

**A Workshop to Review the Evidence on  
Food Policy, Sustainable Food Systems, and Nutrition**

**University of Maryland**  
**November 13, 2019**

**References plus abstracts for each session**

**Session 1: Food Prices**

**Alston, Julian M., Joanna P. MacEwan, and Abigail M. Okrent.** "Effects of US public agricultural R&D on US obesity and its social costs." **Applied Economic Perspectives and Policy** 38, no. 3 (2016): 492-520.

How much has food abundance, attributable to U.S. public agricultural R&D, contributed to high and rising U.S. obesity rates? In this paper we investigate the effects of public investment in agricultural R&D on food prices, per capita calorie consumption, adult body weight, obesity, public healthcare expenditures related to obesity, and consumer welfare. We find that a 10% increase in the stream of annual U.S. public investment in agricultural R&D in the latter half of the twentieth century would have caused a modest increase in the average daily calorie consumption of American adults, resulting in small increases in public healthcare expenditures related to obesity. On the other hand, such an increase in spending would have generated very substantial consumer benefits, and net national benefits, given the very large benefit-cost ratios for agricultural R&D. This implies that current policy objectives of revising agricultural R&D priorities to pursue obesity objectives are likely to be comparatively unproductive and socially wasteful. Moreover, R&D lags of decades mean that such an approach would be totally ineffective in the immediate horizon.

**Alston, Julian M., and Abigail M. Okrent.** **The Effects of Farm and Food Policy on Obesity in the United States.** Palgrave McMillan, 2017. This book uses an economic framework to examine the consequences of U.S. farm and food policies for obesity, its social costs, and the implications for government policy. Drawing on evidence from economics, public health, nutrition, and medicine, the authors evaluate past and potential future roles of policies such as farm subsidies, public agricultural R&D, food assistance programs, taxes on particular foods (such as sodas) or nutrients (such as fat), food labeling laws, and advertising controls. The findings are mostly negative—it is generally not economic to use farm and food policies as obesity policy—but some food policies that combine incentives and information have potential to make a worthwhile impact. This book is accessible to advanced undergraduate and graduate students across the sciences and social sciences, as well as to decision-makers in the public, private, and not-for-profit sectors. Winner of the Quality of Research Discovery Award from the Australasian Agricultural and Resource Economics Society.

**Bartlett, Susan; Klerman, Jacob; Wilde, Lauren; Logan, Christopher; Blocklin, Michelle; Beauregard, Marianne; and Ayesha Enver.** 2014. **Evaluation of the Healthy Incentives Pilot (HIP) Final Report.** Prepared by Abt Associates for the U.S. Department of Agriculture, Food and Nutrition Service. Available online at <https://www.fns.usda.gov/snap/hip/final-evaluation-report>. The Healthy Incentives Pilot (HIP) tested a way of making fruits and vegetables more affordable for participants in the Supplemental Nutrition Assistance Program (SNAP). Under HIP, SNAP participants received a financial incentive for purchasing fruits and vegetables. The HIP evaluation used a random assignment research design. Specifically, 7,500 Hampden County SNAP households were randomly selected to participate in HIP, while the remaining 47,595 households continued to receive SNAP benefits as usual.

The final evaluation report presents findings on the impacts of HIP on fruit and vegetable consumption and spending, the processes involved in implementation and operating HIP, impacts on stakeholders, and the costs associated with the pilot.

**Carlson, A., and E. Frazão. 2012. Are Healthy Foods Really More Expensive? It Depends on How You Measure the Price, Economic Research Service, USDA.** Most Americans consume diets that do not meet Federal dietary recommendations. A common explanation is that healthier foods are more expensive than less healthy foods. To investigate this assumption, the authors compare prices of healthy and less healthy foods using three different price metrics: the price of food energy (\$/calorie), the price of edible weight (\$/100 edible grams), and the price of an average portion (\$/average portion). They also calculate the cost of meeting the recommendations for each food group. For all metrics except the price of food energy, the authors find that healthy foods cost less than less healthy foods (defined for this study as foods that are high in saturated fat, added sugar, and/or sodium, or that contribute little to meeting dietary recommendations).

**Carlson, A., and E. Frazão. 2014. “Food Costs, Diet Quality and Energy Balance in the U.S,” Physiology and Behavior 134:20-31.** The high obesity rates and poor diet quality in the United States, particularly among low income populations, are often attributed to low income, low food access, and high food prices of healthy foods. This paper discusses these associations and questions some of the metrics used to measure food prices. The paper argues that 1. On average, Americans consume diets that need improvement and there is only a very limited relationship between income and diet quality; 2. The way the food price is measured makes a difference in the perception of how expensive healthy and less healthy food is; 3. The way Americans allocate their food budgets between healthy and less healthy foods is not in line with healthy diets; and 4. At any food spending level there are households that purchase healthy (and unhealthy) diets, including budgets at or below the maximum allotment for the Supplemental Nutrition Assistance Program (SNAP) which provides a means for low-income households to purchase food. Our key finding is that healthy foods and diets are affordable, but policy makers, nutrition educators, researchers and the media need to focus on promoting this message, and providing additional guidance on making the changes for Americans to switch to a healthy and affordable diet.

**Caswell, J. and Yaktine, A., Supplemental nutrition assistance program: examining the evidence to define benefit adequacy. 2013. Washington: National Academy of Sciences.** In response to questions about whether there are different ways to define the adequacy of SNAP allotments consistent with the program goals of improving food security and access to a healthy diet, USDA's Food and Nutrition Service (FNS) asked the Institute of Medicine (IOM) and the National Research Council (NRC) to conduct a study to examine the feasibility of defining the adequacy of SNAP allotments, specifically: 1. The feasibility of establishing an objective, evidence-based, science-driven definition of the adequacy of SNAP allotments consistent with the program goals of improving food security and access to a healthy diet, as well as other relevant dimensions of adequacy; and 2. Data and analyses needed to support an evidence-based assessment of the adequacy of SNAP allotments. The committee's conclusions are based on the findings derived from its review of the available evidence. These conclusions formed the basis for the committee's recommendations.

**Cavanagh, Michelle; Janine Jurkowski, Christine Bozlak, Julia Hastings and Amy Klein. 2016. “Veggie Rx: an outcome evaluation of a healthy food incentive programme.” *Public Health Nutrition*: 20(14), 2636–2641.** Objective: One challenge to healthy nutrition, especially among low-income individuals, is access to and consumption of fresh fruits and vegetables. To address this problem, Veggie Rx, a healthy food incentive programme, was established within a community clinic to increase access to fresh

produce for low-income patients diagnosed with obesity, hypertension and/or type 2 diabetes. The current research aimed to evaluate Veggie Rx programme effectiveness. The study found greater improvement in BMI among Veggie Rx programme participants. This information will guide programme changes and inform the field on the effectiveness of healthy food incentive programmes for improving health outcomes for low-income populations.

**Colchero MA, Rivera-Dommarco J, Popkin BM, Ng SW. In Mexico, Evidence Of Sustained Consumer Response Two Years After Implementing A Sugar-Sweetened Beverage Tax. *Health Aff (Millwood)*. 2017;36(3):564-571.**

**2017;36(3):564-571.** Mexico implemented a 1 peso per liter excise tax on sugar-sweetened beverages on January 1, 2014, and a previous study found a 6 percent reduction in purchases of taxed beverages in 2014. In this study we estimated changes in beverage purchases for 2014 and 2015. We used store purchase data for 6,645 households from January 2012 to December 2015. Changes in purchases of taxed and untaxed beverages in the study period were estimated using two models, which compared 2014 and 2015 purchases with predicted (counterfactual) purchases based on trends in 2012-13. Purchases of taxed beverages decreased 5.5 percent in 2014 and 9.7 percent in 2015, yielding an average reduction of 7.6 percent over the study period. Households at the lowest socioeconomic level had the largest decreases in purchases of taxed beverages in both years. Purchases of untaxed beverage increased 2.1 percent in the study period. Findings from Mexico may encourage other countries to use fiscal policies to reduce consumption of unhealthy beverages along with other interventions to reduce the burden of chronic disease.

**Dannefer, Rachel; Abrami, Alyson; Rapoport, Rebecca; Sriphanlop, Pathu; Sacks, Rachel; and Michael Johns. 2015. "A Mixed-Methods Evaluation of a SNAP-Ed Farmers' Market-Based Nutrition Education Program," *J Nutr Educ Behav*. 47:516-525.** Objective: Evaluate the effectiveness of the Stellar Farmers' Market program. Results: Attending 1 classes was associated with more positive attitudes toward consuming FV; Attending 2 classes was associated with greater FV consumption and higher self-efficacy to prepare and consume produce. Respondents attending 2 classes consumed almost one-half cup more FV daily than others. These associations remained after controlling for age, race/ethnicity, education, and gender. Conclusions and Implications: Offering nutrition education and cooking classes at farmers' markets may contribute to improving attitudes, self-efficacy, and behaviors regarding produce preparation and consumption in low-income populations.

**Freedman, Darcy A.; Choi, Seul Ki; Hurley, Thomas; Anadu, Edith and James R. Hébert. 2013. "A farmers' market at a federally qualified health center improves fruit and vegetable intake among low-income diabetics." *Preventive Medicine* 56 (2013) 288–292.** Objective. A 22-week federally qualified health center (FQHC)-based farmers' market (FM) and personal financial incentive intervention designed to improve access to and consumption of fruits and vegetables (FVs) among low-income diabetics in rural South Carolina was evaluated. Results reveal a dose-response relationship between the intervention and FV improvements and emphasize the importance of addressing economic barriers to food access.

**Grummon AH, Lockwood BB, Taubinsky D, Allcott H. Designing better sugary drink taxes. *Science*. 2019;365(6457):989-990.** Taxes on sugar-sweetened beverages (SSBs), such as soda and bottled iced tea, are an increasingly popular approach to reducing obesity, diabetes, and other health harms (1). As of mid-2019, 42 countries and seven U.S. cities have implemented SSB taxes (2). A basic economic principle is that such corrective taxes should be proportional to the harm caused. The harm from sugary drinks comes from the sugar, and SSBs vary substantially in sugar per unit volume. Yet SSB taxes typically set constant rates per unit volume; only three SSB taxes worldwide are proportional to sugar content.

For example, the seven U.S. cities that tax SSBs use volumetric taxes of 34 to 68 cents per liter of liquid (1 to 2 cents per ounce) instead of, say, 0.5 cents per gram of sugar. These volumetric SSB taxes are poorly targeted to the actual health harms from SSBs. We estimate that a simple design change—taxing the amount of sugar in a drink, not the volume of liquid that accompanies the sugar—could boost a SSB tax's health benefits and overall economic gains by roughly 30%.

**Lawman HG, Bleich SN, Yan J, LeVasseur MT, Mitra N, Roberto CA. Unemployment claims in Philadelphia one year after implementation of the sweetened beverage tax. *PLoS One*. 2019;14(3):e0213218.**

Objectives: Possible adverse economic impacts of sweetened drink taxes are a key concern for numerous stakeholders. This study examined changes in unemployment benefit claims filings in Philadelphia compared to its neighboring counties two years prior to and 14 months post implementation of a 1.5 cents per ounce excise tax on sugar- and artificially-sweetened beverages. Conclusions: Public reports of increased unemployment within the first year following the implementation of the Philadelphia beverage tax are not supported by this analysis. Future work should examine employment outcomes and include longer follow-up periods.

**Lee MM, Falbe J, Schillinger D, Basu S, McCulloch CE, Madsen KA. Sugar-Sweetened Beverage Consumption 3 Years After the Berkeley, California, Sugar-Sweetened Beverage Tax. *Am J Public Health*. 2019;109(4):637-639.**

Objectives: To estimate changes in sugar-sweetened beverage (SSB) and water consumption 3 years after an SSB tax in Berkeley, California, relative to unexposed comparison neighborhoods. Conclusions: Reductions in SSB consumption were sustained in demographically diverse Berkeley neighborhoods over the first 3 years of an SSB tax, relative to comparison cities. These persistent, longer-term reductions in SSB consumption suggest that SSB taxes are an effective policy option for jurisdictions focused on improving public health.

**Lin, Biing-Hwan and Joanne F. Guthrie. 2007. *How Do Low-Income Households Respond to Food Prices?* EIB 29-5. U.S. Dept. of Agriculture, Economic Research Service.**

<https://naldc.nal.usda.gov/download/35365/PDF> The potential effectiveness of a price intervention for promoting healthier food choices was estimated using estimates of price elasticity for low-income consumers, as well as information on current consumption compared with the recommended level. Results indicated that a 10-percent discount in the price of fruits and vegetables would increase the amount purchased by 6-7 percent.

