UCLA CENTER FOR
HEALTH POLICY RESEARCH

Association of Food Environments Around Home and School with Adolescent Weight Status and Dietary Behavior

Susan H. Babey, PhD
UCLA Center for Health Policy Research
Los Angeles, CA

American Public Health Association Annual Meeting
Denver, CO
November 8, 2010

Presenter Disclosures

Susan Babey

(1)   The following personal financial relationships with commercial interests relevant to this presentation existed during the past 12 months:

No relationships to disclose

UCLA CENTER FOR
HEALTH POLICY RESEARCH

Acknowledgements

- Co-authors
  - Allison Diamant, MD, MSHS
  - Joelle Wolstein, MPP

- Funding for this study
  - The California Endowment

UCLA CENTER FOR
HEALTH POLICY RESEARCH

Background

- Research suggests that the retail food environment is associated with dietary behaviors and health outcomes
  - Access to healthy food outlets (i.e. more healthy food options), such as supermarkets, is associated with positive dietary behavior and lower levels of obesity
  - Access to unhealthy food outlets (i.e. fewer healthy food options), such as convenience stores, is associated with higher levels of overweight and obesity

UCLA CENTER FOR
HEALTH POLICY RESEARCH

Background - continued

- Previous research has examined the association of the food environment near school with diet and weight status
  - Higher density of fast food restaurants near schools is associated with negative dietary behavior and higher BMI
- There has been little research examining the relationship between health outcomes and the food environments around both home and school

UCLA CENTER FOR
HEALTH POLICY RESEARCH

Data Source – CHIS 2007

- **2007 California Health Interview Survey (CHIS)**
- Telephone survey of adults, adolescents and children from across the state conducted every two years
  - CHIS 2007 interviewed over 50,000 households in California. In households with adolescents, CHIS interviewed one randomly selected adolescent
- Interviews are conducted in five languages: English, Spanish, Chinese, Korean and Vietnamese

UCLA CENTER FOR
HEALTH POLICY RESEARCH

Data Source – CHIS continued

- CHIS collects name of school attended for school-aged children

- The data provide a representative sample of the state's non-institutionalized population, including health information on the overall population and on many racial and ethnic groups as well as local-level health information for most counties

UCLA CENTER FOR
HEALTH POLICY RESEARCH

Data Source – 2007 InfoUSA Business File

- The InfoUSA Business File, which contains North American Industry Classification System (NAICS) codes, was used to identify specific types of food outlets in California
- The following types of outlets were identified:
  - Fast food, convenience stores, dollar stores, gas stations, liquor stores, pharmacies
  - Grocery stores, warehouse stores, produce markets, farmer's markets
- GIS was used to link the individual health data of CHIS respondents with InfoUSA food environment data

UCLA CENTER FOR
HEALTH POLICY RESEARCH

Outcome Variables

- **Body Mass Index (BMI)**
  - 30.0 kg/m^2 or higher

- **Fruit and Vegetable Consumption**
  - "Yesterday, how many servings or fruit, such as an apple or banana, did you eat?"
  - "Yesterday, how many servings of vegetables like green salad, green beans, or potatoes did you have? Do not include fried potatoes."

UCLA CENTER FOR
HEALTH POLICY RESEARCH

Food Environment Variables and Covariates

- **For each type of food store**
  - Number within ½ mile of school
  - Number within 1 mile of home
- **Covariates**
  - Age
  - Sex
  - Race/ethnicity
  - Household income

UCLA CENTER FOR
HEALTH POLICY RESEARCH

Study Population

- 3,638 adolescents living in households in California
- 49% female
- 34% non-Latino white, 46% Latino, 10% Asian, 7% African American, 0.4% American Indian/Alaskan Native, 0.6% Native Hawaiian/Pacific Islander, 3% mixed race
- 39% had household incomes below 200% of the Federal Poverty Level

UCLA CENTER FOR
HEALTH POLICY RESEARCH

Descriptive Results

- 13% are obese
  - Additional 14% are overweight

- 20% eat 5 or more servings of fruits and vegetables on a typical day

UCLA CENTER FOR
HEALTH POLICY RESEARCH

Descriptive Results, continued

- Within 1 mile of home
  - 27% have 3+ convenience stores
  - 22% have 1+ dollar stores
  - 37% have 16+ fast food outlets
  - 42% have 3+ gas stations
  - 15% have 1+ liquor stores
  - 31% have 2+ pharmacies
  - 35% have 1+ produce or farmer's markets
  - 42% have 3+ grocery or warehouse stores

