Joint CAS and CPHHS Ignite Colloquia: Food Insecurity and Food Safety

Feb 24, 2017

Presentations:
4:00 – 5:00 pm

Wine/Beer Reception:
5:00 – 6:00 pm

HFC #115
Session I
Food Intake

Conceptual framework

- Improvements in food security and diet quality

Food acquisition
- Physical limitations
  - Physical energy
  - Mental health
  - Social support

Food preparation
- Density of neighborhood food sources
  - Types of neighborhood stores/restaurants
  - Transportation
  - Food cost
  - Household Income/SNAP

- Cooking appliances
  - Knowledge/skills/recipes

Food Intake
- Appetite
  - Taste and smell
  - Co-morbidities
  - Oral health

- Improved adherence, retention, clinical outcomes, and quality of life
Goal: Improve crops’ nutritional content and resistance to diseases

Food insecurity:

• 40-50% of the world’s population suffer at any one time from diseases caused by a lack of essential minerals and vitamins. The main cause is inadequate intake. Plants are the main sources in the human diet.

• Direct yield losses caused by pathogens, animals, and weeds, are together responsible for losses ranging between 20 and 40% of global agricultural productivity.
Current efforts:

• Biofortification of B vitamins in potato (folate) and rice (thiamin)
• Potato Virus Y

Approach/Expertise: Fundamental and applied research in plant biochemistry, molecular biology, genomics, and biotechnology

Idea: Impact of abiotic stresses (e.g. drought, flooding, heat, CO₂ concentration) on phytonutrient contents of crops
FOOD INSECURITY AMONG AMERICAN INDIAN FAMILIES WITH YOUNG CHILDREN

- Obesity prevention intervention, not intending to directly study food insecurity
- Included validated 2-item screener from USDA Household Food Security Survey
- Sample of 450 American Indian households with young children
- Identified very high prevalence, higher in urban households; preliminary results suggest this may impact intervention efficacy
- Interested to collaborate on ways to address food security in obesity prevention interventions

CONTACT: EMILY TOMAYKO
ASSISTANT PROFESSOR, NUTRITION
EMILY.TOMAYKO@OREGONSTATE.EDU
Brief Background

Joined OSU in summer of 2013, have training in hydrology, range science, ag economics and business, and technology transfer and innovation. Over the last 15 years have worked in water-related research in agriculture and rangeland settings in Oregon, New Mexico, and Chihuahua (MEX). Have collaborated in several projects that integrate multi-institutional, inter-disciplinary, and community/producer participation.

Areas of Specialization (Expertise)

Watershed and Riparian Systems Management, Ecohydrology, Systems Thinking

Collaborative Interests

Coupled Natural and Human Systems
Socio-Hydrology/Ecology
Food-Water-Energy-Environment Nexus

Topic examples related to colloquia:

- Land use effects on ecosystem resilience and sustainability of rural economies.
- Integrated socio-hydrologic frameworks to characterize food production in connected urban-agriculture-wildland systems.

Position Responsibilities

Teaching: RNG 355, Desert Watershed Management.
RNG 455/555, Riparian Ecohydrology and Mgt.

Research: Water quality and ecohydrology relationships in watershed-riparian agroecosystems.

Outreach: No Extension appointment, however, most work involves close collaboration with producers/community.
An integrated approach to enhance understanding of natural and human connections affecting food insecurity and food safety in socio-hydrologic systems.

Potential funding sources:
NSF-CNH (Dynamics of Coupled Natural and Human Systems)
NSF-PIRE (Partnerships for International Research and Education)
USDA-INFEWS (Innovations at the Nexus of Food, Energy and Water Systems)
A Conceptual Model of Rural Childhood Obesity

Are Food and Physical Activity Insecurity Driving the Disparity?

Hypothesis

Food and PA Insecurity are associated with poverty and may be the most significant contributors to rural childhood obesity.

