INNOVATIONS IN FOOD ENVIRONMENT NATURAL EXPERIMENT EVALUATION

Darcy Freedman, PhD, MPH
Associate Professor, Population and Quantitative Health Sciences, Social Work
Associate Director, Prevention Research Center for Healthy Neighborhoods
Case Western Reserve University

Morgan Taggart, MUPDD
Director of ag|re|culture
St. Clair Superior Development Corporation

June 28, 2017
American Evaluation Association, Translational Research Evaluation Topical Interest Group
Principal Investigators
Darcy Freedman, PhD, MPH, Case Western Reserve University
Ash Sehgal, MD, MetroHealth Medical Center

Funded through Time-Sensitive Obesity Policy and Program Evaluation (PAR-12-257)

This research is supported by the National Institute of Diabetes and Digestive and Kidney Diseases of the National Institutes of Health under Award Number R01DK108184. The content expressed in this presentation is solely the responsibility of the authors and does not necessarily represent the official views of the National Institute of Diabetes and Digestive and Kidney Diseases, or the National Institutes of Health.
### Evaluation Funding Mechanism

#### Department of Health and Human Services

**Part 1. Overview Information**

<table>
<thead>
<tr>
<th>Participating Organization(s)</th>
<th>National Institutes of Health (NIH)</th>
</tr>
</thead>
</table>
| **Components of Participating Organizations** | National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK)  
National Institute on Aging (NIA)  
National Cancer Institute (NCI)  
Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD)  
Office of Behavioral and Social Sciences Research (OBSSR) |
| **Funding Opportunity Title** | Time-Sensitive Obesity Policy and Program Evaluation (R01) |
| **Activity Code** | R01 Research Project Grant |
| **Announcement Type** | New |
| **Related Notices** |  
- September 17, 2015 - This PA has been released as PAR-15-346  
- June 3, 2013 - Notice NOT-OD-14-074 supersedes instructions in Section III.3 regarding applications that are essentially the same  
- October 18, 2013 - See Notice NOT-OD-14-003: Guidance on Resumption of NIH Extramural Activities Following the Recent Lapse in Appropriations  
- May 30, 2013 (NOT-OD-13-074) - NIH to Require Use of Updated Electronic Application Forms for Due Dates on or after September 25, 2013. Forms-G applications are required for due dates on or after September 25, 2013. |
| **Funding Opportunity Announcement (FOA) Number** | PAR-12-257 |
OUR TEAM

CWRU Prevention Research Center for Healthy Neighborhoods
• Darcy Freedman, PI
• Erika Trapl, Co-I
• Elaine Borawski, Co-I
• Chaturia Rouse, Project Manager
• Diane Kurup, Grants Administrator
• Stephanie Pike, Graduate Fellow
• Ritchie Koshy, Graduate Researcher
• Cally Byrne, Graduate Researcher
• Tommy To, Graduate Researcher

CWRU Center for Reducing Health Disparities
• Ashwini Sehgal, Co-PI

The Ohio State University, John Glenn School of Public Affairs & Food Innovation Center
• Jill Clark, Co-I

University of South Carolina, College of Social Work
• Bethany Bell, Co-I, Statistician
• Patricia Sharpe, Consultant

CWRU Clinical & Translational Science Collaborative, Bio-nutrition Core
• Alicia Thomas, Bionutrition Manager
• Wanda Rhynes, Survey Administrator
• Jacquelyn Leach, Survey Administrator
• Kristen Heitman, Survey Administrator
• Heather Tribout, Survey Administrator
• Brittany Schmidt, Survey Administrator
• Sarah Sebrasky, Survey Administrator

St. Clair Superior Development Corporation
• Michael Fleming, Consultant
• Morgan Taggart, Consultant

Parson’s Avenue Merchants Association
• Bob Leighty, Consultant
• Chloe Greene, Community Researcher
• Jevonna Morris, Community Researcher
• Jillian Olinger, Community Researcher
• Donna Bates, Community Researcher
1. Describe food environment intervention being evaluated.