**MacEwan, Joanna P., Julian M. Alston, and Abigail M. Okrent. "The consequences of obesity for the external costs of public health insurance in the United States." *Applied Economic Perspectives and Policy* 36, no. 4 (2014): 696-716.**

Over the past five decades in the United States, total medical expenditures and the proportion of medical expenditures financed with public funds have both increased significantly. A substantial increase in the prevalence of obesity has contributed to this growth. In this study we measure the external cost of obesity in the form of publicly funded health-care expenditures, and how this cost changes when the distribution of obesity in the population changes. We use a continuous measure of obesity, Body Mass Index (BMI), rather than discrete BMI categories to represent the distribution of obesity and changes in it. We predict that a one-unit increase in BMI for every adult in the United States would increase annual public medical expenditures by \$6.0 billion. This estimated public cost equates to an average marginal cost of \$27 per year, per adult for a one-unit increase in BMI for each adult in the U.S. population—or \$4.35 per pound. Separately, we estimate that if every U.S. adult who is now obese (BMI  $\geq 30$ ) had a BMI of 25 instead, annual public medical expenditures would decline by \$166.2 billion (in constant 2009 dollars), or 15.2% of annual public

medical expenditures in 2009. Assuming a socially optimal BMI of no more than 25, we estimate that the prevalence of obesity in 2009 resulted in a deadweight loss of \$148.2 billion in 2009.

**Mancino, L., Guthrie, J., Ver Ploeg, M. and B-H Lin. 2018. *Nutritional Quality of Foods Acquired by Americans: Findings from USDA's National Household Food Acquisition and Purchase Survey*. Economic Information Bulletin No. (EIB-188), February 2018.** We use data from the USDA's National Household and Food Acquisition and Purchase Survey to describe the nutritional quality of foods purchased and acquired by a nationally representative sample of Americans. We compare the nutritional quality of foods purchased and acquired by households that participate in USDA's Supplemental Nutrition Assistance Program (SNAP) to the foods of other low-income, SNAP-nonparticipating households and those of higher income households. We also compare the nutritional quality of foods purchased and acquired by households with low access to healthy food retailers to households with better access, for the population as a whole, and for the SNAP-participating and -nonparticipating subgroups previously described. Similarly, we compare nutritional quality of foods obtained from supermarkets and other grocery retailers to foods prepared away from home at restaurants, fast-food establishments, schools, and other sources for the whole population and for defined subgroups. We find that lower nutritional quality of household food acquisitions was associated with SNAP participation status and limited household access to healthy food retailers. More reliance on food prepared away from home was also associated with lower nutritional quality, especially for higher income households.

**National Academies, Health and Medicine Division. 2018. Sustainable Diets, Food, and Nutrition: Proceedings of a Workshop—in Brief**

<http://www.nationalacademies.org/hmd/Activities/Nutrition/FoodForum/2018-AUG-01/workshop-in-brief-sustainable.aspx> On August 1 and 2, 2018, the Food Forum hosted a public workshop in Washington, DC, on sustainable diets, food, and nutrition. The workshop was organized into four main sessions and a closing panel discussion. The workshop objectives were to review current and emerging knowledge on the concept of sustainable diets within the field of food and nutrition; explore sustainable diets and relevant impacts for cross-sector partnerships, policy, and research; and discuss how sustainable diets influence dietary patterns, the food system, and population and public health. The Proceedings of a Workshop—in Brief summarizes the key points made by the workshop participants during the presentations and discussions and is not intended to provide a comprehensive summary of information shared during the workshop. The views summarized here reflect the knowledge and opinions of individual workshop participants and should not be construed as consensus among workshop participants or the members of the Food Forum or the National Academies.

**Okrent, Abigail M., and Julian M. Alston. "The effects of farm commodity and retail food policies on obesity and economic welfare in the United States." American Journal of Agricultural Economics 94, no. 3 (2012): 611-646.** Many commentators claim that farm subsidies have contributed significantly to the "obesity epidemic" by making fattening foods relatively cheap and abundant and, symmetrically, that taxing "unhealthy" commodities or subsidizing "healthy" commodities would contribute to reducing obesity rates. In this article we use an equilibrium displacement model to estimate and compare the economic welfare effects from a range of hypothetical farm commodity and retail food policies as alternative mechanisms for encouraging consumption of healthy food or discouraging consumption of unhealthy food, or both. We find that, compared with retail taxes on fat, sugar, or all food, or subsidies on fruits and vegetables at the farm or retail levels, a tax on calories would be the most efficient obesity policy. A tax on calories would have the lowest deadweight loss per pound of fat reduction in average

adult weight, and would yield a net social gain once the impact on public health care expenditures is considered.

**Olsho, Lauren EW; Klerman, Jacob A; Wilde, Parke E; and Susan Bartlett. 2016. *Financial incentives increase fruit and vegetable intake among Supplemental Nutrition Assistance Program participants: a randomized controlled trial of the USDA Healthy Incentives Pilot*. American Journal of Clinical Nutrition; 104:423–35.** Background: US fruit and vegetable (FV) intake remains below recommendations, particularly for low-income populations. Evidence on effectiveness of rebates in addressing this shortfall is limited. Objective: This study evaluated the USDA Healthy Incentives Pilot (HIP), which offered rebates to Supplemental Nutrition Assistance Program (SNAP) participants for purchasing targeted FVs (TFVs). Conclusions: The HIP significantly increased FV intake among SNAP participants, closing 20% of the gap relative to recommendations and increasing dietary quality. More research on mechanisms of action is warranted.

**Payne, Collin and Niculescu, Mihai. 2018. "Can healthy checkout end-caps improve targeted fruit and vegetable purchases? Evidence from grocery and SNAP participant purchases," Food Policy, vol. 79(C), pages 318-323.** Grocery shoppers face time and attention constraints when shopping that may contribute to decreased purchase and consumption of fruits and vegetables. We created and tested a healthy checkout strategy that made fruits and vegetables both convenient and salient. Specifically, cashiers were trained to suggestive sell pre-packaged, convenient, low-cost, pairs of fruits or vegetables located at the checkout aisle end-cap. Overall and Supplemental Nutrition Assistance Program participant purchases of targeted fruits and vegetables significantly increased within treatment stores and between the treatment stores relative to the control store. A significant decreasing trend in overall produce sales in the control store was found, but not for treatment stores. Further pilot testing of healthy checkout strategies is needed to provide additional evidence of efficacy and to understand better how economically sustainable these strategies are for retailers.

**Prell, Mark and David M. Smallwood. 2017. *Comparing Alternative Mechanisms to Increase Fruit and Vegetable Purchases*.** EIB-170 U.S. Dept. of Agriculture, Economic Research Service.  
<https://www.ers.usda.gov/publications/pub-details/?pubid=83051> Participants in USDA's Supplemental Nutrition Assistance Program (SNAP) typically consume less than the amounts of fruits and vegetables (FVs) recommended by the Dietary Guidelines for Americans. The study considers three economic mechanisms to incentivize purchases of FVs: a bonus for FV spending; a rebate for FV spending; and a Cash Value Voucher (CVV) redeemable for FVs up to a fixed dollar amount. This USDA Economic Research Service (ERS) report uses neoclassical economics to provide a unifying conceptual framework for explaining the effects of these mechanisms, using simplified abstract models. In principle, all three mechanisms can increase FV purchases for the average SNAP consumer. Distributional effects matter in addition to average effects; SNAP consumers who purchase no FVs (in a typical month) can be a sizable subgroup that is important for analysis. For that subgroup, implementing a CVV tends to increase purchases by more than other mechanisms. If the non-purchasing subgroup is a large proportion of SNAP households, a CVV also tends to be the mechanism that increases average FV purchases the most. If the subgroup is relatively small, a rebate or bonus may promote average FV purchases the most.

**Rickard, Bradley J., Abigail M. Okrent, and Julian M. Alston. "How have agricultural policies influenced caloric consumption in the United States?" Health economics 22, no. 3 (2013): 316-339.** Many commentators have speculated that agricultural policies have contributed to increased obesity rates in the United States, yet such claims are often made without any analysis of the complex links between

real-world farm commodity support programs, prices and consumption of foods, and caloric intake. This article carefully studies the effects of US agricultural policies on prices and quantities of 10 agricultural commodities and nine food categories in the United States over time. Using a detailed multimarket model, we simulate the counterfactual removal of measures of support applied to US agricultural commodities in 1992, 1997, and 2002 and quantify the effects on US food consumption and caloric intake. To parameterize the simulations, we calculate three alternative measures of consumer support (the implicit consumer subsidy from policies that support producers) for the 10 agricultural commodities using information about government expenditures on agricultural commodities from various sources. Our results indicate that—holding all other policies constant—removing US subsidies on grains and oilseeds in the three periods would have caused caloric consumption to decrease minimally whereas removal of all US agricultural policies (including barriers against imports of sugar and dairy products) would have caused total caloric intake to increase. Our results also indicate that the influence of agricultural policies on caloric intake has diminished over time.

**Roberto CA, Lawman HG, LeVasseur MT, et al. Association of a Beverage Tax on Sugar-Sweetened and Artificially Sweetened Beverages with Changes in Beverage Prices and Sales at Chain Retailers in a Large Urban Setting. JAMA. 2019;321(18):1799-1810.** Policy makers have implemented beverage taxes to generate revenue and reduce consumption of sweetened drinks. In January 2017, Philadelphia, Pennsylvania, became the second US city to implement a beverage excise tax (1.5 cents per ounce). Objectives: To compare changes in beverage prices and sales following the implementation of the tax in Philadelphia compared with Baltimore, Maryland (a control city without a tax) and to assess potential cross-border shopping to avoid the tax in neighboring zip codes. Conclusions and relevance: In Philadelphia in 2017, the implementation of a beverage excise tax on sugar-sweetened and artificially sweetened beverages was associated with significantly higher beverage prices and a significant and substantial decline in volume of taxed beverages sold. This decrease in taxed beverage sales volume was partially offset by increases in volume of sales in bordering areas.

**Schanzenbach, D.W., 2013. Strengthening SNAP for a more food-secure, healthy America. The Hamilton Project, Policy Brief 2013-06.** For fifty years SNAP has been a critical safety-net program that enhances low-income households' food purchasing power. Its role intensified during the Great Recession as rates of unemployment and food insecurity soared. Even though the Congressional Budget Office predicts that spending on SNAP will decline as the economy improves, some policymakers are considering immediate cuts to rein in program spending. In her Hamilton Project discussion paper, Diane Whitmore Schanzenbach proposes five feasible changes to the SNAP program that would improve its effectiveness and address criticisms of the existing SNAP program. First, she proposes the expansion of a pilot program that provides financial incentives to SNAP recipients to purchase fruits and vegetables, which has been shown to improve nutritional intake. Second, she proposes an update to the TFP's benefit level to realign the program's minimum spending target to a standard that is more realistic for low-income families. Third, she proposes a modest increase to the earned income deduction to strengthen the incentive to work for all SNAP recipients. Fourth, she argues for modifications to the program calculations for housing cost allowances through the cap on the shelter deduction to better target benefits to households facing high housing costs. Fifth, she proposes a relaxation of time restrictions for ABAWDs in order to account for extended job searches and periods of joblessness. Schanzenbach suggests that these proposed reforms can strengthen SNAP while maintaining its fundamental role as a cornerstone of America's social safety net.

**Silver LD, Ng SW, Ryan-Ibarra S, et al. Changes in prices, sales, consumer spending, and beverage consumption one year after a tax on sugar-sweetened beverages in Berkeley, California, US: A before-**

**and-after study. PLoS Med. 2017;14(4):e1002283.** Background: Taxes on sugar-sweetened beverages (SSBs) meant to improve health and raise revenue are being adopted, yet evaluation is scarce. This study examines the association of the first penny per ounce SSB excise tax in the United States, in Berkeley, California, with beverage prices, sales, store revenue/consumer spending, and usual beverage intake. Conclusions: One year following implementation of the nation's first large SSB tax, prices of SSBs increased in many, but not all, settings, SSB sales declined, and sales of untaxed beverages (especially water) and overall study beverages rose in Berkeley; overall consumer spending per transaction in the stores studied did not rise. Price increases for SSBs in two distinct data sources, their timing, and the patterns of change in taxed and untaxed beverage sales suggest that the observed changes may be attributable to the tax. Post-tax self-reported SSB intake did not change significantly compared to baseline. Significant declines in SSB sales, even in this relatively affluent community, accompanied by revenue used for prevention suggest promise for this policy. Evaluation of taxation in jurisdictions with more typical SSB consumption, with controls, is needed to assess broader dietary and potential health impacts.

**Stewart, H., J. Hyman, A. Carlson, and E. Frazão. 2016. The Cost of Satisfying Fruit and Vegetable Recommendations in the Dietary Guidelines, EB-27, U.S. Department of Agriculture, Economic Research Service.** Most Americans do not consume enough fruits and vegetables to meet recommendations in the 2015-2020 Dietary Guidelines for Americans. One reason may be that some consumers perceive these foods to be expensive. We estimate the average price at retail stores of a pound and an edible cup-equivalent (or for juices, a pint and an edible cup-equivalent) of 156 commonly consumed fresh and processed fruits and vegetables and find that in 2013, a consumer on a 2,000-calorie diet could satisfy Federal fruit and vegetable recommendations for \$2.10 to \$2.60 per day. We also find that a family of four could purchase a sufficient variety of fruits and vegetables to meet those same guidelines with a limited budget, based on the U.S. Department of Agriculture's Thrifty Food Plan (TFP). However, this would require the household to allocate a much larger share of its overall food budget to fruits and vegetables and a smaller share to foods high in solid fats, added sugars, and sodium.

