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Undoing the Damage of the Dew

Priscilla Norwood Harris

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> Mountain Dew is unique because it has a lot of sugar and a lot of acid. If you're taking a drink every 20 minutes, that's like bathing the teeth in it all day.[1]
>
> It's just rampant decay[.] People are addicted to Mountain Dew. It's terrible.[2]

I. INTRODUCTION

Over the past several decades, American consumption of carbonated soft drinks[3] (CSDs)[4] has increased dramatically. In 1947, Americans con-

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1. Ketruah Gray & Joseph Diaz, quoting Dr. Edwin Smith, *20/20*, "Mobile Clinic Treats 'Mountain Dew Mouth'" (ABC Feb. 13, 2009) (TV Broad), http://abcnews.go.com/Health/Story?id=6863173&page=2 (last accessed Mar. 5, 2009) [hereinafter ABC News, "*Mountain Dew Mouth*"].

2. Dr. Stacie Moore-Martin, "*Mountain Dew Mouth*," *supra* n. 1 (last accessed Mar. 5, 2009).

3. Harold Saltzman, Roy Levy & John C. Hilke, *Fed. Trade Commission Transformation and Continuity: The U.S. Carbonated Soft Drink Bottling Indus. and Antitrust Policy Since 1980, Bureau of Economics Staff Report*, 1, n. 1. (Nov. 1999) (available at http://www.ftc.gov/reports/softdrink/softdrink.pdf) (last accessed Mar. 4, 2009) [hereinafter *CSD Antitrust Report*]. ("Most CSDs are manufactured by 'bottlers' who buy flavored syrup or concentrate . . . from 'parent' companies, and combine that syrup with carbonated water to make finished CSDs"). *Id.* at 5.

4. In this article, I will use the term CSDs to refer to carbonated soft drinks and energy drinks. *See e.g. Special Issue: All-Channel Carbonated Soft Drink Performance in 2005*, 49 Bev. Dig. (No. 7 Mar. 8, 2006) (available at http://www.beverage-digest.com/pdf/top-10_2006.pdf) (last accessed Mar. 5, 2009) (This is the term used in publications that contain data concerning the beverage industry); *id.* (However, because energy drinks are a relative newcomer to the American market, in the years before 1995, the term CSD would have only included carbonated soft drinks. The term "liquid refreshment beverage" or LRB is used to cover CSDs, non-carbonated drinks, and water).

I will use the term "soft drinks" to refer to carbonated soft drinks without the inclusion of energy drinks. Earlier reports do not contain data concerning energy drinks as they are relatively new to the market. *See e.g.,* Tom Strenk, *Revved Up: The Energy Drink Mantra?*, 127 Bev. World 44 (No.6 June 15, 2008) (after allegedly discovering a tonic recipe in Thailand, Austrian entrepreneur Dietrich Mateschitz launched Red Bull in Austria in 1987, and it came to North American in 1997) (available at 2008 WLNR 1646849).

Over the years the terms for the carbonated soft drink have evolved from "medicated carbonated water" to "soda water" to "soda" to "pop" to "soft drink."

sumed on average two soft drinks per week.[5] By 1996, they consumed on average approximately two soft drinks per day.[6] As a result, the CSD industry is, as of 2007, a $72 billion a year industry.[7]

There is a dark side to all of this consumption. Numerous studies link consumption of CSDs to various health problems,[8] including: heart disease,[9] obesity,[10] osteoporosis,[11] and dental harm,[12] especially dental ero-

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5. I.M. Low & A. Alhunthali, *In-situ Monitoring of Dental Erosion in Tooth Enamel When Exposed to Soft Drinks*, J. Materials Sci. Engr. (forthcoming 2008) (available at http://dx.doi.org/10.1016/j.msec.2008.02.005) (last accessed Mar. 5, 2009) [hereinafter Low, *In-Situ Monitoring*]; J. Anthony von Fraunhofer & Matthew M. Rogers, *Dissolution of Dental Enamel in Soft Drinks*, 52 Gen. Dentistry 308 (2004) [hereinafter von Fraunhofer, *Dissolution in Soft Drinks*].

6. Low, *In-Situ Monitoring*, *supra* n. 5; von Fraunhofer, *Dissolution in Soft Drinks*, *supra* n. 5 at 308. Other countries, such as the United Kingdom, have also seen an increase in the consumption of soft drinks. *See* J.A. Hughes, N.X. West & M. Addy, *The Protective Effect of Fluoride Treatments Against Enamel Erosion in Vitro*, 31 J. Oral Rehab. 357 (2004) [hereinafter Hughes, *Protective Effect of Fluoride Treatments*]. *See also* S.M. Hooper et al., *The Protective Effects of Toothpaste Against Erosion by Orange Juice: Studies in Situ and in Vitro*, 35 J. Dentistry 476 (2007) (United Kingdom has seen "a monumental increase in the consumption of soft drinks, fruit juices and sport drinks") [hereinafter Hooper, *Effects of Toothpaste*].

7. *Special Issue: Top-10 CSD Results for 2007*, 52 Bev. Dig. (No. 5 2008) (available at http://www.beverage-digest.com/pdf/top-10_2008.pdf) (last accessed Mar. 5, 2009) [hereinafter *2007 CSD Top-Ten*].

8. *See* Michael F. Jacobson, Center for Science in the Public Interest, *Liquid Candy – How Soft Drinks are Harming Americans' Health* 8-18 (problems include obesity, osteoporosis, heart disease, and more) (available at http://www.cspinet.org/new/pdf/liquid_candy_final_w_new_supplement.pdf) (last accessed Mar. 5, 2009) [hereinafter *Liquid Candy*]; Amy Jo Johnson, *Soft Drinks Exact a Hard Toll on Kids' Smiles*, Times-Picayune 3 (Mar. 12, 2007) (diabetes, obesity, osteoporosis, and tooth decay) (available at 2007 WLNR 4647733); Rachele Kanigel, *It Raises Diabetes Risk and Robs Bone*, 58 Prevention 160 (2006) (obesity, diabetes, tooth decay, and osteoporosis) (available at 2006 WLNR 20766276).

9. Thomas H. Maugh II, *Diet Soda Linked to Key Heart Risk*, L.A. Times A-10 (July 24, 2007) (available at http://articles.latimes.com/2007/jul/24/science/sci-soda24) (last accessed Mar. 5, 2009).

10. John Barnard, *Do Soft Drinks Make People Want to Eat More?*, Columbus Dispatch (Ohio) 5B (Dec. 9, 2008) ("A link between consumption of sugary soft drinks and childhood obesity is well-established in the scientific literature.") (available at 2008 WLNR 23635925); *but see* Bob Keefe, *Time to Refute Obesity Claims, Coke CEO Says*, Atlanta J. - Const., C1 (Oct, 21, 2008) (Coca-Cola CEO stated: "People need to understand that obesity is not about a beverage or a candy bar or a restaurant meal or a PlayStation game or about working longer hours . . .") (available at 2008 WLNR 20013883).

11. Serena Gordon, *Cola May Be Bad to the Bones*, Health Day (Apr. 26, 2008) (available at 2008 WLNR 7778099).

12. For photographs of dental erosion caused by cola soft drink consumption, see Figures 11 and 12, Beatrice Kay Gandara & Edmond L. Truelove, *Diagnosis and Management of Dental Erosion*, 1 J Contemp. Dental Pract. 16, 20 (1999) (available at http://www.thejcdp.com/issue001/gandara/gandara.htm#abstract) (last accessed Mar. 5, 2009) [hereinafter Gandara, *Diagnosis*]. Their descriptions:

sion.[13] The main culprits causing the dental harm are not the cola CSDs but rather the non-cola drinks such as Mountain Dew.[14] Mountain Dew's effect[15] on teeth even has a name: "Mountain Dew Mouth,"[16] and the effect is devastating.[17]

> Figure 12 illustrates erosion of the left side mandibular molars of a 20-year old female who habitually enjoyed holding a cola beverage in this area for several minutes before swallowing. Other parts of the dentition were not affected . . . .
>
> Figure 11 shows erosion (arrow) secondary to day-long sipping of a cola drink in a patient .
> [whose] acidic oral environment most likely contributed to the extensive occlusal attrition.

Id.

Many of the studies cited in this article relied on one or more methods to determine the effect of soft drinks on teeth: (1) "in vitro"; (2) "in vivo"; and (3) "in situ." In a general medical sense, they mean: (1) in vitro, "[i]n an artificial environment, referring to a process or reaction occurring therein, as in a test tube or culture media"; (2) in vivo, "[i]n the living body, referring to a process or reaction occurring therein"; and (3) in situ, "[i]n position, not extending beyond the focus or level of origin." Stedmans Medical Dictionary (27th ed. 2000).

13. *See* discussion *infra*.

14. Studies have linked other beverages to tooth harm. *See e.g.* Poonam Jain et al., *Commercial Soft Drinks: pH and in Vitro Dissolution of Enamel,* 55 Gen. Dentistry 150 (2007) (Mountain Dew along with Squirt, Surge, Slice Orange, Sprite, and 7Up) (available at http://www.agd.org/publications/articles/?ArtID=923) (last accessed Mar. 5, 2009) [hereinafter Jain, *CSDs and pH*]; J. Anthony von Fraunhofer & Matthew M. Rogers, *Effects of Sports Drinks and Other Beverages on Dental Enamel,* 53 Gen. Dentistry 28, 29 (2005) (Gatorade, Red Bull, KMX, and Snapple Classic Lemonade) [hereinafter Fraunhofer, *Effects of Sports Drinks*]; Barry M. Owens, *The Potential Effects of pH and Buffering Capacity on Dental Erosion, 55* Gen. Dentistry 527 (2007) (Red Bull and Gatorade) [hereinafter Owens, *The Potential Effects of pH and Buffering Capacity on Dental Erosion*; P.A. Brunton & A. Hussain, *The Erosive Effect of Herbal Tea on Dental Enamel,* 29 J. Dentistry 517, 519 (2001) (herbal tea); Isabelle Van Eygen, Bart Vande Vannent & Henrich Wehrbein, *Influence of a Soft Drink With Low pH on Enamel Surfaces: An in Vitro Study,* 128 Am. J. Orthodontics & Dentofacial Orthopedics 372, 377 (2004) (Red Bull) [hereinafter Eygen, *Influence of a Soft Drink With Low pH on Enamel*]. This article focuses on the harm caused to teeth by Mountain Dew.

15. Studies have linked Mountain Dew to tooth harm, such as dental erosion. *See e.g.* Jain, *CSDs and pH, supra* n. 14; von Fraunhofer, *Effects of Sports Drinks, supra* n. 14; von Fraunhofer, *Dissolution in Soft Drinks, supra* n. 5.

16. ABC News, "*Mountain Dew Mouth,*" *supra* n. 1; Deborah Mendenhall, *Watch What You Dew,* Pittsburgh Post-Gazette D2 (Sept. 4, 2001) (available at http://www.post-gazette.com/healthscience/20010904hsoda0904p4.asp) (last accessed Mar. 5, 2009) (2001 WLNR 3446574).

17. Photographs and video graphically show the horrific damage. *See e.g.* ABC News, "*Mountain Dew Mouth,*" *supra* n. 1; Before and After Photo Gallery, Boca Raton Cosmetic Dentist, http://www.bocaratoncosmeticdentist.com/gallery.html (last accessed Mar. 2, 2009); *Enamel Erosion Video – Soda Pop Carbonic Acid,* Boca Raton Cosmetic Dentist, http://www.bocaratoncosmeticdentist.com/video_soda_pop.html (video featuring Mountain

II. THE BEGINNINGS OF CARBONATED SOFT DRINKS

A. *In General*

American soft drinks evolved from artificial mineral waters or "carbonated waters," which, according to English writers, were first commercially manufactured by Thomas Henry in Great Britain during the 1770s.[18] Carbonated water made an immediate impact on the British Navy due to its long "shelf-life," and some inaccurate claims that it "cured scurvy."[19] In the 1790s, the term "Soda Water" came into use, reflecting the fact that "soda was an ingredient for its medicinal properties."[20] Soon the manufacturing of carbonated water became popular across Europe.[21] Carbonated water reached America before 1800, but it was not until 1807 that a Yale chemistry professor began selling soda water commercially in America.[22]

Soda water stopped being considered "therapeutic artificial mineral water" in America before it did in Great Britain.[23] As soda water moved away from being used for medicinal purposes, the soda was eliminated, and flavors were added.[24] Although "some carbonates were consumed purely as a source of refreshment . . . many retained their medicinal pedigree to a greater or lesser extent."[25]

By 1830, the addition of flavors was well established in America, primarily using juices and syrups.[26] With these additions, the term "Soda Water" came into question but was still widely used until well into the 20th century.[27] About midway into the 19th century, the term "Pop" came into use based on "the popping noise made when the gaseous pres-

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Dew Makeover) (last accessed Mar. 2, 2009); Dental Health Photo Library, *Bad Teeth: Enamel Erosion Acids*, http://www.dental—health.com/bad_teeth_acid_erosion.html (last accessed Mar. 2, 2009); Hampton Dental Associates, *The Ravages of Soda Pop – Soft Drinks*, http://www.hamptondentalassociates.com/dentures_basic.html ("Mountain Dew man" Frank featured) (last accessed Mar. 2, 2009).

18. *See* John J. Riley, *A History of the American Soft Drink Industry* 3 (Arno Press 1958) (1972) [hereinafter *History of Soft Drinks*]; *Carbonated Soft Drinks: Formulation and Manufacture* 2-3 (David P. Steen & Philip R. Ashurst eds., Blackwell Pub. 2006) [hereinafter *CSDs: Formulation*].

19. *CSDs: Formulation*, *supra* n. 18, at 2.

20. *History of Soft Drinks*, *supra* n. 18, at 4-5.

21. *CSDs: Formulation*, *supra* n. 18, at 2.

22. *See History of Soft Drinks*, *supra* n. 18, at 4; *CSDs: Formulation*, *supra* n. 18, at 2; Jasper Guy Woodruff & G. Frank Phillips, *Beverages: Carbonated and Noncarbonated* 4 (AVI Pub Co. 1981) [*hereinafter Beverages*].

23. *History of Soft Drinks*, *supra* n. 18, at 5. In Great Britain prior to 1898, "soda water was strictly a medical product and was required to contain sodium bicarbonate." *Id.* As of 2006, Great Britain still required that "soda water contain a minimum of 550 mg/l sodium bicarbonate." *See CSDs: Formulation*, *supra* n. 18, at 4.

24. *History of Soft Drinks*, *supra* n. 18, at 7.

25. *CSDs: Formulation*, *supra* n. 18, at 4.

26. *History of Soft Drinks*, *supra* n. 18, at 9.

27. *Id.* at 11.

sure within the bottle was released by removing the cork or other closure."[28] The term used most often was "Soft Drink."[29] This term was meant "to distinguish the simple flavored refreshment from spirits, or hard liquors for which they were widely recommended as a substitute in the effort to change the imbibing habits so characteristic of earlier days in America."[30]

B. *Coca-Cola*[31]

After the Civil War, the growth of patent medicines exploded, "partly due to wounded veterans who had acquired a self-dosing habit out of necessity."[32] In 1870, John Pemberton (a Confederate veteran and pharmacist) moved to Atlanta from Columbus, Georgia.[33] At that time, local pharmacists knew as much about drug manufacturing as researchers for the national drug companies.[34] As a result, many pharmacists, including Pemberton, "work[ed] with the kettles and test tubes in [their] lab[s] to create potions that would make people feel better."[35] In 1886, Pemberton created a drink that was later named Coca-Cola by his business partner and Union veteran, Frank Robinson.[36]

By 1891, Asa Candler, an Atlanta druggist, had acquired the Coca-Cola sector of Pemberton's business.[37] In 1894, without the benefit of a contract with the Coca-Cola Company, and unbeknownst to Candler, the owner of a confectionary store began bottling Coca-Cola in Mississippi.[38] Candler himself had originally frowned upon bottling Coca-Cola.[39] However, in 1899, Candler signed a 600-word contract with two lawyers from Chattanooga, Tennessee—Benjamin Franklin Thomas and Joseph Whitehead.[40] The contract gave the two lawyers "the right, in perpetuity, to

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28. *Id.* at 12.

29. *Id.*

30. *Id.*

31. Although this article focuses on Mountain Dew, a PepsiCo brand, no discussion of the history of soft drinks would be complete without a brief discussion of Coca-Cola and The Coca-Cola Company.

32. Mark Pendergast, *For God, Country and Coca-Cola* 9 (Basic Books 1993) (2000) [hereinafter *For God and Coca-Cola*].

33. Frederick Allen, *Secret Formula* 19-21 (Harper Bus. 1994) (1995) [hereinafter *Secret Formula*].

34. Lawrence Dietz, *Soda Pop, The History, Advertising, Art, and Memorabilia of Soft Drinks in America* 15 (Simon and Schuster 1973) [hereinafter *Soda Pop*].

35. *Id.*

36. *For God and Coca-Cola*, *supra* n. 32, at 29. Before he created Coca-Cola, Pemberton made "Globe of Flower Cough Syrup, Indian Queen Hair Dye, Triplex Liver Pills, Gingerine, and a blood medicine called Extract of Styllinger." *Soda Pop*, *supra* n. 34, at 15.

37. *Soda Pop*, *supra* n. 34, at 17.

38. *Id.* at 25-27.

39. *Soda Pop*, *supra* n. 34, at 25-27; *For God and Coca-Cola*, *supra* n. 32, at 69-71.

40. *See Soda Pop*, *supra* n. 34, at 28-29.

bottle Coca-Cola," with territorial rights to the entire United States, except for: Mississippi, Texas, and New England north of the New York-Connecticut line.[41]

In 1919, an Atlanta "syndicate," led by Ernest Woodruff, bought the Coca-Cola Company from the Candler family.[42] In 1923, Ernest Woodruff's son, Robert Woodruff, took over as president of the company, where he remained influential until his death in 1985 at the age of ninety-five.[43]

C. *Pepsi*

The origins of Pepsi and PepsiCo[44] began a few years after those of Coca-Cola and the Coca-Cola Company, but followed a rockier road. In the 1890s, Caleb Bradham, a pharmacist in New Bern, North Carolina, developed a drink he called "Brad's Drink," that became a favorite with his pharmacy customers.[45] He began calling it Pepsi-Cola in 1898.[46] In 1903, he was granted a trademark for Pepsi-Cola.[47] One year later, he sold almost 20,000 gallons of syrup.[48]

Bradham reached the height of his success in 1915,[49] but within ten years, he and Pepsi fell on hard times and into bankruptcy.[50] In 1923, the company's assets, including the formula and trademark, were sold for $30,000 to a holding company.[51] That same year, the holding company

41. *Id.* at 29-30. Thomas and Whitehead later had several disagreements so they decided to split their territory. *Id.* at 30-31.

42. *See Secret Formula*, *supra* n. 33, at 100; *For God and Coca-Cola*, *supra* n. 32, at 129-131.

43. *See Secret Formula*, *supra* n. 33, at 156, 408; *For God and Coca-Cola*, *supra* n. 32, at 155, 350.

44. PepsiCo., Inc. is the current name for the parent corporation that owns Pepsi-Cola and Mountain Dew.

45. *See Soda Pop*, *supra* n. 34, at 85; Bob Stoddard, *Pepsi – 100 Years* 15 (General Publishing Group 1997) [hereinafter *Pepsi – Hundred Years*]; Milward W. Martin, *Twelve Full Ounces* 7 (Holt, Rinehart and Winston 1962) [hereinafter *Twelve Ounces*].

46. *See Soda Pop*, *supra* n. 34, at 85; *Pepsi – Hundred Years*, *supra* n. 45, at 18; *Twelve Ounces*, *supra* n. 45, at 7.

47. *See Soda Pop*, *supra* n. 34, at 85; *Pepsi – Hundred Years*, *supra* n. 45, at 19; *Twelve Ounces*, *supra* n. 45, at 9.

48. *Pepsi – Hundred Years*, *supra* n. 45, at 23; *See Twelve Ounces*, *supra* n. 45, at 22.

49. *See Soda Pop*, *supra* n. 34, at 86; *Twelve Ounces*, *supra* n. 45, at 31.

50. *See Soda Pop*, *supra* n. 34, at 86-89; *Pepsi – Hundred Years*, *supra* n. 45, at 29; *Twelve Ounces*, *supra* n. 45, at 39. Bradham miscalculated the future of the price of sugar, paying 22 cents a pound in May, 1920, only to have the price plummet to three cents a pound by December. *Soda Pop*, *supra* n. 34, at 88. This loss alone was not enough to drive Pepsi into bankruptcy, "[b]ut that loss added to several years of losses and combined with a decline in sales brought on by the sugar crisis, may have been enough to wreck Bradham's dreams for Pepsi." *Pepsi – Hundred Years*, *supra* n. 45, at 46.

51. *See Soda Pop*, *supra* n. 34, at 89; *Pepsi – Hundred Years*, *supra* n. 45, at 49; *Twelve Ounces*, *supra* n. 45, at 39.

merged with a Richmond, Virginia soft drink manufacturer to become the Pepsi-Cola Corporation, with Roy Megargel as the driving force.[52] The location of Pepsi headquarters was then moved from North Carolina to Richmond.[53]

From 1923 to 1928, Megargel lost money every year, but used personal funds to make up the deficit.[54] In 1928, the Pepsi-Cola Corporation merged with the newly created National Pepsi-Cola Corporation in order to stop an imminent financial crisis.[55] Unfortunately, when the stock market crashed in 1929, Megargel could no longer use personal funds to support the corporation.[56] As a result, in June of 1931, the National Pepsi-Cola Corporation was forced into bankruptcy, "the second bankruptcy in Pepsi-Cola history."[57]

However, within a few months there was a new Pepsi-Cola Company and a new leader, Charles Guth,[58] who changed the Pepsi-Cola formula "so that the taste was more to [his] liking."[59] Guth "was destined" to make Pepsi profitable,[60] but lost money during his first three years with Pepsi-Cola.[61] At one point in 1933, Guth offered to sell the company to the Coca-Cola Company, but was rebuffed, in what was perhaps the greatest missed opportunity in American corporate history.[62] Later that year, he implemented a change that reversed Pepsi's fortunes. Re-using old beer bottles, he started selling Pepsi-Cola in 12-ounce bottles for a nickel,[63] the same price charged for six-ounce bottles of other brands.[64] The "sales floodgates [were] opened," and Pepsi's finances were secured.[65]

D. *Mountain Dew*

In the 1940s, two brothers in the bottling business in Knoxville, Tennessee, Barney and Ally Hartman, concocted a lemon-lime drink to use as

52. *See Pepsi – Hundred Years*, *supra* n. 45, at 50-52; *Twelve Ounces*, *supra* n. 45, at 41-42.

53. *See Pepsi – Hundred Years*, *supra* n. 45, at 49; *Twelve Ounces*, *supra* n. 45, at 41-42.

54. *Twelve Ounces*, *supra* n. 45, at 42.

55. *Pepsi – Hundred Years*, *supra* n. 45, at 56; *see Twelve Ounces*, *supra* n. 45, at 42.

56. *Twelve Ounces*, *supra* n. 45, at 44.

57. *Id.* at 44; *see Pepsi – Hundred Years*, *supra* n. 45, at 59.

