The Future of Food and Nutrition: A Multidisciplinary Graduate Research Conference

The Friedman School of Nutrition Science and Policy
Tufts University
150 Harrison Ave., Boston, MA

April 11, 2015
Welcome to the 9th Annual Future of Food and Nutrition Conference at the Friedman School of Nutrition Science and Policy at Tufts University.

We are excited to host students, researchers, and professionals from all over the country to talk about critical topics in food and nutrition. We hope you will take the opportunity to meet someone new and ask questions.

We are honored to have **Angie Tagtow, Executive Director of USDA’s Center for Nutrition Policy and Promotion**, as our keynote speaker. This year’s theme is Nutrition Policy at a Crossroads; her talk is titled Dietary Guidelines for Americans: Application and Evolution. The conference also features a panel discussion on Sustainable Diets and the Implications for Dietary Guidance in the United States, which will be moderated by Dr. Parke Wilde. Our panelists include Dr. Miriam Nelson (Member of the 2015 Dietary Guidelines Advisory Committee), Dr. Andrew Rosenberg (Director of the Center for Science and Democracy, Union of Concerned Scientists) and Skye Cornell (VP for Programs, Wholesome Wave).

This year, we received higher quality abstracts than ever before from across the country. Students from multidisciplinary programs will present on research ranging from Farm to School Programs to the effects of aging on vitamin B. We hope you will engage with the student presenters to make these sessions dynamic and enlightening.

Lastly, we could not host this event without the support of our faculty, staff, sponsors, and dedicated students of the Conference Committee. Thank you all! If you have any questions or comments, please do not hesitate to reach out to a committee member.

Enjoy!

Janeen Madan and Claire Anglim
Conference Committee Co-Chairs

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**Conference Committee**

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<tr>
<th>Ashley McCarthy*</th>
<th>Amanda Samuels*</th>
<th>Abbie Steiner*</th>
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<td>Sarah Andrus</td>
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<td>Cailin Kowalewski</td>
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<td>Emily Nink</td>
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*sub-committee chairs
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Lunch is provided by Haley House, whose mission is to use food as a vehicle to ensure financial independence and nourishment for all

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Dr. Tammy Scott
Dr. Fang Fang Zhang
## Conference Schedule

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<td>8:30–9:00</td>
<td><strong>BREAKFAST AND REGISTRATION</strong></td>
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<td>9:00–9:15</td>
<td><strong>Conference Introduction</strong> Dr. Edward Saltzman, Academic Dean, Friedman School</td>
<td>Behrakis Auditorium</td>
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| 9:15–10:15    | **Keynote Lecture—Nutrition Policy at a Crossroads** Dietary Guidelines for Americans: Application and Evolution  
 **Angie Tagtow**, MS, RD, LD Executive Director, Center for Nutrition Policy and Promotion, USDA | Behrakis Auditorium           |
| 10:15–10:30   | **BREAK**                                                              |                               |
| 10:30–12:00   | **Panel Discussion—Sustainable Diets: Implications for Dietary Guidance in the United States**  
 **Panelists:** Dr. Miriam Nelson, Dr. Andrew Rosenberg & Skye Cornell  
 **Moderator:** Dr. Parke Wilde | Behrakis Auditorium           |
| 12:00–1:00    | **LUNCH**                                                              | Sackler 2nd Floor             |
| 12:30–1:30    | **Poster Session**                                                     | Jaharis 155 & 156             |
| 1:30–2:30     | **Presentation Session 1**  
 **1A:** Eating Better: Mechanisms for Expanding Access and Affordability  
 **1B:** Farms, Fisheries, and Food Safety: Decisions for a Sustainable Food System | Behrakis Auditorium           |
| 2:30–3:30     | **Presentation Session 2**  
 **2A:** From School to Communities: Policies and Predictors of Child Health and Nutrition  
 **2B:** Nutrition for Healthy Aging: The Effects of Aging on Vitamin B, Metabolism and Bone Health | Behrakis Auditorium           |
| 3:30–3:45     | **BREAK**                                                              |                               |
| 3:45–4:45     | **Presentation Session 3**  
 **3A:** From Measurement to Program Evaluation: Improving Food Security Across Africa  
 **3B:** Analyzing Public Health Challenges: Factors Associated with Behavior Change | Behrakis Auditorium           |
| 4:45–5:00     | **Closing Remarks**                                                   | Behrakis Auditorium           |
| 5:30–7:30     | **Post-Conference Networking Reception**                              | TRADE 540 Atlantic Ave.       |
Session 1A  
Eating Better: Mechanisms for Expanding Access and Affordability  
Faculty Moderator: Dr. Parke Wilde

“Socioeconomic factors associated with Nutrition Facts Label Comprehension among 2013 Health Information National Trend Survey Participants”  
Abbie Steiner, Tufts University, Friedman School, Food Policy and Applied Nutrition

Background – The nutrition facts label has been identified as a key source of nutrition information for consumers. This research aims to identify socioeconomic factors associated with comprehension of the nutrition facts label.

Methods – The nationally representative Health Information National Trends Survey 4, Cycle 3 data were used for this research (n=3,185). Binary logistic regression was used to predict crude and adjusted odds ratios for the association between socioeconomic factors of education, income, age, race, English speaking capacity, sex, and marital status and the ability to answer all four nutrition facts label survey questions correctly. Multinomial logistic regression was conducted to predict the relative risk ratios of incorrectly answering some or all of the questions. Complex survey weighting procedures were used for all analyses and n= 1,994 for all logistic regression models.

Results – Overall, 52.1% of the weighted sample answered all nutrition facts label questions correctly. Increasing levels of education and income as well as English speaking capacity were all associated with higher odds of having answered all questions correctly as well as lower likelihood of answering any number of questions incorrectly. The black race category was associated with lower odds of having answered all questions correctly (OR=0.35; 95% CI=0.18, 0.66; p-value<0.01) as well as lower likelihood of answering 2, 3, or 4 questions incorrectly compared to those in the white race category. For the most part, age, sex and marital status were not statistically significant predictors for either model.

Conclusion – Socioeconomic factors have a statistically significant association with ability to understand the nutrition facts label. Changing the nutrition facts label to ensure that it is comprehensible for the largest cross-section of the American population will help increase its ability to contribute to healthier food choices.

“Healthy Options in Food Pantries - A qualitative analysis of factors affecting the provision of healthy food items to pantry clients in St. Louis, Missouri”  
Melissa Chapnick, Saint Louis University, Department of Nutrition and Dietetics and Department of Public Health  
Co-authors: Ellen Barnidge, Marjorie Sawicki, Michael Elliot

Background: Research indicates food insecure individuals tend to eat few fruits and vegetables and are at an increased risk of developing diet related chronic diseases. Much of the research on environmental and policy determinants of nutrition related chronic diseases has examined access to healthy, affordable food in the retail food environment. The emergency food system includes food redistribution through food banks and food pantries. Food pantries help meet the needs of food insecure individuals, however, there is little research investigating access to healthy food in food pantries. The purpose of this study is to identify factors that facilitate or hinder the provision...
of healthy food in food pantries. Methods: Telephone interviews were conducted with twelve food pantries in the greater St. Louis area. Pantry selection was based on socio-demographic characteristics of the food pantry zip code. Using focused coding, interviews were analyzed for factors that facilitate or hinder increasing access to healthy options in food pantries. Results: Pantries described barriers (e.g. budget) and facilitators (e.g. refrigeration) to providing their clients with healthy food. While several pantries expressed a desire to provide health food options, few pantries described policies directly related to providing access to healthy food. Conclusions: The results of this study will inform small-scale interventions to increase opportunities for food pantries to provide healthy options.