Food Insecurity

Low Physical Activity

Low Readiness to Provide/Support Structured Physical Activity

“Physical Activity Insecurity”

Rural Child Obesity

PA is Really important for rural children!

Kathy Gunter, Associate Professor, Extension Family & Community Health and Kinesiology
Introduction: Gil Sylvia

• Marine Resource Economist - 26 years at OSU

• Director, Coastal Oregon Marine Experiment Station
  • Newport and Astoria
  • 14 Faculty, 40 Graduate Students, Fifteen Staff
  • Mission
    ... to conduct applied marine research beneficial to Oregon’s coastal communities, the nation, and the world . . .

• My Research: “Systems Guy”
  • Fishery and Aquaculture Economic Policy and Management
  • Bioeconomic Modelling
  • Seafood Marketing – Traceability – An unexpected voyage of discovery

Christina DeWitt
Director, Astoria Seafood Lab
Food Information Systems and Traceability – My Projects and Research

1) Industry Partnerships

2) Enabling Information Technologies

Hardware
Satellites
Data Collection
Computer-Visualization
Integration-Portals

3) Information Systems/Traceability Systems

4) Interoperable Global Traceability “Architecture”
David W. Rothwell, PhD
Poverty, Families, and Social Policy

Research questions I study:

1. What is the poverty rate in Oregon using new and improved measures?
2. Which families are at greatest risk for poverty?
3. What can social policy do to reduce poverty?
4. Why has child poverty in rural communities risen so much in the past 25 years?
5. How does poverty in Oregon compare to other states?
6. How does poverty in the US compare to other countries?

Email: david.Rothwell@oregonstate.edu
Twitter: @davidwrothwell
Web: http://health.oregonstate.edu/rothwell
My contributions

• Measurement of family/household finances and economic insecurity
• Cross-contextual comparisons
• Theory and application of social assistance / safety net programs
• Oregon social safety net programs

I seek expertise in

• Application of poverty to questions of food insecurity
• Community partnerships / data collection
• Extending social science poverty knowledge to ag and science
Program Planning, Implementation, and Evaluation for Community-Based Food Security

stephanie.grutzmacher@oregonstate.edu
Recent Projects
• Social support utilization among food insecure households
• SNAP, maternal depression, and food insecurity
• Latino immigrant food security coping strategies
• Nutrition education for SNAP parents
• Food security among FARM students
• Afghanistan Women in Agriculture

Current Projects/Wish List
• Agricultural Development in Ethiopia
  • School gardens
  • Gender-sensitive agriculture
  • Local food distribution systems/markets
  • Capacity building and professional development
• Food Security Experiences among Food System Workers
  • Examine social networks, unique barriers and benefits, safety net utilization
  • Identify opportunities for food safety net

Integrate  Innovate  Engage
Finding the grass among the redwoods: 
*Low cost measurement of methanol in ethanol*

Paul Hughes: Assistant professor of distilled spirits
Innovating ethanolic solutions

- Methanol
  - Occurs in the diet from several sources:
    - Aspartame
    - Pectin-containing foodstuffs (fruits, veg)
    - Cigarette smoke
  - Rather toxic: minimum lethal dose of 0.3 – 1 g/kg bw; others quote 8 g as being sufficient to cause death
  - Found in many raw materials used for distilling; especially in fruit-, potato- or agave-based spirits
  - Not so easy to measure... low concentrations in presence of high levels of ethanol
  - Gas chromatography ideal, but expensive for small producer
Low cost measurement of methanol in ethanol

• Methanol
  • Recent report of a novel sensor shows promise
  • Based on a polymer film, created electrochemically to a pore size where methanol can penetrate, but ethanol cannot
  • Claims to be able to measure down 50 mg/l alcohol
• Can we reproduce this sensor?
• Cost? Tricky monomer precursor at ca $10/g
• Looking mainly for (electro)-chemist to collaborate with on monomer and membrane synthesis
Session II
Food Insecurity in U.S. Households That Include Children With Disabilities

