

Table of Contents

- 1** First-year evaluation of Mexico's tax on nonessential energy-dense foods: an observational study. Batis et al. *PLOS Med.*
- 2** Association of higher consumption of foods derived from subsidized commodities with adverse cardiometabolic risk among US adults. Siegel et al. *JAMA Intern Med.*
- 3** Influence of unhealthy food and beverage marketing on children's dietary intake and preference: a systematic review and meta-analysis of randomized trials. Sadeghirad et al. *Obes Rev.*
- 4** Empty calories and phantom fullness: a randomized trial studying the relative effects of energy density and viscosity on gastric emptying determined by MRI and satiety. Camps et al. *Am J Clin Nutr.*
- 5** No differential effect of beverages sweetened with fructose, high-fructose corn syrup, or glucose on systemic or adipose tissue inflammation in normal-weight to obese adults: a randomized controlled trial. Kuzma et al. *Am J Clin Nutr.*

FIND US ON SOCIAL MEDIA



We'd love to hear from you! Provide feedback on this publication at this [link](#). Send us articles you think should be included in future issues: pvallila@hfamerica.org.



POLICY

First-year evaluation of Mexico's tax on nonessential energy-dense foods: an observational study.

Batis C, Rivera JA, Popkin BM, Taillie LS. *PLOS Med.* 2016;13(7): e1002057.

This latest evidence from Mexico suggests that the national “junk food” tax led to a reduction in consumer purchases of taxed products. Using data from 6,248 households, researchers found that Mexico's 8 percent tax on nonessential energy-dense foods led to 5.1 percent fewer purchases of taxed foods. The differences were particularly large in households of low socioeconomic status (SES).

In 2014, Mexico implemented an 8 percent tax on nonessential foods that contained at least 275 kcal/100 grams, including many high-sugar products (e.g., high-sugar cereals). Batis et al.'s study was the first evaluation of how the tax influenced consumer purchases. The results largely echo those from an earlier evaluation of Mexico's sugary drink tax, which led to fewer purchases of taxed beverages.

Batis et al. analyzed monthly data on food purchases from 6,248 households, collected in January 2012–December 2014. They compared trends in 2012–13, prior to the tax, to those observed in 2014, the first year after the tax was implemented. Households were followed for an average of 32.7 months during this period; 78 percent

of households participated in all 36 months. Data came from The Nielsen Company's Mexico Consumer Panel Services.

Overall, purchases of taxed products was 5.1 percent lower, on average, than what would have been expected without the tax. The difference came primarily from taxed salty snacks (-6.3 percent) and taxed cereal-based sweets (-5.2 percent). Untaxed products were generally unaffected (-0.3 percent overall). Interestingly, though, sugar and sugar substitutes were the only untaxed products that declined (-8.9 percent, relative to what would have been expected without the tax).

The difference in overall purchases of taxed products was observed primarily in low-SES households (-10.2 percent). A smaller reduction was observed in moderate-SES households (-5.8 percent) and high-SES households (-2.3 percent, not statistically significant). Similar patterns were observed in a previous study that found Mexico's sugary drink tax had a larger effect in low-SES households. ■

Limitations: Nielsen data are objectively collected but rely on barcodes, and thus they cannot measure unpackaged products. They also do not measure actual consumption. Although the study rigorously controlled for pre-tax trends, it was impossible to control for changes that occurred at the same time as the food tax.

Association of higher consumption of foods derived from subsidized commodities with adverse cardiometabolic risk among US adults.

Siegel KR, McKeever Bullard K, Imperatore G, et al. *JAMA Intern Med.* 2016 (In press)

In a widely publicized study, Siegel et al. found that adults who consumed a higher proportion of federally subsidized food commodities tended to have more cardiometabolic risk factors. Their findings added to ongoing speculation of whether agricultural subsidy reform would reduce obesity and related diseases.

Federal agricultural subsidies have been criticized for being inconsistent with federal dietary guidelines. Subsidies primarily finance the production of corn, soybeans, wheat, rice, sorghum, dairy, and livestock, many of which are converted into high-calorie foods and beverages, including sugary drinks. There is controversy, though, about whether subsidy reform would ultimately affect disease rates.

Siegel et al. contributed to the debate by analyzing the association between a "subsidy score" – the proportion of total dietary intake that was derived from major subsidized food commodities – and six objective measures of cardiometabolic health among U.S. adults. Their data were pooled from the National Health and Nutrition Examination Surveys (NHANES) conducted in 2001 to 2006 (n=10,308).