“The 2009 WIC Food Package Revisions Impact on Dietary Intake, Healthy Food Access and Breastfeeding Initiation”

Daniel Schultz, Montana State University, Health and Human Development
Co-authors: Carmen Byker, Bailey Houghtaling

Background. For the first time since 1980, the USDA’s Food and Nutrition Service Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) food package policies were revised in 2009 to meet the Institute of Medicine’s nutritional recommendations. These changes include increases in fruits, vegetables, whole grains, and low-fat dairy to improve nutrition and health of WIC participants.

Objective. The systematic review of literature assessed the impact that the 2009 WIC food package revisions have had on dietary intake, healthy food accessibility, and breastfeeding participation.

Design. The systematic review followed PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) recommendations.

Methods. Four electronic databases were searched in April 2014 for peer-reviewed research. Two reviewers screened the articles and extracted the data.

Results. Twenty articles were included that met our inclusion criteria. Eight of the studies examined changes in healthy food availability, nine analyzed changes in dietary intake, and three evaluated breastfeeding participation. The review demonstrated an improved availability of healthy food and dietary intake improved after the 2009 revisions. Mixed results were demonstrated in regard to improved breastfeeding participation.

Conclusions and Implications. The 2009 revisions to the WIC food package led to improved healthy food access and dietary intake in participants. Further research is needed to assess the impact on breastfeeding participation. The positive nutritional changes could have implications on policies for other United States Department of Agriculture supplemental feeding programs.

Session 1B

Farms, Fisheries and Food Safety: Decisions for a Sustainable Food System

Faculty Moderator: Dr. William Masters

“Sizing up when scaling down: comparing the performance and land requirements of niche and conventional pork production”

Jamie Picardy, Tufts University, Friedman School, Agriculture Food and the Environment
Co-authors: Christian Peters, Silvana Pietrosemoli, Timothy Griffin
Consumers are becoming more particular over the practices used to raise livestock. Concerns of animal welfare, food safety, economic viability, and environmental sustainability are supported by increasing consumer demand for food with socio-environmental credence attributes, such as local, organic, humanely raised, and grass-finished.

As part of my dissertation, I analyzed the production and consumption components of our food system for pork raised in a more environmentally sustainable manner. This research addresses timely issues in the field of sustainability and animal agriculture, specific to public concerns about antibiotic and hormone use, animal welfare, and the viability of family farms.

Concentrating on the production side of the supply chain, I asked these research questions: What are the land requirements of producing niche pork and how do they compare to conventional pork? What are the reasons for producers of niche pork to participate in this value chain? What production characteristics should be included under the "niche" term?

In the spring 2014, I surveyed approximately 150 niche pork producers in the upper Midwest, the Carolinas and New England. The farmer questionnaire focused on performance metrics, which were used to model the land required for feed, bedding and housing. My comparative analysis was modeled as static, quantitative and deterministic. Preliminary results of this study indicate that niche production results in 12.5% fewer finished animals per year compared to conventional production, equating to 33% less edible meat for their target markets. Although less meat is produced, the niche system requires 15% more total feed.

This project’s approach crosses disciplines to connect producers, aggregators and retail customers. Furthermore, the study is timely due to the lack of niche benchmarking performance metrics. Outreach and dissemination of my results will provide an opportunity for niche farmers to compare their production against alternative and conventional averages, thus improving productivity and profit.

“Sustainable Fishing Practices and U.S. Policy Considerations”

Melanie Heazel, Tufts University, Friedman School, Food Policy and Applied Nutrition

Overfishing and a lack of oversight in the fishing industry have led to concern about the sustainability of current fishing practices and their ability to meet American demand in the future. Eighty-five percent of all commercial fish stocks are now fished up to or beyond their limits. A study published in September 2014 estimated that 20-32% of United States wild-caught seafood is illegally imported, equating to $1.3 to $2.1 billion of a $16.5 billion seafood market. The United States’ portion of illegally traded fish represents 4 to 16% of the global market for illegal fish, illuminating the large, if unintended role, the United States plays in perpetuating illegal fishing.

Though clearly an international issue, this talk will explore the complexities and controversies of domestic policy making in the United States with consideration for slowing the illegal trade of pirated seafood, providing enough fish to meet demand, and maintaining fish populations in our oceans to support healthy ecosystems. Current regulations that govern over-fishing and pirated fish imports have proven too weak to protect today’s markets and consumers. In the White House and Congress, policy is being enacted and legislation is under consideration to address the myriad problems facing today’s fishing industry. However, among American fishermen in the Pacific, there are concerns that further regulation will only disadvantage domestic catch in an international market that does not equally govern waters and ports. The result would be increased prices for consumers on domestically caught seafood. Others view sustainable aquaculture as the key to supplying the United States and world with enough fish as the population approaches nine billion by 2050. These perspectives and regulatory options will be explored to assess viable policy options for sustainable fisheries and legally sourced fish.
"An innovative method for early detection of microbiological food contamination based on microvesicles"

Fatemeh Momen-Heravi, Harvard University, TH Chan School of Public Health
Co-authors: Shashi Bala

Microbial contamination of food or beverages and subsequent infectious diseases is perhaps the most prevalent health problem in the contemporary world. There are more than 250 known foodborne diseases, which can be caused by bacteria, fungi, viruses, or parasites. The presence of various different microorganisms that can cause food-borne diseases, lack of fast and sensitive microbiologic quality control tests in the market, and presence of antibiotic-resistant pathogens are among those challenges facing current methods of food microbiological quality control assays. Most of the present food quality control assays are just limited to detection of few famous hazardous microorganisms such as E. coli and ignore the crucial aspect of checking for other microorganisms. Moreover, these tests are usually time consuming (12h-24h) and the test result can be falsely influenced by potential acidity, thermal processing, and chemical additives of the food. Microvesicles are a small part of the plasma membrane of microorganisms and cells that are shedding regularly under both physiological and pathological conditions. Almost all Gram-negative and Gram-positive bacteria produce microvesicles and regularly shed those microvesicles into the microenvironment even before their rapid logarithmic growth phase. Recent findings indicate that both bacteria and fungi release microvesicles. Here we developed a method for early detection of food microbiological contamination based on enumeration of microvesicles. The extra sensitivity of the assay can help reduce morbidity and mortality of foodborne illnesses in overall population and protect vulnerable population such as immune-compromised elderly and children.

Presentation Session 2 2:30 – 3:30pm

Session 2A Behrakis Auditorium

From Schools to Communities: Policies and Predictors of Child Health and Nutrition
Faculty Moderator: Dr. Beatrice Rogers

"Do State Farm to School Related Laws Increase Participation in Farm to School Programs?"
Ashley McCarthy, Tufts University, Friedman School, Agriculture Food and the Environment
Abbie Steiner, Tufts University, Friedman School, Food Policy and Applied Nutrition

BACKGROUND: Farm to School (FTS) programs connect schools to local food producers and provide nutrition education to students. This study examines whether school districts in states with formal FTS related laws have higher participation rates and a greater frequency of serving local foods in school meals than districts in states without FTS related laws.

METHODS: The USDA Farm to School Census, a cross-sectional analysis of responding school districts in all 50 states and the District of Columbia, was used to assess the possible influence of state laws. Logistic regression examined the possible impact of state laws on participation in FTS programs (n=9,042) and multinomial logistic regression examined the impact of state laws on frequency of serving local foods in school meals in districts participating in FTS (n=2,817). The models controlled for school size, type of locale, free and reduced price meal eligibility, race, and region.