**Vericker, Tracy, Dixit-Joshi, Sujata; and Jeffrey Taylor, et al. The Evaluation of Food Insecurity Nutrition Incentives (FINI) Interim Report. Prepared by Westat, Inc. for the U.S. Department of Agriculture, Food and Nutrition Service, May 2019. Project Officer: Eric Sean Williams. Available online at: <https://www.fns.usda.gov/snap/evaluation-food-insecurity-nutrition-incentives-interim-report>.** The Food Insecurity Nutrition Incentive (FINI) grant program provided \$100 million to fund and evaluate projects that were intended to increase fruit and vegetable purchases among Supplemental Nutrition Assistance Program (SNAP) participants by providing incentives at the point of purchase. Grants were awarded in Fiscal Years (FYs) 2015, 2016, 2017, and 2018 to state and local governmental entities and nonprofit organizations. An independent evaluation measured the impact of FINI on two primary outcomes, increasing fruit and vegetable (1) expenditures and (2) consumption among SNAP households, and on several secondary outcomes. The pilot projects are not included in the evaluation. This report presents the results of the process evaluation and outcome evaluation through September 2017. Key findings include: 1. Except for participants who had previously shopped at a farmers market that offered incentives, awareness of the local incentive program tended to be low; 2. Although, FINI increased monthly household fruit and vegetable expenditures by 12 to 16 percent in three of the four study groups, about one-quarter to one-half of SNAP households reported spending less of their own money on fruits and vegetables as a result of the incentive; and 3. FINI had no measurable impact on SNAP participants' consumption of fruits and vegetables.

**Wilde, P., 2018. Food policy in the United States: An introduction, Second Edition, Routledge.** This new edition offers a timely update to the leading textbook dedicated to all aspects of U.S. food policy. As with the first edition, real-world controversies and debates motivate the book's attention to economic principles, policy analysis, nutrition science and contemporary data sources. The book assumes that the reader's concern is not just the economic interests of farmers and food producers but also includes nutrition, sustainable agriculture, food justice, the environment and food security. The goal is to make U.S. food policy more comprehensible to those inside and outside the agri-food sector whose interests and aspirations have been ignored. The chapters cover U.S. agriculture, food production and the environment, international agricultural trade, food and beverage manufacturing, food retail and restaurants, food safety, dietary guidance, food labeling, advertising and federal food assistance programs for the poor.

**Wilde, P., Huang, Y., Sy, S., Abrahams-Gessel, S., Jardim, T.V., Paarlberg, R., Mozaffarian, D., Micha, R. and Gaziano, T., 2019. Cost-Effectiveness of a US National Sugar-Sweetened Beverage Tax With a Multistakeholder Approach: Who Pays and Who Benefits. American journal of public health, 109(2), pp.276-284.** Objectives. To estimate the health impact and cost-effectiveness of a national penny-per-ounce sugar-sweetened beverage (SSB) tax, overall and with stratified costs and benefits for 9 distinct stakeholder groups. Methods. We used a validated microsimulation model (CVD PREDICT) to estimate cardiovascular disease reductions, quality-adjusted life years gained, and cost-effectiveness for US adults aged 35 to 85 years, evaluating full and partial consumer price pass-through. Results. From health care and societal perspectives, the SSB tax was highly cost-saving. When we evaluated health gains, taxes paid, and out-of-pocket health care savings for 6 distinct consumer categories, incremental cost-effectiveness ratios ranged from \$20 247 to \$42 662 per quality-adjusted life year for 100% price pass-through (incremental cost-effectiveness ratios similar with 50% pass-through). For the beverage industry, net costs were \$0.92 billion with 100% pass-through (largely tax-implementation costs) and \$49.75 billion with 50% pass-through (largely because of partial industry coverage of the tax). For government, the SSB tax positively affected both tax revenues and health care cost savings. Conclusions. This stratified analysis improves on unitary approaches, illuminating distinct costs and benefits for stakeholders with political influence over SSB tax decisions.

**Wilde, P., Klerman, J.A., Olsho, L.E. and Bartlett, S., 2015. Explaining the impact of USDA's healthy incentives pilot on different spending outcomes. Applied Economic Perspectives and Policy, 38(4), pp.655-672.** This article reports spending results for the USDA's Healthy Incentives Pilot (HIP), which tested a 30% incentive on fruit and vegetable purchases with Supplemental Nutrition Assistance Program (SNAP) benefits. Self-reported mean usual monthly spending for all fruits and vegetables was \$6.15 higher for randomly assigned HIP participant households than for a control group. Much of the additional spending appears to have taken place in ways that did not earn the incentive—spending with non-SNAP resources or in retailers that did not participate in HIP. This article investigates mechanisms that might explain the HIP impact on fruit and vegetable purchases that did not earn the incentive.

**Wilde, P.E. and Llobrera, J., 2009. Using the thrifty food plan to assess the cost of a nutritious diet. Journal of Consumer Affairs, 43(2), pp.274-304.** The federal government's Thrifty Food Plan (TFP) minimizes the difference between a proposed food plan and a current consumption bundle, subject to cost and nutrition constraints. This article adapted the TFP framework to estimate the cost of a nutritious diet, distinguishing between nutrition constraints based on food categories (meat, vegetables) or nutrients (saturated fat, calcium). The official cost target for the TFP was sufficient if one tolerated a very high difference from current consumption patterns, or if one used nutrition standards instead of

MyPyramid food category standards. In other scenarios, with different constraints, the official cost target was insufficient.

### **Session 2. Food Access and Availability**

**Buczynski, A., Freishtat, H., & Buzogany, S. (2015). Mapping Baltimore City's Food Environment: 2015 Report. Baltimore: Johns Hopkins Center for a Livable Future.** Baltimore's residents have different levels of access to healthy food based on their specific circumstances. The 2015 Food Environment Map and Report is a culmination of years of data collection, analysis and strategizing around innovative solutions to improve access to healthy food. The Baltimore Food Policy Initiative (BFPI) and the Johns Hopkins Center for a Livable Future (CLF) created this 2015 Food Environment Map and Report in order to better understand Baltimore's food environment and food deserts - areas where residents lack both access and sufficient economic resources to purchase healthy food - and to more proactively and effectively promote equitable access to healthy food. The 2015 map reveals that one in four of Baltimore City residents live in areas identified as food deserts. Children are affected disproportionately, with 30 percent living in food deserts. African Americans have disproportionately low access to healthy food and are the most likely of any racial or ethnic group to live in a food desert neighborhood.

**Chenarides, L, and E. Jaenicke. (2019). "Documenting the Link Between Poor Food Access and Less Healthy Product Assortment Across the U.S." Applied Economic Perspectives and Policy (2019) volume 41, number 3, pp. 434–474.** This paper, which investigates food access and underserved areas in the U.S., differs from most existing research by explicitly examining food retailers' in-store product availability, a retailing outcome that might exacerbate or mitigate consumer impacts of residing in areas with poor food access. Using detailed retailer scanner data from 2010–2015 and measures of food access, we investigate the relationship between healthy product assortments and food access. Our results consistently show a negative and significant relationship between census tracts with poor food access and healthy product assortments featuring fruits and vegetables. This finding provides rigorous documentation for what other researchers have claimed, namely that consumers who reside in underserved communities and are already burdened with poor food access endure the hardship of facing less healthy assortments of food items.

**Cooksey, K., Schwartz, and K Brownell. 2017. Food Swamps Predict Obesity Rates Better Than Food Deserts in the United States. International Journal of Environmental Research and Public Health. 14:1366-1386.** This paper investigates the effect of food environments, characterized as food swamps, on adult obesity rates. Food swamps have been described as areas with a high-density of establishments selling high-calorie fast food and junk food, relative to healthier food options. This study examines multiple ways of categorizing food environments as food swamps and food deserts, including alternate versions of the Retail Food Environment Index. We merged food outlet, sociodemographic and obesity data from the United States Department of Agriculture (USDA) Food Environment Atlas, the American Community Survey, and a commercial street reference dataset. We employed an instrumental variables (IV) strategy to correct for the endogeneity of food environments (i.e., that individuals self-select into neighborhoods and may consider food availability in their decision). Our results suggest that the presence of a food swamp is a stronger predictor of obesity rates than the absence of full-service grocery stores. We found, even after controlling for food desert effects, food swamps have a positive, statistically significant effect on adult obesity rates. All three food swamp measures indicated the same positive association, but reflected different magnitudes of the food swamp effect on rates of adult obesity (p values ranged from 0.00 to 0.16). Our adjustment for reverse causality, using an IV approach,

revealed a stronger effect of food swamps than would have been obtained by naïve ordinary least squares (OLS) estimates. The food swamp effect was stronger in counties with greater income inequality ( $p < 0.05$ ) and where residents are less mobile ( $p < 0.01$ ). Based on these findings, local government policies such as zoning laws simultaneously restricting access to unhealthy food outlets and incentivizing healthy food retailers to locate in underserved neighborhoods warrant consideration as strategies to increase health equity.

**Dubowitz, T, M. Ghosh-Dastidar, D.A. Cohen, R. Beckman, E.D. Steiner, G.P. Hunter, K.R. Florez, C. Huang, C.A. Vaughan, J.C. Sloan, S.N. Zenk, S. Cummins and R.L. Collins, 2015. "Diet and Perceptions Change With Supermarket Introduction in Food Desert, But Not Because of Supermarket Use," *Health Affairs, 34(11): 1858-1868, 2015.*** Placing full-service supermarkets in food deserts--areas with limited access to healthy food--has been promoted as a way to reduce inequalities in access to healthy food, improve diet, and reduce the risk of obesity. However, previous studies provide scant evidence of such impacts. We surveyed households in two Pittsburgh, Pennsylvania, neighborhoods in 2011 and 2014, one of which received a new supermarket in 2013. Comparing trends in the two neighborhoods, we obtained evidence of multiple positive impacts from new supermarket placement. In the new supermarket neighborhood, we found net positive changes in overall dietary quality; average daily intakes of kilocalories and added sugars; and percentage of kilocalories from solid fats, added sugars, and alcohol. However, the only positive outcome in the recipient neighborhood specifically associated with regular use of the new supermarket was improved perceived access to healthy food. We did not observe differential improvement between the neighborhoods in fruit and vegetable intake, whole grain consumption, or body mass index. Incentivizing supermarkets to locate in food deserts is appropriate. However, efforts should proceed with caution, until the mechanisms by which the stores affect diet and their ability to influence weight status are better understood.

**Fan, L, K Baylis, C Gundersen, and M Ver Ploeg. "Does a nutritious diet cost more in food deserts?" *Agricultural Economics, 2018.*** Food deserts and their potential effects on diet and nutrition have received much attention from policymakers. While some research has found a correlation between food deserts and consumer outcomes, it is unclear whether food deserts truly affect consumer choices. In this article, we compare food prices in food deserts, defined as low-income, low-access census tracts, and nonfood deserts to observe whether and to what extent consumers face higher prices for a complete diet in food deserts. If a nutritionally complete diet costs significantly more in food deserts, resident consumers may be constrained from consuming healthier foods. We use store-level scanner data from a nationally representative sample and calculate a census-tract level Exact Price Index (EPI) based on a food basket defined by the Thrifty Food Plan (TFP). The EPI addresses potential biases from both product heterogeneity and variety availability. We find that the overall price impact of living in a food desert is small; low-access areas have only 3.5% higher EPI than high-access counterparts. However, consumers who are constrained to shop within their own census tracts face a much higher EPI than high-access counterparts (9.2%). The higher EPI primarily comes from lower variety availability in food deserts.

**Fitzpatrick, K., N. Greenhalgh-Stanley, and M. Ver Ploeg, The Impact of Food Deserts on Food Insufficiency and SNAP Participation among the Elderly. *American Journal of Agricultural Economics, Published on Advance Access Alert, September 2015.*** Residents of neighborhoods with limited access to grocery stores may face barriers to obtaining adequate food for a healthy diet. Low-income elderly may be uniquely affected by these so-called food deserts due to limited transportation options, strong attachments to local neighborhoods, fixed incomes, and physical limitations for food shopping. Using 2006 and 2010 Health and Retirement Study data linked to census tract-level measures of food deserts,

this study measures whether living in a food desert affects food and material hardship, participation in food assistance programs, and the food spending of elderly adults. In both cross-sectional and fixed effects regressions of elderly residents of urban counties, we find little evidence that living in a food desert affects these outcomes. We find, however, that individuals residing in a food desert without a vehicle are 12 percentage points more likely to report food insufficiency. Those SNAP recipients living in food deserts are 11 percentage points more likely to receive subsidized meals, while nonparticipants in food deserts and SNAP recipients outside of food deserts are less likely to receive subsidized meals. Our findings suggest that seniors without vehicles and SNAP recipients in food deserts may be the most vulnerable to limited food store access.

**Gundersen, C. “The Right to Food in the U.S.: The Role of the Supplemental Nutrition Assistance Program (SNAP)” American Journal of Agricultural Economics 101(5), 1328-1336. 2019** The “right to food” has been formally implemented in some countries and, in other contexts, it is used as an exhortation for governments or other entities to take actions to reduce food insecurity. Central to any comprehensive set of policies to reduce food insecurity are food assistance programs directed towards vulnerable households. One example of such a food assistance program is in the United States, the Supplemental Nutrition Assistance Program (SNAP, formerly known as the Food Stamp Program). I begin by discussing one measure of a right to food, namely, to be free from food insecurity and then turn to a consideration the role of SNAP in meeting this goal. To do so, I cover five components that would seem to be essential to any definition of a right to food and how SNAP does and does not meet these components.

