ARIC MANUSCRIPT PROPOSAL FORM

Manuscript #526

1. a. Full Title: The Relationship Between the Local Food Environment and Dietary Intake in ARIC
   b. Abbreviated Title (Length 26): Diet and Locality in ARIC

2. Writing Group:

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3. Timeline:

Submit proposal to Pubs Committee	9/97
Complete data collection/data entry	1/99
Complete data analysis	9/99
Submit draft to Publications Committee	12/99

4. Background:

The relationship between diet and cardiovascular disease has been well established. However, efforts to modify individuals' diets by education has been largely unsuccessful (Carleton, 1995, Farquhar, 1990; Luepker, 1996). This suggests that there are other contributing factors which either reduce motivation to adopt a healthful diet or make changes difficult or impossible to achieve. Determinants of food purchasing patterns suggest diet is affected by the local food environment. However the relationship betvieen the local food environment and individuals' food consumption has not been studied.

Factors Influencing Individuals Diets

Research shows the diets of individuals are influenced by several factors: preferences, cost and locality as described below.

Preferences

Individual preferences, mediated by knowledge or culture, have an influence on food consumption (Conner, 1994). For instance, the change in the US regulatory policy in 1985, allowing producers to discuss the relationship between diet and disease, has led to improvements in food choices by some individuals (Ippolito, 1994). Other research has shown that education attainment is associated with healthier diets (Shimakawa, 1994). In addition, knowledge of the relationship between health and dietary fat has been shown to influence food choice (Carlson, 1994).

Food preferences are also influenced by cultural factors. The social environment in AF-Ams and Caucasian

cultures may increase/reduce motivation to adopt healthful diets (Stayman, 1989). Other research on the location of spending shows that neighborhood food spending is associated with community attachment (Cowell, 1994; Brown, 1992).

Cost

Another barrier which prevents individuals form attaining a healthful diet is the cost of food. Some researchers have found the under nutrition of the urban poor is linked to the cost of food (US Select Committee on Hunger, 1990). Food costs for persons of low socio-economic status because purchases are made in smaller quantities than for wealthier individuals and there is more of a reliance on processed food. Other survey research has shown that urban dwellers pay 3-37% more for groceries in their local food environment compared to the same goods purchased in large suburban supermarkets (US Select Committee on Hunger, 1992)

Locality

Finally, the locality of food stores is linked to the food purchases of individuals. For instance, the analysis of the Food Stamp Program, Aid of Families with Dependent Children and Supplemental Security Income has shown that even beneficiaries receiving combined aid, continue to be unable to purchase food to meet their nutritional needs (US Select Committee on Hunger, 1988). These authors speculated that the migration of supermarkets out of urban areas and lack of transportation contribute to the undernutrition of the poor. Other researchers have concurred with these findings, indicating a sharp decline of supermarkets in low income areas (Curtis, 1995). This has forced residents to depend on small stores with a limited selection of food at substantially higher prices than supermarkets.

In addition to those in poverty, research has shown that grocery shopping among the elderly is restricted to their immediate neighborhoods (Smith 1991). These data indicate that the urban dwellers are spatially disadvantaged compared to suburban dwellers because of a lack of local supermarkets in their neighborhoods and a lack of automobile transportation. Proximity to grocery stores contributes to the wellness of the elderly population (Smith, 1995).

Therefore, the convenience of food has become an important factor. Single parent families have increased the popularity of convenience foods (Wynn, 1990). McDonalds, who feeds seven percent of the US population each day, ahs a corporate mission to build a restaurant within a four minute walk or drive from every American (Gabriel, 1997).

Rationale

Although there is some research characterizing the food purchasing patterns of individuals, the relationship between the local food environment and individuals' food consumption has not been studied. The usefulness of knowing if individuals' food consumption is influenced by their local food environment has both clinical and public health benefits. From a clinical perspective, it is important to know if the dietary guidelines being prescribed are actually achievable. If a restricted local food environment inhibits or prevents dietary change, then clinicians may assign a different therapy. The benefit to public health is the opportunity to intervene at an organizational level, while still educating individuals to the relationship between diet and risk for cardiovascular disease. Health education has been unable to manifest long term dietary changes in individuals which would affect risk for cardiovascular disease (Car:leton, 1995; Farquhar, 1990; Luepker, 1996). These prevention programs may be more effective by considering the local food environment. The most effective interventions are those which use a multi-disciplinary approach. Intervening on the food environment by making healthful foods more convenient may be an efficient way to change the dietary habits of populations and prevent future cardiovascular disease events.

