Resources and Information

Over the last several years, there have been a growing number of published studies examining the relationship between the intake of sugar-sweetened beverages and rates of overweight and obesity. While these studies acknowledge that there are many contributing factors to overweight and obesity, they also establish a relationship between the increasing consumption patterns of sugar-sweetened beverages, including sodas, and rising rates of overweight and obesity internationally. Some of the most important of these studies are abstracted below.

Relation Between Consumption of Sugar-Sweetened Drinks and Childhood Obesity: a Prospective, Observational Analysis.
Ludwig, DS, Peterson, KE, and Gortmaker, SL.
***Lancet.* 2001; 357: 505-508;**

The authors of this observational analysis examined school children aged 11-12 from Boston, Massachusetts over two academic years, from October 1995 through May 1997. The authors set out to examine the relationship between consumption of sugar-sweetened beverages and childhood obesity. A primary hypothesis was that "consumption of sugar-sweetened drinks could directly predict a rise or fall in BMI over 2 academic years."[1] An activity questionnaire was used, filled out by students under the supervision of teachers who had received some training before administration of the questionnaire.

While the authors acknowledge that that "the cause of this apparent obesity epidemic is likely to be multifactorial, our findings suggest that sugar-sweetened drink consumption could be an important contributory factor. The odds ratio of becoming obese among children increased 1.6 times for each additional can or glass of sugar-sweetened drink that they consumed every day."[2] A possible explanation offered for the apparent relationship between sugar-sweetened beverage consumption and obesity is that "compensation at subsequent meals for energy consumed in the form of a liquid could be less complete than for energy consumed in the form of solid food."[3]

Based on their analysis and observations, the authors of this study conclude that while they cannot prove causality directly between sugar-sweetened beverage consumption and obesity, they can say that there is an association between consumption of sugar-sweetened beverages and obesity. Increases in consumption of sugar-sweetened beverages, such as sodas, is related to increasing rates of childhood obesity.

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[1] Ludwig, DS, Peterson, KE, and Gortmaker, SL. Relation Between Consumption of Sugar-Sweetened Drinks and Childhood Obesity: a Prospective, Observational Analysis. *Lancet.* 2001; 357: 505-508.

[2] *Ibid.*

[3] *Ibid.*

The Sweetening of the World's Diet.
Popkin, B. and S.J. Nielson.
***Obesity Research.* 2003: Vol. 11, No. 11.**

The authors examine the increasing use of caloric sweeteners, looking at data from countries around the world. Their analysis demonstrates that "increased consumption of caloric sweetener is one element in the world's dietary changes, . . . of this increase, 80% comes from sugared beverages."[4] The use of caloric sweetener has risen across the world, and has contributed to an increasing number of calories consumed per day, which leads to weight gain. Sugared "beverage intake seems to be a major contributor"[5] to the increasing rates of caloric sweetener consumption globally.

Preventing Childhood Obesity by Reducing Consumption of Carbonated Drinks: Cluster Randomised Controlled Trial.
James, J, Thomas, P, Cavan, D, and Kerr, D.
***British Medical Journal.* April 2004; Vol. 328;**

This study, based in six primary schools in southwest England, aimed to determine whether a school based educational intervention designed to reduce the consumption of carbonated drinks could prevent excessive weight gain in children. The participants received in class instruction from teachers, focusing on the overall improvement to their health and wellbeing that could come about with reduced sugar consumption. "The main objective was to discourage the consumption of 'fizzy' drinks (sweetened and unsweetened) with positive affirmation of a balanced healthy diet."[6]

The results of the study demonstrate that "at 12 months the mean percentage of overweight and obese children increased in the control clusters by 7.5%, compared with a decrease in the intervention group of 0.2%."[7] Additionally, "at 12 months, consumption [of sugar-sweetened beverages] decreased in the intervention group compared with the control group."[8] The study shows that a school based intervention aimed to educate students about the effects of sugar-sweetened beverages can positively influence the likelihood of children becoming overweight and obese.

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[4] Popkin, B. and S.J. Nielson. The Sweetening of the World's Diet. *Obesity Research.* 2003: Vol. 11, No. 11.

[5] *Ibid.*

[6] James, J, Thomas, P, Cavan, D, and Kerr, D. Preventing Childhood Obesity by Reducing Consumption of Carbonated Drinks: Cluster Randomised Controlled Trial. *British Medical Journal.* April 2004; Vol. 328.

[7] *Ibid.*

[8] *Ibid.*

Intake of Sugar-Sweetened Beverages and Weight Gain: A Systematic Review.
Malik, V, Schulze, MB, and Hu, FB.
***American Journal of Clinical Nutrition.* 2006; 84: 274-288;**

The authors of this review article examined 30 publications to examine the relationship between sugar-sweetened beverages (SSBs) and weight gain. Of the publications they examined, 15 were cross-sectional, 10 were prospective, and 5 were experimental. Based on their review and analysis, the authors concluded that the "weight of epidemiologic and experimental evidence indicates that a greater consumption of SSBs is associated with weight gain and obesity."[9]

Effects of Decreasing Sugar-Sweetened Beverage Consumption on Body Weight in Adolescents: A Randomized, Controlled Pilot Study.
Ebbeling, CB, Feldman, HA, Osganian, SK, Chomitz, VR, Ellenbogen, SJ, Ludwig, DS.
***Pediatrics.* 2006; 117: 673-680,**

The authors of this study conducted a randomized, controlled pilot study to examine the effect of sugar-sweetened beverage (SSB) consumption on rates of overweight and obesity. Specifically, they examined the effect of decreasing SSB consumption on overall body weight. The study consisted of 103 randomly chosen adolescents from age 13 to age 18, and lasted 25 weeks. The control group was told to continue their consumption of SSBs as normal, while the intervention group received home-delivery of noncaloric beverages, which were meant to replace the intake of SSBs. The results of the study showed that while the control group maintained their normal intake of SSBs, the intervention group reduced their intake by 82%.

