

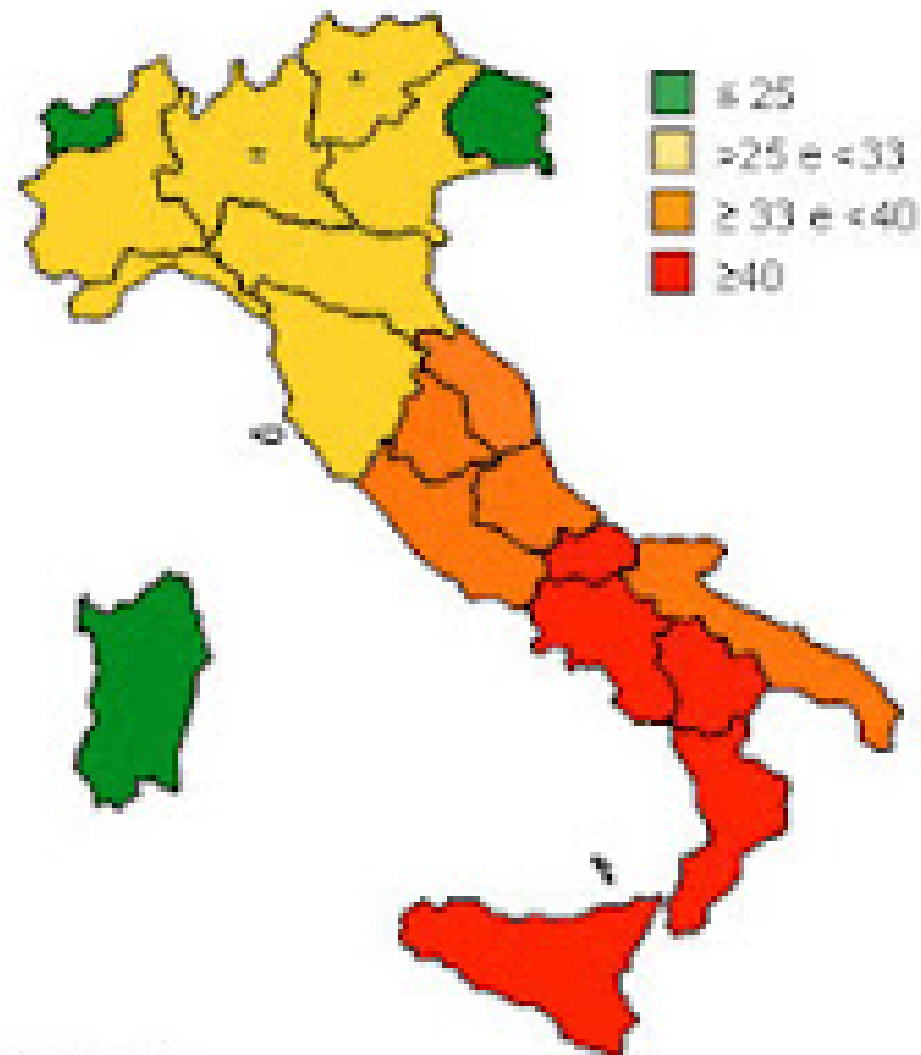
Obesità, attività fisica e malattie respiratorie nel bambino