**Gundersen, C., B. Kreider, and J. Pepper. “Reconstructing SNAP to More Effectively Alleviate Food Insecurity in the U.S.” RSF: The Russell Sage Foundation Journal of the Social Sciences 4(2), 113-130. 2018.** Although the central objective of the Supplemental Nutrition Assistance Program (SNAP) is to reduce food insecurity in the United States, the majority of SNAP households are food insecure. Higher benefits may lead these households to food security. To evaluate this possibility, we use a question from the Current Population Survey that asks respondents how much additional money they would need to be food secure. Food insecure SNAP households report needing an average of about \$42 per week to become food secure. Under a set of assumptions about the measurement of benefits and behavioral responses, we find that an increase in weekly benefits of \$42 for SNAP households would lead to a 62 percent decline in food insecurity at a cost of about \$27 billion.

**Gundersen, C., B. Kreider, J. Pepper, and V. Tarasuk. “Food Assistance Programs and Food Insecurity: Implications for Canada In Light of the Mixing Problem.” Empirical Economics 52(3), 1065-1087. 2017.** In light of concerns about high rates of food insecurity, some have suggested that it might be time for Canada to implement national food assistance programs like those provided in the US, namely the Supplemental Nutrition Assistance Program (SNAP) and the National School Lunch Program (NSLP). In this paper, we assess how adopting these types of assistance programs would change the food insecurity rate in Canada among households with children. Using data from the Current Population Survey (CPS), we first evaluate the causal impact of these programs on food insecurity rates in the US using the Canadian definition of food security. Following other recent evaluations of food assistance programs, we use partial identification methods to address the selection problem that arises because the decision to take up the program is not random. We then combine these estimated impacts for the US with data from the Canadian Community Health Survey (CCHS) to predict how SNAP and NSLP would impact food insecurity rates in Canada. Partial identification methods are used to address the “mixing problem” that arises if some eligible Canadian households would participate in SNAP and others would not. The strength of the conclusions depends on the strength of the identifying assumptions. Under the

weakest assumptions, we cannot determine whether food insecurity rates would rise or fall. Under our strongest nonparametric assumptions, we find that food insecurity would fall by at least 16% if SNAP were implemented and 11% if NSLP were implemented.

**Gundersen, C. and Ziliak, J. "Food Insecurity Research in the United States: Where We Have Been and Where We Need to Go."** *Applied Economic Perspectives and Policy* 40(1), 119-135. 2018. Food insecurity is now recognized as a major health crisis in the United States. This is due to the size of the problem—more than 42 million persons were food insecure in 2015—as well as the multiple negative health outcomes and higher health care costs attributable to food insecurity. An extensive body of literature from multiple fields has examined the causes and consequences of food insecurity and the efficacy of food assistance programs—especially the Supplemental Nutrition Assistance Program. We review this literature and provide suggestions for future research directions. We suggest examining the distribution of food insecurity within households, the impact of the food distribution system on food insecurity, the coping mechanisms of low-income food secure families, food insecurity among American Indians, the effects of charitable food assistance, the causal relationship between food insecurity and health outcomes, the declining age gradient in food insecurity among Seniors, the effects of labor force participation and the Great Recession on food insecurity, and the long-term consequences of food insecurity. In addition, the impact of two recent policy recommendations on food insecurity – the minimum wage and the Affordable Care – Act should be considered.

**Hunt Allcott, Rebecca Diamond, Jean-Pierre Dubé, Jessie Handbury, Ilya Rahkovsky, Molly Schnell, "Food Deserts and the Causes of Nutritional Inequality,"** *The Quarterly Journal of Economics*, Volume 134, Issue 4, November 2019, Pages 1793–1844, <https://doi.org/10.1093/qje/qjz015>

We study the causes of “nutritional inequality”: why the wealthy eat more healthfully than the poor in the United States. Exploiting supermarket entry, household moves to healthier neighborhoods, and purchasing patterns among households with identical local supply, we reject that neighborhood environments contribute meaningfully to nutritional inequality. Using a structural demand model, we find that exposing low-income households to the same products and prices available to high-income households reduces nutritional inequality by only nine percent, while the remaining 91 percent is driven by differences in demand. These findings counter the common notion that policies to reduce supply inequities, such as “food deserts,” could play an important role in reducing nutritional inequality. By contrast, the structural results predict that means-tested subsidies for healthy food could eliminate nutritional inequality at a fiscal cost of about 15 percent of the annual budget for the U.S. Supplemental Nutrition Assistance Program.

**Lagisetty, P., Flamm, L., Rak, S. et al. "A multi-stakeholder evaluation of the Baltimore City virtual supermarket program,"** *BMC Public Health* 17, 837 (2017) doi:10.1186/s12889-017-4864-9

**Background:** Increasing access to healthy foods and beverages in disadvantaged communities is a public health priority due to alarmingly high rates of obesity. The Virtual Supermarket Program (VSP) is a Baltimore City Health Department program that uses online grocery ordering to deliver food to low-income neighborhoods. This study evaluates stakeholder preferences and barriers of program implementation. **Methods:** This study assessed the feasibility, sustainability and efficacy of the VSP by surveying 93 customers and interviewing 14 programmatic stakeholders who had recently used the VSP or been involved with program design and implementation. **Results:** We identified the following themes: The VSP addressed transportation barriers and food availability. The VSP impacted customers and the city by including improving food purchasing behavior, creating a food justice “brand for the city”, and fostering a sense of community. Customers appreciated using Supplemental Nutrition Assistance Program (SNAP) benefits to pay for groceries, but policy changes are needed to allow online processing of

SNAP benefits. Conclusions: This evaluation summarizes lessons learned and serves as a guide to other public health leaders interested in developing similar programs. Provisions in the U.S. Department of Agriculture (USDA) Farm Bill 2014 allow for select grocers to pilot online transactions with SNAP benefits. If these pilots are efficacious, the VSP model could be easily disseminated.

**Mancino, L, J Guthrie, M Ver Ploeg, and BH Lin. Nutritional Quality of Foods Acquired by Americans: Findings From USDA's National Household Food Acquisition and Purchase Survey, EIB-188, U.S. Department of Agriculture, Economic Research Service, February 2018.** We use data from the USDA's National Household and Food Acquisition and Purchase Survey to describe the nutritional quality of foods purchased and acquired by a nationally representative sample of Americans. We compare the nutritional quality of foods purchased and acquired by households that participate in USDA's Supplemental Nutrition Assistance Program (SNAP) to the foods of other low-income, SNAP-nonparticipating households and those of higher income households. We also compare the nutritional quality of foods purchased and acquired by households with low access to healthy food retailers to households with better access, for the population as a whole, and for the SNAP-participating and -nonparticipating subgroups previously described. Similarly, we compare nutritional quality of foods obtained from supermarkets and other grocery retailers to foods prepared away from home at restaurants, fast-food establishments, schools, and other sources for the whole population and for defined subgroups. We find that lower nutritional quality of household food acquisitions was associated with SNAP participation status and limited household access to healthy food retailers. More reliance on food prepared away from home was also associated with lower nutritional quality, especially for higher income households.

**Rahkovsky, I and Snyder, S. Food Choices and Store Proximity, ERR-195, U.S. Department of Agriculture, Economic Research Service, September 2015.** In 2010, 9.7 percent of the U.S. population lived in low-income areas more than 1 mile from the nearest supermarket. The diet quality of these consumers may be compromised by their food environment. Some may be unable to reach supermarkets regularly or without effort, instead buying food from nearer stores that offer less healthy food products. This report investigates the correlation between households that live in low-income, low-access (LILA) areas and their purchases of 14 major food groups that vary in dietary quality. The report finds a modest negative effect, particularly among urban LILA consumers, and this effect is only slightly alleviated when LILA consumers travel farther from their homes to purchase food.

**Rhone, A, M Ver Ploeg, C Dicken, R Williams and V Breneman. Low-Income and Low-Supermarket-Access Census Tracts, 2010-2015, EIB-165, U.S. Department of Agriculture, Economic Research Service, January 2017.** Limited access to supermarkets or other sources of healthy and affordable food may impede the ability of some Americans to eat a healthy diet. Income, transportation, and distance may be barriers to food access for some. This brief updates estimates of low-income and low-supermarket-access census tracts (as found in ERS' Food Access Research Atlas) using a 2015 directory of supermarkets and 2010-2014 American Community Survey data on household vehicle access and family income. The number of tracts classified as low income (LI), based on the poverty rate and median income, increased 5.41 percent from 2010 to 2015. The number of tracts that are classified as low access (LA) solely by proximity to the nearest supermarket decreased from 2010 to 2015—that is, fewer tracts had a significant number or share of people more than 0.5 or 1.0 mile (10 or 20 miles) from the nearest supermarket in urban (rural) areas. For these proximity-only measures, the increase in low-income tracts outnumbered the decrease in low-access tracts so that there was a small net increase in the number of tracts that are both low-income and low-access (LILA) in 2015. The number of low-access tracts with a significant number of vehicle-less housing units more than 0.5 mile from the nearest

supermarket grew by 412 from 2010 to 2015. This increase (4 percent) largely reflects lower levels of vehicle access across all U.S. housing units relative to 2010.

**Ver Ploeg, M, L Mancino, JE Todd, DM Clay, and B Scharadin. Where Do Americans Usually Shop for Food and How Do They Travel To Get There? Initial Findings From the National Household Food Acquisition and Purchase Survey, EIB-138, U.S. Department of Agriculture, Economic Research Service, March 2015.** This report compares food shopping patterns of (1) Supplemental Nutrition Assistance Program (SNAP) households to nonparticipant households, (2) participants in the Special Supplemental Nutrition Assistance Program for Women Infants and Children (WIC) to nonparticipants, and (3) food-insecure to food-secure households. Findings: The vast majority of households, 88 percent, use their own vehicle to get to the store where they do their main grocery shopping. The percentage of SNAP and food-insecure households who use their own vehicle to get to the grocery store is lower. Despite differences in transportation modes, households do not necessarily shop at the store that is closest to them. Overall, households are, on average, 2.2 miles from the nearest SNAP-authorized supermarket or supercenter, but their usual store is 3.8 miles away. Even households that do not drive their own vehicle to shop for groceries tend to shop around. Those who usually walk, bike, or take public transit or another mode of transportation shop at stores farther from their house than the nearest store. These households are, on average, 0.5 mile from the nearest SNAP-authorized supermarket or supercenter, but do their primary shopping at a store that is 0.9 mile away, on average.

**Wilde, P, A Steiner, M Ver Ploeg, 2017. For low-income Americans, living 1 mile (1.6 km) from the nearest supermarket is not associated with self-reported household food security. Current Developments in Nutrition, CDN/2017/001446 Version 2.** Background: Motivated by concern over lack of access to nutritious food in low-income neighborhoods, healthy food financing initiatives have encouraged the introduction of new supermarkets. Extensive research on the association between the food retail environment and nutrition outcomes has shown mixed results. There has been less research specifically on food security outcomes. Conclusions: Having a closest supermarket  $\leq$ 1 mile from home was not associated with household food security. In contrast, the mode of transportation used to access the primary retailer was associated with household food security. In future research, it may be valuable to not only focus on the distance to the nearest supermarket but to investigate the qualities of the food retail environment at distances  $>$ 1 mile that are most strongly associated with food security outcomes.

**Wilde, P, J Llobre, M Ver Ploeg, 2014. Population Density, Poverty, and Food Retail Access in the United States: An Empirical Approach. International Food and Agribusiness Management Review, 17(Special Issue A).** This article uses a random sample of census block groups to describe the adequacy of the local food retail environment in the continental United States. It builds upon simple empirical relationships between population density, poverty rates, vehicle access, and proximity to the nearest supermarket. In contrast with the conventional wisdom, the results show that high-poverty block groups had closer proximity to the nearest supermarket than other block groups did, on average: 85.6% of high-poverty block groups had a supermarket within 1 mile, while 76.8% of lower-poverty block groups had a supermarket within this distance. Population density is a strong predictor of proximity to the nearest supermarket. Block groups with very high population density generally had very close proximity to a nearest supermarket. In block groups lacking a nearby supermarket, rates of automobile access generally were quite high (more than 95%), although this still leaves almost 5% of the population in these areas lacking both an automobile and a nearby supermarket.

**Session 3: Local and Community Food Systems**

**Bauman, A., D. Thilmany McFadden, B.B.R. Jablonski. 2018. "The financial performance implications of differential marketing strategies: Exploring farms that pursue local markets as a core competitive advantage" *Ag and Resource Economics Review* 47(3), 477-504.** This study explores how participation in direct and intermediated marketing channels and key operational factors influence agricultural producers' financial performance. Accordingly, we divide the sample of local and regional food marketers into quartiles segmented by profitability performance as an initial exploration of how strong and weak performance may vary across scale, location, and choice of direct and intermediated channels. Moreover, other financial metrics that vary across types of producers and performance-based quartiles are analyzed. This paper provides initial evidence that participation in direct and intermediated markets may allow farms of any scale of sales volume to be financially viable.

