

Rural and Urban Food Deserts: How are people responding?

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January 22, 2013

Ohio Research Internship Program at OARDC (ORIP)

- Each summer, we employ between 50 and 75 high achieving high school and college students to undertake research projects on agricultural topics
- Dr. Parwinder Grewal heads up ORIP

Focus of ORIP Research

Much of the research is on soils and biology

In recent years, socio-economic issues in agriculture have become an important component of ORIP

Understanding how people cope with lack of local availability of healthy foods – those living in “food deserts”



Food deserts exist in both urban and rural settings

Places where retail outlets for purchasing healthy foods like fruits and vegetables are lacking

Many of these communities seem to have little else in common

Summaries of two studies in which I co-directed ORIP interns

In 2009, we studied community gardeners in Cleveland

In 2012, we surveyed residents in a rural area in northern Holmes/southern Wayne Counties

Community Gardens Project: A Socio-Economic Profile of the Cleveland Gardener



**ORIP Interns: Ashley Dawes
Darrin Snider**

**Mentors: Dr. Parwinder Grewal
and
Dr. Thomas Blaine**

Department: Entomology



Community gardens are urban open spaces shared by local residents to grow food and ornamental plants

Community Gardens help achieve many purposes, including in social aspects.

In Cleveland, there are approximately 200 community gardens.



Specific Objectives:



- **This study was conducted in order to profile the Cleveland area community gardener:**
 - **Behavioral Garden Information (diet changes, method of travel, etc.)**
 - **Basic Demographics of Gardener (gender, age, income level, etc.)**



Hypotheses

Community gardening promote life changes?

- changes in diet
- changes in long term behavior
- social patterns

Materials and Methods

- **Survey:**
 - Total number of 23 questions
 - Focused mainly on information critical to our study (behavioral and demographic)
- **Contact information of Gardeners**
 - Cuyahoga County Extension
 - List consisted of roughly 800 names
 - Sample ($n \approx 400$) of community gardeners randomly selected.



Procedure



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graph LR; A[Conduct Survey using Telephone] --> B[Enter Data Into SPSS]; B --> C[Use SPSS to analyze data by running frequencies and linear regressions. And evaluating p-values to determine statistical significance.];
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Conduct Survey using Telephone

Enter Data Into SPSS

Use SPSS to analyze data by running frequencies and linear regressions. And evaluating p-values to determine statistical significance.