- Italo Marinelli
- UO Pediatria
- Ospedale Gubbio e Gualdo Tadino

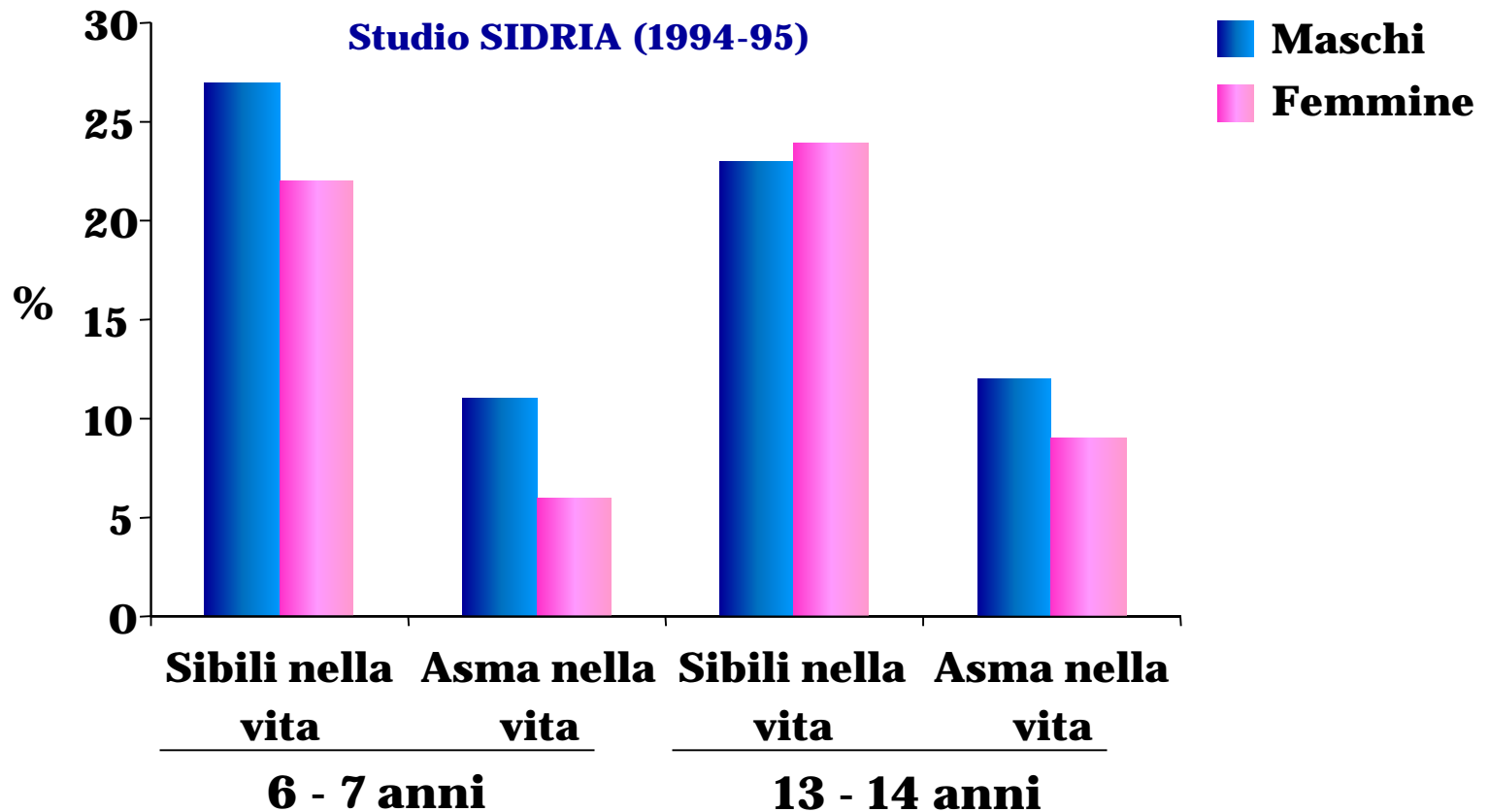


Sovrappeso e obesità per regione, bambini di 8-9 anni della 3^a primaria. Italia, 2008

