

Assessment and Surveillance of Child Food Insecurity and Hunger

Edward Frongillo

Eliza Fishbein

Maryah Fram

Department of Health Promotion, Education,
and Behavior and College of Social Work
University of South Carolina



Outline

1. Aim
2. Conceptualization of food insecurity and hunger
3. Conceptualization of assessment and measurement
4. Current assessment method
5. Current assessment system
6. Direct assessment of children
7. Improving assessment of child food insecurity and hunger

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1. Aim

- Address what we know about the adequacy of the current assessment approach, in both conceptualization and implementation
 - Does it capture key dimensions?
 - Are we missing important populations (i.e., homeless)?
 - Does it adequately describe the experience of all in household?
 - What should be done to improve assessment?
- How should research funds be invested?
 - Enhance current surveillance system
 - Augment current surveillance system

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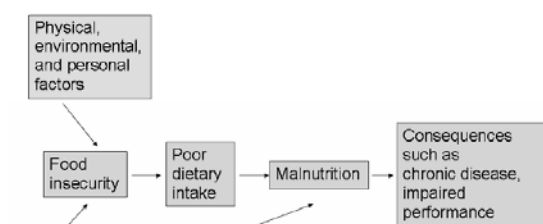
2. Conceptualization of food security

- Access to enough food for an active, healthy life
- Includes at a minimum
 - ready availability of nutritionally adequate and safe foods
 - assured ability to acquire acceptable foods in socially acceptable ways

LSRO (1989)

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Core concepts related to nutritional state



LSRO (1989)

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Prioritization of mothers' perspectives

- Food decision-makers and primary actors in acquiring and managing food
- More likely to be food-insecure (especially if single mother)
- Most of what we think we know about child FI based on report from mothers
 - Food security is household issue involving a managed process
 - Parents sacrifice, try to buffer children against suffering



Radimer et al.(1992), CCHIP (1992)

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Quantitative domain

Severity	Description
Least	Food depletion: Low food stocks but adequate calories
More	Having to eat less food than usual
Most	One or more days without food, actual "hunger"

Wolfe et al. (2003) [Radimer et al. (1992), Hamelin et al. (2002)]⁷

Qualitative domain

Severity	Description
Least	Having to buy and eat less-preferred foods (not actual FI)
More	Having to eat a nutritionally inadequate diet
Most	Not being able to eat the right food and meals for health

Wolfe et al. (2003) [Radimer et al. (1992), Hamelin et al. (2002)]⁸

Psychological Domain

(Knowledge and perception of food situation, how they feel about it)

- Uncertain food situation and not right foods for health lead to feelings of worry and anxiety
- Lack of choice and need to make compromises lead to feelings of deprivation and depression

Wolfe et al. (2003) [Radimer et al. (1992), Hamelin et al. (2002)]⁹

Social Domain

- Accessing food in socially unacceptable ways:
 - Food pantry
 - Having to ask others for food or meals
 - Borrowing money for food
 - Buying food on credit
- Socially or culturally less normative patterns of eating

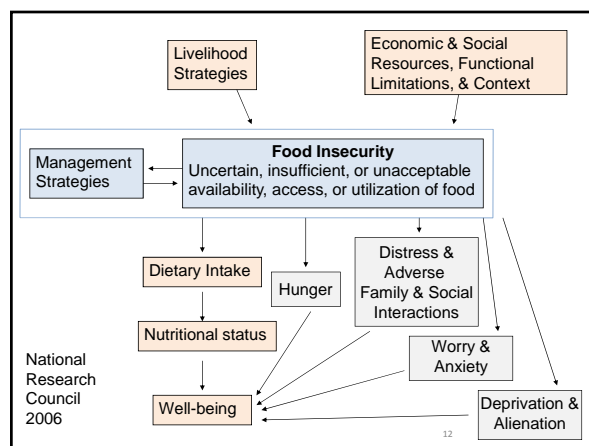
Wolfe et al. (2003) [Radimer et al. (1992), Hamelin et al. (2002)]¹⁰

Children in (even marginally) food-insecure households do poorly in many ways

- Behavior
- Mental health
- Social
- Academic
- Developmental trajectories
- Hospitalizations
- Obesity

National Research Council 2006; Alaimo, Olson & Frongillo 2001, 2002; Slack & Yoo 2005; Jyoti, Frongillo & Jones 2005; Cook et al. 2006; Cook et al. 2013

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Child awareness of and responsibility for FI

Cognitive	Knowing about food scarcity and family challenges created by it
Emotional	Feelings such as worry, sadness, or anger
Physical	Physical feelings such as hunger, pain, tiredness, and weakness at home
Participation	Going along with adult strategies for managing scarce food resources
Initiative	Initiating strategies to make existing food resources stretch
Resource generation	Taking action to attain additional food or money for buying food

Funded by ERS-SRDC-RIDGE

Fram et al. (2011), Bernal et al. (2012)

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Food insecurity in families

- Parents try to provide quality and quantity of food, and emotional support around eating
- Parents not fully successful at protecting children
- Protection is attempted in multiple directions:
 - Parents to children
 - Parent to parent
 - Children to parents (especially mothers)
 - Children to children (especially younger and poorer)
- Children live adult roles (e.g., chores, labor)



