ILSI North America

Nutrition Briefs

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Dietary Patterns

Dietary Supplement Use Was Very High Among Older Adults in the United States in 2011–2014

Gahche JJ, Bailey RL, Potischman N, Dwyer JT. *J Nutr*. 2017 Aug 30. doi: 10.3945/jn.117.255984. Article Link

Significance: Dietary supplements (DSs) have the potential to be both beneficial and harmful to health, especially in adults aged ≥60 y. Use of DSs among older adults continues to be high in the United States, with 29% of users regularly taking ≥4 DSs, and there is a high concurrent usage of them with prescription medications.

Background: Dietary supplements (DSs) have the potential to be both beneficial and harmful to health, especially in adults aged ≥60 y, and therefore it is important to monitor the patterns of their use. **Objectives:** This study evaluated DS use by adults aged ≥60 y to characterize the use of DSs, determine the motivations for use, and examine the associations between the use of DSs and selected demographic, lifestyle, and health characteristics. **Methods:** Data from 3469 older adults aged ≥60 y from the 2011-2014 NHANES were analyzed. DSs used in the past 30 d were ascertained via an interviewer-administered questionnaire in participants' homes. The prevalence of overall DS use and specific types of DSs were estimated. The number of DSs reported and the frequency, duration, and motivation(s) for use were assessed. Logistic regression models were constructed to examine the association between DS use and selected characteristics. **Results:** Seventy percent of older adults in the United States reported using ≥1 DS in the past 30 d; 54% of users took 1 or 2 products, and 29% reported taking ≥4 products. The most frequently reported products were multivitamin or mineral (MVM) (39%), vitamin D only (26%), and omega-3 fatty acids (22%). Women used DSs almost twice as often as men [adjusted OR (aOR), 1.8; 95% CI: 1.5, 2.3]. Those not reporting prescription medications were less likely to take a DS than those reporting ≥3 prescription medications (aOR, 0.4; 95% CI: 0.3, 0.6). The most frequently reported motivation for DS use was to improve overall health (41%). **Conclusions:** Use of DSs among older adults continues to be high in the United States, with 29% of users regularly taking ≥4 DSs, and there is a high concurrent usage of them with prescription medications.

Perspective: Improving Nutritional Guidelines for Sustainable Health Policies: Current Status and Perspectives

Magni P, Bier DM, Pecorelli S, et al. *Adv Nutr*. 2017 Jul 14;8(4):532–545. Article Link

Significance: There is a strong and urgent need to develop a successful commitment among all the stakeholders to define novel and sustainable approaches toward the management of the health value of nutrition at individual and population levels.

A large body of evidence supports the notion that incorrect or insufficient nutrition contributes to disease development. A pivotal goal is thus to understand what exactly is appropriate and what is inappropriate in food ingestion and the consequent nutritional status and health. The effective application of these concepts requires the translation of scientific information into practical approaches that have a tangible and measurable impact at both individual and population levels. The agenda for the future is expected to support available methodology in nutrition research to personalize guideline recommendations, properly grading the quality of the available evidence, promoting adherence to the well-established evidence hierarchy in nutrition, and enhancing strategies for appropriate vetting and transparent reporting that will solidify the recommendations for health promotion. The final goal is to build a constructive coalition among scientists, policy makers, and communication professionals for sustainable health and nutritional policies. Currently, a strong rationale and available data support a personalized dietary approach according to personal variables, including sex and age, circulating metabolic biomarkers, food quality and intake frequency, lifestyle variables such as physical activity, and environmental variables including one's microbiome profile. There is a strong and urgent need to develop a successful commitment among all the stakeholders to define novel and sustainable approaches toward the management of the health value of nutrition at individual and population levels. Moving forward requires adherence to well-established principles of evidence evaluation as well as identification of effective tools to obtain better quality evidence. Much remains to be done in the near future.