58. Guth was the President of a candy store chain that also sold fountain drinks. *Twelve Ounces*, *supra* n. 45, at 46. Guth was unhappy with the price that he had to pay for Coca-Cola syrup and wanted a volume discount, "an argument that left Coca-Cola unimpressed." *Pepsi – Hundred Years*, *supra* n. 45, at 63. Guth's solution was to buy his own cola company. *Id.*

59. *Pepsi – Hundred Years*, *supra* n. 45, at 65.

60. *Twelve Ounces*, *supra* n. 45, at 46; *see Pepsi – Hundred Years*, *supra* n. 45, at 61.

61. *Twelve Ounces*, *supra* n. 45, at 54.

62. *Pepsi – Hundred Years*, *supra* n. 45, at 67.

63. *Twelve Ounces*, *supra* n. 45, at 58; *See Pepsi – Hundred Years*, *supra* n. 45, at 67.

64. *See Twelve Ounces*, *supra* n. 45, at 58.

65. *Id.*

a mixer in their favorite bourbon, calling it Personal SetUp.[66] Others jokingly called it "Mountain Dew."[67] Visitors to the brothers' bottling plant liked the taste, so the Hartmans decided to go public with their drink. They hired a local high school senior to draw a label with "a hillbilly" on it, and took their drink to a Tennessee convention where it was well received.[68] In 1948, the Hartmans filed for a trademark on the Mountain Dew name and design, including a green bottle with the slogan: "It'll Tickle Yore Innards!"[69] Ally Hartman received approval five years later in 1953.[70]

While waiting for the trademark, Ally Hartman continued to bottle Mountain Dew in the Knoxville plant and experiment with different bottle designs and sizes. He finally decided on a green, seven-ounce bottle, with part of its logo displaying "a hillbilly shooting at a Revenoo'r as he exits from the outhouse."[71] The other part of the logo was the slogan he had submitted with the trademark application.[72]

In 1957, Billy Jones, the president of the Tip Corporation (Tip) of Marion, Virginia, approached Ally Hartman and asked him to invest in Tip.[73] Tip made its money "selling concentrated flavors to bottlers," but had incurred a lot of debt.[74] To secure working capital, Jones needed additional investors other than himself.[75] Jones approached four bottlers he

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66. Dick Bridgforth, *Mountain Dew: The History* 78-79 (Booksurge 2007) [hereinafter *Mountain Dew History*]. Old Taylor was their favorite bourbon. *Id.*

67. *Id.* at 79.

68. *Id.* at 79-80.

69. *Id.* at 82-83.

70. *Id.* The examiner originally refused to grant the trademark due to the fact that Mountain Dew did not contain liquor, making the trademark deceptive. *Id.* at 83. Barney Hartman died in 1949 before the trademark was granted. *Id.* at 84.

71. *Id.* at 85-87. The term Revnoo'r is explained as follows:

> Prohibition (a law prohibiting the manufacturing or sale of alcoholic beverages) started in 1920 and ended in 1933. Federal Prohibition agents (feds) were given the task of enforcing prohibition and stopping guys like Al Capone or Tennessee hillbillies from making illegal brew.
>
> The first Mountain Dew soft drink logo is steeped in [P]rohibition. "Mountain Dew" was the nickname for illegal alcohol made in the mountains. The soft drink's logo shows a moonshining hillbilly shooting at a fed as he runs out of an outhouse.
>
> When alcohol became legal in some states, feds became known as "revenooers" as their job description changed from stopping manufacturing to collecting revenue on the legal or illegal production.

Id. at 86, n. 85.

72. *See id.* at 83, 86-87 (photograph of trademark application bottle).

73. *Id.* at 92, 140-41, 148.

74. *Id.* at 45, 140-41, 148.

75. *Id.* at 140-41, 148; *Pepsi – Hundred Years*, *supra* n. 45, at 142-43.

knew, including Ally, and all four agreed.[76] Shortly thereafter, in 1957, Ally transferred the rights to Mountain Dew to Tip.[77]

In 1958, Bill Bridgforth, the plant manager of Tri-City Beverage in Knoxville, Tennessee (the plant that bottled Mountain Dew) asked Jones for help in coming up with a new flavor concentrate.[78] Jones obliged, and Tri-City Lemonade, a citrus-lemonade drink with added caffeine, was born.[79] Tri-City Lemonade sold moderately well because people liked the flavor, "but the name was not that catchy."[80] On the other hand, Bridgforth heard "a lot of buzz about the Mountain Dew name," but sales were only good, not great.[81] As a result, Bridgforth thought it would be a great idea to take the taste of Tri-City Lemonade and put it in the Mountain Dew bottle.[82] He approached Jones with the idea, and Jones agreed to make the substitution on a limited geographic basis.[83]

In 1960, Bridgforth began bottling the "NEW" Mountain Dew in Knoxville, and the "results were unexpectedly strong."[84] In 1962, Jones convinced the Minges brothers to start bottling the "NEW" Mountain Dew in North Carolina, and he also began seeking out other bottlers, starting first with Pepsi bottlers.[85] Within two years, he had signed up 54 bottlers, with only 16 being non-Pepsi bottlers.[86]

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76. *Mountain Dew History, supra* n. 66 at 140-41, 148. Jones asked the following bottlers, including two brothers, to invest in Tip: (1) Wythe Hull, Marion, Virginia; (2) Richard Minges, Fayetteville, North Carolina; (3) Herman Minges, North Carolina; and (4) Ally Hartman, Knoxville, Tennessee. *Id.*; *Pepsi – Hundred Years*, *supra* n. 45, at 142-43. All four were Pepsi bottlers. *Id.*

77. *Mountain Dew History*, *supra* n. 66, at 148. There are several versions concerning how Tip acquired Mountain Dew: (1) Ally donated it to Tip; (2) Ally substituted it for the $1,500 investment commitment that Jones was seeking; and (3) Ally sold it to a third party who then sold it to Tip. *Id.* at 92, 149. Another source gives a fourth version: Ally received a steak dinner worth $6.95. *Pepsi – Hundred Years*, *supra* n. 45, at 143.

78. *Mountain Dew History*, *supra* n. 66, at 45-46.

79. *Id.* at 45-46, 51-52.

80. *Id.* at 52.

81. *Id.* at 52. At that time Mountain Dew was a "lithiated-lime" drink. In the industry, lithiated-lime is basically a lemon-lime drink. *See id.* at 52, 78. Mountain Dew was competing with 7Up, another lemon-lime drink, and Bridgforth did not think that Mountain Dew could compete in that flavor group. *Id.* at 52. (With the citrus-lemonade flavor of Tri-City Lemonade, however, Mountain Dew could compete with 7Up).

82. *Id.* at 52, 154.

83. *Id.* at 52.

84. *Id.*

85. *Id.* at 154-56. All of the investors in Tip, except for Jones, were Pepsi bottlers. *Id.* at 155-56. At that time Pepsi was trying to sell its own lemon-lime drink, Teem. *Id.* at 156. Because Mountain Dew was no longer a lemon-lime drink but rather a citrus-lemonade drink, it no longer competed with Teem. *Id.*; *Pepsi – Hundred Years*, *supra* n. 45, at 144.

86. *See Mountain Dew History*, *supra* n. 66, at 157-158 (They were called the "Sweet 16" by the Tip board).

Sales kept increasing, causing the bottlers to demand more concentrate from Tip.[87] This put a strain on Tip because only Bridgforth and Jones knew the formula, and Jones "insisted on mixing every batch personally."[88] The Minges brothers became concerned about the concentrate being dependent on one person and a "slow, manual process."[89] In 1964, the CEO of PepsiCo contacted Herman Minges about purchasing Mountain Dew, and discussions continued throughout the year.[90] By September, they had reached an agreement whereby PepsiCo would buy all of the stock of Tip.[91] The purchase price was rumored to be $6 million in PepsiCo stock.[92]

III. THE CONTENTS OF THESE BEVERAGES

CSDs contain the following basic ingredients: carbonated water, refined sugar or substitute sweetener, acids, coloring agents, flavoring agents, neutralizing or buffering agents, and preservatives; some also contain caffeine.[93] Acids are present to balance the sweetness,[94] "enhance the taste and to allow for the dissolution of greater amounts of sugar."[95] Not only do acids enhance flavors, they also protect against microbiological spoilage.[96] The most commonly used acid in soft drinks is citric acid, "a bulky, highly polar molecule," which "is highly soluble in water and can deliver a 'burst' of tartness."[97]

These ingredients have caused concern among researchers and health care professionals due to their lack of nutrients and potential to cause harm. Among dental professionals, the sugar and acids cause the "greatest concern."[98] When it comes to the sugar content, non-diet soft drinks contribute 33% of added sugar to our diets; no other food contributes as much.[99] Concerning nutrients, "[s]oft drinks 'clearly have no vitamins,

87. *Id.* at 161.

88. *Id.* at 161-162.

89. *Id.* at 162.

90. *Id.*

91. *Pepsi – Hundred Years*, *supra* n. 45, at 142; *Mountain Dew History*, *supra* n. 66, at 163.

92. *Pepsi – Hundred Years*, *supra* n. 45, at 142.

93. Mohamed A. Bassiouny & Jie Yang, *Influences of Drinking Patterns of Carbonated Beverages on Dental Erosion*, 53 Gen. Dentistry 205 (2005) [hereinafter Bassiouny, *Influences of Drinking Patterns*].

94. A. Hansson et al., *Effect of Changes in pH on the Release of Flavor Compounds From a Soft Drink-Related Model System*, 74 Food Chemistry 429 (2001) [hereinafter Hansson, *Flavor Compounds*].

95. Bassiouny, *Influences of Drinking Patterns*, *supra* n. 93, at 205.

96. Hansson, *Flavor Compounds*, *supra* n. 94, at 429.

97. *Id.*

98. Bassiouny, *Influences of Drinking Patterns*, *supra* n. 93, at 205.

99. Jean L. Wiecha et al., *School Vending Machine Use and Fast-Food Restaurant Use Are Associated with Sugar-Sweetened Beverage Intake in Youth*, 106 J. Am. Dietetic Assn. 1624 (2006).

no minerals, [and] no phytochemicals (chemicals or nutrients from a plant source), so they're basically empty calories. . . .' "[100]

Throughout the years, the ingredients of CSDs have been altered due to changes in the law, concerns over costs of ingredients, and the preferences of consumers. For example, Coca-Cola originally contained traces of cocaine, which was removed in 1903,[101] and Pepsi did not add caffeine until 1919 to boost declining sales.[102] In addition, CSDs originally contained 100% cane sugar, but later the manufacturers switched to high-fructose corn syrup (HFCS).[103]

Changes continue even today. In April of this year, Pepsi announced that it will switch back to using real sugar in two new products: "Mountain Dew Throwback" and "Pepsi Throwback."[104] PepsiCo is also changing the formula of Mountain Dew for its South African market.[105] It is adding more caffeine in order to "position the brand as an energy drink for

100. Nanci Hellmich, *Obesity Studies Continue to Stir the Soft-Drink Debate*, USA Today (Sept. 9, 2006) (quoting Harvard researcher, Frank Hu) (available at http://www.usatoday.com/news/health/2006-08-08-soda-obesity_x.htm) (last accessed Mar. 5, 2009). To find out more about the nutrients or lack of nutrients in specific brands of soft drinks, *see What's in the Foods You Eat*, http://199.133.10.140/codesearchwebapp/(rt3ccebnqdfe2fvnbqqyl255)/codesearch.aspx (last accessed Mar. 3, 2009) (This site has a search function using keywords and gives nutrient information based on categories. Mountain Dew is in the category numbered "92410559, Soft drink, fruit flavored, caffeine containing." In the category the columns for most nutrients contain zeros. However, a few nutrients have more than zero grams though the amounts sound like agent numbers from a James Bond movie: iron (0.07 grams); zinc (0.04 grams); and niacin (0.056 grams)).

101. *See For God and Coca-Cola*, *supra* n. 32, at 87-89. "The drink's cocaine content had been a source of trouble from the beginning, but it was also a major selling point." *Id.* at 87. Some early ads even "emphasized the use of the coca leaf by the Andeans" when touting the medicinal values of Coca-Cola. *Id.* at 64. In Atlanta, alcohol was outlawed in 1885 although repealed one year later. *See id.* at 27, 32. Interestingly, the State of Georgia did not outlaw cocaine until 1902. *Id.* at 89. When Atlanta and Fulton County, Georgia, voted in prohibition on November 25, 1885, effective July 1, 1886, Pemberton scrambled to modify the current drink he had developed, Wine Coca, so as to remove the wine. *Id.* at 27. This modification of his Wine Coca ultimately led to Coca-Cola. *Id.*

102. *Pepsi – Hundred Years*, *supra* n. 45, at 45.

103. *See For God and Coca-Cola*, *supra* n. 32, at 331. In 1980, the Coca-Cola Company switched to 50% sugar and 50% HFCS. *Id.;* Roger Enrico, *The Other Guy Blinked* 68 (Bantam 1986) [hereinafter *Blinked*]. In 1983, it went to 75% HFCS in its fountain syrup; in 1984, it went to 100% HFCS in its fountain syrup and 75% in its bottles and cans. *Id.* at 70. In 1983, Pepsi switched to 50% sugar and 50% HFCS. *Id.* at 70.

104. Anonymous, *New Flavors Create Soft Drink Bubbles in a Flat Year*, 96 Bev. Indus. 10 (2005) (available at 2005 WLNR 13384610) [hereinafter *New Flavors*].

105. Tom Robbins, *PepsiCo Won't Forfeit Margin for Volume*, Bus. Rep. (Feb. 16, 2009) (available at http://www.busrep.co.za/index.php?fArticleId=4845768) (last accessed Mar. 4, 2009) [hereinafter Robbins, *PepsiCo Margin*].

young adults."[106] In 2005, "Pepsi reformulated its one-calorie Pepsi One with Splenda . . . ."[107]

IV. THE CONSUMPTION OF SOFT DRINKS AND CSDs

A. *In General*

Until 1999, Americans had consistently consumed more CSDs in each passing year.[108] For example, in 1947, each American consumed 100 12-ounce cans of soft drinks,[109] while in 1997, every American consumed, on average, nearly 600 12-ounce cans.[110]

The U.S. government, the CSD industry, and scientists track and research the consumption of CSDs and soft drinks by Americans. They track consumption based on both availability and on consumption, and, both per user and per user combined with non-user. Per capita availability of CSDs in America was over 50 gallons as of 2006, the latest year with available data, as compared to 42.7 gallons in 1980.[111] This represents a decline from a high of 53.8 gallons per capita availability in 1998.[112]

In addition to the decline in American per capita availability, the per capita consumption of CSDs has declined as well, following years of

106. *Id.*

107. *New Flavors, supra* n. 104, at 10. At the same time "Coca-Cola introduced Coca-Cola Zero, a new zero-calorie cola. Coca-Cola Zero is sweetened with a blend of aspartame and acesulfame potassium (ace-k)." *Id.*

108. *See* discussion *infra*.

109. von Fraunhofer, *Dissolution in Soft Drinks*, *supra* n. 5, at 308.

110. *Id.*

111. *See* Econ. Res. Serv., U.S. Dept. of Agric., Food Availability Data, 1984-2006 (available at http://www.ers.usda.gov/Data/FoodConsumption/spreadsheets/beverage.xls #CarbonatedSoftDrinks!a1) (last accessed Mar. 2, 2009) [hereinafter *Food Availability Data 1984-2006*]. These figures only go to 2006 because the Economic Research Service (ERS) "no longer provides estimates for carbonated drinks." *Id.* The ERS relied on data from the Beverage Marketing Corporation of New York. *Id.*

112. *Id.* The full figures are as follows:

increase. In 1899, Americans consumed 0.6 gallons of CSDs per capita.[113] By 1966, Americans were consuming around 20.3 gallons of soft drinks

Year	Resident population, July 1	Carbonated soft drinks					
		Regular	Per capita	Diet	Per capita	Total	Per capita
Year	Millions	Mill. gal.	Gallons	Mill. gal.	gallons	Mill. gal.	gallons
1980	*227.225*	NA	NA	NA	NA	7,640.8	33.6
1981	*229.466*	NA	NA	NA	NA	7,938.8	34.6
1982	*231.664*	NA	NA	NA	NA	8,208.7	35.4
1983	*233.792*	NA	NA	NA	NA	8,652.0	37.0
1984	*235.825*	7,036.7	29.84	2,160.4	9.2	9,197.1	39.0
1985	*237.924*	7,317.3	30.75	2,477.6	10.4	9,794.9	41.2
1986	*240.133*	7,590.4	31.61	2,664.8	11.1	10,255.2	42.7
1987	242.289	7,903.8	32.62	2,833.4	11.7	10,737.2	44.3
1988	*244.499*	8,109.2	33.17	3,111.2	12.7	11,220.4	45.9
1989	*246.819*	8,149.7	33.02	3,306.3	13.4	11,456.0	46.4
1990	*249.623*	8,266.5	33.12	3,487.4	14.0	11,753.9	47.1
1991	*252.981*	8,380.7	33.13	3,573.0	14.1	11,953.7	47.3
1992	256.514	8,579.5	33.45	3,553.5	13.9	12,133.0	47.3
1993	*259.919*	8,913.9	34.29	3,546.7	13.6	12,460.6	47.9
1994	*263.126*	9,356.4	35.56	3,640.0	13.8	12,996.4	49.4
1995	*266.278*	9,787.9	36.76	3,676.4	13.8	13,464.3	50.6
1996	*269.394*	10,183.7	37.80	3,717.5	13.8	13,901.2	51.6
1997	272.647	10,658.3	39.09	3,698.8	13.6	14,357.1	52.7
1998	*275.854*	10,995.3	39.86	3,845.7	13.9	14,841.0	53.8
1999	*279.040*	11,069.0	39.67	3,861.0	13.8	14,930.0	53.5
2000	*282.194*	11,107.5	39.36	3,897.5	13.8	15,005.0	53.2
2001	*285.112*	11,110.0	38.97	3,970.0	13.9	15,080.0	52.9
2002	*287.888*	11,069.3	38.45	4,132.8	14.4	15,202.1	52.8
2003	*290.448*	10,890.1	37.49	4,368.4	15.0	15,258.5	52.5
2004	*293.192*	10,719.8	36.56	4,647.4	15.9	15,367.2	52.4
2005	*295.896*	10,521.9	35.56	4,749.7	16.1	15,271.6	51.6
2006	*298.755*	10,343.0	34.62	4,760.6	15.9	15,103.6	50.6

Id.

113. A. Porter & Rebecca Wayland, *Coca-Cola versus Pepsi-Cola and the Soft Drink Industry* 1, Case Study for Harvard Bus. Sch., 9-391-179 (Oct. 12, 1994) [hereinafter *Coca-Cola versus*].

per capita.[114] Between 1965 and 1996, American consumption of soft drinks increased 300%.[115] Some historical soft drink consumption numbers illustrate this trend:

YEAR[116]	GALLONS PER CAPITA	% OF TOTAL BEVERAGE CONSUMPTION
1899	0.6	n/a
1965	17.8	9.8
1970	22.7	12.4
1975	26.6	14.4
1981	34.5	18.7
1985	40.8	22.4

Throughout the 1990s, with the exception of 1999, per capita consumption of CSDs by Americans increased[117] as shown below:

YEAR	GALLONS PER CAPITA[118]	% OF TOTAL BEVERAGE CONSUMPTION[119]
1990	48.0	26.1
1991	48.4	26.2
1992	48.8	26.3

114. Jain, *CSDs and pH*, *supra* n. 14, at 150.

115. Justine L. Kolker et al., *Dental Caries and Dietary Patterns in Low-Income African American Children*, 29 Pediatric Dentistry 457 (2007) [hereinafter Kolker, *Caries and African American Children*].

116. For all but 1899, David B. Yoffie & Sharon Foley, *Cola Wars Continue: Coke vs. Pepsi in the 1990s* Exh. 1, 14, Case Study for Harvard Bus. School, 9-794-055 (Mar. 31, 2000) [hereinafter *Coke vs. Pepsi, 1990s*]. For 1899, *Coca-Cola versus*, *supra* n. 113, at 1.

117. Greg W. Prince, *The Year of Living Dangerously*, 119 Bev. World 34 (No. 1688 March 15, 2000) (available at 2000 WLNR 9898905) [hereinafter Prince, *Living Dangerously*].

118. *Functional Beverages*, 127 Bev. World 14 (No. 3 Mar. 15, 2008) (available at 2008 WLNR 9348096). Another source cites somewhat lower per capita consumption numbers for the 1990s:

Year	Gallons per Capita
1990	47.7
1991	47.8
1992	48.0
1993	48.4
1994	49.6
1995	51.2
1996	52.6
1997	53.7
1998	54.8

Coke vs. Pepsi, 1990s, *supra* n. 116, Ex. 1, at 14.

119. *Coke vs. Pepsi, 1990s*, *supra* n. 116, Ex. 1, at 14.

1993	49.7	29.8
1994	51.5	27.2
1995	52.2	28.1
1996	53.4	28.8
1997	54.6	29.4
1998	56.1	30.0
1999	55.9 (preliminary)	-

After 1999, industry figures show that the decline in per capita consumption continued. In 2006, per capita consumption was 50.4 gallons,[120] far from the high point in 1998 of 54.9 gallons.[121] Another way to view the decline is in terms of eight-ounce servings. In 2000, per capita consumption was 849 eight-ounce servings, but by 2007 the number had declined to 789 eight-ounce servings.[122]

The combined amount of CSDs consumed by Americans remains enormous even with the declines in recent years. Moreover, Americans still consume far more CSDs per capita than consumers in any other country.[123] The volume of CSDs consumed amounted to: 9.88 billion cases in 1998,[124] 9.93 billion cases in 1999,[125] 10.2 billion cases in 2004,[126] and 10.2 billion cases in 2005.[127] In 2006, the volume of CSDs consumed dropped

120. *Functional Beverages*, *supra* n. 118.

121. *Id.*

122. *2007 Top-10 CSDs, supra* n. 7. The figures for previous years show a pattern of declining consumption: in 2004, 837 eight-ounce servings; in 2005, 828 eight-ounce servings; and in 2006, 814 eight-ounce servings. *Id.* However, earlier years showed increases. In 1850, there were two eight-ounce servings per capita, but by 1970, there were 350 eight-ounce servings. *Beverages*, *supra* n. 22, at 7.

123. *See 2007 Top-10 CSDs, supra* n. 7. According to one Scottish newspaper, the top five consumers of CSDs were, in liters, as follows: (1) United States, 216; (2) Ireland, 126; (3) Canada, 119.8; (4) Norway, 119.8; and (5) Belgium, 102.9. *See Stat's Life*, Daily Rec. 5 (Glasgow, Scotland) (Dec. 4, 2004) (available at 2004 WLNR 13035991).

124. *1998 Top-10 Soft Drink Companies and Brands*, Bev. Dig. (1999) (available at http://www.beverage-digest.com/editorial/990212s.html) (last accessed Mar. 4, 2009) [hereinafter *1998 Top-10 CSDs*].

125. *Special Issue: US 1999 Top-10 Soft Drink Companies and Brands*, Bev. Dig. (2000) (available at http://www.beverage-digest.com/editorial/000218s.html) (last accessed Mar. 4, 2009) [hereinafter *1999 Top-10 CSDs*]. In this article the term "case" means a 192-ounce unit case which is the industry standard. *See* Andrew Ross Sorkin & Andrew Martin, *Coca-Cola is Said to Buy Vitaminwater*, N.Y. Times C1 (May 25, 2007) (available at 2007 WLNR 9795071).