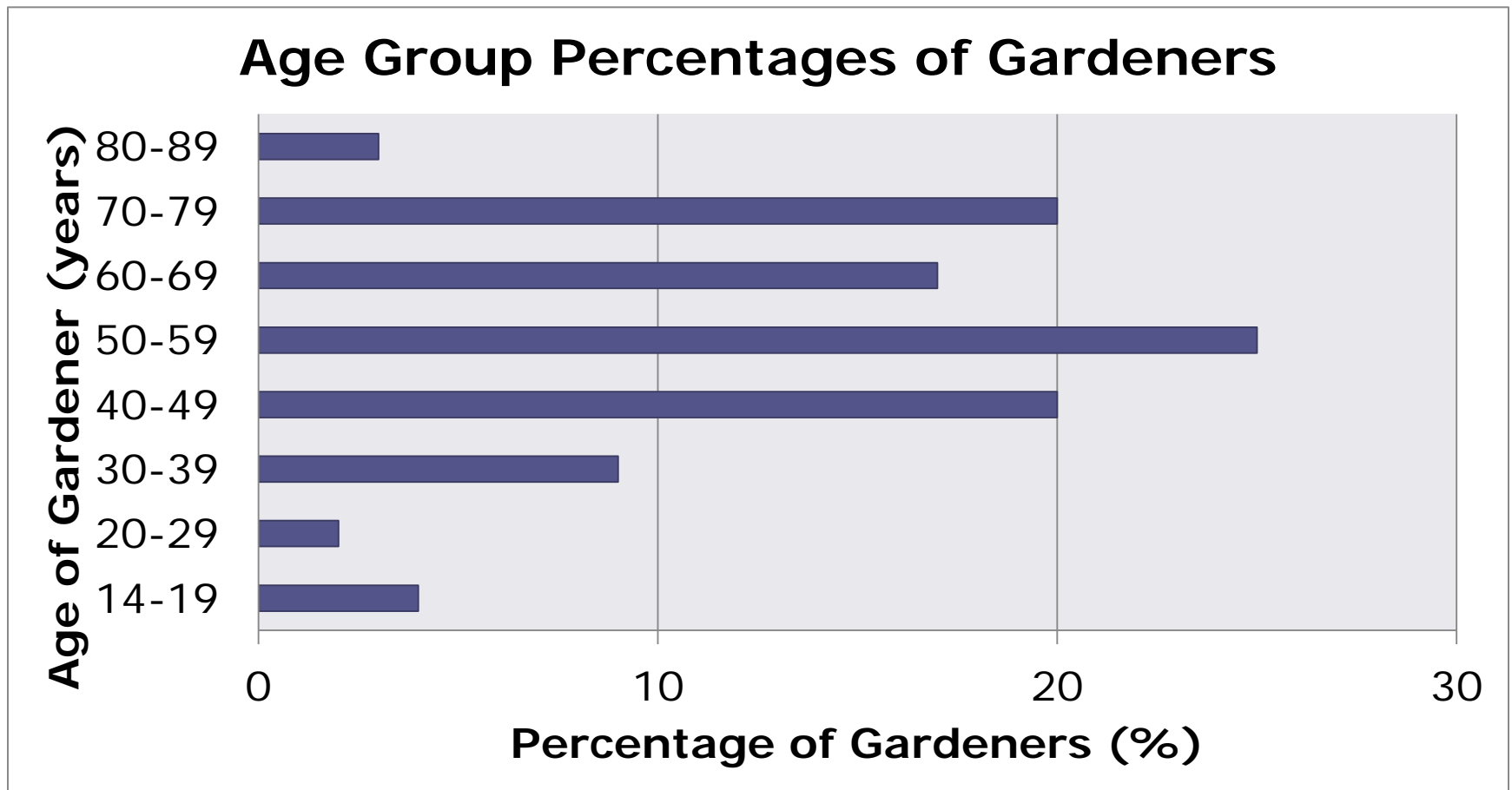
Results

Overview of Calling Data for Gardener Surveys

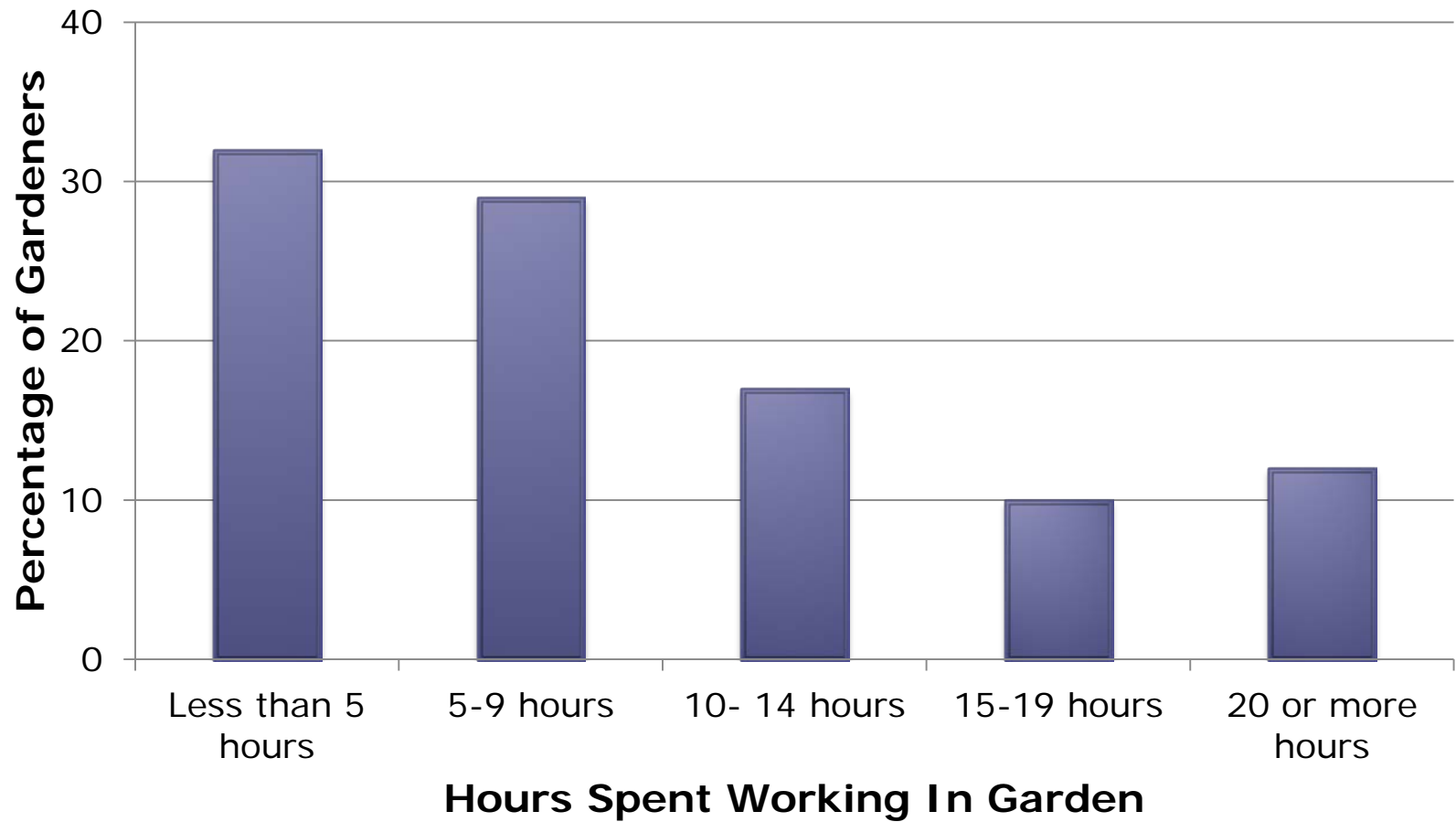
Column1	Total number of Refusals	Total Number of Bad/ Disconnected Numbers	Total Number of Non-Response	Total Number of Surveys Conducted	Total number of usable phone numbers	Percentage of respondents
Overall Total	81	98	180	124	390	32%

Data Table 1. 1 - Represents the calling data for gardener survey. Four individuals made calls 1-2 times a week for four weeks in July 2009. Calling hours varied between 11:00 am- 3:30 pm and 6:30 pm- 8:30 pm.