**Cleary, R., S.J. Goetz, D. Thilmany and H. Ge. 2019. Eating the Locals: Food Hubs and Market Cannibalization. *Journal of Agricultural and Resource Economics*. January. 44: 141-63.** Food hubs offer a novel solution to connect small and mid-sized local farms, which individually lack the scale to profitably market their products. Because many food hubs rely on grants and philanthropy to provide services and are not necessarily profit-driven, markets may unintentionally oversaturate due to overinvestment. We use a firm-entry model to estimate the average U.S. county population necessary for one, two, and three food hubs to break even. Our findings suggest that policy makers and philanthropists need to consider the carrying capacity of the local food environment and population prior to supporting additional food hubs.

**Hardesty, S., G .Feenstra, D. Visher, T. Lerman, D. Thilmany McFadden, A. Bauman, T. Gillpatrick, and G. Nurse-Rainbolt. 2014. "Values-based supply chains: Supporting regional food and farms. *Economic Development Quarterly* 28:17-27.** Values-based supply chains (VBSCs) have emerged as a structure to enhance the viability of mid-scale farms while preserving jobs and rural economies. They involve partnerships between producers, processors, distributors, retailers, and food service operators who share environmental, economic, and/or social values. We developed case studies and interviewed key informants to analyze the impacts of access to capital, regulations, infrastructure, and business acumen on the success of VBSCs. Communicating the benefits of VBSCs' products to customers, as well as to the VBSC partners, was instrumental to the success of the VBSCs in our case studies. However, our key informants emphasized that additional communications are needed to develop markets for VBSCs' products. Scale-appropriate infrastructure is also required, but funders are not convinced that these investments are secure. Successful VBSCs operate with economies of scale to broaden demand for their products while also generating fair returns to producers and other supply chain partners.

**Low, S.A., A. Adalja, E., Beaulieu, N. Key, S. Martinez, A. Melton, A. Perez, K., Ralston, H. Stewart, S. Shuttles, S. Vogel, and B.B.R. Jablonski. 2015. Trends in U.S. Local and Regional Food Systems. Administrative Publication Number 067. Washington, DC: Economic Research Service U.S. Department of Agriculture.** This report provides an overview of local and regional food systems across several dimensions. It details the latest economic information on local food producers, consumers, and policy, relying on findings from several national surveys and a synthesis of recent literature to assess the current size of and recent trends in local and regional food systems. Data are presented on producer characteristics, survival rates and growth, and prices. The local food literature on consumer willingness to pay, environmental impacts, food safety regulations, and local economic impacts is synthesized when nationally representative data are unavailable. Finally, this report provides an

overview of Federal and selected State and regional policies designed to support local food systems and collaboration among market participants

**Low, S.A., M. Bass, D. Thilmany McFadden, and M. Castillo. 2020. Local Foods Go Downstream: Exploring the Spatial Factors Driving U.S. Food Manufacturing. Applied Economic Perspectives and Policy.** Manufacturing, specifically food and beverage production, is a key employer in rural areas and has linkages to the agricultural sector. Using data drawn from the National Establishment Time-Series for 2013-15, we explore what entrepreneurship, farm marketing channel innovations, and more traditional spatial factors influence the location decisions of food and beverage manufacturing establishments in the U.S. We find that traditional spatial decision factors still matter but, in addition, proxies for farm adopting downstream innovations are also related to start-ups. We conclude discussing implications of findings for food market dynamics and rural economic development policy.

**Nurse, G., Y. Onozaka and D. Thilmany McFadden. 2012. "Consumer Motivations and Buying Behavior: The Case of the Local Food System Movement." Journal of Food Products Marketing. 18:5, 385-396.** The significant attention and growth surrounding sustainable foods has created a demand for research investigating different factors that can aid in predicting and explaining consumer behavior. This article utilized an attitude-behavior framework, the Theory of Planned Behavior (TPB), to identify factors that might influence consumer valuation of organic, fair trade, and local labeled food. Approximately 1,000 consumers from a 2008 nationwide survey were used in data analyses. Some TPB determinants proved successful in understanding consumer motivations (behavioral control, social norms). These results can be used by a wide variety of food marketers to connect with consumers to promote effective marketing strategies of sustainable food products.

**Onozaka, Y, W. Hu and D. Thilmany. 2015. Can Eco-Labels Reduce Carbon Emissions? Market-Wide Analysis of Carbon Labeling and Locally Grown Fresh Apples. Renewable Ag and Food Systems: 31(2); 122–138.** Despite the heightened efforts to implement eco-labeling schemes as the market-based vehicle for improving environmental quality, the overall effectiveness of eco-labels are still uncertain due to complex and sometimes unexpected market responses. In this paper, we assess the overall changes in carbon emissions resulting from two types of labeling on fresh apples, carbon labels and location designation labels (e.g., locally grown), both of which can have mixed implications for carbon emissions due to fluctuating supply chain factors. We employ an equilibrium displacement model that integrates existing estimates of differences across production systems, and our own estimates of consumer responses to labels in order to simulate the changes in prices, trade flows and estimate carbon impacts across several scenarios in the US fresh apple market. We find that both labels ultimately affect market outcomes and overall carbon emissions. With location designation labels, consumers' preference for local products leads to a net decrease in carbon emissions during the local growing season, while the interaction of various market dynamics results in a subsequent net increase in carbon emissions during the local off-season. The interaction of a carbon label with the location label lowers the overall attractiveness of products and reduces the quantity demanded, and thus, reduces the carbon emissions in both seasons. Overall, providing the location designation label increases annual carbon emissions, whereas providing both the location designation and carbon labeling decreases annual emissions. In short, the dynamics and interdependency of labeling strategies are important to consider in the context of eco-labeling.

**Thilmany McFadden, D., D. Conner, S. Deller, D. Hughes, K. Meter, A. Morales, T. Schmit, D. Swenson, A. Bauman, M. Phillips Goldenberg, R. Hill, B. B.R. Jablonski and D. Tropp. 2016. The Economics of Local Food Systems: A Toolkit to Guide Community Discussions, Assessments and Choices. USDA AMS**

**Report. 128 pp. Posted at: localfoodeconomics.com.** As consumers across the Nation express a growing interest in a closer connection to their food producers—whether through access to more localized markets and/or shorter supply chains—cities and regions have begun to regard the expansion of local food marketing activities as a critical component of their economic development strategies. Rising demand for locally produced, source-identified, and differentiated food products has generated a plethora of new and spinoff businesses in many communities, which aim to increase the range of and accessibility to local food items for both retail and wholesale customers. In turn, this emergence of local food businesses has sparked a groundswell of financial support and interest from private foundations and public agencies on the assumption that the development of local food systems contributes to positive economic outcomes, especially with respect to local economic development and improved farm viability. Unfortunately, given the nascent nature of local food demand growth and the scarcity of available data, relatively few of these efforts have been guided by rigorous assessments. In response, the United States Department of Agriculture (USDA) has formed new initiatives and programs to develop new markets and support existing markets so that producers and their communities may leverage these new opportunities. Specifically, the USDA, Agricultural Marketing Service (AMS) has managed the Farmers Market Promotion Program (now expanded to the Local Foods Promotion Program), with great expectations of positive outcomes, but no standardized approach on how to evaluate market and economic outcomes. As a result, a team of regional economists and food system specialists were assembled through a project hosted by Colorado State University (CSU) to develop a Toolkit comprised of food system assessment principles and economic indicators a community may expect to share. Given the real-world projects, experiences, and applied research of the CSU-led team, the Toolkit is grounded in practices that are credible and useable within the economic development discussions guiding communities. The goal of this Toolkit is to guide and enhance the capacity of local organizations to make more deliberate and credible measurements of local and regional economic activity and other ancillary benefits.

**Thilmany McFadden, D. and S. Low. 2012. Will Local Foods Influence American Diets? CHOICES, 2nd Quarter 2012.** There are a number of indicators that illustrate the increasing public attention and food supply chain responses to consumers choosing to “Go Local.” Included are the number of food retailers adopting new local procurement policies, the persistent, double digit growth in farmers markets throughout the United States as tracked by USDA Agricultural Marketing Service, and the more recent emergence of urban food systems in and near metropolitan areas (Martinez et al., 2010; Lockeretz, 1986). Onozaka, Nurse, and Thilmany McFadden (2010) found that a sizable number of buyers connect local food purchases with outcomes that may impact their environment, local economy, and of particular relevance to this theme, public health. But, some of the connections between local foods and issues of public importance are difficult to assess. In this article, we begin exploring the linkages between relocalization and an increased propensity for households to integrate the USDA’s dietary guidelines into their lifestyles. This includes, in particular, those households facing health risks, but also, the broader public.

#### Session 4: Nutrition Education and Labeling

**Acton, R., & Hammond, D. (2018). The impact of price and nutrition labelling on sugary drink purchases: Results from an experimental marketplace study. Appetite, 121, 129–137.** Objective: To examine the effect of front-of-package (FOP) nutrition labelling and sugary drink taxation on consumer beverage purchases. Conclusions: Increasing price was associated with reduced sugary drink purchases. Enhanced FOP labelling results highlight the need for further research to investigate

their potential impact. The study adds empirical support for taxation to reduce sugary drink consumption.

**Acton, R., Vanderlee, L., Roberto, C. A., & Hammond, D. (2018). Consumer perceptions of specific design characteristics for front-of-package nutrition labels. *Health Education Research*, 33(2), 167–174. <https://doi.org/10.1093/her/cyy006>.** An increasing number of countries are developing front-of-package (FOP) labels; however, there is limited evidence examining the impact of specific design characteristics for these labels. The current study investigated consumer perceptions of several FOP label design characteristics, including potential differences among sociodemographic sub-groups. Two hundred and thirty-four participants aged 16 years or older completed nine label rating tasks on a laptop at a local shopping mall in Canada. The rating tasks asked participants to rate five primary design characteristics (border, background presence, background colour, 'caution' symbol and government attribution) on their noticeability, readability, believability and likelihood of changing their beverage choice. FOP labels with a border, solid background and contrasting colours increased noticeability. A solid background increased readability, while a contrasting background colour reduced it. Both a 'caution' symbol and a government attribution increased the believability of the labels and the perceived likelihood of influencing beverage choice. The effect of the design characteristics was generally similar across sociodemographic groups, with modest differences in five of the nine outcomes. Label design characteristics, such as the use of a border, colour and symbols can enhance the salience of FOP nutrition labels and may increase the likelihood that FOP labels are used by consumers.

**Ares, G., Aschemann-Witzel, J., Curutchet, M. R., Antunez, L., Machin, L., Vidal, L., & Gimenez, A. (2018). Product reformulation in the context of nutritional warning labels: Exploration of consumer preferences towards food concepts in three food categories. *Food Research International* (Ottawa, Ont.), 107, 669–674. <https://doi.org/10.1016/j.foodres.2018.03.021>** The reformulation of the food products available in the marketplace to improve their nutritional quality has been identified as one of the most cost-effective policies for controlling the global obesity pandemic. Front-of-pack (FOP) nutrition labelling is one of the strategies that has been suggested to encourage the food industry to reformulate their products. However, the extent to which certain FOP labels can encourage product reformulation is dependent on consumer reaction. The aim of the present work was to assess consumers' perception towards product reformulation in the context of the implementation of nutritional warnings, an interpretive FOP nutrition labelling scheme. Three product categories were selected as target products: bread, cream cheese and yogurt, each associated with high content of one target nutrient. For each category, six packages were designed using a  $3 \times 2$  experimental design with the following variables: product version (regular, nutrient-reduced and nutrient-free) and brand (market leader and non-market leader). A total 306 Uruguayan participants completed a choice experiment with 18 choice sets. Reformulated products without nutritional warnings were preferred by participants compared to regular products with nutritional warnings. No apparent preference for products reformulated into nutrient-reduced or nutrient-free product versions was found, although differences depended on the product category and the specific reformulation strategy. Preference for reformulated products without nutritional warnings was more pronounced for non-market leaders. Results from the present work suggest that reformulation of foods in the context of the implementation of nutritional warnings holds potential to encourage consumers to make more healthful food choices and to cause a reduction of their intake of nutrients associated with non-communicable diseases.

**Arrua, A., Curutchet, M. R., Rey, N., Barreto, P., Golovchenko, N., Sellanes, A., Ares, G. (2017). Impact of front-of-pack nutrition information and label design on children's choice of two snack foods: Comparison of warnings and the traffic-light system. *Appetite*, 116, 139–146.**

<https://doi.org/10.1016/j.appet.2017.04.012> Research on the relative influence of package features on children's perception of food products is still necessary to aid policy design and development. The aim of the present work was to evaluate the relative influence of two front-of-pack (FOP) nutrition labelling schemes, the traffic light system and Chilean warning system, and label design on children's choice of two popular snack foods in Uruguay, wafer cookies and orange juice. A total of 442 children in grades 4 to 6 from 12 primary schools in Montevideo (Uruguay) participated in the study. They were asked to complete a choice-conjoint task with wafer cookies and orange juice labels, varying in label design and the inclusion of FOP nutrition information. Half of the children completed the task with labels featuring the traffic-light system (n = 217) and the other half with labels featuring the Chilean warning system (n = 225). Children's choices of wafer cookies and juice labels was significantly influenced by both label design and FOP nutritional labels. The relative impact of FOP nutritional labelling on children's choices was higher for the warning system compared to the traffic-light system. Results from the present work stress the need to regulate the design of packages and the inclusion of nutrient claims, and provide preliminary evidence of the potential of warnings to discourage children's choice of unhealthful products.

