Obesity Economics for the Western United States

Mariah D. Ehmke*, Tina Willson, Christiane Schroeter, Ann Marie Hart and Roger Coupal[24]

Introduction

The estimated obesity-related health care costs across the Western region in 2008 were $16.2 billion (this is an inflation-adjusted estimate based on the work of Finkelstein, Fiebelkorn, and Wang (2004)). [25] The Western populations, the percentage of obese adults in each state, and the estimated annual obesity-related expenditures by state are summarized in Table 1. The cost estimates include only direct health care expenditures related to obesity. The actual cost of obesity is much higher and includes not only obesity-related illness and disease, but also indirect costs resulting from missed work days and lower worker productivity as well as valued activities foregone as an opportunity cost (Trogdon et al., 2008).

One of the many challenges for nutrition and health policy in the Western United States is serving a diverse population. For example, 36.6% of California's population is of Hispanic or Latino origin, compared to the U.S. average of 15.4% (U.S. Census Bureau, 2009). Obesity rates differ across racial and ethnic groups. The adult obesity rates are higher among several groups, such as Blacks and Hispanics, when compared to the general population. Adjusting general state-level adult population obesity statistics for non-Hispanic white citizens, the percentage of obese adults in the population decreases to less than 20 percent in New Mexico and California. In Arizona, California, Colorado, Utah, and Wyoming, the prevalence of obesity among Hispanic adults is approximately five percentage points higher than the general population. The obesity gap increases for Blacks. The percentage of obese Blacks is five to 14 percent higher than the general adult population in Arizona, California, Colorado, New Mexico, Oregon, Utah, and Wyoming ((CDC/NCHS), 2009). [26] Challenges to effective obesity prevention in the West also include geographically isolated communities, diverse climates affecting the availability of fresh fruits and vegetables (FFVs), and substantial income disparities within communities.

The following review reports approximately ten years of work by economists, especially agricultural economists, studying obesity. We synthesize significant findings and identify potential areas of research need for the Western region. This review compliments work by Rosin (2008) surveying the economic causes of obesity and Philipson and Posner's (2008)

---

[24] Assistant Professor, Department of Agricultural and Applied Economics, University of Wyoming; Post-Doctoral Research ellow, Department of Agricultural and Applied Economics, University of Wyoming; Assistant Professor, Agribusiness Department, California Polytechnic State University; Associate Professor, ay W . Whitney School of Nursing, University of Wyoming; Associate Professor, Department of Agricultural and Applied Economics, University of Wyoming.
*Corresponding Author: Mariah D. Ehmke, Assistant Professor, Department of Agricultural and Applied Economics, University of Wyoming, 1000 E. University Ave., Dept. 3354, Laramie, WY 82071, (307) 766-53773, mehmke@uwyo.edu

[25] We define the Western United States as those 11 states in the Rocky Mountain Region and West, excluding Alaska and Hawaii

[26] Data is not available on the adult obesity rates for Blacks in Idaho and Montana ((CDC/NCHS), 2009).

review of economic explanations and interventions for the obesity epidemic. Our review builds upon these in consideration of the special needs and populations of the Western United States. We also include studies beyond those including theoretical models and general empirical studies. We incorporate health policy literature along with work by agricultural economists focusing on the possible role of agricultural policy in obesity.

Table 1. Overview Western United States Overweight and Obesity (2008)

State	Population	Percentage of Obese Adults in Total Population	Annual State Obesity-Related Health Expenditure
		(Percent)	(Millions)
Arizona	6,500,180	20-24	$937
California	36,756,666	20-24	$9,564
Colorado	4,939,456	15-19	$1,089
Idaho	1,523,816	20-24	283
Montana	967,440	20-24	$218
Nevada	2,600,167	25-29	$420
New Mexico	1,984,356	25-29	$404
Oregon	3,790,060	20-24	$973
Utah	2,736,424	20-24	$490
Washington	6,549,224	25-29	$1,657
Wyoming	532,668	20-24	$108

References: ((CDC/NCHS), 2009; E.A. Finkelstein, Fiebelkorn, & G.Wand, 2004; Eric A. Finkelstein et al., 2004; U.S. Census Bureau, 2009)

[a] The estimates are based on those of Finkelstein, Fiebelkorn, and Wang and inflated from 2003 estimates to 2009 dollars assuming a 4.5 percent inflation rate for medical expenses

Review of Literature

We divide the economics and health policy literature into five main categories. First, we consider economic research findings using structural and neoclassical productivity growth models. Then we review findings from studies focusing on labeling and consumer choice relationships to weight and health. The third category includes studies focusing on the effects of community and school environments on adult and child weight outcomes. Another area relates to intra-household economic processes and the weight outcomes for mothers and children. Finally, we review literature on issues at the intersection of food and fitness-based weight interventions and health care policy and procedures.