UCLA CENTER FOR
HEALTH POLICY RESEARCH

Descriptive Results, continued

- Within 1/2 mile of school
  - 16% have 2+ convenience stores
  - 9% have 1+ dollar stores
  - 35% have 5+ fast food outlets
  - 43% have 1+ gas stations
  - 4% have 1+ liquor stores
  - 24% have 1+ pharmacies
  - 16% have 1+ produce or farmer's markets
  - 49% have 1+ grocery or warehouse stores

UCLA CENTER FOR
HEALTH POLICY RESEARCH

Adjusted Analyses - Obesity

- The following are more likely to be obese:
  - African Americans (relative to whites)
  - Latinos (relative to whites)
  - Adolescents with family incomes below poverty line
- The following are less likely to be obese:
  - Girls
  - Asians (relative to whites)

UCLA CENTER FOR
HEALTH POLICY RESEARCH

Associations Between Food Stores and Obesity

Food Outlets within 1/2 Mile of School	OR	p-value	Food Outlets within 1 Mile of Home	OR	p-value
Convenience Stores (0)			Convenience Stores (0)		
1	1.10		1-2	0.77	
2+	1.99	<0.05	3+	1.14	<0.05
Fast Food (0)			Fast Food (0-2)		
1-2	1.10		3-6	1.26	
2-4	1.00		7-15	1.00	
5+	1.15		16+	1.09	
Grocery Stores (0)			Grocery Stores (0)		
1+	1.34	<0.10	1-2	1.10	
			3+	1.25	
Produce Stores (0)			Produce Stores (0)		
1+	1.24		1+	1.26	
Liquor Stores (0)			Liquor Stores (0)		
1+	1.55		1+	1.31	
Dollar Stores (0)			Dollar Stores (0)		
1+	1.74	<0.05	1+	1.25	
Gas Stations (0)			Gas Stations (0)		
1+	1.32	<0.10	1-2	0.83	
			3+	1.13	
Pharmacies (0)			Pharmacies (0)		
1+	0.86		1+	1.07	

Note: Models are adjusted for age, gender, race/ethnicity and household income but do not include other types of food stores

UCLA CENTER FOR HEALTH POLICY RESEARCH

Source: 2007 California Health Interview Survey and 2007 InfoUSA Business data

---

Adjusted Analyses – Fruit and Vegetable Consumption

- The following are more likely to eat five-a-day:
  - Asians (relative to whites)
- The following are less likely to eat five-a-day:
  - Older adolescents
  - American Indians (relative to whites)
  - Adolescents with family incomes below poverty line

UCLA CENTER FOR HEALTH POLICY RESEARCH

Associations Between Food Stores and Five-a-day

Food Outlets within 1/2 Mile of School	OR	p-value	Food Outlets within 1 Mile of Home	OR	p-value
Convenience Stores (0)			Convenience Stores (0)		
1	0.85		1-2	1.00	
2+	0.93		3+	0.64	p<0.05
Fast Food (0)			Fast Food (0-2)		
1-2	1.08		3-6	0.94	
2-4	1.08		7-15	0.84	
5+	0.93		16+	0.97	
Grocery Stores (0)			Grocery Stores (0)		
1+	0.87		1-2	1.08	
			3+	0.91	
Produce Stores (0)			Produce Stores (0)		
1+	1.04		1+	0.78	
Liquor Stores (0)			Liquor Stores (0)		
1+	1.02		1+	0.77	
Dollar Stores (0)			Dollar Stores (0)		
1+	0.96		1+	0.97	
Gas Stations (0)			Gas Stations (0)		
1+	1.01		1-2	1.14	
			3+	0.90	
Pharmacies (0)			Pharmacies (0)		
1+	0.76	<0.10	1+	0.77	p<0.10

Note: Models are adjusted for age, gender, race/ethnicity and household income but do not include other types of food stores

UCLA CENTER FOR HEALTH POLICY RESEARCH

Source: 2007 California Health Interview Survey and 2007 InfoUSA Business data

Summary

- Having these food outlets near home was significantly associated with an increased likelihood of obesity:
  - Convenience stores
- Having these food outlets near school
  - Convenience stores
  - Dollar stores
- No significant associations were found for having other food outlets near home or near school

Challenges and Limitations

- The food outlet data contains errors
  - Misclassification of stores
  - Inconsistencies between data set and stores on the ground
- Cross-sectional analysis does not allow us to draw conclusions about the direction of any relationships between food environment and weight status or diet

Next Steps and Conclusions

- Examine associations for food environment around home and school combined
  - Number of stores near home and school (total of each type for combined area)
- Preliminary analyses suggest that some types of food stores may be associated with weight status or dietary behaviors.
  - Relationships are not always consistent for food environment around home and around school

UCLA CENTER FOR
HEALTH POLICY RESEARCH

www.healthpolicy.ucla.edu