126. *Special Issue: All-Channel Carbonated Soft Drink Performance in 2005*, 49 Bev. Dig., (No. 7 2006) (available at http://www.beverage-digest.com/pdf/top-10_2006.pdf) (last accessed Mar. 5, 2009) [hereinafter *2005 CSD Performance*].

127. *Id.*

to 10.16 billion cases,[128] and in 2007, the volume consumed dropped even more to 9.9 billion cases, this being less than 10 billion cases for the first time since 2000.[129]

Not only are Americans consuming more soft drinks now than decades before, they are consuming more "low pH soft drinks."[130] As of 2003, "[c]arbonated beverages represent[ed] 51% of the market share of acidic soft drinks consumed."[131]

B. *Consumption of Mountain Dew*

Mountain Dew has consistently performed for PepsiCo, as shown below:

YEAR	MARKET SPOT	% OF MARKET SHARE	MILLION CASES	MILLION GALLONS
1977[132]	8	1.9	100.0	
1978[133]	8	2.4	130.0	
1981[134]	6	3.2	179.0	
1982[135]	7	3.2	185.4	
1983[136]	7	2.8	170.6	
1984[137]	8	2.8	176.6	
1985[138]	9	2.6	180.5	-
1986[139]	7	2.6	189.0	
1987			236.1[140]	-
1988[141]	7	3.4	255.0	

128. *Special Issue: Top-10 CSD Results for 2006*, 50 Bev. Dig. (No. 5 2007) (available at http://www.beverage-digest.com/pdf/top-10_2007.pdf) (last accessed Mar. 4, 2009) [hereinafter *2006 Top-10 CSDs*].

129. *2007 Top-10 CSDs, supra* n. 7.

130. N.X. West et al., *Development of Low Erosive Carbonated Fruit Drinks 2. Evaluation of an Experimental Carbonated Blackcurrant Drink Compared to a Conventional Carbonated Drink*, 31 J. Dentistry 361, 364 (2003) [hereinafter West, *Experimental Carbonated Blackcurrant Drink*].

131. *Id.* at 365.

132. *Beverages*, *supra* n. 22, Table 1.4, at 3.

133. *Id.*

134. *See US Top 10 Soft Drinks Brands*, Bev. World 631 (Apr. 1, 1982).

135. *See US Top 10 Soft Drink Brands for 1982*, Bev. World 311 (Mar. 1, 1983).

136. *See 1983 US Top 10 Soft Drinks Brands*, Bev. World 321 (Mar. 1, 1984).

137. *See Top 10 Soft Drinks Brand*, Bev. World 441 (Mar. 1, 1985).

138. *See Top 10 Soft Drink Brand for 1985*, Bev. World 471 (Mar. 1, 1986).

139. *See Other Brands Grab the Spotlight: Top 10 Soft Drink Brands for 1986*, Bev. World 38 (Mar.1, 1987).

140. *See Top 10 Soft Drink Brands for 1988*, Bev. World 24 (Mar. 1, 1989).

141. *Id.*

1989	7[142]	3.6[143]	-	-
1990		3.7[144]	-	-
1991		4.0[145]	552.6[146]	-
1992[147]	-	4.3	526.7	-
1995[148]	6	5.7	509.6	-
1996[149]	6	5.8	535.6	-
1997[150]	4	6.3	605.2	-
1998	4[151]	6.7[152]	665.1[153]	1,017.6[154]
1999[155]	4	7.1	705.0	1,078.7
2000[156]	4	7.0	719.8	
2001[157]	4	6.7	691.5	
2002[158]	4	6.4	648.4	

142. *See Diet Colas, Caffeine-Free and Otherwise, Lead the Charge*, 109 Bev. World 24 (No. 1461 Mar. 1, 1990).

143. *See Mountain Dew*, 112 Bev. World 38 (No. 1537 Mar. 1, 1993). [hereinafter *Mountain Dew 1993*].

144. *Id.*

145. *Id.*

146. *See Pepsi-Cola Company*, 111 Bev. World 77 (No. 1511 Mar. 1, 1992).

147. *See Mountain Dew 1993, supra* n. 143, at 38.

148. *1996 Top-10 U.S. CSD Numbers: Coca-Cola Co Up Sharply*, Bev. Dig. (1997) (available at http://www.beverage-digest.com/editorial/970207.html) (last accessed Mar. 5, 2009) [hereinafter *1996 Top-10 CSDs*].

149. *Id.*

150. *1998 Top-10 CSDs, supra* n. 124.

151. *Id.*

152. *Id.*

153. *Id.*

154. *1999 Top-10 CSDs, supra* n. 125.

155. Prince, *Living Dangerously, supra* n. 117, at 34.

156. BevNet.com, *US Soft Drink Sales Increased 0.5% in 2001*, (Mar. 1, 2002) http://www.bevnet.com/news/2002/03-01-2002-softdrink.asp (last accessed Mar. 3, 2009) [hereinafter *CSDs 2001 Increase*].

157. *Id.*

158. *Special Issue: Top-10 U.S. CSD Companies and Brands for 2003*, 44 Bev. Dig. (No. 6 2004) (available at http://www.beverage-digest.com/pdf/top-10_2004.pdf) (last accessed Mar. 3, 2009) [hereinafter *2003 Top-10 CSD*]; *cf.* Jeff Cioletti, *Weathering the Perfect Storm: Last Year Presented a Series of Difficult Challenges for the CSD Category*, 13 Beverage Aisle 23 (2004) (available at 2004 WLNR 5687810) (2002 figures by Beverage Marketing revised to reflect that in 2002, Mountain Dew was number four with 6.5% market share, 655.9 million cases, and 983.9 million gallons) [hereinafter Cioletti, *Perfect Storm*].

2003[159]	4	6.3	638.7	
2004[160]	4	6.3	648.0	
2005[161]	4	6.5	659.7	
2006[162]	4	6.6	666.3	
2007[163]	4	6.6	659.6	1,001.8

In 1999, among the top ten CSD brands, Mountain Dew "post[ed] the best share and volume growth" with 705 million cases and 7.1% share of the market, making it the fourth most popular CSD.[164] Since 1999, Mountain Dew's volume in cases and its share of the CSD market have both decreased; nevertheless, it has remained at number four. In the current decade, Mountain Dew has performed fairly consistently but without much growth. In 2003, it had 6.3% of market share and a volume of 638.7 million cases.[165] In 2004, it had 6.3% of market share and a volume of 648 million cases.[166] In 2005, it had 6.5% of market share and a volume of 660 million cases.[167] In 2006, it had 6.6% of market share and a volume of 666.3 million cases.[168] In 2007, it had 6.6% of market share and a volume of 659.6 million cases.[169]

As of 1998, one industry report described the earlier performance of Mountain Dew as follows:

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159. *2003 Top-10 CSD, supra* n. 158; BevNet.com, *Beverage Digest/Maxwell Ranks U.S. Soft Drink Industry for 2003*, (March 4, 2004) (available at http://www.bevnet.com/news/2004/03-04-2004-bevdigest_maxwell_2003.asp) (last accessed Mar. 3, 2009) (relying on *Top-10 for 2003*); *cf.* Cioletti, *Perfect Storm, supra* n. 158, at 23 (in 2003, Mountain Dew was number four with 6.4% market share, 646.1 million cases, and 969.1 million gallons) (available at 2004 WLNR 5687810).

160. *2005 CSD Performance, supra* n. 126; *cf.* Jeff Cioletti, *Carbonated Soft Drink Report: Diet Performance Not as Stellar as Expected as Overall Industry Continues to Fend Off Attacks*, 125 Bev. World 29 (No 4, Apr. 15, 2006) (in 2004, Mountain Dew in number four spot with market share of 6.4%, 655.8 million cases, and 983.7 million gallons) (available at 2006 WLNR 7528525) [hereinafter Cioletti, *CSDs Not as Stellar*].

161. *2005 CSD Performance, supra* n. 126; Cioletti, *CSDs Not as Stellar, supra* n. 160, at 29 (in 2005, Mountain Dew in number four spot with market share of 6.6%, 667.6 million cases, and 1,001 million gallons).

162. *2006 Top-10 CSDs, supra* n. 128.

163. *2007 Top-10 CSD, supra* n. 7; Heather Landi, *A Challenging Year: Soft Drink Volume Decline Accelerates as Consumers Take Advantage of Beverage Options*, 127 Bev. World S4 (No. 4 Apr. 15, 2008) (available at 2008 WLNR 25470116) [hereinafter Landi, *2007-Challenging Year for CSDs*].

164. *1999 Top-10 CSDs, supra* n. 125 (In this article "cases" means "192-ounce unit cases").

165. BevNet.com, *Bev. Digest/Maxwell Ranks U.S. Soft Drink Industry for 2003*, (Mar. 4, 2004) (available at http://www.bevnet.com/news/2004/03-04-2004-bevdigest_maxwell_2003.asp) (last accessed Mar. 5, 2009).

166. *2005 CSD Performance, supra* note 126.

167. *Id.*

168. *2006 Top-10 CSDs, supra* n. 128.

169. *Top-10 CSDs, supra* n. 7; Landi, *2007- Challenging Year for CSDs, supra* n. 163.

> In the late '80s, an energetic Mountain Dew was posting double-digit increases on a fairly regular basis . . . . In each year between 1993 and 1995, Dew posted an annual volume jump of at least 10 percent . . . .[170]

C. *A Closer Look at the Consumption of CSDs*

Since 1894, the United States Department of Agriculture (USDA) has conducted surveys concerning U.S. consumption of various food products,[171] including beverages such as soft drinks and milk.[172] Some

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170. Greg W. Prince, *Give Them Their Dew*, Bev. World 54 (Jan. 15, 1998) (available at 1998 WLNR 5405838).

171. Robert L. Rizek & Eleanor M. Pao, *Dietary Intake Methodology I. USDA Surveys and Supporting Research*, J. of Nutrition 1525 (1990) (available at http://jn.nutrition.org/cgi/reprint/120/11_Suppl/1525.pdf) (last accessed Mar. 4, 2009). The USDA has conducted many surveys:

> The [USDA] conducted the Nationwide Food Consumption Survey (NFCS) in 1935, 1942, 1948, 1955, 1965-66, 1977-78 and 1987-88. A series of food consumption surveys conducted by USDA in 1985, 1986, 1987, 1989, 1990 and 1991 were called Continuing Surveys of Food Intakes of Individuals (CSFII). The 1965-66, 1977-78, 1987-88 NFCS and the CSFII surveys determined individual food consumption. The earlier NFCSs only determined overall household food consumption.

Offi. of Envtl. Health Hazard Assessment, Cal. Envtl. Protec. Agency Air Toxics Hot Spots Program, Risk Assessment Guidelines, *Part IV, Tech. Support Doc. for Exposure Assessment and Stochastic Analysis* (2000) 7-2 (available at http://oehha.ca.gov/air/hot_spots/pdf/Stoch4f.pdf) (last accessed Mar. 4, 2009).

The most recent food consumption surveys were conducted earlier this decade as part of the National Health and Nutrition Examination Surveys (NHANES). "What We Eat in America (WWEIA) is the dietary intake interview component of the [NHANES]. WWEIA is conducted as a partnership between the [USDA] and the U.S. Department of Health and Human Services (DHHS)." *What We Eat In America (WWEIA), NHANES: Overview, Agric. Res. Serv., U.S. Dept. of Agric.*, http://www.ars.usda.gov/Services/docs.htm?docid=13793 (last updated Feb. 5, 2009).

The Food and Nutrient Database for Dietary Studies (FNDDS) "was designed for the purpose of processing dietary intake information collected in [WWEIA] " FNDDS Frequently Asked Questions, Agric. Res. Serv., U.S. Dept. of Agric., http://www.ars.usda.gov/Services/docs.htm?docid=7886 (last updated Feb. 5, 2009). I have relied on earlier surveys.

172. Agric. Res. Serv., U.S. Dept. of Agric., Design and Operation: The Continuing Survey of Food Intakes by Individuals and the Diet and Health Knowledge Survey, 1994–96, Nationwide Food Surv. Rep. No. 96–1 (Katherine S. Tippett and Yasmin S. Cypel, eds.,1997), Tbl. 1, at 7-8 (listing USDA surveys from 1965-1996) [hereinafter *1994-96 Design of CSFII and DHKS*] (available at http://www.ars.usda.gov/SP2UserFiles/Place/12355000/pdf/Dor9496.pdf) (last accessed Mar. 4, 2009) [hereinafter *Food Availability Data 1984-2006*].

Researchers from the USDA, relying on USDA food surveys, have concluded that consumption of CSDs has increased and that of milk has decreased. *See* Wilkinson et al., *Trends in Food and Nutrient Intakes by Adolescents in the U.S.*, 15 Family Econ. And Nutr. Rev. 15, 24 (2003) (available at http://www.ars.usda.gov/SP2UserFiles/Place/12355000/

surveys include household, as compared to individual, consumption.[173] Four surveys show the following concerning household consumption of soft drinks:

YEAR	TOTAL QUANTITY OF SOFT DRINKS PER HOUSEHOLD PER WEEK (LBS)	HOUSEHOLDS USING IN A WEEK (PERCENT)
1987-88[174]	7.48	68.8
1977-78[175]	5.84	61.1-63.4
1965-66	5.19	58.9-67.9
1955[176]	2.89	53.1

pdf/03enns.pdf) (last accessed Mar. 6, 2009); Wilkinson et al., *Trends in Food and Nutrient Intakes by Children in the U.S.*, 14 Family Econ. And Nutr. Rev. 56, 64 (2002) (available at http://www.ars.usda.gov/SP2UserFiles/Place/12355000/pdf/fenrv14n2p56.pdf) (last accessed Mar. 6, 2009); Wilkinson et al., *Trends in Food and Nutrient Intakes by Adults: NFCS 1977-78, CSFII 1989-91, and CSFII 1994-95*, 10 Family Econ. And Nutr. Rev. 2, 8, 10 (1997) (available at http://www.ars.usda.gov/SP2UserFiles/Place/12355000/pdf/Trends.pdf) (last accessed Mar. 6, 2009).

173. *1994-96 Design of CSFII and DHKS*, *supra* n. 172, at 3. ("The 1965–66 Household Food Consumption Survey and the 1977–78 and 1987–88 Nationwide Food Consumption Surveys included a household food use component ").

174. Agric. Res. Serv., U.S. Dept. of Agric., *Food Consumption and Dietary Levels of Households in the U.S., 1987-88, Nationwide Food Consumption Survs., Rep. No. 87-H-1, NTIS No. PB95-208732,* Tbl. 21, at 68 (1994), (available at http://www.ars.usda.gov/SP2UserFiles/Place/12355000/pdf/8788/nfcs8788_rep_87-h-1.pdf) (last accessed Mar. 4, 2009) [hereinafter *1987-88 Nationwide Food Consumption Survey*]. It covers all 50 states. *1994-96 Design of CSFII and DHKS*, *supra* n. 172, Table 1, at 7-8.

The abstract to this survey contains a caveat: "Due to the small number of The household-level response rate for the survey was low (38%); therefore, the likelihood of non-response bias [that] cannot be disregarded." *See id.* at unnumbered page 2, *Abstract.* Yet, the *1987-88 Nationwide Food Consumption Survey* "is the only nationwide survey that provides data on current household food use ." *Id.* However, "USDA'S last survey, conducted in 1987-1988, was so flawed that federal agencies were unable to use the information collected, according to FDA and EPA officials." Resources, Comm., and Econ. Dev. Div., U.S. Gen. Acctg. Off., GAO/RCED 94-192, *Food Safety: Changes Needed to Minimize Unsafe Chemicals in Food 24 (1994)* (available at http://archive.gao.gov/t2pbat2/152620.pdf) (last accessed Mar. 4, 2009).

175. Consumer Nutrition, Human Nutrition Info. Serv., U.S. Dept. of Agric., *Food Consumption: Households in the U.S., Seasons and Year 1977-78, Nationwide Food Consumption Survs. 1977-78, Report No. H- 6*, Table 19, at 61 (1983), (available at http://www.ars.usda.gov/SP2UserFiles/Place/12355000/pdf/7778/nfcs7778_rep_h-6.pdf) (last accessed Mar. 4, 2009) [hereinafter *1977-78 Nationwide Food Consumption Survey*]. The *1977-1978 Nationwide Food Consumption Survey* divided use in a week into the four seasons without providing an overall number. *See 1977-78 Household Food Consumption Survey*, Tbl. 19, at 61. It covers all 50 states. *1994-96 Design of CSFII and DHKS*, *supra* n. 172, Tbl. 1, at 7-8.

176. U.S. Dept. of Agric., *Food Consumption of Households in the U.S. - 1955, Nationwide Food Consumption Survey 1955, Report No. 1*, Tbl. 20, at 158 (1956) (available at http://www.ars.usda.gov/SP2UserFiles/Place/12355000/pdf/5556/hfcs5556_rep_1.pdf) (last accessed Mar. 4, 2009) [hereinafter *1955 Nationwide Food Consumption Survey*]. It covers 48 states and excludes Alaska and Hawaii *1994-96 Design of CSFII and DHKS*, *supra* n. 172, Tbl. 1, at 7-8.

These food consumption surveys also include data concerning the household consumption of "total fresh fluid milk[177] per household:

177. Whenever possible, I use the term "fluid milk" to include whole milk (including goat), buttermilk, skim milk, nonfat milk, and lowfat milk. What has constituted "fluid milk" has varied somewhat from survey to survey. For 1987-88, "Fresh fluid milk" included whole milk (including goat), buttermilk, skim milk, nonfat milk, lowfat milk, yogurt, and chocolate milk. *See 1987-88 Nationwide Levels Survey*, *supra* n. 174, Tbl. 5, at 18, 91. However, in an accompanying report, "Total fluid milk" was defined as "[i]nclud[ing] fluid whole, lowfat, skim, acidophilus, and filled cow's milk; buttermilk; goat's milk; reconstituted dry milk; evaporated milk; and sweetened condensed milk." Human Nutrition Info. Serv., U.S. Dept. of Agric., *Food and Nutrient Intakes by Individuals in the U.S., 1 Day, 1987-88, Nationwide Food Consumption Survs., Rep. No. 87-I-1*, at 89 (1994) (available at http://www.ars.usda.gov/SP2UserFiles/Place/12355000/pdf/8788/nfcs8788_rep_87-i-1.pdf) (last accessed Mar. 4, 2009) [hereinafter *1987-88 Individual Intakes Survey*].

For 1977-78, one report defined "fresh fluid milk" as including whole milk (including goat), skim milk, lowfat milk, and chocolate milk, but did not include buttermilk or yogurt. *See 1977-78 Nationwide Food Consumption Survey*, *supra* n. 174, at 256. However, buttermilk and yogurt were added to fluid milk in the pertinent table. *See id.*, Tbl. 4, at 19. An accompanying report failed to define "fresh fluid milk." *See* Consumer Nutrition, Human Nutrition Info. Serv., U.S. Dept. of Agric., *Food and Nutrient Intakes by Individuals in the U.S., 1 Day, 1977-78*, Nationwide Food Consumption Surveys, Preliminary Rep. No. 2 (1980) (available at http://www.ars.usda.gov/SP2UserFiles/Place/12355000/pdf/7778/nfcs7778_rep_i-1.pdf) (last accessed Mar. 4, 2009) [hereinafter *1977-78 Individual Intakes Survey*].

For 1965-66, "fresh fluid milk" included whole (including goat), skim (including lowfat and yogurt), and chocolate milk. *1965-66 Household Food Consumption Survey*, at 201. Thus, yogurt was considered part of skim milk. Moreover, buttermilk was added to fluid milk in the pertinent part of the table. *See id.*, Tbl. 4, at 12.

For 1955, the term included whole, buttermilk, skim, chocolate, and half and half, but no yogurt. *See 1955 Nationwide Food Consumption Survey*, *supra* n. 176, Tbl. 12, at 36 (the term "yogurt" not found in survey using "find" search).

A later survey for years 1994-96 did not monitor household consumption but tracked two types of individual consumption: "The quantities consumed per eating occasion (Tbl. Set 1) and in a day (Tbl. Set 2) [which were] quantities consumed by users only and . reported in terms of gram weights." Helen Smiciklas-Wright et al., Agric. Res. Serv., U.S. Dept. of Agric., *Foods Commonly Eaten in the U.S.: Quantities Consumed Per Eating Occasion and in a Day, 1994-1996*, NFS Rep. 96-5 (2002), at 7 (available at http://www.ars.usda.gov/SP2UserFiles/Place/12355000/pdf/Portion.pdf) (last accessed Mar. 4, 2009) [hereinafter *1994-96 Foods Commonly Eaten Report*]. This Report was based on "data collected in the *1994-1996 Continuing Survey of Food Intakes by Individuals (CSFII)*, conducted by the [USDA]." *Id.* at 1.

For Table Set 2 of the Report, "total milk" was measured and defined as "includ[ing] all cows' milk reported separately or as an ingredient in another food including all milk in ice creams, pudding, yogurt, processed foods except cheese and margarine." *Id.* at 229. It "also include[ed] reconstituted weight of dried and evaporated milk." *Id.*

The *CSFII* and the *1994-1996 Diet and Health Knowledge Survey* (*DHKS*) produced "Data Tables." *See* Food Survs. Res. Group, Agric. Res. Serv., U.S. Dept. of Agric., *U.S.D.A.'s 1994-1996 Continuing Survey of Food Intakes by Individuals and 1994-1996 Diet and Health Knowledge Survey*, Data Tbl. Set 10, at 2-4 (available at http://www.ars.usda.

YEAR	TOTAL QUANTITY OF FRESH FLUID MILK PER HOUSEHOLD PER WEEK (LBS)	HOUSEHOLDS USING IN A WEEK (PERCENT)
1987-88[178]	12.67 (pounds)	94.2
1977-78[179]	15.85 (pounds)	93.6-95.6
1965-66[180]	9.2 (quarts)	94.1-95.5
1955	14.81 (quarts)[181]	93.6[182]

In addition, for several decades the USDA has tracked individual consumption of food, including soft drinks and milk.[183] The USDA Food Surveys break down consumption by gender and age.[184] For ages six through eleven, the mean intakes were as follows:

gov/SP2UserFiles/Place/12355000/pdf/Csfii3yr.pdf) (last accessed Mar. 4, 2009) [hereinafter *1994-96 Tbl. set 10*].

In *1994-96 Data Tbl. set 10*, "[t]otal fluid milk [i]nclude[d] fluid whole, lowfat, skim, and acidophilus milk; buttermilk; reconstituted dry milk; evaporated milk; and sweetened condensed milk." *1994-96 Tbl. Set 10*, at 54. Tbl. Set 17 contained the same definitions. *See* Food Survs. Res. Group, Agric. Res. Serv., U.S. Dept. of Agric., *Food and Nutrient Intakes by Children 1994-96, 1998*, Data Tbl. Set 17 (1999), Tbl. 12A and 12B, at 31-32, 51 (containing year 1998) (available at http://www.ars.usda.gov/SP2UserFiles/Place/12355000/pdf/scs_all.PDF) (last accessed Mar. 4, 2009) [hereinafter *1994-96, 1998 Children Tbl. set 17*].

178. *1987-88 Nationwide Food Consumption Survey*, *supra* n. 174, Tbl. 5, at 18. This includes whole, buttermilk, skim, low fat, yogurt, and chocolate. *Id.* at 91.