RESULTS: When controlling for demographic and geographic variables, districts in states with FTS
laws were significantly more likely to have FTS programs than districts in states without FTS laws (OR=1.14; 95% CI 1.03-1.26; p-value <0.05). Districts in states with laws were more likely to be in the low frequency category than zero frequency (RRR=1.68; 95% CI 1.07-2.59; p-value <0.05). This was also true for both the medium frequency category (RRR=1.78; 95% CI 1.06-2.98; p-value <0.05) and the high frequency category (RRR=1.83; 95% CI 1.01-3.31; p-value <0.05). In the very low frequency category, there was not a statistically significant likelihood of being in the zero frequency category between districts in states with laws relative to those in states without laws.

CONCLUSION: The presence of FTS related laws was associated with an increased likelihood of having FTS programs and with serving local foods at higher frequencies in school meal programs.

“Can coupons get kids to buy healthier snacks? Initial findings from the CHOMPS Project”
Megan Lehnerd, Tufts University, Friedman School, Agriculture Food and the Environment
Co-authors: Sean Cash, Anna McAlister, Christina Economos, Katherine Panarella

The Coupons for Healthier Options for Minors Purchasing Snacks (CHOMPS) is a USDA-funded pilot project aimed at assessing the potential for kids-only coupons to guide children away from energy-dense nutrient-poor (EDNP) foods towards more healthful alternatives. Using a novel intervention approach to explore children’s autonomous food purchase behaviors in non-school environments, CHOMPS is working with community partners and small stores in Somerville, MA to conduct this pilot.

The three-step intervention involves a natural observation phase, a “coupon intervention” phase, and an individual assessment phase (which is outside the scope of this presentation). During the natural observation, we collected baseline measurements regarding children’s food purchase behavior in convenience stores. Second, coupon discounts of varying amounts have been put in place on healthier choice alternatives, as determined by IOM standards for children’s snacks. In this pilot, we also alternated with occasional promotions on EDNP snacks, in order to measure the price response for less-ideal options as well. The Kids Purchase Observation Tool (KPOT) was developed specifically for this pilot to collect in-store data during phases one and two.

In this presentation, we report on the study design and development of these data collection tools, and discuss the results of the first two phases of the pilot round. These results focus on the observed purchase patterns of children in participating convenience stores, and their responses to the coupon intervention in these stores. Our initial results indicate that kids-only coupons could play a role in shifting snacking behavior, and future research will explore the scalability of the CHOMPS project into additional rural and urban environments.

“Food Hub Development and Decision-Making”
Joanna Hamilton, Tufts University, Friedman School, Agriculture Food and the Environment, and School of Arts and Sciences, Urban and Environmental Policy and Planning

Food hubs are organizations that address key issues of scale and infrastructure in alternative food system development. Prior food hub research has focused on defining, describing, and classifying the organizations to better understand the landscape of hubs at a particular point in time. We know less about the process of designing food hubs and their development. This research uses interviews with twelve well-established food hubs to investigate the factors involved in decisions about their products, activities, structure, and governance; the relationships among those choices; and how the hubs have changed over time.

Food hubs were created to address constituent needs and to support particular missions and values. Food hub decisions, in the start-up stage and at later points of growth and change, were also based on those founding principles and responding to constituent needs. Their decisions also took
into account factors such as the hubs’ capacity and expertise and financial considerations such as taxes, funding sources, and profit. Initial food hub decisions affected their later choices by limiting the available options and/or determining the priority level given to certain factors. This research also provides recommendations for food hub founders, funders and other supporters, and future food hub research.

Session 2B

Nutrition for Healthy Aging: The Effects of Aging on Vitamin B, Metabolism, and Bone Health
Faculty Moderator: Dr. Ligi Paul Pottenplackel

“Association between Transcobalamin II C776G Polymorphism and Neuropathy is Modified by Folate Intake in Vitamin B-12 Sufficient Elders”
Hathairat Sawaengsri, Tufts University, Friedman School, Biochemical and Molecular Nutrition
Co-authors: Wei Qiao Qiu, Tammy M Scott, Irwin H Rosenberg, Paul F Jaques, Jacob Selhub, Ligi Paul Pottenplackel

The C776G polymorphism of the vitamin B-12 transport protein transcobalamin II (TC2) gene (rs1801198) is associated with lower holotranscobalamin concentration in plasma and can reduce the availability of vitamin B-12 to tissues. Low vitamin B-12 status can result in cognitive impairment and neuropathy which is exacerbated by high folate status. We determined the effect of TC2 C776G polymorphism and its interaction with folate intake on cognitive function and neuropathy in a population of vitamin B-12 replete (plasma vitamin B-12, 368 ± 132pmol/L; vitamin B-12 intake, 16 ± 16mcg) homebound elders ≥60 y. The data were analyzed by analysis of variance for continuous outcomes and logistic regression for binary outcomes. The GG genotype (n= 316) was associated with lower plasma vitamin B-12 when compared to CC + CG genotypes (n= 386) (318 ± 190 vs 362 ± 330 pmol/L, P<0.01) but not with plasma homocysteine. MMSE scores were slightly lower in GG genotypes compared to CC + CG genotypes (24.5 ± 8.8 vs 25.2 ± 5.0, P= 0.04) but not scores of memory, executive function, or attention. Of 171 subjects assessed for neuropathy, GG genotypes had 3 fold higher odds for neuropathy when compared to CC genotypes (OR: 3.1; 95% CI: 1.1, 8.8). When folate intake was above median (763mcg), GG genotypes had 5 times the odds of having neuropathy compared to CC genotype (OR: 5.0; 95% CI: 1.05, 24.62) but not with below median folate intake (OR: 1.04; 95% CI: 0.15, 7.32). The association between TC2 C776G polymorphism and neuropathy was modified by folate intake even in vitamin B12 sufficient elderly.

“The Relationship between Visceral Adipose Tissue/Bone Marrow Adipose Tissue and Cortical Bone Area in Children and Adults”*
*This session will include one presentation on three inter-related projects
Sneha Aidasani, Jennifer Jeon & Devon Roeshot, Columbia University Medical Center, Institute of Human Nutrition, Master of Science in Nutrition Program
Co-authors: Kuang Zong, Jun Chen, Wei Shen
“The Relationship between Visceral Adipose Tissue and Cortical Bone Area in Children and Adolescents”

Previous studies have shown an inverse relationship between visceral adipose tissue (VAT) and bone mineral density (BMD) in cancellous bone in adults. Pathogenic attributes of VAT in adults offer possible explanations of the emergence of diseases such as osteoporosis and type 2 diabetes. Fewer studies have been conducted regarding this relationship in cortical bone during childhood and adolescence, two critical periods of development. This study investigates the associations between fat and bone in children according to the region of adiposity. A total of 185 healthy children (76 females and 109 males, 5-18 years old) were included in this study. Right femoral bone marrow adipose tissue area (BMA), right femoral cortical bone area (CBA), subcutaneous adipose tissue (SAT), VAT, and skeletal muscle were accessed by whole-body magnetic resonance imaging (MRI). In regression analysis with CBA as dependent variable and VAT as the independent variable, VAT negatively contributed to CBA after adjusting for weight and total body fat, SAT, BMA, and skeletal muscle (β=-0.192, p<0.001). These results suggest an inverse relationship between VAT and CBA in children after adjustment of body weight or body composition. We speculate that these visceral fat deposits may adversely affect bone health in children specifically via a hormonal effect, contributing to insulin resistance, rather than the weight-bearing effect of VAT.

