Web-based Compilation: Measures of the Food Environment

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Web-based Compilation: Measures of the Food Environment
Outline

- Background on the food environment and compilation of measures
- Overview/demonstration of the website
- Trends from recent articles
- Insights, challenges, next steps
Why is the food environment relevant?
Why is the food environment relevant?
Socio-ecological model
Home
Food stores
Schools
Worksites
Measuring the food environment: macro and micro levels

- **Macro-level assessment**
  - availability and spatial location of food stores, restaurants, and other food environments

- **Micro-level assessment**
  - availability, quality, and cost of foods within environments
Food environment metrics: macro and micro

Macro

Micro

Food environment metrics: macro and micro
Food environment metrics: macro and micro

Macro
- geographic analyses

Micro
- checklists
- interviews/
- questionnaires

Food environment metrics: macro and micro
Food environment measurement: research directions

- Descriptive
- Validation
- Epidemiology
- Natural Experiments
- Interventions
Descriptive research

- What are the characteristics of the food environment in a particular area or city in relation to socioeconomic status or race/ethnic composition?

Franco et al. AJPM 2008

Apparicio et al. IJHG 2007
Epidemiology research

- How does proximity to a supermarket or shelf space allocated to fruits and vegetables in a corner store relate to fruit and vegetable consumption?

- How does density of fast food outlets relate to area-level rates of obesity?
Interventions and Natural Experiments

A farmers' market in a food desert: Evaluating impacts on the price and availability of healthy food

Kristian Larsen, Jason Gilliland

changes in neighbourhood food store environment, food behaviour and body mass index, 1981–1990

May C. Wang, Catherine Cebin, Dave Ahn, and Marilyn A. Winkleby

Public Health Nutrition 11(5), 963–970
Validation research

- Checklists and questionnaires for assessing foods offered in food stores, restaurants, and schools

- Groundtruthing and other assessments of accuracy of geocoded databases
Why a web-based compilation?
Why a web-based compilation?

- Food Environment Work Group
- Workshop on Measures of the Food and Physical Activity Environments: Enhancing Research Relevant to Policy on Diet, Physical Activity, and Weight
  - Instruments & Measures Work Group
- Journal Supplement
  - Compilation by McKinnon et al
  - Work Group summary by Saelens & Glanz
Goals of the Measures of the Food Environment web-based compilation

- Enable access to existing measures of the food environment
- Stimulate the development of the next generation of tools to strengthen research on the effects of the community-level food environment
Outline

- Background on the food environment and compilation of measures
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Searchable database of citations

- Searchable fields include:
  - Food environment
  - Type of measure (instrument, methodology)
  - Psychometric properties
  - Specific populations of interest (e.g., low SES; children, African-American)

Searchable database of citations
Categorizing the food environment

- Food store
- Restaurant
- School
- Worksite
- Macro (food supply)
- (Home)
Classification of measures

• **Instruments**:  
  - Checklists  
  - Inventories  
  - Market basket measures  
  - Interviews/questionnaires

*Instruments shared by authors are available for download.*
Classification of measures

- Methodologies:
  - Geographic analysis
  - Menu analysis
  - Nutrient analysis
  - Sales analysis
  - Food supply analysis
Current status

- Bibliography of almost 300 research articles (updated weekly)
- Inventory of almost 50 instruments
- Listing of recent review articles and commentaries
- Details of funding opportunities related to food environment measures
- Listserv for periodic updates (visit the home page to join)
- >2000 hits/month
Demonstration of the Measures of the Food Environment web-based compilation

https://riskfactor.cancer.gov/mfe
Questions?
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Insights gleaned from web compilation – ‘state of the literature’

- Provides continually updated snapshot of the state of & trends in the field

- Summary statistics and methodological considerations drawn from articles published in 2009/10 (n=97)
Growth in number of research studies published (1990-2010, n=297)

*Reflects articles published to May 2010
Main research directions (2009-2010, n=97)

Jan. 2009-May 2010

Main research directions (2009-2010, n=97)
Geographic analysis is most prevalent methodology (2009-2010, n=97)
Most studies focus on food stores, restaurants and schools (2009-2010, n=97)

*Do not reflect exhaustive review.

Jan. 2009-May 2010

Most studies focus on food stores, restaurants and schools (2009-2010, n=97)
Measures used in research assessing food stores (2009-2010, n=59)
Measures used in research assessing restaurants (2009-2010, n=43)
Measures used in research assessing schools (2009-2010, n=20)
Considerations at the macro level
Defining the area of interest

- Census tract or other administrative boundaries
- Natural boundaries
- Sociodemographic characteristics (e.g., low income or high minority neighborhoods)
- Individual’s perception of his or her ‘neighbourhood’
Complexities in defining the area of interest

- Which area is most relevant:
  - Where an individual/household lives, works, learns, plays?

- How to account for how one interacts with food environments?
  - Networks of travel throughout the day
  - Access to private and public transportation
  - Economic resources that influence where one obtains food
  - Other factors?