Rajan Sonik¹, Susan L. Parish¹, Subharati Ghosh², and Leah Igdalsky¹

Abstract
The authors examined food insecurity in households including children with disabilities, analyzing data from the 2004 and 2008 panels of the Survey of Income and Program Participation, which included 24,729 households with children, 3,948 of which had children with disabilities. Logistic regression models were used to estimate the likelihood of food insecurity after adjusting for adult disability status, income, and other sociodemographic factors. Compared to other households with children, those including children with disabilities were more likely to report household food insecurity of any kind, very low household food security, and child food insecurity. Families raising children with disabilities were also more likely to receive Supplemental Nutrition Assistance Program benefits. These results suggest that children with disabilities face an increased risk of experiencing food insecurity and that there is a pressing need to improve the safety net system for these children.
90 Children; 90 Parents/ Caregivers; Siblings; 40 Waitlisted
Come visit!
Friday 5:30- 7:00pm (almost every Friday of the term)
November 2012 to Present

Department of Animal and Rangeland Sciences

Research interests:

(1) Nutrigenomics in dairy cows
(2) Milk and human health
(3) Welfare and management of dairy cows
(4) Systems biology

Teaching:

(1) Dairy Production Systems (ANS439/539 - Fall)
(2) Lactation Biology (ANS538 - Spring)
Ongoing projects

Nutrigenomics

• Prevention of mastitis and improvement of milk quality via nutrient-gene interaction (hatch USDA, two OBC)
• High-throughput system to study nutrigenomics
• Development of in vivo-in vitro hybrid system for nutrigenomic studies (OBC)
• Effect of selenium-enriched hay on cows and calves health and dairy products (two ARF)

Milk and human health

• Milk and Childhood Obesity: Effect of miRNAs in Raw Cow’s Milk on Adipose Stem Cells (AFRI NIFA USDA) \( \rightarrow \) also effect on bone development and cognition
• Effect of feeding poison oak and pasteurization on milk miRNA profiling in goats (ARF)
Mapping Rural Food Availability: Using Spatial Analysis to Explain Access as an Obesogenic Factor

Distribution of adult BMI (kg/m$^2$) calculated from DMV data (2005-2012)

Courtesy of Oregon Environmental Public Health Tracking Program

Deborah John, PhD
Associate Professor, Biological and Population Health Sciences
Extension Specialist, Population Health and Place

Research funded by the Agriculture and Food Research Initiative of the USDA National Institute of Food and Agriculture, grant # 2011-68001-30020.
Distribution and Access to Food Resources

Less than 30% of the Clatskanie population had easy access to food resources, many of which were only seasonally available.

“Easy” access estimated as ¼ - ½ mi network buffer and 10 min drive

% Population

<table>
<thead>
<tr>
<th>Locally Ag</th>
<th>Grocery Stores &amp; Food Assistance</th>
<th>Convenience Stores</th>
<th>Fast Food and Restaurants</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
</tbody>
</table>

KEY:
- ♦ = #
- □ = %

Food Resource Categories

- **Food Assistance**
  - Community Meals
  - Food Banks
  - Summer Lunch

- **Local Agriculture**
  - Farm Stands/U-picks
  - Farmers Markets
  - Home-based Retailers
  - Gleaning/Hunting/Fishing
  - Community Gardens

- **Fast Food, Restaurants, etc.**
  - Drive through Coffee hut
  - Fast Food
  - Concession Stand
  - All you can eat buffet
  - Restaurant w/ wait staff
  - Deli/Sandwich shops
  - Café/Bakery
  - Convenience Stores
  - Vending machines
Urban-Rural and Regional Variability in the Prevalence of Food Insecurity: the Survey of the Health of Wisconsin

Natalie Guerrero; Matthew C Walsh, MPH, PhD; Kristen C Malecki, MPH, PhD; F. Javier Nieto, MD, MPH, PhD