Productivity Growth Analysis

Advances in technology affect the affordability and availability of food as well as the degree of individual inactivity (Philipson & Posner, 2008). Over time, food has become cheaper while exercise time is more costly. According to Lakdawalla and Philipson (2002), much of the obesity epidemic may be caused by factors affecting consumer demand. They find approximately 60%

of the cause of obesity may be explained by demand-side factors while around 40% of obesity may be attributed to supply-side factors. They speculate decreased food prices, spurred by agricultural technology innovation, may increase the likelihood of obesity. This makes gaining weight less expensive. Individuals, especially underweight individuals, will gain weight until the marginal utility of weight begins to decline. The authors report a long-term decrease in physical inactivity caused by technological change, especially in the workplace technology, increases the probability an individual will become overweight. This robust result is from empirical analysis controlling for the effects of demographic factors such as income and education.

The technology and productivity growth approach was adopted by Alston, Sumner, and Vosti (2006) to measure the role of agricultural research and development expenditures on obesity. Some suggest obesity rates have risen because the prices of energy dense foods have fallen while healthier foods are more expensive (Drewnowski, 2003; Philipson & Posner, 2008). Alston, Sumner, and Vosti (2006) find this is not the case. From 1980 to 2005, the real prices of all foods generally fell, including many FFVs. They find the effect of agricultural policies is not clear. For example, the price of sugar, one of the most protected commodities, has generally fallen along with general prices of FFVs, meat, and fish. The increased year-round availability of certain FFVs, like strawberries, is an additional benefit of technological change in agriculture and transportation systems. In conclusion, economic analysis considering lower food prices as a function of technology growth refutes the notion low food prices lead to a more obese population.

Labeling, Taxation, and Consumer Choice

Economists have conducted informative research for possible food labeling, advertising, and taxation policy. Labeling investigations, grounded in asymmetric information theory, are motivated by the notion that people's health may improve if they are able to accurately judge the nutritional value of the food they are eating (see Akerlof, 1970). Frazao and Allshouse (2003) found consumers may have misconceptions or misinformation about the nutritional content and quality of the foods they consume. The implications of this misperception for health are ambiguous. For one, other food attributes, such as taste, convenience, and cost, may outweigh the benefits of healthy food intake. Simple health claims (e.g., oatmeal is "heart healthy") do not have a statistically significant influence on consumers' purchase of restaurant foods. However more complete nutrition label information (e.g., the grams of saturated fat in oatmeal) does influence purchase intent (Kozup, Creyer, & Burton, 2003). Few studies, however, have examined the impact of labeling on obesity. Variyam and Cawley (2006) looked at whether the move to a mandatory, standardized nutrition fact panel required under the Nutrition Labeling and Education Act (NLEA) had an impact on body weight. They found that the new labels led to significantly lower BMIs and probability of obesity, but only for non-Hispanic white females. Drichoutis, Nayga, and Lazaridis (2009) also conclude that the use of nutritional labels does not affect BMI.

Recent work on food advertising clearly supports policy to limit fast-food advertising to combat obesity. Richards and Padilla (2009) used Canadian data to show fast-food advertising increases overall demand for fast food in the general population. Chou, Rashad, and Grossman (2008), estimated the effects of a fast-food advertising ban on childhood overweight and obesity in the United States. They found such a ban would decrease the number of overweight 3-11 year-old children by 18 percent. The number of overweight adolescents would decrease by 14 percent. Research outside of the United States supports tighter food advertising regulations, especially for advertising to children (Chang & Nayga, 2009; Garde, 2008).

Food taxes are often proposed as a means to depress the intake of high fat and sugar-laden foods. Thus far, research on taxing less healthy foods does not support taxation, but rather subsidization of healthy foods, such as FFV, is recommended (Lochhead, 2009). Kuchler, Tegene, and Harris (2005) find that dietary changes resulting from a tax on salty snacks would be very small. Taxes are predicted to decrease the amount of sugar consumed, but not necessarily for all consumers and may have unintended consequence, such as increasing fat consumption (Nordstrom & Thunstrom, 2009; Smed, Jensen, & Denver, 2007). Several studies suggest that a FFV subsidy may be efficient, because it would reach several high-risk population groups, such as blacks, whites, unemployed consumers and consumers, who do not consume enough fruit and vegetables (e.g., Cash, Sunding, & Zilberman, 2004; Schroeter, Lusk, & Tyner, 2008; Sturm & Datar, 2005). A FFV subsidy could encourage consumption of these and decrease the intake of high-calorie fast foods. Overall, subsidies on low-calorie food are progressive and would provide health benefits to all consumer classes, independent of income. However, the greatest benefit would be experienced by low-income consumers (Cash et al., 2004).

