



CALIFORNIA STATE SCIENCE FAIR 2011 PROJECT SUMMARY

Name(s) Divya Siddarth	Project Number 31825
Project Title Fit and Fat: Fact or Fiction?	
Objectives/Goals This project will determine if body mass index (BMI) is related to cardiovascular (CV) fitness in children and adolescents aged 12-18 years. I will also examine if the relationship between BMI and fitness changes depending on gender, ethnicity, socioeconomic status of the family, and age groupings. Abstract Methods/Materials I downloaded demographic, cardiovascular fitness and body mass index data of subjects aged 12-18 years from the National Health and Nutrition Examination Survey website. I classified subjects as normal weight, overweight or obese based on their BMI and as low fit, moderately fit or highly fit, based on their estimated oxygen uptake (VO ₂ max). I computed frequency tables for BMI by CV fitness groups and calculated chi-square statistics using SAS to determine if these two variables were associated with each other. I also ran a regression model, with estimated VO ₂ max as the dependent variable and BMI as the independent variable. I repeated these analyses for males and females, different ethnicities, income levels, and age groupings separately. Results The results show that only a small percentage of the children and adolescents aged 12-18 years were fit and fat. In addition, the linear regression demonstrated that BMI was inversely related to estimated VO ₂ max. These findings were consistent within early (12-15 years) and late (16-18 years) adolescents, and within different ethnicities and income levels. However, more females compared to males were both fit and fat, and the relationship between BMI and VO ₂ max was weaker in females than males, suggesting that the fit but fat theory is more likely to be valid in females than males. Conclusions/Discussion Obese and overweight children and adolescents had significantly lower cardiovascular fitness levels than did individuals with normal weight. Seventy percent of the obese children and nearly 50% of the overweight children were in the low fit category. However, over a tenth (12%) of the obese and overweight children were highly fit and another 30% of these children were moderately fit. This is encouraging, since it means that even obese and overweight children can achieve a degree of fitness that could potentially minimize their risk of heart disease and other weight-related illnesses.	
Summary Statement Obesity is associated with significantly reduced cardiovascular fitness in children and adolescents.	
Help Received Mother helped download data from NHANES website.	