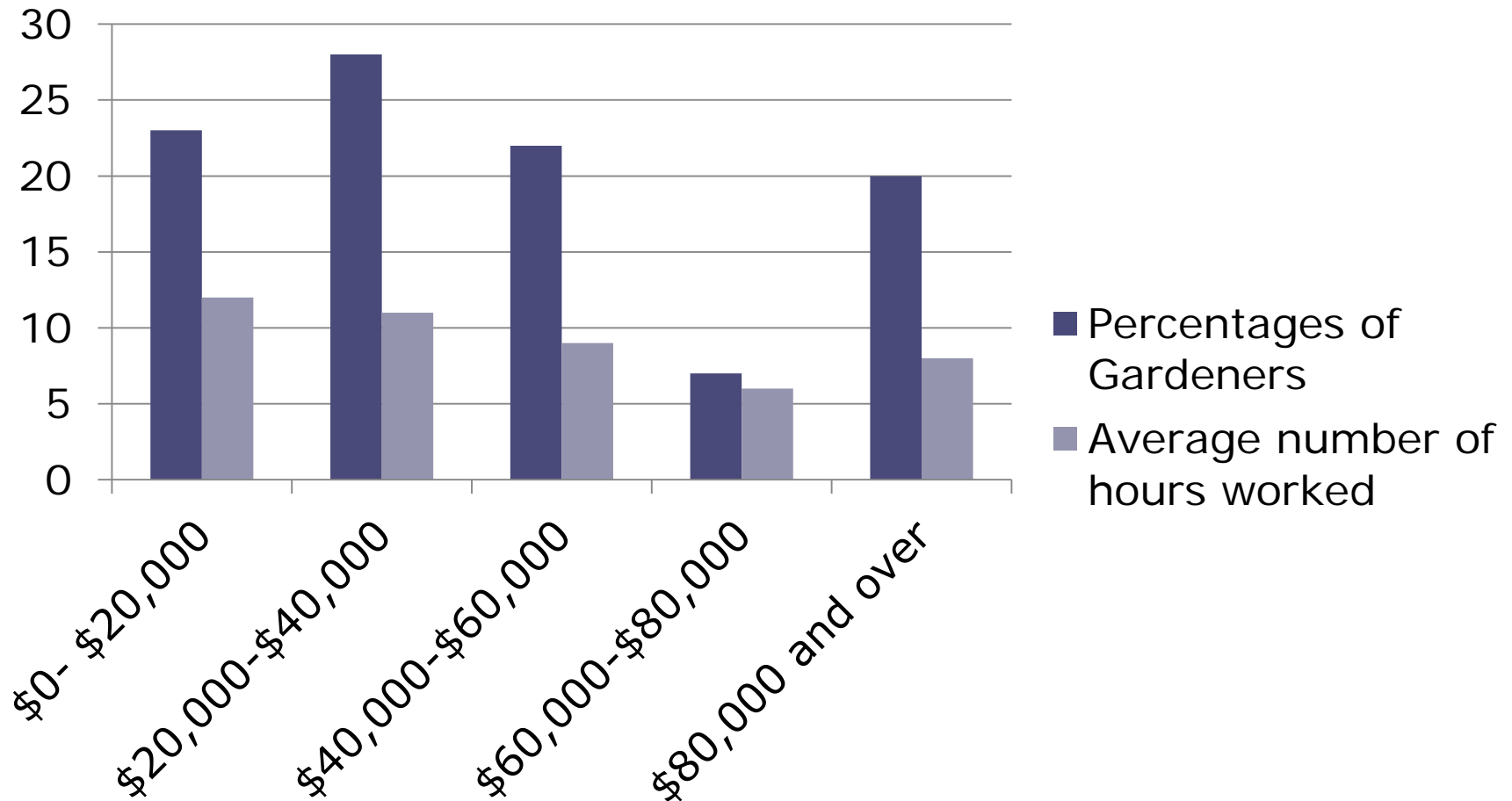
Results- Age Distribution



Hours Per Week Spent in Community Garden



Average Hours Worked Based On Income



Results

Item	Percentages (%)
Vegetables	100
Fruits	73
Flowers	49
Other (herbs and spices)	22

- **Gardeners were also asked their average servings of fruits and vegetables per week.**
 - **The average (mean) of fruits per day-2 servings**
 - **The average (mean) of vegetables per day- 3 servings.**

Results- Diet Change

- 71 % of gardeners that have been gardening for less than a year stated that they expected a diet change due to the program.
- 74 % of gardeners that have been gardening for more than a year stated that their diets had indeed changed as a result of community gardening.

Statistical procedure - linear regression

- A linear regression was used to analyze relationships between:
- Dependent Variable - Hours spent weekly in garden

Independent Variables:

- Years in gardening program
- Household income
- Vegetable servings consumed per day
- Donate produce
- Early/Late Response

Results- Linear Regression

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
Constant	11.21	2.43		4.62	.000
Years in Garden Program	0.24	.077	0.28	3.07	.003
Total Annual Household Income	-1.58	.627	-0.19	-2.52	.017
Donate Produce	4.32	1.84	0.22	2.35	.023
Vegetable Serving	0.75	.360	0.18	2.07	.034
Wave- Early or Late Respondent	-3.64	1.80	-0.19	-2.08	.045

Table 2.1- From the above output, the regression equation is:

Hours Spent in Garden = 11.21 + 0.24YEARS GARDENING - 1.58INCOME + 4.32DONATEPRODUCE + 0.75VEGGIESERVING -3.64WAVE.

Discussion

Cuyahoga County Research (2006)

- Previous research that was conducted by Cuyahoga County Extension in 2006 (n≈ 21)
- Males- 20% Females – 80%
- Average Age- 53 years old
- Average hours worked- 4.5
- 57% Total Annual income of less than \$35,000
- 52% drove a car, while only 19% walked.

ORIP Research 2009

- Our research was conducted with a much larger sample size (n≈ 400).
- Males- 42% Females- 58%
- Average Age- 55 years old
- Average hours worked- 10
- 51% Total Annual Income of Less Than \$40,000
- 53% of individuals walked, while 41% drove a car.

Conclusions

Community gardens bring people together from a wide range of income and age groups

Participation in community gardening promotes life changes that appear to be long lasting:

Conclusions (continued)

Dietary changes: roughly 75% of respondents consume more vegetables as a result of the program

Hours spent in the garden per week increase with years spent in the program

Those who donate produce spend 40% more time in the garden

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Images Sources: <http://urbanprograms.osu.edu/urban-impacts/gardening/> - Slide 1- Top left Photo
http://blog.cleveland.com/metro/2009/07/clevelands_forprofit_urban_gar.html - Slide 1- Top right photo
<http://urbanprograms.osu.edu/urban-impacts/gardening/> - Slide 1- Bottom Photo

Acknowledgments

- A special thanks to all the following people for their help and guidance throughout this project....
 - Mentors: Dr. Grewal and Dr. Blaine, for their continued support and guidance.
 - Our other teammates- Gretchen Pleuss and Devon Williams, for all their help with the conducting of the surveys.
 - Cuyahoga County Extension, particularly Marie Barni, for the names and phone numbers of all the gardeners.
 - Cleveland Area Gardeners, for their time and patience with taking the survey.
 - Also, the OARDC and the ORIP program for providing us with this opportunity.

Household Production and Consumption of Fresh Produce in an Ohio Rural Food Desert

- Michael Pinkham and Sarah Pinkham
- Dr. Thomas Blaine,
Agricultural/Environmental Economics
- Dr. Parwinder Grewal, Entomology

Introduction

- Food desert: "area in the US with limited access to affordable and nutritious food, ...composed of predominantly lower income communities" (USDA, ERS, 2009; Mulangu & Clark, 2012).
- Lower income ("particularly vulnerable to access barriers") defined as $\leq \$43,670$ for $\geq 40\%$ of region (USDA 2009).
- Previous research focuses on urban food deserts (Walker, et al., 2010).
- Counterintuitive: plenty of fertile agricultural land, but people travel 10+ miles to buy fresh produce (USDA, 2009).
- Access difficulty may prevent healthy eating (USDA, 2009; Walker, et al., 2010; Baker et al., 2006).

