

Nutrition Perspectives

University of California, Davis, Department of Nutrition and the Center for Nutrition in Schools

Different Low-Calorie Sweeteners Affect Body Weight in Different Ways

The effect of low-calorie sweeteners (often called artificial sweeteners) on weight gain compared to sugar is a hotly debated topic in the nutrition sphere, largely due to the mixed results of related research. Some studies find that low-calorie sweeteners promote weight gain, while others find the opposite effect, and still others find no effect at all. New research may shed some light on why study results have been so varied (1). Researchers from Purdue University compared the effects of consumption of four different low-calorie sweeteners compared to sucrose on body weight and found that not all low-calorie sweeteners are created equally.



Participants (n=123) were randomly assigned to consume a sweetened beverage daily for 12 weeks that either contained sugar or one of four different low-calorie sweeteners: aspartame, saccharine, sucralose, and rebaudioside A (often referred to as stevia). At baseline, height and weight were measured, as were usual calorie intake (assessed through three 24-hour recalls), appetite, and glucose tolerance. Over the course of the study, body weight was measured every two weeks, while calorie intake and appetite were measured every four weeks.



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Participants were informed that the purpose of the study was to assess the effects of different sweeteners on fine motor control in order to prevent any dietary changes had they known that change in body weight was the outcome of interest. To make sure that participants were drinking the assigned beverages, a compound called para-aminopenzoic acid (PABA) was added that could be detected in urine to assess compliance.

At the end of the 12-week study, the researchers found that the different sweeteners had different effects on body weight. Three of the sweeteners, aspartame, sucralose, and rebaudioside, had no statistically significant effect on body weight compared to baseline. Saccharine, however, was observed to result in increased body weight, as did sugar. Those in the sugar group gained an average of 4 pounds over the course of the 12-week study, which can be attributed to the 400 to 560 calories they consumed each day from the sugar-sweetened beverage. However, the low-calorie sweetener groups consumed less than 5 calories per day from their beverage, which raises questions about the mechanism behind the average 2.5 pound weight gain in the saccharine group.



Rebaudioside A is extracted from the stevia leaf.

In addition to examining differences in body weight between baseline and 12 weeks, the researchers also compared how the body weight changed for each group in relation to one another. Although there was no significant difference when compared to baseline in the sucralose group, the researchers found that the group lost weight on average when compared to the other groups. They also observed that the sucralose group consumed fewer calories at week 12 than they did at the start of the study.

The researchers pointed to other studies that may provide the reasons behind these differences. Each low-calorie sweetener is absorbed and metabolized differently; the differences in how the body handles these compounds may be the key to how they impact weight differently. The researchers also speculated that the differing effects of different low-calorie sweeteners may partly explain why past research results have been inconsistent. Epidemiological studies generally group all low-calorie sweeteners together; with differing effects on body weight they may essentially cancel each other out when analyzed as a single

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group. The proportion of different low-calorie sweeteners in the food supply has shifted as different products have been FDA approved, which may further muddy findings. Sucralose, for example, was first approved for use in 1998, and since then has become the most commonly-used low-calorie sweetener (2).

While this study yielded interesting results, there are a few weaknesses to the study design that may limit the ability to generalize the results to the general population. The first is that there was no plain water group used as comparison. Because participants consumed an additional 1.25 to 1.75 liters of fluid, this additional fluid intake may have influenced feelings of fullness, which in turn could impact hunger. A plain water group would have enabled researchers to assess whether this was the case. One factor about the study design that limits generalizability is that participants were blinded to which sweetener they were receiving. This is not the case in normal day-to-day life, which may change how much individuals would choose to consume.

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After 20-year Increase, New Diabetes Cases Decline



New cases of diabetes have declined from 1.7 million in 2008 to 1.3 million in 2017.

New cases of diagnosed diabetes in the U.S. decreased by 35 percent since a peak in 2009 – the first sign that efforts to stop the nation’s diabetes epidemic are working, CDC researchers report.

New cases have declined from 1.7 million new cases per year in 2008 to 1.3 million new cases in 2017. And there’s more good news: The number of people living with diagnosed diabetes in the United States has remained stable during the past 8 years. The latest findings appear in the *British Medical Journals’ Open Diabetes Research and Care*.

The new report represents the longest sustained plateau in existing cases of diagnosed diabetes and the longest decline in new diabetes cases.