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Modeled Dietary Impact of Industry-Wide Food and Beverage Reformulations in the United States and France

Gressier M, Privet L, Mathias KC, Vlassopoulos A, Vieux F, Masset G. *Am J Clin Nutr*. 2017 Jul;106(1):225–232. Article Link

Significance: Potential industry-wide reformulation of the food supply could lead to higher compliance with recommendations in both the United States and France, and across all socioeconomic groups.

Background: Food reformulation has been identified as a strategy to improve nutritional intakes; however, little is known about the potential impact of industry-wide reformulations. **Objective:** The aim of the study was to model the dietary impact of food and beverage reformulation following the Nestlé Nutritional Profiling System (NNPS) standards for children, adolescents, and adults in the United States and France. **Design:** Dietary intakes of individuals aged ≥4 y were retrieved from nationally representative surveys: the US NHANES 2011-2012 (n = 7456) and the French Individual and National Survey on Food Consumption (n = 3330). The composition of all foods and beverages consumed were compared with the NNPS standards for energy, total and saturated fats, sodium, added sugars, protein, fiber, and calcium. Two scenarios were modeled. In the first, the nutrient content of foods and beverages was adjusted to the NNPS standards if they were not met. In the second, products not meeting the standards were replaced by the most nutritionally similar alternative meeting the standards from the same category. Dietary intakes were assessed against local nutrient recommendations, and analyses were stratified by body mass index and socioeconomic status. **Results:** Scenarios 1 and 2 showed reductions in US adults' mean daily energy (-88 and -225 kcal, respectively), saturated fats (-4.2, -6.9 g), sodium (-406, -324 mg), and added sugars (-29.4, -35.8 g). Similar trends were observed for US youth and in France. The effects on fiber and calcium were limited. In the United States, the social gradient of added sugars intake was attenuated in both scenarios compared with the baseline values. **Conclusions:** Potential industry-wide reformulation of the food supply could lead to higher compliance with recommendations in both the United States and France, and across all socioeconomic groups. NNPS standards seemed to be especially effective for nutrients consumed in excess.

Trends in Added Sugars From Packaged Beverages Available and Purchased by US Households, 2007–2012

Ng SW, Ostrowski JD, Li KP. *Am J Clin Nutr*. 2017 Jul;106(1):179-188. Article Link

Significance: Packaged beverages alone account for per capita consumption of 12 g/d of added sugars purchased by US households in 2007-2012, representing 32-48% of calories from packaged beverages. Whereas the absolute amount of added sugars from beverages has not changed meaningfully over time.

Background: The US Food and Drug Administration's updated nutrition labeling requirements will include added sugars starting in July 2018, but no measure currently exists to identify the added sugar content of products and what it represents among purchases. Beverages are one of the first targets for reducing added sugar consumption, and hence are the focus here. **Objective:** Our goal was to estimate trends in added sugars in nonalcoholic packaged beverage products available in the United States and to estimate amounts of added sugars obtained from these beverages given the purchases of US households overall and by subpopulations. **Design:** On the basis of nutrition label data from multiple sources, we used a stepwise approach to derive the added sugar content of 160,713 beverage products recorded as purchased by US households in 2007-2012 (345,193 observations from 110,539 unique households). We estimated the amounts of added sugars obtained from packaged beverages US households reported buying in 2007-2008, 2009-2010, and 2011-2012, overall and by subpopulations based on household composition, race/ethnicity, and income. The key outcomes are added sugars in terms of per capita grams per day and the percentage of calories from packaged beverages. **Results:** Packaged beverages alone account for per capita consumption of 12 g/d of added sugars purchased by US households in 2007-2012, representing 32-48% of calories from packaged beverages. Whereas the absolute amount of added sugars from beverages has not changed meaningfully over time, the relative contribution of added sugars to calories from beverages has increased. Non-Hispanic black households and low-income households obtain both higher absolute and relative amounts of added sugars from beverages than non-Hispanic white households and high-income households (all $P < 0.01$). **Conclusions:** These results provide measures of added sugars from packaged beverages at both the product level and the population level in the United States and can be used for comparisons after the revised nutrition labels are implemented and for future monitoring.