2. Review foodNEST rationale and study aims.

3. Describe foodNEST methods.

4. Highlight data collection innovation.
FOOD ENVIRONMENT INTERVENTION BEING EVALUATED
St Clair Superior Development: Unites people, expands opportunity, and builds livable, healthy, and attractive places.
IMPLEMENTATION FUNDING MECHANISMS

US Department of Health and Human Services Healthy Food Financing Initiative
- Supports the development and construction costs of Hub 55
- Outcomes focused on job creation

Kresge Foundation
- Programs, projects and outreach that engage community and integrate placemaking, local food, arts, and community development

Mt Sinai Health Care Foundation
- Feasibility study in partnership with Lutheran Metropolitan Ministry to develop a social enterprise that provides healthy, affordable, convenient foods

O’Neill Family Foundation
- Development of an intergenerational community food center that offers hands-on classes that celebrate food, culture, and community
HUB 55 + AG|RE|CULTURE IMPLEMENTATION
HUB 55 + AG|RE|CULTURE IMPLEMENTATION

Progress to Date

- **Hub 55**
  - Opened Café 55, Goldhorn Brewery, and St. Clair Farm Market
  - Hosted cooking and nutrition education classes
- **ag|re|culture**
  - Neighborhood Ambassadors + Community Engagement Strategy
  - Cooking Circles
  - Gardener Group and Meet-up
  - Urban Lambscape Program
  - Good Food Here – Healthy Retail Program
  - Food Not Bombs + Pop-up BBQ in St. Clair Plaza
  - Develop social enterprise to provide healthy, affordable, convenient meals
  - Expand cooking classes at St. Clair Farm Market and area schools

Future Plans

- Launch food start-up business competition
- Storytelling + Public Art project to capture and elevate food and culture in SCS
- Coordinate emergency food provider network
- Create community culinary center that offers cooking classes for families
Food hubs

- *Values-based* supply chain, rather than a value-added supply chain
- Treat growers as strategic partners deserving of a fair return
- Emphasize the relationship between producers and customers
- Socially-driven businesses that
  - Increase availability of healthy food to local residents – focus on healthy and whole foods
  - Provide a venue for entrepreneurship
  - Be a vehicle for community-based economic development
  - Flexible format

(Cleveland, Müller, Tranovich, Mazaroli, & Hinson, 2014; Sitaker, Kolodinsky, Pitts, & Seguin, 2014; Lerman, 2012; USDA, 2017)
FOODNEST RATIONALE AND STUDY AIMS
Prevalence of Self-Reported Obesity Among Non-Hispanic White Adults by State and Territory, BRFSS, 2012-2014

Source: Behavioral Risk Factor Surveillance System
Prevalence of Self-Reported Obesity Among Non-Hispanic Black Adults by State and Territory, BRFSS, 2012-2014

Source: Behavioral Risk Factor Surveillance System

*Sample size < 50 or the relative standard error (dividing the standard error by the prevalence) ≥ 30%
<table>
<thead>
<tr>
<th>Store Type</th>
<th>Quality Composite Score (mean)</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Convenience Stores (70%)</td>
<td>-0.74</td>
<td><img src="image1.jpg" alt="Convenience Store" /></td>
</tr>
<tr>
<td>Local Markets (24%)</td>
<td>-0.38</td>
<td><img src="image2.jpg" alt="Local Market" /></td>
</tr>
<tr>
<td>Supermarkets (6%)</td>
<td>6.5</td>
<td><img src="image3.jpg" alt="Supermarket" /></td>
</tr>
</tbody>
</table>

Composite score = sum of scores for access to fresh fruit, fresh vegetables, lean meats, low-fat milk, tobacco products, alcohol. Chronbach’s alpha = .76

Source: Freedman & Bell, 2009
Food deserts in Ohio tend to co-locate in communities where residents are experiencing the highest morbidity and mortality due to diet-related health conditions (e.g., obesity, hypertension, diabetes).

-Results of Food Trust analysis in Ohio (2014)
Food deserts in Ohio tend to co-locate in communities where residents are experiencing the highest morbidity and mortality due to diet-related health conditions (e.g., obesity, hypertension, diabetes).