Objectives

- Determine how rural residents in Wayne/Holmes counties acquire, produce, and consume fresh fruits and vegetables
- Find out whether demographic factors influence production and consumption

Hypotheses

- Residents of rural food deserts will have gardens to make up for reduced access to retail fruits and vegetables
- Gardeners will consume more produce than non-gardeners
- Large households are more likely to have gardens
- Households with higher incomes are likely to consume more fruits and vegetables but produce less
- Households that farm are more likely to have gardens

Materials and Methods: Experimental Design

- Survey
 - How much produce do you consume daily?
 - Where do you get it?
 - Do you farm? Do you garden? If so, what do you grow?
 - How much of what you eat comes from your garden?
 - Demographics (age, income, gender, family size)

Materials and Methods: Data Collection

Names and numbers from Americalist
Postcard, front and back



The Ohio State University researchers are conducting a landmark study on fruit and vegetable production and consumption in Wayne and Holmes counties. We have selected you for a brief telephone survey to answer a few questions. You will receive a call within the next week. Your responses are extremely important to the study and will remain private. Thank you in advance.

Sincerely,

Thomas W. Blaine, Ph.D
Associate Professor
Ohio State University Extension

Photo credit: Donald T. Iannone, Visual Advantage Photography

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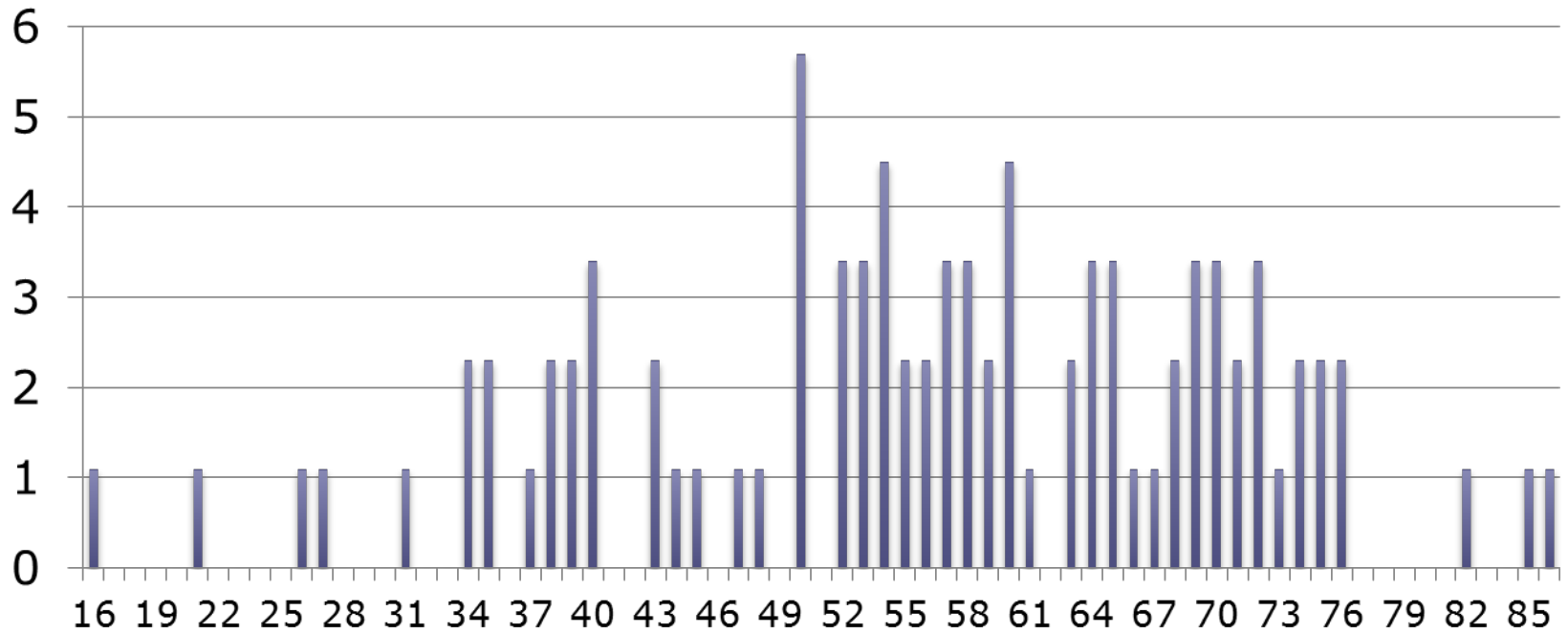