179. *1977-78 Nationwide Food Consumption Survey*, *supra* n. 175, Tbl. 4, at 19. The *1977-1978 Nationwide Food Consumption Survey* divided use in a week into the four seasons without providing an overall number. *See id.*

180. *1965-66 Household Food Consumption Survey*, *supra* n. 177, Tbl. 4, at 12. The *1965-66 Household Food Consumption Survey* divided use in a week into the four seasons without providing an overall number. *See id.*

181. *1955 Nationwide Food Consumption Survey*, *supra* n. 177, Tbl. 6, at 34. This survey included under "total fresh fluid milk" whole milk, skim milk, low fat milk, buttermilk, and chocolate milk, but not yogurt. *See id.*

182. *Id.* at 36.

183. *See 1994-96 Design of CSFII and DHKS*, *supra* n. 172, Tbl. 1, at 7-8.

184. To compare these surveys, I have used the 1-day data.

MEAN INTAKE PER INDIVIDUAL[185] IN A DAY, 1-DAY (IN GRAMS),[186] MALES 6-11				
BEVERAGE	**1977-78**	**1987-88**	**1989-91**	**1994-1996, 1998**
Fluid Milk[187]	447[188]	439[189]	374[190]	335[191]
Carbonated Soft Drinks (Regular) (R	112 (105)[192]	136 (111)[193]	169 (154)[194]	217 (194)[195]

MEAN INTAKE PER INDIVIDUAL IN A DAY, 1-DAY (IN GRAMS), FEMALES 6-11				
BEVERAGE	**1977-78**	**1987-88**	**1989-91**	**1994-1996, 1998**
Fluid Milk	416[196]	310[197]	339[198]	283[199]
Carbonated Soft Drinks (R)	105 (101)[200]	126 (108)[201]	136 (122)[202]	200 (181)[203]

185. "Food group quantities represent average intakes of *both consumers (users of that food group) and non-consumers* on the survey day." *1994-96 Tbl. set 10*, *supra* n. 177, at 46 (emphasis added). *See also 1994-96 Foods Commonly Eaten Report*, *supra* n. 177, at 235 ("mean quantities of food consumed" represents both consumers and non-consumers).

186. *1994-96 Tbl. set 10*, *supra* n. 177, at 46. ("One ounce (by weight) is equivalent to 28.35 grams").

187. *Id.* at tbl. 9.4, at 29 (yogurt excluded).

188. Human Nutrition Info. Serv., U.S. Dept. of Agric., *Food and Nutrient Intakes by Individuals in the U.S., 1 Day, 1987-88*, Nationwide Food Consumption Surveys, Rep. No. 87-I-1, NTIS No. *PB94-168325*, 1977-78 Data, Appendix Tbl. A1.2-1, at 104 (available at http://www.ars.usda.gov/SP2UserFiles/Place/12355000/pdf/8788/nfcs8788_rep_87-i-1.pdf) (last accessed Mar. 4, 2009) [hereinafter *1987-88 Individual Intakes Survey*].

189. *Id.* at 6. In 1994, Congress moved the functions of the HNIS to the ARS. *1994-96 Design of CSFII and DHKS*, *supra* n. 172.

190. Katherine S. Tippett et al., Agric. Res. Serv., U.S. Dept. of Agric., *Food and Nutrient Intakes by Individuals in the U.S., 1 Day, 1989-91*, Nationwide Food Surv. Rep. No. 91-2, tbl. 4.1A, at 54 (1995) (available at http://www.ars.usda.gov/SP2UserFiles/Place/12355000/pdf/csfii8991_rep_91-2.pdf) (last accessed Mar. 4, 2009) [hereinafter *1989-91 Individual Intakes Survey*].

191. *See 1994-96, 1998 Children Tbl. set 17*, *supra* n. 177, at 31.

192. *1987-88 Individual Intakes Survey (1977-78 Data)*, *supra* n. 188, app. tbl. A1.7-1, at 114.

193. *Id.* at tbl. 1.7-1, at 16.

194. *1989-91 Individual Intakes Survey*, *supra* n. 190, tbl. 7.1A, at 102.

195. *1994-96, 1998 Tbl. set 17*, *supra* n. 177, tbl. 15A, at 37.

196. *1987-88 Individual Intakes Survey (1977-78 Data)*, *supra* n. 188, app. tbl. A1.2-1, at 104.

197. *Id.* at tbl. 1.2-1, at 6.

198. *1989-91 Individual Intakes Survey*, *supra* n. 190, tbl. 4.1A, at 54.

199. *1994-96, 1998 Tbl. set 17*, *supra* n. 177, tbl. 12A, at 31.

200. *1987-88 Individual Intakes Survey (1977-78 Data)*, *supra* n. 188, app. tbl. A1.7-1, at 114.

201. *Id.* at tbl. 1.7-1, at 16.

202. *1989-91 Individual Intakes Survey*, *supra* n. 190, tbl. 7.1A, at 102.

203. *1994-96, 1998 Tbl. set 17*, *supra* n. 177, tbl. 15A, at 37.

For ages 12 through 19, the mean intakes were as follows:

MEAN INTAKE PER INDIVIDUAL IN A DAY, 1-DAY (IN GRAMS), MALES 12-19				
BEVERAGE	**1977-78**	**1987-88**	**1989-91**	**1994-1996, 1998**
Fluid Milk	471[204]	392[205]	376[206]	303[207]
Carbonated Soft Drinks (R)	217 (206)[208]	390 (361)[209]	424 (380)[210]	609 (584)[211]

MEAN INTAKE PER INDIVIDUAL IN A DAY, 1-DAY (IN GRAMS), FEMALES 12-19				
BEVERAGE	**1977-78**	**1987-88**	**1989-91**	**1994-1996, 1998**
Fluid Milk	303[212]	260[213]	239[214]	190[215]
Carbonated Soft Drinks (R)	207 (183)[216]	283 (215)[217]	324 (264)[218]	395 (349)[219]

For ages 20 through 29, the mean intakes were as follows:

204. *1987-88 Individual Intakes Survey (1977-78 Data), supra* n. 188, app. tbl. A1.2-1, at 104.
205. *Id.* at 6.
206. *1989-91 Individual Intakes Survey, supra* n. 190, tbl. 4.1A, at 54.
207. *1994-96, 1998 Tbl. set 17, supra* n. 177, tbl. 12A, at 31.
208. *1987-88 Individual Intakes Survey (1977-78 Data), supra* n. 189, app. tbl. A1.7-1, at 114.
209. *Id.* at tbl. 1.7-1, at 16.
210. *1989-91 Individual Intakes Survey, supra* n. 190, tbl. 7.1A, at 102.
211. *1994-96, 1998 Tbl. set 17, supra* n. 177, tbl. 15A, at 37.
212. *1987-88 Individual Intakes Survey (1977-78 Data), supra* n. 188, app. tbl. A1.2-1, at 104.
213. *Id.* at 6.
214. *1989-91 Individual Intakes Survey, supra* n. 190, tbl. 4.1A, at 54.
215. *1994-96, 1998 Tbl. set 17, supra* n. 177, tbl. 12A, at 31.
216. *1987-88 Individual Intakes Survey (1977-78 Data), supra* n. 188, app. tbl. A1.7-1, at 114.
217. *Id.* at tbl. A1.7-1, at 16.
218. *1989-91 Individual Intakes Survey, supra* n. 190, tbl. 7.1A, at 102.
219. *1994-96, 1998 Tbl. set 17, supra* n. 177, tbl. 15A, at 37.

MEAN INTAKE PER INDIVIDUAL IN A DAY, 1-DAY (IN GRAMS), MALES 20-29				
BEVERAGE	**1977-78**	**1987-88**	**1989-91**	**1994-1996**
Fluid Milk	271[220]	248[221]	229[222]	176[223]
Carbonated Soft Drinks (R)	268 (248)[224]	409 (357)[225]	439 (371)[226]	613 (549)[227]

MEAN INTAKE PER INDIVIDUAL IN A DAY, 1-DAY (IN GRAMS), FEMALES 20-29				
BEVERAGE	**1977-78**	**1987-88**	**1989-91**	**1994-1996**
Fluid Milk	179[228]	169[229]	162[230]	145[231]
Carbonated Soft Drinks (R)	224 (178)[232]	288 (230)[233]	337 (216)[234]	466 (351)[235]

A 2006 study compared mean intake of beverage consumptions from the *1977-78 Nationwide Food Consumption Survey* with 2001–02 data as shown below:[236]

220. *1987-88 Individual Intakes Survey (1977-78 Data)*, *supra* n. 188, app. tbl. A1.2-1, at 104.

221. *Id.* at tbl. 1.2-1, at 6.

222. *1989-91 Individual Intakes Survey*, *supra* n. 190, tbl. 4.1A, at 54.

223. *1994-96 Tbl. set 10*, *supra* n. 177, tbl. 9.4, at 29.

224. *1987-88 Individual Intakes Survey (1977-78 Data)*, *supra* n. 188, app. tbl. A1.7-1, at 114.

225. *Id.* at tbl. 1.7-1, at 16.

226. *1989-91 Individual Intakes Survey*, *supra* n. 190, tbl. 7.1A, at 102.

227. *1994-96 Tbl. set 10*, *supra* n. 177, tbl. 9.7, at 32.

228. *1987-88 Individual Intakes Survey (1977-78 Data)*, *supra* n. 188, app. tbl. A1.2-1, at 104.

229. *Id.* at tbl. 1.2-1, at 6.

230. *1989-91 Individual Intakes Survey*, *supra* n. 190, tbl. 4.1A, at 54.

231. *1994-96 Tbl. set 10*, *supra* n. 177, tbl. 9.4, at 29.

232. *1987-88 Individual Intakes Survey (1977-78 Data)*, *supra* n. 188, app. tbl. A1.7-1, at 114.

233. *Id.* at tbl. 1.7-1, at 16.

234. *1989-91 Individual Intakes Survey*, *supra* n. 190, tbl. 7.1A, at 102.

235. *1994-96 Tbl. set 10*, *supra* n. 176, tbl. 9.7, at 32.

236. Rhonda S. Sebastian et al., *Trends in the Food Intakes of Children 1977-2002*, 52 Consumer Interests Annual 433 (2006) (available at http://www.ars.usda.gov/SP2UserFiles/Place/12355000/pdf/Trends_in_Food_Intakes_Children_1977-2002.pdf) (last accessed Mar. 4. 2009) [hereinafter *Intake Trends of Children 1977-2002*] (relied on intake data from "two nationally representative surveys: the 1977-78 Nationwide Food Consumption Survey . . and the 2001-02 What We Eat in America, National Health and Nutrition Examination Survey.").

CHANGE IN MEAN INTAKE OF BEVERAGES BY USERS 6-19 YEARS, 1977-78 TO 2001-02						
BEVERAGE	**CHILDREN 6-11**			**TEENS 12-19**		
	1977-78	2001-02	Difference	1977-78	2001-02	Difference
Milk	480 gm	382 gm	− 98*	503 gm	458 gm	− 45
Soda	355	474	+119*	480	761	+281*
Fruit Drinks and Ades	353	410	+ 57	432	592	+160*
100% Fruit Juice	212	327	+115*	238	423	+185*

*p<.001

The USDA also keeps track of the percentages of use by gender and age. For ages six through eleven, the percentages were as follows:

PERCENTAGES OF INDIVIDUALS USING AT LEAST ONCE, 1-DAY, MALES 6-11				
BEVERAGE	**1977-78**	**1987-88**	**1989-91**	**1994-1996, 1998**
Fluid Milk	89.5[237]	92.1[238]	79.5[239]	76[240]
Carbonated Soft Drinks (R)	30.9 (28.7)[241]	31.8 (25.7)[242]	37.7 (35.1)[243]	47.1 (43.2)[244]

237. *1987-88 Individual Intakes Survey (1977-78 Data)*, *supra* n. 188, app. tbl. A1.2-2, at 105.

238. *Id.* at tbl. 1.2-2, at 7.

239. *1989-91 Individual Intakes Survey*, *supra* n. 190, tbl. 4.1B, at 55.

240. *1994-96, 1998 Children Tbl. set 17*, *supra* n. 177, tbl. 12B, at 32.

241. *1987-88 Individual Intakes Survey (1977-78 Data)*, *supra* n. 188, app. tbl. A1.7-2, at 115.

242. *Id.* at tbl. 1.7-2, at 17.

243. *1989-91 Individual Intakes Survey*, *supra* n. 190, tbl. 7.1B, at 103.

244. *1994-96, 1998 Children Tbl. set 17*, *supra* n. 177, tbl. 15B, at 38.

PERCENTAGES OF INDIVIDUALS USING AT LEAST ONCE, 1-DAY, FEMALES 6-11				
BEVERAGE	**1977-78**	**1987-88**	**1989-91**	**1994-1996, 1998**
Fluid Milk	90.4[245]	81.9[246]	82.2[247]	76.0[248]
Carbonated Soft Drinks (R)	30.3 (28.7)[249]	32.7 (27.7)[250]	37.0 (33.9)[251]	44.8 (40.9)[252]

For ages 12 through 19, the percentages were as follows:

PERCENTAGES OF INDIVIDUALS USING AT LEAST ONCE, 1-DAY, MALES 12-19				
BEVERAGE	**1977-78**	**1987-88**	**1989-91**	**1994-1996, 1998**
Fluid Milk	81.9[253]	75.7[254]	72.4[255]	59.6[256]
Carbonated Soft Drinks (R)	43.4 (41.3)[257]	55.4 (50.2)[258]	59.4 (54.3)[259]	69.2 (66.2)[260]

245. *1987-88 Individual Intakes Survey (1977-78 Data)*, *supra* n. 188, app. tbl. A1.2-2, at 105.

246. *Id.* at tbl. 1.2-2, at 7.

247. *1989-91 Individual Intakes Survey*, *supra* n. 190, tbl. 4.1B, at 55.

248. *1994-96, 1998 Children Tbl. set 17*, *supra* n. 177, tbl. 12B, at 32.

249. *1987-88 Individual Intakes Survey (1977-78 Data)*, *supra* n. 188, app. tbl. A1.7-2, at 115.

250. *Id.* at tbl. 1.7-2, at 17.

251. *1989-91 Individual Intakes Survey*, *supra* n. 190, tbl. 7.1B, at 103.

252. *1994-96, 1998 Children Tbl. set 17*, *supra* n. 177, tbl. 15B, at 38.

253. *1987-88 Individual Intakes Survey (1977-78 Data)*, *supra* n. 188, app. tbl. A1.2-2, at 105.

254. *Id.* at tbl.1.2-2, at 7.

255. *1989-91 Individual Intakes Survey*, *supra* n. 190, tbl. 4.1B, at 55.

256. *1994-96, 1998 Children Tbl. set 17*, *supra* n. 177, tbl. 12B, at 32.

257. *1987-88 Individual Intakes Survey (1977-78 Data)*, *supra* n. 188, app. tbl. A1.7-2, at 115.

258. *Id.* at tbl. 1.7-2, at 17.

259. *1989-91 Individual Intakes Survey*, *supra* n. 190, tbl. 7.1B, at 103.

260. *1994-96, 1998 Children Tbl. set 17*, *supra* n. 177, tbl. 15B, at 38.

PERCENTAGES OF INDIVIDUALS USING AT LEAST ONCE, 1-DAY, FEMALES 12-19				
BEVERAGE	**1977-78**	**1987-88**	**1989-91**	**1994-1996, 1998**
Fluid Milk	71.7[261]	60.9[262]	59.5[263]	49.7[264]
Carbonated Soft Drinks (R)	45.5 (40.5)[265]	52.0 (43.0)[266]	58.0 (47.9)[267]	62.2 (56.1)[268]

For ages 20 through 29, the percentages were as follows:

PERCENTAGES OF INDIVIDUALS USING AT LEAST ONCE, 1-DAY, MALES 20-29				
BEVERAGE	**1977-78**	**1987-88**	**1989-91**	**1994-1996**
Fluid Milk	60.6[269]	52.5[270]	53.3[271]	39.6[272]
Carbonated Soft Drinks (R)	48.2 (44.8)[273]	58.9 (51.8)[274]	59.3 (51.2)[275]	68.3 (62.9)[276]

261. *1987-88 Individual Intakes Survey (1977-78 Data)*, *supra* n. 188, app. tbl. A1.2-2, at 105.

262. *Id.* at tbl. 1.2-2, at 7.

263. *1989-91 Individual Intakes Survey*, *supra* n. 190, tbl. 4.1B, at 55.

264. *1994-96, 1998 Children Tbl. set 17*, *supra* n. 177, tbl. 12B, at 32.

265. *1987-88 Individual Intakes Survey (1977-78 Data)*, *supra* n. 188, app. tbl. A1.7-2, at 115.

266. *Id.* at tbl. 1.7-2, at 17.

267. *1989-91 Individual Intakes Survey*, *supra* n. 190, tbl. 7.1B, at 103.

268. *1994-96, 1998 Children Tbl. set 17*, *supra* n. 177, tbl. 15B, at 38.

269. *1987-88 Individual Intakes Survey (1977-78 Data)*, *supra* n. 188, app. tbl. A1.2-2, at 105.

270. *Id.* at 1.2-2, at 7.

271. *1989-91 Individual Intakes Survey*, *supra* n. 190, tbl. 4.1B, at 55.

272. *1994-96 Children Tbl. set 10*, *supra* n. 177, tbl. 10.4, at 36.

273. *1987-88 Individual Intakes Survey (1977-78 Data)*, *supra* n. 188, app. tbl. A1.7-2, at 115.

274. *Id.* at 1.7-2, at 17.

275. *1989-91 Individual Intakes Survey*, *supra* n. 190, tbl. 7.1B, at 103.

276. *1994-96 Children Tbl. set 10*, *supra* n. 177, tbl. 10.7, at 39.

PERCENTAGES OF INDIVIDUALS USING AT LEAST ONCE, 1-DAY, FEMALES 20-29				
BEVERAGE	**1977-78**	**1987-88**	**1989-91**	**1994-1996**
Fluid Milk	59.1[277]	52.0[278]	52.6[279]	46.1[280]
Carbonated Soft Drinks (R)	46.8 (38.4)[281]	50.1 (40.2)[282]	54.2 (39.5)[283]	63.2 (50.3)[284]

D. *The Effect of Increased CSD Consumption on Other Drinks*

The intake of CSDs by individuals has an inverse relation to the consumption of other beverages. "Carbonated beverage intake is directly related to other beverages since individuals have only a limited capacity to consume liquid."[285] As a result, "[w]hen carbonated beverages grow it generally is at the expense of noncarbonated beverages—even water."[286]

But other alternatives such as milk and water are much healthier, especially when children and adolescents are concerned. As stated in a 2003 study, "there should be no doubt that the dental profession should advocate milk and water as first choice drinks for children and adolescents who are susceptible to erosion . . . ."[287] Unfortunately, these "first choice drinks" are not what children and adolescents are choosing first.

In 1966, Americans consumed 33.0 gallons of milk per capita.[288] Milk consumption declined and soft drink consumption increased during 1977–78, as compared to 1965–66 as follows:

QUANTITY OF HOME FOOD USED PER PERSON IN A WEEK, U.S (POUNDS)		
BEVERAGE	**1965-66**	**1977-78**
Soft Drinks[289]	1.585	2.112
Fresh Fluid Milk[290]	6.053	5.737

277. *1987-88 Individual Intakes Survey (1977-78 Data)*, *supra* n. 188, app. tbl. A1.2-2, at 105.

278. *Id.* at tbl. 1.2-2, at 7.

279. *1989-91 Individual Intakes Survey*, *supra* n. 190, tbl. 4.1B, at 55.

280. *1994-96 Children Tbl. set 10*, *supra* n. 177, tbl. 10.4, at 36.

281. *1987-88 Individual Intakes Survey (1977-78 Data)*, *supra* n. 188, app. tbl. A1.7-2, at 115.

282. *Id.* at 1.7-2, at 17.

283. *1989-91 Individual Intakes Survey*, *supra* n. 190, tbl. 7.1B, at 103.

284. *1994-96 Tbl. set 10*, *supra* n. 177, tbl. 10.7, at 39.

285. *Beverages*, *supra* n. 22, at 16.

286. *Id.*

287. West, *Experimental Carbonated Blackcurrant Drink*, *supra* n. 130, at 364-365.

288. Jain, *CSDs and pH*, *supra* n. 14, at 150.

289. *1977-78 Nationwide Food Consumption Survey*, *supra* n. 175, tbl. 26, at 285.

290. *Id.* at 282.

In 2003, individual Americans consumed, on average, 21.6 gallons of milk.[291] In 1998, American per capita consumption of CSDs peaked at 54.9 gallons,[292] "more than twice that of any other beverage."[293] According to one study, "[b]y the age of 5 years, the intake of soft drinks exceeds that of 100% fruit juices, and by age 13, the intake of soft drinks exceeds the intake of milk."[294]

As shown by the USDA data, *supra*, American consumption of soft drinks has increased while at the same time American consumption of milk has decreased. Remarkable trends are present. For one, milk consumption has generally decreased as age has increased.[295] Another trend is the increase in energy intake (calories) from soft drinks among children.[296] During 1977–78 as compared to 1994–96, in children ages 6 to 17, the share of energy intake from soft drinks increased by 103% from 2.9 to 5.9 calories.[297]

Researchers have linked the decline in milk consumption to the increase in soft drink consumption.[298] They have found higher nutrient intakes in children who drink more milk than children who drink more soda.[299] In addition, "[s]tudies have found that soft drink consumption in children and adolescents is inversely associated with calcium intake."[300]

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291. *Id.*

292. *Functional Beverages*, *supra* n. 118; *Liquid Candy*, *supra* n. 8, at 1; *but see CSD Antitrust Report*, *supra* n. 3 at 5 (1998 per capita consumption: 54.9 gallons).

293. *CSD Antitrust Report*, *supra* n. 3, at 5.

294. Kolker, *Caries and African American Children*, *supra* n. 115, at 457.

295. *See* Maureen L. Storey, Richard A. Forshee & Patricia A. Anderson, *Beverage Consumption in the US Population*, 106 J. Am. Dietetic Assn. 1992, 1995 (2006); Steven T. Lee & Biing-Hwan Lin, *Beverage Consumption among US Children and Adolescents: Fill-Information and Quasi Maximum-Likelihood Estimation of a Censored System*, 29 Eur. Rev. Agric. Econ. 85, 100 (2002); *see also* Shanthy A. Bowman, *Beverage Choices of Young Females: Changes and Impact on Nutrient Intakes*, 102 J. Am. Dietetic Assn. 1234, 1235 (2002) (females ages 12-19).

296. Simone A. French et al., *National Trends in Soft Drink Consumption Among Children and Adolescents age 6 to 17 Years: Prevalence, Amounts, and Sources, 1977/1978 to 1994/1998*, 103 J. of Am. Dietetic Assn., 1326, 1328, 1329 (Table 2) (2003).

297. *Id.*

298. *See* Tara L. LaRowe et al., *Beverage Patterns, Diet Quality, and Body Mass Index of US Preschool and School-Aged Children*, 107 J. of Am. Dietetic Assn., 1124, 1131 (2007) [hereinafter LaRowe, *Beverage and BMI of Children*].