Overall, adults consumed approximately 56 percent of calories from subsidized food commodities. The authors consistently found that adults in the highest subsidy score quartile (i.e., the highest percentage of subsidized foods) had worse health indicators, including obesity (37 percent higher than the lowest quartile), abdominal adiposity (fat, 41 percent higher), and dyslipidemia (abnormally elevated cholesterol or fats in the blood, 14 percent higher). Blood pressure, in contrast, was not associated with subsidy score.

The policy implications of this study have been debated. The study did not directly analyze the effect of agricultural subsidies, and as the authors note, some agricultural economists have projected that subsidy reform would have little impact on food prices or health. The authors countered that past modeling studies focused on quantity of calories, not dietary quality, and they recommended additional modeling on the impact of subsidy changes. ■

Limitations: Subsidy scores and risk factors were measured in the same survey, making it impossible to determine if scores were the cause of any risk factors. NHANES also relies on self-reported data of dietary intake from one 24-hour recall survey. Finally, the survey was not designed to directly calculate items such as high-fructose corn syrup, which would affect the score's accuracy.

Influence of unhealthy food and beverage marketing on children's dietary intake and preference: a systematic review and meta-analysis of randomized trials. [🔗](#)

Sadeghirad B, Duhaney T, Motaghipisheh S, Campbell NR, Johnston BC. *Obes Rev.* 2016 (In press)

Two meta-analyses add to the growing body of evidence that marketing unhealthy foods and beverages works. After less than five minutes of exposure to marketing of unhealthy foods and beverages, children consumed an average of 30 additional calories in less than 20 minutes.

Companies use food and beverage marketing to get people to consume more of their products. Sadeghirad and colleagues conducted a meta-analysis of randomized control trials (RCTs) to assess the impact of unhealthy food and beverage marketing on children's (2-18 years) consumption and preference for foods and beverages. Unlike prior reviews of this topic that focused on studies of lesser quality (observational or non-randomized experimental studies), this review was restricted to RCTs. Authors searched publication databases through January 2015 to identify RCTs that assessed the impact of unhealthy food or non-alcoholic beverages advertising delivered through TV/movie commercials, advergames (electronic games to advertise a product and might be played online or offline) or use of branded logos, packaging with licensed characters or booklet/magazine advertisements on dietary intake or preference.

Nine studies of marketing and food/beverage intake and 17 studies of marketing and food/beverage preference were included. Almost half of both types of studies were found to be at risk for bias. This means the studies lacked a clear description of elements such as how participants were blinded to their exposure condition.

Results were reported in terms of either calories or grams. Studies that measured calories reported that, on average, after 4 minutes of marketing, children who saw unhealthy food and beverage marketing consumed 30 more calories (in an average of 17 minutes) than those not exposed to dietary marketing. These children consumed more unhealthy calories than healthy ones. Studies that measured grams reported that, on average, after 7 minutes of marketing, children who saw unhealthy food and beverage marketing consumed 4.8 more grams of

foods/beverages (in an average of 19 minutes) than those not exposed to dietary marketing. There were too few studies to assess the quality of the foods and beverages.

Authors found a small increase in preferences for unhealthy foods and beverages following marketing, with children eight and younger reporting a greater preference after marketing than older children. ■

Limitations: This study measured acute marketing exposure in a laboratory and results may not represent the impact of the continued exposure that occurs in real life. Many of the studies included in the meta-analyses were rated high for risk of bias, which limits certainty in the evidence.

HEALTH IMPACTS

Empty calories and phantom fullness: a randomized trial studying the relative effects of energy density and viscosity on gastric emptying determined by MRI and satiety. [🔗](#)

Camps G, Mars M, de Graaf C, Smeets PA. *Am J Clin Nutr.* 2016;104(1):73-80.

In this study, authors observed what they describe as “phantom fullness,” in which drinking a thick, low-calorie shake made participants feel relatively full even when MRI scans revealed that they weren’t full. Conversely, participants had a high desire to eat even after drinking a thin, 500-calorie shake. The authors discussed how this supports the idea that thin, high-calorie drinks such as soda are “empty calories.”

Sugary drinks vary in both energy density (calories) and viscosity, with drinks such as soda being high in calories and thin. Past research suggested that both characteristics may increase a person’s overall energy intake, although the mechanisms behind viscosity’s effect are not fully understood. Furthermore, the relative importance of these two characteristics is unclear.