“The findings suggest that our work to stem the tide of type 2 diabetes may be working – but we still

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have a very long way to go,” said Ann Albright, Ph.D., director of the Division of Diabetes Translation at the Centers for Disease Control and Prevention. “We must continue proven interventions and deploy innovative strategies if we’re going to see a continued decline in type 2 diabetes among Americans.”

Diabetes decline seen nationwide

The number of people living with diagnosed diabetes increased by 4.4 percent per year from 1990-2009 to a peak of 8.2 per 100 adults, before plateauing to 8 per 100 adults in 2017. Similar trends were seen across all ages, racial and ethnic groups, sexes, and education levels.

“We’ve seen the same thing across states, underscoring the importance of putting science-proven programs into action,” Albright said. “A prime example is the National Diabetes Prevention Program. We must also increase access to affordable, healthier foods and safe places to be active.”

CDC scientists used 1980-2017 cross-sectional survey data from the CDC’s National Health Interview Survey to look at trends in prevalence and incidence of diagnosed diabetes among adults aged 18-79 years. The data relies on self-reported behaviors and medical conditions, and does not distinguish between diabetes type, though type 2 diabetes typically

represents 95% of diabetes cases.

While the causes of the plateau and decrease remain unclear, researchers suggest that they may be driven in part by increased awareness of – and emphasis on – type 2 diabetes prevention, changes in diet and physical activity, and changes in diabetes

diagnostic and screening practices. Trends in population subgroups suggest that the decrease in new diabetes cases may have been driven primarily by a decrease in new cases of diagnosed diabetes in non-Hispanic white adults. The plateau seen in existing cases of diabetes may be due to the fact that people with diabetes are living longer. There have been recent reports of a decline in cardiovascular and all-cause mortality in adults with diagnosed diabetes.



The researchers suggested that the declines may be driven by increased emphasis on prevention, such as changes in diet and physical activity.

In the United States, the number of people living with diagnosed diabetes and new cases of diabetes doubled in the

1990s and throughout the 2000s, becoming one of the country’s most troubling public health threats. Today, more than 30 million Americans are living with diabetes, and 1 in 4 do not know they have it.

To learn more about diabetes in the U.S. and type 2 diabetes prevention, visit <https://www.cdc.gov/diabetes/home/index.html>.

Source: CDC Newsroom, May 28, 2019; <https://www.cdc.gov/media/releases/2019/p0529-diabetes-cases-decline.html>.

USDA Launches SNAP Online Purchasing Pilot

Participants May Buy Groceries Online in New York

For the first time, Supplemental Nutrition Assistance Program (SNAP) participants will be able to select and pay for their groceries online, during a two-year test (pilot) launched today in New York State. In making the announcement, U.S. Secretary of Agriculture Sonny Perdue highlighted online purchasing's potential, along with the U.S. Department of Agriculture's (USDA) commitment to program integrity by looking carefully at the pilot. Lessons learned from this pilot are expected to inform future efforts to expand online purchasing in SNAP.

"People who receive SNAP benefits should have the opportunity to shop for food the same way more and more Americans shop for food – by ordering and paying for groceries online. As technology advances, it is important for SNAP to advance too, so we can ensure the same shopping options are available for both non-SNAP and SNAP recipients," Secretary Perdue said. "We look forward to monitoring how these pilots increase food access and customer service to those we serve, specifically those who may experience challenges in visiting brick and mortar stores."

The system is developed to allow online purchasing only by SNAP households with electronic benefit transfer (EBT) cards issued by New York for this start of the online pilot project. Online retailers will be limited to delivery in the pilot areas in New York only. Information regarding expansion will be available after this launch is determined successful and other pilot states indicate their readiness to implement.



The pilot will test both online ordering and payment. SNAP participants will be able to use their benefits to purchase eligible food items.



A new pilot program in New York will allow SNAP recipients to purchase food online in addition to traditional brick-and-mortar stores.

Background

Amazon, Walmart, and ShopRite participated in the pilot launch. ShopRite and Amazon are providing service to the New York City area and Walmart is providing online service in upstate New York locations. Additional retailers are slated to participate in the pilot in coming months. The pilot will eventually expand to other areas of New York as well as Alabama, Iowa, Maryland, Nebraska, New Jersey, Oregon and Washington.

The pilot will test both online ordering and payment. SNAP participants will be able to use their benefits to purchase eligible food items, but will not be able to use SNAP benefits to pay for

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service or delivery charges. For more information, please visit the SNAP Online Purchasing pilot webpage (<https://www.fns.usda.gov/snap/online-purchasing-pilot>).