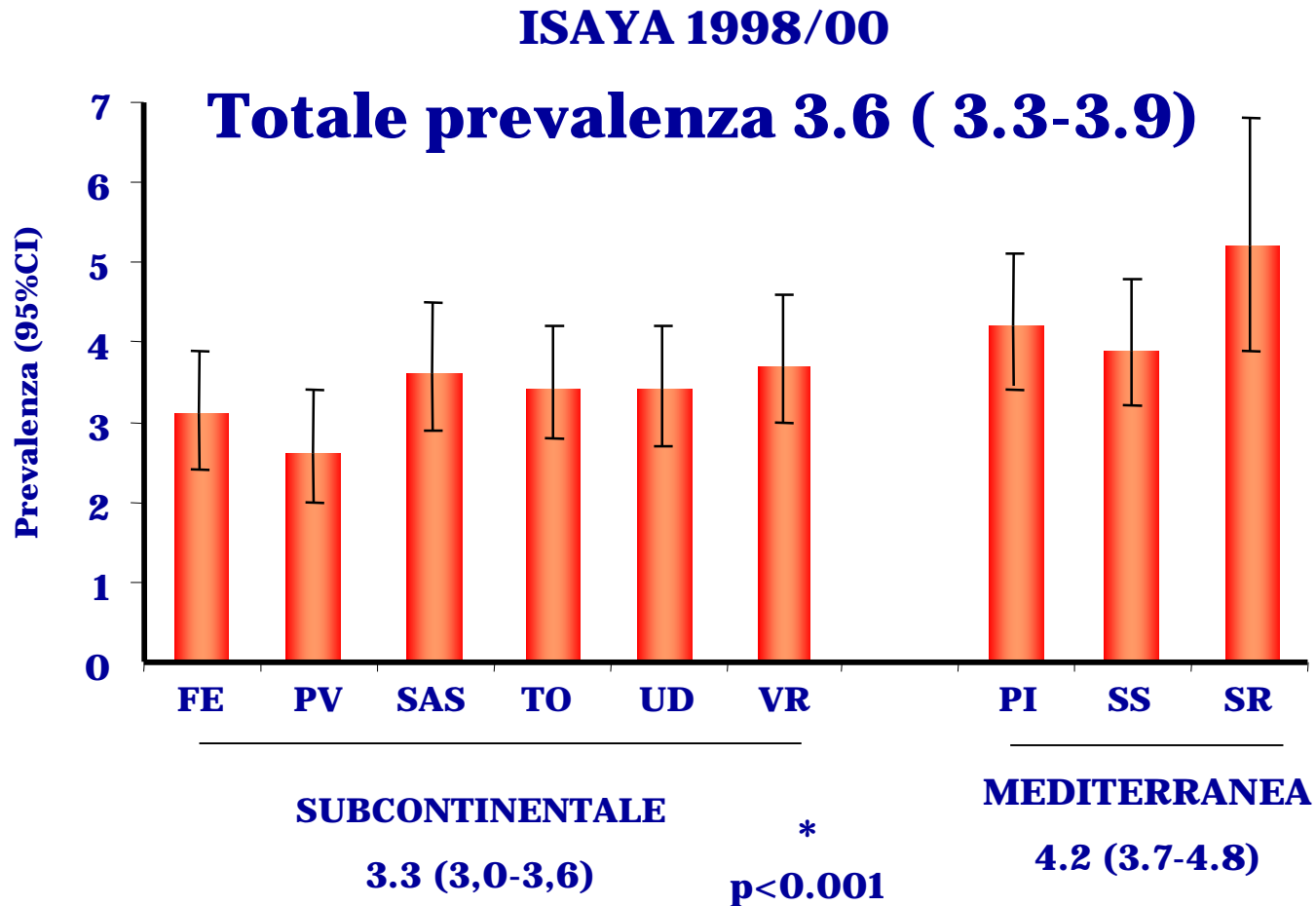


^a Dati stimati

Prevalenza di sibili e asma in bambini ed adolescenti italiani



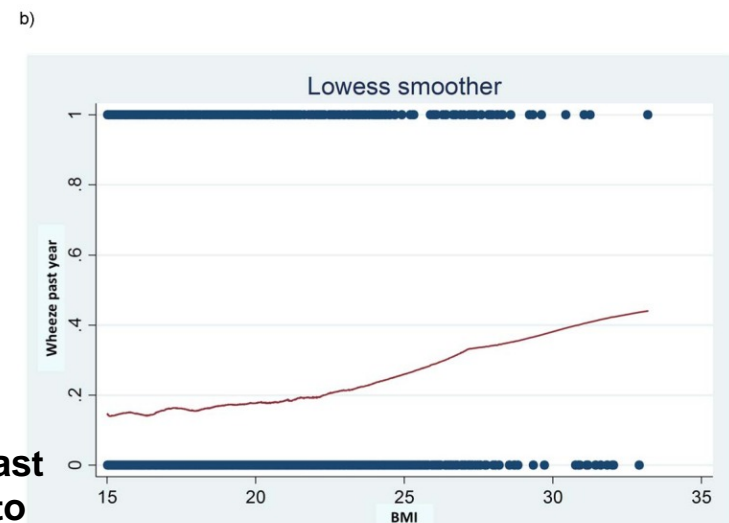
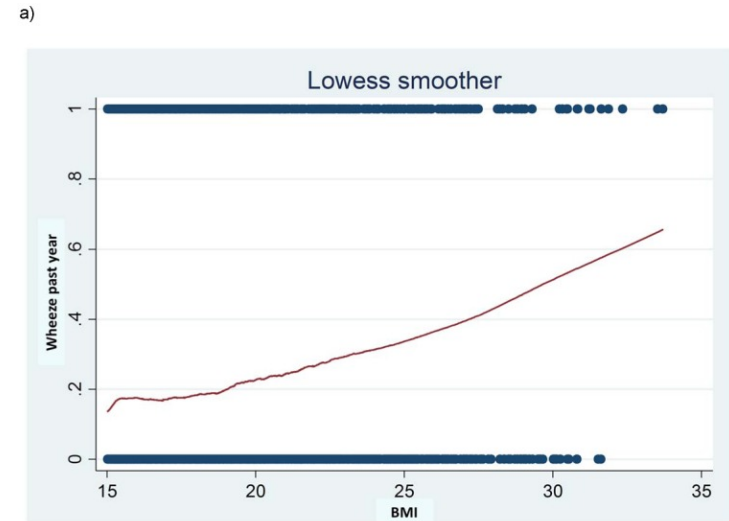
Prevalenza degli attacchi d'asma in Italia



Overweight/Obesity and Respiratory and Allergic Disease in Children: International Study of Asthma and Allergies in Childhood (ISAAC) Phase Two

- Gudrun Weinmayr and the ISAAC Phase Two Study Group PLoS One. 2014; 9(12)
- There is a strong relation of body mass index with wheeze especially in affluent countries
- Body Mass Index is associated with an objective marker of airways obstruction (FEV1/FVC) but no other objective markers of respiratory and allergic disorders

average proportion of wheeze in the past year in relation to BMI (a: boys; b: girls)



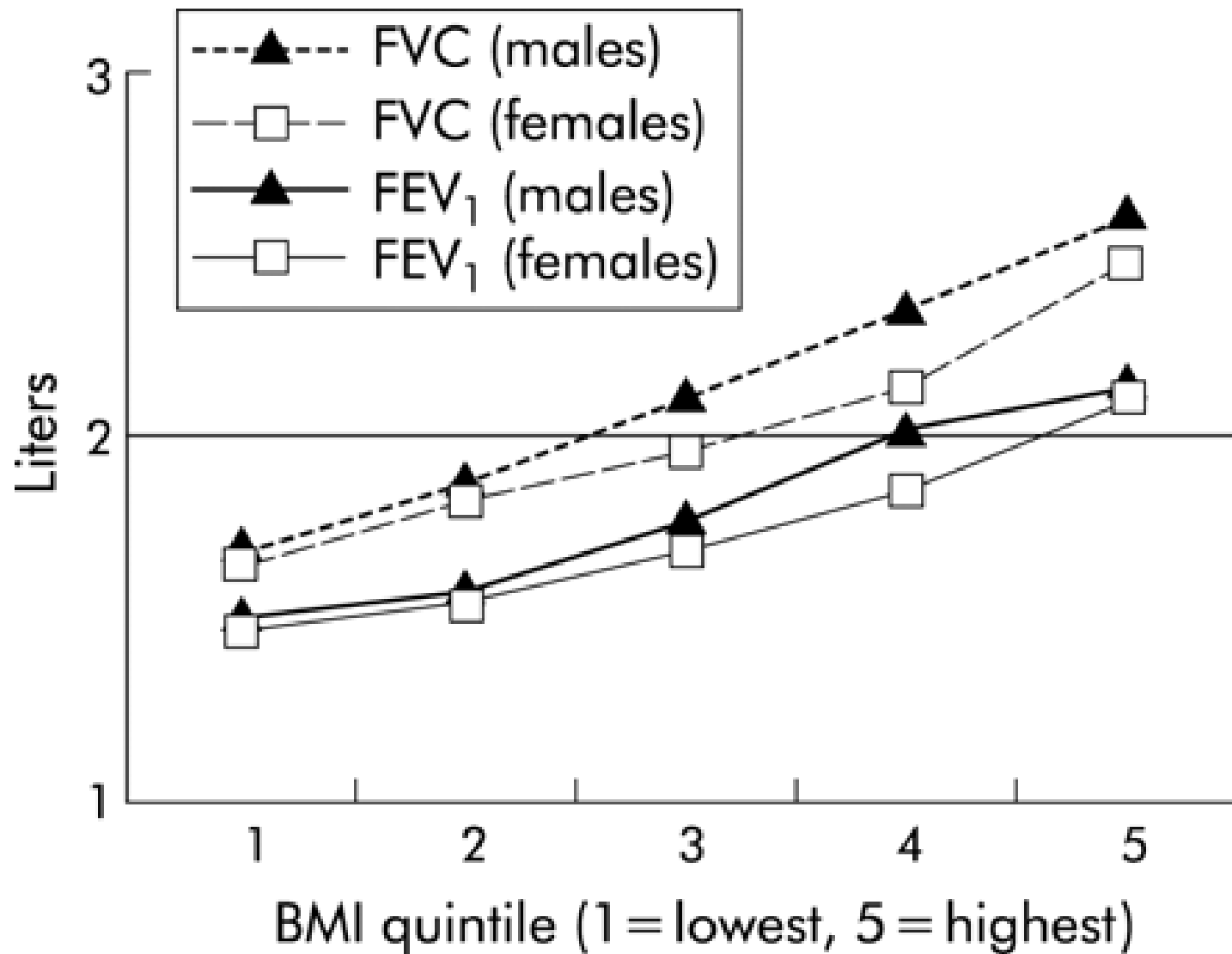
Body mass index trajectory classes and incident asthma in childhood: results from 8 European Birth Cohorts-a Global Allergy and Asthma European Network initiative.