Carbohydrate Quality

Plasma Glucose and Insulin Responses After Consumption of Breakfasts With Different Sources of Soluble Fiber in Type 2 Diabetes Patients: A Randomized Crossover Clinical Trial

de Carvalho CM, de Paula TP, Viana LV, Machado VM, de Almeida JC, Azevedo MJ. *Am J Clin Nutr*. 2017 Aug 30. doi: 10.3945/ajcn.117.157263. Article Link

Significance: Regarding fiber content, it is unclear whether the intake of soluble fibers from foods or supplements has an equally beneficial effect on lowering postprandial glucose. Higher fiber intake was associated with lower postprandial glucose at breakfast, and the intake of soluble fiber from food and supplement had a similar effect in patients with T2D.

Background: The amount and quality of carbohydrates are important determinants of plasma glucose after meals. Regarding fiber content, it is unclear whether the intake of soluble fibers from foods or supplements has an equally beneficial effect on lowering postprandial glucose. **Objective:** The aim of our study was to compare the acute effect of soluble fiber intake from foods or supplements after a common meal on postprandial plasma glucose and plasma insulin in patients with type 2 diabetes (T2D). **Design:** A randomized crossover clinical trial was conducted in patients with T2D. Patients consumed isocaloric breakfasts (mean ± SD: 369.8 ± 9.4 kcal) with high amounts of fiber from diet food sources (total fiber: 9.7 g; soluble fiber: 5.4 g), high amounts of soluble fiber from guar gum supplement (total fiber: 9.1 g; soluble fiber: 5.4 g), and normal amounts of fiber (total fiber: 2.4 g; soluble fiber: 0.8 g). Primary outcomes were postprandial plasma glucose and insulin (0-180 min). Data were analyzed by repeated measures ANOVA and post hoc Bonferroni test. **Results:** A total of 19 patients [aged 65.8 ± 7.3 y; median (IQR), 10 (5-9) y of T2D duration; glycated hemoglobin 7.0% ± 0.8%; body mass index (in kg/m^2) 28.2 ± 2.9] completed 57 meal tests. After breakfast, the incremental area under the curve (iAUC) for plasma glucose [mg/dL · min; mean (95% CI)] did not differ between high fiber from diet (HFD) [7861 (6257, 9465)] and high fiber from supplement (HFS) [7847 (5605, 10,090)] (P = 1.00) and both were lower than usual fiber (UF) [9527 (7549, 11,504)] (P = 0.014 and P = 0.037, respectively). iAUCs [μIU/mL · min; mean (95% CI)] did not differ (P = 0.877): HFD [3781 (2513, 5050)], HFS [4006 (2711, 5302), and UF [4315 (3027, 5603)]. **Conclusions:** Higher fiber intake was associated with lower postprandial glucose at breakfast, and the intake of soluble fiber from food and supplement had a similar effect in patients with T2D.

Fructose Replacement of Glucose or Sucrose in Food or Beverages Lowers Postprandial Glucose and Insulin Without Raising Triglycerides: A Systematic Review and Meta-Analysis

Evans RA, Frese M, Romero J, Cunningham JH, Mills KE. *Am J Clin Nutr.* 2017 Aug;106(2):506–518. Article Link

Significance: Strong evidence exists that substituting fructose for glucose or sucrose in food or beverages lowers peak postprandial blood glucose and insulin concentrations. Isoenergetic replacement does not result in a substantial increase in blood triglyceride concentrations.