Phone calls to 209 rural residents in 4 zip
codes along the Wayne-Holmes border

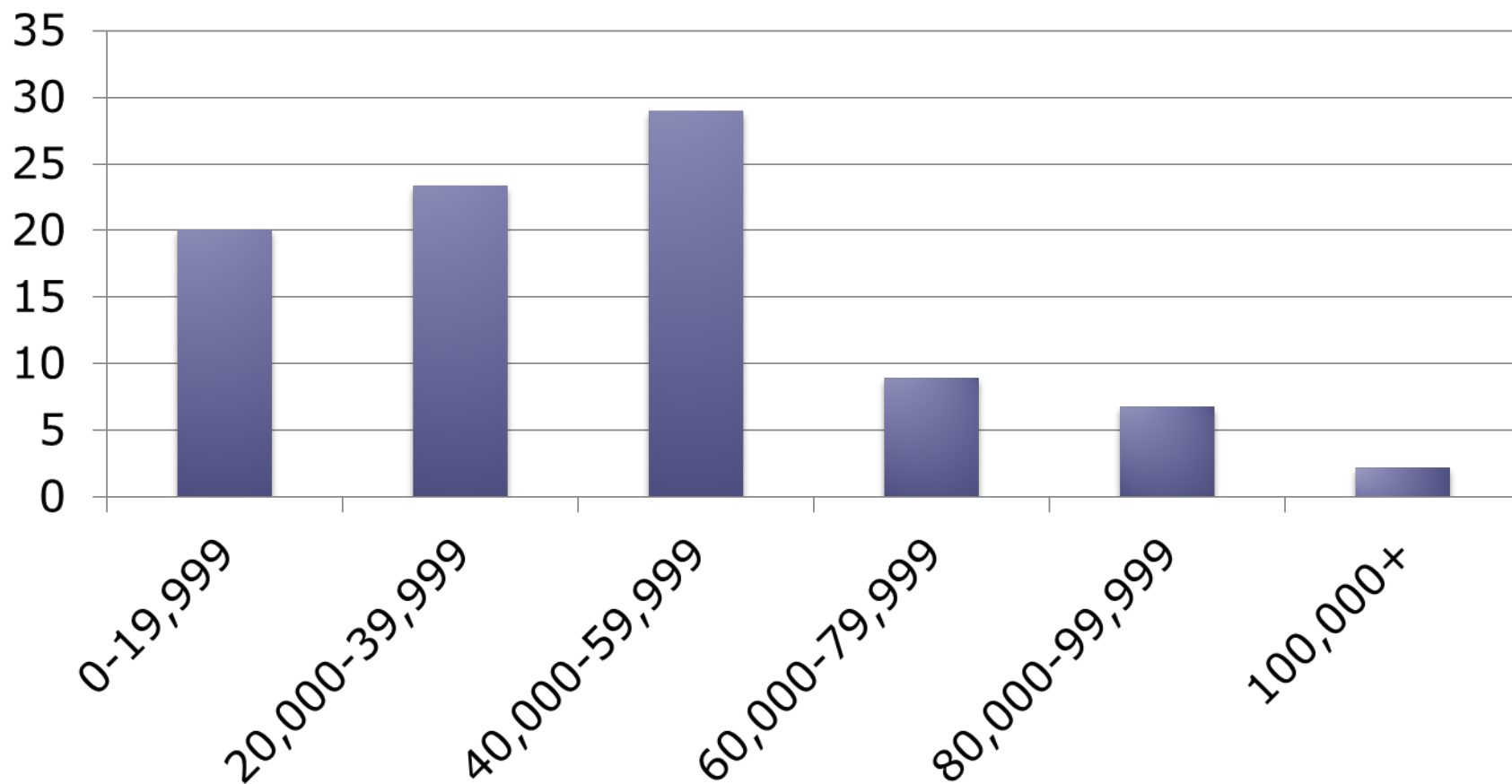
Materials and Methods: Statistics

- 209 phoned – 25 bad numbers = 184 sample size
- 20 refusals (11%)
- 90 completed surveys (49% - high response rate)
- Frequencies/descriptive stats, linear regression models, binary logistic regression