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Roles and myths

- Mothers
 - Manager
 - Protect children
- Fathers
 - Provider
 - Protect wife and children
- Children
 - Active contributor
 - Protect other children and parents (including myth)



Frangillo (2013)

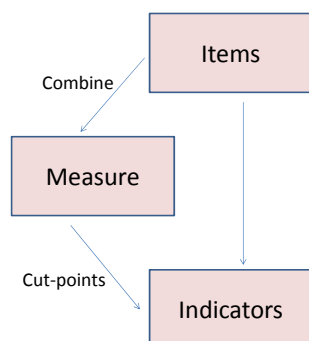
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3. Assessment and measurement

- Measure
 - Assign numbers to represent whether a person or thing is higher or lower on some characteristic of interest
 - Obtained through the application of tools or instruments
- Indicator
 - Demonstrate an aspect of the characteristic for person or thing (or identify those with the aspect)
 - Derived from one or more measures or directly from tool or instrument

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Assessment



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Scales as measures

- Item response theory
- Scale comprised of multiple items has greater reliability than single item
- Assumptions for a unidimensional scale
 - One underlying construct
 - Frequency of affirmation is function of severity (i.e., severe indications occur comparatively infrequently)

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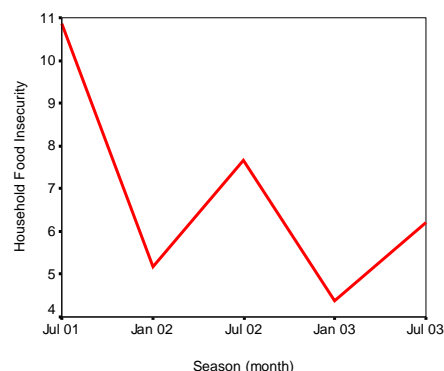
Options for constructing indicators

1. Create scale, and report average
2. Create scale, and construct ordinal categories by making cut-points on scale based on distribution
3. Create scale, and construct ordinal categories by making cut-points on scale based on specific meaning of items
4. Construct nominal categories based on specific meaning of items, not using scale

Frongillo, Nanama, Wolfe (2004)

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Household food insecurity by season in northern Burkina Faso



Frongillo, Nanama (2006)

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Household food insecurity in northern Burkina Faso (%)

Categories	# of items	3. Scale, specific meaning	4. No scale, specific meaning
Food secure		11	11
Uncertainty and worry about providing adequate food	2	45	33
Reduction of consumption or consumption of undesirable foods	5	40	43
Engagement in actions that compromise dignity or resilience	4	4	13

Frongillo, Nanama, Wolfe (2004)

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Purposes for **groups** of households or individuals

Purpose	Question
Estimation of prevalence	How many are affected?
Determination of causes and consequences	Why are they affected and what are effects?
Early warning	When is action needed?
Targeting	Who will receive which action?
Monitoring	How is the situation changing?
Impact evaluation	Has the action made a difference?

Frongillo (1999)

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Purposes for **separate** households or individuals

Purpose	Question
Screening	Is the household or individual at risk?
Diagnosis of problem	Does the household or individual have the problem, and what are the salient causes?
Diagnosis of solution	What is the most appropriate action?
Monitoring	How is the situation changing?

Frongillo (1999)

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4. Current assessment method: Purposes

- HFFSM deployed in 1995
- Intended purposes for groups of households
 - Estimate prevalence
 - Monitor
- Other purposes for groups of households
 - Determination of causes and consequences
 - Impact evaluation
- Other purposes for separate households
 - Screening
 - Diagnosis of problem

Frongillo et al. (1997), Wolfe et al. (1998), Frongillo (1999), Frongillo and Nanama (2006)

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Current assessment method: Assumptions

- Focuses on households (and children), on access constrained by money
- Mixture of items
 - Refer to household, adults, children
 - Statements and questions
- Covers some domains, not all
 - Quantitative (many items)
 - Qualitative (few items)
 - Psychological (one item on worry & anxiety, none on deprivation)
- Unidimensional scale
 - Assumes frequency = severity
 - Selected only items that fit
 - Cut-points based on specific meaning (meaning now suppressed)

National Research Council (2006)

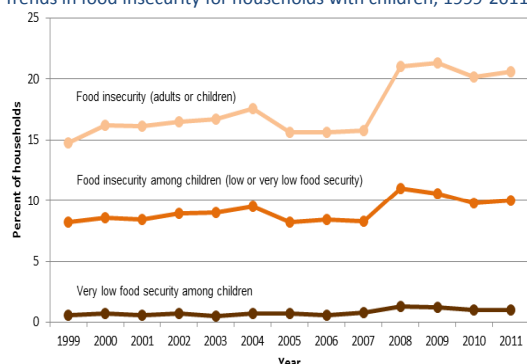
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5. Current assessment system

- Coverage of population
 - Institutionalized
 - Military
 - Indigenous
 - Homeless and marginally housed
 - Chronic disease (e.g., HIV, diabetes)
 - Mental illness
 - Ethnic groups, immigrants
- Samples with child food insecurity and hunger
 - Households with very low food security
 - Size of samples