-Results of Food Trust analysis in Ohio (2014)
Hub 55 Intervention Components

Physical Food Environment
- 42,000 square foot food hub
- Open year-round, 6 days/week, 12 hours/day
- One-stop food shopping
- Accepts food assistance benefits
- Healthy food incentive programs
- Healthy Food Café
- Food Aggregation and Distribution

Social Food Environment
- Food-related jobs creation (e.g., agripreneurs, culinary entrepreneurs)
- Healthy food community organizers
- Cross-cultural food production mentorship
- Cooking clubs
- Creative place making linking arts, food, and culture

Fig. 3. Conceptual Model for Hub 55 Evaluation

Healthy Food Availability, Variety, Price
- At Hub 55
- Broader Food Retail Environment

Perceptions of Food Environment

Perceived Control of Food Shopping

Attitudes, Social Norms, and Social Support for Healthy Eating

Food Shopping Frequency

Diet Outcomes
- Healthy Eating Index
- FV Consumption
- Caloric Intake

Socio-demographic Covariates (See Section 3.6.B)

Space

Urban, Food Desert, High-Diet-Related Morbidity and Mortality, Economically Disadvantaged

Time

Hub Opens
Oct. 2015

Study Ends Sept. 2017
Hub 55 remains open after study ends
**Primary Aim:**
Evaluate the impact of a new food hub on individual-level changes in (a) diet quality, (b) fruit and vegetable consumption, and (c) caloric intake among primary food shoppers living in a community receiving a new food hub compared to primary food shoppers in a matched control community.

**Secondary Aims:**
- Examine the reach, adoption and fidelity of food hub implementation, and the dose-response relationship between food hub use and the three diet outcomes.
- Evaluate the impact of the food hub on the surrounding food retail environment.
FOODNEST METHODS
## Quasi-Experimental Study Design

<table>
<thead>
<tr>
<th>Intervention Site</th>
<th>2015-16</th>
<th>2016-17</th>
<th>2017-18</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cleveland, OH</td>
<td>0-month survey &amp; dietary recall</td>
<td>12-month survey &amp; dietary recall</td>
<td>24-month survey &amp; dietary recall</td>
</tr>
<tr>
<td>Comparison Site</td>
<td>0-month survey &amp; dietary recall</td>
<td>12-month survey &amp; dietary recall</td>
<td>24-month survey &amp; dietary recall</td>
</tr>
<tr>
<td>Columbus, OH</td>
<td>Hub 55 + ag</td>
<td>RE</td>
<td>culture Implementation (rolling)</td>
</tr>
</tbody>
</table>

Goal to enroll 520 people (260/community)  --- Analysis powered to detect effects with 400
TARGETED COMMUNITIES

INTERVENTION COMMUNITY
ST. CLAIR SUPERIOR, CLEVELAND

COMPARISON COMMUNITY
SOUTHSIDE NEIGHBORHOOD, COLUMBUS
## Community Characteristics

<table>
<thead>
<tr>
<th></th>
<th>Total Households</th>
<th>Households with SNAP</th>
<th>Race = Black</th>
<th>Food Desert Census Tracks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cleveland</td>
<td>3,214</td>
<td>43%</td>
<td>72%</td>
<td>5 of 7</td>
</tr>
<tr>
<td>Columbus</td>
<td>4,185</td>
<td>37%</td>
<td>63%</td>
<td>4 of 4</td>
</tr>
</tbody>
</table>
COMMUNITY-BASED RECRUITMENT

FEBRUARY 2016

The foodNEST Monthly Volume 1 Issue 5

The FUTURE of FOOD in your NEIGHBORHOOD STUDY

Thank you!

Thank you for taking part in The Future of Food in Your Neighborhood Study. We now have over 500 individuals from Cleveland and Columbus enrolled in the study! We are still looking for about 100 people in each community. We want to thank you for helping us spread the word and encourage you to continue to let your family, friends, and neighbors know about our study. As always, please have them call 216-368-3745.

The foodNEST team

Meet our team

Jackie, Wendy, and Heather currently serve as our survey administrators for the foodNEST Study. Jackie, Wendy, and Heather work in the Department of Biostatistics at University Hospitals in Cleveland, OH. They spend their time recording dietary recalls and conducting surveys. Our survey administrators love speaking with participants and look forward to completing your next set of surveys!

When will we ask you to do your second set of surveys?

We will begin year two of the surveys in August 2016, but your exact date will depend on when you took your first survey. Your next surveys will start one year from your first survey.

If you have any questions about the study, would like to let us know that you've received, or changed contact information, please call us at 216-368-3745 or email foodNEST@case.edu.

FOOD NEST

The FUTURE OF FOOD

LAST CHANCE! CALL TODAY!

Over 200 people have joined the foodNEST Study from your community. We are still looking for about 50 more participants in your area to help us learn about food shopping habits, food access, diet, and health. Call today to see if you are eligible to join!

All eligible participants will be compensated. Only one person per household may take part in the survey.