Community, Education, and the Environment

Next, we examine what is known about school and community nutrition and physical activity environments and the impact of these environments on obesity. Researchers have focused considerable attention on the link between obesity and the built environment.[27] With regard to urban sprawl, researchers conclusively find residents of less sprawling, more walk-able neighborhoods report more minutes of physical activity and lower obesity prevalence than residents of more sprawling neighborhoods with lower walk-ability (Giles-Corti & Donovan, 2003; Saelens, Sallis, Black, & Chen, 2003). Furthermore, increases in car travel time are associated with increased probability of obesity (Amarasinghe, D'Souza, Brown, Oh, & Borisova, 2009; Frank, Andresen, & Schmid, 2004). However, Eid (2008) finds no evidence urban sprawl actually causes obesity, but rather people pre-disposed to obesity self-select into sprawling neighborhoods.

Neighborhood and socioeconomic characteristics also appear linked to obesity. Researchers consistently show that living in an area of poverty increases a person's odds of being obese (Black & Macinko, 2008; Booth, Pinkston, & Poston, 2005). Often, low-income people live in communities deficient of physical infrastructure needed to promote a healthy lifestyle. This trend is most severe in extremely urban and rural communities. The local food retail formats are not supermarkets with diverse food offerings, but smaller convenience-sized stores with a limited assortment of affordable FFVs (Baker et al., 2006; Block & Kouba, 2006; Horowitz, Colson, Hebert, & Lancaster, 2004; Moore & Diez Roux, 2006; Morland, Wing, Roux, & Poole, 2002; Powell, Slater, Mirtcheva, Bao, & Chaloupka, 2007). Poor neighborhoods also confront barriers to physical activity. These areas tend to provide fewer physical activity resources and often have unsafe conditions and dangerous neighborhood environments (Ross & Mirowsky, 2001; Wilson, Kirtland, Ainsworth, & Addy, 2004). Given this, it is not surprising that low-income neighborhood residents are less active (Yen & Kaplan, 1998).

Communities may rely on school-based policies to prevent childhood overweight and obesity. The two primary areas of intervention include the school food environment and physical

[27] Sallis and Glanz(2006, p. 90) define the built environment as "neighborhoods, roads, buildings, food sources, and recreational facilities in which people live, work, are educated, eat, and play."

education. While policies have focused on increasing the nutritional content of school nutrition programs, there is no definitive evidence on whether participation in programs such as the National School Lunch Program (NSLP) or School Breakfast Program (SBP) is linked to weight status. Early studies on this issue suffered from serious methodological problems including selection bias, incomplete participation data, and lack of measured height and weight data (Gleason, Briefel, Wilson, & Dodd, 2009). This led Fox et al. (2004) and Linz et al. (2005) to conclude that there is no definitive evidence linking participation in school nutrition assistance programs with children's weight status. More recent studies address the methodological issues, but offer no definitive conclusions. Schanzenbach (2009) finds that despite beginning kindergarten with similar BMIs and obesity rates, children who consume school lunches are 2 percentage points more likely to be obese by the end of first grade than those who bring their lunch from home. After accounting for selection, Millimet, Tchernis, and Husain (2008) conclude that participation in the SBP is not a contributing factor to childhood obesity, but participation in the NSLP is a contributing factor. Hofferth and Curtin (2005) find no evidence that participation in the SBP and NSLP is associated with increased likelihood of obesity among low-income children while Gleason et al. (2009) find no relationship between NSLP participation and obesity and that SBP participation is associated with a significantly lower BMI.

Others researchers have examined the availability of food and beverages in schools beyond school lunches. Anderson, Butcher and Levine (2003) address a variety of issues including increased access to vending machines in schools, brand name fast food in schools, "pouring rights" contracts, and beverage advertising in schools. While the percentage of elementary and middle schools with vending machines has increased since 2000, the percentage of high schools with vending machines has fallen and the number of states and school districts prohibiting access to junk food in school settings for at least part of the day has increased (P. M. Anderson et al., 2003; O'Toole, Anderson, Miller, & Guthrie, 2007). Anderson and Butcher (2006) examine the effect of increased access to junk food in schools on students' BMIs and find that for students with normal weight parents there is no effect, but for students with an overweight parent, a ten percentage point increase in access to junk food in schools leads to a greater than 2 percent increase in students' BMIs.