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Trends in food insecurity for households with children, 1999-2011



Source: USDA, Economic Research Service calculations based on Current Population Survey Food Security Supplement data

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6. Direct assessment of children

- Child-report questionnaire adapted selected items from HFSSM for use with children 12-17 y (Connell et al., 2005)
 - Assumes children and adults have same experiences, just requiring use of different language
 - Reflects adult concerns, problems, and ways of thinking (e.g., conditioning on money)
- Poor agreement between adult and adolescent reports in NHANES (Nord and Hanson, 2013)
 - Adolescents' self-reported food insecurity more common than adult report
 - Only weakly associated with adult reports of adolescents' food insecurity
- Similar poor agreement in Ethiopia (Hadley et al., 2008), Venezuela (Bernal et al.), and South Carolina (Fram et al., in press)

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Parental knowledge of child experiences

- Parents not fully knowledgeable of child food-insecurity experiences
 - Lack of communication
 - Efforts to protect each other
- Qualitative study of 16 families
 - For children with cognitive and emotional awareness, about half of parents knew
 - For children with physical awareness, initiation, and resource generation, no parents knew

Escobar-Alegría et al. (2012)

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Accuracy of child and parent report (n=87)

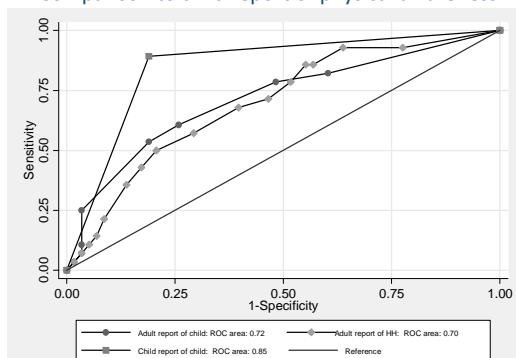
Domain	ROC area	Prev indicator (%)	Prev definitive (%)
Cognitive	0.77	63	64
Emotional	0.78	67	55
Physical	0.85	43	33
Participation	0.64	66	56
Initiation	0.80	51	47
Generation	0.66	41	23
Cognitive	0.61	53	66
Physical	0.65	15	33

Funded by ERS-SRDC-RIDGE

Fram et al. (in press)

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Comparison to child report of physical awareness



Fram et al. (in press)

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7. Improving assessment of child food insecurity and hunger

1. FI is powerful stressor and marker of other stressors
2. Children are accurate reporters of their own FI experiences
3. Parents are inaccurate reporters of their children's experiences
4. Current U.S. parent-report system likely underestimates prevalence of child food insecurity and hunger
5. Current system in U.S. using HFSSM valuable for monitoring prevalence of household food insecurity (and research)
6. Other system(s) with accurate instrument needed to assess:
 - Ways in which children experience food insecurity
 - How many children have those experiences
 - Which children have those experiences
 - Which actions will ameliorate those experiences

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What are most salient causes and domains of FI in children?

- Causes
 - Lack of money (major cause)
 - Parental physical and mental health
 - Transportation barriers to accessing food in stores or sources of food assistance
 - Parent work demands and schedule (e.g., not available to cook)
 - Stigma
- Domains
 - Awareness (cognitive, emotional, physical)
 - Responsibility (participation, initiation, resource generation)

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Identifying and responding to child food insecurity and hunger

- Need an assessment system that builds on existing systems
- Schools already respond formally and informally in haphazard ways
 - Formal lunch, breakfast, and snack programs
 - About 53% of teachers nationally purchased extra food to give to students without sufficient food to eat (Share Our Strength, 2012)
 - Holiday food baskets, in-school food pantries, food backpacks
- Schools are a place
 - Where food insecurity is seen
 - To get food
 - Where secrecy is important
- Need to potentiate schools as system for child food insecurity
 - Education and training of school personnel
 - Systematic attention to problem and responses
 - Meaningful assessment and holistic response

Funded by Nord Family Foundation via United Way Fram et al. (submitted)

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Public-health and systems approach

- Other community systems needed to augment school systems
 - Schools only reach school-age children
 - Schools cannot operate effectively in a vacuum
 - Food augmentation often not best response, can be harmful
- Holistic community assessment and response works for other forms of abuse and neglect: U.S. Triple P System Population Trial
 - 18 counties randomly assigned to Triple P system vs. usual
 - Training for existing workforce (>600 service providers), universal media and communication strategies
 - Large effects on reducing
 - Substantiated child maltreatment
 - Child out-of-home placements
 - Child maltreatment injuries

Prinz et al. (2009)

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Ending child food hunger requires

- Thinking based on
 - Systems
 - Public health
 - Resource realism
 - Holism regarding children and families
- Assessment instruments and systems to directly and accurately identify children with FI
 - Questionnaire covering all domains of child FI
 - Observation
- Developing resources and protocols for actions that can help when child with FI is identified
- Training school personnel, nurses, pediatricians, clergy, and other helping professionals who come in contact with children to assess, identify, target, act, and monitor

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Measurement and Surveillance of Child Food Insecurity and Hunger