Complexities in defining the area of interest
Considering the complexity of interactions with food environments

- Example: supermarket availability in relation to access to public transportation

Larsen & Gilliland, JH+G 2008
What food outlets should be assessed?

- What food outlets are most relevant?
  - All stores selling food? Or only corner stores or supermarkets?
  - All restaurants? Or only fast food outlets?
  - What about other retail outlets that sell food? e.g., gas stations, super stores, etc.

What food outlets should be assessed?
Identifying and mapping food outlets

- Data sources:
  - Commercial databases
  - Yellow pages/business listings
  - Groundtruthing

- Sources of error:
  - Accuracy/completeness of databases/listings, including geographic coordinates
  - Temporal issues
Defining spatial access

- Distance/proximity:
  - Euclidian (straight line)
  - Manhattan (city block)
  - Network (by road or street)

- Travel time:
  - By what mode?

- Density:
  - Buffer (e.g., supermarkets within 1000 m, clustering)
  - Network
  - Cluster
Defining spatial access

- Perceived access:
  - As a proxy for geographic access
  - As a predictor of diet or disease outcomes in its own right
Defining spatial access

- What thresholds are most relevant?
  - How close to a grocery store is close enough?
  - How many grocery stores or fast food restaurants should be in a neighborhood?
  - Are ratios of one type of outlet to another meaningful?
Considerations at the micro level
What aspects at the micro level are most relevant?

- What features of the environment to focus on?
- Food
  - Availability/shelf space
  - Cost
  - Quality
- Other factors
  - Accommodations for disabilities
  - Other?

What aspects at the micro level are most relevant?
What foods should be assessed?

- ‘Total diet’ type of approach
  - Inventory or market basket

- Indicator foods
  - Checklists
    - Fruits and vegetables
    - Salty or sugary snacks
What tools should be used to assess the food environment at the micro level?

- What is the most appropriate tool?
  - Inventory
  - Market basket
  - Checklist
  - Index
  - Other?

- Is there a gold standard?
- How should validity and reliability be assessed?
Linking to individual- or area-level data on diet, disease, or sociodemographics

- What individual- or area-level data are being used:
  - As outcome data (e.g., to assess the impact of the food environment on diet or disease?)
  - As covariates (e.g., to adjust for socioeconomic status or behavioral factors such as shopping preferences)

- Similar data quality considerations should apply to all study variables, regardless of food environment(s) assessed or measure(s) used
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Insights from reviews and commentaries

- Over 30 review articles and commentaries published in past 5 years
  - In 2010: 7 published already
    (Health & Place, Journal of Nutrition, Public Health Nutrition, JADA)
Insights from reviews and commentaries

- Focus not only on conclusions from existing research, but also methodologic challenges and recommendations for the future
Key challenges

- Lack of conceptual framework for data collection and analysis
- Lack of well-defined metrics for key concepts
- Lack of research with combined metrics (macro and micro)
- Lack of validated instruments and standards for spatial analyses means that most studies are not comparable
Key challenges

- Most research focuses on local communities, small areas
- Heterogeneity and lack of comparability across studies leads to a fragmented understanding of food environments at state/national levels
Key challenges

- Is it feasible/desirable to create a system of food environment surveillance at the state or national levels?
  - What metrics are most important?
  - What levels of the socio-ecologic framework are most relevant?
  - What about measures of perception of the food environment? How do subjective and objective measures compare?
Next steps for food environment research

- Include well-defined conceptual framework for data collection and analysis
- Create clearly defined metrics for key concepts
- Develop standards/protocols for measuring environments at both micro- and macro- levels
- Encourage research that accounts for complexity inherent in food environments and combines data at micro- and macro- levels

Next steps for food environment research
Next steps for food environment research

- Emphasize validity and reliability of measures

- Encourage use of food environment data with robust individual-level data for the purposes of assessing relevance of various features of the food environment to diet and disease outcomes

- Develop peer review guidelines for publications related to measurement of food environments for major journals publishing in this field
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Macro

Micro

Food environment metrics: macro and micro
How can the web-based compilation facilitate rigorous methods and validated instruments?

- Highlight research that uses metrics at macro and micro levels?
- More heavily emphasize research using validated measures and provide more specific data on psychometrics?
- Create a separate section for validation-related research?
- Post validated instruments only?
- Other strategies?

How can the web-based compilation facilitate rigorous methods and validated instruments?
Next steps for web-based compilation

- Revisit goals
  - Enable access to existing measures of the food environment
  - Stimulate the development of the next generation of tools to strengthen research on the effects of the community-level food environment

- Consider how goals should evolve

- Consider how the compilation can be structured to best meet goals

Next steps for web-based compilation
Measures of the Food Environment
web-based compilation

- [https://riskfactor.cancer.gov/mfe](https://riskfactor.cancer.gov/mfe)

- Listserv for periodic updates: visit the home page - [https://riskfactor.cancer.gov/mfe](https://riskfactor.cancer.gov/mfe) - to join

- Questions, comments or to share an article or instrument:
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