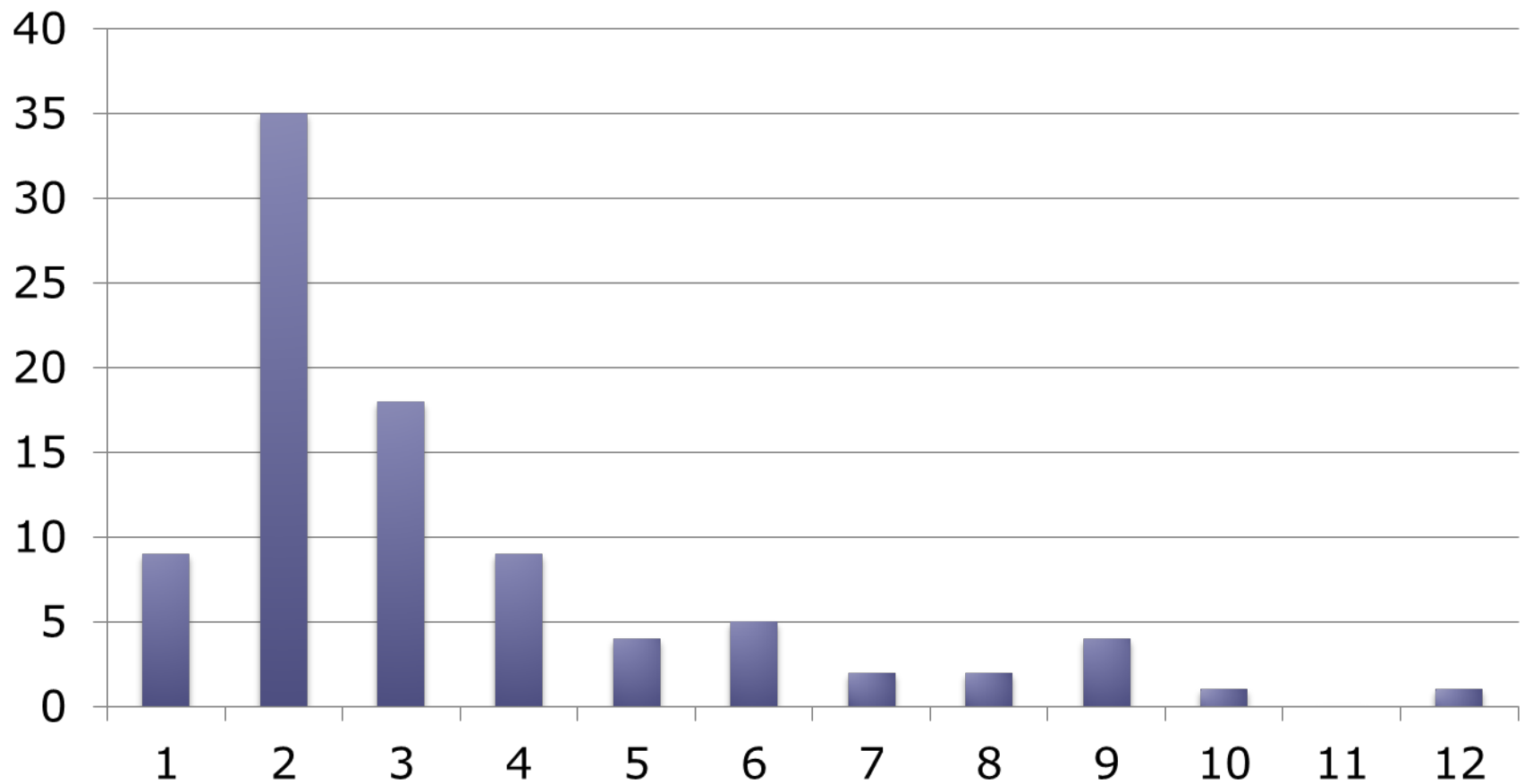
Age Distribution



Household Annual Income



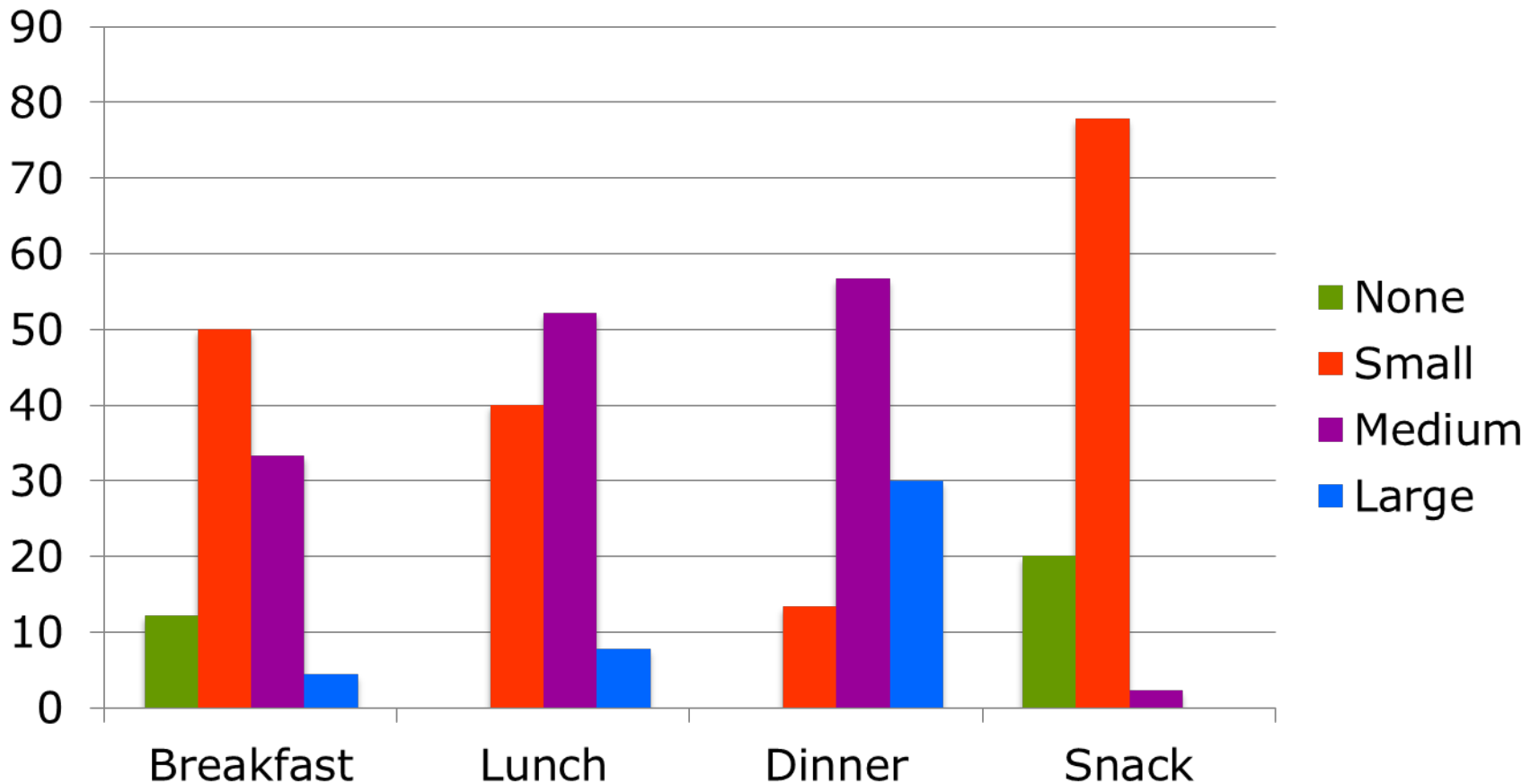
Household Size



Household Transportation Cost to Acquire Fresh Produce

- Transportation cost for produce =
[(trips/month)x(miles/trip)x(\$0.55/mile)]
 - \$0.55 = vehicle cost/mile, calculated by the IRS
- Mean transportation cost to buy produce = \$61.26/mo. = \$735.13/year

