



**AgEcon** SEARCH  
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

*The World's Largest Open Access Agricultural & Applied Economics Digital Library*

**This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.**

**Help ensure our sustainability.**

Give to AgEcon Search

AgEcon Search  
<http://ageconsearch.umn.edu>  
[aesearch@umn.edu](mailto:aesearch@umn.edu)

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

## **The Effect of Food Store Access on Children's Diet Quality**

**Gaogao Yu, Rodolfo M. Nayga, Michael R. Thomsen**

Department of Agricultural Economics and Agribusiness

University of Arkansas Division of Agriculture

[gyu@uark.edu](mailto:gyu@uark.edu), [rnayga@uark.edu](mailto:rnayga@uark.edu), [mthomsen@uark.edu](mailto:mthomsen@uark.edu)

**Leanne Whiteside-Mansell, Taren M. Swindle**

Department of Family & Preventive Medicine

College of Medicine

University of Arkansas for Medical Sciences

[WhitesideMansellLeanne@uams.edu](mailto:WhitesideMansellLeanne@uams.edu), [TMSwindle@uams.edu](mailto:TMSwindle@uams.edu)

Selected poster prepared for presentation at the Agricultural & Applied Economics Association's 2013 AAEA & CAES Joint Annual Meeting,  
Washington, DC, August 4-6, 2013

*Copyright 2013 by the authors. All rights reserved. Readers may make verbatim copies of this document for non-commercial purposes by any means, provided that this copyright notice appears on all such copies.*

Googao Yu, Graduate Research Assistant, University of Arkansas at Fayetteville; Rodolfo M. Nayga, Professor and Tyson Chair in Food Policy Economics, University of Arkansas Division of Agriculture; Michael R. Thomsen, Associate Professor, University of Arkansas Division of Agriculture; Leanne Whiteside-Mansell, Professor, University of Arkansas for Medical Sciences; Taren M. Swindle, Instructor, University of Arkansas for Medical Sciences

## Objective

- Our objective is to determine whether accessibility of food stores around young children's home neighborhood impacts their dietary intake. Our focus is on children enrolled in Head Start programming during the 2006-07 school year in several, relatively small, central Arkansas Communities.

## Data and Methods

- Our sample represents a cross section of 161 children enrolled in Head Start preschools.
  - Information on diet quality was obtained from responses to the Family Map, a structured interview assessment that was administered to parents within the home (see <http://www.thefamilymap.org>). The Family Map interview covered many aspects of the children's home environment, including questions on diet (see Figure 1)
  - Responses for the 2006-2007 school year were used because the collaborating Head Start agency was able to help in geocoding the responses and most surveys could be assigned to the census block of residence.
- A child's risk status on a specific food item constitutes the dependent variable of interest. Children were classified as being at risk (binary variable taking the value of 1) if the responses indicated under consumption of healthy food items or over consumption of unhealthy items. In Figure 1, responses falling into gray areas on the interview instrument were used to classify children as being at risk.
- Food store access, the dependent variable of interest, is measured in two ways:
  - As the radial distance from the census-block centroid of residence to the nearest food store of a specific type.
  - The density of food stores of a specific type within a one-mile radius of the census-block centroid of residence.
- Data on the commercial food environment were obtained from Dun and Bradstreet. These data represent the physical locations of food stores as of December 2006 and so are synchronous with the geocoded Family Map interviews.
  - Food stores examined are primarily for food-at-home purchases and include large grocery stores (including supermarkets and supercenters) and convenience stores. Our criteria for classifying an establishment as a large grocery store was whether the store included a fresh produce department.
- Probit models were used to model the probability of a child being at-risk in a given food group.
  - Controls were included for gender, race, and whether parent responses elsewhere in the Family Map interview indicated parental issues with depression.
  - Because choice of residence and location of food stores are jointly determined by equilibrium processes, it is likely that the food store access measures are endogenous. Consequently, we use IV probit models with food store access instrumented by the proportion of commercially zoned land within a 0.5 mile radius of the child's residence.