“Association Between Visceral Adipose Tissue and MRI-measured Cortical Bone Area in Adults”

Background: With the obesity epidemic, adipose tissue and its distribution in the body has received a lot of attention. Visceral adipose tissue (VAT) in particular has been shown to have a negative effect on cardiometabolic health and now research is emerging on its association with skeletal muscle (SM) and bone mineral density (BMD). Recent studies have shown that VAT is negatively associated with BMD.

Objective: This study aims to examine the association between VAT and cortical bone area (CBA) in adults

Methods: Whole body DXA was used to measure total body fat and whole body T1-weighted MRI scans to examine the right mid-femur for CBA and bone marrow adipose tissue area (BMA) measurements in 613 men and women (18-89yo). VAT, subcutaneous adipose tissue (SAT), and SM were also measured using the MRI scans.

Results: After adjustment for demographics, BMA, SAT and SM, we found a strong negative association between VAT and CBA (β = -0.173, P<0.001). The negative association between VAT and CBA (β = -0.179, P<0.001) persisted after we further adjusted for weight and body fat.

Conclusion: A statistically significant negative association was found between VAT and CBA after adjustment for demographics, weight, and other body composition. This study adds to the existing research by examining the relationship between adipose tissue distribution and weight-bearing cortical bone. Since VAT increases with age, this stresses the importance of reducing body VAT through diet and exercise in obese adults. Perhaps future studies can look at the effect of VAT reduction through a diet and exercise-based intervention on CBA.

“A Comparison of the Relationship between Bone Marrow Adipose Tissue and Cortical Bone Area in Children and Adults”

Given that a large portion of the world’s population is obese, it is important to understand the relationship between fat and bone. Recent studies have looked at the effects of bone marrow adipose tissue (BMA) on bone mineral density (BMD) in both hematopoietic cancellous bone and weight-bearing cortical bone of adults and children. This study compares the relationship between BMA and cortical bone area (CBA) in adults and children. A total of 185 healthy children (age 5-18) as well as 613 healthy adults (age 18-89) were included in this study. BMA and right mid-femur
CBA were measured using whole-body T1-weighted magnetic resonance imaging (MRI). Total body fat was measured using whole-body dual-energy x-ray absorptiometry (DXA). In both adults and children, an inverse relationship was observed between BMA and CBA. After adjustment for demographics, weight, total body fat, or visceral adipose tissue (VAT), subcutaneous adipose tissue (SAT), and age, an inverse relationship was seen between BMA and CBA in adults ($\beta = -0.248$ to $-0.298$, $P < 0.001$) and in children ($\beta = -0.201$ to $-0.272$, $p < 0.001$). The fact that the inverse relationship between BMA and CBA exists in both children and adults supports the hypothesis that there is competition between fat and bone across the lifespan. Given that CBA accrual may be dependent on BMA levels and vice versa at all stages of life, targeting and reducing BMA through lifestyle or drug therapies may promote higher bone mass. Future studies should examine the interaction between BMA and CBA in bone diseases in both children and adults.

Presentation Session 3 3:45 – 4:45pm

Session 3A  
Behrakis Auditorium

From Measurement to Program Evaluation: Improving Food Security Across Africa  
Faculty Moderator: Dr. Steven Block

“Food Security and Monoculture: Effects of the Land and Water Husbandry Program in Rwanda”

Nathaniel Rosenblum, Tufts University, Fletcher School and Friedman School, Agriculture Food and the Environment

Janeen Madan, Tufts University, Friedman School, Food Policy and Applied Nutrition

Co-authors: Jonathan Brands, Eric Jospe, Hee-Jun Lim, Axel Olson

The Land and Water Husbandry (LWH) project is currently being implemented in Rwanda’s eastern province by the Rwandan government in collaboration with the World Bank. The goal of this project is to improve and sustain the productivity of hillside agriculture through technology and knowledge transfers. The World Bank aims to evaluate the effect of the program on a variety of outcomes including food security as measured by the Household Hunger Scale (HHS) and the Women’s Dietary Diversity Score (WDDS). However, increased monoculture practices are believed to be one effect of the program. As part of the World Bank overall evaluation of the LWH program, our group analyzed the impact on food security and monoculture. Our primary econometric specification was a difference-in-differences estimator using fixed effects. We found a strong positive relationship between LWH and lower crop diversity ($p < 0.05$ and <0.01) and a weaker correlation between LWH and WDDS ($p < 0.1$), while there was no impact on HHS. With few program sites we were heavily power constrained, and attrition may also be an issue. These results indicate that the LWH program may be increasing monoculture practices, while having a smaller effect on food security.

“Cheaper Ceebu Jen: Engineering Inland Food Prices and Supply Chains in Senegal”
This conference paper addresses logistics challenges related to rural distribution, using as a case study the fish and rice sectors in Senegal. The Senegalese agro-transportation sector is entirely dependent on relatively expensive, imported oil. This poses two immediate challenges. First, increases in the price of oil used to transport fish and rice are frequently passed onto consumers. Second, fish and rice originate in central cities (e.g. along the coast and at the Port of Dakar, respectively) where they can be purchased for low wholesale prices. Then, further inland in rural markets, fish and rice can be sold for high retail prices. This price increase is a function of the value added from transportation required to move the good from a central city to a rural area, as well as a function of high demand and low supply in a rural area. Using well-established literature, interviews with supply chain actors, and simple statistical models, this paper illustrates the relationship between logistics challenges and rural pricing schemes. For contrast, this paper examines the – distinct – logistics challenges related to 'last mile distribution'. This paper posits that as food policy interventions continue to examine potential areas for private sector engagement, understanding mid-level distribution as well as last-mile distribution will be essential.

“Multidimensional Household Food Security Measurement in Rural Zambia”

Mark Brennan, Massachusetts Institute of Technology, Engineering Systems

Ayala Wineman, Michigan State University, Department of Agricultural, Food, and Resource Economics

Food security is recognized as a multifaceted condition of complex causality that is related to, yet distinct from, poverty and hunger. Given its broad definition, it is no surprise that food security eludes precise measurement. This study considers there to be three components of household food security (quantity, quality, and stability), and attempts to address the "concept-to-measurement" gap in food security by building an index that spans these dimensions. A panel data set is used for descriptive analysis of food security indicators in rural Zambia from 2001 to 2008. For most food security indicators, Zambia is characterized by stagnancy over the study period, although individual households exhibit a high level of mobility in calorie status. A multidimensional index of food security is then developed using principal component analysis, thereby avoiding subjectivity when generating weights. The index alternately includes forward-looking indicators of vulnerability in order to evaluate whether this improves our ability to forecast future welfare. This composite index is used to explore the spatial patterns of food security in Zambia over time, to assess correlates of food insecurity, and to measure the impacts of climate shocks on food security. Female-headed households have significantly lower food sufficiency and security scores, on average, than the general population. An Arellano-Bond estimation reveals a persistent effect of current food security status on future welfare, even after controlling for immediate shocks. For poor households, both temperature and early growing season rainfall affect food sufficiency in a quadratic manner. In addition, climate affects each element of the index differently, such that the policy implication is not evident until the index is decomposed. The paper concludes with a consideration of the merits and shortcomings of developing a composite food security index.
Analyzing Public Health Challenges: Factors Associated with Behavior Change
Faculty Moderator: Dr. Robert Houser

“Factors Associated with Community Health Worker’s Utilization of Mobile Health Technology”

Nisha Mohamed, Tufts University, Friedman School, Food Policy and Applied Nutrition
Reem Al Sukait, Tufts University, Friedman School, Food Policy and Applied Nutrition

Introduction: Mobile health technology is increasingly being recognized in its ability to support community health worker (CHW) performance. However, there is a concern that low motivation of CHWs is leading to decreased retention and/or poor utilization of mobile technologies. This poor utilization could reduce the potential impact of health programming in developing countries. This study aims to study aims to analyze CHW utilization ratios (UR) across the health projects and to better understand the relative influence of technical support, device type, type of project, size of project, and country on UR.