School physical education (PE) programs have also been at the forefront of policies to reduce childhood obesity. Reduced PE in schools has been hypothesized as a contributing factor to overweight and obesity among children leading to increased or reformed PE in many states (Cawley, Meyerhoefer, & Newhouse, 2007). However, when Cawley, Meyerhoefer, and Newhouse (2007) examine the impact of state laws on time active in PE and the effect of PE on overall physical activity and weight in high school students, they find little evidence that PE impacts weight. They conclude that while state PE credit requirements are effective in increasing the active time spent in PE, there is no evidence that such time affects BMI or the probability of being overweight or obese.

Family and Household

Analysis of household decision processes and obesity is evolving. For some time, economists have noted family membership influences individual health status and an important function of families is the production of nutrition, rest, and leisure time—all of which are pertinent to the obesity discussion (Becker, 1991). Data limitations, however, tend to prevent empirical analysis of intra-household allocation processes and their effects on obesity. Ehmke et al. (2008) propose the use of economic experiments to analyze family decision processes and dynamics related to food and fitness. Such work reveals there are connections between mother-child

bargaining behavior around food and their weight outcomes. Households with incompatible, conflict-prone mother-child bargaining behavior tend to have poorer health outcomes (M. Ehmke, Schroeter, Morgan, Larson-Meyer, & Ballenger, 2010; M. D. Ehmke, Morgan, Schroeter, Larson-Meyer, & Ballenger, Forthcoming). These findings are consistent with findings from the literature on child food and feeding (Birch & Fisher, 1998; Davison & Birch, 2002; Faith, Scanlon, Birch, Francis, & Sherry, 2004).

A noticeable structural change over the last thirty years is the increased numbers of working mothers. Researchers do find a link between maternal employment and childhood overweight and obesity. Children of mothers who work do suffer a slightly higher probability of becoming obese. Curiously, the child weight effects of a working mother are most pronounced in affluent households. Children in higher-income households see a 3.5 percent increase in the likelihood they will be obese for every 10 additional hours their mother works per week (P. Anderson, K. Butcher, & P. Levine, 2003; P. M. Anderson et al., 2003; Fertig, Glomm, & Tchernis, 2009).

Health Care

The obesity epidemic brings food and agricultural policy into the health policy sphere. Currently, the medical community faces many challenges as it tries to halt obesity's momentum. Primary health care providers' role in obesity management remains unclear and warrants serious consideration by health experts and economists. Adult and pediatric clinical practice guidelines recommend that providers screen and counsel patients regarding overweight and obesity (Barlow & Committee, 2007; U.S. Preventive Services Task Force, 2003). Yet, there is growing skepticism over the utility of these recommendations.

Health providers are not consistently documenting or counseling their overweight and obese patients, especially such pediatric patients (O'Brien, Holubkov, & Reis, 2004). Providers often fail to screen for and/or diagnose their adult and pediatric patients with overweight and obesity. In addition, providers often neglect to counsel patients who are overweight or obese (Jackson, Doescher, Saver, & Hart, 2005; O'Brien et al., 2004; Waring, Roberts, Parker, & Eaton, 2009). This omission likely stems from a variety of reasons including but not limited to short patient visit times (Tsui, Dodson, & Jacobson, 2004), lack of knowledge regarding effective weight loss strategies (van Gerwen, Franc, Rosman, Le Vaillant, & Pelletier-Fleury, 2009; Vetter, Herring, Sood, Shah, & Kalet, 2008), and negative stereotypes regarding overweight and obese individuals (Ferrante, Piasecki, & Ohman-Strickland, 2009). When they do offer counsel, the patients may lack the motivation or incentives needed to carry out lifestyle changes.

Right now, it does not appear primary health care providers have the training necessary to support provider-based health intervention. A recent systematic review found that current individual physician-based weight loss counseling with obese adults was largely ineffective (Tsai & Wadden, 2009). Similarly, a review of interventions for overweight and obese children and adolescents found that the most effective interventions occurred in schools and specialty settings (e.g., programs and locations designed around healthy lifestyle enhancement), not in the offices of primary care providers (Whitlock, O'Connor, Williams, Beil, & Lutz, 2008).

It is critical that we ascertain how best to prevent, diagnose, and effectively manage overweight and obese individuals. Society and the media encourage people to "talk to their doctors" regarding weight management issues. However, providers often fail to screen or diagnose patients with overweight or obesity, and when they do; they may not be using the best methods for determining true adiposity. In addition, current evidence does not support the efficacy of a provider-based counseling for the management of overweight and obesity. Rather, the most

compelling evidence supports programs that are focused on changing the behavior, which are often led by experts in exercise, nutrition, and psychology (Galani & Schneider, 2007; Wilfey et al., 2007).

