Assessment of dietary outcomes in food environment research: A barrier to policy and programs to support healthy eating?

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SUMMARY

- **Purpose:** To evaluate approaches to assessing dietary outcomes within the field of food environment research.
- **Methods:** Review of studies published between January 2007 and May 2011, identified from the U.S. National Cancer Institute's Measures of the Food Environment website.
- **Results:**
  - Examination of 71 food environment studies that included at least one measure of dietary intake indicates a tendency toward the use of dietary assessment instruments with low cost and respondent burden at the expense of accuracy and precision.
    - Almost one in three studies made use of a screener and >15% used only 1-2 questions to assess dietary intakes.
    - About 30% of studies made use of a food frequency questionnaire.
    - More detailed methods, such as 24-hour recalls or records, were used in about one in five studies.
- **Conclusions**:
  - Measurement error in dietary intake data collected as part of food environment studies:
    - May be substantial, particularly if estimates are based on brief instruments and appropriate analytic methods are not employed.
    - May lead to spurious findings and reduced statistical power to detect relationships between features of food environments and diet.

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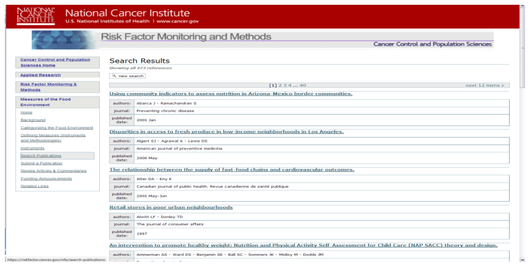
BACKGROUND

- Significant growth in research examining the impact of food environment features on health outcomes, including obesity and diet.
- Difficult to draw conclusions from this literature due to methodologic differences among studies and lack of accuracy and precision in dietary measures.
  - Self-report dietary assessment data contain significant measurement error.
  - The type and extent of error and the effects on study results depend on the assessment instruments used and analytic methods employed.
- The aim of this study is to examine dietary measures used in food environment research.

METHODS

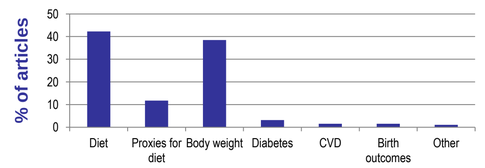
- Review of studies published between January 2007 and May 2011, identified through examination of the U.S. National Cancer Institute's Measures of the Food Environment website (riskfactor.cancer.gov/mfe).
  - Updated weekly using PubMed searches and key terms including food environment and food deserts.



RESULTS

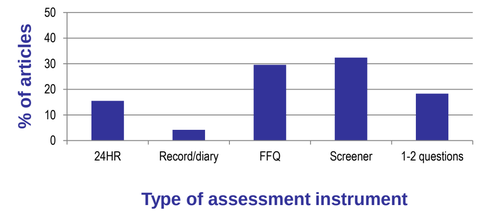
- 187 studies assessed a relationship between food environment features and a health outcome (Fig. 1).

Figure 1: Outcomes assessed in articles examining relationships between food environment features and health (n=187).



- 71 studies included at least one measure of dietary intake.
- Tendency toward the use of brief assessment instruments (e.g., screeners, 1-2 questions) that tend to be less expensive to administer and impose less respondent burden in comparison to more detailed methods (Fig. 2).

Figure 2: Type of dietary intake assessment instruments used in studies examining relationships between food environment features and diet (n=71).



24HR = 24-hour recall; FFQ = food frequency questionnaire

- Little use of established techniques to calibrate data from brief instruments, such as screeners, to reduce error.
- The existence of extensive error in dietary intake data and the potential impact on study findings are rarely discussed.
- Common focus on 'indicator foods', such as fruits and vegetables or salty or sugary snacks, may hinder understanding of relevance of food environment to total diet.

DISCUSSION

- Tendency for food environment researchers to employ dietary assessment instruments that are low in cost and respondent burden at the expense of accuracy and precision.
- Error in intake data can:
  - Mask relationships that actually exist.
  - Reduce statistical power.
  - Result in spurious findings.

} Barrier to environmental-level policy and program interventions to facilitate healthy eating.

RECOMMENDATIONS

- Use detailed and precise measures for all study variables, including dietary outcomes.
- Take advantage of technological advances to collect more detailed dietary data.
- Adopt techniques from other fields of nutrition to reduce and correct for measurement error in dietary data.