**Arrúa, A., Machín, L., Curutchet, M. R., Martínez, J., Antúnez, L., Alcaire, F., Ares, G. (2017). Warnings as a directive front-of-pack nutrition labelling scheme: Comparison with the Guideline Daily Amount and traffic-light systems. *Public Health Nutrition*, 20(13), 2308–2317.** Objective: Warnings have recently been proposed as a new type of directive front-of-pack (FOP) nutrition labelling scheme to flag products with high content of key nutrients. In the present work, this system was compared with the two most common FOP nutrition labelling schemes (Guideline Daily Amounts (GDA) and traffic-light system) in terms of goal-directed attention, influence on perceived healthfulness and ability to differentiate between products. Design/Setting/Subjects Goal-directed attention to FOP labels was evaluated using a visual search task in which participants were presented with labels on a computer screen and were asked to indicate whether labels with high sodium content were present or absent. A survey with 387 participants was also carried out, in which the influence of FOP labels on perceived healthfulness and ability to identify the healthful alternative were evaluated. Conclusions: Results from the present work suggest that warnings have potential as directive FOP nutrition labels to improve consumer ability to identify unhealthful products and highlight advantages compared with the traffic-light system.

**Bartlett, Susan, Jacob Klerman, Lauren Olsho, et al. Evaluation of the Healthy Incentives Pilot (HIP): Final Report. Prepared by Abt Associates for the U.S. Department of Agriculture, Food and Nutrition Service, September 2014.** The Healthy Incentives Pilot (HIP) tested a way of making fruits and vegetables more affordable for participants in the Supplemental Nutrition Assistance Program (SNAP). Under HIP, SNAP participants received a financial incentive for purchasing fruits and vegetables. The HIP evaluation used a random assignment research design. Specifically, 7,500 Hampden County SNAP households were randomly selected to participate in HIP, while the remaining 47,595 households continued to receive SNAP benefits as usual. The study found that HIP participants (respondents aged 16 and older) consumed almost a quarter of a cup (26 percent) more targeted fruits and vegetables per day than did nonparticipants. HIP households spent more SNAP benefits on targeted fruits and vegetables than non-HIP households in participating supermarkets and superstores – \$12.05 versus \$10.86 on average each month – an increase of \$1.19 or 11 percent. HIP households reported higher total spending on fruits and vegetables than non-HIP households. HIP participants were more likely to have fruits and

vegetables available at home during the pilot. Awareness and understanding of HIP increased over time. Most retailers did not find HIP difficult to operate. The estimated total cost for implementing HIP nationwide is approximately \$90 million over 5 years, including costs for modifying EBT and retailer systems and State agency costs. Estimates for annual incentive costs range from \$825 million to \$4.5 billion, depending on assumptions about retailer participation and fruit and vegetable spending.

**Bleich, Sara N., Christina D. Economos, Marie L. Spiker, Kelsey A. Vercammen, Eric M. VanEpps, Jason P. Block, Brian Elbel, Mary Story, and Christina A. Roberto.** “**A Systematic Review Of Calorie Labeling and Modified Calorie Labeling Interventions: Impact On Consumer And Restaurant Behavior**”, *Obesity* 25, no. 12 (December 2017): pp. 2018-2044. Background: Evidence on the effects of restaurant calorie labeling on consumer and restaurant behavior is mixed. This paper examined: 1) consumer responses to calorie information alone or compared to modified calorie information, and 2) changes in restaurant offerings following or in advance of menu labeling implementation. Conclusion: Due to a lack of well-powered studies with strong designs, the degree to which menu labeling encourages lower calorie purchases and whether that translates to a healthier population is unclear. Although there is limited evidence that menu labeling affects calories purchased at fast-food restaurants, some evidence demonstrates that it lowers calories purchased at certain types of restaurants and in cafeteria settings. The limited data on modified calorie labels find that such labels can encourage lower-calorie purchases, but may not differ in effects relative to calorie labels alone.

**Bleich, Sara N., Julia A. Wolfson, Marian P. Jarlenski, and Jason P. Block.** “**Restaurants With Calories Displayed On Menus Had Lower Calorie Counts Compared To Restaurants Without Such Labels**”, *Health Affairs* 34, no. 11 (November 2015): pp. 1877-1884 Beginning in December 2016, calorie labeling on menus will be mandatory for US chain restaurants and many other establishments that serve food, such as ice cream shops and movie theaters. But before the federal mandate kicks in, several large chain restaurants have begun to voluntarily display information about the calories in the items on their menus. This increased transparency may be associated with lower overall calorie content of offered items. This study used data for the period 2012-14 from the MenuStat project, a data set of menu items at sixty-six of the largest US restaurant chains. We compared differences in calorie counts of food items between restaurants that voluntarily implemented national menu labeling and those that did not. We found that the mean per item calorie content in all years was lower for restaurants that voluntarily posted information about calories (the differences were 139 calories in 2012, 136 in 2013, and 139 in 2014). New menu items introduced in 2013 and 2014 showed a similar pattern. Calorie labeling may have important effects on the food served in restaurants by compelling the introduction of lower-calorie items.

**Bollinger, Bryan, Phillip Leslie, and Alan Sorensen.** “**Calorie Posting In Chain Restaurants**”, *American Economic Journal: Economic Policy* 3, no. 1 (February 2011): pp. 91-128. We study the impact of mandatory calorie posting on consumers’ purchase decisions using detailed data from Starbucks. We find that average calories per transaction fall by 6 percent. The effect is almost entirely related to changes in consumers’ food choices—there is almost no change in purchases of beverage calories. There is no impact on Starbucks profit on average, and for the subset of stores located close to their competitor Dunkin Donuts, the effect of calorie posting is actually to increase Starbucks revenue. Survey evidence and analysis of commuters suggests the mechanism for the effect is a combination of learning and salience.

**Cantor, Jonathan, Alejandro Torres, Courtney Abrams, and Brian Elbel.** “**Five Years Later: Awareness Of New York City’s Calorie Labels Declined, With No Changes In Calories Purchased**”, *Health Affairs* 34,

**no. 11 (November 2015): pp. 1893-1900.** To follow up on a previous study that examined how the mandated displaying of calorie information on menu boards in fast-food restaurants in New York City influenced consumers' behavior, we analyzed itemized cash register receipts and survey responses from 7,699 consumers at four fast-food chains. Using a difference-in-differences study design, we found that consumers exposed to menu labeling immediately after the mandate took effect in 2008 and at three points in 2013-14 reported seeing and using the information more often than their counterparts at fast-food restaurants without menu labeling. In each successive period of data collection, the percentage of respondents noticing and using the information declined, while remaining above the prelabeling baseline. There were no statistically significant changes over time in levels of calories or other nutrients purchased or in the frequency of visits to fast-food restaurants. Menu labeling at fast-food chain restaurants, which the Affordable Care Act requires to be implemented nationwide in 2016, remains an unproven strategy for improving the nutritional quality of consumer food choices at the population level. Additional policy efforts that go beyond labeling and possibly alter labeling to increase its impact must be considered.

**Cates, Sheryl, Kristen Capogrossi, Linnea Sallack, Karen Deehy Celia Eicheldinger, Shawn Karns, Samantha Bradley, Katherine Kosa, and Jenna Brophy. WIC Nutrition Education Study: Phase I Report. Prepared by Altarum Institute and the University of California, Agriculture and Natural Resources, Nutrition Policy Institute for the U.S. Department of Agriculture, Food and Nutrition Service, May 2016.** The Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) is administered at the Federal level by the Food and Nutrition Service (FNS) of the U.S. Department of Agriculture (USDA), which provides grants to WIC State agencies (SAs) to provide program services to eligible participants. WIC SAs provide program services, including nutrition education, either directly or through contracts or agreements with local health agencies and community-based organizations. Nutrition education, the program feature often cited as pivotal to WIC's success, is designed to emphasize the relationship between nutrition, physical activity, and the health of pregnant, breastfeeding, and postpartum women, infants, and young children. The Federal regulations and guidance provide a policy framework for delivering WIC nutrition education, but State and local WIC agencies have significant flexibility to design nutrition education appropriate for the demographics of their participants to achieve established goals. This flexibility has yielded a wide range of messages, delivery systems, approaches, and qualifications and training for WIC nutrition educators and variation in the nutrition education participants receive. Findings from Phase I demonstrate that nutrition education policies and practices are evolving in ways that address the needs identified 15 years ago as part of FNS's Revitalizing Quality Nutrition Services (RQNS) initiative and the associated WIC Program Nutrition Education Guidance and Value Enhanced Nutrition Assessment (VENA) guidance for conducting a comprehensive nutrition assessment to frame effective, participant-centered education.

**Cates, S., Blitstein, J., Hersey, J., Kosa, K., Flicker, L., Morgan, K., and Bell, L. Addressing the Challenges of Conducting Effective Supplemental Nutrition Assistance Program Education (SNAP-Ed) Evaluations: A Step-by-Step Guide. Prepared by Altarum Institute and RTI International for the U.S. Department of Agriculture, Food and Nutrition Service, March 2014.** Nutrition education is an optional component of USDA's Supplemental Nutrition Assistance Program (SNAP), known as SNAP-Education or SNAP-Ed. The goal of SNAP-Ed is to improve the likelihood that SNAP participants and persons eligible for SNAP or other means-tested programs will make healthy food choices within a limited budget and choose physically active lifestyles in accordance with the Dietary Guidelines for Americans. SNAP-Ed Guidance also encourages all States to evaluate the effectiveness of their SNAP-Ed interventions. This can include formative, process, outcome, and impact evaluations.<sup>1</sup> The SNAP Education and Evaluation, Waves I and II studies were USDA Food and Nutrition Service (FNS)-initiated independent evaluations designed to

identify potential models of effective SNAP education and evaluation. The overarching goal of these evaluations was to determine whether the selected projects can serve as good examples of effective nutrition education and promotion activities within SNAP-Ed. To accomplish the study goal, three complementary assessments were conducted for each demonstration project: a process evaluation, an impact evaluation, and an assessment of the IA's own impact evaluation. The process evaluations determined whether the interventions were implemented as intended.

**Cawley, John, Alex Susskind, and Barton Willage. "The Impact Of Information Disclosure On Consumer Behavior: Evidence From A Randomized Field Experiment Of Calorie Labels On Restaurant Menus", NBER Working Paper No. 24889 (August 2018).** The impact of information on consumer behavior is a classic topic in economics, and there has recently been particular interest in whether providing nutritional information leads consumers to choose healthier diets. For example, a nationwide requirement of calorie counts on the menus of chain restaurants took effect in the U.S. in May, 2018, and the results of such information disclosure are not well known. To estimate the impact of menu labeling, we conducted a randomized controlled field experiment in two full-service restaurants, in which the control group received the usual menus and the treatment group received the same menus but with calorie counts. We estimate that the labels resulted in a 3.0% reduction in calories ordered, with the reduction occurring in appetizers and entrees but not drinks or desserts. Exposure to the information also increases consumers' support for requiring calorie labels by 9.6%. These results are informative about the impact of the new nationwide menu label requirement, and more generally contribute to the literature on the impact of information disclosure on consumer behavior.

**Donnelly, G., Zatz, L., Svirsky, D., & John, L. (2018). The effect of graphic warnings on sugary-drink purchasing. Psychological Science, 29(8), 1321–1333.** Governments have proposed text warning labels to decrease consumption of sugary drinks-a contributor to chronic diseases such as diabetes. However, they may be less effective than more evocative, graphic warning labels. We field-tested the effectiveness of graphic warning labels (vs. text warning labels, calorie labels, and no labels), provided insight into psychological mechanisms driving effectiveness, and assessed consumer sentiment. Study 1 indicated that graphic warning labels reduced the share of sugary drinks purchased in a cafeteria from 21.4% at baseline to 18.2%-an effect driven by substitution of water for sugary drinks. Study 2 showed that graphic warning labels heighten negative affect and prompt consideration of health consequences. Study 3 indicated that public support for graphic warning labels can be increased by conveying effectiveness information. These findings could spur more effective labeling policies that facilitate healthier choices, do not decrease overall beverage purchases, and are publicly accepted.

**Elbel, Brian, Rogan Kersh, Victoria L. Brescoll, and L. Beth Dixon. "Calorie Labeling And Food Choices: A First Look At The Effects On Low-Income People In New York City", Health Affairs 28, Supplement 1 (October 2009): pp. w1110-w1121.** We examined the influence of menu calorie labels on fast food choices in the wake of New York City's labeling mandate. Receipts and survey responses were collected from 1,156 adults at fast-food restaurants in low-income, minority New York communities. These were compared to a sample in Newark, New Jersey, a city that had not introduced menu labeling. We found that 27.7 percent who saw calorie labeling in New York said the information influenced their choices. However, we did not detect a change in calories purchased after the introduction of calorie labeling. We encourage more research on menu labeling and greater attention to evaluating and implementing other obesity-related policies.