To learn more or to see if you are eligible, please email us at foodNESTCLE@case.edu or call us at 216-688-8516, or visit our website at www.foodNEST.org.

HEALTH STUDY SEeks SOUTH SIDE PARTICIPANTS

A National Institute of Health study needs residents in the South Side to take part in a health study. The study will look for and store blood plasma from healthy individuals to use in future research. According to Dr. Hart, Director of the Preventive Medicine and Public Health Department, the study is looking for people who are healthy and do not have any chronic conditions. Participants will be compensated for their time and will receive a healthy snack. The study is open to all residents of the South Side regardless of age, gender, or race. For more information, please contact the study team at 216-636-3500.

KEEP IN TOUCH

Welcome to Heart Health Month!

Heart Health Month is observed each February to raise awareness of the number one cause of death in America: heart disease. It is estimated that 1 in 4 deaths in the United States is caused by heart disease. Heart disease is preventable and treatable with proper diet, exercise, and medication. For more information on heart health, please visit www.heart.org.
RECRUITMENT TRENDS

foodNEST YEAR 1 RECRUITMENT SUMMARY
August 14, 2015-October 11, 2016

# Screened 1,396
CLE (732); CBUS (673)

- # Not Eligible 714
  CLE (594); CBUS (320)
  - 48.9% of those screened were eligible

- # Eligible 682
  CLE (129); CBUS (353)
  - 78.0% of those eligible are enrolled (completed survey 1)

# Not Enrolled 143
CLE (82); CBUS (61)

# Completed Survey 1 539
CLE (267); CBUS (272)
  - 97.2% of those who completed survey 1 have completed survey 2

# Incomplete Survey 2 15
CLE (7); CBUS (8)
# Completed Survey 2 524
CLE (260); CBUS (264)
  - 98.5% of those who completed survey 2 have completed survey 3

# Incomplete Survey 3 8
CLE (4); CBUS (4)
# Completed Survey 3 516
CLE (256); CBUS (260)
  - 100% of those who completed survey 3 retained for Year 1

Final Sample 516
CLE (256); CBUS (260)
STUDY PARTICIPANTS

Eligibility criteria included
• At least 18 years old.
• English speaking.
• Living in targeted census tracts.
• Plan to live in current community at least 12 months.
• Responsible for some household food shopping.
• Only one person per household could join.
### Descriptive Characteristics of Participants

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Mean (SD) or %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, years</td>
<td>49.2 (13.5)</td>
</tr>
<tr>
<td>Female</td>
<td>73.3</td>
</tr>
<tr>
<td>African American</td>
<td>69.9</td>
</tr>
<tr>
<td>High school graduate/GED or less education</td>
<td>59.6</td>
</tr>
<tr>
<td>Household income ≤ $20,000</td>
<td>66.0</td>
</tr>
<tr>
<td>Receipt of SNAP, past 12 months</td>
<td>65.5</td>
</tr>
<tr>
<td>Self-reported diet-related chronic disease</td>
<td>58.6</td>
</tr>
</tbody>
</table>
DATA COLLECTION

- 24-hour dietary recalls using Nutrition Data System for Research (3 recalls to \(\rightarrow\) 1 composite score per year)
- Psychosocial survey (once per year)
- Food retail audits (once per year)
- Implementation tracking
 MAIN OUTCOME MEASUREMENT
24-HOUR DIETARY RECALLS

• Nutrition Data System for Research (NDSR)
  http://www.ncc.umn.edu/products/

• 3 recalls per person per year
  • Collected in ~30 day window (same time each year)

• Multi-pass method
## KEY OUTCOME:
### HEALTHY EATING INDEX (HEI-2010)