Discussant Comments
Mark Nord
Economic Research Service
USDA

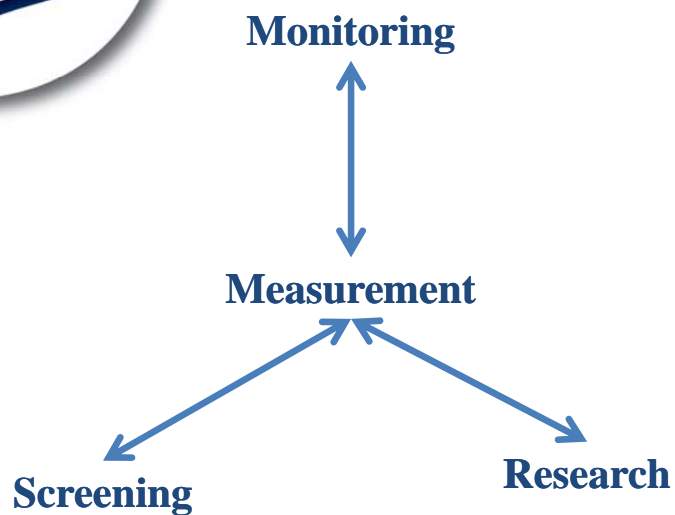
National Academies Workshop on Research Gaps—Causes and
Consequences of Child Food Insecurity and Hunger

April 8-9, 2013



United States Department of Agriculture
Economic Research Service

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Purpose of monitoring:

- **To retain and improve an effective, efficient program and policy framework to prevent or minimize the extent and severity of childhood hunger and food insecurity**
- **Maintain public and policy-official awareness and understanding of extent and severity of children's food insecurity**
- **Document trends over time and distribution by relevant household characteristics and geography**



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Measurement requirements for monitoring:

- **Credible, consistent, timely measurement**
- **Understandable to policy officials and public**
- **At appropriate geographic level**
- **Publicly accessible information**
- **Regularly interjected into policy and program consideration**
- **Prevalence is key, some measurement error is ok if random relative to reported categories**
- **Method must be implementable at large scale**



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Purpose of screening:

- **To identify specific cases needing a specific intervention (or one of several available)**

Measurement requirements for screening:

- **High sensitivity**
- **Reasonable specificity**
- **Low burden**
- **Suitable for context**



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Purpose of research:

- **To identify causes and consequences of FI**
- **To gauge effectiveness of programs and policies**
- **To assess quality and characteristics of the measure**

Measurement requirements for research

- **Low measurement error (both random and systematic)**
- **Collectible from population of interest**



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Current issues in measurement:

- **Measuring frequent or persistent food insecurity within the survey year**
- **Improving the household-level measure in households with children**
 - **Problems with current measure**
 - **Overstates food insecurity and understates very low food security in households with children relative to those without children**
 - **Biases vary depending on ages of children**
 - **Solution: Cross-classify by adult and child measures**



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Research needed in measurement:

- **Understanding differences between youth and adult-proxy-reports of youth's food security**
 - **Bio-markers of recent nutritional status in NHANES for youth who self-report personal food security**
 - **Get household proxy report to standard child food security questions in qualitative studies of youth perceptions.**



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For more information....

<http://ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-us.aspx>



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The Childhood Hunger Coalition's Screen and Intervene Pilot Project


Workshop on Research Gaps—Causes and Consequences of Child and Food Insecurity and Hunger, April 9, 2013

Liz Adams, Oregon Health & Science University, adamse@ohsu.edu
Childhood Hunger Coalition
<http://www.childhoodhunger.org/>


Overview




- Childhood Hunger Coalition
- CHC's pilot screening project
 - Update on work in progress
- Lessons learned to date
- Knowledge gaps and research




Childhood Hunger Coalition




- Formed in 2007
- Interdisciplinary collaborative of health care and public health providers and anti-hunger advocates.
- Guided by a steering committee that includes
 - Oregon Food Bank
 - Kaiser Permanente
 - Partners for a Hunger Free Oregon
 - OSU Extension
 - Oregon Health and Science University
 - Oregon Health Authority




Focus on hunger as a public health concern




- CHC works to eliminate public health problems caused by childhood hunger.
 - Believes that health care providers can help identify hunger and connect families with food assistance resources.
 - Provides research, education and outreach to health care providers on the link between food insecurity and poor health outcomes.




Engaging with Oregon health care providers




- 2008 survey of Oregon health care providers
 - found that providers are very supportive (nearly 90%) of screening for hunger, but time constraints and other barriers exist.
 - providers indicated their willingness to use screening questions if provided.
 - want to offer assistance.



Conclusions



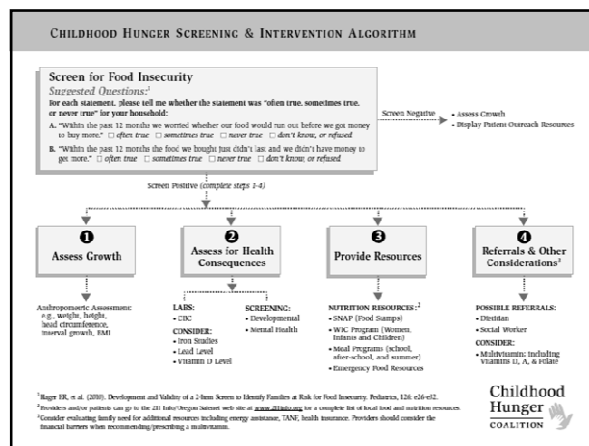
- Pediatric clinical setting an ideal place to address hunger, but not always utilized due to barriers.
 - time in the clinical visit as the main barrier.
 - Other barriers include discomfort in discussing food insecurity and inadequate knowledge about the topic.
- Addressing concerns and standardized screening procedures may increase monitoring behaviors.
- Identified need for providing information and resources on this topic.