299. *See id.* at 1131 ("[i]n general, children in the high-fat milk pattern had the highest micronutrient intakes whereas micronutrient intake was the lowest for children in the soda and sweetened drinks pattern, suggesting consumption of calorically sweetened beverages displaces important nutrients.").

300. Debra Cuylun Grimm et al., *Factors Associated with Soft Drink Consumption in School-Aged Children*, 104 J. of Am. Dietetic Assn., 1244, 1245 (2004).

Other nutrients inversely affected are riboflavin, vitamin A, and vitamin C,[301] as well as magnesium and ascorbic acid.[302]

Studies have linked the higher consumption of CSDs with the lower consumption of milk. "Another example of a potential nutritional problem is the decreased consumption of milk, which has not been replaced by other rich sources of calcium but rather by soft drinks and noncitrus juices and drinks."[303]

There are some studies, funded by the CSD industry, which dispute any link between higher consumption of CSDs and lower consumption of milk.[304] One study, funded by the American Beverage Association, disagreed with the studies that found an inverse relationship between the drinking of milk, CSDs, and calcium intake. The study concluded that, "calcium intake is largely determined by consumption of fluid milk and . . . there is no direct, negative association between calcium intake and

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301. Gail C. Rampersaud et al., *National Survey Beverage Consumption Data for Children and Adolescents Indicate the Need to Encourage a Shift Toward More Nutritive Beverages*, 103 J. of Am. Dietetic Assn., 97, 99 (2003).

302. Nada O. Kassem et al., *Understanding Soft Drink Consumption Among Female Adolescents Using the Theory of Planned Behavior*, 18 Health Educ. Res. 278 (2003).

303. Claude Cavadini et al., *US Adolescent Food Intake Trends from 1965 to 1996*, 173 W. J. of Med. 378-383 (2000) (available at http://www.pubmedcentral.nih.gov/article render.fcgi?artid=1071186) (last accessed Mar. 1, 2009).

304. Richard A. Forshee, Patricia A. Anderson & Maureen L. Storey, *Changes in Calcium Intake and Association with Beverage Consumption and Demographics: Comparing Data from CSFII 1994–1996, 1998 and NHANES* 1999–2002, 25 J. of the Am. College of Nutrition 108-116 (2005) (available at http://www.jacn.org/cgi/content/full/25/2/108) (last accessed Mar. 5, 2009); Maureen L. Storey, Richard A. Forshee & Patricia A. Anderson, *Associations of Adequate Intake of Calcium with Diet, Beverage Consumption, and Demographic Characteristics among Children and Adolescents*, 23 J. of the Am. College of Nutrition 18-33 (2004) (available at http://www.jacn.org/cgi/content/full/23/1/18?maxtoshow=&HITS=10&hits=10&RESULTFORMAT=&fulltext=carbonated&andorexactfulltext=and&searchid=1&FIRSTINDEX=0&sortspec=relevance&resourcetype=HWCIT) (last accessed Mar. 5, 2009) [hereinafter Storey et al., *Associations of Calcium*]. That "research was made possible through an unrestricted gift from the National Soft Drink Assn. [NSDA]."; NSDA was the predecessor of the Am. Bev. Assn. *See History of American Beverage Association*, Am. Bev. Assn., (available at http://www.ameribev.org/about-aba/history) (last accessed Dec. 20, 2009); *see* Lena Zak, *Where Have the Good Foods Gone?*, Food Mag. (July 1, 2008) (available at 2008 WLNR 19216327) (In the context of the food industry Michael Pollan, author of he bestseller, *The Omnivore's Dilemma*, has questioned industry-sponsored research. More specifically, he was quoted as saying:

> "There is a lot of food industry commissioned science. If you have a product you want to sell, say the pomegranate, you can go out and commission a study and low and behold you'll find some wonderful antioxidant in the pomegranate, and you can go to town and market it on the basis of its heart healthiness and its cancer prevention.
>
> There has been a study done of that type of science that shows it's remarkably reliable in finding a health benefit in whatever it studies."

[regular, carbonated soft drink] consumption."[305] These same researchers reached a similar conclusion in an earlier study funded by the National Soft Drink Association, which, not surprisingly, is the previous name of the American Beverage Association. The study concluded: "Carbonated soft drink consumption among adolescent girls is modest and does not appear to be linked to decreased calcium intake."[306]

V. THE ADVERTISING OF CSDS

A. *The CSD Industry*

Carbonated soft drinks make up a multi-billion-dollar industry. The industry has seen yearly increases in retail value over the years. In 2004, the estimated retail value for CSDs was $65.9 billion.[307] In 2005, the estimated value for CSDs was $68.1 billion.[308] In 2006, the estimated value for CSDs was $70.1 billion.[309] In 2007, the estimated value for CSDs was $72 billion.[310] In addition, the rate of return for the parent company manufacturers of CSDs has exceeded the average rate of return for other U.S. companies.[311] "The recent rise in soft drink consumption likely reflects the tremendous resources directed at marketing these beverages."[312]

B. *Early Advertising*

From the beginning, the CSD manufacturers have relied extensively on advertising to market their products.[313] Both the Coca-Cola Company

305. Richard A. Forshee et al, *Changes in Calcium Intake and Association with Beverage Consumption and Demographics: Comparing Data from CSFII 1994–1996, 1998 and NHANES* 1999–2002, *supra* n. 304.

306. Storey et al., *Associations of Calcium, supra* n. 304, at 18-33.

307. *2005 CSD Performance, supra* n. 126.

308. *Id.*

309. *2006 Top-10 CSDs, supra* n. 128 (this increase in light of decreased consumption was due to carbonated soft drinks having price increases and premium-priced energy drinks having growth).

310. *2007 Top-10 CSDs, supra* n. 7 (as in 2006, this increase in light of decreased consumption was due to carbonated soft drinks having price increases and premium-priced energy drinks having growth).

311. *See CSD Antitrust Report, supra* n. 3, at 6, n. 8 (the average rate of return for the parent companies between 1963 and 1977 "was 21%, compared to 12% for all manufacturing").

312. Jean L. Wiecha et al., *School Vending Machine Use and Fast-Food Restaurant Use Are Associated with Sugar-Sweetened Beverage Intake in Youth*, 106 J. Am. Dietetic Assn. 1624, 1625 (2006); *see also Beverages, supra* n. 22, at 16 ("The intensive advertising, low price, widespread availability in durable and attractive containers helped assure early success.").

313. *CSD Antitrust Report, supra* n. 3, at 5 (in addition to the parent companies that make the syrup, other groups spend money advertising CSDs. Such groups include grocery retailers and bottlers). This article focuses on PepsiCo, the parent company.

and PepsiCo were leading the advertising charge. Throughout the years, both were close with their respective advertising firms.[314]

In the very beginning, the inventor of Coca-Cola, John Pemberton, spent $73.96 to advertise his product, with sales of only 25 gallons of syrup at $1 a gallon.[315] During both the time when Pemberton controlled the company, and later with Asa Candler in control, the Coca-Cola Company continued to spend heavily on advertising.[316] In 1899, Candler hired his nephew, Sam Dobbs, who convinced Candler to go on "a promotional and advertising blitz for Coca-Cola."[317]

The cumulative amount the Coca-Cola Company spent on advertising from 1886–1903 was $762,502.65, and thereafter continued to increase its advertising expenditures.[318] Sales of its syrup[319] increased as follows: in 1887, 2,171 gallons; in 1890, 8,855 gallons; in 1891, 19,831 gallons; in 1892, 35,360 gallons; and in 1893, 48,427 gallons.[320] In 1893, it spent $12,000 on advertising —12% of its budget.[321] In 1894, it sold 64,333 gallons,[322] and in 1895, it spent $17,744 on adverting and sold 76,244 gallons of syrup.[323] In 1899, it spent $48,000 in advertising and sold 280,000 gallons of syrup.[324] The advertising during this period was "medicinal in tone," relying on testimonials and coupons.[325] The key to the increase in sales during this time was advertising.[326]

The Coca-Cola Company continued to increase its advertising spending with the turn of the century. It was spending "almost $85,000 on advertising" in 1900.[327] In 1903, its advertising budget had more than

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314. *Blinked*, *supra* n. 103, at 20 (For example, the BDDO agency came on board with PepsiCo in 1963. In 2008, PepsiCo ended its relationship with BDDO.); *Secret Formula*, *supra* n. 33, at 76, 306-307 (The Coca-Cola Company first hired the D'Arcy Agency in 1906, and only fired it in 1955).

315. *Soda Pop*, *supra* n. 34, at 16.

316. *Id.* at 16-17.

317. *Id.* at 17; *For God and Coca-Cola*, *supra* n. 32, at 104.

318. *Soda Pop*, *supra* n. 34, at 49, 52.

319. *Id.* at 31 (There are 128 drinks per gallon of syrup).

320. *Id.* at 17-18.

321. *Id.* at 18.

322. *For God and Coca-Cola*, *supra* n. 32, at 59.

323. *Id.* at 61.

324. *Pepsi – Hundred Years*, *supra* n. 45, at 18.

325. *Soda Pop*, *supra* n. 34, at 17-18; *For God and Coca-Cola*, *supra* n. 32, at 63 (In 1895, consumers were criticizing this "medicinal image" and wrote to express their objections. The consumers "didn't want to feel guilty for taking doses of a medicine when all they wanted was a bracing soft drink." *Id.* Taxes led the way for the company to "shy away from medicinal claims." *Id.* Due to the Spanish-American War, Congress passed a war tax in 1899 that taxed certain medicines but not beverages. *Id.* The Coca-Cola Company was ordered to pay the tax by the Internal Revenue Service, but it successfully challenged that ruling and won. *Id.* at 64. The company then began to move away from such claims. *Id.*).

326. *See For God and Coca-Cola*, *supra* n. 32, at 59.

327. *Id.* at 89.

doubled, as it "spent $207,008.29," and increasing the amount in a direct ratio to sales.[328] Six years later, in 1909, it spent $761,981.35 on advertising.[329] By 1912, it was a million.[330] In 1913, it spent even more—over $1,399,000.[331] The numbers for 1916 were "staggering," with 9,715,892 gallons of syrup being sold, bringing in $13,182,940.00 to the Coca-Cola Company; $1,717,941.86 spent on advertising; over 1 billion drinks sold (over 3 million a day), and retail volume generated amounting to $62,181,709.[332] By 1966, it had sales of $979 million, with advertising expenditures estimated to be $71 million.[333]

The people in charge of the Pepsi brand also emphasized advertising from the very beginning. In 1903, the inventor of Pepsi-Cola, Caleb Bradham, looking at the success of Coca-Cola "realized that a great part of Candler's success was directly attributable to advertising, so he began advertising his drink . . ."[334] That year Bradham "spent $1,888.78 on advertising and sold 7,968 gallons of syrup," compared to The Coca-Cola Company's $207,008.20 on advertising and 881,423 gallons of syrup.[335] "By 1907, Bradham was selling 104,000 gallons of syrup."[336]

Though The Coca-Cola Company had a head start on PepsiCo and led in sales and advertising expenditures, PepsiCo made some memorable advertising decisions. In 1939, Walter Mack, then president, continued using skywriting as a means to advertise.[337] That same year, Pepsi introduced its own cartoon version of the Keystone Cops—Pepsi and Pete—the Pepsi-Cola cops, which proved to be immensely popular.[338] In 1940, "8 planes logged 145,000 miles in a coast-to-coast skywriting campaign that had all [of] America craning its neck,"[339] and the Pepsi-Cola cops "appear[ed] in 205 Sunday newspapers."[340] Around the same time, Pepsi

328. *Soda Pop*, *supra* n. 34, at 49, 86.

329. *Id.* at 52, 31 (The huge increase in advertising expenditures reflects the increase in sales of syrup due to increased sales to a fairly new market- the bottlers. In 1905, the Coca-Cola Company sold 1,548,888 gallons of syrup with the bottlers buying 425,511 gallons.).

330. *For God and Coca-Cola*, *supra* n. 32, at 89.

331. *Soda Pop*, *supra* n. 34, at 54.

332. *Id.* at 59.

333. *Id.* at 19.

334. *Id.* at 85.

335. *Id.* at 86.

336. *Id.*

337. *See Pepsi – Hundred Years*, *supra* n. 45, at 82.

338. *Id.* at 83-86; *see* John McDonough, *Pepsi Turns 100: One of the World's Great Brands has been Shaped in Large Measure by its Advertising*, Advert. Age (July 20, 1998) (available at 1998 WLNR 1304294) [hereinafter McDonough, *Pepsi Turns 100*].

339. *Blinked*, *supra* n. 103, at 18.

340. *Id.* at 18. For an animated cartoon featuring the Pepsi-Cola cops, *see Pepsi Hits the Spot*, YouTube (available at http://www.youtube.com/watch?v=rrceIelAB3s) (last accessed Mar. 6, 2009).

introduced its most effective advertising tool to date, the Pepsi-Cola jingle: "Pepsi-Cola Hits the Spot."[341] It was sung to the tune of "John Peel."[342]

During this time, Pepsi's advertising budget was constantly increasing. "By 1936, Pepsi had a $500,000 budget and retained the Brown Agency, a small shop in Manhattan."[343] By 1938, that amount had *doubled*, and Pepsi had changed agencies.[344]

In 1980, PepsiCo spent $10,511,000 advertising Mountain Dew.[345] In 1981, it spent $13,120,000.[346] In the 1990s, PepsiCo continued to spend its massive advertising budget, much of it on its "premier" brands.[347] Pepsi spent 100% of its ad dollars on its top four brands during the first three quarters of 1995: Pepsi-Cola, (71%); *Mountain Dew*, (16%); Diet Pepsi, (7%) and Diet Mountain Dew, (6%).[348]

The impact of these ads from the Coca-Cola Company and PepsiCo is long-lasting and in some cases profound. In fact, the Coca-Cola Company gave us the modern image of Santa Claus, recognized worldwide: "a jolly looking gentleman in a red coat with a white beard."[349] Over 20

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341. McDonough, *Pepsi Turns 100, supra* n. 336; *Blinked, supra* n. 103, at 18. The jingle was very short:

Pepsi-Cola hits the spot.
Twelve full ounces, that's a lot.
Twice as much for a nickel, too.
Pepsi-Cola is the drink for you.

342. *Blinked, supra* n. 103, at 18.

343. McDonough, *Pepsi Turns 100, supra* n. 336.

344. *Id.* (emphasis added) (For several years, Pepsi frequently changed agencies before it finally settled on BBDO). BBDO was responsible for several memorable ad campaigns:

> The agency had handled the Pepsi brand since 1960 and was responsible for one of the most famous campaigns in advertising history: the "Pepsi Challenge" blind taste test. In 1960, BBDO also launched the "Pepsi Generation" campaign, which portrayed Coca-Cola as the older, more stodgy brand and made room for the 1980s slogan: "Pepsi. The Choice of a New Generation."

BBDO Worldwide, Hoovers Co. In-Depth Records, (Feb. 11, 2009) (available at 2009 WLNR 2665201). In the fall of 2008, however, PepsiCo ended its relationship with BBDO. *Id.*

345. *See US Soft Drink Ad Expenditures*, Bev. World 291 (June 1, 1981) (available at 1981 WLNR 273030).

346. *US Carbonated Soft Drinks Advertising Expense*, Bev. World 25 (June 1, 1982) (available at 1982 WLNR 374809).

347. *Next, On the Root Beer Channel .* , Bev. World 8 (Mar. 1, 1996) (available at 1996 WLNR 4436955) (emphasis added) [hereinafter *Next, On the Root Beer Channel*].

348. *Id.* (emphasis added).

349. *See* Annette Farr, *The View from A Farr - Coke Can Do Better*, Just-Drinks (Dec. 13, 2007) (available at 2007 WLNR 24585522) [hereinafter Farr, *Coke Can Do Better*]; *see Soda Pop, supra* n. 34, at 46 ("[O]ver 75 years ago . . Coca-Cola commissioned Swedish American artist Haddon Sundblom to create a series of holiday advertisements . . . . One of Sunblom's advertisements appeared in 1931.") (picture of original advertisement as well);

years later, the company had Norman Rockwell keep the red-coat-white-beard tradition going by commissioning additional advertisements.[350]

C. *More Recent Advertising*

The beverage industry continues to spend vast amounts of money on advertising. As one Pepsi marketing director explained:

> Advertising directly affects sales because it keeps your product in front of the consumer providing top-of-the-mind awareness. Product image through promotions and advertising ties you to the consumer and the desired image they want to achieve through your product . . . .[351]

As consumers have become more health conscious, CSD sales have declined.[352] As a result, "[l]ong-term rivals PepsiCo and Coca-Cola are both looking to revive the ailing fortunes of their carbonated beverages."[353] In fact, PepsiCo's strategy involves three years and $1.2 billion.[354] To further this strategy, it just adopted a new Pepsi logo, which one expert has estimated will end up costing PepsiCo several hundreds of millions of dol-

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"[T]he example of the Sundblom Santa image shows just how much influence this iconic brand can wield." Farr, *Coke Can Do Better*, *supra* n. 347.

350. *See Soda Pop*, *supra* n. 34, at 47 (picture of original advertisement as well); *see also WWL Santa,* YouTube, http://www.youtube.com/watch?v=1owu0pz6KTE (last accessed Mar. 6, 2009) (news video on history of Coca-Cola Santa from Channel 9 News, Tucson, Arizona).

351. Catherine Penn, *Summer is the Season and 2001 Will Be a Party*, 92 Bev. Indus. 42 (2001) (available at 2001 WLNR 4470667). A former president and CEO of the Pepsi-Cola Company stated in 1986:

> Americans don't drink fifty gallons of soft drinks apiece each year because they have to.
>
> Water's a lot cheaper and booze gives a better kick.
>
> But you choose soft drinks – more often, these days, than you pour yourselves a glass of water or any other beverage – because soft drinks have become part of American life.
>
> And *because companies like Pepsi and people like me spend a great deal of time and energy to encourage you.* We do this with print advertising. With coupons in newspapers. With signs in stadiums and billboards along highways. With eye-catching displays in supermarkets and convenience stores. With catchy jingles in radio ads.
>
> And we do it with television commercials.

Blinked, *supra* n. 103, at 15 (emphasis added).

352. *See PepsiCo and Coca-Cola: Going Head-to-Head*, Datamonitor Drinks Wire (Jan. 22, 2009, 14:59:00) [hereinafter *Going Head-to-Head*].

353. *Id.*

354. Natalie Zmuda, *Pepsi Upends Brands with $1.2 Bil Shake-Up*, 79 Advert. Age 1 (2008) (available at 2008 WLNR 20294235).

lars.[355] PepsiCo is clear that its goal is to stop the decline in soft drink consumption:

> Let me be clear, [carbonated soft drinks] are declining between 3% and 4%, [PepsiCo Chairman-CEO Indra Nooyi] said. We're saying goal one is to stem that decline and make it decline 1% to 2% and get it to flat. If we did that, that would be enormous . . . . It's a critical source of profitability, and it's very, very important that we don't let the slide get out of hand . . . .[356]

Both PepsiCo and Coca-Cola Company advertised in Super Bowl XLIII, held February 1, 2009. However, PepsiCo received a better deal on its spots for Super Bowl XLIII, paying less than $2.4 million for each 30-second spot, due to buying in bulk and being a longstanding NFL partner.[357] PepsiCo's website, www.refresheverything.com, saw a 313% increase in visitation on the day after Super Bowl XLIII.[358] PepsiCo also had more "Twitter" users generating the most "tweets."[359]

In 2007, PepsiCo was 26th in the nation in terms of money spent on advertising, spending $1,308,300,000.[360] In 2007, PepsiCo spent about $162 million on its Pepsi brand.[361] In 2004, PepsiCo spent in the "measured media" $211,654,000 on Pepsi.[362] A leading industry publication defines " 'measured media' as the variety of measurable, traditional marketing strategies utilized to sell goods—magazine, newspaper, billboard, network and cable television ads, radio spots, and internet advertising."[363]

In 2006, "Pepsi spent $152 million . . . on network TV, down 23.6 percent from the previous year and making up 42.7 percent of its media

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355. *See* Rupal Parekh, *Purported Arnell Pepsi Doc Has Folks Scratching Heads*, 80 Advert. Age 2 (2009) (available at 2009 WLNR 3361637).

356. Natalie Zmuda, *Pepsi Upends Brands with $1.2 Bil Shake-Up*, 79 Advert. Age 1 (2008) (available at 2008 WLNR 20294235).

357. Anthony Crupi & Steve McClellan, *Fourth and Goal: Observers Say NBC Will Have to Resort to a Field Goal by Feb. 1, But It May Still Sneak into the End*, 19 Media Week 8 (2009) (available at 2009 WLNR 2257753).

358. Ann Marie Kerwin, *Everyone Gets a Trophy*, 80 Advert. Age 3 (2009) (available at 2009 WLNR 2889974) [hereinafter Kerwin, *Trophy*].

359. *Id.*

360. *Marketer Trees 2008*, Advert. Age (available at http://adage.com/marketertrees08 update) (last updated Dec. 29, 2008).

361. Rupal Parekh, *Major Agency Shifts of 2008*, 79 Advert. Age 24 (2008) (available at 2008 WLNR 24323485).

362. *Out of Balance – Marketing of Soda, Candy, Snacks and Fast Foods Drowns Out Healthful Messages*, Cal. Pan-Ethnic Health Network and Consumers Union 13 (2005) (available at http://epsl.asu.edu/ceru/Articles/CERU-0509-140-OWI.pdf) [hereinafter *Out of Balance*].

363. *Id.* at 8.

budget for the year."[364] But television is not where all of the money is going. PepsiCo is not alone in looking at medium beyond television.[365] "For Pepsi . . . the Web is growing in influence as TV spending wanes."[366] As stated by one industry watcher:

> 'Big beverage brands need to have a strong presence on TV, but clearly, TV is relatively less important,' says John Sicher, editor of trade journal Beverage Digest. 'The big companies are shifting more of their marketing dollars to the Internet, viral marketing and sampling. On a relative basis, TV is less important than it was some years ago.'[367]

Just recently, however, PepsiCo spent $3 million for exposure on the television show "Saturday Night Live."[368] In that instance:

> In a rare twist, the cast and crew [of] NBC's venerable "Saturday Night Live" crafted three ads for Pepsi that essentially grafted mentions, cans and logos of the famous soft drink onto three different executions of "MacGruber," the show's long-running spoof of the old "MacGyver" TV series. The ads looked just like "SNL" skits but ran during commercial breaks on the Jan. 31 episode of the show. One of the ads also appeared during the recent Super Bowl.[369]

With hundreds of millions of dollars being spent by the CSD industry on advertising, those waging efforts to educate consumers about nutrition cannot overlook "[t]he role of carbonated beverage companies in the promotion of soft drink consumption."[370] Today, this promotion may include more than just traditional advertising and may include "unmeasured media," such as "marketing strategies used by food companies for which

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364. Kenneth Hein, *Beverages*, 17 Media Week 12 (2007) (available at 2007 WLNR 26545336).

365. As of 2006: TV was Coca-Cola's top medium [in 1960] and now [in 2006]. TV's share of measured spending rose from 40% in 1960 to 81.6% in 1980 and 94% in 2000. But it's fallen sharply since then; TV [in 2006] year accounted for 70% of measured spending. Magazines' share tumbled from 32% in 1960 to about 3% in 1980, '90 and '00. But magazines got back in the mix, snaring 12% of measured spending last year. *Ad Spending by Medium, 1960-2006*, 78 Advert. Age S6 (2007) (available at 2007 WLNR 12241521).