The authors determined that "decreasing SSB consumption had a beneficial effect on body weight that was strongly linked to baseline BMI . . . [m]oreover, the effect was greater among the subjects who drank more SSBs at baseline, presumably because of greater displacement of SSBs by noncaloric beverages."[10]

[9] Malik, V, Schulze, MB, and Hu, FB. Intake of Sugar-Sweetened Beverages and Weight Gain: A Systematic Review. *American Journal of Clinical Nutrition.* 2006; 84: 274-288.
[10] Ebbeling, CB, Feldman, HA, Osganian, SK, Chomitz, VR, Ellenbogen, SJ, Ludwig, DS. Effects of Decreasing Sugar-Sweetened Beverage Consumption on Body Weight in Adolescents: A Randomized, Controlled Pilot Study. *Pediatrics.* 2006; 117: 673-680.

The following is a bibliography of studies on consumption of high calorie beverages, diet, and health:

Adair, L. and B. Popkin. Are Child Eating Patterns Being Transformed Globally? *Obesity Research.* 2005: Vol. 13 No. 7. http://www.obesityresearch.org/

Anderson, P. and K.F. Butcher. Childhood Obesity: Trends and Potential Causes. *The Future of Children.* 2006: Vol. 16 No. 1. http://www.futureofchildren.org/

Ebbeling, CB, Feldman, HA, Osganian, SK, Chomitz, VR, Ellenbogen, SJ, Ludwig, DS. Effects of Decreasing Sugar-Sweetened Beverage Consumption on Body Weight in Adolescents: A Randomized, Controlled Pilot Study. *Pediatrics.* 2006; 117: 673-680. http://pediatrics.aappublications.org/cgi/content/abstract/117/3/673

Food and Agriculture Organization of the United Nations. The Double Burden of Malnutrition Case Studies From Six Developing Countries. *FAO Food and Nutrition Paper 84*, Rome: 2006. http://www.fao.org/documents/advanced_s_result.asp?QueryString=The+Double+Burden+of+Malnutrition+Case+Studies+From+Six+Developing+Countries

Hawkes, C. *Marketing Activities of Global Soft Drink and Fast Food Companies in Emerging Markets: A Review.* Chapter in World Health Organization Report Globalization, Diets and Noncommunicable Diseases, 2002. http://www.who.int/hpr/NPH/docs/globalization.diet.and.ncds.pdf

Jacoby, E. The Obesity Epidemic in the Americas: Making Healthy Choices the Easiest Choices. *Revista Panamerica de Salud Pública/Pan American Journal of Public Health.* 2004: Vol. 15, No. 4. http://revista.paho.org/index.php?a_ID=477

James, J. et. al. Preventing Childhood Obesity by Reducing Consumption of Carbonated Drinks: Cluster Randomized Controlled Trial. *British Medical Journal.* 27 April 2004. http://www.bmj.com/cgi/content/abstract/bmj.38077.458438.EEv1

James, P.T. et. al. The Worldwide Obesity Epidemic. *Obesity Research.* 2001: Vol. 9, Supp. 4. http://www.obesityresearch.org/cgi/content/abstract/9/suppl_4/S228

Lang, T. and G. Raynor. Overcoming Policy Cacophony on Obesity: An Ecological Public Health Framework for Policymakers. *Obesity Reviews.* 2007: Vol. 8, Suppl. 1. http://www.blackwell-synergy.com/doi/abs/10.1111/j.1467-789X.2007.00338.x

Leatherman, T.L. and A. Goodman. Coca-colonization of Diets in the Yucatan. *Social Science & Medicine.* 2005: Vol. 61. http://www.sciencedirect.com

Lowell, J. The Food Industry and its Impact Upon Increasing Global Obesity: A Case Study. *British Food Journal.* 2004: Vol. 106, No. 3. http://www.emeraldinsight.com/info/journals/bfj/bfj.jsp

Ludwig, DS, Peterson, KE, and Gortmaker, SL . Relation Between Consumption of Sugar-Sweetened Drinks and Childhood Obesity: a Prospective, Observational Analysis. *Lancet.* 2001; 357: 505-508 http://www.thelancet.com

Malik, V.S., M.B. Schulze, and F.B. Hu. Intake of Sugar-Sweetened Beverages and Weight Gain: A Systematic Review. *American Journal of Clinical Nutrition.* 2006: Vol. 84. http://www.ajcn.org/cgi/content/abstract/84/2/274

Popkin, B. and S.J. Nielson. The Sweetening of the World's Diet. *Obesity Research.* 2003: Vol. 11, No. 11. http://www.obesityresearch.org/cgi/content/abstract/11/11/1325

Popkin, B. The Nutrition Transition in the Developing World. *Development Policy Review.* 2003: Vol. 21, No. 5-6. http://www.blackwell-synergy.com/loi/dpr

Popkin, B. and P. Gordon-Larsen. The Nutrition Transition: Worldwide Obesity Dynamics and Their Determinants. *International Journal of Obesity.* 2004: Vol. 28, S2-S9. http://www.nature.com/ijo/index.html

Popkin, B. Global Nutrition Dynamics: The World is Shifting Rapidly Toward a Diet Linked with Noncommunicable Diseases. *American Journal of Clinical Nutrition.* 2006: Vol. 84. http://www.ajcn.org/cgi/content/abstract/84/2/289

Prentice, A. The Emerging Epidemic of Obesity in Developing Countries. *International Journal of Epidemiology.* 2006: Vol. 35. http://ije.oxfordjournals.org/cgi/content/abstract/35/1/93