The 2014 Farm Bill authorized USDA to conduct and evaluate a pilot for online purchasing prior to national implementation. The pilot phase is intended to ensure online transactions are processed safely and securely. USDA anticipates all eligible and interested retailers who can meet the requirements to process online SNAP transactions will eventually be able to take part, though the timeline is dependent on the progress of the pilot and any

regulations which may need to be issued.

USDA's Food and Nutrition Service (FNS) works to reduce food insecurity and promote nutritious diets among the American people. The agency administers 15 nutrition assistance programs (<https://www.fns.usda.gov/>) that leverage American's agricultural abundance to ensure children and low-income individuals and families have nutritious food to eat. FNS also co-develops the Dietary Guidelines for Americans (<https://www.dietaryguidelines.gov/>), which provide science-based nutrition recommendations and serve as the cornerstone of federal nutrition policy.

Adapted from: USDA FNS Press Releases; April 18, 2019; <https://www.fns.usda.gov/pressrelease/2019/fns-000319>

Sodium Reduction More Effective in Reducing Blood Pressure in Those with High Blood Pressure

The relationship between dietary sodium and blood pressure is fairly well established. Or is it? A recent meta-analysis of randomized controlled trials suggests that while many, especially those with high blood pressure (hypertensive), would benefit from a reduction in sodium, this isn't the case for everyone (1).

Researchers identified 133 randomized controlled trials in which participants were randomly assigned to sodium restriction or usual sodium intake. Once the studies were identified, relevant data were extracted from each in order to group the data from all the studies together. After this was done,



For many but not all, reducing sodium intake will help lower blood pressure.

the data were reanalyzed using multivariable regression. Studies were divided into groups based on whether the participants were above or below the 75th percentile for blood pressure (131/78 mm Hg) in the U.S. at baseline. Since each study design varied, variables such as study duration, whether antihypertensive treatments were used, and participant characteristics were included in the model.

In studies in which the mean systolic blood pressure was above 131 mm Hg at baseline, the researchers found that there was a

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Those above the 75th percentile for blood pressure benefited the most.

that daily sodium intake was significantly associated with blood pressure in those with hypertension (blood pressure above 130/80 mm Hg) but not those with normal blood pressure. Low sodium intake has also been associated with increased mortality, which merits caution in suggesting sodium reduction for those without high blood pressure (2).

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Newly Updated Dietary Reference Intakes for Sodium and Potassium Released by National Academies

For the first time in over a decade the National Academies of Science, Engineering, and Medicine (NASEM) have published updated Dietary Reference Intakes (DRI) for sodium and potassium, last updated in 2005 (1). Before these most recent updates, the last time the NASEM updated the DRI for a nutrient was in 2011 for Calcium and Vitamin D. Especially noteworthy is the addition of a new category, Chronic Disease Risk Reduction Intakes (CDRR), which

expands the traditional focus of the DRIs beyond preventing diseases related to inadequate intake to reflect the impact of excessive sodium in the development of hypertension and cardiovascular disease. The report, issued in March, reviews and synthesizes the current research to provide up-to-date estimates of adequate intakes (AI) for sodium and potassium and establishes a CDRR for sodium (2).

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Sodium

The updated DRI for sodium AI recommends that those age 14 and older consume at least 1,500 mg per day. For children, the recommended values are: 800 mg per day for ages 1-3, 1,000 mg per day for ages 4-8, and 1,200 mg for ages 9-13. The infant adequate intakes are 110 mg for 0-6 months and 370 mg for 7-12 months.

While most essential nutrients have a tolerable upper intake (UL) established, reflecting the highest level that is safe to consume without experiencing negative consequences, sodium presents a unique case in that chronic excessive sodium consumption can contribute to the development of hypertension in large proportions of the population. For this reason, the NASEM established a CDRR to set limits on recommended sodium intake in the interest of chronic disease prevention. For those above the age of 14, the CDRR is 2,300 mg. Those in this age range who consume above this amount are recommended to reduce their consumption to below this level.