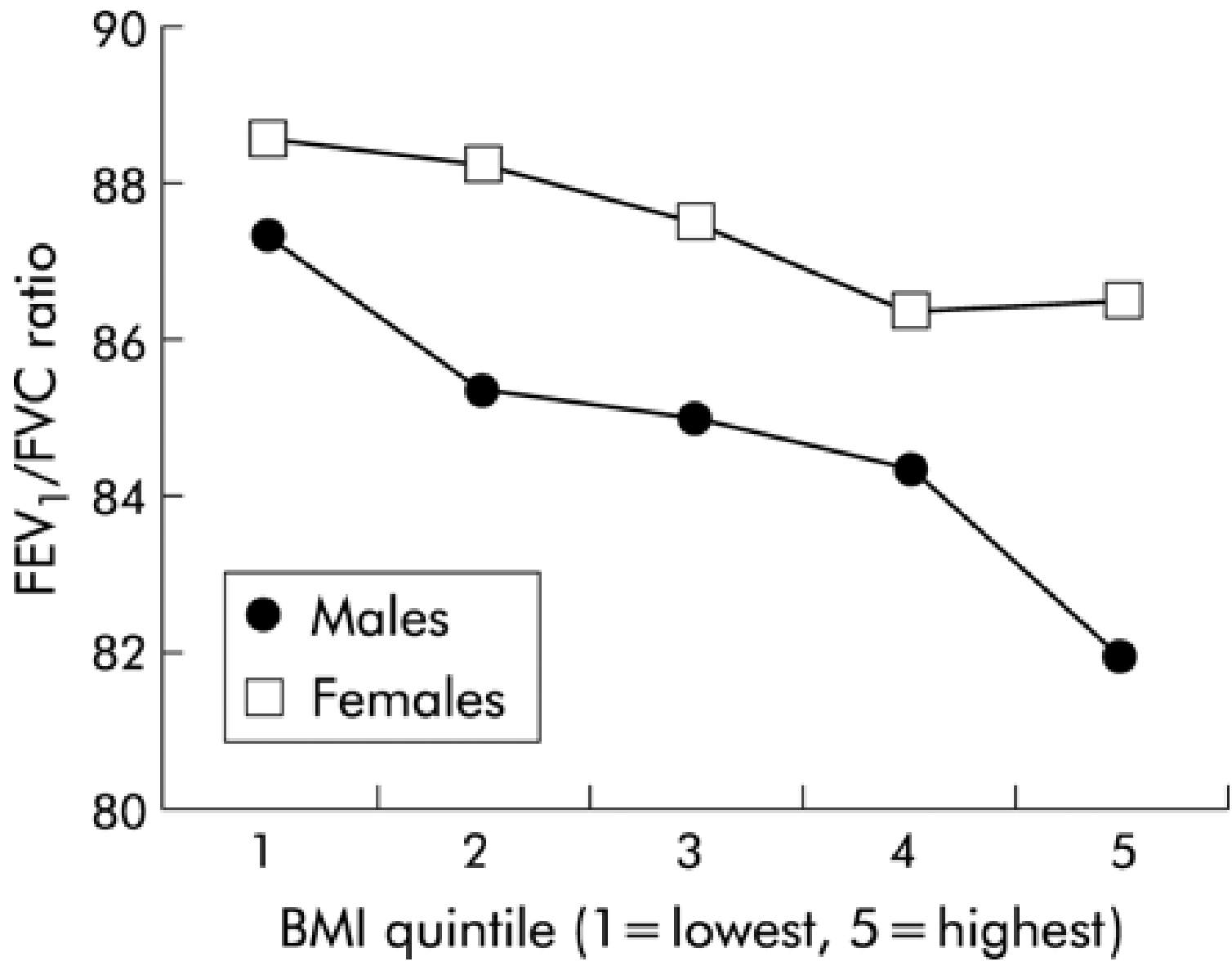
Rzehak P et al J Allergy Clin Immunol. 2013 Jun;131(6):1528-36