**Finkelstein, Eric A., Kiersten L. Strombotne, Nadine L. Chan, and James Krieger. "Mandatory Menu Labeling In One Fast-Food Chain In King County, Washington", American Journal of Preventive**

**Medicine 40, no. 2 (February 2011): pp. 122-127.** Background: As part of a comprehensive effort to stem the rise in obesity, King County, Washington, enforced a mandatory menu-labeling regulation requiring all restaurant chains with 15 or more locations to disclose calorie information at the point of purchase beginning in January 2009. Purpose: The purpose of this study is to quantify the impact of the King County regulation on transactions and purchasing behavior at one Mexican fast-food chain with locations within and adjacent to King County. Conclusions: In this setting, mandatory menu labeling did not promote healthier food-purchasing behavior.

**Gleason, Stacy, Brenda Wolford, Margaret Wilkin, Becca Hofer, Diane Woloshin, Linnea Sallack, and Vivian Gabor. Analysis of Supplemental Nutrition Assistance Program Education (SNAP-Ed) Data for All States Study: Final Report. Prepared by Altarum Institute for the U.S. Department of Agriculture, Food and Nutrition Service, August 2018.** The Supplemental Nutrition Assistance Program (SNAP) is the largest U.S. nutrition safety net program administered by the U.S. Department of Agriculture's (USDA) Food and Nutrition Service (FNS). SNAP offers nutrition assistance to millions of eligible, low-income individuals and families and provides economic benefits to communities. SNAP-Education (SNAP-Ed) is the nutrition education and obesity prevention component of SNAP; its goal is to improve the likelihood that persons eligible for SNAP will make healthy food choices within a limited budget and choose physically active lifestyles consistent with the current Dietary Guidelines for Americans (DGA) and USDA food guidance. The study had five objectives, including identifying common SNAP-Ed programming across states and determine the types of programming that have the best outcomes.

**Grummon, A., Smith, N., Golden, S., Frerichs, L., Taillie, L., & Brewer, N. (2019). Health warnings on sugar-sweetened beverages: Simulation of impacts on diet and obesity among U.S. adults. American Journal of Preventive Medicine. <https://doi.org/10.1016/j.amepre.2019.06.022>** Overconsumption of sugar-sweetened beverage (SSB) is a significant contributor to obesity. Policymakers have proposed requiring health warnings on SSBs to reduce SSB consumption. Randomized trials indicate that SSB warnings reduce SSB purchases, but uncertainty remains about how warnings affect population-level dietary and health outcomes. Methods: This study developed a stochastic microsimulation model of dietary behaviors and body weight using the 2005–2014 National Health and Nutrition Examination Surveys, research on SSB health warnings, and a validated model of weight change. In 2019, the model simulated a national SSB health warning policy's impact on SSB intake, total energy intake, BMI, and obesity among U.S. adults over 5 years. Sensitivity analyses varied assumptions about: (1) how warning efficacy changes over time, (2) the magnitude of warnings' impact on SSB intake, and (3) caloric compensation. Results: A national SSB health warning policy would reduce average SSB intake by 25.3 calories/day (95% uncertainty interval [UI]= -27.0, -23.6) and total energy intake by 31.2 calories/day (95% UI= -32.2, -30.1). These dietary changes would reduce average BMI by 0.64 kg/m<sup>2</sup> (95% UI= -0.67, -0.62) and obesity prevalence by 3.1 percentage points (95% UI= -3.3%, -2.8%). Obesity reductions persisted when assuming warning efficacy wanes over time and when using conservative estimates of warning impact and caloric compensation. Benefits were larger for black and Hispanic adults than for white adults, and for adults with lower SES than for those with higher SES. Conclusions: A national SSB health warning policy could reduce adults' SSB consumption and obesity prevalence. Warnings could also narrow sociodemographic disparities in these outcomes.

**Fred Kuchler, Maria Bowman, Megan Sweitzer, and Catherine Greene, 2018, "Evidence from Retail Food Markets That Consumers Are Confused by Natural and Organic Food Labels," Journal of Consumer Policy, published online Nov. 23.** In the USA, food producers can label their products as *organic* only if they are certified by the United States Department of Agriculture (USDA) as having met comprehensive regulatory standards for environmental stewardship. In contrast, the Federal

Government has not defined the term *natural* for most food products. Survey and experimental studies suggest that consumers are confused by the meanings of *natural* and *USDA Organic* on food labels, and often believe that these two label claims have similar meanings. In this paper, we examine whether this confusion influences aggregate retail food expenditures. High-frequency Google Trends data on the volume of web searches for “organic food” and for “natural food” are used as indicators of consumer interest in those food attributes. Results from a vector autoregression model show that web searches for both terms are correlated with retail purchases of organic food. Web searches for both help predict retail purchases. If consumers were aware of differences implied by the two label claims, searches for natural food would be uncorrelated with decisions to purchase organic products. These results are therefore evidence that consumers view the two claims as related, or even view the two claims as identical.

**Khandpur, N., Mais, L. A., de Moraes Sato, P., Martins, A. P. B., Spinillo, C. G., Rojas, C. F. U., ... Jaime, P. C. (2019). Choosing a front-of-package warning label for Brazil: A randomized, controlled comparison of three different label designs. *Food Research International*, 121, 854–861.** Introduction: Warning labels (WLs) are the newest paradigm of nutrient-based, front-of-package labels (FOP) that have been consistently shown to be more effective at informing consumer purchases than other FOP labels. Their effectiveness may be attributed to their design and the consistency in the information they communicate. The present study assessed designs effects of WLs in improving understanding and perceptions among 2419 Brazilian adults. Conclusions: In this study, WLs were an important addition to the current nutrition label. The triangular symbol, the white background and the signal word, 'High in/ Alto em' showed consistently better results than the signal word 'A lot of/ Muito' and the octagonal symbol. These design elements serve to make WLs more visible to consumers, capturing their attention and informing their food evaluations, and may have greater potential to influence appropriate for a Brazilian audience.

**Fred Kuchler, Catherine Greene, Maria Bowman, Kandice K. Marshall, John Bovay, and Lori Lynch, 2017, Beyond Nutrition and Organic Labels—30 Years of Experience With Intervening in Food Labels, Economic Research Report Number 239, Economic Research Service, U.S. Department of Agriculture, November, 97 pp. <https://www.ers.usda.gov/publications/pubdetails/?pubid=85686>.** Consumers are increasingly interested in farming methods and the nutritional quality of food. Manufacturers, in turn, are adding more information to food labels. In 1990, Congress passed two watershed laws on food labeling, one requiring nutrition labels to be included on most processed foods and the other requiring organic foods to meet a national uniform standard. This report examines the economic issues involved in five labels for which the Federal Government has played different roles in securing the information and making it transparent to consumers. In addition to the nutrition and organic labels, the report scrutinizes three other labels—one advertising foods made without genetically engineered ingredients, another advertising products made from animals raised without antibiotics, and the Federal country-of-origin label, which is now required for fresh and frozen fruits and vegetables, some nuts, fish and shellfish, ginseng, and certain meats. As interest grows in process-based and other types of food labeling, findings from these five case studies illustrate the economic effects and tradeoffs in setting product standards, verifying claims, and enforcing truthfulness.

**Long, Michael W., Deirdre K. Tobias, Angie L. Cradock, Holly Batchelder, and Steven L. Gortmaker. “Systematic Review And Meta-Analysis Of The Impact Of Restaurant Menu Calorie Labeling”, *American Journal of Public Health* 105, no. 5 (May 2015): pp. e11-e24.** We conducted a systematic review and meta-analysis evaluating the relationship between menu calorie labeling and calories ordered or purchased in the PubMed, Web of Science, PolicyFile, and PAIS International databases

through October 2013. Among 19 studies, menu calorie labeling was associated with a -18.13 kilocalorie reduction ordered per meal with significant heterogeneity across studies (95% confidence interval = -33.56, -2.70;  $P = .021$ ;  $I^2 = 61.0\%$ ). However, among 6 controlled studies in restaurant settings, labeling was associated with a nonsignificant -7.63 kilocalorie reduction (95% confidence interval = -21.02, 5.76;  $P = .264$ ;  $I^2 = 9.8\%$ ). Although current evidence does not support a significant impact on calories ordered, menu calorie labeling is a relatively low-cost education strategy that may lead consumers to purchase slightly fewer calories. These findings are limited by significant heterogeneity among nonrestaurant studies and few studies conducted in restaurant settings.

**Machín, L., Curutchet, M. R., Giménez, A., Aschemann-Witzel, J., & Ares, G. (2019). Do nutritional warnings do their work? Results from a choice experiment involving snack products. Food Quality and Preference, 77, 159–165.** Nutritional warnings have been recently introduced as a new front-of-pack nutrition labelling scheme. Its particular goal is to facilitate the identification of products with excessive content of nutrients, given these are associated with non-communicable diseases. The aim of the present study was to evaluate the influence of nutritional warnings on consumers' choice of a snack in a choice experiment involving real products. A total of 199 participants were asked to evaluate a series of bread images on a computer screen using eye-tracking glasses. Once they finished the task, they were invited to help themselves a snack from a shelf as a compensation for their participation in the study. A total of 15 snack products with different nutritional composition were included on the shelf. Participants were randomly divided into groups: one that made their choice from a shelf containing products that did not include front-of-package nutritional information, whereas the other chose among products that featured nutritional warnings. Participants in both experiments invested an average of 14 s to select their product. When products were presented with warnings, 50% of the participants who fixated their gaze on them during the choice task. Significant differences in the frequency of selection of the products ( $p=0.002$ ) were found between the groups: When the warnings were present, participants chose products with fewer warnings and lower average sodium, saturated fat, and sugar content ( $p<0.001$ ). These findings confirm the potential of nutritional warnings to encourage more healthful food choices.

**Moran, A. J., & Roberto, C. A. (2018). Health Warning Labels Correct Parents' Misperceptions About Sugary Drink Options. Am J Prev Med, 55(2), e19–e27. <https://doi.org/10.1016/j.amepre.2018.04.018>**  
Introduction: Noncarbonated sugar-sweetened beverages, such as fruit drinks, sports drinks, and sweetened teas are increasingly promoted to and consumed by youth. These beverages may be perceived as healthier options than soda. To educate consumers about beverages high in added sugar, several cities and states have proposed policies mandating health warning labels on sugar-sweetened beverages. Methods: In 2015, a total of 2,381 parents were randomized to a no label, calorie label, or warning label condition. An online survey asked about the healthfulness of different beverages, and asked parents to select a beverage for their child in a choice task. Regressions compared the warning and calorie label groups to the control group and measured mediating effects of health beliefs on beverage choice. Data were analyzed in 2016. Results: Parents viewed fruit drinks, sports drinks, and sweetened teas as healthier and less likely to cause disease than soda. Compared with no label, warning labels significantly increased parents' risk perceptions for all beverages except soda. Warning labels significantly reduced the odds of selecting fruit drinks for the child ( $OR=0.42$ , 95% CI=0.32, 0.56), and this effect was mediated by changes in health beliefs and risk perceptions. Conclusions: Fruit drinks, sports drinks, and sweetened teas are increasingly promoted to youth. Parents believe these beverages are healthier and less likely to cause disease than soda, and warning labels may correct these misperceptions.

**Restrepo, Brandon J. "Calorie Labeling In Chain Restaurants And Body Weight: Evidence From New York", *Health Economics* 26, vol. 10 (October 2017): pp. 1191-1209.** This study analyzes the impact of local mandatory calorie labeling laws implemented by New York jurisdictions on body weight. The analysis indicates that on average the point-of-purchase provision of calorie information on chain restaurant menus reduced body mass index (BMI) by 1.5% and lowered the risk of obesity by 12%. Quantile regression results indicate that calorie labeling has similar impacts across the BMI distribution. An analysis of heterogeneity suggests that calorie labeling has a larger impact on the body weight of lower income individuals, especially lower income minorities. The estimated impacts of calorie labeling on physical activity, smoking, and the consumption of alcoholic beverages, fruits, and vegetables are small in magnitude, which suggests that other margins of adjustment drive the body-weight impacts estimated here.

**Roberto, Christina A., Peter D. Larsen, Henry Agnew, Jenny Baik, and Kelly D. Brownell. "Evaluating The Impact Of Menu Labeling On Food Choices And Intake", *American Journal of Public Health* 100, no. 2 (February 2010): pp. 312-318.** Objectives. We assessed the impact of restaurant menu calorie labels on food choices and intake. Methods. Participants in a study dinner (n = 303) were randomly assigned to either (1) a menu without calorie labels (no calorie labels), (2) a menu with calorie labels (calorie labels), or (3) a menu with calorie labels and a label stating the recommended daily caloric intake for an average adult (calorie labels plus information). Food choices and intake during and after the study dinner were measured. Results. Participants in both calorie label conditions ordered fewer calories than those in the no calorie labels condition. When calorie label conditions were combined, that group consumed 14% fewer calories than the no calorie labels group. Individuals in the calorie labels condition consumed more calories after the study dinner than those in both other conditions. When calories consumed during and after the study dinner were combined, participants in the calorie labels plus information group consumed an average of 250 fewer calories than those in the other groups. Conclusions. Calorie labels on restaurant menus impacted food choices and intake; adding a recommended daily caloric requirement label increased this effect, suggesting menu label legislation should require such a label. Future research should evaluate menu labeling's impact on children's food choices and consumption.