6. Main Hypothesis:
The primary aim of this research is to evaluate how an individual's local food environment (density of supermarkets, corner markets, fast food and non fast food restaurants) is associated with his or her food consumption. The primary hypothesis is that individuals living in areas with a restrictive food environment are more likely to consume foods higher in fat, cholesterol and sodium and consume fewer fruits and vegetables compared to individuals living in a less restrictive food environment. A restrictive food environment is defined as a local food environment containing primarily a high density of fast food restaurants and corner markets and few or none supermarkets. A less restrictive food environment is one that a) contains an equal density of supermarkets, corner markets, fast food and non fast food restaurants or b) contains a higher density of supermarkets than the other types of food stores.

7. Data (variables, time window, source, inclusions/exclusions):
OVERVEW: A secondary data analysis using the baseline data from the Atherosclerosis Risk in Communities (ARIC) study will be used to investigate the association between a restrictive food environment and individual's food consumption in four United States communities. This cross sectional design will use the food consumption data collected at the baseline interview in 1986- 1989. In addition, we will collect the addresses of food stores and restaurants for each of the communities. Finally, aggregate information about neighborhoods will be collected from the 1990 Bureau of the Census. The outcome variables will be derived from individuals' food frequency questionnaires, estimating an intake of each of the following: percent of calories from fat, cholesterol(mg), sodium(mg), and servings per day of fruits and vegetables. The independent variables for density of supermarkets, corner markets, fast food and non-fast food restaurants will be derived from the collection of food and restaurant addresses from city and county tax and licensing departments. These data will then be entered into a FoxPro database and merged to the database with the residence addresses of the ARIC participants. We will then derive an area density for supermarkets, comer markets, fast food restaurant and non-fast food restaurant based on a defined geographical boundary representing individuals' neighborhoods using MapInfo. We will also consider the transportation constraints of individuals by attaining a global measure of public transportation from city and county transportation departments and an aggregate measure of personal transportation from the 1990 U. S. Bureau of the Census.

PRIMARY DATA SOURCE.S AND ENTRY PROCEDURES: Data for this research will be collected from four different sources:
ARIC BASELINE REVIEW: Individual food frequency, demographic and health information of ARIC participants will be used.
TAX AND LICENSING DEPARTMENTS: Food store and restaurant addresses still be collected from city or county tax and licensing departments. Names of food establishments and their addresses.

References:
Brown RB. Characteristics of outshoppers in a more and a less viable rural service/trade center. Rural Sociological Society 1992.
Carleton RA, Lasater TM, Assaf AR, Feldman HA, McKinlay S, et.al. The Pawtucket Heart Health Program: community changes in cardiovascular risk factors and projected disease risk. American Journal of Public health 1995;85:777-85.
Carlson KA, Gould BW. The role of health knowledge in deterrmining dietary fat intake. Review of Agricultural Economics 1994;16:373-86.
Conner M. Accounting for gender, age and socioeconomic differences in food choice. Appetite 1994,23: 195.

Cowell DK, Green GP. Cornmunity attachment and spending location: the importance of place in household consumption. Social Science Quarterly 1994,75:637-55.
Curtis KA, McClellan S. Falling through the safety net: poverty, food assistance and shopping constraints in an American city. Urban Anthropology 1995,24:93-135.

Diez-Roux AV, Meto F, Mlmtaner C, Tyroler HA, Comstock GW, Shahar E, Cooper LS, Watson RL, Szklo M. Neighborhood environments and coronary heart disease: a multilevel analysis. American Journal of Epidemiology 1997;146:48-63.
Farquhar JW, Fortmann SP, Flora JA, Taylor CB, Haskell WL, Williams PT, Maccoby N, Wood PD. Effects of community wide education on cardiovascular disease risk factors: the Stanford five-city project. Journal of the American Medical Association 1990;264:359-365.
Gabriel T. Will 55 cent hamburgers cheapen the diet? The New York Times. Wednesday, March 5, 1997.
Ippolito PM, Mathios AD. Nutrition information and policy: a study of the U. S. food production trends. Journal of Consumer Policy 1994;17:271-305.
Luepker RV, Rastarn L, Hannan PJ, Murray Di!d, Gray C, Baker WL, Crow R, Jacobs DR, Pirie PL, Mascioli SR, Mittelmark MB, Blackburn H. Community education for cardiovascular disease prevention: morbidity and mortality results from the Minnesota Heart Health Program. American Journal of Epidemiology 1996,144:351-62.
Nelson J. Peri-urban malnutrition, a neglected problem: patterns and approaches. Assignment Children 1978,43:25-46.
Shimakawa T, Sorlie P, Carpenter X , Dennis B, Tell GS, Watson R, Williams OD. Dietary intake patterns and socio demographic factors in the Atherosclerosis Risk in Communities Study. Preventive Medicine 1994,23:769-80.
Smith GC. Grocery shopping patterns of the ambulatory urban elderly.