- 8 coorti europeee:10.652 bambini
- Analisi dei profili di crescita e rischio di sviluppo di asma
- “Children with a rapid BMI-SDS gain in the first 2 years of life had a higher risk for incident asthma up to age 6 years than children with a less pronounced weight gain slope in early childhood”
- “Rapid growth in BMI during the first 2 years of life increases the risk of asthma up to age 6 years”

Association of body mass with pulmonary function in the Childhood Asthma Management Program (CAMP)

- **K G Tantisira**, et al. for the Childhood Asthma Management Program Research Group
- *Thorax* 2003;**58**:1036-1041
- 1041 bambini con asma lieve/moderato
- Ipotesi iniziale: correlazione tra BMI e gravità dell'asma





Association of body mass with pulmonary function in the Childhood Asthma Management Program (CAMP)

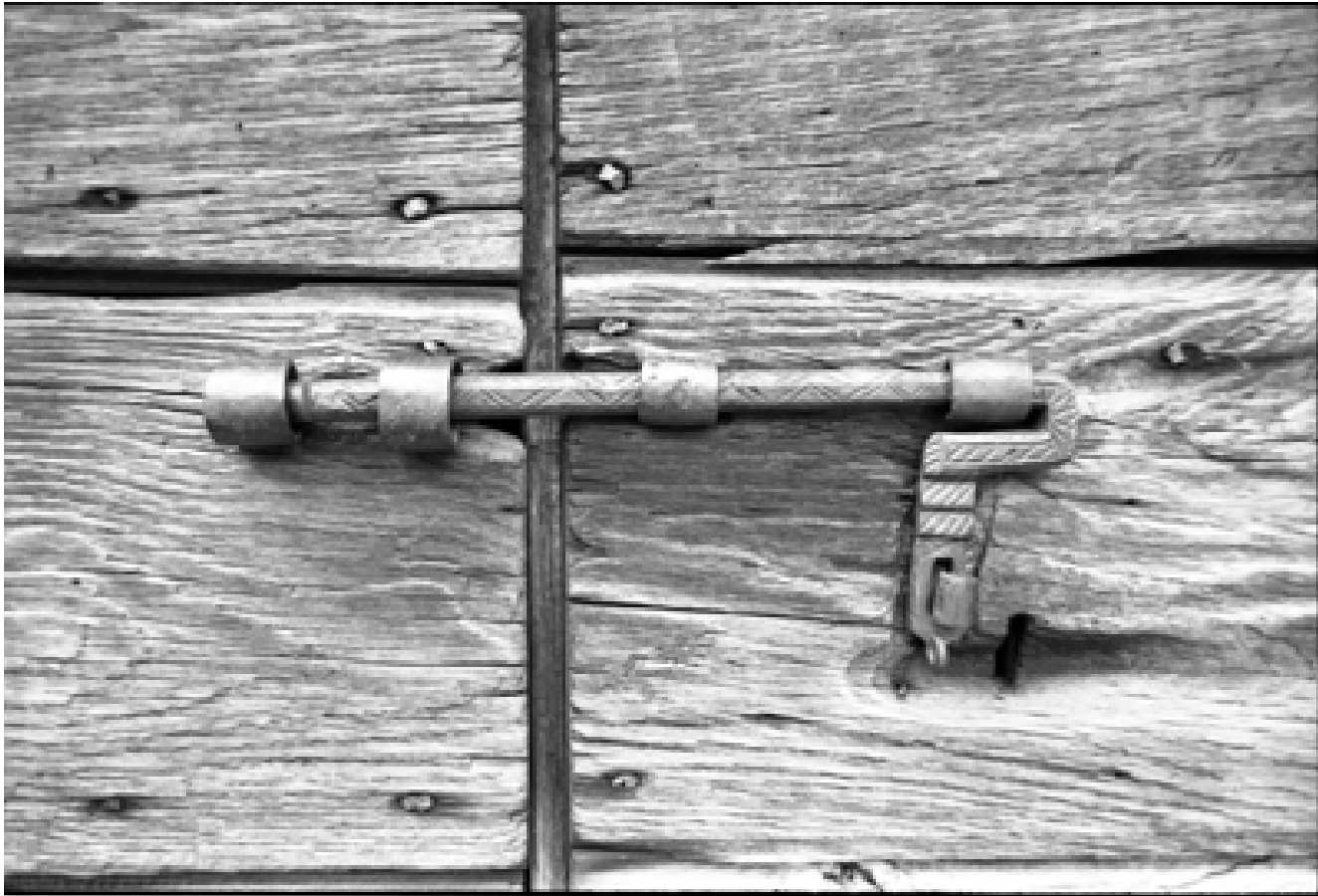
- **Conclusioni:**
- Increases in BMI were associated with increased spirometric pulmonary function.
- BMI as predictor of pulmonary function.
- Significant decrements in the FEV1/FVC ratio were noted in association with increasing BMI
- Sex differences

Mechanisms relating obesity to asthma

– Mechanical

- Alterations in tidal stretch leading to latch
- Gastro-oesophageal reflux

The Latch hypothesis.