366. Kenneth Hein, *Beverages*, 18 Media Week 10 (2008) (available at 2008 WLNR 8739286) [hereinafter Hein, *Beverages*].

367. *Id.*

368. *See Pepsi's Placement, DPSG's Stimulus,* BevNet (2009) (available at http://www.bevnet.com/news/2009/2-3-2009-the_flow (last updated Feb. 3, 2009).

369. Brian Steinberg, *'Saturday Night Live' Takes on New Role as Pepsi Agency*, 80 Advert. Age 4 (2009) (available at 2009 WLNR 2889963).

370. Lisa Harnack et al., *Soft Drink Consumption Among US Children and Adolescents: Nutritional Consequences*, 99 J. of Am. Dietetic Assn. 436, 440 (1999) [hereinafter Harnack, *Soft Drink Consumption Among Children*].

ad buy data may not be accessible, such as direct mail, sales promotion, coupons, catalogs, and special events."[371]

Sales of beverages to children and adolescents amount to billions of dollars as there are millions of potential customers. For one, "[t]here are 35.8 million children between the ages of 3 and 11, and it is estimated that the sale of beverages [to them] amounted to $4.3 billion."[372] For another, there are around 33 million teens between the ages of 12–19.[373] And these teens spend even more money than children between the ages of 3 and 11. According to a study by Teenage Research Unlimited (TRU Study) in 2003, American teens spent $175 billion total and around $103 a week.[374]

And these teens drink a lot of soft drinks. The TRU Study found that in 2003, "teens drank an average of 11 soft drinks per week."[375] According to a youth marketing consultant, "Beverage preference is a badge of independence, something teens buy using their own money. Teenagers need to break away from their parents."[376] The consultant noted that, "the way teens experience a brand is as important as the product."[377] She added, "[t]aste is a ticket to the game but the imagery the beverage inspires is key."[378] The CSD industry is quite aware of the buying power of children and teens. Not surprisingly, "[s]ome of the [its] marketing strategies have been primarily geared toward children and adolescents."[379]

A recent report prepared by the Federal Trade Commission (FTC Report) addressed advertising directed towards children. It concluded: "[F]ood and beverage companies surveyed for this report spent more than $1.6 billion marketing their products to children and adolescents in 2006."[380] Out of that $1.6 billion, "[m]akers of carbonated beverages

371. *Out of Balance*, *supra* n. 362, at 10.

372. Elizabeth Fuhrman, *Health & Wellness Happenings*, 98 Bev. Indus. 20 (2007) (available at 2007 WLNR 5590577).

373. Sandy Parlin, *Teens Make Statements Through Beverage Choices*, Bev. Indus. (2009) (available at http://www.bevindustry.com/Archives_Davinci?article=1227 (last accessed Dec. 28, 2009) (relying on the U.S. Census Bureau) [hereinafter Parlin, *Teens Make Statements*].

374. *Id.* (Males drank 12 drinks per week, females a little less than 11).

375. *Id.*

376. *Id.* (quoting "Jennifer Goodman, managing director of The Geppetto Group, a youth marketing consultancy and advertising company based in New York City"). Ms. Goodman also stated, "[Teens] dress in their own style and may experiment with drugs, alcohol and sexual activity. Successful brands understand this." *Id.*

377. *Id.*

378. *Id.*

379. Harnack, *Soft Drink Consumption Among Children*, *supra* n. 370, at 440.

380. Fed. Trade Commission, *A Report to Congress, Marketing Food to Children and Adolescents A Review of Industry Expenditures, Activities, and Self-Regulation* (July 2008) (available at http://www.ftc.gov/os/2008/07/P064504foodmktingreportappendices.pdf) (last accessed Dec. 28, 2009).

spent the most on marketing to children and teenagers."[381] More specifically, "about $870 million in marketing spending was directed at children under 12, while $1 billion was directed at teenagers (those figures include $300 million worth of marketing that was aimed at both groups)."[382]

PepsiCo targets younger consumers in its advertising.[383] For example:

> Pepsi also unveiled a massive marketing and repackaging campaign at the start of 2007. Aimed at attracting a younger demographic, Pepsi-Cola cans, bottles and cups received new graphics every few weeks. The graphics, some designed by celebrities, were to change 35 times during the year to reflect images of sports, music, fashion and cars.[384]

In November 2006, the Council for Better Business Bureaus (CBBB) created the Children's Food and Beverage Advertising Initiative (Ad Initiative or CFBAI).[385] The creation of the Ad Initiative "follow[ed] a nine-month review of an existing advertising self-regulation program, the Children's Advertising Review Unit's (CARU) Guidelines for Children's

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381. Stephanie Clifford, *Tug of War in Food Marketing to Children*, N.Y. Times C5 (July 30, 2008) (available at 2008 WLNR 14160360) [hereinafter Clifford, *Tug of War*].

382. *Id.*

383. *See* Greg Johnson, *Mountain Dew Hits New Heights to Help Pepsi Grab a New Generation*, L.A. Times C1 (Oct. 6, 1999) (available at http://articles.latimes.com/1999/oct/06/business/fi-19312) (last accessed Mar. 4, 2009) [hereinafter Johnson, *Dew Hits New Heights*].

384. David Phillips, *Whatever Floats the Boat*, 109 Dairy Foods 40 (No. 2 Feb. 1, 2008) (available at 2008 WLNR 4691271); *see also* Elizabeth Fuhrman, *Bottler of the Year: Pepsi Bottling Ventures*, Bev. Indus. (Jan. 15, 2009) ("For the flagship PepsiCo brands, Pepsi, Diet Pepsi, *Mountain Dew* and Sierra Mist, [Pepsi Bottle Ventures] also is beginning to distribute the brands featuring their new redesigned graphics and packaging, which is part of a holistic campaign *aimed at drawing in younger consumers*.") (emphasis added) (available at http://www.bevindustry.com/Articles/Cover_Story/BNP_GUID_9-5-2006_A_10000000000000514065).

385. *About the Initiative*, Better Bus. Bureau (available at http://www.bbb.org/us/SitePage.aspx?site=113&id=b712b7a7-fcd5-479c-af49-8649107a4b02). For many years the FTC has relied on industry to self-regulate. As summarized:

> The FTC frequently partners with self-regulatory bodies in order to leverage our impact. This approach is especially useful where the scope of a problem may be too widespread for an agency with limited resources to handle, or where our jurisdiction to handle particular matters may be constrained by constitutional principles. And, we have long expressed the belief that effective industry self-regulation can have significant benefits, and can, in specific instances, address problems more quickly, creatively, and flexibly than government regulation.

Lydia Parnes, *Remarks to American National Standard Institute*, Conference on Building Consumer Confidence (Sept. 26, 2007) (transcript available at http://www.ftc.gov/speeches/parnes/070926ansi.pdf).

Advertising."[386] According to the CBBB, the Ad Initiative and the CARU work together.[387] As of 2005, some groups, including Consumer Union, did not believe that the self-regulating CARU was working.[388]

In 2007, PepsiCo joined the Ad Initiative, along with ten other companies, and in July 2007, PepsiCo "announced that all of its advertising directed at children under 12 in the US will be devoted solely towards two of its products - its Gatorade drinks brand and snack product Baked Cheetos."[389] It further "pledged that it [would] not advertise its products in elementary and middle schools."[390]

In the FTC Report, "the F.T.C. seemed to applaud the progress that the [Ad Initiative] had made."[391] Earlier, the chairman of the FTC had stated at a meeting of the Association of National Advertisers, "I am encouraged by the establishment of the [Ad Initiative]."[392] Others have criticized this self-regulation because the companies define the terms. "In the Better Business Bureau program, the companies themselves determine what is better food, [and] the companies themselves determine what is children's advertising. The companies determine all these things."[393] Moreover, some viewed the Ad Initiative as "a bid to fend off mandatory regulation and potential litigation amid an epidemic of childhood obesity."[394]

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386. C. Lee Peeler, President, Ltr. to the Ed., *National Advertising Review Council*, 48 Brandweek 14 (Sept. 3, 2007) (available at 2007 WLNR 26832591).

387. *See Fact Sheet on CFBAI and CARU*, Better Bus. Bureau, http://www.bbb.org/us/storage/16/documents/Fact%20Sheet%20on%20CFBAI%20and%20CARU%20Dec%2008.pdf.

388. *Out of Balance*, *supra* n. 362, at 19.

389. *PepsiCo Declares Dividend*, Just-Drinks (July 20, 2007) (available at 2007 WLNR 13872184) [hereinafter *PepsiCo Dividend*]; *see* Gregory Lopes, *Companies to Limit Youth Junk Food Ads*, Wash. Times C10 (July 19, 2007) (available at 2007 WLNR 13775702).

390. Lopes, *Companies to Limit Youth Junk Food ads*, *supra* n. 389.

391. Clifford, *Tug of War*, *supra* n. 381, at C5.

392. Deborah Platt Majoras, Chairman, Fed. Trade Commn., *Remarks at the Mtg. of the Assn. of Natl. Advertisers* (Jan. 17, 2007) (transcript available at http://www.ftc.gov/speeches/majoras/070117adresnewyear.pdf); *FTC Chairman Majoras Comments on 'Advertising Resolutions for New Year*, US Fed. News (Jan. 17, 2007) (available at 2007 WLNR 1287686).

393. Clifford, *Tug of War*, *supra* n. 381, at C5 (quoting executive director of Center for Screen-Time Awareness, Robert Kesten), (*available at* 2008 WLNR 14160360). For example, two million children watch the television show *American Idol*, sponsored by Coca-Cola Company. According to a Coca-Cola spokesperson, "'American Idol' is family entertainment. It is not programming primarily directed at children under 12 . . . ." *Id.* In addition, Coca-Cola Company defines children's advertising as shows aimed at an audience consisting of 50% children while the Mars Company defines it as shows aimed at an audience consisting of 25% children. *Id.*

394. *CPG Firms Pledge to Self-Regulate Kids' Food, Beverage Ads*, Progressive Grocer (July 19, 2007) (available at 2007 WLNR 13911870).

In March 2008, Coke and PepsiCo, as members of the International Council of Beverages Associations (ICBA), "voluntarily agree[d] to eliminate the advertising and marketing of a range of beverages, including CSDs, to any audience that is comprised *predominantly* of children under 12."[395] This voluntary agreement covers "paid media outlets such as TV, radio, print, Internet, phone messaging and cinema."[396]

The President and CEO of the American Beverage Association described the ICBA Agreement as "broaden[ing] our industry's commitment to providing meaningful leadership around the world . . . "[397] She added, "Our industry has long recognized the positive role it can play in promoting healthy lifestyles for consumers of all ages, including children, and this policy will only serve to strengthen that role."[398]

The Beverage Marketing Corporation (BMC)[399] recently released a report concerning child drinkers and described it as follows: "This report explores the beverages designed especially for youngsters and the dynamics of this special consumer group."[400] The report is available for purchase online for around $2,000.00.[401]

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395. Editorial Team, *ICBA Adopts Child Marketing Guidelines*, Just-Drinks (May 24, 2008) (emphasis added) (available at 2008 WLNR 9845463) [hereinafter Editorial, *Child Marketing Guidelines*]. Under the ICBA Agreement "composed predominantly of children under 12" means "any marketing communication whose audience consists of 50 percent or more of children under the age of 12." This is the same meaning used by the Coca-Cola Company. One critic has stated these definitions would exclude few shows "except Teletubbies," and "[f]or the most part it will mean business as usual." *Id.* (quoting national Canadian coordinator of Centre for Science in the Public Interest, Bill Jeffery). Earlier in December 2007, PepsiCo and Coca-Cola Company had agreed to participate in a "new self-regulatory initiative in Europe under which they will voluntary make changes to how and what they advertise directly to children." Editorial Team, *Drinks Producers in European Kids' Advertising Initiative*, Just-Drinks (Dec. 21, 2007) (available at 2007 WLNR 25220350). This represents a major change from years past when the beverage industry "relied on cartoon graphics and Saturday morning advertising" to reach children. Sarah Theodore, *Making the Grade*, 98 Bev. Indus. 63 (Sept. 1, 2007) (available at 2007 WLNR 20832586).

396. Editorial, *Child Marketing Guidelines, supra* n. 395.

397. *Id.*

398. *Id.*

399. According to its website, "BMC and its subsidiaries provide unparalleled consulting, financial services, and data to the global beverage industry." Beverage Marketing Corp., *About BMS* (available at http://www.beveragemarketing.com/?section=about).

400. *2008 Focus Report The Kids' Beverage Market in the U.S.*, http://www.beverage marketing.com/?service=publications&section=kidsbeverages (Oct. 2008) (Description of the BMC).

401. Ordering Information for BMC *2008 Focus Report - The Kids' Beverage Market in the U.S.*, http://www.beveragemarketing.com/?service=publications&section=kidsbeverages (Oct. 2008). Until recently, data about the carbonated soft drink industry was available for free online and was cited in reports critical of the effects of the soft drinks. *See e.g.*, von Fraunhofer, *Effects of Sports Drinks, supra* n. 14 at 28 (U.S. sales "rapidly approaching $64 billion per year with an annual growth rate of 30%," citing http://www.beverage

VI. THE EFFECT OF CSDS ON TEETH

A. *In General*

There are two main kinds of tooth decay or dental lesions: (1) dental caries or caries lesions; and (2) dental erosion or erosion lesions. "Dental caries is a nutritional disease caused by the action of oral bacteria (streptococcus mutans)."[402] The "bacteria found in dental plaque inter[acts] with sugars from food, which, in turn produces a localized acid that leads to decay, or caries"[403] by dissolving tooth enamel.[404] On the other hand, "[e]rosion lesions are seen as characteristic demineralization patterns within the enamel."[405] They are "caused by the direct impact of *acidic* foods and drinks on the entire tooth enamel, causing it to soften and lose minerals, eventually eroding the whole surface of the tooth."[406] Basically, "[e]rosion demineral[z]es tooth enamel . . . start[ing] at the tooth's surface."[407] Such "erosion lesions have specific radiographic characteristics, regardless [of where they are found in the mouth.]"[408]

There are clear microscopic differences between the two types of lesions.[409] "[T]he caries lesion is located under the plaque while erosion appears widespread on exposed surfaces."[410] There are additional differ-

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marketing.com/news2jj.htm) (author of that study accessed such web page on Nov. 2004); Jacobson, *Liquid Candy, supra* n. 8, at 1 (carbonated soft drinks "account for more than one out of every four beverages consumed in America," citing Natl. Soft Drink Assn. at http://www.nsda.com/SoftDrinks/index.html) (that author accessed such web page on July 5, 2002). The pages cited in both articles are no longer available. Now it seems that some such data and studies are available online only for purchase. *See e.g., 2009 Focus Report - The Future of Liquid Refreshment Beverages in the U.S.*, Bev. Mktg. (book cost, $2,295) (available at http://www.beveragemarketing.com/?service=publications&section=refreshment); *2009 Carbonated Soft Drinks in the U.S.*, Beverage Marketing (book cost, $5,395) (available at http://www.beveragemarketing.com/?service=publications&section=softdrinks) Moreover, the Natl. Soft Drink Assn. is now the Am. Bev. Assn. with a new website. *See History*, Am. Bev. Assn, http://www.ameribev.org/about-aba/history/

402. Klaus D. Jandt, *Probing the Future in Functional Soft Drinks on the Nanometre Scale-Towards Tooth Friendly Soft Drinks*, 17 Trends Food Sci. Tech. 263, 264 (2006) [hereinafter *Tooth Friendly Soft Drinks*].

403. *See* Suzannah Olivier, *Fruit and Tooth Erosion*, Times (U.K.) (Feb. 26, 2002) (available at 2002 WLNR 3988777) [hereinafter Olivier, *Fruit and Tooth Erosion*]; *see also* G.A. Sánchez & Fernandez De Preliasco, *Salivary pH Changes During Soft Drinks Consumption in Children*, 13 Intl. J. Pediatric Dentistry 251 (2003) ("a caries lesion is caused by acids formed by the bacterial degradation of carbohydrates") [hereinafter Sánchez, *Salivary pH Change*].

404. Jandt, *Tooth Friendly Soft Drinks*, *supra* n. 402, at 264.

405. Effrat Habsha, *The Etiology and Pathogenesis of Tooth Wear, Part 1*, Oral Health (Oct. 1999) (available at 1999 WLNR 177680) [hereinafter Habsha, *Tooth Wear*].

406. Olivier, *Fruit and Tooth Erosion, supra* n. 403.

407. Jandt, *Tooth Friendly Soft Drinks*, *supra* n. 402, at 264.

408. Bassiouny, *Influences of Drinking Patterns*, *supra* n. 93, at 208.

409. Sánchez, *Salivary pH Change, supra* n. 403, at 251.

410. *Id.*

ences between the two. For one, improved oral care, including the use of fluoride, has resulted in a decrease in the number of dental caries in many industrialized nations.[411] In addition, caries lesions can be remineralized or recalcified.[412] This is in marked contrast to erosion lesions, which are "gaining ground" in industrialized countries. Unlike caries lesions, erosion lesions cannot be recalcified[413] and so are non-reversible.[414]

B. *Caries*

A cavity is the late manifestation of the infectious disease known as dental caries.[415] Although some early studies showed no association between the consumption of soft drinks and formation of cavities and dental caries,[416] "[m]ore recent studies [have] found positive associations between a high intake of soft drinks and dental caries."[417] One such study examined the diet of low-income African American children, ages 3 to 5, from Detroit, Michigan.[418] It found that 75% of the children had caries.[419] The study concluded:

> 1. This homogenous population of low-income, 3- to 5-year-old children in Detroit, Mich. had unhealthy diets, including high intakes of sugared beverages, cold cereals, potato chips, and cheese. Vegetables were rarely consumed by the children.
> 2. Unhealthy diets were related to the severity of dental caries, *with the consumption of soda and powered/sport drinks related to a higher level of caries.*

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411. Jandt, *Tooth Friendly Soft Drinks*, *supra* n. 402, at 264.

412. Colin Dawes, *What Is the Critical pH and Why Does a Tooth Dissolve in Acid?*, 69 Can. Dental Assn. 722, 724 (2003) (available at http://www.cda-adc.ca/jcda/vol-69/issue-11/722.pdf) [hereinafter Dawes, *Critical pH*]. More specifically:

> In a white-spot caries lesion, the decalcification has occurred below the surface, and the lesion is covered by a virtually intact surface zone of enamel with a thickness of about 0.03 mm. There is very good clinical evidence that such lesions can be remineralized if the surface remains intact, provided they are kept free of plaque, salivary flow is adequate or is regularly stimulated by use of sugar-free gum, and topical fluoride treatments are given. *Id.*

413. *Id.* ("[E]namel that has suffered surface erosion by acid cannot be recalcified, because there is no suitable matrix for crystal growth.").

414. Hooper, *Effects of Toothpaste*, *supra* n. 6, at 477.

415. Esther M. Wilkins & Lois Rigmont Barber, *Evidence-Based Prevention, Management, and Monitoring of Dental Caries*, 76 J. Dental Hygiene 270 (2002) (available at 2002 WLNR 14707859).

416. Kolker, *Caries and African American Children*, *supra* n. 115, at 457.

417. *Id.*

418. *Id.*

419. *Id.* This compares to rates of 38% in a Connecticut Head Start Program and 86% and 91% reported in other Head Start programs. *Id.* at 460.

3. Conversely, *healthier diets consisting of milk and real juice* (not orange) consumption were associated with having a lower level of caries. Although all the associations were significant, the relationship may be classified as weak due to the low odds ratios.
4. *This evidence clearly supports the need for dietary interventions* that address not only healthy eating behaviors, but availability and affordability of healthy foods.[420]

An earlier study focused on carbonated soft drink consumption and caries in children.[421] That study "found that a high consumption of carbonated soft drinks in early childhood was significantly associated with an increased risk of dental caries in the primary dentition after adjustment for [other factors]."[422] Another study reached a similar conclusion: "[c]onsumption of regular soda pop . . . was associated with increased caries risk."[423] On the other hand, "[m]ilk had a neutral association with caries."[424]

C. *Dental Erosion*

Unfortunately, "dental erosion has received little attention in the United States,"[425] and "public awareness of dental erosion . . . is not

420. *Id.* at 463 (emphasis added).

421. W. Sohn et al., *Carbonated Soft Drinks and Dental Caries in the Primary Dentition*, 85 J. of Dental Res. 262 (2006) (available at http://jdr.sagepub.com/cgi/reprint/85/3/262) (last accessed Mar. 4, 2009) [hereinafter Sohn, *CSDs and Dental Caries*].

422. *Id.* at 265.

423. Teresa H. Marshall et al., *Dental Caries and Beverage Consumption in Young Children*, 112 Pediatrics e184, e190 (2003) (available at http://pediatrics.aappublications.org/cgi/reprint/112/3/e184?ijkey=2e7a62affcc448ecceb1eb7ddb02794b7b5d3920) (last accessed Mar. 5, 2009) [hereinafter Marshall, *Caries, Beverages, and Young Children*].

424. *Id.*

425. *See* Rachael E. Davis et al., *In Vitro Protection Against Dental Erosion Afforded by Commercially Available, Calcium-Fortified 100 Percent Juices*, 138 J. Am. Dental Assn. 1593, 1594 (2007) [hereinafter Davis, *Calcium-Fortified Juices*]. Most of the studies relied upon in this article are from Europe where dental erosion began receiving attention in about 1996. *See* Trevor H. Grenby, *Lessening Dental Erosive Potential by Product Modification*, 104 Eur. J. Oral Sci. 221 (1996) [hereinafter Grenby, *Lessening by Product Modification*]. *See also* N.X. West et al., *A Method to Measure Clinical Erosion: The Effect of Orange Juice Consumption on Erosion of Enamel*, 26 J. Dentistry 329 (1998) (article from United Kingdom: "[r]ecently there has been an increase in the number of articles discussing tooth wear"); Cornelius T. Bamise et al., *Erosive Potential of Soft Drinks in Nigeria*, 2 World J. of Med. Sci. 115 (2007) (study assessed erosive potential of soft drinks commonly consumed in Nigeria due to concern about erosion and increasing consumption of soft drinks in Nigeria) (available at http://www.idosi.org/wjms/2(2)07/9.pdf). The studies from Europe focus on soft drinks and beverages popular in Europe and do not include Mountain Dew. *See e.g.* M.E. Barbour et al., *The Relationship Between Enamel Softening and Erosion Caused by Soft Drinks at a Range of Temperature*, 34 J. Dentistry 207 (2006) (drinks studied: Robinson's Original Apple and Blackcurrant Juice Drink and Ribena Toothkind Blackcurrant Juice Drink). Some recent

high."[426] Dental erosion affects dental enamel which "forms the top layer, the crown, of our teeth."[427] It consists of "inorganic mineral which is predominantly characterized as calcium-phosphate crystals"[428] or "hydroxyapatite (HA), which is embedded in an organic protein matrix . . . "[429] This protein matrix serves as "a kind of scaffold in which the enamel minerals rest."[430]

Dental erosion[431] is "defined as the irreversible loss of dental hard tissue by a chemical process not involving bacteria."[432] It is painless,[433] and no microorganisms are involved.[434] "Clinically, the demineraliz]ed enamel surface is removed, leaving a smooth surface."[435]

Causes of dental erosion are both intrinsic and extrinsic.[436] Extrinsic acids are those coming from "source[s] . . . outside of the body [such as] acidic beverages, foods, medications or environmental acids. The most

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studies from American research teams have, however, included Mountain Dew in their research.