Background: Conflicting evidence exists on the effects of fructose consumption in people with type 1 and type 2 diabetes mellitus. No systematic review has addressed the effect of isoenergetic fructose replacement of glucose or sucrose on peak postprandial glucose, insulin, and triglyceride concentrations. **Objective:** The objective of this study was to review the evidence for postprandial glycemic and insulinemic responses after isoenergetic replacement of either glucose or sucrose in foods or beverages with fructose. **Design:** We searched the Cochrane Library, MEDLINE, EMBASE, the WHO International Clinical Trials Registry Platform Search Portal, and clinicaltrials.gov. The date of the last search was 26 April 2016. We included randomized controlled trials measuring peak postprandial glycemia after isoenergetic replacement of glucose, sucrose, or both with fructose in healthy adults or children with or without diabetes. The main outcomes analyzed were peak postprandial blood glucose, insulin, and triglyceride concentrations. **Results:** Replacement of either glucose or sucrose by fructose resulted in significantly lowered peak postprandial blood glucose, particularly in people with prediabetes and type 1 and type 2 diabetes. Similar results were obtained for insulin. Peak postprandial blood triglyceride concentrations did not significantly increase. **Conclusions:** Strong evidence exists that substituting fructose for glucose or sucrose in food or beverages lowers peak postprandial blood glucose and insulin concentrations. Isoenergetic replacement does not result in a substantial increase in blood triglyceride concentrations.

A Review of the Characteristics of Dietary Fibers Relevant to Appetite and Energy Intake Outcomes in Human Intervention Trials

Poutanen KS, Dussort P, Erkner A, Fiszman S, Karnik K, Kristensen M, et al. *Am J Clin Nutr.* 2017 Sep;106(3):747–754. Article Link

Significance: Methods of DF characterization, incorporation, and study design are too inconsistent to allow generalized conclusions about the effects of DF properties on appetite and preclude the development of reliable, predictive, structure-function relations.

Background: Many intervention studies have tested the effect of dietary fibers (DFs) on appetite-related outcomes, with inconsistent results. However, DFs comprise a wide range of compounds with diverse properties, and the specific contribution of these to appetite control is not well characterized. **Objective:** The influence of specific DF characteristics [i.e., viscosity, gel-forming capacity, fermentability, or molecular weight (MW)] on appetite-related outcomes was assessed in healthy humans. **Design:** Controlled human intervention trials that tested the effects of well-characterized DFs on appetite ratings or energy intake were identified from a systematic search of literature. Studies were included only if they reported 1) DF name and origin and 2) data on viscosity, gelling properties, fermentability, or MW of the DF materials or DF-containing matrixes. **Results:** A high proportion of the potentially relevant literature was excluded because of lack of adequate DF characterization. In total, 49 articles that met

these criteria were identified, which reported 90 comparisons of various DFs in foods, beverages, or supplements in acute or sustained-exposure trials. In 51 of the 90 comparisons, the DF-containing material of interest was efficacious for ≥1 appetite-related outcome. Reported differences in material viscosity, MW, or fermentability did not clearly correspond to differences in efficacy, whereas gel-forming DF sources were consistently efficacious (but with very few comparisons). **Conclusions:** The overall inconsistent relations of DF properties with respect to efficacy may reflect variation in measurement methodology, nature of the DF preparation and matrix, and study designs. Methods of DF characterization, incorporation, and study design are too inconsistent to allow generalized conclusions about the effects of DF properties on appetite and preclude the development of reliable, predictive, structure-function relations. Improved standards for characterization and reporting of DF sources and DF-containing materials are strongly recommended for future studies on the effects of DF on human physiology.

Taste

College-Aged Males Experience Attenuated Sweet and Salty Taste With Modest Weight Gain

Noel CA, Cassano PA, Dando R. *J Nutr*. 2017 Aug 23. doi: 10.3945/jn.117.255869. Article Link

Significance: Human and animal studies report a blunted sense of taste in people who are overweight or obese. This study showed a modest weight gain is associated with concurrent taste changes in the first year of college, especially in males who experience a decrement in sweet and salty taste.