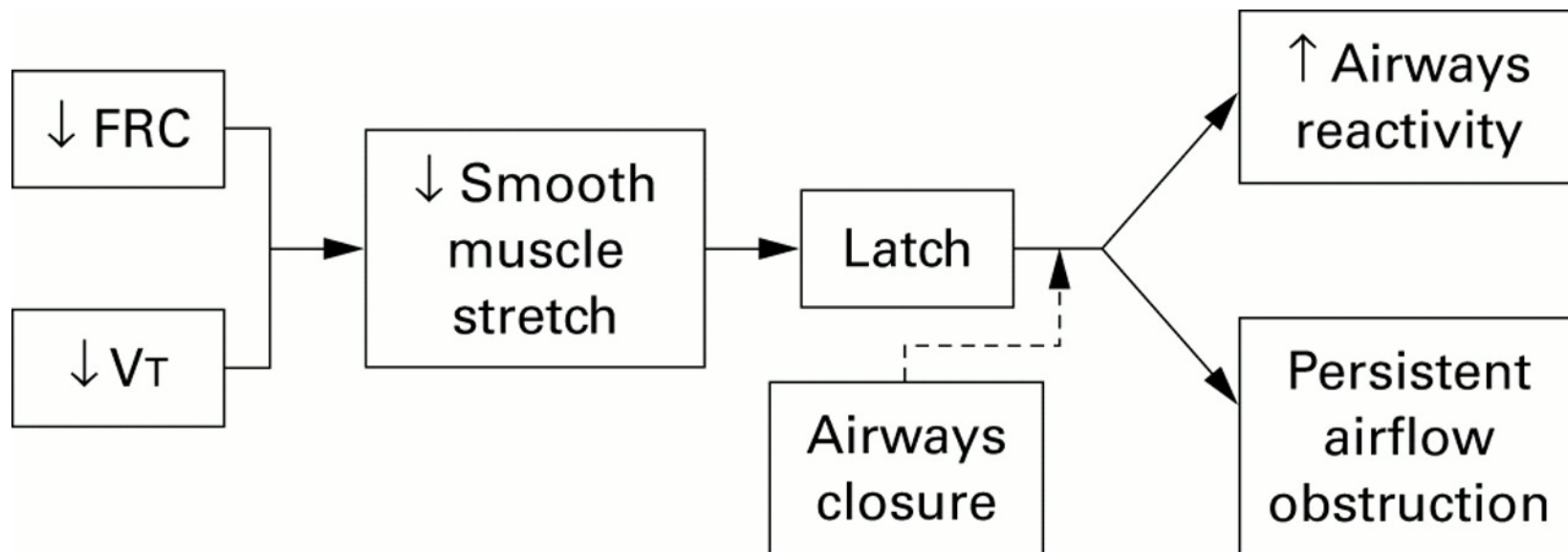


The Latch hypothesis.

- Obesity leads to decrements in functional residual capacity (FRC) and tidal volumes (VT), resulting in dynamic decreases in smooth muscle stretch. The resultant latching of the smooth muscle leads to enhanced airways reactivity and irreversibility of obstruction. These effects may be enhanced by breathing around the closing volume, which is characteristic of morbid obesity.



The Latch hypothesis.



K G Tantisira, and S T Weiss Thorax 2001;56:ii64-ii74

Mechanisms relating obesity to asthma

– Immune modification

- $\text{TNF}\alpha$
- $\text{IL-1}\beta$
- IL-6
- Leptin

Mechanisms relating obesity to asthma

– Genetic effects

- Common candidate genes (TNF α , β 2 adrenergic receptor)
- Candidate regions (5q, 6p, 11q, 12q)
- Obesity candidate genes related physiologically to asthma
- Sex
- Airway size differences
- Inflammatory mediators enhanced in women
- Oestrogen
- Gene \times environment interactions

Mechanisms relating obesity to asthma

- Physical activity
- Diet
- Developmental
- Fetal programming

Possible mechanisms for gene × environment interactions in the relationship between obesity and asthma

- (A) Altered physical activity levels may interact with genetics resulting in obesity which subsequently leads to the development of asthma.

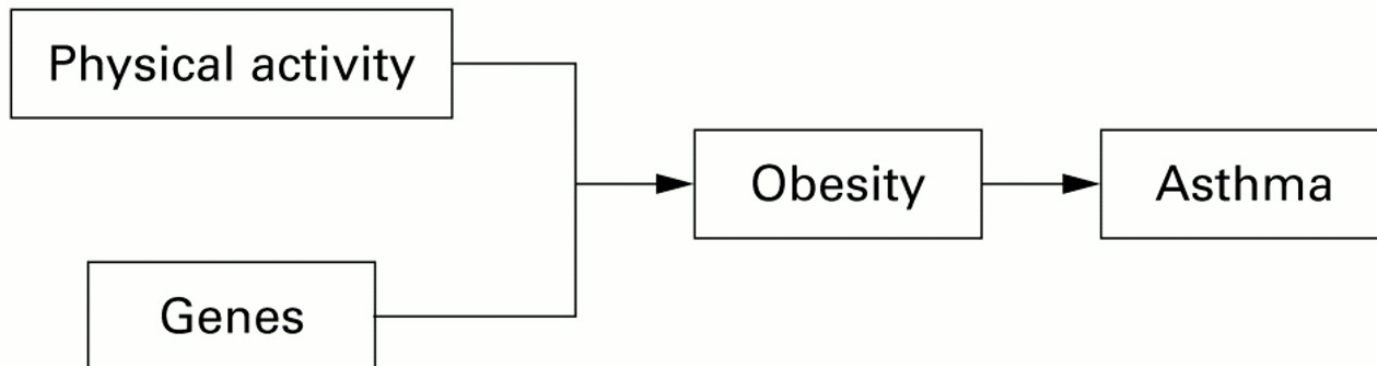
Possible mechanisms for gene × environment interactions in the relationship between obesity and asthma

- (B) Alternatively, physical activity and genetic influences may portend to the independent development of asthma and obesity. Asthma and obesity may then further influence the expression of each other. Other environmental factors such as diet may interact with obesity and asthma via similar mechanisms.