Conclusions

The obesity epidemic has pervaded society at a fast rate and researchers have struggled to determine the possible causes of its momentum. Our review of the current literature reveals a few, known links between obesity and food and agriculture policy. First, fast food advertising has been shown to increase consumer demand for fast food products. Second, obesity is not simply a function of cheaper calories. Policies have caused "healthy" as well as "unhealthy" food prices to fall. All food, in general (but not across the board) is less expensive (Alston et al., 2006). It seems food advertising may route consumers more toward high-fat and calorie laden foods. Third, taxing fat, salty, and sugary foods does not appear to be a powerful means to curb consumer demand for such foods although the revenues generated from taxes on such foods could be used to fund health promotion programs (Jacobson & Brownell, 2000; Kuchler et al., 2005). Rather, subsidizing fresh fruits and vegetables and other healthy foods appears to be a more viable retail-level solution. Finally, there is a relationship between neighborhood safety and availability of fresh produce and obesity in extremely rural and urban areas.

Findings from our literature review suggest obesity-prevention policy in the West should consider the societal costs of food advertising, especially to high-risk populations. At a state and community level, resources need to be aligned to help geographically based high-risk populations, especially those in extremely rural or urban areas. Although states (e.g., California) are considering taxes on sugary or less healthy foods to finance obesity prevention, food subsidies may be the most effect first line of defense again obesity at the food-retail level. Finally, health care providers in the West need additional resources and perhaps training for patient counseling regarding healthy weight loss and healthy lifestyle improvements. This may be especially true for providers working with obesity-prone populations.

Other areas of study reveal more ambiguous findings. For example, there is a slight relationship between working mother status and child weight status, but it does not explain a majority of the rise in childhood overweight and obesity. Regarding childhood overweight and obesity, school lunch and physical exercise policies appear effective only to a point. Children do consume a majority of their calories at home (Story, 2009). There is a dearth of data on intra-household allocation processes and their effects on obesity, especially childhood obesity. What is available, shows parent and child economic behavior play a role in the health outcomes of families' decisions.

More research is needed from agricultural economists, in particular, on the effects of food labeling on obesity. In particular, why do the benefits of the NLEA regulations appear to accrue to only one demographic group (Variyam & Cawley, 2006), and what types of information will really change behavior and produce measurable health outcomes, especially for susceptible groups in the Western United States? Furthermore, Drichoutis, Nayga, and Lazaridis (2009) note the need to examine the effects of nutritional information in restaurant and fast food settings on weight outcomes, although currently no dataset exists that would enable this analysis. Additional investigation is needed to link clinical dietary recommendations and weight control practices to patient lifestyle change. Although primary care providers receive directives to be aware of obesity in their patient population and encourage healthy lifestyles, they experience many obstacles in their ability to change patient lifestyles.

References

(CDC/NCHS), C. f. D. C. a. P. N. C. f. H. S. (2009, January 25). Prevalence of Overweight and Obesity among Adults: United States, 1985-2008. Retrieved September 7, 2009, from http://www.cdc.gov/obesity/data/trends.html

Akerlof, G. A. (1970). The Market for 'Lemons': Quality Uncertainty and the Market Mechanism. *Quarterly Journal of Economics, 84*(3), 488-500.

Alston, J. M., Sumner, D. A., & Vosti, S. A. (2006). Are Agricultural Policies Making Us Fat? Likely Links between Agricultural Policies and Human Nutrition and Obesity, and Their Policy Implications. *Review of Agricultural Economics, 28*(3), 313-322.

Amarasinghe, A., D'Souza, G., Brown, C., Oh, H., & Borisova, T. (2009). The Influence of Socioeconomic and Environmental Determinants on Health and Obesity: A West Virginia Case Study. *International Journal of Environmental Research and Public Health, 6*(8), 2271-2287.

Anderson, P., Butcher, K., & Levine, P. (2003). Maternal Employment and Overweight Children. *Journal of Health Economics, 22*, 477-504.

Anderson, P. M., & Butcher, K. F. (2006). Reading, Writing, and Refreshments: Are School Finances Contributing to Children's Obesity? *J. Human Resources, XLI*(3), 467-494.

Anderson, P. M., Butcher, K. F., & Levine, P. B. (2003). Economic Perspectives on Childhood Obesity. *Economic Perspectives, 27*(3), 30-48.