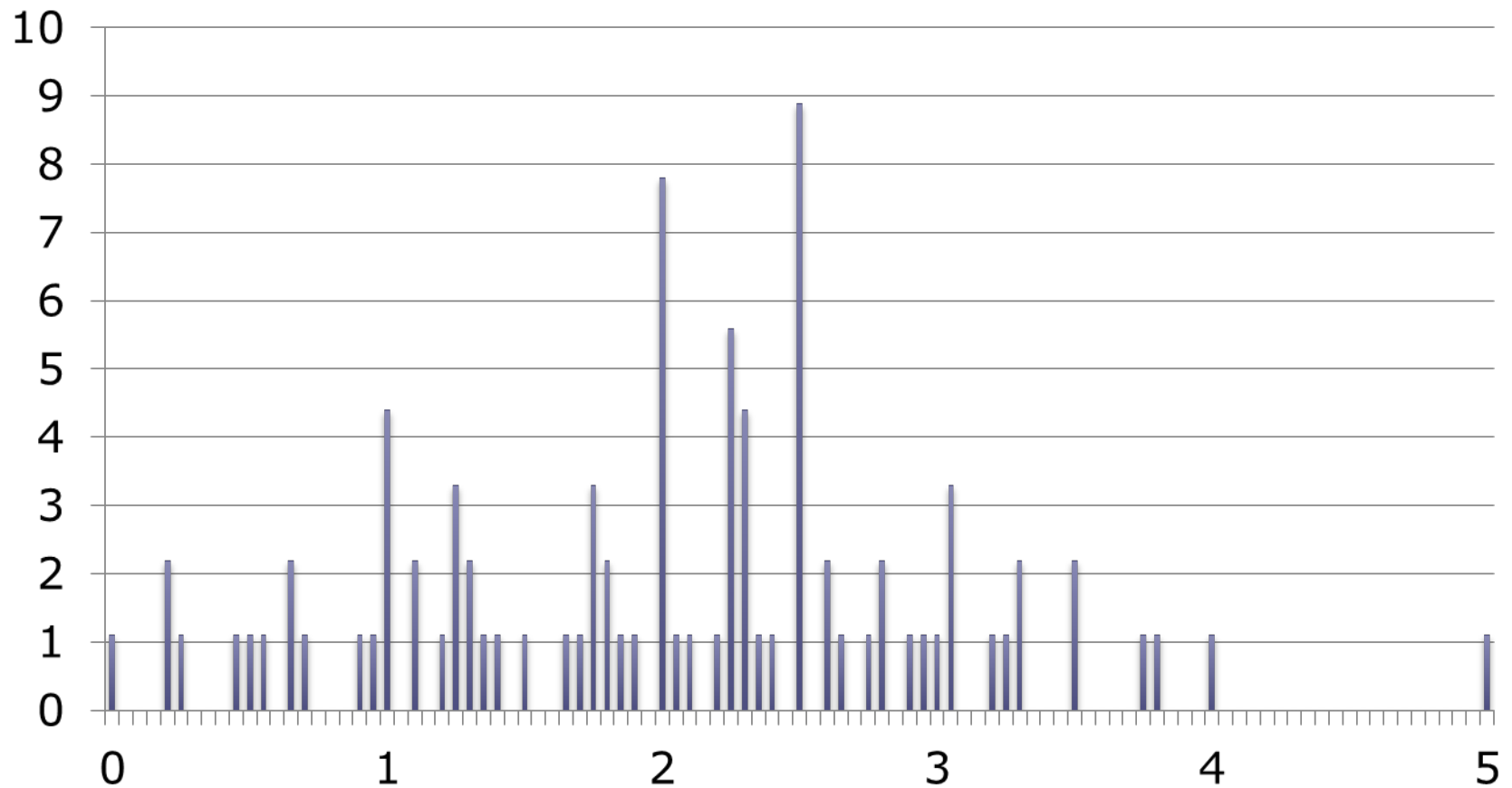
Meal Sizes of Respondents



Calculating Produce Consumption Index

- Two variables:
 - Meal size: scale of 0-3 corresponding to none, small, medium, large (each meal)
 - Percent fruits and vegetables: %FV per meal
- Produce consumption index
 - Each meal = (meal size) * (%FV)
 - Overall = breakfast % + lunch % + dinner % + snack%
 - Gives value between 0 and 12
 - Actual range in sample: 0 - 5

Produce Consumption



Factors that Predict Produce Consumption (Regression 1)

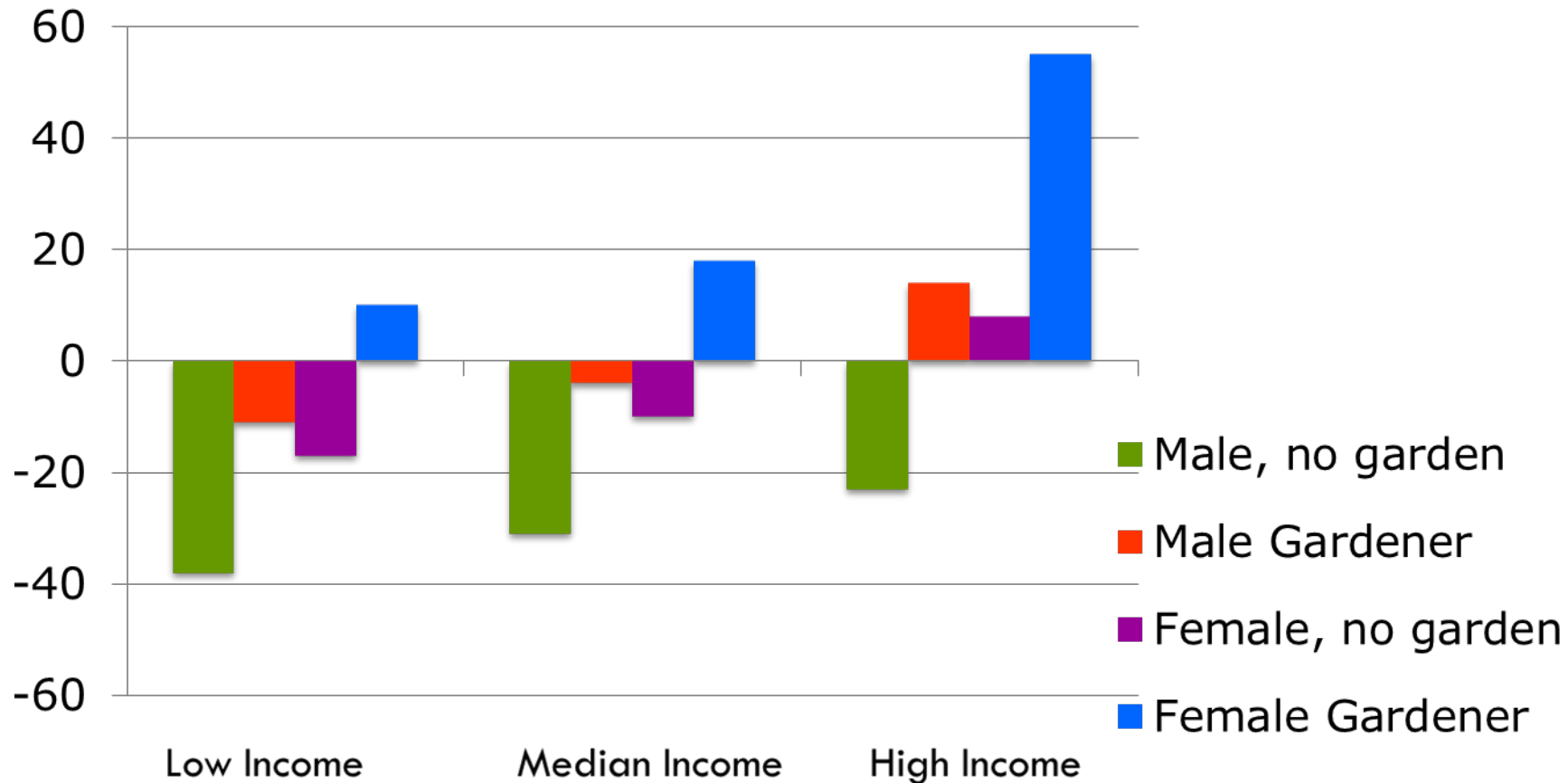
Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	1.579	.304		5.195	.000
gender	-.421	.221	-.209	-1.905	.060
garden	.536	.249	.239	2.154	.034
incomepercapita	1.415E-5	.000	.154	1.422	.159