WMJ 2014;113:133-38

Table 3. Regional Variation of Food Insecurity, Survey of the Health of Wisconsin 2008-2012*

<table>
<thead>
<tr>
<th>Urbanicity (RUCA)</th>
<th>Number</th>
<th>Food insecure (%)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban core</td>
<td>1210</td>
<td>14.1</td>
<td></td>
</tr>
<tr>
<td>Other urban</td>
<td>384</td>
<td>6.5</td>
<td></td>
</tr>
<tr>
<td>Rural</td>
<td>965</td>
<td>10.5</td>
<td>0.13</td>
</tr>
</tbody>
</table>

Table 4. Odds Ratios and 95% Confidence Intervals for Food Insecurity Adjusted by Various Sets of Covariates, Survey of the Health of Wisconsin 2008-2012

<table>
<thead>
<tr>
<th>Poverty Income Ratio</th>
<th>Adjusted for demographics a</th>
<th>Fully Adjusted b</th>
</tr>
</thead>
<tbody>
<tr>
<td>OR</td>
<td>95% CI</td>
<td>P-Value</td>
</tr>
<tr>
<td>&lt;200% FPL</td>
<td>13.39</td>
<td>7.06-25.42</td>
</tr>
<tr>
<td>200-299% FPL</td>
<td>9.53</td>
<td>5.14-17.69</td>
</tr>
<tr>
<td>300-499% FPL</td>
<td>2.02</td>
<td>0.92-4.42</td>
</tr>
<tr>
<td>≥500% FPL</td>
<td>1.0</td>
<td>Reference</td>
</tr>
</tbody>
</table>

aDemographic variables: age, gender, and race; fully adjusted model added socioeconomic variables (education, income).
Food insecurity and dyslipidemia in a representative population-based sample in the US

Jung-Im Shin a, Leonelo E. Bautista a, Matthew C. Walsh b, Kristen C. Malecki a, F. Javier Nieto a,*.  

Prep Med 2015;77:186-90

Table 2  
Age-adjusted prevalence of obesity and dyslipidemia by food security history among women living in Wisconsin, 2008-2011.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Food Insecure (n = 189)</th>
<th>Food Secure (n = 711)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obesity (%)</td>
<td>51.9 41.2, 62.6</td>
<td>34.5 30.5, 38.5</td>
<td>0.003</td>
</tr>
<tr>
<td>High TC (%)</td>
<td>22.1 15.0, 29.1</td>
<td>23.3 19.7, 26.9</td>
<td>0.77</td>
</tr>
<tr>
<td>Low HDL-C (%)</td>
<td>67.4 58.9, 75.9</td>
<td>46.7 41.6, 51.9</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Abbreviations: CI, confidence interval; HDL-C, high-density lipoprotein cholesterol; TC, total cholesterol.

Table 3  
Age-adjusted prevalence of obesity and dyslipidemia by food security history among men living in Wisconsin, 2008-2011.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Food Insecure (n = 147)</th>
<th>Food Secure (n = 616)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obesity (%)</td>
<td>39.3 29.6, 49.0</td>
<td>37.1 31.5, 42.7</td>
<td>0.73</td>
</tr>
<tr>
<td>High TC (%)</td>
<td>27.9 20.5, 35.3</td>
<td>30.8 26.1, 34.6</td>
<td>0.58</td>
</tr>
<tr>
<td>Low HDL-C (%)</td>
<td>57.1 47.3, 67.0</td>
<td>51.1 46.3, 55.8</td>
<td>0.28</td>
</tr>
</tbody>
</table>

Abbreviations: CI, confidence interval; HDL-C, high-density lipoprotein cholesterol; TC, total cholesterol.

Food insecurity and cardiovascular health: Findings from a statewide population health survey in Wisconsin

Augustine M. Saiz Jr., MD a, Allison M. Aul, MD a, Kristen M. Malecki, PhD, MPH b, Andrew J. Bersch, MS b, Rachel S. Bergmans, MPH b, Tamara J. LeCaire, PhD b, F. Javier Nieto, MD, PhD, MPH b,*.  