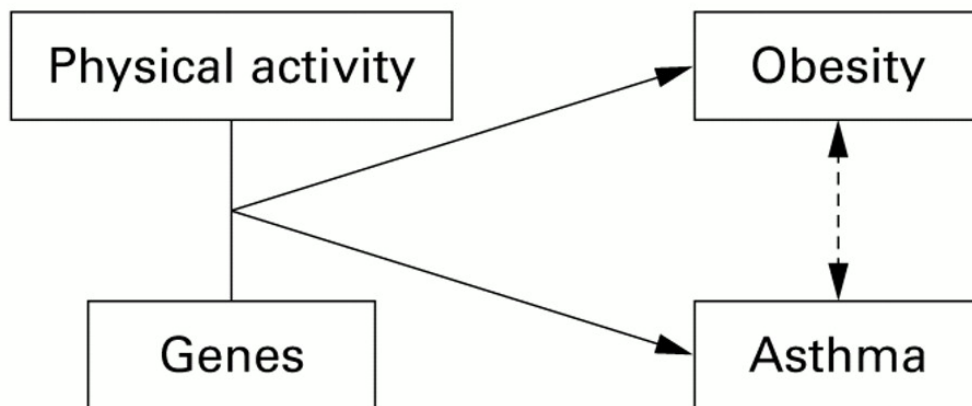


Possible mechanisms for gene × environment interactions in the relationship between obesity and asthma.

A



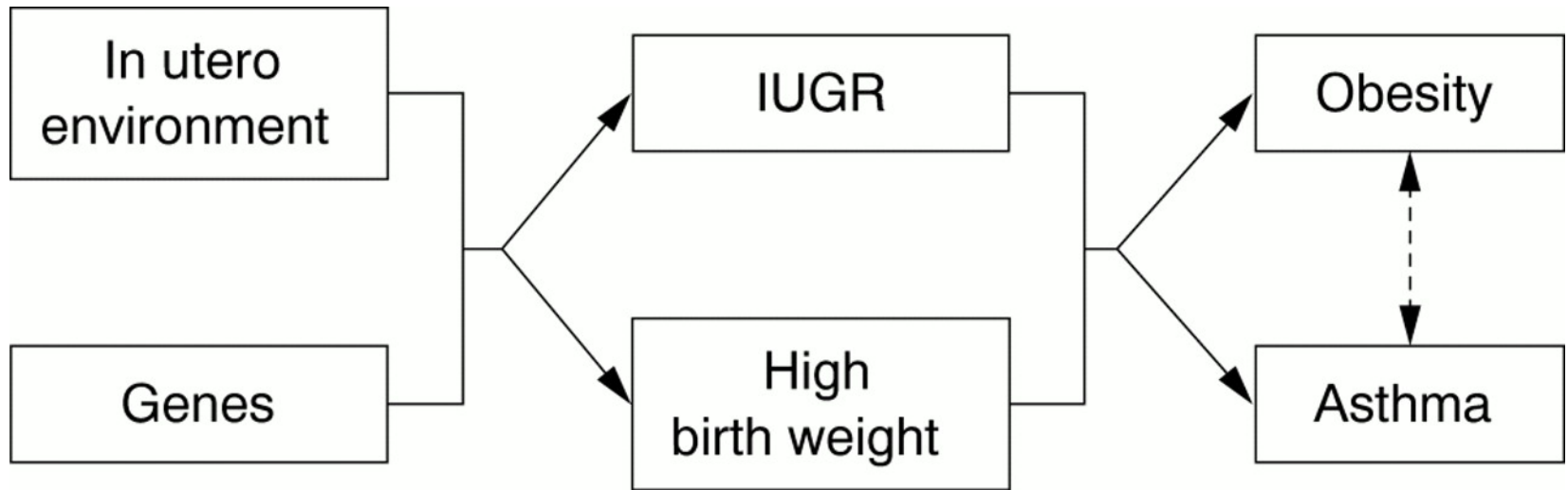
B



K G Tantisira, and S T Weiss Thorax 2001;56:ii64-ii74



In combination with genetic influences, alterations in the intrauterine nutritive environment can lead to diminished fetal growth (IUGR) during early gestation or increased birth weight during late gestation.



K G Tantisira, and S T Weiss Thorax 2001;56:ii64-ii74

"THE CHICKEN -OR- THE CHICKEN EGG"



RAPPORTO ASMA/OBESITA'

- **INTERAZIONE COMPLESSA DI CONDIZIONI COMPLESSE**
- **GRANDE QUANTITA' DI PICCOLE INTERAZIONI**
- **ASSENZA DI UN SINGOLO MECCANISMO CAUSALE**