Baker, E. A., Kelly, C., Barnidge, E., Strayhorn, J., Schootman, M., Struthers, J., et al. (2006). The Garden of Eden: Acknowledging the impact of race and class in efforts to decrease obesity rates. *American Journal of Public Health, 96*(7), 1170-1174.

Barlow, S. E., & Committee, E. (2007). Expert committee recommendations regarding prevention, assessment, and treatment of child and adolescent overweight and obesity: summary report. *Pediatrics, 120*, S164-S192.

Becker, G. S. (1991). *A treatise on the family*. Cambridge, Mass. and London: Harvard University Press.

Birch, L., & Fisher, J. A. (1998). Development of eating behaviors among children and adolescents. *Pediatrics, 101*(539-549).

Black, J. L., & Macinko, J. (2008). Neighborhoods and obesity. *Nutrition Reviews 66*(1), 2-20.

Block, D., & Kouba, J. (2006). A comparison of the availability and affordability of a market basket in two communities in the Chicago area. *Public Health Nutrition 9*(7), 837-845.

Booth, K. M., Pinkston, M. M., & Poston, W. S. C. (2005). Obesity and the Built Environment. *Journal of the American Dietetic Association, 105*(5), S110-S117.

Cash, S. B., Sunding, D. L., & Zilberman, D. (2004). *Fat Taxes and Thin Subsidies: Prices, Diet, and Health Outcomes*. Paper presented at the Annual Meeting of the American Agricultural Economics Association.

Cawley, J., Meyerhoefer, C., & Newhouse, D. (2007). The impact of state physical education requirements on youth physical activity and overweight. *Health Economics, 16*(12), 1287-1301.

Chang, H.-H., & Nayga, R. M., Jr. (2009). Television Viewing, Fast-Food Consumption, and Children's Obesity. *Contemporary Economic Policy, 27*(3), 293-307.

Chou, S.-Y., Rashad, I., & Grossman, M. (2008). Fast-Food Restaurant Advertising on Television and Its Influence on Childhood Obesity. *Journal of Law and Economics, 51*(4), 599-618.

Davison, K. K., & Birch, L. L. (2002). Obesigenic families: parents' physical activity and dietary intake patters predict girls' risk of overweight. *International Journal of Obesity, 26*, 1186-1193.

Drewnowski, A. (2003). Fat and Sugar: An Economic Analysis. *The Journal of Nutrition, 133*, 838S-840S.

Drichoutis, A., Nayga, R. M., & Lazaridis, P. (2009). *Can nutritional label use influence body weight outcomes?* Agricultural University of Athens, Working Paper Series No. 2009-5.

Ehmke, M., Schroeter, C., Morgan, K., Larson-Meyer, E., & Ballenger, N. (2010). Mother-Child Generosity and Punishment Behavior Related to Weight and Fitness Outcomes. University of Wyoming Agricultural and Applied Economics Department.

Ehmke, M. D., Morgan, K., Schroeter, C., Larson-Meyer, E., & Ballenger, N. (Forthcoming). Using Experimental Economics to Measure the Role of Parental Generosity and Food Control in Childhood Obesity. *Revue Francais d'Economie*.

Ehmke, M. D., Warziniack, T., Schroeter, C., & Morgan, K. (2008). Applying Experimental Economics to Obesity in the Family Household. *Journal of Agricultural and Applied Economics, 40*(2), 539-549.

Eid, J., Overman, H. G., Puga, D., & Turner, M. A. (2008). Fat city: Questioning the relationship between urban sprawl and obesity. *Journal of Urban Economics, 63*(2), 385-404.

Faith, M. S., Scanlon, K. S., Birch, L. L., Francis, L. A., & Sherry, B. (2004). Parent-child feeding strategies and their relationships to child eating and weight status. *Obesity Research, 12*(11), 1711-1722.

Ferrante, J. M., Piasecki, A. K., & Ohman-Strickland, P. A., & Crabtree, B.F. (2009). Family physicians' practices and attitudes regarding care of extremely obese patients. *Obesity, 17*(1710-1716).

Fertig, A., Glomm, G., & Tchernis, R. (2009). The Connection between Maternal Employment and Childhood Obesity: Inspecting the Mechanisms. *Review of Economics of the Household, 7*(3), 227-255.

Finkelstein, E. A., Fiebelkorn, I. C., & Wang, G. (2004). State-Level Estimates of Annual Medical Expenditures Attributable to Obesity. *Obesity Research, 12*(1), 18-24.

Fox, M., Hamilton, W., & Lin, B. (2004). *Effects of Food Assistance and Nutrition and Health: Volume 3, Literature Review*: Food Assistance and Nutrition Research Report No. 19-3, USDA, ERS.

