

# Profile of Overweight Children

INSIGHT 13

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Overweight children (high Body Mass Index [BMI]) are at risk of serious health, economic, and quality of life consequences. For example, adults with high BMIs are overweight and have been found to be at increased risk of adult onset diabetes, hypertension, stroke, and other diseases. Thus, it is important to identify those most likely to have high BMIs and take steps to both maintain weight and prevent the onset of obesity. This strategy is most effective when applied to young people, because it is probably easier to form healthful living habits at a young age. Current evidence suggests that childhood overweightness continues into adulthood (Guo et al., 1994). With an estimated 1 in 5 children now overweight, even small improvements can have large benefits to society (Troiano and Flegal, 1998).

## Methods

The purpose was to investigate the probability or likelihood that a child would be at risk of high BMI, based on a variety of attributes characterizing the child. Data were analyzed from the Third National Health and Nutrition Examination Survey (NHANES III) conducted during 1988-94 by the National Center for Health Statistics (NCHS) of the Centers for Disease Control and Prevention. The subsample of children 7 to 16 years old was divided into five age and gender groups (table 1). For each group, the 85<sup>th</sup> percentile of the Body Mass Index (BMI) was calculated (table 1). This level was chosen in light of the recommendation that children at the 85<sup>th</sup> percentile and above be screened, because they could be at risk for obesity (Barlow and Dietz, 1998).

**Table 1. Children's Body Mass Index by age and gender**

Age/gender	BMI 85th percentile	BMI median	BMI mean
Children 7-10	20.9	16.7	18.0
Females 11-14	25.0	20.0	20.9
Males 11-14	24.0	19.3	20.6
Females 15-16	27.2	21.2	22.7
Males 15-16	26.2	21.2	22.3

To estimate the effect of each of several characteristics, independent of the others, a logistic regression was used. The following characteristics were examined: Biological and environmental (child's age, child's gender, and BMI of child's father and mother); socioeconomic (the number of family members, family income as a percent of the Federal poverty threshold, participation in the Food Stamp Program, participation in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), race and ethnic origin, and geographic location); and diet-related (child's 1-day caloric intake, child's intake in gram weight, and the proportion of calories from protein and fat). Also examined were the effect of hours of TV watched on the day before the survey (a proxy for lack of physical activity).

**Table 2. Estimated effects of characteristics on the risk of overweightness**

Characteristic	Estimated Effect
Age (years)	(NS)
Female	(NS)
Father's BMI	(+)
Mother's BMI	(+)
Family size	(-)
Family income	(-)
Family on food stamps	(NS)
Family on WIC	(NS)
African American, Non-Hispanic	(NS)
Mexican American	(NS)
Family lives in Nonmetro area	(NS)
Family lives in the Midwest	(NS)
Family lives in the South	(NS)
Family lives in the West	(NS)
Caloric intake	(-)
Total food intake	(+)
Percent Kcal from protein	(+)
Percent Kcal from total fat	(+)
Hours of TV watching	(+)

Note: Not significant (NS), positive and significant (+), and negative and significant (-). Region characteristic is contrasted to "Family lives in the East" and race/ethnicity variable is contrasted to "White, Non-Hispanic."

## Results

After taking into account the effects of all characteristics in the analysis, no statistical associations between the risk of a child having a BMI over the 85<sup>th</sup> percentile and the following were found: Food stamp participation, WIC participation, age, gender, race and ethnic origin, and geographic location (table 2).

Several statistical associations with the remaining characteristics of children were found. The strongest association was with parents' BMIs. The higher the parents' BMIs, the greater the risk that their child would have a high BMI. Higher family income and larger family size were associated with a lower risk of high BMI.

Dietary patterns were statistically associated with the likelihood of high BMI. Total weight of food and beverage intake was positively associated with the likelihood of high BMI. Also, the higher the proportion of caloric intake from protein or fat, the higher the likelihood that a child would have high BMI. However, total caloric intake was negatively associated with the likelihood of high BMI. This paradoxical finding has been reported numerous times in the past. Although its interpretation in this context is unclear, it may be related to underreporting or dieting among heavier children (Basiotis et al., 1989)

## Conclusion

It was found that children most likely to have a high BMI would share some or many of the following characteristics: Either parent or both parents are overweight or obese; the children live in smaller families or are poor; they consume a high proportion of calories from fat; and they are avid TV watchers.

These findings deserve further study in the light of other research. In particular, the findings on the dietary behaviors need to be better understood because they, along with physical activity level, can be controlled by the individual.

Note: To the extent that higher BMI may translate to overweight and obesity, these results may be useful in identifying children at risk of being overweight or obese. All estimates were derived through appropriate use of survey weights and thus are population estimates. All statistical tests were performed using the statistical software package SUDAAN, which calculates standard errors appropriately.

## References

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Authors (in alphabetical order): Rajen S. Anand, Ph.D., Executive Director; P. Peter Basiotis, Ph.D., Director, Nutrition Policy and Analysis Staff; Bruce W. Klein, Ph.D., Senior Economist; Center for Nutrition Policy and Promotion, USDA.

### How to Calculate BMI

$$BMI = \frac{\text{weight (in kilograms)}}{\text{height (in meters)}^2}$$

$$BMI = \frac{\text{weight (in pounds)}}{\text{height (in inches)}^2 \times 705}$$



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