Develop educational materials for providers

Childhood Hunger COALITION

- 2-question screen and intervene algorithm
- Online continuing medical education course, www.ecampus.oregonstate.edu/hunger
- Educational toolkits
- Quarterly Digest
- Website, www.childhoodhunger.org



Provide information on food assistance programs

Childhood Hunger COALITION

Call WIC Today

Your child has you, and you have WIC.
 A nutrition program for women, infants and children.

- Pregnant?
- Breastfeeding?
- Family with a child under age 5?

Call 1-800-SAFENET (1-800-773-3638)

Pilot of food security screening & intervention

Childhood Hunger COALITION

- Oregon Food Bank and OHSU collaborating to test feasibility and impact of clinic-based food security screening and intervention.
- Piloting at 2 pediatric clinic sites.
- Quantify food insecurity and changes in use of resources.
- Assess impact on families and clinic.
- Develop best practices and lessons learned that can be shared broadly.

Protocol

Screening and Intervention protocol

- Physicians screen as routine care, provide link to resources, and follow up per clinical judgment.
- Interventions are not standardized, but may be based on the CHC algorithm.

Recruitment and Enrollment

- Families of children <18 y screened positive between 12/2012 and 3/2013 are eligible. Follow 1st child.
- Researcher reviews protocol, answers questions, and obtains informed consent from parent/guardian.

Electronic Medical Record after visit summary

Food Resources in Your Community Multnomah County

This booklet can help you learn about resources in your community that provide food or help you make your food last through the month.

It provides information on access to such programs and services as:

- OregonHelps Website
- Supplemental Nutrition Assistance Program (SNAP)
- WIC
- Child Nutrition Programs
- Emergency Foods
- Gardening
- Cleaning
- Farmer's Markets

Protocol

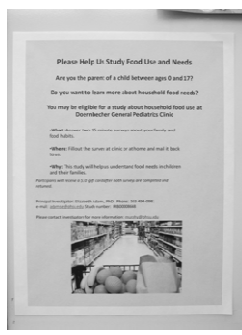


Baseline questionnaire:

Child health, household characteristics, food program use, core food security module questions over last 6 months, including child questions.

6 month follow up questionnaire:

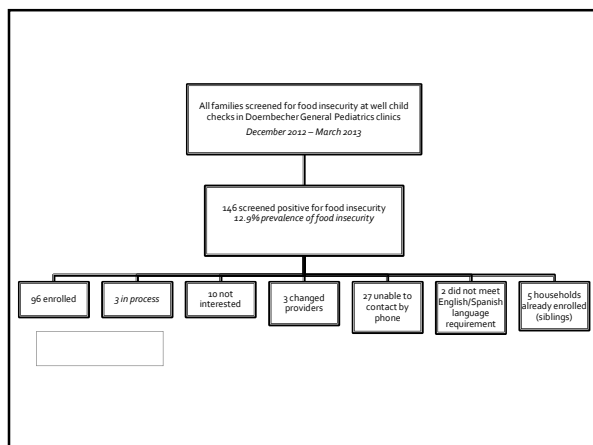
change in child & parent health, household characteristics, food program use, CFMS over last 6 months.



Initial observations: patient recruitment



- 1,130 patients screened over 4 months.
- 146 households screened positive for food insecurity (12.9%).
- Providers have been enthusiastic about project and surprised by number of families screening positive.
- Families have appreciated the issue being raised.



Lessons learned and future practice



- The pilot will help inform an **evidence-based model** for food insecurity assessment and intervention in outpatient and educational settings in Oregon.
- Worked well:** engagement of families and providers, standard screen/referral approach within EMR.
- Barriers:** Sensitivity of topic for documentation; time constraints (family and clinical), social situations.



Discussion of session:

- Importance of system to better assess and monitor child experiences of FI.
 - Parent-child discrepancy in experiences.
- Public health approach to address child food insecurity.
 - Coordinate efforts of public health, medical, education programs working to improve health and developmental outcomes of children.
 - Multitude of motivated partners focus on child health.



What are the gaps in knowledge?

- Knowledge gaps:
 - Special needs populations—better understand experiences of food insecurity, triggers and outcomes; consider implications for assessment and monitoring needs.
 - Root causes of hunger (all children).
 - Generational patterns of food insecurity; life course determinants and experiences need to be taken into consideration.
 - Community-based resource systems.

How to get from here to there?