Prev Med 2016;93:1-6

Table 4  
Adjusted odds ratios (OR)* and 95% confidence intervals (CI) of good cardiovascular health (CVH) and good or ideal Simple 7 components based on food insecurity status. Survey of the Health of Wisconsin 2008-2014.

<table>
<thead>
<tr>
<th>Level</th>
<th>Adjusted OR*</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall CVH</td>
<td>0.53</td>
<td>0.31–0.92</td>
</tr>
</tbody>
</table>

*Adjusted for sex, race, age, education, income, marital status, employment status, self-rated health status, physical activity, smoking, and alcohol consumption.
Insects and Food Security

Sujaya Rao

Pests

Food

[Images of insects and affected fruits and vegetables]

[Graph showing world population trends from 1950 to 2050, with estimates from 3 billion to 9 billion]

[Image of edible insects and related text: "Edible insects: Future prospects for food and feed security"]
Crop Pollinators

Tracking foraging behaviors

Metabolomics analysis

Targeted analysis

Un-targeted analysis

Toxic compounds

NMR

GC-MS

LC-MS

Inspiring next generation of scientists
POLITICAL ECONOMY OF TRADE AND FOOD SECURITY IN MLICS
Chunhuei Chi, MPH, Sc.D. and Jessica Bliss, PhD., Center for Global Health, CPHHS
Kindra McQuillan, MA, Candace Link, Virginia Katz, Graduate Students in MPH-Global Health, CPHHS


Research Questions

1. What are the impacts of trade agreements (especially AoA) and SAP on food security and food sovereignty in low-income nations?

2. How can government agricultural subsidies and food subsidies in low-income nations promote food security and equitable distribution, especially to poor farmers and poor consumers?

3. In countries with severe and recurrent famine, to what extent do poverty alleviation programs and short-term emergency programs overlap, and how might they be?

Frameworks

- Food Security
- Right to Food
- Food Sovereignty
On-Farm Research

Contaminated irrigation water and onions (MCES)
Microbiological quality of surface water used for irrigation of specialty crops
Cattle feeding trials to reduce STEC shedding (EOARC)
Prevalence studies of Salmonella in hazelnuts
State-licensed poultry producers and Salmonella
Salmonella Dublin shedding immediately after calving
Risks of biosolids as biological soil amendments
Impacts of milk hauling practices on microbial load of fluid milk

Processing Environment

Dehydration processes to inactivate Salmonella and STEC in jerky production
Steam blanching to kill Salmonella on in-shell hazelnuts
Efficacy of sanitizers to reduce Salmonella on naturally contaminated hazelnuts
High pressure processing to kill L. mono and E. coli O157:H7 in cheese
Propylene oxide treatment as an effective strategy to inactivate Salmonella on tree nuts (commercial-scale)

"Band-aid" spoilage of chocolate milk (spoilage)
Foam destabilization of fluid milk (spoilage)
Reconditioning process of Oregon nut butters associated with a Salmonella outbreak
Hop beta acids as “clean label” antimicrobials to prevent L. mono growth in deli meats

Examples of recent and current projects

"Band-aid" spoilage of chocolate milk (spoilage)
Foam destabilization of fluid milk (spoilage)
Reconditioning process of Oregon nut butters associated with a Salmonella outbreak
Hop beta acids as “clean label” antimicrobials to prevent L. mono growth in deli meats
Research Capabilities

Joy Waite-Cusic, Ph.D.
Assistant Professor of Food Safety Systems
Food Science and Technology, CAS

Processing Capabilities: e.g., thermal, dehydration, high pressure
(scale: bench, pilot, and commercial)

Method Development, Validation, and Evaluation

Biofilm Formation and SEM Imaging

BSL-2 Lab and Greenhouse:
Pathogens
- Salmonella spp.
- Listeria monocytogenes
- Shiga toxin-producing E. coli
- And others....