Frank, L. D., Andresen, M. A., & Schmid, T. L. (2004). Obesity relationships with community design, physical activity, and time spent in cars. *American Journal of Preventive Medicine, 27*(2), 87-96.

Frazao, E., & Allshouse, J. (2003). Strategies for Intervention: Commentary and Debate. *The Journal of Nutrition, 133*.

Galani, C., & Schneider, H. (2007). Prevention and treatment of obesity with lifestyle interventions: review and meta-analysis. *International Journal of Public Health, 52*, 348-359.

Garde, A. (2008). Food Advertising and Obesity Prevention: What Role for the European Union? *Journal of Consumer Policy, 31*(1), 25-44.

Giles-Corti, B., & Donovan, R. J. (2003). Relative Influences of Individual, Social Environmental, and Physical Environmental Correlates of Walking. *American Journal of Public Health 93*(9), 1583-1589.

Gleason, P., Briefel, R., Wilson, A., & Dodd, A. H. (2009). *School meal program participation and its association with dietary patterns and childhood obesity*: Mathematica Policy Research, Inc.

Hofferth, S. L., & Curtin, S. (2005). Poverty, food programs, and childhood obesity. *Journal of Policy Analysis and Management, 24*(4), 703-726.

Horowitz, C. R., Colson, K. A., Hebert, P. L., & Lancaster, K. (2004). Barriers to buying healthy foods for people with diabetes: evidence of environmental disparities. *American Journal of Public Health, 94*(9), 1549-1554.

Jackson, J. E., Doescher, M. P., Saver, B. G., & Hart, L. G. (2005). Trends in professional advice to lose weight among obese adults, 1994 to 2000. *Journal of General Internal Medicine, 20*, 814-818.

Jacobson, M. F., & Brownell, K. D. (2000). Small Taxes on Soft Drinks and Snack Foods to Promote Health. *American Journal of Public Health, 90*(6), 4p.

Kozup, J. C., Creyer, E. H., & Burton, S. (2003). Making Healthful Food Choices: The Influence of Health Claims and Nutrition Information on Consumers' Evaluations of Packaged Food Products and Restaurant Menu Items. *Journal of Marketing, 67*, 19-34.

Kuchler, F., Tegene, A., & Harris, J. M. (2005). Taxing snack foods: Manipulating diet quality or financing information programs? *Review of Agricultural Economics, 27*(1), 4-20.

Lakdawalla, D., & Philipson, T. J. (2002). *The Growth of Obesity and Technological Change: A Theoretical and Empirical Examination*. Unpublished manuscript, Cambridge, MA.

Linz, P., Lee, M., & Bell, L. O., Poverty, and Participation in Nutrition Assistance Programs. . (2005). *Obesity, Poverty, and Participation in Nutrition Assistance Programs*: Prepared by ALTA Systems, Inc. for the Food and Nutrition Service, USDA.

Lochhead, C. (2009, August 16, 2009). Industry battles proposals to tax sugar sodas. *San Francisco Chronicle*.

Millimet, D., L., Tchernis, R., & Husain, M. (2008). *School Nutrition Programs and the Incidence of Childhood Obesity*: National Bureau of Economic Research, Inc.

Moore, L. V., & Diez Roux, A. V. (2006). Associations of Neighborhood Characteristics With the Location and Type of Food Stores. *American Journal Public Health, 96*(2), 325-331.

Morland, K., Wing, S., Roux, A. D., & Poole, C. (2002). Neighborhood Characteristics Associated with the Location of Food Stores and Food Service Places. *American Journal of Preventive Medicine, 22*, 23-29.

Nordstrom, J., & Thunstrom, L. (2009). The impact of tax reforms designed to encourage healthier grain consumption. *Journal of Health Economics, 28*(3), 622-634.

O'Toole, T., Anderson, S., Miller, C., & Guthrie, J. (2007). Nutrition Services and Foods and Beverages Available at School: Results From the School Health Policies and Programs Study 2006. *The Journal of School Health, 77*, 500-521.

O'Brien, S. H., Holubkov, R., & Reis, E. C. (2004). Identification, evaluation, and management of obesity in an academic primary care center. *Pediatrics, 114*, e154-e159.

Philipson, T. J., & Posner, R. A. (2008). Is the Obesity Epidemic a Public Health Problem? A Review of Zoltan J. Acs and Alan Lyles's Obesity, Business and Public Policy. *Journal of Economic Literature, 46*(4), 974-982.

Powell, L. M., Slater, S., Mirtcheva, D., Bao, Y., & Chaloupka, F. J. (2007). Food store availability and neighborhood characteristics in the United States. *Preventive Medicine, 44*(3), 189-195.

