Food Insecurity and Childhood Obesity

Craig Gundersen
University of Illinois

This research was supported by the National Research Initiative of the USDA Cooperative State Research, Education and Extension Service, grant 2007-35215-17871
Conclusions

- Is food insecurity associated with numerous negative health outcomes?
  - YES
  - Work since 2005:
    - Chilton and Booth (2007)
    - Cook et al. (2006)
    - Eicher-Miller et al. (2009)
    - Gundersen and Kreider (2009)
    - Hernandez and Jacknowitz (2009)
    - Jyoti et al. (2005)
    - Kirkpatrick et al. (2010)
    - Rose-Jacobs et al. (2008)
    - Skalicky et al. (2006)
    - Slack and Yoo (2005)
    - Whitaker et al. (2006)
    - Yoo et al. (2009)
    - Zaslow et al. (2009)
Conclusions

- Are children in food insecure households more likely to be obese?
  - Probably not
    - Larson and Story (2010)

- In combination with other factors, are children in food insecure households more likely to be obese?
  - Some evidence

- In combination with other factors, are children in food insecure households less likely to be obese?
  - Some evidence
Defining Food Insecurity

- A household’s food insecurity status is based on responses to 18 questions in the Core Food Security Module (CFSM)
- Examples of questions:
  - “I worried whether our food would run out before we got money to buy more”
  - “Did you or the other adults in your household ever cut the size of your meals or skip meals because there wasn’t enough money for food”
  - “Were you ever hungry but did not eat because you couldn’t afford enough food”
  - “Did a child in the household ever not eat for a full day because you couldn’t afford enough food”
- Categories
  - Food insecure if have 3 or more affirmative responses
  - Very low food secure if have 8 or more affirmative responses
    - 6 or more for households without children
  - Very low food security among children if have 5 or more affirmative responses to child-specific questions
Reviews of some papers

- For direct relationship of food insecure, confine discussions to papers using
  - Measures of obesity collected by trained personnel
    - Lyons et al. (2007)
  - Measures of food insecurity using the Core Food Security Module (18-item or 6-item)
  - Most recent paper using a particular method
  - Samples of children including at least some children over the age of 2
  - Took seriously main conclusion
Multiple Measures of Obesity

- Data – 2001-2004 National Health and Nutrition Examination Survey (NHANES)
  - Sample of all children between ages 8 and 17
  - Sample of children in households under 200% of the poverty line
- Measures of obesity - BMI, waist circumference, triceps skinfold thickness, trunk fat mass, body fat
- Logistic regression models
- Findings
  - No relationship between food insecurity and childhood obesity for full sample
  - No relationship between food insecurity and childhood obesity for
    - white, non-Hispanic children
    - black, non-Hispanic children
    - Hispanic children
    - boys
    - girls

Longitudinal Analyses

• Data from Early Childhood Longitudinal Study, 1999-2003

• Measures
  • “Obesity” – level of BMI
  • Food insecurity levels

• Dynamic random effects models

• Findings
  • No effect of level of food insecurity on BMI

Counterfactuals

- Do not know potential effect of food insecurity on obesity for food secure children and do not know potential effect of food security on obesity for food insecure children

- Average Treatment Effect bounds for 
  \[ \Delta = P(OB=1 | FI=1) - P(OB=1 | FI=0) \]
  \[ [-0.424, 0.039] \]
  - under assumptions of MIV

  \[ \Delta = P(PFH=1 | FI=1) - P(PFH=1 | FI=0) \]
  \[ [0.014, 0.035] \]
  - under assumptions of MIV, MTS, and MTR

Food Insecurity and Stress (1)

- Data from the Three-City Study
  - Sample of all children between ages 10 and 15
  - Virtually all children have incomes below 200% of the poverty line
  - Indices of stress
    - individual, maternal, family
- Central findings
  - Increased levels of individual stressors lead to increases in probabilities of obesity
  - Increased levels of maternal stressors lead to increases in probabilities of obesity for food insecure children

Food Insecurity and Stress (2)

• Data from the 1999-2002 NHANES
  • Sample of all children between ages 3 and 17
  • Restricted to incomes below 200% of the poverty line
  • Cumulative index of stress
    • based on mental, physical, financial, and family structure stressors

• Central findings
  • For children under the age of 10, increased levels of stress led to increases in probabilities of obesity for food secure children

Policy Issues

- Would reductions in poverty lead to reductions in childhood obesity?
  - YES
  - Recent work:
    - Miech et al. (2006), Ogden et al. (2007), Phipps et al. (2006), Shrewsbury and Wardle (2008), Singh et al. (2008)

- Would reductions in stress lead to reductions in childhood obesity?
  - YES
  - Recent work:
    - Crossman et al. (2006), Garasky et al. (2009), Gibson et al. (2007), Koch et al. (2008), Stenhammar et al. (2010), Zeller et al. (2007), Franko et al. (2005), Sweeting et al. (2005), Van Jaarsveld et al. (2009)

- Would reductions in food insecurity lead to reductions in childhood obesity?
  - No
Role of SNAP

- Demonstrated ability of SNAP to alleviate food insecurity
  
- Subsequent impacts of SNAP on obesity are unlikely

- But, SNAP leads to reductions in
  
  - Poverty
    - Jolliffe et al. (2005)
    - Subsequent reductions in obesity
  
  - Stress
    - As a social safety net
    - Subsequent reductions in obesity
Future Research Directions

- Should scarce research dollars be spent studying the connection between food insecurity and childhood obesity?
  - No
    - Has been extensively studied; not clear that even more research in this area is needed

- How should scarce research dollars instead be spent?
  - What are the determinants of very low food security among children?
    - Consistent with the goal to eliminate childhood hunger by 2015
  - What is the effect of stress among low-income households on childhood obesity?
    - Early work demonstrates that the effects of stress are very large
  - And, if food insecurity did end up being associated with obesity, these results would be relevant