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Title: Effect of body mass index on lung function in children

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Body: Asthma and obesity are important health issues in industrialized countries and obesity is a risk factor for asthma. Our study was aimed at investigating the effect of body mass index (BMI) on lung function in a large sample of healthy children enrolled in two cross-sectional surveys performed on random samples of children, aged 10-17 years, living in the city of Palermo, Southern Italy. At school, all the subjects completed self-administered questionnaires regarding past and current respiratory symptoms and personal information, and performed spirometry. On a total of 3,200 children, 807 reporting wheeze ever, nocturnal cough, or exercise-induced cough were excluded from the analysis. 2,393 subjects (49% M) were evaluated. Height-adjusted lung function measures were plotted against BMI Z-score for each gender and age class, and slope values were computed by linear regression analysis. Height-adjusted FVC and FEV₁ were positively correlated to BMI Z-score in both males and females. Slope values (L/BMI Z-score unit) were 0.057 in males and 0.114 in females for FVC and 0.022 and 0.072 for FEV₁ respectively, being significantly steeper among females in each age class. FEV₁/FVC ratio was inversely correlated to BMI Z-score with similar slope values for male and females. FEF_{25-75%}/FVC ratio was negatively correlated to BMI Z-score: the slope values were steeper among females in each age group. In conclusion, despite both FVC and FEV₁ are positively correlated to BMI, their disproportionate increase as BMI increases could cause a reduction of relative airway size as measured by the FEF_{25-75%}/FVC at higher BMI values. This could, at least in part, contribute to the reported association between overweight-obesity and asthma.