Methods: Data was consolidated from CommCare health projects in 35+ countries and worker activity was analyzed to see the effects of different variables on utilization of the technology. A total of 112 projects were analyzed. Statistical analysis was conducted using Ordinary Least Square (OLS) regression model to predict the effect of technical support, device type, type of project, size of project, and country on URs.

Results: The average UR was 0.82 (closer to 1) with standard deviation of 0.14. The majority of health projects were maternal, newborn and child programs (46%). The most frequent (44%) level of technical support purchased was Plus. The highest median UR in the sample was for HIV/AIDS projects with a utilization ratio of 0.91 (0.81,0.97). The lowest UR median was for those receiving no technical support (self-starters) at 0.77 (0.71,0.85). Level of technical support was found to be significant at three levels; Basic, Plus and Other (p value < 0.05).

Conclusions: As more CHW programs are looking to incorporate mobile technology or scale up existing programs, it is critical to pay attention to the factors that ensure maximum utilization of this technology. Utilization is of mobile technology in CHW programming is generally high but some level of technical support is crucial to maximizing usage. Future work should be done to analyze other variables that could be critical in engaging health workers in this process to ensure increased and enhanced health care services to individuals and communities.

“Disordered eating and sports participation as predictors of weight misperception in adolescents”

Cailin Kowalewski, Tufts University, Friedman School, Food Policy and Applied Nutrition
Chelsea Clarke, Tufts University, Friedman School, Agriculture Food and the Environment

This paper analyzes factors associated with inaccurate perception of weight status among adolescents using the National Longitudinal Study of Adolescent to Adult Health (Add Health) Wave II dataset (1996), which surveyed 14,738 students in grades 7-12. Factors of specific interest are disordered weight control behaviors and participation in team sports. The study also considers the impact of gender, race, age, body mass index, and weight loss attempts on perceived weight status. Overall, our findings indicated no significant association between extreme weight loss behavior and over-perceived weight status. However, extreme weight loss behavior was rare (1.43%) in the sample population. At high levels of sports participation, adolescents had slightly lower odds of over-perceived weight status. It should be noted that the relationship between non-extreme weight
loss attempts (i.e. diet and exercise) and weight status perception was both strong and significant. Adolescents attempting weight loss were twelve times as likely to over-perceive their weight status \((OR=12.07746, p=0.000)\), and significantly less likely to under-perceive their weight status \((OR=0.3926816, p=0.000)\). This has important implications in that over half of adolescents who were attempting weight loss qualified as normal weight.

“Predictors of Parental Adherence in Toddler Obesity Prevention Programs”

**Shariece Johnson, University of Maryland Baltimore County, Public Policy**

*Co-authors: Maureen Black, Erin Hager*

The prevention of obesity in the United States has become a serious public health concern, especially among children. In 2013, it was estimated that there were 23.9 million children in the U.S. ages 2 to 19 who were overweight or obese. Since overweight and obese children are at high risk for becoming obese adults that will suffer from serious chronic disease, addressing the issue of preventing childhood obesity should be a top priority. One important barrier to overcome when trying to develop childhood obesity prevention programs is addressing parental adherence to such programs. Childhood obesity prevention programs often deal with low parental adherence to program protocols, which can lead to diminished program results. Exploring factors that predict parental adherence will help to increase childhood obesity prevention program adherence levels, which in turn will lead to better program outcomes. Using the Health Belief Model as a theoretical framework, this research will explore factors that predict parental adherence to a toddler obesity prevention program conducted in a rural area of Maryland and an urban area of Maryland. A logistic regression analysis will be used to develop a model that predicts factors closely related to parental adherence in toddler obesity prevention programs. The effect of parents’ perceived susceptibility, perceived severity, and perceived benefits of the program on level of parental adherence will also be explored. The information obtained from the data analysis will be used to create a foundation of research that will help address issues of parental adherence in toddler obesity prevention programs in order to obtain more successful program outcomes. Successful program outcomes will ultimately lead to fewer obese adults, which in turn will reduce medical expenditures and medical costs associated with treating obesity and obesity-related chronic diseases.

Poster Presentation Session

12:30 pm – 1:30 pm

Jaharis 155 and 156

“Effects of chicory caffeoylquinic acids and metabolites on hepatic glucose metabolism”

**Abeer Hussain Alssafi, Florida International University, Food, Dietetics and Nutrition**

*Co-authors: Fatma G. Huffman*

Background/Objectives: Hypovitaminosis D is highly prevalent worldwide with affecting one billion people however, a higher prevalence is observed in sunny countries such as Saudi Arabia. The study objectives were to (1) determine the gender differences in \(25(\text{OH})\)D level; (2) examine the relative contributions of dietary calcium and vitamin D, body mass index, physical activity, and exposure to sun to plasma \(25(\text{OH})\)D.

Methods: This study was a secondary data analysis of a cross-sectional study. Data were collected by Prince Mutaib Bin Abdullah, Chair for Biomarkers Research on Osteoporosis from four Primary Health Care Centers in Riyadh, Saudi Arabia. Subjects were 72 Saudi adults ages 25-60 years. Data
were collected through a self-administered questionnaire addressing the dietary habits and risk factors. Anthropometrics and blood samples for vitamin D and calcium analysis were taken for each subject.

Results: Participants’ mean age was 43.54 ± 9.10 years, 54.2% (39/72) were women, 56.5% (39/69) were obese, 53.6% (37/69) were jobless, 62.5% (45/72) were physically inactive, and 80.6% (58/72) exposed their bodies to the sun. The prevalence of hypovitaminosis D was 84.72%. Vitamin D was significantly higher in men (P<0.001) than women. Intakes of dietary calcium and vitamin D were not associated with higher serum 25-hydroxyvitamin D. Obesity was not associated with lower serum 25(OH)D. A marginally significant difference was found between those who exercised and those who did not (P<0.065). Moreover, after adjusting for dietary vitamin D, there was a significant difference in the levels of vitamin D between non-exposure and exposure to the sun groups (P<0.002). Multivariate analysis identified age and monthly income as statistically significant positive and negative independent predictors of vitamin D level, respectively.

Conclusion: The prevalence of vitamin D deficiency is very high among the Saudi’s studied. Being female seem to be an independent predictor of lower serum vitamin D, in addition to sedentary lifestyle and low sun exposer. There is a need for research to evaluate the utility and applicability of the levels set for the diagnosis of vitamin D deficiency or insufficiency. Health education of the public should focus on the practice of improving dietary and lifestyle change.

"Associations between empirically-derived dietary patterns and anthropometric and biomarker outcomes among university students"

**Stacy Blondin, Tufts University, Friedman School, Food Policy and Applied Nutrition**

**Co-authors: Megan Mueller, Silvina Choumenkovitch, Christina Economos**

Background: Dietary patterns have been linked with health and disease outcomes across the lifespan. However, associations between dietary patterns and health outcomes among students attending four-year universities have received limited attention.

Objective: To investigate cross-sectional and longitudinal associations between empirically-derived dietary patterns and anthropometric and biomarker health indices among four-year university students.