<table>
<thead>
<tr>
<th>HEI-2010 component</th>
<th>Maximum</th>
<th>Standard for maximum score</th>
<th>Standard for minimum score of zero</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Adequacy (higher score indicates higher consumption)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Fruit²</td>
<td>5</td>
<td>≥ 0.8 cup equiv. / 1,000 kcal¹</td>
<td>No fruit</td>
</tr>
<tr>
<td>Whole Fruit³</td>
<td>5</td>
<td>≥ 0.4 cup equiv. / 1,000 kcal</td>
<td>No whole fruit</td>
</tr>
<tr>
<td>Total Vegetables⁴</td>
<td>5</td>
<td>≥ 1.1 cup equiv. / 1,000 kcal</td>
<td>No vegetables</td>
</tr>
<tr>
<td>Greens and Beans⁴</td>
<td>5</td>
<td>≥ 0.2 cup equiv. / 1,000 kcal</td>
<td>No dark-green vegetables, beans, or peas</td>
</tr>
<tr>
<td>Whole Grains</td>
<td>10</td>
<td>≥ 1.5 ounce equiv. / 1,000 kcal</td>
<td>No whole grains</td>
</tr>
<tr>
<td>Dairy⁵</td>
<td>10</td>
<td>≥ 1.3 ounce equiv. / 1,000 kcal</td>
<td>No dairy</td>
</tr>
<tr>
<td>Total Protein Foods⁶</td>
<td>5</td>
<td>≥ 2.5 ounce equiv. / 1,000 kcal</td>
<td>No protein foods</td>
</tr>
<tr>
<td>Seafood and Plant Proteins⁶,⁷</td>
<td>5</td>
<td>≥ 0.8 ounce equiv. / 1,000 kcal</td>
<td>No seafood or plant proteins</td>
</tr>
<tr>
<td>Fatty Acids⁸</td>
<td>10</td>
<td>(PUFAs + MUFAs) / SFAs ≥ 2.5</td>
<td>(PUFAs + MUFAs) / SFAs ≤ 1.2</td>
</tr>
<tr>
<td><strong>Moderation (higher score indicates lower consumption)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Refined Grains</td>
<td>10</td>
<td>≤ 1.8 ounce equiv. / 1,000 kcal</td>
<td>≥ 4.3 ounce equiv. / 1,000 kcal</td>
</tr>
<tr>
<td>Sodium</td>
<td>10</td>
<td>≤ 1.1 gram / 1,000 kcal</td>
<td>≥ 2.0 grams / 1,000 kcal</td>
</tr>
<tr>
<td>Empty Calories⁹</td>
<td>20</td>
<td>&lt; 19% of energy</td>
<td>&gt; 50% of energy</td>
</tr>
</tbody>
</table>

**HEI Scoring Standards**

- **Good**: 81-100
- **Needs Improvement**: 51-80
- **Poor**: 0-50

### Healthy Eating Index (HEI-2010)

**N=516 Participants**

#### Table 3. Healthy Eating Index (HEI) scores among foodNEST participants compared to national trends among adults.

<table>
<thead>
<tr>
<th></th>
<th>foodNEST Total (Mean Score)</th>
<th>foodNEST Cleveland (Mean Score)</th>
<th>foodNEST Columbus (Mean Score)</th>
<th>National* (Mean Score)</th>
<th>Maximum Possible HEI Score</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total HEI Score</strong></td>
<td>50.1</td>
<td>49.4</td>
<td>50.8</td>
<td>58.3</td>
<td>100</td>
</tr>
<tr>
<td><strong>HEI Components</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Adequacy Component</strong> (Foods we should eat enough to get the nutrients needed for overall health. Higher score indicates higher consumption)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Fruit</td>
<td>1.6</td>
<td>1.5</td>
<td>1.6</td>
<td>2.6</td>
<td>5</td>
</tr>
<tr>
<td>Whole Fruit</td>
<td>1.3</td>
<td>1.2</td>
<td>1.4</td>
<td>3.5</td>
<td>5</td>
</tr>
<tr>
<td>Total Vegetables</td>
<td>2.6</td>
<td>2.5</td>
<td>2.7</td>
<td>3.5</td>
<td>5</td>
</tr>
<tr>
<td>Greens &amp; Beans</td>
<td>1.3</td>
<td>1.3</td>
<td>1.3</td>
<td>3.6</td>
<td>5</td>
</tr>
<tr>
<td>Whole Grains</td>
<td>2.9</td>
<td>2.9</td>
<td>2.9</td>
<td>2.8</td>
<td>10</td>
</tr>
<tr>
<td>Protein</td>
<td>4.3</td>
<td>4.4</td>
<td>4.3</td>
<td>5.0</td>
<td>5</td>
</tr>
<tr>
<td>Dairy</td>
<td>5.5</td>
<td>5.2</td>
<td>5.7</td>
<td>5.8</td>
<td>10</td>
</tr>
<tr>
<td>Seafood &amp; Plant Proteins</td>
<td>1.3</td>
<td>1.2</td>
<td>1.4</td>
<td>4.0</td>
<td>5</td>
</tr>
<tr>
<td>Fatty Acids</td>
<td>4.7</td>
<td>4.7</td>
<td>4.7</td>
<td>5.0</td>
<td>10</td>
</tr>
<tr>
<td><strong>Moderation Component</strong> (Foods that should be limited or consumed in small amounts. Higher score indicates lower consumption)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Refined Grains</td>
<td>6</td>
<td>6.1</td>
<td>5.9</td>
<td>6.4</td>
<td>10</td>
</tr>
<tr>
<td>Sodium</td>
<td>4.3</td>
<td>4.4</td>
<td>4.1</td>
<td>4.0</td>
<td>10</td>
</tr>
<tr>
<td>Empty Calories</td>
<td>14.4</td>
<td>14</td>
<td>14.6</td>
<td>12.5</td>
<td>20</td>
</tr>
</tbody>
</table>