Background: Human and animal studies report a blunted sense of taste in people who are overweight or obese, with heightened sensitivity also reported after weight loss. However, it is unknown if taste changes concurrently with weight gain. **Objective:** This study investigated the association of weight gain with changes in suprathreshold taste intensity perception in a free-living population of young adults. **Methods:** Taste response, anthropometric measures, and diet changes were assessed with a longitudinal study design in first-year college students 3 times throughout the academic year. At baseline, 93 participants (30 males, 63 females) were an average of 18 y old, with a body mass index (in kg/m^2) of 21.9. Sweet, umami, salty, sour, and bitter taste intensities were evaluated at 3 concentrations by using the general Labeled Magnitude Scale. Ordinary least-squares regression models assessed the association of weight gain and within-person taste change, adjusting for sex, race, and diet changes. **Results:** Participants gained an average of 3.9% in weight, ranging from -5.7% to +13.8%. With each 1% increase in body weight, males perceived sweet and salty as less intense, with taste responses decreasing by 11.0% (95% CI: -18.9%, -2.3%; $P = 0.015$) and 7.5% (95% CI: -13.1%, -1.5%; $P = 0.015$) from baseline, respectively. Meanwhile, females did not experience this decrement, and even perceived a 6.5% increase (95% CI: 2.6%, 10.5%; $P = 0.007$) in sour taste with similar amounts of weight gain. Cha nges in the consumption of meat and other umami-rich foods also negatively correlated with umami taste response (-39.1%; 95% CI: -56.3%, -15.0%; $P = 0.004$). **Conclusions:** A modest weight gain is associated with concurrent taste changes in the first year of college, especially in males who experience a decrement in sweet and salty taste. This suggests that young-adult males may be susceptible to taste loss when gaining weight.

Flavonoids

Dietary Flavonoid Intake Reduces the Risk of Head and Neck But Not Esophageal or Gastric Cancer in US Men and Women

Sun L, Subar AF, Bosire C, Dawsey SM, Kahle LL, Zimmerman TP, et al. *J Nutr*. 2017 Sep;147(9):1729–1738. Article Link

Significance: Previous studies have shown that flavonoid intake reduces the risk of certain cancers; however, few studies to date have examined associations of flavonoids with upper gastrointestinal cancers. In this study, the highest quintile of total flavonoid intake was associated with a 24% lower risk of head and neck cancer compared with the lowest quintile.

Background: Flavonoids are bioactive polyphenolic compounds found in fruits, vegetables, and beverages of plant origin. Previous studies have shown that flavonoid intake reduces the risk of certain cancers; however, few studies to date have examined associations of flavonoids with upper gastrointestinal cancers or used prospective cohorts. **Objective:** Our study examined the association between intake of flavonoids (anthocyanidins, flavan-3-ols, flavanones, flavones, flavonols, and isoflavones) and risk of head and neck, esophageal, and gastric cancers. **Methods:** The NIH-AARP Diet and Health Study is a prospective cohort study that consists of 469,008 participants. Over a mean 12-y follow-up, 2453 head and neck (including 1078 oral cavity, 424 pharyngeal, and 817 laryngeal), 1165 esophageal (890 adenocarcinoma and 275 squamous cell carcinoma), and 1297 gastric (625 cardia and 672 noncardia) cancer cases were identified. We used Cox proportional hazards regression models to estimate HRs and CIs for the associations between flavonoid intake assessed at study baseline and cancer outcomes. For 56 hypotheses examined, P-trend values were adjusted using the Benjamini-Hochberg (BH) procedure for false discovery rate control. **Results:** The highest quintile of total flavonoid intake was associated with a 24% lower risk of head and neck cancer (HR: 0.76; 95% CI: 0.66,

0.86; BH-adjusted 95% CI: 0.63, 0.91; P-trend = 0.02) compared with the lowest quintile. Notably, anthocyanidins were associated with a 28% lower risk of head and neck cancer (HR: 0.72; 95% CI: 0.62, 0.82; BH-adjusted 95% CI: 0.59, 0.87; P-trend = 0.0005), and flavanones were associated with a 22% lower risk of head and neck cancer (HR: 0.78; 95% CI: 0.68, 0.89; BH-adjusted 95% CI: 0.64, 0.94; P-trend: 0.02). No associations between flavonoid intake and risk of esophageal or gastric cancers were found. **Conclusions:** Our results indicate that flavonoid intake is associated with lower head and neck cancer risk. These associations suggest a protective effect of dietary flavonoids on head and neck cancer risk, and thus potential as a risk reduction strategy.