Table 1: Updated Sodium Adequate Intakes

Age	Male	Female	Pregnancy	Lactation
Birth to 6 months	110 mg	100 mg		
7-12 months	370 mg	370 mg		
1-3 years	800 mg	800 mg		
4-8 years	1,000 mg	1,000 mg		
9-13 years	1,200 mg	1,200 mg		
14-18 years	1,500 mg	1,500 mg	1,500 mg	1,500 mg
19-50 years	1,500 mg	1,500 mg	1,500 mg	1,500 mg
51+ years	1,500 mg	1,500 mg		

Potassium

The newly-updated AIs for potassium represent a decrease in recommendations. In the 2005 DRI, the AI for all adults (with the exception of those who were breastfeeding) recommended 4,700

Table 2: Updated Potassium Adequate Intakes

Age	Male	Female	Pregnancy	Lactation
Birth to 6 months	400 mg	400 mg		
7-12 months	860 mg	860 mg		
1-3 years	2,000 mg	2,000 mg		
4-8 years	2,300 mg	2,300 mg		
9-13 years	2,500 mg	2,300 mg		
14-18 years	3,000 mg	2,300 mg	2,600 mg	2,500 mg
19-50 years	3,400 mg	2,600 mg	2,900 mg	2,800 mg
51+ years	3,400 mg	2,600 mg		

mg, while the new AI recommendations for adults vary from 2,600 to 3,400 mg depending on age and sex (3,4). The committee stated that the decrease is related to the development of a CDRR; however, while there is strong evidence that potassium consumption can reduce blood pressure, a CDRR was not established due to inconsistencies in research and dose-response relationships (2).

The AIs for infants and young children do not vary by sex until the 9-13 years grouping. Infants from 0-6 months

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are recommended to consume 400 mg, while 860 mg is recommended for those who are 7-12 months of age, 2,000 mg for 1-3 years and 2,300 for 4-8 years.

potassium UL, stating that there was insufficient evidence for healthy individuals, though they recommended caution for those with kidney conditions.

The committee did not establish a

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Cooking and Gardening Attitudes May Influence Fruit, Vegetable and Fiber Intake in Children



Image credit: USDA Food and Nutrition Service

One method for increasing fruit and vegetable consumption in children is to involve them in cooking and gardening activities.

Getting kids to eat their vegetables can often be a struggle, but improving cooking and gardening attitudes and behavior may help with that. A recent study conducted in Los Angeles Unified School District found that students with more positive cooking and gardening attitudes and self-efficacy consumed more fruits, vegetables, and fiber.

The evaluation was nested in a larger intervention called LA Sprouts that included 12 weekly classes comprising 45 minutes of cooking and nutrition and 45 minutes of gardening. Self-efficacy to cook fruits and vegetables, cooking and gardening attitudes, motivation to cook with fruits and vegetables, and motivation to garden with fruits and vegetables were assessed before and after the intervention in both participants (n=160)

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Higher cooking attitudes and self-efficacy was associated with higher fruit, vegetable and fiber consumption.

and fiber intakes. Those that scored higher for gardening behaviors and self-efficacy were also more likely to have higher fiber intakes.

A few possible explanations for the lack of impact of the intervention were suggested by the researchers. It's possible that the small sample and size short duration of the intervention may be why no changes were suggested. However, these results suggest that, while the LA Sprouts intervention did not result in increases in attitudes and self-efficacy, the relationship between these and fruit, vegetable, and fiber consumption is a promising avenue for improving dietary intake in youth.

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1. Landry MJ, Markowitz AK, Asigbee FM, et al. Cooking and Gardening Behaviors and Improvements in Dietary Intake in Hispanic/Latino Youth. *Child Obes.* 2019 May/Jun;15(4):262-270. doi: 10.1089/chi.2018.0110.

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and controls (n=130). The tools asked participants to include their level agreement with statements such as "I think I can help cook a dish with vegetables," "Growing fruits and vegetables is fun," and "The reason I cook regularly is because it is an important choice I want to make."

On average, participants were 9 years old and approximately half (51 percent) were overweight or obese. The majority of participants were Hispanic/Latino (87 percent) and qualified for free or reduced-price lunch (91 percent) through the National School Lunch Program. The researchers did not find a significant difference between the LA Sprouts intervention group and the control group with regards to cooking and gardening attitudes or that attitudes or self-efficacy increased over time. However, they found that there was a significant positive association between cooking attitudes and self-efficacy and the consumption of fruits, vegetables, and dietary fiber. They also found a similar relationship between gardening attitudes and self-efficacy and increased fiber intake. Students that scored higher for cooking attitudes and self-efficacy were more likely to have higher fruit, vegetable,



Children with more positive gardening attitudes and self-efficacy reported higher fiber intake.

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