Methods: The Tufts Longitudinal Health Study (1998-2007) collected annual anthropometric, dietary, behavioral, and biomarker data from Tufts University undergraduate students via the Block Food Frequency Questionnaire (FFQ), Health Behavior Survey, and fasting blood samples. For this analysis, dietary patterns will be derived from dietary data employing principle component analysis (PCA) and orthogonal rotation. Scree plots, eigenvalues, factor loadings, and patterns identified in previous studies will be used to determine the number of dietary patterns to retain. Analysis of covariance and fixed effects regression models will be used to determine the relationship between dietary patterns and adiposity and lipid biomarkers. Models will control for physical activity, age, sex, and ethnicity. Models will be run with and without total energy intake and other socio-demographic, psychosocial, and lifestyle covariates included. Gender will be tested as a potential effect modifying variable.

Results: The number of dietary patterns will be identified via PCA and labeled based on unique identifying characteristics and previous literature. Coefficients for associations between students’ scores on each dietary pattern and the following outcomes will be included: body mass index (BMI), waist circumference, and body fat percent and triglycerides, LDL and HDL cholesterol. P values <0.05 will be considered statistically significant.

Conclusions/Application/Significance: The transition period between late adolescence and early adulthood is a critical time point for establishing nutrition behaviors that will be carried into
adulthood. This study adds to existing literature by investigating the longitudinal relationship between dietary patterns and health outcomes among four-year university students.

“New York City resident fruit and vegetable intake and its association with perceptions of neighborhood crime: An exploratory study”

Cristian Meier, University of Iowa, Social Work

Background: Few Americans meet the recommended daily intake for fruits and vegetables, which is associated with the development of chronic conditions. Much of the literature has explored fruit and vegetable intake and its relationship with demographics, neighborhood segregation, and the food environment, while little research has included additional social neighborhood factors including crime. A smaller related body of research of social factors has examined the relationship between childhood obesity and perceptions of neighborhood crime and resulted in mixed findings suggesting further research is needed to understand the proposed relationship. This exploratory study seeks to identify if there is a relationship between fruit and vegetable intake and perceived neighborhood crime.

Methods: This study used data from the 2010 New York City Community Health Survey. Respondents were 8,665 adults from 34 neighborhood clusters in New York City from 5 boroughs. Daily fruit and vegetable intake is a one-item measure of how many fruits and vegetables consumed yesterday with a continuous response choice with reported range from 0 to 20. Perceptions of neighborhood crime was aggregated from one-item that asked residents how safe their neighborhood was from crime with responses ranging from extremely safe to not at all safe. Multilevel multivariate regression models were estimated and included demographic controls.

Results: As expected, fruit and vegetable intake was significantly negatively associated with being black, Hispanic, unmarried, and not employed. Neighborhood perceptions of crime significantly predicted that those who live in neighborhoods perceived as less safe from crime consumed fewer fruits and vegetables daily (-0.36, p=0.001).

Implications: The results of this study have important implications for those designing and implementing interventions aimed at increasing fruit and vegetable intake. Future research in this area should focus on understanding the proposed relationship between perceptions of neighborhood crime and fruit and vegetable intake.

“Relating plant biodiversity in Guatemalan cornfields to maize protein concentration”

AnneElise Stratton, Tufts University, School of Arts and Sciences, Environmental Studies and Biology

Biodiversity in agroecosystems has been shown to contribute to soil and plant health by way of multiple environmental services. Increasing crop biodiversity may also lead to improved product quality and nutritional value for human consumption. This study sought further understanding into the impacts of cover crop (velvetbean, Mucuna sp.) fixation of nitrogen, maize landrace biodiversity (white or white plus red, yellow, and/or black maize) in a single field, multiple- or mono-cropped growing system, and extent of insect herbivory on maize nutritional quality (based on kernel protein) in Sarstún, Guatemala. Different aspects of cornfield vegetative biodiversity were identified based on farmer interview data from Sarstún, which were then compared to laboratory determinations of local corn kernel protein concentration. Overall, only the presence or absence of Mucuna cover crop had a significant effect on percent protein (p=0.008). Presence of Mucuna increased protein concentration by an average of 13% without interactive effects by either cropping system (p=0.419) or number of kernel classes grown by a farmer (p=0.774). Neither cropping system nor kernel class had a significant effect on maize protein (p=0.620 and p= 0.419,
Level of herbivory by the maize weevil also did not affect protein concentration (p=0.184). Data demonstrate that intercropping with Mucuna in Central American tropical maize agroecosystems has the potential to improve not only soil and plant health and augment yields, but also to slightly increase crop quality. Elevated maize protein concentration could therefore create a public health incentive for farmers in Sarstún and elsewhere in Latin America to manage their farms with Mucuna spp. or other nitrogen-fixing cover crop species.


Caleigh Sawicki, Tufts University, Friedman School, Nutritional Epidemiology
Co-authors: Kara A. Livingston, Martin Obin, Susan B. Roberts, Mei Chung, Nicola M. McKeown

Evidence mapping is a non-exhaustive, systematic process by which the breadth of research on a particular topic may be explored. It is useful for summarizing research and influencing new priorities in rapidly developing areas of interest. The aim of this project was to use evidence mapping to summarize published data on dietary fibers and the human gut microbiome. A newly developed comprehensive fiber database, comprised of human intervention studies, identified 141 relevant publications with the following broad outcomes: (1) modulation of colonic microflora and/or (2) colonic fermentation/short-chain fatty acid production. Descriptive analyses were performed to summarize study design characteristics, fiber exposures, and outcomes. The majority of studies were crossover designs (66%) in adult populations (82%) with healthy baseline status (82%). While 17% were acute studies (≤1 day), most had a duration of 1-4 weeks (69%), but there were fewer studies of longer duration (13%). The dietary fibers most frequently examined were resistant starch (14.4%), wheat (7.0%), inulin (7.0%), barley (6.4%), and fructooligosaccharides (6.4%). A total of 7.0% of studies administered an intervention that used a combination of fibers. In the emerging field of dietary fiber and the microbiome, research gaps exist regarding how different fiber types and combinations may affect gut microbiota. This project was supported by a research grant from ILSI North America.

“Linking Social Capital to Measures of Food Insecurity in Northern Ethiopia”

Karin Christianson, Tufts University, Friedman School, Food Policy and Applied Nutrition, and School of Medicine, Public Health
Janet Kim, Tufts University, Friedman School, Food Policy and Applied Nutrition
Co-author: Bapu Vaitla

Although social capital has been previously associated with decreased risk of food security within the United States, this relationship has not been thoroughly examined within international contexts, and in settings that suffer from chronic food insecurity. Utilizing a dataset from Tigray, Northern Ethiopia, this study conducted lagged multinomial logistic regression analyses to assess the relationship between social capital measures and various scales of food security during Lean and Harvest Seasons, between 2012 and 2013. Food security measures analyzed included the Coping Strategies Index (in full and reduced forms), Self-Assessed Food Insecurity Scale, and Household Food Insecurity and Access Scale. Social capital indicators utilized for this study included self-reported numbers of friends, individual emergency networks, community support, and participation in church groups. While there were few statistically significant household social capital measures associated with food security status, these were highly variable within and between various food security scales. We suggest that such variability may be attributable to the dynamic nature of the relationship with social capital inferring both benefits and disadvantages to households. Further research, both in depth (the manifold dimensions of social capital) and scope (changes over time) is recommended to expand the currently limited knowledge base on this
relationship to guide agencies and donors so that they are better able to allocate resources in a timely and efficient manner to households in food security crises.

“How does the food environment affect food security in college students?”