foodNEST, NIDDK-funded cohort Year 1 data, *Adults 18-64 years, 2011-12, USDA*
### Healthy Eating Index (HEI-2010) N=516 Participants

Table 3. Healthy Eating Index (HEI) scores among foodNEST participants compared to national trends among adults.

<table>
<thead>
<tr>
<th></th>
<th>foodNEST Total (Mean Score)</th>
<th>foodNEST Cleveland (Mean Score)</th>
<th>foodNEST Columbus (Mean Score)</th>
<th>National$ (Mean Score)</th>
<th>Maximum Possible HEI Score</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total HEI Score</strong></td>
<td>50.1</td>
<td>49.4</td>
<td>50.8</td>
<td>58.3</td>
<td>100</td>
</tr>
<tr>
<td><strong>HEI Components</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Adequacy Component</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Fruit</td>
<td>1.6</td>
<td>1.5</td>
<td>1.6</td>
<td>2.6</td>
<td>5</td>
</tr>
<tr>
<td>Whole Fruit</td>
<td>1.3</td>
<td>1.2</td>
<td>1.4</td>
<td>3.5</td>
<td>5</td>
</tr>
<tr>
<td>Total Vegetables</td>
<td>2.6</td>
<td>2.5</td>
<td>2.7</td>
<td>3.5</td>
<td>5</td>
</tr>
<tr>
<td>Greens &amp; Beans</td>
<td>1.3</td>
<td>1.3</td>
<td>1.3</td>
<td>3.6</td>
<td>5</td>
</tr>
<tr>
<td>Whole Grains</td>
<td>2.9</td>
<td>2.9</td>
<td>2.9</td>
<td>2.8</td>
<td>10</td>
</tr>
<tr>
<td>Protein</td>
<td>4.3</td>
<td>4.4</td>
<td>4.3</td>
<td>5.0</td>
<td>5</td>
</tr>
<tr>
<td>Dairy</td>
<td>5.5</td>
<td>5.2</td>
<td>5.7</td>
<td>5.8</td>
<td>10</td>
</tr>
<tr>
<td>Seafood &amp; Plant Proteins</td>
<td>1.3</td>
<td>1.2</td>
<td>1.4</td>
<td>4.0</td>
<td>5</td>
</tr>
<tr>
<td>Fatty Acids</td>
<td>4.7</td>
<td>4.7</td>
<td>4.7</td>
<td>5.0</td>
<td>10</td>
</tr>
<tr>
<td><strong>Moderation Component</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Refined Grains</td>
<td>6</td>
<td>6.1</td>
<td>5.9</td>
<td>6.4</td>
<td>10</td>
</tr>
<tr>
<td>Sodium</td>
<td>4.3</td>
<td>4.4</td>
<td>4.1</td>
<td>4.0</td>
<td>10</td>
</tr>
<tr>
<td>Empty Calories</td>
<td>14.4</td>
<td>14</td>
<td>14.6</td>
<td>12.5</td>
<td>20</td>
</tr>
</tbody>
</table>

foodNEST, NIDDK-funded cohort Year 1 data, $Adolescents 18-64 years, 2011-12, USDA
EXTENDING PRIOR RESEARCH

Liese et al., 2013, Public Health Nutrition
COMMUNITY-LEVEL FOOD ENVIRONMENT BLOCK SCORE

Adapted Versions of…

• Nutrition Environment Measures Survey in Convenience Stores (NEMS-CS) (Cavanaugh et al., 2013)

• Bridging the Gap Community Obesity Measures Project (BTG-COMP) (Bridging the Gap, 2012)

2 trained auditors (97% agreement)

All stores in targeted census tracts + nearest supermarket in adjacent tract (N=55)

Store scores range -13 to 65

Block score – average of all stores within ½ mile of centroid of block
Food Retail Choice Context

NEMS-CS/BTG-COMP Scores

low (≤10), medium (11-29), and high (≥30)

Lower scores are associated with lower availability, higher pricing, and reduced quality of healthy food options as well as higher rates of unhealthy food or product advertising.

