Measuring Food Environments: A Historical Perspective

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NCI Workshop: Measures of the Food and Built Environments: Enhancing Research Relevant to Policy on Diet, Physical Activity, Weight
Why measure food environments?

- Food environments are complex - and different
- Traditions/ streams of measurement
- Roles for measures in the current obesity epidemic
- Focus forward → toward the present and future
Environments are believed to be important among the multiple levels of determinants of nutrition and physical activity.

Environmental Causes of Obesity

- Increased eating
- Decreased energy expenditure
To make significant progress in the area of eating & nutrition environments...

* we need valid, reliable measures of nutrition environments and policies... that are also practical
An Ecological Framework Depicting the Multiple Influences on What People Eat

- Individual Factors (personal)
  - Cognitions (e.g. attitudes, preferences, knowledge, values)
  - Skills and behaviors
  - Lifestyle
  - Biological (e.g. genes, gender, age)
  - Demographics (e.g. income, race/ethnicity)

- Access
  - Availability
  - Barriers
  - Opportunities

- Practices
  - Legislative, regulatory, or policy actions

- Societal and cultural norms and values
- Food and beverage industry
- Food marketing and media
- Food and agriculture policies
- Economic systems
- Food production & distribution systems
- Government & political structures and policies
- Food assistance programs
- Health care systems
- Land use and transportation

- Physical Environments (settings)
- Macro-level Environments (sectors)
- Social Environment (networks)
- Individual Factors (personal)

- Home
- Worksites
- School, Afterschool
- Child-care
- Neighborhoods & Communities
- Restaurants & fast food outlets
- Supermarkets
- Convenience & corner stores

- Access
- Availability
- Barriers
- Opportunities

- Outcome expectations
- Motivations
- Self-efficacy
- Behavioral capability

- Role modeling
- Social support
- Social norms

Story et al., ARPH, 2007
Social Environment (networks)

Macro-level Environments (sectors)

Physical Environments (settings)

Social Environment (networks)

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- Role modeling
- Social support
- Social norms

Family
Friends
Peers

Story et al., *ARPH*, 2007
Macro-level Environments (sectors)

- Access
- Availability
- Barriers
- Opportunities

Physical Environments (settings)

- Practices
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Story et al., *ARPH*, 2007
Nutrition/Food vs PA Environments

Food is a commodity
Food products are big business
Food is highly regulated
(safety, taxation, hygiene)
Complex (nutrients, foods)
Organizational environments may play a bigger role
Not as advanced as PA environment measures for a range of current needs
Food Environments & Policies: How do they go together?

Policies can shape environments → school food policies, catering policies, price supports, food assistance policies

BUT

Environments often evolve in the absence of specific policies

AND

Policies can be health-promoting or not
Model of Community Nutrition Environments

[Glanz, Sallis, Saelens, & Frank 2005]

Policy Variables

- Government and Industry Policy

Environmental Variables

- Community Nutrition Environments
  - Type & Location of Food Outlets (stores, restaurants)
  - Accessibility – hours of Operation, drive-thru)

- Organizational Nutrition Environments
  - Home
  - Work
  - School
  - Other

Individual Variables

- Socio-demographics
- Psychosocial Factors
- Perceived Nutrition Environments

Behavior

- Eating Patterns

Consumer Nutrition Environment

- Available healthy options
- Price, promotion, placement
- Nutrition Information

Information Environment

- Media, Advertising
Traditions/ Streams of Measuring Food Environments*

- Macro level: food and agriculture policies
- Economics and pricing
- Food marketing and media influences
- Organizational food environments & policies
- Community food environments
- Consumer food environments

* U.S.-focused summary
Government and Industry Policy

- Macro level food & agriculture policy data systems
- Economic and pricing data
Macro Level: Food & Agriculture Policies

Public source: US Department of Agriculture

- Crop production, food disappearance data, price supports
- Regulations for food assistance programs (Food Stamps, WIC, School lunches, etc.)
- Since.... 1895 [began collecting milk and fat production records; 1925 tabulated electronically]

[Image of people working on data]
Economic & Pricing Data (and sales data)

Public sources: US Department of Agriculture – Economic Research Service

Commercial sources: food industry – corporations, industry groups and tracking services

How valid are sources? Historical data—unknown quality/applicability
Soft Drink Single Serving Size, 1950 - 2002

8 ounces
12 ounces
20 ounces
42 ounces

5¢ per oz.
4¢ per oz.
2.3¢ per oz.