- Data to address gaps:
 - Head start, schools/school-based health centers
 - Surveillance systems (PRAMS, BRFSS)
 - Regional clinical health information networks
- Research opportunities:
 - Collaborate with existing programs
 - Integrate FS research with emerging healthcare & education transformations
 - Quantify impact of program and policy changes

- Research team:
 - Liz Adams
 - Dana Hargunani
 - Beth Cohen
 - Laurel Hoffman
- Childhood Hunger Coalition



Session 8

Measurement and Surveillance of Child Food Insecurity and Hunger

Maureen Black, Ph.D.
Division of Growth & Nutrition
Department of Pediatrics
University of Maryland School of Medicine
mblack@peds.umaryland.edu

Outline

- Global Measure of Food Insecurity
 - Over 90% of world's children live in developing countries
- Food Insecurity Screener
- Parental Assessment of Body Size

Household Food Access & Child Malnutrition

- Food Insecurity
 - Availability: population
 - Access: household
 - Utilization: individual
- Malnutrition - associated with 50% child deaths worldwide
 - Stunting: chronic
 - Wasting: acute
- How food insecurity relates to child stunting and wasting

Psaki et al. Population Health Metrics 2012, 10:24

MAL-ED

- Eight countries
 - Bangladesh, Brazil, India, Nepal, Pakistan, Peru, South Africa, Tanzania
- Families (N=800)
 - Child Age: 24-60 months

Psaki et al. Population Health Metrics 2012, 10:24

Global estimates of Stunting in children <5 years

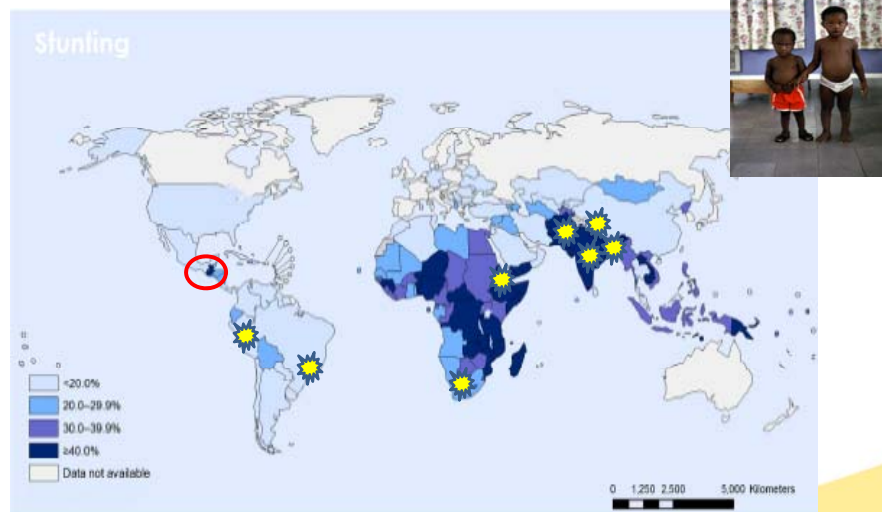


Figure 2. Latest country prevalence estimates for stunting among children under-five years of age.

FOOD AND
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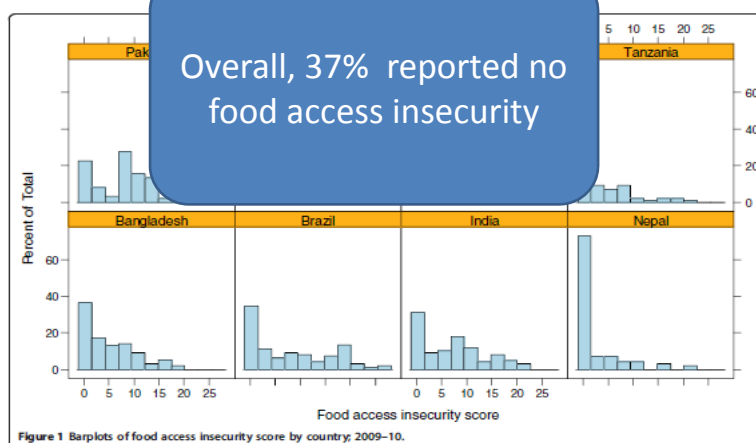
Household Food Insecurity Access Scale (HFIAS)

No.	Occurrence Questions	
1.	In the past four weeks, did you worry that your household would not have enough food?	Anxiety
2.	In the past four weeks, were you or any household member not able to eat the kinds of foods you preferred because of a lack of resources?	
3.	In the past four weeks, did you or any household member have to eat a limited variety of foods due to a lack of resources?	Quality
4.	In the past four weeks, did you or any household member have to eat some foods that you really did not want to eat because of a lack of resources to obtain other types of food?	
5.	In the past four weeks, did you or any household member have to eat a smaller meal than you felt you needed because there was not enough food?	Food Intake & consequ
6.	In the past four weeks, did you or any household member have to eat fewer meals in a day because there was not enough food?	
7.	In the past four weeks, was there ever no food to eat of any kind in your household because of lack of resources to get food?	
8.	In the past four weeks, did you or any household member go to sleep at night hungry because there was not enough food?	
9.	In the past four weeks, did you or any household member go a whole day and night without eating anything because there was not enough food?	