Erin Grigorian, University of Michigan, Undergraduate Research Opportunity Program
Co-authors: Danielle Tondreau, Erica Mirabitur, Karen Peterson, Nicole Kasper

According to campus wide surveys, food access and insecurity on campus is a concern for many students at the University of Michigan. A study conducted in 2012 and 2013 found that 40% of students experienced food insecurity. Students reported limited access to healthy affordable food and limited transportation as causes of food insecurity on campus. Through our research, we are trying to determine how food outlet access affects student food insecurity. We are currently looking at access to food outlets and price within those outlets to help us determine the answer. We first conducted a literature review where we analyzed how similar projects have been organized, specifically how food outlets were categorized within their research. After finishing the literature review, we obtained a complete list of food outlets in Washtenaw County from ReferenceUSA and separated the list into 18 specific categories. This streamline method of organizing food outlets into 18 specific categories will be applied to a list of food outlets for other surrounding counties in Michigan, besides Washtenaw County. We will also use ArcGIS software to map out where the food outlets are located. We are also organizing a supermarket food audit by composing a list of common food items to analyze the price and availability of each at the supermarkets in the county. Another campus-wide student survey regarding food insecurity will be conducted in the winter that will gather geographic residence’s location, which we will then use to allow us to determine how the food environment, as measured by the variety of food outlets around where a student lives, as well as the affordability of the closest supermarket, affects food insecurity and fruit and vegetable intake.

“Xanthurenic acid is associated with higher insulin resistance and higher odds of diabetes”

Christina Reginaldo, Tufts University, Friedman School, Nutritional Epidemiology
Co-authors: Paul Jacques, Tammy Scott, Gregory Oxenkrug, Jacob Selhub Ligi Paul

Pyridoxal 5’phosphate (PLP), the bioactive form of vitamin B6, is a cofactor for enzymes in the kynurenine pathway of tryptophan degradation that produce immunomodulatory compounds. Early studies suggest that one of these compounds, xanthurenic acid (XA), has diabetogenic effects by chelating with insulin and reducing its hormonal activity. We determined the relation of PLP, XA, insulin resistance and diabetes in a population of Boston area elderly >60yr (n=171). Data from liquid chromatograph – tandem mass spectrometry measurements of plasma kynurenines were combined with existing dataset from this cohort in this ancillary study. Data were log transformed where necessary and analyzed using multiple linear and logistic regression analysis. Higher PLP was associated with higher XA concentrations (β=0.001, p<0.03). Higher plasma XA was associated with higher insulin resistance (HOMAIR) (β=0.19, p<0.002) and higher odds of having diabetes (OR: 1.15, 95% CI: 1.03 – 1.27). The precursor of XA is hydroxykynurenine, which can produce either XA or hydroxyxanthranilic acid. Higher ratio of XA to its precursor, hydroxykynurenine, are associated with increased insulin resistance (HOMA IR) (β=6.0, p<0.05), whereas the ratio of hydroxyxanthranilic acid to hydroxykynurenine are not associated with HOMA IR (p>0.05). Our data suggests that PLP is involved in development of diabetes via xanthurenic acid production in the kynurenine pathway.
“Can Nutritional Benefit be Considered Quantitatively when Advising Urban Gardeners which Vegetables to Grow to Reduce Risks of Lead Exposure?”
Amanda Kopet, SUNY Albany, School of Public Health, Epidemiology
Co-author: Henry Splethoff

BACKGROUND: Foods differ with respect to their nutritional content (and associated health benefits), and also in their tendency to contain potentially harmful chemical contaminants. Vegetables also contain nutrients that are important for good health, and the public is encouraged to eat vegetables. This message can be particularly important in some urban neighborhoods with poor access to fresh produce and high incidence of chronic diseases. However, vegetables grown in these urban neighborhoods may harbor chemical contaminants (e.g., lead). As a result, gardeners in urban areas are encouraged to grow vegetables lower in lead (fruiting vegetables) over others (leafy and root vegetables). This advice does not consider relative differences in nutritional value of vegetables and associated health benefits. In the current study, we explore the feasibility of considering nutrient content of vegetables to refine advice given to urban gardeners to minimize exposure to lead.

METHODS: An existing lead dataset was combined with available nutrient data sets (e.g., antioxidant content), matching by common vegetable name and categorizing by vegetable type (e.g., fruiting vegetables). We calculated individual vegetable means, stratified by the median for all vegetables and examined data by quadrants (lower and higher lead and nutrients) for each nutrient.

RESULTS: We found that levels of lead and certain nutrients differ significantly by vegetable type. While nearly all fruiting vegetables have lower levels of lead, fruits differ significantly with respect to content of some nutrients, suggesting the potential benefit of fine-tuning recommendations to consider growing those which are lowest in lead and highest in nutrient content (e.g., green beans, broccoli). Conversely, some vegetables that have higher levels of lead have low levels of nutrients, and gardeners could consider not growing these vegetables.

CONCLUSIONS: Our preliminary analysis suggests that consideration of nutrient content could inform some outreach strategies for urban gardeners. However, a more comprehensive analysis incorporating a bigger lead data set and more nutrient data would be needed to confirm results.

“Evaluation of the Cambridge Food and Fitness Policy Council: Lessons learned and considerations for other collaborative bodies”
Molly Lawrence, Boston University, School of Public Health, Department of Community Health Sciences
Co-authors: Jacey A. Greece, Dawn Olcott, Josefine Wendel

Introduction: The increasing complexity and disintegration of the Western food system has caused concern about the impact on human, environmental, and ecological health. Food Policy Councils (FPCs) are established to localize and secure food systems and unite diverse sectors. Limited evidence exists on best practices for evaluating FPCs.

Methods: The Cambridge Food and Fitness Policy Council (FFPC) conducted a process-oriented evaluation of their collaborative efforts over the past three years. The evaluation questions, based on the FFPC’s strategic plan, addressed the extent to which recommended actions and corresponding activities were implemented. The evaluation plan included a literature review of best practices, qualitative data collection (i.e., key informant interviews, focus group, survey), and quantitative data collection (i.e., survey, pre-existing data). The evaluation plan was adapted from several best practices, including cross-sector case studies examining evaluations of collaborative bodies.
Results: The evaluation demonstrated that 17 out of 22 recommended activities from the strategic plan had been fulfilled. Strengths uncovered by the evaluation included: 1) significant member satisfaction and engagement; and, 2) the enumerative benefits of strong cross-sector networks, both leading to constructive sharing of resources. Barriers included: 1) limited allotted resources (i.e., staff time); 2) ineffectual external communications; and, 3) the necessary refinement of the broad scope of the council. Recommendations for improvement of the Cambridge FFPC included the development of effective outreach and communication strategies, the reinforcement of diverse member networks, and enhancing the visibility and accessibility of the FFPC.

Discussion: The results of the evaluation demonstrate the significance of the Cambridge FFPC and its efforts. There is a need for more comprehensive and rigorous evaluations in this area to strengthen and clarify FPC’s goal-oriented activities and inform current and future work. Engaging key stakeholders in evaluation has demonstrated enhanced relational capacity, allowing FPCs to better serve their target community.

“Partnering with community organizations to improve outcomes and boost sustainability”

**Leslie Redmond, Johns Hopkins University, Bloomberg School of Public Health, Bloomberg School of Public Health, Johnson & Johnson Community Healthcare Program**

**Co-authors:** Michael Guarine, Anna Hershey, Beatriz Delgado, Fannie Fonseca-Becker

Background: Childhood obesity is a major concern across the nation. Erie Neighborhood House (ENH) is a community based organization in Chicago that has developed an after school program called Super H Kids, which focuses on nutrition and physical activity for the prevention of childhood obesity. A partnership was formed between ENH and Johns Hopkins Bloomberg School of Public Health, with funding from the Johnson and Johnson (J&J) Community Healthcare Program, to improve in-house monitoring and evaluation capacity of ENH and increase sustainability of the program.