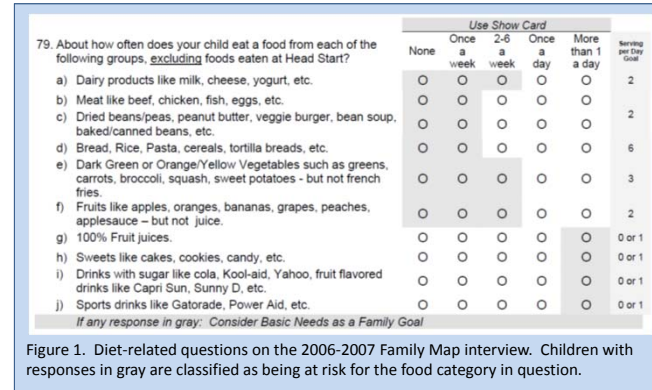


Figure 1. Diet-related questions on the 2006-2007 Family Map interview. Children with responses in gray are classified as being at risk for the food category in question.

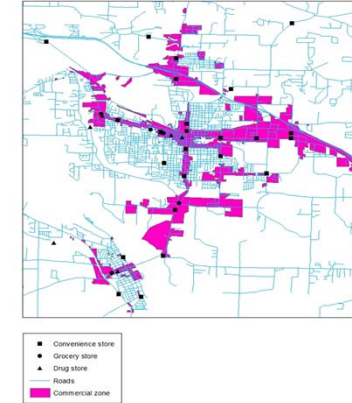


Figure 2. Commercially zoned land and food store locations for Russellville & Dardanelle Arkansas. One of the larger communities in the study.

## Results and Conclusions

- Given the IV strategy, the effect of each food-store access measure is estimated in a separate regression.
- IV probit models were estimated using the ivprobit routine in Stata 12. Models were not estimated for the meats, grains or sports-drinks categories because of the small proportions of respondents with children at risk for these categories (see right).
- Large grocery stores are important for consumption of healthy foods
  - As the distance to the nearest large grocery store increased, children had a higher probability of being at risk for under consumption of healthy foods such as legumes, vegetables and fruit.
  - Similarly, as density of large grocery stores increases, children had a lower probability of being at risk for these healthy food groups.
  - Unexpectedly, risk of under consumption of dairy foods decreased as distance to the nearest large grocery increased. However, density of large grocery stores did not statistically affect risk for under consumption of dairy foods.
- Increased access to grocery stores placed children at a higher risk of overconsumption of sugary beverages.
- Findings for convenience stores indicate that ready access to convenience stores placed children at higher risk for under consumption of legumes, vegetables, and fruit.
- Interestingly, convenience store access reduced the risk of overconsumption of sweets (statistically significant for convenience store density) and reduced the risk of overconsumption of sugary beverages. This may indicate that monetary costs and higher convenience-store price points are more important to the purchase of these items than are transportation costs.

Percent of children at risk by food group	
Dairy	11.18
Meats	4.38
Legumes	23.90
Grains	1.88
Vegetables	57.14
Fruits	28.57
100% Juice	22.15
Sweets	15.82
Sugary Drinks	13.38
Sports Drinks	1.89

IV probit model estimates for food store access measures. The instrumental variable is the proportion of commercially zoned land within a 0.5 mile radius of the census block centroid of the child's residence. Each estimate is from a separate model.

Model/Food-store access measure	Dairy	Legumes	Vegetables	Fruit	100% Juice	Sweets	Sugary Drinks
Distance to nearest large grocery store	-0.213*** (0.040)	0.190*** (0.045)	0.198*** (0.037)	0.195*** (0.024)	0.164 (0.373)	-0.201 (0.042)	-0.208*** (0.015)
Distance to nearest convenience store	0.012 (0.218)	-0.247 (0.166)	-0.202 (0.194)	-0.336*** (0.010)	-0.112 (0.238)	0.166 (0.195)	0.178 (0.179)
One-mile density of large grocery stores	0.378 (0.418)	-0.629** (0.248)	-0.527* (0.295)	-0.714*** (0.072)	-0.375 (0.705)	0.441 (0.288)	0.458* (0.259)
One-mile density of convenience stores	-0.546*** (0.081)	0.514*** (0.050)	0.523*** (0.016)	0.519*** (0.024)	0.507*** (0.114)	-0.536*** (0.044)	-0.534*** (0.052)

Standard errors are in parenthesis. Asterisks indicate significance: \*, \*\*, and \*\*\* at the 10, 5, and 1 percent levels, respectively.