426. S. Wongkhantee et al., *Effect of Acidic Food and Drinks on Surface Hardness of Enamel, Dentine, and Tooth-Coloured Filling Materials,* 34 J. Dentistry 214 (2006) [hereinafter Wongkhantee et al., *Effect of Acidic Food and Drinks*].

427. Jandt, *Tooth Friendly Soft Drinks, supra* n. 402, at 264.

428. T. Attin, K. Weiss, K. Becker, W. Buchalla & A. Wiegand, *Impact of Modified Acidic Soft Drinks on Enamel Erosion*, 11 Oral Diseases 7 (2005) [hereinafter Attin, *Impact of Modified Acidic Soft Drinks on Enamel Erosion*].

429. Jandt, *Tooth Friendly Soft Drinks, supra* n. 402, at 264; *see also* Dawes, *Critical pH, supra* n. 412, at 722.

430. Jandt, *Tooth Friendly Soft Drinks, supra* n. 402, at 264.

431. One researcher has criticized the choice of the term erosion due to the long-standing use of the term to "describe[ ] a mechanical wearing down of soil through wind, water and the weathering of rock." Jandt, *Tooth Friendly Soft Drinks, supra* n. 402, at 264. As a term, "dental erosion seems not ideally chosen, since it is a *chemical process*" and not a mechanical process. *Id.* (emphasis added).

432. V. Sirimaharaj, L. Brearley Messer & M.V. Morgan, *Acidic Diet and Dental Erosion Among Athletes,* 47 Austrl. Dental J. 228 (2002); J.D. Eccles & W.G. Jenkins, *Dental Erosion and Diet*, 2 J. Dentistry 153 (1974) [hereinafter Eccles, *Dental Erosion and Diet*]; *see also* B.T. Amaechi & S.M. Higham, *Dental Erosion: Possible Approaches to Prevention and Control*, 33 J. Dentistry 243 (2005) ("Dental erosion, otherwise known as erosive tooth wear, is the loss of dental hard tissue through either chemical etching and dissolution by acids of non-bacterial origin or chelation.") [hereinafter Amaechi, *Dental Erosion: Possible Approaches*].

433. A.M. Cairns et al., *The pH and Titratable Acidity of a Range of Diluting Drinks and Their Potential Effects on Dental Erosion*, 30 J. Dentistry 313 (2002) [hereinafter Cairns, *pH and Titratable Acidity*].

434. Eygen, *Influence of a Soft Drink with Low pH on Enamel, supra* n. 14, at 372.

435. L. Lupi-Pegurier et al., *In Vitro Action of Bordeaux Red Wine on the Microhardness of Human Dental Enamel*, 48 Archives Oral Bio. 141 (2003) [hereinafter Lupi-Pegurier, *Bordeaux Red Wine*].

436. D.H.J. Jager et al.,km *Influences of Beverage Composition on the Results of Erosive Potential Measurement by Different Measurement Techniques*, 42 Caries Res. 98 (2008) [hereinafter Jager, *Influences of Beverage Composition*].

common of these are dietary acids."[437] References to dental erosion date back to 1778, though cases of dental erosion linked to diet, as compared to industrial erosion, are "more sporadic in distribution."[438] Soft drink consumption is an extrinsic cause of dental erosion[439] and "has frequently been reported to be one of the most important risk factors of dental erosion."[440]

Dental erosion involves "the environmental stability of the mineral component of enamel [which] is pH[441] dependent." The critical pH[442] is

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437. Gandara, *Diagnosis, supra* n. 12, at 6. Intrinsic causes are "acid source[s] inside the body, [such as] gastric acids regurgitated into the esophagus and mouth." *Id.*

438. Eccles, *Dental Erosion and Diet, supra* n. 432, at 153.

439. Jager, *Influences of Beverage Composition, supra* n. 432, at 98; A. Lussi, T. Jaeggi & D. Zero, *The Role of Diet in the Aetiology of Dental Erosion*, 38 Caries Res. 34 (2004) [hereinafter Lussi, *Role of Diet*].

440. Thorbjörg Jensdottir, Allan Bardow & Peter Holbrook, *Properties and Modification of Soft Drinks in Relation to Their Erosive Potential in Vitro*, 33 J. Dentistry 569, 569-70 (2005) [hereinafter Jensdottir, *Properties and Modification of Soft Drinks*]. *See* Gandara, *Diagnosis, supra* n. 12, at 20 (Table 4 - "Risk Factors for Dental Erosion," includes "Soft drinks consumed (4-6 or more per week)"). For photographs of dental erosion caused by soft drink consumption, *see id.*, Figures 11 and 12. Their descriptions:

> Figure 12 illustrates erosion of the left side mandibular molars of a 20-year old female who habitually enjoyed holding a cola beverage in this area for several minutes before swallowing. Other parts of the dentition were not affected.
>
> . .
>
> Figure 11 shows erosion (arrow) secondary to day-long sipping of a cola drink in a patient . . [whose] acidic oral environment most likely contributed to the extensive occlusal attrition.

Id.

441. pH is the measure of acidity. In addition:

> Degrees of acidity or alkalinity are expressed in terms of their pH. Distilled water has a pH of 7.0 and is considered neutral. When the pH is higher than 7.0, the substance is a base (i.e., alkaline), and when the value is lower, the substance is acid. The greater the numerical distance from 7.0, the stronger the acid or base. For example, coffee is considered weakly acid, with its pH of 5.0; battery acid, a strong acid, has a pH of 0.8.

Ed Blonz, *No Need to Manipulate Body's pH*, S.D. Union-Trib. E2 (Feb. 27, 2008) (available at 2008 WLNR 4025038).

442. *See* Dawes, *Critical pH, supra* n. 412, at 722 (more specifically: "The critical pH is the pH at which a solution is just saturated with respect to a particular mineral, such as tooth enamel. [I]f the pH of the solution is less than the critical pH, the solution is unsaturated, and the mineral will tend to dissolve until the solution becomes saturated. The concept of critical pH is applicable only to solutions that are in contact with a particular mineral, such as enamel. Saliva and plaque fluid, for instance, are normally supersaturated with respect to tooth enamel because the pH is higher than the critical pH, so our teeth do not dissolve in our saliva or under plaque."); Von Fraunhofer, *Dissolution in Soft Drinks, supra* n. 5, at 308 ("[a] pH of 5.5 generally is accepted as the threshold level for the development of dental caries," but tooth demineralization may also occur as well as dental caries).

around 5.5.[443] "When the pH value in the mouth falls below 5.5, enamel demineralization can occur."[444] Many soft drinks have pH values well below 5.5,[445] with Mountain Dew having a pH of *3.3*.[446] Within 20 min-

443. Manuela Finke, David M. Parker & Klaus D. Jandt, *Influence of Soft Drinks on the Thickness and Morphology of in Situ Acquired Pellicle Layer on Enamel*, 255 J. Colloid Interface Sci. 263 (2002) [hereinafter Finke, *Thickness and Morphology*].

444. Banu Dincer, Serpil Hazar & Bilge Hakan Sen, *Scanning Electron Microscope Study of the Effects of Soft Drinks on Etched and Sealed Enamel*, 122 Am. J. Orthodontics Dentofacial Orthopedics 135 (2002) [hereinafter Dincer, *Scanning Electron Microscope Study*]; Habsha, *Tooth Wear, supra* n. 405 ("[A]ny solution with a lower pH value [than 5.5] may cause erosion, particularly if the attack is of long duration and repeated over time.").

445. Dincer, *Scanning Electron Microscope Study, supra* n. 444, at 135; *see* Jain, *CSDs and pH, supra* n. 14, at 150 (study "measure[d] the pH of 20 commercial brands of soft drinks, the dissolution of enamel resulting from the immersion in these drinks, and the influence of pH on enamel loss;" brands included Mountain Dew, Squirt, Surge, Slice Orange, Sprite, and 7Up).The pH of some common drinks:

Drink Name	pH* — Low is More Acidic
Pure Water	7.0 (neutral)
Barq's Root Beer	4.0
Minute Maid (R) Orange Juice	3.8
Propel (R) Fitness Water	3.4
Red Bull (R)	3.3
Sprite (R)	3.3
Mountain Dew (R)	*3.3*
Diet Coke (R)	3.1
Sierra Mist	3.1
Full Throttle Energy Drink	3.0
Diet Pepsi (R)	3.0
Gatorade (R)	2.9
Sunkist (R) Orange Soda	2.9
Dr. Pepper (R)	2.9
Vault Energy Soda	2.9
Amp—Mountain Dew (R)	2.8
SoBe (R) Energy	2.6
Minute Maid (R) Lemonade	2.6
Pepsi (R)	2.5
Diet Schweppes Tonic	2.5
Coca-Cola (R) Classic	2.4
Battery Acid	1.0

* Laboratory tests, Dr. John Ruby, University of Alabama, Birmingham School of Dentistry, 2007. *Sip All Day, Get Decay*, Minn. Dental Assn., http://www.mndental.org/public_home/educational_activities/sip_all_day_get_decay (emphasis added) (last accessed Mar. 4. 2009) [hereinafter *Sip All Day, Get Decay*]. The pH of other beverages and food items varies greatly. For a list of the pH of common beverages and food, *see* Gandara, *Diagnosis, supra* n. 12, at 6 (Table 2).

446. *Sip All Day, Get Decay, supra* n. 445 (emphasis added).

utes, soft drinks can decrease the pH value in the mouth to the critical pH of 5.5.[447]

Saliva protects the teeth against an acid challenge brought about by the consumption of acidic drinks.[448] "Saliva and the salivary pellicle counteract the acid attacks, but if the challenge is severe, a total destruction of the tooth tissue follows."[449]

"[A]cid erosion produces a zone of softened enamel at the base of an erosive lesion, which is a few micrometers in depth and extremely susceptible to physical wear."[450] As discussed, *supra*, an erosive lesion differs from a caries lesion. As a result of dental erosion, the "soft under-layer of teeth, the dentine, [is] exposed."[451] "Signs of tooth erosion are a "glassiness" of the teeth, sensitivity to cold, heat and sweetness, enamel fracture[,] and pain."[452]

Dental erosion affects more than just enamel.[453] It can cause hypersensitivity and pulp exposure,[454] and, in rare cases, tooth fracture.[455]

Since the early 19th century, dental erosion has increased in various parts of the world.[456] As stated by the Oral Health Program of the World Health Organization (WHO): "[D]ental erosion seems to be a growing problem and in some countries an increase in erosion of teeth is associated with an increase in consumption of beverages containing acids."[457]

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447. Dincer, *Scanning Electron Microscope Study, supra* n. 445, at 135.

448. Finke, *Thickness and Morphology, supra* n. 443, at 263.

449. Habsha, *Tooth Wear, supra* n. 405; *see* Thomas Imfeld, *Prevention of Progression of Dental Erosion by Professional and Individual Prophylactic Measures*, 104 Eur. J. Oral Sci. 215 at 217 (1996) ("[R]epeated erosive acid challenges, however, overwhelm the salivary capacity, and the introduction of additional buffering substances into the mouth becomes necessary."); Finke, *Thickness and Morphology, supra* n. 443, at 263 (Saliva has a high buffering capacity, and "saliva proteins are also involved in building a protective pellicle layer on the enamel surface.").

450. M. Eisenburger & M. Addy, *Erosion and Attrition of Human Enamel in Vitro Part I: Interaction Effects*, 30 J. Dentistry 341 (2002).

451. Olivier, *Fruit and Tooth Erosion, supra* n. 406.

452. *Id.*; *see also* Lussi, *Role of Diet, supra* n. 439, at 35 (describing the signs of enamel erosion).

453. Wongkhantee, *Effect of Acidic Food and Drinks, supra* n. 426, at 215.

454. Lupi-Pegurier, *Bordeaux Red Wine, supra* n. 435, at 141.

455. Wongkhantee, *Effect of Acidic Food and Drinks, supra* n. 426, at 215.

456. *See* Amaechi, *Dental Erosion: Possible Approaches, supra* n. 432, at 243-44; Attin, *Impact of Modified Acidic Soft Drinks on Enamel Erosion, supra* n. 428, at 7 ("The prevalence of dental erosion in children, adolescents and adults has increased in the past several years in several countries.").

457. WHO, *Oral Health Program, Risks to Oral Health and Intervention, Diet and Nutrition*, http://www.who.int/oral_health/action/risks/en/; *see also* Leslie A. Ehlen et al., *Acidic Beverages Increase the Risk of in Vitro Tooth Erosion*, 28 Nutrition Res. 299 (2008) [hereinafter Ehlen, *Acidic Beverages Increase the Risk of in Vitro Tooth Erosion*] ("Dental erosion is considered a significant oral health concern in European and Middle Eastern countries.");

Dental enamel is "one of the most highly mineralized tissues in the human body,"[458] and [a]cids in soft drinks can especially affect "[m]ineralized tissues, such as bone and teeth . . . ."[459] Studies have linked the consumption of carbonated drinks and beverages with dental erosion.[460] More specifically, this consumption can produce a "chemical erosion lesion, which . . . [is] a progressive superficial tissue loss of tooth surface—not associated with trauma, mechanical instrumentation, or caries activity—that can be commensurate only with chronic exposure to acidic fumes or fluids."[461]

Results of a recent study "impl[y] that the increasing weight loss of tooth enamel as a result of erosion in soft drink[s] can be attributed to the continuous loss of calcium ions, along with phosphorus, oxygen, and hydrogen ions, into the solution."[462] The loss of these ions results in demineralization of the dental tissue, which, in turn, causes the tissue to become weaker and softer.[463]

Moreover, some of these studies have shown that the pH of soft drinks does not correlate with dental erosion.[464] Some suggest that "[t]he measurement of a beverage's total acid content [that is, the titratable acid[465]] may be a more realistic and more accurate method for predicting erosive potential."[466] The erosive potential of acidic drinks is also "influ-

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Hooper, *Effects of Toothpaste, supra* n. 6, at 476 (similar levels of dental erosion in the UK and US "indicat[e] perhaps the global nature of this issue").

458. Finke, *Thickness and Morphology, supra* n. 443, at 263.

459. Jandt, *Tooth Friendly Soft Drinks, supra* n. 304, at 263.

460. *See* David W. Bartlett, George P. Bureau & Angela Anggiansah, *Evaluation of the pH of a New Carbonated Soft Drink Beverage: An in Vivo Investigation*, 12 J. Prosthodontics 21 (2003) [hereinafter Bartlett, *Evaluation of the pH of a New Carbonated Soft Drink Beverage*]; *but see* Esber Çaglar et al., *Dental Erosion Among Children in an Istanbul Public School*, 72 J. of Dentistry for Children 5, 8 (2005) (In one study, 80% of children with erosive tooth wear consumed soft drinks); Lussi, *Role of Diet, supra* n. 439, at 36 (citing a 2001 study of 416 British 14-year-olds).

461. Bassiouny, *Influences of Drinking Patterns, supra* n. 93, at 208.

462. Low, *In-Situ Monitoring, supra* n. 5, at 4.

463. *Id.* at 4.

464. *See* Ehlen, *Acidic Beverages Increase the Risk of in Vitro Tooth Erosion, supra* n. 457, at 302; Jain, *CSDs and pH, supra* n. 14, at 154; von Fraunhofer, *Dissolution in Soft Drinks, supra* n. 5, at 311; *see also* Eccles, *Dental Erosion and Diet, supra* n. 432, at 156 ("[I]t must not be assumed that pH is the only factor affecting the dissolution of tooth substance."). "Different techniques are available to assess the erosive potential of acidic beverages." Jager, *Influences of Beverage Composition, supra* n. 436, at 98. Some such techniques include the weight loss method, surface hardness and nanoindentation techniques, profilometry, chemical analysis, and others. *See e.g.* Low, *In-Situ Monitoring, supra* n. 5 (Other techniques are also being researched, including a new weighing technique).

465. Davis, *Calcium-Fortified Juices, supra* n. 425, at 1593 ("Titratable acidity . . is the quantity of base required to bring a solution to neutral pH . . . .").

466. Von Fraunhofer, *Dissolution in Soft Drinks, supra* n. 5; *see also* Cairns, *pH and Titratable Acidity, supra* n. 433, at 313 ("It is now widely accepted that the total titrable

enced by the interplay of the titrable acidity, pH, and acid concentration and the presence of calcium, phosphate, and fluoride ions."[467] Concerning soft drinks and titrable acidity:

> Soft drinks with a high titrable acidity can have a strong buffering capacity and may resist pH changes brought about by salivary actions. The high buffering capacity precipitates a prolonged period of oral acidity, causing a sustained low pH. These factors are necessary for the erosive process to occur in the oral cavity.[468]

Thus, soft drinks with a high buffering capacity impede the saliva's attempt to raise pH, and by keeping pH low for a longer period of time, create a better environment for dental erosion. This helps explain the correlation "between enamel dissolution and increased time of immersion."[469] Moreover, "reductions in enamel microhardness" can occur even in a short period of time.[470]

Other factors also influence the erosivity of soft drinks and erosive lesions, such as the drinking patterns of the user "and the local physiologic salivary factors."[471] These drinking patterns include: "frequency, amount, duration, and timing of soft drink intake, the length of time it remains in the mouth and in contact with the teeth, and . . [t]he method by which the acidic beverage is consumed."[472] Concerning this "flow of liquid over

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acidity is a more accurate measure of the total acid content of a drink, and may, therefore, be a more realistic means of predicting erosive potential."); *but see* Davis, *Calcium-Fortified Juices, supra* n. 425, at 1597 ("the titrable acidities of [100] juices in our study were not related to enamel or root surface erosion").

467. Bassiouny, *Influences of Drinking Patterns, supra* n. 93, at 205.

468. Owens, *The Potential Effects of pH and Buffering Capacity on Dental Erosion, supra* n. 14, at 527.

469. Jain, *CSDs and pH, supra* n. 14, at 153.

470. Eygen, *Influence of a Soft Drink with Low pH on Enamel, supra* n. 14, at 377.

471. Bassiouny, *Influences of Drinking Patterns, supra* n. 93, at 205.

472. *Id.* at 205; M. Eisenburger & M. Addy, *Influence of Liquid Temperature and Flow Rate on Enamel Erosion and Surface Softening*, 30 J. Oral Rehab. 1076, 1079-1080 (2003) [hereinafter Eisenburger, *Influence of Temperature and Flow Rate*] The Bassiouny study discussed two case reports in which the patients shared common traits. The first, an 18-year-old man who "[f]or the past four to five years . . . had routinely consumed one 2.0 L bottle of carbonated soda each day and another 20 ounces of soda before retiring to bed." In addition, he spent much of his time playing video games and sipping carbonated beverages out of cans but always keeping the soda on the right side of his mouth. Bassiouny, *Influences of Drinking Patterns, supra* n. 93, at 205. The second was a 16-year-old girl who "[f]or the past five to six years had consumed 1.0 L bottle of carbonated beverage during the daytime and another 12 ounces of soda before retiring to bed," using a straw positioned against her front teeth. *Id.* at 207-208. Both had similar dental hygiene habits. *Id.* at 208. Both patients came for treatment only after pieces of their teeth began to fall out. *Id.* at 205, 208. Both had blackened teeth. *Id.* at 206, 208. Both suffered from "erosion lesions associated with chronic excessive intake of acidulated carbonated beverages." *Id.* at 208. "Both cases exhibited massive hard tissue dental destruction [but]

the tooth surface . . . [i]t is well known that habits such as holding acidic drinks in the mouth, while moving them around by tongue or cheek movements, accelerate the erosive loss of hard tissue."[473] Other factors include the temperature of the drink, with chilled drinks being less harmful.[474]

One researcher has broken down dental erosion into three steps:

> The first step, early demineralisation, is characterized by a softening of the tooth enamel and structural changes on a nanoscopic scale. In the second step, microscopic material loss and structural collapse of dental hard tissue occurs. Finally, the erosion is visible to the naked eye and can be diagnosed by the dentist.[475]

Studies further have shown that non-cola drinks cause more dental erosion than cola drinks.[476] In other words, "non-cola beverages were far more aggressive than cola drinks."[477]

Also, "[p]ermanent teeth of adolescents are more prone to assault from acids found in soft drinks due to the porous characteristic of immature enamel and a deficiency of salivary conditioning; as a result, the erosion potential among this age demographic may rise in the future."[478]

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with one distinctive difference: [the location of the destruction.]" *Id.* With the first patient, the destruction of the teeth occurred more on the right side than on the left and to the posterior (back) rather than to the anterior (front). *See id.* at 206, 208-209. With the second patient, the destruction occurred more to the anterior teeth than to the posterior which were those teeth impacted by the straw. *Id.* at 208. This is consistent with other studies: "Acidic drinks imbibed through a straw directly at the labial surface of teeth are likely to markedly increase erosion." Eisenburger, *Influence of Temperature and Flow Rate*, *supra* n. 472, at 1080.

473. R.P. Shellis et al., *Relationship between Enamel Erosion and Liquid Flow Rate*, 113 Eur. J. Oral Sci. 232 (2005).

474. Eisenburger, *Influence of Temperature and Flow Rate*, *supra* n. 472, at 1080; Jandt, *Tooth Friendly Soft Drinks*, *supra* n. 404, at 264 (Dental erosion is a chemical process); Barbour, *Range of Temperature*, *supra* n. 425, at 208, 213 ("It is well known that the rate of many chemical reactions varies with temperature." That study concluded: "Our results indicate that there is a clear correlation between erosion, softening, and temperature." As temperature increased, it resulted in loss of enamel hardness and material loss).

475. Jandt, *Tooth Friendly Soft Drinks*, *supra* n. 404, at 265.

476. Ehlen, *Acidic Beverages Increase the Risk of in Vitro Tooth Erosion*, *supra* n. 457, at 299; *see* Jain, *CSDs and pH*, *supra* n. 14, at 153; von Fraunhofer, *Dissolution in Soft Drinks*, *supra* n. 5, at 308.

477. *See* von Fraunhofer, *Dissolution in Soft Drinks*, *supra* n. 5, at 311; Jain, *CSDs and pH*, *supra* n. 5.

478. Owens, *The Potential Effects of pH and Buffering Capacity on Dental Erosion*, *supra* n. 14, at 527.

VII. The Damage of Mountain Dew

A. *Marketing of Mountain Dew to Its Consumers*

And who are the Americans consuming these CSDs, and more specifically, Mountain Dew? According to one report, "[t]he most avid consumers of all are 12 to 29-year-old males."[479] Another report provides:

> * Sprite is the non-cola of choice for 18-24-year-olds, followed by Dr[.] Pepper and Mountain Dew.
> * Teens are much more frequent consumers of regular soft drinks than adults, reporting as many as 8.43 glasses per week, on average.
> * Children aged 6 to 11 consume 2.41 glasses of regular cola per week and 2.51 servings of other soft drinks.[480]

Another study, the TRU Study, found that in 2003 "teens drank an average of 11 soft drinks per week."[481]

And how does PepsiCo reach these consumers? According to one industry insider, "Pepsi has done a masterful job of marketing Mountain Dew"[482] and its "marketing and overall promotion of Mountain Dew has been dead-on target."[483] Moreover, "it's one of the two or three best-marketed brands in the entire industry."[484] One Mountain Dew consumer was described as being located "[m]idway between loyalty and addiction" with PepsiCo having built "a cult following" in regard to Mountain Dew.[485]

Over the years, PepsiCo has targeted its advertising to a core audience.[486] For example, it "clearly align[s] its Mountain Dew brand with gamers, males 12 to 36 who spend more of their free time playing video games than watching TV."[487] In fact, with the release of the new "Halo 3"

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479. *Liquid Candy*, *supra* n. 8, at 2.