To address this, Camps et al. conducted a randomized trial in which 15 participants drank each of 4 shakes that differed in calorie density (100 kcal/ml vs. 500 kcal/ml) and viscosity (thin vs. thick). Participants were men of normal weight status who reported themselves as being in good health, and each man drank a different shake in four visits to the research facility. During each visit, after consuming the shake, participants had their stomach volume measured in an MRI scanner for 90 minutes. This scan provides a picture of how full the stomach is. Participants also rated their fullness, on a 0-100 scale, every 10 minutes during the scan.

Calories had a greater effect on stomach emptying, based on MRI results. Drinking high-calorie shakes slowed how fast the stomach emptied regardless of the thickness of the shake, whereas thick shakes slowed how fast the stomach emptied primarily when low-calorie shakes were consumed. However, viscosity had a larger impact on subjective sense of fullness. Participants reported feeling more full after drinking a thick 100-calorie shake than a thin 500-calorie shake, even though stomach content was greater in the latter.

Participants' reported desire to eat was highest after drinking a thin, 500-kcal shake. The authors discussed how this reflects the notion that thin, high-calorie drinks are "empty calories." Interestingly, though, there was no statistically significant difference in actual consumption after the MRI scan. ■

Limitations: The study was limited to healthy, normal weight men, and results cannot be generalized to others. The sample size was small and the study was only designed to detect significant differences in stomach emptying, which may explain the lack of effect on actual consumption.

No differential effect of beverages sweetened with fructose, high-fructose corn syrup, or glucose on systemic or adipose tissue inflammation in normal-weight to obese adults: a randomized controlled trial. [🔗](#)

Kuzma JN, Cromer G, Hagman DK, et al. *Am J Clin Nutr.* 2016 (In press)

Previous research suggests that the fructose in sugary drinks is what accounts for the association between these drinks and metabolic disease risk factors such as inflammation. Authors here find, in contrast, that fructose does not affect inflammation differently than glucose.

Sugary drinks and low-grade, chronic inflammation are each associated with diabetes and heart disease. Kuzma et al. explored how beverages sweetened with either fructose, high fructose corn syrup (HFCS), or glucose impact inflammation. Inflammation may be a pathway through which consuming sugary drinks increases the risk for diabetes and heart disease. Authors hypothesized that fructose, not glucose, triggers inflammation.

Twenty-four adults (12 normal weight, 12 overweight/obese) participated in a randomized controlled study. Participants completed three eight-day diet periods during which they consumed standardized solid foods until they were full. They also consumed four mandatory daily servings of beverages sweetened with fructose, glucose, or HFCS. The order in which the beverages were consumed was randomized. Aspartame was included in the glucose and HFCS beverages to match the sweetness of the fructose beverage.

Authors measured biomarkers of systemic inflammation (fasting plasma concentration of C-reactive protein and interleukin-6), fat (adipose) tissue inflammation, intestinal permeability (passage of material from the intestine into the rest of the body) and plasma fetuin-A concentrations (a protein secreted by the liver that increases in response to inflammation).

Authors found no evidence of a differential effect of the three sweeteners on systemic inflammation or adipose inflammation. It is possible that the study was not long enough to see changes in the biomarkers by sweetener type. The study was not designed to measure if the sweeteners increased inflammation overall. ■

Limitations: The study did not include a comparison group that did not consume fructose, glucose, or HFCS. The sample was small, with a short follow-up period.

Sweetened beverage consumption and risk of biliary tract and gallbladder cancer in a prospective study.

Larsson SC, Giovannucci EL, Wolk A. *J Natl Cancer Inst.* 2016;108(10).

This study made headlines earlier this month because it suggested people who drink at least two sweetened beverages a day may have a higher risk of developing rare cancers in the gallbladder and bile ducts around the liver. There are some important caveats with the findings, however:

- 1.** The authors measured cancer risk over 13.4 years, on average, but relied on a single self-reported measure of baseline consumption.
- 2.** The original survey included a limited number of sugary drinks, which were combined with artificially sweetened drinks into one measure. Several sugary drinks such as sports drinks were not measured.
- 3.** Rare cancers such as these are difficult to study because results are more influenced by random chance. Gallbladder cancer only occurred in 1 out of 1000 participants overall, and only 10 cases of it occurred among people who drank at least two sweetened beverages. When a disease is this uncommon, the exact size of any effect (i.e., the increase in disease risk) is very unreliable.

Research Watch reviews the evidence on the health effects of sugar and the effectiveness of policy and other interventions to curb consumption to inform sugar reduction activities across the US.

Healthy Food America acts on scientific evidence to drive change in food policy and industry practice, giving people greater control over their health and reducing diet-related illnesses, such as obesity, diabetes, and heart disease.

This publication was prepared by Dan Taber and Petra Vallila-Buchman.