Richards, T. J., & Padilla, L. (2009). Promotion and Fast Food Demand. *American Journal of Agricultural Economics, 91*(1), 168-183.

Rosin, O. (2008). The Economic Causes of Obesity: A Survey. *Journal of Economic Surveys, 22*(4), 617-647.

Ross, C. E., & Mirowsky, J. (2001). Neighborhood disadvantage, disorder, and health. *Journal Health and Social Behavior, 42*(3), 258-276.

Saelens, B. E., Sallis, J. F., Black, J. B., & Chen, D. (2003). Neighborhood-Based Differences in Physical Activity: An Environment Scale Evaluation. *American Journal of Public Health, 93*(9), 1552-1558.

Schanzenbach, D. W. (2009). Do School Lunches Contribute to Childhood Obesity? *J. Human Resources, 44*(3), 684-709.

Schroeter, C., Lusk, J. L., & Tyner, W. (2008). Determining the Impact of Food Prices and Income on Body Weight. *Journal of Health Economics, 27*, 45-68.

Smed, S., Jensen, J. D., & Denver, S. (2007). Socio-economic characteristics and the effect of taxation as a health policy instrument. *Food Policy, 32*(5-6), 624-639.

Story, M. (2009). The Third School Nutrition Dietary Assessment Study: Findings and Policy Implications for Improving the Health of US Children. *Journal of the American Dietetic Association, 109*(2), s7-s13.

Sturm, R., & Datar, A. (2005). Body Mass Index in Elementary School Children, Metropolitan Area Food Prices and Food Outlet Density. *Public Health, 119*(1059-1068).

Trogdon, J. G., Finkelstein, E. A., Hylands, T., Dellea, P. S., & Kamal-Bahl, S. J. (2008). Indirect costs of obesity: a review of the current literature. *Obesity Review, 9*(5), 489-500.

Tsai, A. G., & Wadden, T. A. (2009). Treatment of obesity in primary care practice in the United States: a systematic review. *Journal of General Internal Medicine, 24*(1073-1079).

Tsui, J. I., Dodson, K., & Jacobson, T. A. (2004). Cardiovascular disease prevention counseling in residency: resident and attending physician attitudes and practices. *Journal of the National Medical Association, 96*, 1080–1083, 1088–1091.

U.S. Census Bureau. (2009). State and County QuickFacts. Retrieved September 22, 2009, from http://quickfacts.census.gov/qfd/index.html

U.S. Preventive Services Task Force. (2003). Screening for obesity in adults: recommendations and rationale. *Annals of Internal Medicine, 139*, 930-932.

van Gerwen, M., Franc, C., Rosman, S., Le Vaillant, M., & Pelletier-Fleury, N. (2009). Primary care physicians' knowledge, attitudes, beliefs and practices regarding childhood obesity: a systematic review. *Obesity Reviews: An Official Journal of The International Association for the Study of Obesity, 10*, 227-236.

Variyam, J. N., & Cawley, J. (2006). Nutrition Labels and Obesity. *SSRN eLibrary*.

Vetter, M. L., Herring, S. J., Sood, M., Shah, N. R., & Kalet, A. L. (2008). What do resident physicians know about nutrition? An evaluation of attitudes, self-perceived proficiency and knowledge. *Journal of the American College of Nutrition, 27*(287-298).

Waring, M. E., Roberts, M. B., Parker, D. R., & Eaton, C. B. (2009). Documentation and management of overweight and obesity in primary care. *Journal of the American Board of Family Medicine, 22*, 544-552.

Whitlock, E. P., O'Connor, E. A., Williams, S. B., Beil, T. L., & Lutz, K. W. (2008). *Effectiveness of Weight Management Programs in Children and Adolescents* (No. 170). Rockville, MD: Agency for Healthcare Research and Quality.

Wilfey, D. E., Tibbs, T. L., Van Buren, D. J., Reach, K. P., Walker, M. S., & Epstein, L. H. (2007). Lifestyle interventions in the treatment of childhood overweight: a meta-analytic review of randomized controlled trials. *Health Psychology, 26*, 521-532.

Wilson, D. K., Kirtland, K. A., Ainsworth, B. E., & Addy, C. L. (2004). Socioeconomic status and perceptions of access and safety for physical activity. *Ann Behav Med, 28*(1), 20-28.

Yen, I. H., & Kaplan, G. A. (1998). Poverty area residence and changes in physical activity level: evidence from the Alameda County Study. *Am J Public Health, 88*(11), 1709-1712.