Methods: The Super H Kids program is being implemented over 18-months. Program directors at ENH worked with a J&J scholar to create a conceptual framework, goals, objectives, and outcome measures to inform the curriculum. Pre- and post-tests evaluating knowledge, behaviors, and self-efficacy relating to nutrition and physical activity were administered, and heights and weights were measured, at the beginning and end of each 16-week session. A data management and evaluation system was developed to assist ongoing evaluation of the program and to improve effectiveness.

Results: At baseline, 46% of the children were overweight or obese. Only 41% of the children knew the recommended number of daily fruit and vegetable servings, and about two thirds (66.7%) could identify at least three healthy drinks. Recruitment is ongoing; follow-up data will be reported.

Conclusion: Grassroots efforts of programs such as Super H Kids have the potential to impact public health issues of nutrition such as childhood obesity. These programs can be made more sustainable through the development of in-house monitoring and evaluation skills. Results of program evaluation can be used to assess progress in meeting goals/objectives and identify areas for improvement.

Application: Partnerships between community based health organizations and academic institutions can improve program outcomes and provide evidence-based feedback for future program development.
“Diet Related Risk Factors of Cancer Among Haitian and African American Males”

Simone Morgan, Florida International University, Dietetics and Nutrition

Co-authors: Zisca Dixon, Gustavo Zarini, Fatma Huffman

There is some evidence that suggests that high vegetable intake may decrease the risk of certain cancers. However, research providing an in-depth look into the dietary risk factors of the African and Haitian American population is lacking. The goal of this study was to find out whether Haitian American (HA) or African American (AA) males have an increased risk of developing prostate cancer and other cancers. This elevated risk was determined by comparing their total vegetable and green leafy vegetable intake and mean body mass index (BMI). Dietary data was obtained using the Harvard semi-quantitative food frequency questionnaire, while BMI was determined by measuring participants' height and weight. The final sample, N = 224 (117 HA, 107 AA), was analyzed using the independent t-test and sequential multiple regression to compare the risk factors between the ethnicities. Results showed that HA had significantly higher intakes (p < 0.05) of total vegetable (4.40 serv/day) and green leafy vegetable (1.26 serv/day) than AA (3.21 and 0.92 serv/day, respectively). In addition, the mean BMI for HA was 28.05 Kg/m 2, which was significantly lower (p < 0.001) than the mean BMI for AA (30.73 Kg/m 2). These data suggest that African American males are at a greater risk for developing prostate cancer and other cancers than Haitian American males. Furthermore, results from this study could contribute to diet related recommendations. This is particularly important in community nutrition education programs, counseling sessions and other dietary nutrition intervention programs that target black males.

“The role of nutrient dense fruits and vegetables in meeting the nutrient targets of the Dietary Approaches to Stop Hypertension (DASH) diet: A food pattern modeling approach”

Zach Conrad, Tufts University, Friedman School, Agriculture Food and the Environment

Co-authors: Kenneth Chui, Christian Peters, Timothy Griffin

Hypertension is a prominent risk factor for cardiovascular disease, which is the leading cause of mortality in the US. Over one-half of adults are hypertensive or pre-hypertensive. The Dietary Approaches to Stop Hypertension (DASH) diet has been continuously shown to normalize blood pressure by meeting specific nutrient targets, but the adherence rate is consistently low. Following the DASH diet requires individuals to modify their consumption of all food groups, which is unachievable for most people. Fortunately, a growing body of research shows that modest lifestyle changes can be readily adopted and maintained, and can result in positive health outcomes. We use a food pattern model to investigate whether the DASH diet nutrient targets can be met by incorporating nutrient dense fruits and vegetables into a typical diet pattern. Data on food consumption and nutrient intake among hypertensive adults were retrieved from the National Health and Nutrition Examination Survey (NHANES), 2009-2010 (n=738). Data from the USDA National Nutrient Database for Standard Reference (NDB) Release 26 were used as input data for a nutrient density index that measured nutrient density per serving of individual fruits and vegetables. Our results show that diets that include nutrient dense fruits and vegetables meet the DASH diet nutrient targets with fewer fruit and vegetable servings than is recommended by the DASH diet. These findings provide health care practitioners with the information needed to recommend achievable diet patterns for their hypertensive patients, which could increase the prevalence of individuals meeting recommended nutrient intakes.
“Summary and Comparison of Existing Sustainable Diet Guidelines”

**Chelsea Clarke, Tufts University, Friedman School, Food Policy and Applied Nutrition**

Co-authors: Dianna Bartone, Danielle Ngo

A call to action on dietary guidance for sustainability arose over 30 years ago. Recently, the topic resurfaced in US food policy when a subcommittee in Dietary Guidelines for Americans (DGA) Committee 2015 was tasked to summarize current sustainable diet research. Proponents of sustainable diet guidance cite the connections between agriculture, food policy, and food availability as undeniable factors influencing diet, nutritional status, and health outcomes in our society. Opposition arises from concern over conflicting messages between sustainability and nutrition, the quality of evidence on sustainable diets, and the potential economic impacts of sustainable diet preferences. Our research addresses these concerns, investigating consistency of sustainable diet recommendations and laying the groundwork to analyze the standard of evidence underlying these recommendations.

Search terms on sustainable diet guidance identified white papers published by government, non-profits, and universities worldwide. The research scope was limited to guidelines targeted to a consumer audience, excluding informal media sources such as news articles or blog posts. Examples of recommendations include, “eat fewer animal products” and “choose dried beans over canned,” with accompanying graphics such as the Barilla Double Pyramid and LiveWell 2020 Plate. The purpose of this research is to assess congruence of existing guidelines and consistency with the literature on sustainable diets. By sorting individual recommendations into broader categories (e.g. Animal Products, Biodiversity, Culture, Equality, and Waste), we identify the most consistent guidance, as well as gaps and misalignments in sustainable diet advice directed at consumer audiences.

The results point to misalignments of some recommendations with current scientific evidence, as well as visible gaps in the sustainable diet categories of equality, culture, and biodiversity. Creation of future sustainable dietary guidelines for consumers must take care to emphasize actions that represent a harmonious effort towards sustainability, valuing all components within the consensus definition of sustainable diets.

“Climate change and cranberry cultivation in Massachusetts”

**Elena Martinez, Erin Foster-West and Ashley McCarthy, Tufts University, Friedman School, Agriculture Food and the Environment**

The cranberry industry has been important to Massachusetts historically and it remains a vibrant part of the local economy today. In 2012, the cranberry was the largest single agricultural crop grown in the state, with over 13,000 acres harvested on more than 400 farms, contributing $265 million to the Commonwealth’s economy. In the next few decades, projected changes in climate will threaten cranberry productivity and profitability in Massachusetts through decreased optimal growing time and increased risk of scald, frost, flood, and pest damage. In this paper, we propose four policy options to support the Massachusetts cranberry industry in addressing the impacts of climate change. These policy options include providing incentives for farmers to adopt adaptation strategies; funding research on adaptation and mitigation; reassessing water and wetlands regulations; and providing exit strategies for the most vulnerable farmers. The long-term viability of the Massachusetts cranberry industry will depend on its ability to adapt to climate change and remain competitive with other cranberry-producing regions.

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