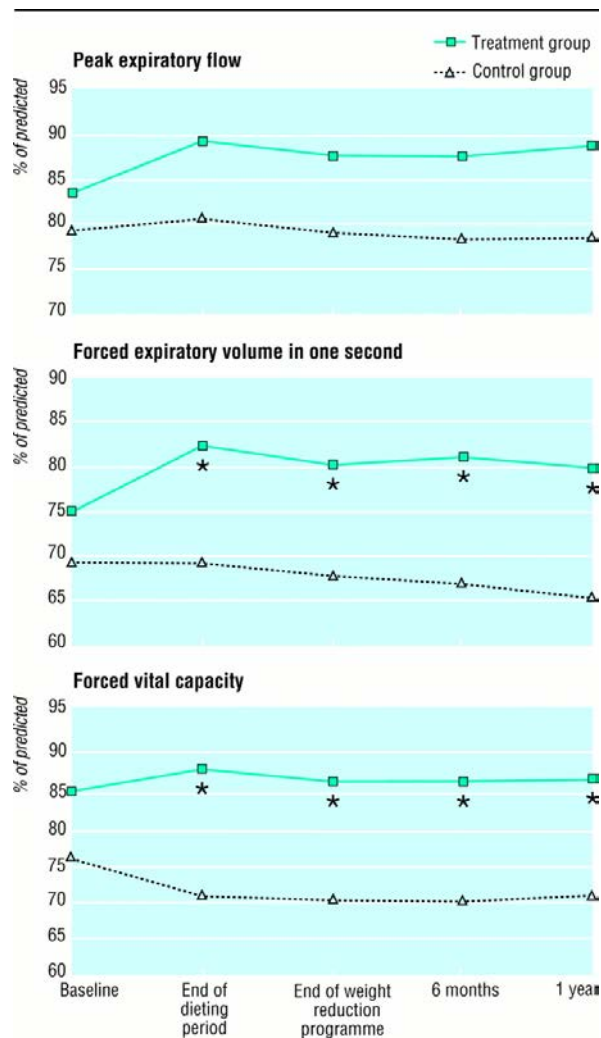
**Immediate and long term effects
of weight reduction in obese
people with asthma: randomised
controlled study.**

BMJ 2000 Mar 25;320(7238):827-32.

Stenius-Aarniala et al.



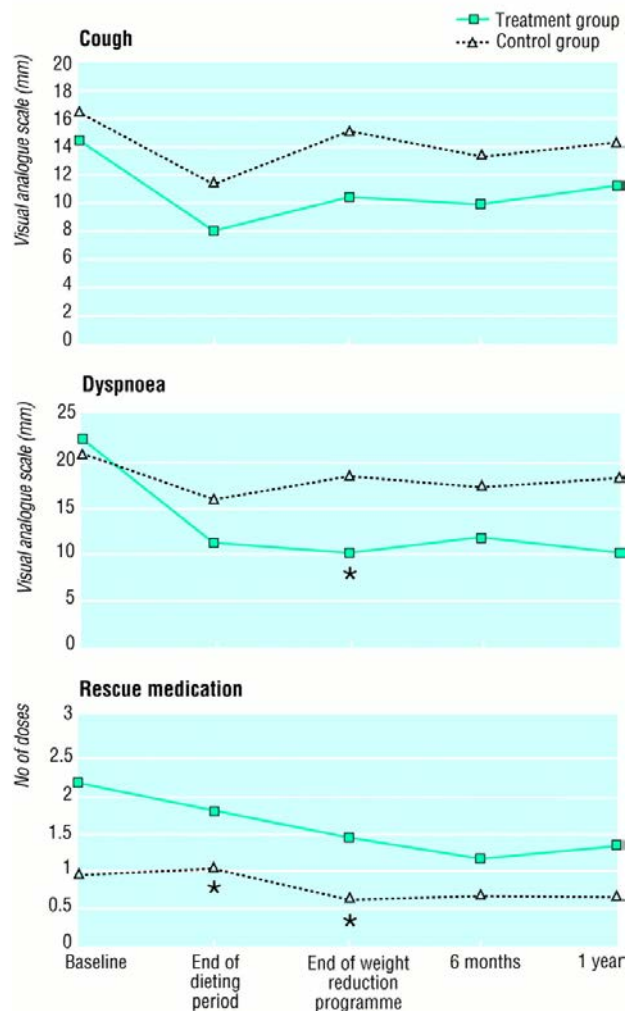
Mean morning premedication values for PEF, FEV1, and FVC (% of predicted) at different stages during study.



Brita Stenius-Aarniala et al. BMJ 2000;320:827-832



Mean values for cough and dyspnoea (mm on visual analogue scale) and mean number of daily rescue medication doses at different stages during study. *Change from baseline shows significant ($P < 0.05$) difference between groups (see text for P values).



Brita Stenius-Aarniala et al. BMJ 2000;320:827-832



Immediate and long term effects of weight reduction in obese people with asthma: randomised controlled study.

Conclusion: Weight reduction in obese patients with asthma improves lung function, symptoms, morbidity, and health status.

ATTIVITA' FISICA NEL BAMBINO ASMATICO E OBESO

- Pianificazione dell'intervento
- Principi generali
- Fattori ambientali
- Tipo di attività fisica

Pianificazione dell'intervento

- Definire con cura il punto di partenza
- Ottimizzare la terapia dell'asma
- Escludere o trattare le comorbidità
- Definire realisticamente un piano e le tappe

Principi generali

- Procedere a piccoli passi divertenti, attraenti emotivamente e socialmente
- Includere i coetanei
- Enfatizzare i benefici dell'attività fisica e le conseguenze dell'inattività
- Usare il preriscaldamento per ridurre la possibilità di asma da sforzo

Principi generali

- Evitare l'attività fisica all'aperto in caso di elevata inquinazione o temperature molto basse
- Procedere a piccoli passi. Iniziare con esercizi intermittenti della durata di 5 minuti
- Aumento settimanale del 10% in intensità e durata

Fattori ambientali

- Per i bambini più piccoli l'attività all'aperto è particolarmente importante
- Per gli adolescenti è fondamentale il gruppo dei pari che andrebbe coinvolto nel programma
- Coinvolgere la famiglia: i genitori sono un modello fondamentale

Tipo di attività fisica

- I ragazzi obesi hanno di solito una maggior quantità di massa muscolare e gli sport di potenza risultano più attrattivi
- Il nuoto ha un effetto preventivo sull'asma e nasconde il corpo
- Si può praticare ogni tipo di sport o attività fisica senza particolari restrizioni

