

DESCRIPTION: See instructions. State the application's broad, long-term objectives and specific aims, making reference to the health relatedness of the project (i.e., relevance to the **mission of the agency**). Describe concisely the research design and methods for achieving these goals. Describe the rationale and techniques you will use to pursue these goals.

**In addition**, in two or three sentences, describe in plain, lay language the relevance of this research to **public** health. If the application is funded, this description, as is, will become public information. Therefore, do not include proprietary/confidential information. **DO NOT EXCEED THE SPACE PROVIDED.**

We will study longitudinal changes in body composition and morphometrics in adolescents residing in 31 counties (577 census tracts) in central and northeastern Pennsylvania (PA), an area with a range of settings from rural to urban. We will measure primary mediating behaviors related to caloric input and output and assess individual, parental, home, and school factors that may influence these primary mediators of body composition and morphometrics. We will assess two conceptual axes of the environment – the built (BE) and social environments (SE). The latter is important and offers a novel approach to evaluate mediating and moderating influences of the environment on behavior. We propose to assess the BE in five dimensions using traditional (density, design and diversity of land use) and novel methods (perceptual qualities of urban design, accessibility metrics of food and physical activity environments). We propose to measure the SE in four dimensions (community deprivation, social disorder & safety, commercial messaging, time pressure & demands), which will allow evaluation of novel mediating and moderating causal pathways. Separating BE and SE, and measuring the former on local and regional scales for land use, the food environment, and the physical activity environment, will offer unique opportunities for identification of high-risk settings. While the BE and SE are likely to be independent risk factors for obesity, we believe the BE will moderate the SE and obesity risk. We propose to determine: 1) the association of BE and SE metrics with morphometrics; 2) the extent to which the association of the BE and SE are “differentially” mediated through input behaviors and output behaviors; 3) the extent to which parental, home environment, and school environment factors moderate associations of the BE and SE with intake and output behaviors; 4) if the BE moderates relations of the SE with morphometrics; and 5) evaluate, using a multi-level framework, the relative contribution of individual, home, school, and BE and SE factors in explaining spatial variation in longitudinal measures of body composition and morphometrics. We will enroll 1,000 subjects aged 11-15 years from 50 census tracts, selected to maximize BE and SE variability. Each participant will complete two clinic visits (for interviews, outcome measures, blood sample), two years apart. Parents will be interviewed. In addition, over a two-year period we will obtain seasonal measures of activity level and caloric and nutrient intake. The Geisinger Clinic, a large health care provider in the 31-county region, will be used to identify individuals. The 44 practice clinics use an electronic health record, an asset that offers historical BMI data and the means to recruit study subjects. The prevalence of obesity in the region is high and is increasing for all birth cohorts, with an almost 4-fold variation in obesity prevalence by zip code. Finally, public use data indicate substantial variation in environmental factors suspected to influence output and input behaviors in the study area.

PERFORMANCE SITE(S) (organization, city, state)

Geisinger Clinic  
Center for Health Research & Rural Advocacy  
100 N. Academy Avenue  
Danville, PA 17822