COMMUNITY-LEVEL MEASURE PERCEPTION OF FOOD ENVIRONMENT

Think about their neighborhood defined as the area within a 20 minute walk or one mile from their home and rate agreement with the following statements:

(a) A large selection of fruits and vegetables is available in your neighborhood,
(b) The fresh fruits and vegetables in your neighborhood are of high quality, and
(c) A large selection of low-fat products is available in your neighborhood.

Mujahid et al., 2007

Responses to all questions were coded on a 4-point Likert scale (1-strongly disagree, 2-tend to disagree, 3-tend to agree, 4-strongly agree).

Chronbach’s alpha = 0.83
INTERPERSONAL MEASURE
SOCIAL SUPPORT FOR HEALTHY EATING

How often during the past 12 months have members of your family:

(a) Eaten fresh and healthy foods with you
(b) Encouraged you to eat fresh and healthy foods
(c) Told you about fresh and healthy foods and how to prepare them
(d) Prepared fresh and healthy foods with you

How often during the past 12 months have neighbors:

(a) Eaten fresh and healthy foods with you
(b) Encouraged you to eat fresh and healthy foods
(c) Told you about fresh and healthy foods and how to prepare them
(d) Prepared fresh and healthy foods with you

Adapted from Ball et al, 2010; Stanton 2007
Responses options coded on a 5-point Likert scale (1-Never, 2-Hardly Ever, 3-Now and again, 4-Quite Often, 5-Most of the time). Cronbach’s alpha = 0.82
FRESH AND HEALTHY FOODS =

“foods like fresh fruits and vegetables, fresh meats and dairy, and unprocessed foods”
INDIVIDUAL-LEVEL MEASURE
PERCEIVED CONTROL OF HEALTHY EATING

Participants asked to rate agreement with the following statements:

(a) I have enough time to shop for fresh and healthy foods,
(b) It is convenient for me to purchase fresh and healthy foods,
(c) Eating a fresh and healthy diet is affordable, and
(d) It is easy to eat a fresh and healthy diet.

Adapted from Middletown et al., 2011

Responses to all questions were coded on a 4-point Likert scale (1-strongly disagree, 2-tend to disagree, 3-tend to agree, 4-strongly agree).

Chronbach’s alpha = 0.72
INDIVIDUAL-LEVEL MEASURE
HEALTHY EATING IDENTITY

Participants were asked to rate agreement with the following statements:

(a) I am a healthy eating,
(b) I am someone who eats in a nutritious manner, and
(c) I am someone who is careful about what I eat.

Blake et al., 2013

Responses to all questions were coded on a 4-point Likert scale (1-strongly disagree, 2-tend to disagree, 3-tend to agree, 4-strongly agree).

Chronbach’s alpha = 0.86
INTERMEDIATE OUTCOME
FREQUENCY OF FOOD SHOPPING

• Monthly frequency of shopping at supermarkets, supercenters, smaller full-service grocery stores, and warehouse food clubs.

• Store 1 and 2.

• Due to some extreme (and likely implausible) values, we winsorized the data at the 99th percentile.
DATA COLLECTION INNOVATION

Food Hub Implementation Evaluation
LOYALTY APP

Social Events

Food Retail Events
DATA COLLECTION INNOVATION

Biomarker Pilot: Microbiome
Fecal sampling
(with additional support beyond R01)

30 participants

Selected based on baseline HEI score
  Low
  Medium
  High

Goals: To explore relationship between diversity of gut microbiome and HEI.
COMING SOON!
Baseline Analysis 1: Socio-ecological Influences on Healthy Eating Index

Hypothesize all relationships are positive (+)
LESSONS LEARNED
• Complications related to public-private partnership model for community-level interventions.

• Things don’t always go as planned.

• Differences between intervention and comparison community may not be as expected.

• Multiple interventions happening at once.
THANKS! QUESTIONS?

Darcy Freedman
daf96@case.edu

Morgan Taggart
MTaggart@stclairsuperior.org