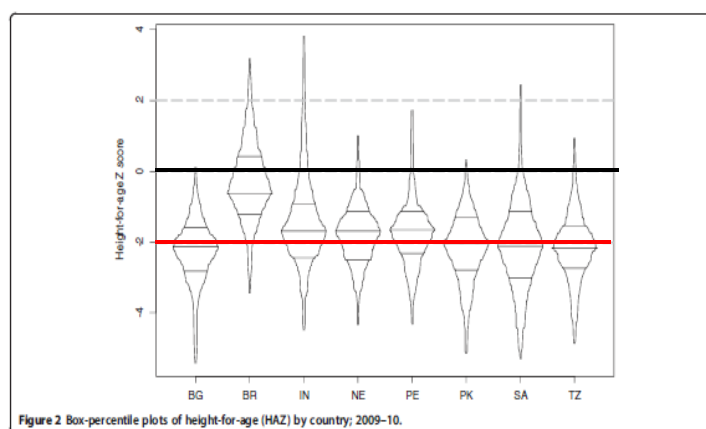
House
Hunger

http://www.fantaproject.org/downloads/pdfs/HFIAS_v3_Aug07.pdf

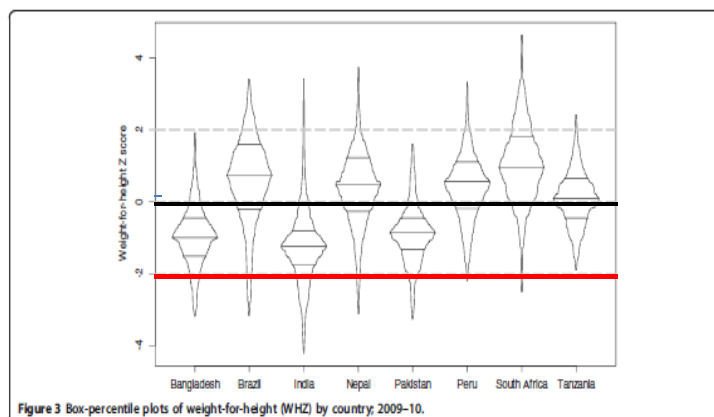
Food Insecurity by Country



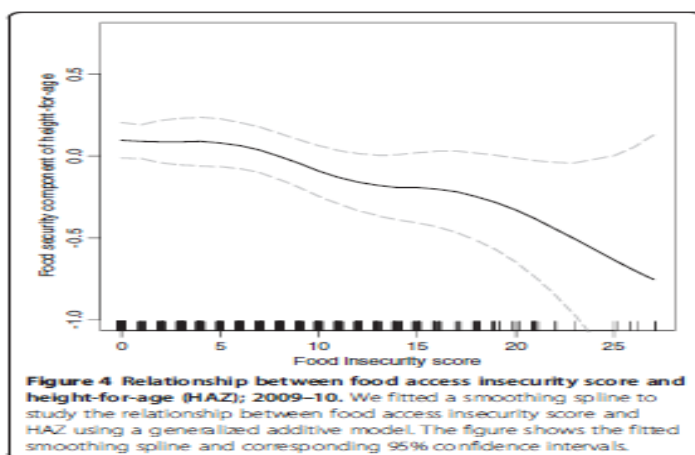
Height-Age (HAZ) - Stunting by Country



Weight-Height (WHZ) - Wasting by Country



Relation Between Food Insecurity & Height-for-Age



Results

- Food Insecurity associated with negative shift in distribution of HAZ
 - Controlling for SES (water source, maternal education, household density)
 - Relationship consistent across countries
- No relation between Food Insecurity and WHZ
- No relation with Household Hunger (last 3 items)

Global measure of food insecurity

- Cultural aspects of responding to questionnaire
- Food insecurity relates to poor child growth (HAZ), beyond SES
 - Multiple factors relate to child growth – not only food insecurity

Possible to Develop a Screener ?

- Identify questions most often endorsed by Food Insecure families
- Use data set of >30,000 Children's HealthWatch participants to validate
 - Under age 3
 - 7 medical centers across US

Hager, Children's Health Watch. *Pediatrics*, 2010.

Screening Questions

1. We worried whether our food would run out before we got money to buy more **Anxiety**
2. The food we bought just didn't last and we didn't have money to get more **Food Intake**
 - ☐ Often True
 - ☐ Sometimes True
 - ☐ Never True

Families who answer "sometimes true" or "often true" to either or both statements are **"at risk for food insecurity"**

Sensitivity and Specificity

“Yes” to Q1 and/or Q2		HFSS		TOTAL N
		Food Insecure	Food Secure	
Screen	Positive	6,514	3,977	10,591
	Negative	228	19,279	19,507
TOTAL		6,419	21,931	30,098

Sensitivity = 97% - Captures 97% of Food Insecure families

Specificity = 83% - May misclassify 17% of Food Secure families as Insecure – although still at risk

Convergent Validity of Screen

	Screen	HFSS	p
Child health (fair/poor)	1.56	1.73	<.001
Child hospitalizations	1.17	1.19	<.001
Developmental risk	1.60	1.72	<.001
Caregiver health (fair/poor)	1.99	2.29	<.001
Caregiver depressive symptoms	2.76	3.13	<.001

Adjusted for site, race/ethnicity, US born mother vs. immigrant, marital status, education, child gender, caregiver employment, breastfeeding, LBW

Food Insecurity Screener

- High sensitivity (97%)
- High specificity (83%)
- High convergent validity with health indices
- Food insecurity often invisible – must ask to identify

Parent Report of Child Size

- Are parents able to report their child's body size accurately?
 - Toddlers
 - Teenagers

Underweight, Overweight, or Within Normal???



