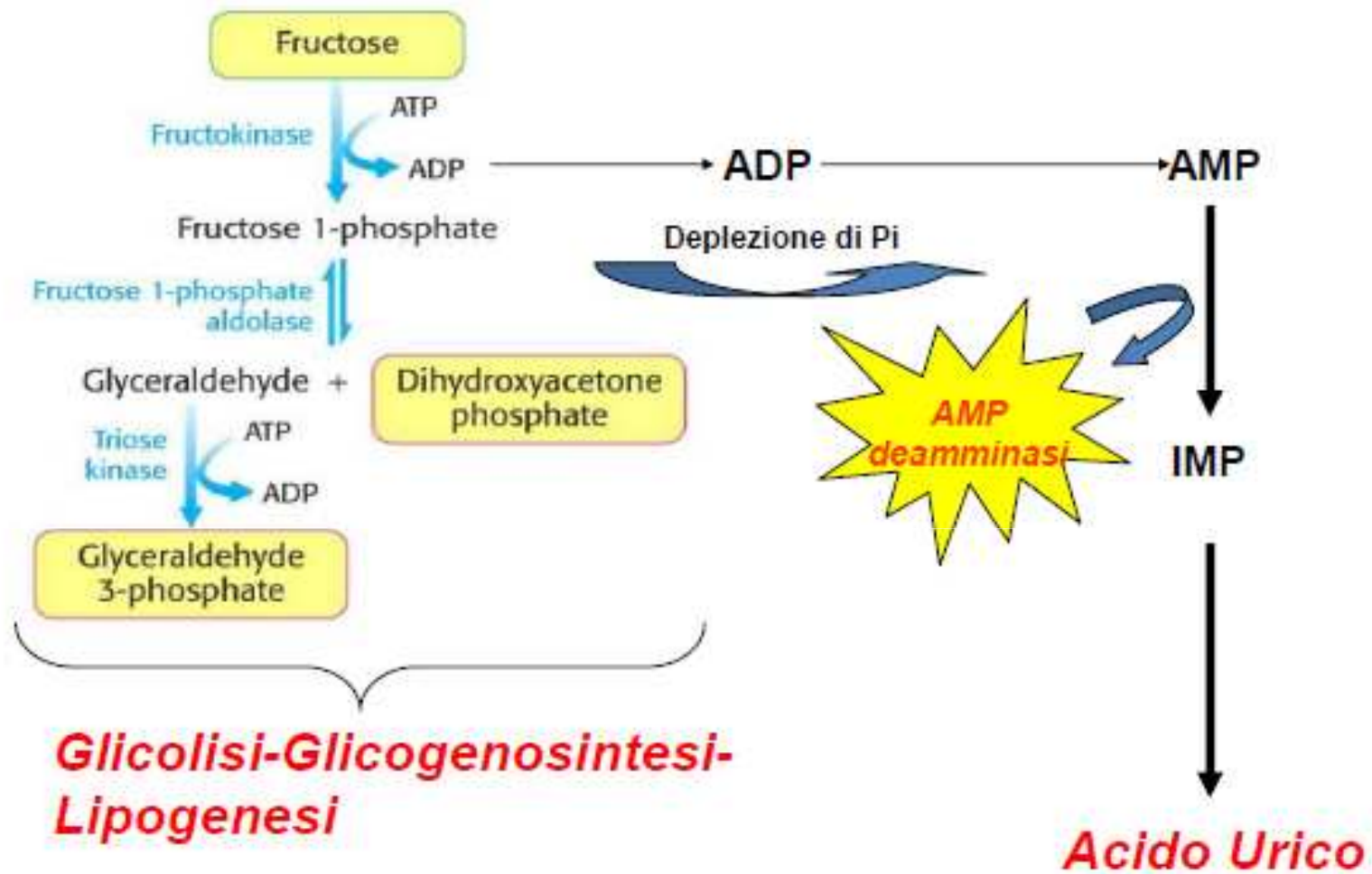
**Phase 2: Arteriolar Wall Thickening**



Uric Acid  
→  
Vascular smooth muscle proliferation mediated by PDGF and MCP-1



Becomes uric acid independent  
Sodium sensitive



## **In conclusione:**

- **Nel caso dell'ipertensione arteriosa i principi della prevenzione coincidono con quelli del trattamento.**
- **Si deve incrementare l'attività fisica e scoraggiare la sedentarietà.**
- **Devono essere evitati l'eccesso ponderale e limitato l'uso del sale.**
- **È ragionevole limitare l'assunzione di soft-drink (calorie, caffeina, fruttosio).**
- **Si devono proporre diete equilibrate (potassio, calcio) con abolizione di alcolici, fumo, liquirizia, sostanze di dubbia origine.**