Sodium

Modeled Changes in US Sodium Intake From Reducing Sodium Concentrations of Commercially Processed and Prepared Foods to Meet Voluntary Standards Established in North America: NHANES

Cogswell ME, Patel SM, Yuan K, Gillespie C, Juan W, Curtis CJ, et al. *Am J Clin Nutr*. 2017 Aug;106(2):530–540. Epub 2017 Jul 12. Article Link

Significance: Voluntary sodium standards for commercially processed and prepared foods were established in North America, but their impact on sodium intake is unclear. This study concludes that If established sodium standards are applied to commercially processed and prepared foods, a significant reduction of US sodium intake could occur.

Background: Approximately 2 in 3 US adults have prehypertension or hypertension that increases their risk of cardiovascular disease. Reducing sodium intake can decrease blood pressure and prevent hypertension. Approximately 9 in 10 Americans consume excess sodium (≥2300 mg/d). Voluntary sodium standards for commercially processed and prepared foods were established in North America, but their impact on sodium intake is unclear. **Objective:** We modelled the potential impact on US sodium intake of applying voluntary sodium standards for foods. **Design:** We used NHANES 2007-2010 data for 17,933 participants aged ≥1 y to model predicted US daily mean sodium intake and the prevalence of excess sodium intake with the use of the standards of the New York City's National Salt Reduction Initiative (NSRI) and Health Canada for commercially processed and prepared foods. The Food and Nutrient Database for Dietary Studies food codes corresponding to foods reported by NHANES participants were matched to NSRI and Health Canada food categories, and the published sales-weighted mean percent reductions were applied. **Results:** The US population aged ≥1 y could have reduced their usual daily mean sodium intake of 3417 mg by 698 mg (95% CI: 683, 714 mg) by applying NSRI 2014 targets and by 615 mg (95% CI: 597, 634 mg) by applying Health Canada's 2016 benchmarks. Significant reductions could have occurred, regardless of age, sex, race/ethnicity, income, education, or hypertension status, up to a mean reduction in sodium intake of 850 mg/d in men aged ≥19 y by applying NSRI targets. The proportion of adults aged ≥19 y who consume ≥2300 mg/d would decline from 88% (95% CI: 86%, 91%) to 71% (95% CI: 68%, 73%) by applying NSRI targets and to 74% (95% CI: 71%, 76%) by applying Health Canada benchmarks. **Conclusion:** If established sodium standards are applied to commercially processed and prepared foods, a significant reduction of US sodium intake could occur.

Interaction Between Genes and Macronutrient Intake on the Risk of Developing Type 2 Diabetes: Systematic Review and Findings From European Prospective Investigation Into Cancer (EPIC)-InterAct

Li SX, Imamura F, Ye Z, Schulze MB, Zheng J, Ardanaz E, et al. *Am J Clin Nutr*. 2017 Jul;106(1):263-275. Article Link

Significance: This review aimed to identify existing evidence for gene-macronutrient interactions and type-2 diabetes. Eight gene-macronutrient interactions were identified for the risk of T2D from the literature, but they were not replicated in the EPIC-InterAct study, which mirrored the analyses undertaken in the original reports.

Background: Gene-diet interactions have been reported to contribute to the development of type 2 diabetes (T2D). However, to our knowledge, few examples have been consistently replicated to date. **Objective:** We aimed to identify existing evidence for gene-macronutrient interactions and T2D and to examine the reported interactions in a large-scale study. **Design:** We systematically reviewed studies reporting gene-macronutrient interactions and T2D. We searched the MEDLINE, Human Genome Epidemiology Network, and WHO International Clinical Trials Registry Platform electronic databases to identify studies published up to October 2015. Eligibility criteria included assessment of macronutrient quantity (e.g., total carbohydrate) or indicators of quality (e.g., dietary fiber) by use of self-report or objective biomarkers of intake. Interactions identified in the review were subsequently examined in the EPIC (European Prospective Investigation into Cancer)-InterAct case-cohort study (n = 21,148, with 9403 T2D cases; 8 European countries). Prentice-weighted Cox regression was used to estimate country-specific HRs, 95% CIs, and P-interaction values, which were then pooled by random-effects meta-analysis. A primary model was fitted by using the same covariates as reported in the published studies, and a second model adjusted for additional covariates and estimated the effects of isocaloric macronutrient substitution. **Results:** Thirteen observational studies met the eligibility criteria (n < 1700 cases). Eight unique interactions were reported to be significant between macronutrients [carbohydrate, fat, saturated fat,