**VanEpps, Eric M., Julie S. Downs, and George Loewenstein. "Calorie Label Formats: Using Numeric And Traffic Light Calorie Labels To Reduce Lunch Calories", *Journal of Public Policy & Marketing* 35, no. 1 (April 2016): pp. 26-36.** In a field experiment involving online workplace lunch orders, this study examines the impact of numeric and traffic light calorie labels on calorie intake. Employees of a large corporation ordered lunches through a website of the authors' design, on which they were presented menus with numeric calorie labels, traffic light labels, or both together, and the authors compared the calorie content of the ordered lunches with that of diners randomized to receive no calorie information. Each label type reduced lunch calories by approximately 10%. Nutrition knowledge was not improved by any menu format. Traffic light labels achieved meaningful reductions in calories ordered even in the absence of numeric information, and the authors found no apparent benefit or detriment of combining label types. These findings suggest that consumers may benefit most from help in identifying relatively healthier choices but rely little on information about the exact caloric content of items.

**VanEpps, E. M., & Roberto, C. A. (2016). The Influence of Sugar-Sweetened Beverage Warnings: A Randomized Trial of Adolescents' Choices and Beliefs. *Am J Prev Med*, 51(5), 664-672.**  
<https://doi.org/10.1016/j.amepre.2016.07.010> Introduction: California, New York, and the cities of San Francisco and Baltimore have introduced bills requiring health-related warning labels for sugar-sweetened beverages. This study measures the extent to which these warning labels influence

adolescents' beliefs and hypothetical choices. Design: Participants completed an online survey in which they chose a beverage in a hypothetical vending machine task, rated perceptions of different beverages, and indicated interest in coupons for beverages. Data were collected and analyzed in 2015. Conclusions: Health-related warning labels on sugar-sweetened beverages improved adolescents' recognition of the sugar content of such beverages and reduced hypothetical choices to buy sugar-sweetened beverages.

### **Session 5: Food Loss and Waste**

**Berkenkamp, J., Nennich, T., 2015. Beyond beauty: the opportunities and challenges of cosmetically imperfect produce. <http://ngfn.org/resources/ngfn-cluster-calls/beyond-beauty>** The Beyond Beauty initiative explored the possibilities for expanding market opportunities for cosmetically imperfect fruits and vegetables. In particular, we have sought to understand how Minnesota-based fruit and vegetable growers view these products and to assess their feasibility in fresh-cut processing contexts and collegiate foodservice environments within the state. Major findings: Participating foodservice operators expressed significant openness to expanding their use of cosmetically imperfect fruits and vegetables. They also reported very limited impacts on labor rates given their current use of imperfects. If the volume of imperfects was increased significantly, additional staff training may be needed, particularly in more conventional foodservice settings. Local farmers could benefit from expanded market opportunities for imperfects. For instance, locally grown and locally grown organic imperfects that are competitively priced with non-local, non-organic #1 product could potentially enjoy newfound access to collegiate foodservice markets. It is conceivable, however, that growing acceptance of imperfects in the foodservice market place could lead to adverse consequences for some Minnesota farmers if imperfects simply supplant (or "cannibalize") existing sales of their higher value #1 products, particularly if it became commonplace for imperfects to be shipped across the country or imported from overseas.

**Dunning, R., Johnson, L., Boys, K., 2019. Putting dollars to waste: estimating the value of on-farm food loss. Choices. 34, 1.** This study pairs field estimates of the volume of unharvested produce with sale price and cost data to estimate the market value of produce left unharvested in North Carolina fields. A few generalizable insights can be gleaned from this analysis. Most importantly, the mix of marketable, edible, and inedible produce varies considerably by crop and significantly affects the profitability of strategies to recapture food loss. Regardless of the type of crop, the significant volumes of unharvested but edible produce suggest that opportunities exist to at least reduce or compensate growers for their packaging and labor costs a significant volume of food is available to be recaptured and could be streamed into food assistance channels. These results, however, suggest that no single food recovery strategy will be most appropriate across all crops. Rather, among other considerations, recovery strategies would do well to consider targeting limited food recovery resources to the crops which offer the highest proportion of edible relative to inedible produce.

**Ellison B., Muth M.K., Golan E. 2019. Opportunities and Challenges in Conducting Economic Research on Food Loss and Waste Applied Economic Perspectives and Policy. March. 41(1): 1–19.** Food loss and waste (FLW) issues are receiving heightened attention from local, national, and international governments and nongovernmental organizations. While research in the FLW space is growing rapidly, economists have important contributions to make to the FLW conversation. In this paper we discuss the opportunities and challenges in conducting economic research on FLW. We highlight some of the more technical opportunities and challenges related to data, measurement, and evaluation of FLW reduction initiatives as these are often focal points in the current FLW literature. In addition, we discuss the notion of optimal FLW, which has been mostly absent from the policy discussion to date. Economic analyses

can help contribute towards identifying market failures that support the need for FLW interventions, estimating the costs and benefits of FLW interventions, and clearly identifying the winners and losers of potential mandatory requirements to reduce FLW.

**Harvard Law School Food Law and Policy Clinic and Natural Resources Defense Council (NRDC), 2017. Don't Waste, Donate: Enhancing Food Donations through Federal Policy.**

<https://www.nrdc.org/sites/default/files/dont-waste-donate-report.pdf>. While there is an abundance of food produced in the U.S. every year, a significant amount of this wholesome, healthy, and safe food ends up in businesses' dumpsters and consumers' trash cans, making its way to landfills. Forty percent of the food produced in the U.S. goes uneaten, resulting in at least 62.5 million tons of wasted food each year. The amount of food waste in the U.S. has been on the rise for the past several decades, with per capita food loss increasing by 50 percent from 1974 to 2005. At the same time, 42.2 million individuals, including 13.1 million children, were food insecure in 2015, meaning that at some point during the year they lacked access to a sufficient amount of food to lead an active, healthy lifestyle. Diverting safe, edible food from the waste stream to food insecure individuals can significantly reduce food waste, while also playing a role in hunger relief efforts. The authors of this report acknowledge that food donations alone cannot solve the pressing challenge of food insecurity, as this would require addressing the underlying poverty that is its root cause. However, as we work to implement broader and deeper solutions to food insecurity, complementary mechanisms for addressing hunger relief are still needed. Donations of healthy, wholesome food can provide a mechanism for immediate relief of food shortages and a critical response to food insecurity. A number of federal laws and policies strive to enhance food recovery, yet many are out of touch with the evolving landscape of food donation and the effectiveness of others is limited by a number of barriers. This policy paper presents actions the federal government can take to better align federal laws and policies with the objective of increasing donation of safe surplus food.

**Hodges, R.J., J.C. Buzby, and B. Bennett. "Postharvest losses and waste in developed and less developed countries: opportunities to improve resource use" The Journal of Agricultural Science Volume 149, Issue S1, February 2011 , pp. 37-45.** This review compares and contrasts postharvest food losses (PHLs) and waste in developed countries (especially the USA and the UK) with those in less developed countries (LDCs), especially the case of cereals in sub-Saharan Africa. Reducing food losses offers an important way of increasing food availability without requiring additional production resources, and in LDCs it can contribute to rural development and poverty reduction by improving agribusiness livelihoods. The critical factors governing PHLs and food waste are mostly after the farm gate in developed countries but before the farm gate in LDCs. In the foreseeable future (e.g. up to 2030), the main drivers for reducing PHLs differ: in the developed world, they include consumer education campaigns, carefully targeted taxation and private and public sector partnerships sharing the responsibility for loss reduction. The LDCs' drivers include more widespread education of farmers in the causes of PHLs; better infrastructure to connect smallholders to markets; more effective value chains that provide sufficient financial incentives at the producer level; opportunities to adopt collective marketing and better technologies supported by access to microcredit; and the public and private sectors sharing the investment costs and risks in market-orientated interventions.

**Johnson, Lisa K., J. Dara Bloom, Rebecca D. Dunning, Chris C. Gunter, Michael D. Boyette, Nancy G. Creamer. "Farmer harvest decisions and vegetable loss in primary production" Agricultural Systems 176 (2019) 102672.** The topic of food loss and waste has risen in importance since the revelation that an estimated 40% of food in America is never consumed. Losses at the field level, however, are not well understood, and economic and growing conditions that dictate decisions made by

fruit and vegetable growers can determine how much food is left unharvested. Many strategies have been suggested to reduce food loss and waste, but their development has been informed by concerns at the consumer level, and may not motivate growers to reduce losses. This study sought to understand how growers make decisions regarding when to end the harvest, and explores growers' perceptions of strategies that would incentivize them to reduce losses. The authors conducted seventeen semistructured interviews with mid-sized to large commercial vegetable growers in North Carolina. The resulting findings clarify the primary decision-making drivers affecting food loss in the field, including whether growers have an interested buyer, the quality of the produce, the available price, the financial risk of product rejection, and the priority of another field becoming mature and ready to harvest. Findings from this research suggest that, in order to effectively reduce the loss of edible food at the farm level, growers must be included in the development of strategies, and those strategies must incentivize their participation in order to be effective.

**Johnson, Lisa K., Rebecca D. Dunning, Chris C. Gunter, J. Dara Bloom, Michael D. Boyette, Nancy G. Creamer.** “Field measurement in vegetable crops indicates need for reevaluation of on-farm food loss estimates in North America” *Agricultural Systems* 167 (2018) 136–142. Food loss and waste in the US has been estimated at 40%, a figure that does not include losses at the agricultural level. Consumer food waste is expensive and environmentally damaging as it travels the length of the supply chain and largely ends up in the landfill. Most research and campaigns emphasize the consumer level, which has resulted in the omission of data collection and development of solutions for producers of fruit and vegetable crops. The available estimates of edible produce lost in the field are based on assumptions and estimates, rather than field data. Therefore, this project aimed to measure losses in the field in order to understand if estimates are accurate. Sixty-eight fields of eight vegetable crops were evaluated on nine North Carolina farms during the 2017 production season, using a sampling and scaling method. Combining the unharvested crops of marketable quality and edible but not marketable quality (produce that does not meet appearance quality standards), the average produce volume available after the primary harvest was 5114.59 kg per hectare. Totaling an average of 42% of the marketed yield for these crops, these high figures indicate the need for a reevaluation of the food loss estimates at the agricultural level in the US, and a focus on solutions.

**Minor, T., Hitaj, C., Kuchler, F., Skorbiansky, S.R., Roe, B. and Thornsby, S., 2019. Exploring Food Loss from Farm-to-Retail in the Produce Industry.** *Choices*, 34(1), pp.1-7. While much of the established literature on food loss in the United States focuses on food retailers and consumers, understanding of farm-to-retail food loss is more limited. In December 2017, the USDA Economic Research Service (ERS) hosted a workshop titled “Farm-to-Retail Food Loss in Produce: An Exploratory Discussion of the Causes and Economic Drivers of Change.” The focus was on identifying knowledge gaps and discussing underlying economic drivers and mitigators of food loss at earlier stages of the supply chain. This article summarizes the insights and lessons learned from that full-day workshop. Furthermore, we highlight topics where economists might contribute to a growing area of inquiry and illustrate the complexity and interrelated impacts of actions suggested to reduce food loss and waste (FLW).

**Muth, M.K. et al. 2019. A systems approach to assessing environmental and economic effects of food loss and waste interventions in the United States. Science of The Total Environment, October. 685: 1240-1254.** <https://www.sciencedirect.com/science/article/pii/S0048969719328037>. Reducing food loss and waste (FLW) is critical for achieving healthy diets from sustainable food systems. Within the United States, 30% to 50% of food produced is lost or wasted. These losses occur throughout multiple stages of the food supply chain from production to consumption. Reducing FLW prevents the waste of land, water, energy, and other resources embedded in food and is therefore essential to improving the

sustainability of food systems. Despite the increasing number of studies identifying FLW reduction as a societal imperative, we lack the information needed to assess fully the effectiveness of interventions along the supply chain. In this paper, we synthesize the available literature, data, and methods for estimating the volume of FLW and assessing the full environmental and economic effects of interventions to prevent or reduce FLW in the United States. We describe potential FLW interventions in detail, including policy changes, technological solutions, and changes in practices and behaviors at all stages of the food system from farms to consumers and approaches to conducting economic analyses of the effects of interventions. In summary, this paper comprehensively reviews available information on the causes and consequences of FLW in the United States and lays the groundwork for prioritizing FLW interventions to benefit the environment and stakeholders in the food system.

**van der Hoeven, G. 2017. "Enhanced Deduction for Donation of Food." *NC State Extension*. Available online: <https://localfood.ces.ncsu.edu/2017/12/enhanced-deduction-for-donation-of-food/>** The Protecting Americans from Tax Hikes Act of 2015 (PATH Act), Pub. L. 114-113, which became law on December 18, 2015, provided for an enhanced deduction for the donation of food. Small and large farms that produce food may benefit from the enhanced deduction as a result of the change in Internal Revenue Code (IRC) section 170(e). The rules can be confusing and farmers wanting to take advantage of the enhanced donation for food should consult with an income tax professional to ensure their eligibility of the charitable deduction. This article provides theoretical examples to explain how the law might apply.