Information Environment (Media, Advertising)
with permission from McDonald’s Corporation
Media Use by Food Manufacturers, 1997

- Television ($5.5 billion)
- Magazines ($1.2 billion)
- Radio ($0.26 billion)
- Newspapers ($0.56 billion)

Source: USDA/ERS, 1999
Total Food-Related Advertising, 1999

- Processed Food: $7.2 billion (63%)
- Eating / Drinking Places: $3.4 billion (29%)
- Food Stores: $0.9 billion (8%)

Source: USDA/ERS, 2001
Food Marketing and Media Influences

Television & other broadcast media: tracked by Nielsen Media Research – since the 1920’s

Print and electronic media:
111 media tracking services currently active (a growing business)

Food advertising: tracked by USDA’s Economic Research Svc

Puppets as Fast Food Promotion in 1960-70’s
Organizational Nutrition Environments

Home

Work

School

Other
School Food Environments & Policies

School Health Policies & Programs Study (SHPPS) [CDC]
- Since 1994; all states
- Elementary/ middle/ senior high schools
- Environment issues assessed: vending machines; offerings of fruit, vegetables, french fries, high-fat baked goods

M-SPAN, CATCH, & other studies
- Surveys of food svc managers
- Observations/ analyses of student lunches
- Food service sales data

Limitations (historically):
- Manual recording of on-site data
- Details of instruments & protocols not disseminated (part of larger studies)
Worksite Food Environments & Policies

Mainly used in intervention studies

**Example:** Working Well Trial (Biener, Glanz et al. 1998)
- Multicomponent assessment
- Access to healthy food, nutrition information
- Found to be associated with intervention + self-report

**Example:** Section of CHEW (Australia) (Oldenburg, Sallis, et al. 2002; dev 1995)
- Audit tool, included nutrition information, canteen (cafeteria), vending machines
- Used NHF ‘tick’ to indicate healthful choices
- High reliability (0.8-1.0)
Community & Consumer Nutrition Environments

**Community nutrition environments** =
- Type & location of food outlets
- Accessibility (e.g., hours, drive-thru)

**Consumer nutrition environments** =
- Availability of healthful food choices
- Pricing, promotion, placement
- Information availability
Community Nutrition Environments

- Type & Location of Food Outlets (stores, restaurants)
- Accessibility – hours of Operation, drive-thru)
Grocery Stores

Convenience Stores

Supermarkets
Convenience Stores
Farmer’s Markets
Internet Groceries

Snack Shops
Vending Machines
Restaurants

Fast-food restaurants
Cafeterias
Food courts

Deli, take-out
Bars serving food
Food service, catering
Community Food Environments:  
Objective Data Sources  
Or, ‘where are places to get food’?

Public Sources  
**Government:** Food licenses (retail & food service)  
**Other:** Yellow Pages, Online directories, etc.

Commercial Sources  
Dun & Bradstreet, InfoUSA, others

**Issues:** Completeness? Up-to-date? Accuracy? High turnover  
Wang et al. [IJ BNPA, 2007] –  
• compared sources of historical data on food stores  
• State Board vs business directories: 127 vs 351 food stores  
• State Board had 36 added stores, directories showed 260 more
Consumer Nutrition Environments

• Available healthy options
• Price, promotion, placement
• Nutrition Information
Early Observational Measures of Food Store Environments

Sallis, Nader et al (1986, Pub Health Reports)
• San Diego Food Availability Survey
• Supermarkets, groceries, convenience stores
• Inventory of 71 ‘heart-healthy’ foods
• 78-99% interobserver agreement
• Documented more HH foods in supermarkets (m=56.7) than neighborhood groceries (m=25.7) and convenience stores (m = 12.2)

Cheadle et al. (1989, 1990, others)
• Evaluation of Kaiser Family Fdn healthy communities
• Focused on small # of items (e.g. skim milk); compared healthy to less healthy
• Examined shelf space
Self-Reported Measures of Consumer Nutrition Environments

• **Reports** ['factual'] – e.g., how far to nearest store, where do you shop, where do you eat out?

• **Perceptions** ['opinion/ attitude'] – how easy/hard is it to find...? How expensive are...?

• **Sources of measures/ scales**: not too ‘old’ – Echeverria et al. 2004 (4 items); NQLS study (unpublished)

• **Important distinction!** Report vs perception
Emergence of the current obesity epidemic - roles for food environment measures

- Describe environments & variation across them (including disparities)
- Defined neighborhoods + macro analyses
- Perceived - reported - archival measures
- Assess environment → ID needed interventions
- Evaluate interventions
Focus toward the Present and Future

- Research + practical needs
- Standards for measurement
- Adaptable, disseminable measures
The Fork is in the Road...
Thank you!