Extensive culture collection
(clinical, food, and environmental)

Non-Pathogens
- Spoilage organisms
- Surrogates
- Indicators

Strain Characterization

Genotypic

Phenotypic

DNA Amplification Assays – various strategies
Whole genome sequencing very soon!

Method Development, Validation, and Evaluation
Methods in Foodborne Outbreak Investigations

- Jeff Bethel, PhD, CPHHS, BIOPOP, Epidemiology Program
- Infectious disease epidemiologist
- Academic partner with Northwest Center for Foodborne Outbreak Management, Epidemiology, and Surveillance (FOMES)
  - CDC-funded Integrated Food Safety Center of Excellence (CoE)
  - Fosters the public health practice of foodborne and diarrheal disease surveillance and outbreak investigation
- Outbreak detection via PulseNet is transitioning from PFGE to WGS
Potential Areas of Collaboration

• Methods to handle massive amounts of WGS data on human, environmental, and food isolates in combination with epi data

• Improving methods for traceback investigations for more timely investigations

• Quantifying level of contamination in foods
Interested Collaborators Unable to Attend

• **Dave Stone**, Director of the Food Innovation Center
  • Associate Professor with Extension/outreach responsibilities and research

• **Katie Murray**, Research Assistant, Extension
  • Integrated Plant Protection Center

• **Bruce Weber**, Professor Emeritus
  • Department of Applied Economics
Dave Stone, Food Science Technology – Food Innovation Center

**Brief Background**
I direct the Food Innovation Center, a unique agricultural experiment station in Portland. We are extending our capacity in several food safety areas including: pathogen research targeted to NW food sectors, novel detection methods for contaminants in food, antimicrobial resistance to sanitizers and training/outreach for the Food Safety Modernization Act.

**Areas of Specialization**
- Public Health Toxicology
- Risk Assessment/Food Safety

**Collaborative Interests**
- Food safety research, particularly related to chemical contaminants in food
- Food adulteration and detection methods
- Risk Assessment of chemical contaminants in food
- Public health and sustainability in food product development

**Position Responsibilities**
Director of the Food Innovation Center
Associate Professor with Extension/outreach responsibilities, research, extension/outreach)
**Collaborative Interest Areas:**

- Public Health: Pesticide acute and chronic health effects
- Environmental Health: Water quality, environmental contamination and ecotoxicology
- Education: Adult education and coupled social-ecological systems

**Center Responsibilities:** Extension/Outreach, Research, Teaching

Contact Katie Murray: katie.murray@oregonstate.edu

**Brief Background:**
We establish networks of farmers, advisors, industry and regulatory personnel on local, regional, national, and international scales. We develop education methods and decision support tools that allow farmers to meet production and protection goals specializing in management of pests, pesticides, biodiversity and climate risks. We operationalize complex farming systems by connecting farmers and others with needed research, education, and regulatory support.

**Areas of Specialization (Expertise):**
Social-Ecological Systems; Pest, Pesticide, Biodiversity and Climate Risk Assessment; Extension Education and Network Capacity Development; Decision-Support Tools for Risk Management
Collaborative Interests:
Seeking collaborators to explore mixed method research on household income/survival strategies – combining earnings, informal work, unemployment insurance and public assistance (including SNAP) – in rural and urban areas.

Brief Background:
Current research project analyzes SNAP participation prior to and during the Great Recession. Past research has explored determinants of food insecurity in rural and urban Oregon. Planned effort to develop a Supplemental Poverty Measure for Oregon.

Areas of Specialization (Expertise):
Analysis of impacts of safety net and economic development policy on households and rural economies; analysis of responsiveness of household food insecurity and participation in public assistance programs to economic and policy changes

Position Responsibilities
I have had Extension, research and teaching responsibilities in rural and community economics at OSU since 1974. Currently working part-time in emeritus position.
Thank you - Please join us at the reception!