dietary fiber, and glycemic load derived from self-report of dietary intake and circulating n-3 (ω-3) polyunsaturated fatty acids] and genetic variants in or near transcription factor 7-like 2 (TCF7L2), gastric inhibitory polypeptide receptor (GIPR), caveolin 2 (CAV2), and peptidase D (PEPD) (P-interaction < 0.05). We found no evidence of interaction when we tried to replicate previously reported interactions. In addition, no interactions were detected in models with additional covariates. **Conclusions:** Eight gene-macronutrient interactions were identified for the risk of T2D from the literature. These interactions were not replicated in the EPIC-InterAct study, which mirrored the analyses undertaken in the original reports. Our findings highlight the importance of independent replication of reported interactions.

Scientific Integrity

The Influence of the Team in Conducting a Systematic Review

Uttley L and Montgomery P. *Syst Rev*. 2017 Aug 1;6(1):149. Article Link

There is an increasing body of research documenting flaws in many published systematic reviews' methodological and reporting conduct. When good systematic review practice is questioned, attention is rarely turned to the composition of the team that conducted the systematic review. This commentary highlights a number of relevant articles indicating how the composition of the review team could jeopardize the integrity of the systematic review study and its conclusions. Key biases require closer attention such as sponsorship bias and researcher allegiance, but there may also be less obvious affiliations in teams conducting secondary evidence-syntheses. The importance of transparency and disclosure are now firmly on the agenda for clinical trials and primary research, but the meta-biases that systematic reviews may be at risk from now require further scrutiny.

Relationship Between Research Outcomes and Risk of Bias, Study Sponsorship, and Author Financial Conflicts of Interest in Reviews of the Effects of Artificially Sweetened Beverages on Weight Outcomes: A Systematic Review of Reviews

Mandrioli D, Kearns CE, Bero LA. *PLoS One*. 2016 Sep 8;11(9):e0162198. Article Link

Background: Artificially sweetened beverage consumption has steadily increased in the last 40 years. Several reviews examining the effects of artificially sweetened beverages on weight outcomes have discrepancies in their results and conclusions. **Objectives:** To determine whether risk of bias, results, and conclusions of reviews of effects of artificially sweetened beverage consumption on weight outcomes differ depending on review sponsorship and authors' financial conflicts of interest. **Methods:** We performed a systematic review of reviews of the effects of artificially sweetened beverages on weight. Two assessors independently screened articles for inclusion, extracted data, and assessed risks of bias. We compared risk of bias, results and conclusions of reviews by different industry sponsors, authors' financial conflict of interest and journal sponsor. We also report the concordance between review results and conclusions. **Results:** Artificial sweetener industry sponsored reviews were more likely to have favorable results (3/4) than non-industry sponsored reviews (1/23), RR: 17.25 (95% CI: 2.34 to 127.29), as well as favorable conclusions (4/4 vs. 15/23), RR: 1.52 (95% CI: 1.14 to 2.06). All reviews funded by competitor industries reported unfavorable conclusions (4/4). In 42% of the reviews (13/31), authors' financial conflicts of interest were not disclosed. Reviews performed by authors that had a financial conflict of interest with the food industry (disclosed in the article or not) were more likely to have favorable conclusions (18/22) than reviews performed by authors without conflicts of interest (4/9), RR: 7.36 (95% CI: 1.15 to 47.22). Risk of bias was similar and high in most of the reviews. **Conclusions:** Review sponsorship and authors' financial conflicts of interest introduced bias affecting the outcomes of reviews of artificially sweetened beverage effects on weight that could not be explained by other sources of bias.