Underweight, Overweight, or Within Normal???



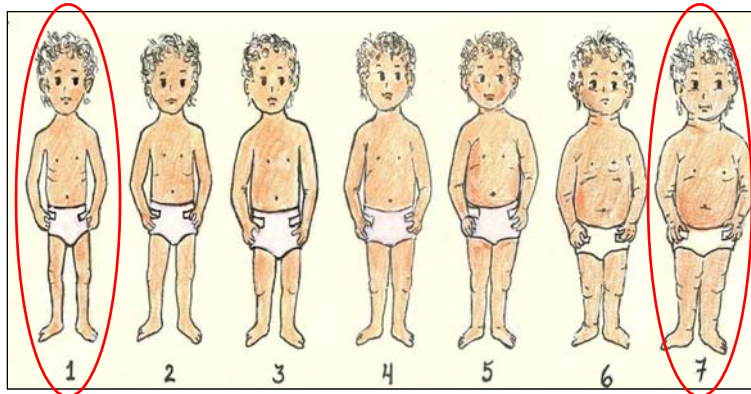
0.4%ile

91%ile

56%ile

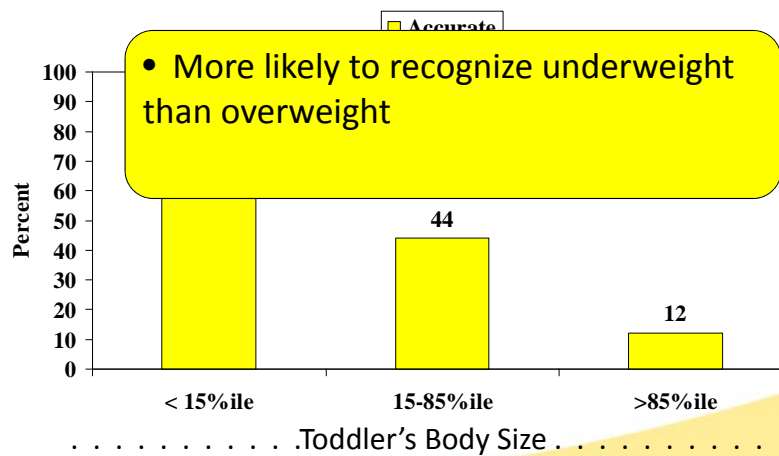
4%ile

Toddler Silhouette Scale



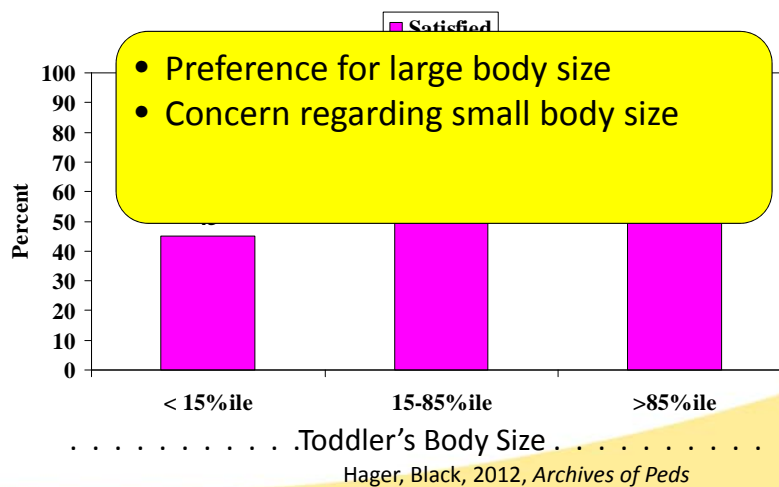
Hager, McGill, Black (2010). *Obesity*

Parent Perceptions of Toddler Body Size



Hager, Black, 2012, *Archives of Peds*

Parent Satisfaction With Toddler Body Size



Comparison of Parents' & Adolescents' Assessment of Adolescent Body Size

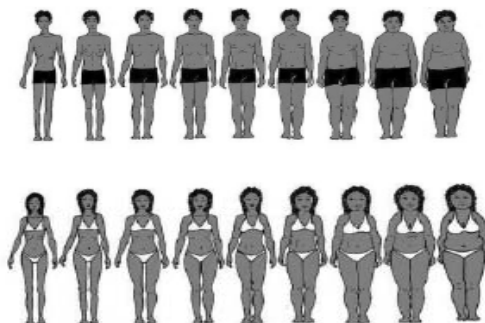


Figure 1. Culturally adapted, age- and gender-specific, 9-point silhouettes.

Mitola, *J of Pediatric Psychology*, 2007

High agreement for normal weight & obese adolescents, not overweight



Figure 2. Adolescent and caregiver satisfaction with adolescent body size by adolescent BMI category.



One more thing -

Take care of me, I am your future!

Thank You!