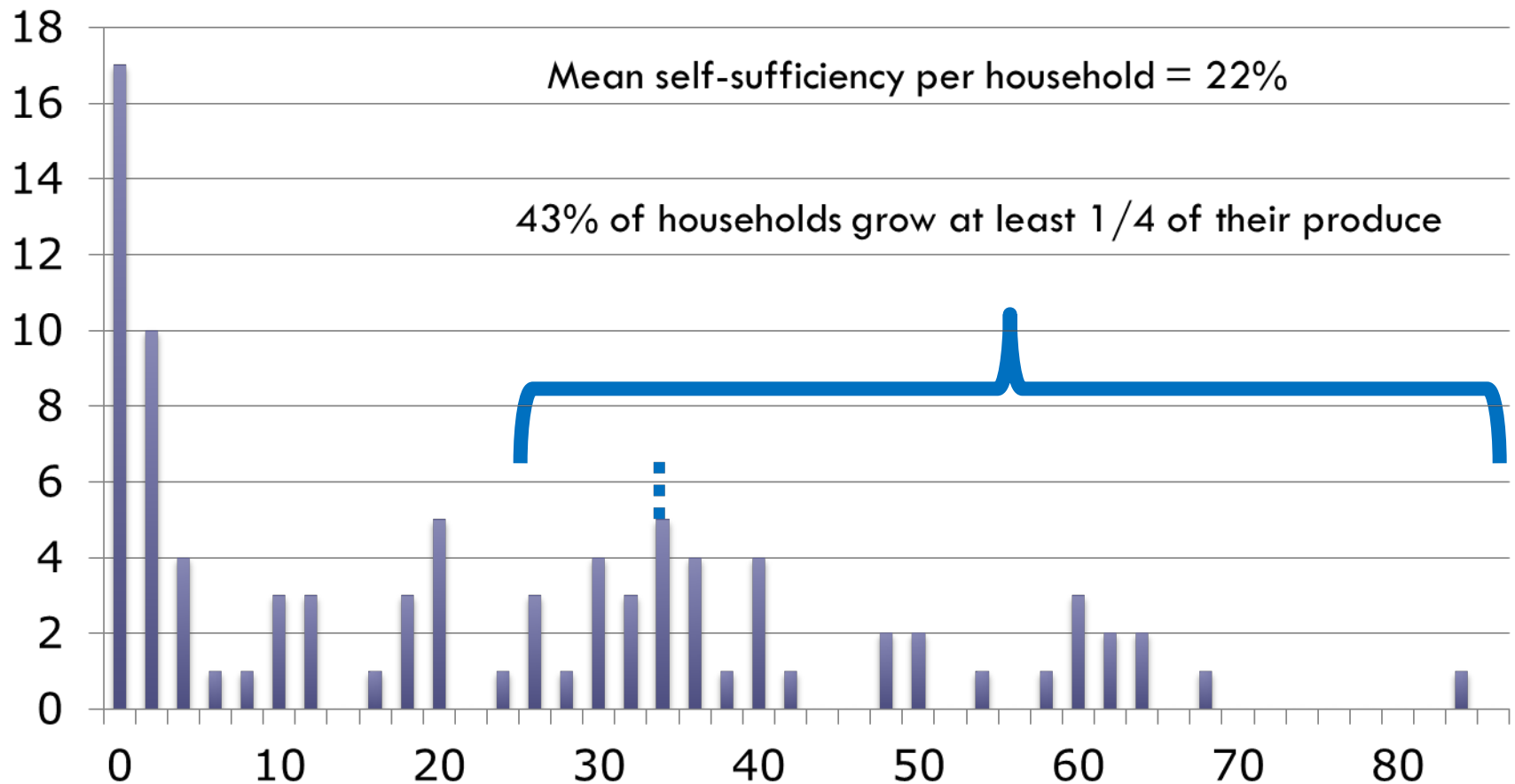
a. Dependent Variable: produceconsumption

Predicted Produce Consumption

(Percent Deviation from Mean)



Household Annual Percent Self-Sufficiency (Produce)



Factors that Influence Having a Garden

Variables in the Equation

	B	S.E.	Wald	df	Sig.	Exp(B)
Step 1 ^a						
gender	-.894	.605	2.181	1	.140	.409
farm	1.684	.928	3.293	1	.070	5.387
produceconsumption	.750	.335	5.021	1	.025	2.116
respondentage	-.060	.025	5.753	1	.016	.942
incomepercapitathous	-.046	.027	2.859	1	.091	.955
Constant	3.934	1.556	6.388	1	.011	51.110

a. Variable(s) entered on step 1: gender, farm, produceconsumption, respondentage, incomepercapitathous.

Classification Table^a

Observed			Predicted		
			garden		Percentage Correct
			no	yes	
Step 1	garden	no	12	10	54.5
		yes	2	57	96.6
Overall Percentage					85.2

Conclusions

- 74% of households maintained a garden in the food desert
- Mean self-sufficiency per household = 22%
- Rural residents drive about 11 miles one way to the grocery store, at an average transportation cost of \$735/year

Conclusions (cont'd)

- Females and people with gardens eat more produce than other respondents
- High income households and seniors are less likely to have their own gardens
- Large households are more likely to grow their own food than small households, as are farmers and people with lower income

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Our studies accomplish a couple of important ORIP objectives:

Acquaint student interns with principles and practices of applied research – survey design and implementation, statistical analysis

Give members of the public, community leaders and policy makers information they can use in addressing problems concerning local foods

Thanks for coming!

- Questions, comments, suggestions are welcome
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