480. Landi, *2007 Challenging Year*, *supra* n. 163, at S4.

481. Parlin, *Teens Make Statements*, *supra* n. 373.

482. Johnson, *Dew Hits New Heights*, *supra* n. 383.

483. Henry Unger & Scott Leith, *'Hick' to Hip-Hop, Dew Reigns*, Atlanta J. Const., July 8, 2001, at F1 (quoting John Sicher) (available at 2001 WLNR3949262) (last accessed Mar. 4, 2009) [hereinafter Unger, *'Hick' to Hip-Hop, Dew Reigns*].

484. *Id.*

485. *Id.*

486. *See e.g.* Pepsi – Hundred Years, *supra* n. 45, at 90 (concerning magazines; for *Life*, they supplied family-oriented ads, while for *Esquire*, they addressed more adult themes).

487. John Gaudiosi, *Mountain Dew Makes MMO More Than Just a Game*, 79 Advert. Age 21 (2008) (available at 2008 WLNR 2105730).

came a new drink, "Halo 3" Mountain Dew.[488] PepsiCo has also licensed Mountain Dew for lip balm.[489]

PepsiCo relies on innovative ways to reach its Mountain Dew consumers, such as having its own record label, Green Label Sound.[490] In a recent interview by Billboard magazine, Dave Burwick, the chief marketing officer of PepsiCo North America Beverages, was asked how he measured the success of such a label?[491] He responded: "Buzz and Internet chatter. We also track the success of the artists and how their careers are going. We ask, 'Are we getting a reaction from our consumers and are consumers aware?'"[492]

PepsiCo has not only targeted younger consumers—it has reached them.[493] It also has succeeded in building brand loyalty with them, especially with regard to Mountain Dew. To achieve this loyalty, PepsiCo has relied on advertising. In the 1980s, PepsiCo, with the help of a New York advertising firm, abandoned the "hillbilly" image of Mountain Dew and its slogan "tickle your innards."[494] The new target was "savvy youth."[495] In the 1990s PepsiCo's advertising was "aimed squarely at young males

488. Jeff Bell & Beth Snyder Bulik, "*Halo 3*," 78 Advert. Age S6 (2007) (available at 2007 WLNR 22766386); *see also Halo 3 Mountain Dew Game Fuel Ad*, YouTube, http://www.youtube.com/watch?v=UO-J5ImDEi8 (Views: 152,697) (last accessed Mar. 6, 2009).

489. Kate MacArthur, *Soda Giants Expand beyond the Fizz Biz*, 78 Advert. Age 10 (2007) (available at 2007 WLNR 10557995).

490. *See Mountain Dew Green Label Website*, http://www.greenlabelsound.com/ (last accessed Mar. 6, 2009).

491. Kamau High, *6 Questions with Dave Burwick*, 121 Billboard 13 (2009) (available at 2009 WLNR 7714105) [hereinafter High, *6 Questions*].

492. *Id.*

493. *See* Nada O. Kassem & Jerry W. Lee, *Understanding Soft Drink Consumption Among Male Adolescents Using the Theory of Planned Behavior*, 27 J. of Behavioral Med. 273, 291 (2004) (Among male adolescents, "seeing advertisements to encourage drinking soda was the second predictor of perceived behavioral control." The first was availability of regular soda at home).

494. Johnson, *Dew Hits New Heights*, *supra* n. 383; *see e.g. Mountain Dew — Original Commercial from the 1960's*, YouTube, http://www.youtube.com/watch?v=nokH3a63bEk&feature=related (last accessed Mar. 6, 2009) (In the 1960s, the hillbilly theme was primarily used); *Willie the Hillbilly - First Mountain Dew Commercial + Lyrics*, YouTube, http://www.youtube.com/watch?v=4xd8fzk8Rlk&NR=1 ("It'll Tickle Yore Innards" and "There's a Bang in every Bottle") (last accessed Mar. 6, 2009). By the 1970s, hillbillies were out and barefoot was in. *See e.g. Mountain Dew Commercial - 1970s*, YouTube, http://www.youtube.com/watch?v=tesGQ3FS4GE&feature=related ("Barefoot Feeling Drinking Mountain Dew"); *see e.g. Dew It Country Cool!*, YouTube, http://www.youtube.com/watch?v=A9miyq8nutM&NR=1 (horse pulling water skier) (last accessed Mar. 6, 2009) (In the 1980s, "Country Cool" came into the picture); *Mountain Dew Ad - 1985 - Country Cool – Skaters*, YouTube, http://www.youtube.com/watch?v=ZK0TkKPl2rI&feature=related (teenage skateboarders with cowboy hats) (last accessed Mar. 6, 2009).

495. Johnson, *Dew Hits New Heights*, *supra* n. 383, at C1.

. . . ."[496] In fact, Mountain Dew's tremendous growth in the 1990s "was jump-started by the 'Do the Dew' campaign that began in 1995."[497]

Not surprisingly, PepsiCo has spent millions advertising Mountain Dew:[498]

ADVERTISING YEAR	AMOUNT IN US DOLLARS
1975	2,800,000
1980	10,200,000
1985	9,000,000
1990	11,700,000
1995	29,800,000
1996	29,000,000
1997	34,000,000
1998	39,800,000
2004	57,803,000

B. *"Mountain Dew Mouth"*

Several studies show that Mountain Dew, a non-cola, is much more erosive than other drinks.[499] As stated earlier, the effect of "Mountain Dew Mouth" is devastating.[500] On February 10, 2009, the ABC television show *20/20* aired a segment entitled "*A Hidden America: Children of the Mountains*" (*Children on 20/20*),[501] which included "what dentists in the region have nicknamed 'Mountain Dew Mouth.'"[502] As a result of "the eruption of reaction" to *Children on 20/20*, the *Good Morning Show* had a

496. *Id.*

497. *Id.* (These "[a]ction-packed commercials revolve[d] around four dudes (Dewds?) who [had] never met a mountain high enough to keep them from grabbing a snowboard.").

498. For all years except 2004, Chiaki Moriguchi & David Lane, *A Hundred Year War: Coke vs. Pepsi 1890s-1990s, Case Study for Harvard Business School*, 9-799-117 (Jan. 14, 2000) [hereinafter *100 Year War*]. For year 2004, *Out of Balance, supra* n. 362, at 10. PepsiCo is not the only CSD corporation spending millions on advertising. During one year, "Coca-Cola alone spen[t] $500,000 per day on advertising." Nada O. Kassem et al., *Understanding Soft Drink Consumption Among Female Adolescents Using the Theory of Planned Behavior*, 18 Health Educ. Res. 278 (2003).

499. *See e.g.* Low, *In-Situ Monitoring, supra* n. 5; von Fraunhofer, *Dissolution in Soft Drinks, supra* n. 5.

500. *See supra* nn. 16, 17.

501. *20/20*, "A Hidden America, Children in the Mountains," (ABC TV. Feb. 10, 2009) (TV series) (available at http://abcnews.go.com/2020/story?id=6845770&page=1) (last accessed Mar. 6, 2009).

502. Diane Sawyer Interview with Edwin Smith, *Good Morning America*, (Feb. 13, 2009) (TV broad., transcr. available at 2009 WLNR 2888700); *see The Effect of Soda on Teeth, Good Morning America*, http://abcnews.go.com/Video/playerIndex?id=6870419 (Feb. 13, 2009) (video showing effect of soft drink on teeth) [hereinafter, *Transcript of Sawyer with Smith*].

follow up the next day with Diane Sawyer interviewing Edwin Smith, the Kentucky dentist who appeared in the original segment.[503] She began the interview by saying:

> A 20 ounce bottle of Mountain Dew contains 19 teaspoons of sugar, 93 milligrams of caffeine, equal to an adult tablet of NoDoz, but the biggest offender may be acid. A University of Maryland study immersed healthy teeth for 14 days in different sodas, and found that while all sodas cause enamel erosion, Mountain Dew caused two to five times the damage of that of regular colas, dissolving 6% of the tooth's enamel. We told you how Dr. Edwin Smith decided to take $150,000 of his own money to convert a truck into a traveling dental clinic for people who have few resources, a region rated number one in toothlessness. He says yes, the problem is diet and lack of dental care, *but it's also Mountain Dew.*[504]

Ms. Sawyer specifically asked Dr. Smith about the effects of other sodas: "Other sodas, too? Sugar sodas?"[505] Dr. Smith responded: "Other sodas, too, but Mountain Dew is unique. It has a lot of sugar, a lot of acid."[506]

PepsiCo gave several statements to ABC. It issued the first on February 11, 2009 (First Statement):

> This is old, irresponsible news. It is preposterous to blame soft drinks or any one food for poor dental health. So many factors determine individual dental health, including the types of food consumed, the length of time foods are retained in the mouth, and the level of oral hygiene and access to professional dental care.
>
> Sticky foods like raisins and cookies that tend to stay in the mouth longer and/or cling to teeth can be a significant source of dental cavities. In contrast, liquids, including those that contain sugar, clear the mouth quickly.
>
> It's about common sense, including a balanced diet and proper dental hygiene—like flossing and brushing teeth after meals and snacks.[507]

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503. *Transcript of Sawyer with Smith*, *supra* n. 502.

504. *Id.* (emphasis added).

505. *Id.*

506. *Id.*

507. *Pepsi's First Statement to ABC News*, ABC News, http://abcnews.go.com/video/playerIndex?id=6870419 (Feb. 13, 2009). This response shares language found on a Questions and Answers part of the website of the American Beverage Association: Do soft drink beverages contribute to poor dental health?

> You cannot single out one food or beverage as causing dental caries or erosion considering so many factors determine individual dental health. These include the types of food consumed, the length of time foods are

Almost immediately PepsiCo changed the tone of its response. On February 12, 2009, PepsiCo made another statement (Second Statement):

> One of the greatest tragedies of poverty is its impact on health and nutrition. Our products, consumed in moderation, can be part of a healthy, balanced diet. It's heartbreaking to see the impact of excessive or inappropriate consumption in combination with little or no dental care.
>
> We certainly don't advocate consumption of our products in this way, and we're continually expanding our offerings of healthier, more nutritious products. For anyone who has a concern about sugar or caffeine, we offer a wide range of sugar-free and caffeine-free products.
>
> We're also working with schools, non-profit groups and governments to educate people and encourage them to lead healthier lifestyles.[508]

On February 13, 2009, Pepsi issued another statement (Third Statement):

> PepsiCo VP of Global Health Policy Derek Yach, a former senior official of the World Health Organization whose responsibilities included the WHO dental health program, reached out directly to Dr. Smith earlier today.
>
> Dr. Yach called to learn more about Dr. Smith's mobile clinic. They also discussed how we might support his efforts

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> retained in the mouth and the level of oral hygiene and access to professional dental care. For instance, *sticky foods that tend to stay in the mouth longer and/or cling to teeth can be a significant source of dental cavities. In contrast, liquids that contain sugar, such as soft drinks or sweetened beverages, clear the mouth quickly.*
>
> Do sports drinks impact teeth enamel more than other drinks?
>
> There is no single cause of dental erosion, and there are numerous factors that can contribute to it besides various foods and beverages. A person's susceptibility to dental erosion varies depending on a person's behavior, lifestyle, diet and genetic make-up. General dental health has improved due to many factors, including better oral hygiene, water fluoridation and frequent dental check-ups.
>
> The facts demonstrate that there are multiple causes of dental erosion and many protective factors that can help prevent or minimize it. *It is irresponsible to blame foods, beverages or any other single factor for enamel loss and tooth decay.*

Am. Bev. Assn., *Questions and Answers, Beverages and Oral Health*, http://www.ameribev.org/nutrition—science/oral-health/qas/#question16 (last accessed Mar. 6, 2009) (emphasis added).

508. *Pepsi's Second Statement to ABC News*, ABC News, http://abcnews.go.com/2020/story?id=6870516&page=1(Feb. 12, 2009) [hereinafter *Pepsi's Second Statement*].

> to educate people in Appalachia about proper dental care and help them lead healthier lifestyles.[509]

PepsiCo's response continued to evolve. On February 17, 2009, it "told ABC News' Diane Sawyer that the company wants to work with a dentist in Eastern Kentucky to help save children's teeth . . . ."[510] PepsiCo CEO Indra Nooyi "expressed concern 'about any overuse or misuse of the soda among small children[,]' and that PepsiCo would donate another van to Dr. Edwin Smith for his mobile dental clinic and "work to recruit more dentists in the region . . . ."[511]

VIII. PROPOSALS

A. *In General*

Mountain Dew and other acidic beverages are causing extensive harm. "In view of the reported findings, it is significant to consider the extent of financial burden to individuals and/or the dental health system[,] if a comprehensive restorative approach is to be considered."[512] Many diverse organizations and individuals have proposed various solutions.[513]

B. *Potential Legal Actions*

Plaintiffs could possibly have failure-to-warn or other types of claims against the CSD manufacturers.[514] A recent case from the Third Circuit Court of Appeals, *Fellner v. Tri-Union Seafoods, L.L.C.*,[515] involved a failure-to-warn claim in regard to the label of a food item. There, the plaintiff had filed a complaint alleging that the defendant, the distributor of Chicken-of-the-Sea tuna products, had failed to warn her of the risks of

509. *Pepsi's Third Statement to ABC News*, ABC News, http://abcnews.go.com/2020/story?id=6873721&page=1 (Feb. 13, 2009).

510. Keturah Gray & Joseph Diaz, *PepsiCo to Support Dentist in Appalachia*, ABC News, http://abcnews.go.com/Health/story?id=6899312&page=1) (Feb. 17, 2009) [hereinafter Gray, *PepsiCo to Support Dentist*].

511. *Id.*

512. Bassiouny, *Influences of Drinking Patterns*, *supra* n. 93, at 209-210.

513. *See e.g. Liquid Candy*, *supra* n. 8, at V, 25-27; *Out of Balance*, *supra* n. 362, at 18-21 (dealing with soft drinks and other foods).

514. Currently, several cases dealing with the issue of products liability or deceptive advertising are pending against soft drink and beverage manufacturers. For example, on January 15, 2009, a complaint was filed against Coca-Cola Company "alleg[ing] that Coca-Cola deceived consumers by marketing Vitamin Water as a healthy alternative to soft drinks " Class Action Lawsuit Alleges Deceptive Advertising Claim, BevNet.com, (available at http://www.bevnet.com/news/2009/1-15-2009-coca-cola_class_action_suit). Class Action Complaint, *Koh v. The Coca-Cola Co.*, No. CV09-0182 (N.D. Cal., Jan. 14, 2009) (2009 WL 192234).

515. *Fellner v. Tri-Union Seafoods, L.L.C.*, 539 F.3d 237 (3d Cir. 2009) (petition for cert. filed 77 U.S.L.W. 3437 (U.S. Jan. 13, 2009)) (No. 08-889).

eating its products and that she had suffered severe mercury poisoning.[516] The defendant filed a motion to dismiss based on federal preemption, which the district court had granted, "ruling that Fellner's claims are preempted by the FDA's 'regulatory approach' to the risks posed by mercury compounds in tuna fish."[517] The appellate court reversed and described the situations as follows:

> This is a situation in which the FDA has promulgated no regulation concerning the risk posed by mercury in fish or warnings for that risk, has adopted no rule precluding states from imposing a duty to warn, and has taken no action establishing mercury warnings as misbranding under federal law or as contrary to federal law in any other respect.[518]

The court ruled that the plaintiff's lawsuit did not conflict with the FDA's regulatory actions in three ways. First, there was no "conflict with the FDA's 'regulatory scheme' for the risks posed by mercury in fish or the warnings appropriate for that risk because the FDA simply has not regulated the matter."[519]

Second, "the plaintiff's duty-to-warn claim [did] not conflict with an FDA determination deliberately to forego warnings because the FDA took no action to preclude state warnings-at least, no binding action via ordinary regulatory procedures, and no action whatsoever until after Tri-Union allegedly wrongfully failed to warn."[520] Third, the plaintiff's "lawsuit [did] not conflict with the FDA's food misbranding provision or the FDA's actions thereunder because the FDA has not exercised its misbranding authority under the FDCA with respect to methylmercury warnings for fish."[521]

The Third Circuit is not alone. In a recent decision from California, a federal district court relied on *Fellner* in allowing the plaintiff's claims concerning product labeling to proceed.[522] There, the plaintiff had alleged violations of several state statutes including: (1) misleading and deceptive advertising; (2) untrue advertising; (3) unlawful business acts and practices; (4) fraudulent business acts and practices; and (5) injunctive and declaratory

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516. *Id.* at 241.

517. *Id.*

518. *Id.* at 256.

519. *Id.*

520. *Id.*

521. *Id.*

522. *Hitt v. Ariz. Bev. Co.*, 2009 WL 449190 (S.D. Cal. Feb. 4, 2009); *Cf. In re PepsiCo, Inc., Bottled Water and Marketing and Sales Practice Litigation*, 588 F. Supp. 2d 527, 539 (S.D.N.Y. 2008) ("Aquafina meets the federal standards regarding source disclosure for purified water, and thus this action is preempted.").

relief under the consumers legal remedies act.[523] In addition, the United States Supreme Court recently ruled that there was no federal preemption in a case involving a plaintiff who brought a products liability claim against a drug manufacturer based on failure-to-warn.[524]

C. *Reformulation of Drinks*

Because acidic soft drink consumption has been increasing for years, especially in young people, "[i]t would therefore seem reasonable to expect soft drink manufacturers to try and improve their drinks[']properties from a dental perspective."[525] Moreover, "[r]ecent research has focused on modifying commercial products to decrease the erosive damage to teeth."[526]

According to various studies, modified-drinks "appear[ ] to have less erosive potential than the original formula when assessed by measuring pH at the tooth surfaces."[527] Studies have shown that the addition of calcium to drinks can reduce erosive potential.[528] Other additions to drinks include

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523. *Hitt,* 2009 WL 449190. The Plaintiff specifically alleged several counts: (1) "Defendants' beverages labeled as 'All Natural' are deceptively labeled because they contain high fructose corn syrup ('HFCS'), which is not a natural substance"; (2) "Defendants' beverages that have a fruit in the name are deceptively labeled because the beverages 'do not contain any substantial amount of the fruit named on the label'"; (3) "Defendants do not mention that the 'All Natural Products' contain one or more non-natural or artificial ingredients, including HFCS, except in inconspicuous and hard-to-read type in the 'Ingredients' statement on the back or sides of these products"; and (4) "'Plaintiff Hitt naturally and reasonably relied on the labels and advertising created by the Defendants and did not double-check those representations against the ingredient list in small type on the back of the container.'" *Id.*

524. *Wyeth v. Levine*, 2009 WL 529172 (U.S. Mar. 4, 2009).

525. *See* S. Hooper, J. Hughes et al., *A Clinical Study in Situ to Assess the Effects of a Food Approved Polymer of the Erosion Potential of Drinks*, 35 J. Dentistry 541 (2007). Another study concluded: "It would therefore seem eminently sensible to provide the consumer with the choice of a low erosive alternative carbonated beverage " West, *Experimental Carbonated Blackcurrant Drink, supra* n. 130, at 365.

526. Bartlett, *Evaluation of the pH of a New Carbonated Soft Drink Beverage, supra* n. 460, at 21.

527. *Id.*; *see* J.A. Hughes et al., *Further Modification to Soft Drinks to Minimize Erosion*, 36 Caries Res. 70 (2002); *see also* West, *Experimental Carbonated Blackcurrant Drink, supra* n. 130, at 364 ("This study has shown that carbonated drinks can indeed be modified, so that the differences in enamel loss between the experimental carbonated drink and the conventional carbonated drink were highly statistically significant at all time points measured."); *but see* Jensdottir, *Properties and Modification of Soft Drinks, supra* n. 440 at 574 ("modification of very acidic drinks like Coca-Cola seems unrealistic").

528. S. Hooper et al., *A Comparison of Enamel Erosion by a New Sports Drink Compared to Two Proprietary Products: A Controlled Crossover Study in Situ*, 32 J. of Dentistry, 541 (2004); J.A. Hughes et al., *Effects of pH and Concentration of Citric, Malice and Lactic Acids on Enamel, in Vitro*, 28 J. Dentistry 147, 151 (2000). Calcium could prevent dental erosion by two mechanisms:

phosphate salts and citrate.[529] "[M]odification of citric acid with low concentrations of [a combination of] calcium, phosphate and fluoride is able to reduce the erosive potential of the acidic solution."[530] Calcium and phosphate additives work by "saturat[ing] the soft drinks . . . so that the potential for these drinks to dissolve HA from the tooth enamel is reduced."[531] The downside to the additives is that "[a]dding too much calcium and phosphate to a soft drink may result in a chalky or soapy taste."[532] Adding calcium fluoride to soft drinks has not succeeded in preventing dental erosion.[533]

> First, the acid typically dissolves the surface of the enamel, dentin or both until a calcium-saturated solution is reached. This saturated solution prevents further dissolution or erosion. Addition of sufficient calcium to the initial solution, as in the calcium fortification of juice, can saturate the initial solution and prevent subsequent dissolution. Second, the calcium added to the solution can bind to citrate and prevent citrate from chelating calcium from enamel.

Davis, *Calcium-Fortified Juices*, *supra* n. 425, at 1597.

529. *See* Amaechi, *Dental Erosion: Possible Approaches*, *supra* n. 432, at 249; M.E. Barbour et al., *Human Enamel Dissolution in Citric Acid as a Function of pH in the Range 2.30 ≤ pH ≤ 6.30 – a Nanoindentation Study*, 111 Eur. J. Oral Sci. 258 (2003). A 1974 study stated: "Possibilities exist for the modification of commercially prepared beverages by the addition of fluorides, calcium, and phosphate in order to make them less harmful." Eccles, *Dental Erosion and Diet*, *supra* n. 432, at 159.

530. Attin, *Impact of Modified Acidic Soft Drinks on Enamel Erosion*, *supra* n. 428, at 11; *see also* Davis, *Calcium-Fortified Juices*, *supra* n. 425, at 1596 ("[C]alcium fortification of 100 percent juices can prevent enamel surface erosion and decrease the severity of root surface erosion associated with prolonged exposure to 100 percent juices.").

531. Jandt, *Tooth Friendly Soft Drinks*, *supra* n. 402, at 268.

532. *Id.* at 269. Moreover, the modifications to these drinks are associated with a less appealing drink taste and increased microbiological spoilage though adding "calcium and phosphate" may be a more practical means of reducing the erosive potential of soft drinks while maintaining a good drink taste and shelf life. *See* M.E. Barbour et al., *Human Enamel Erosion in Constant Composition Citric Acid Solutions as a Function of Degree of Saturation with Respect to Hydroxyapative*, 32 J. Oral Rehab. 16, 20 (2005) (study received support from GlaxoSmithKline, a beverage manufacturer).

533. M.J. Larsen & A. Richards, *Fluoride is Unable to Reduce Dental Erosion from Soft Drinks*, 36 Caries Res. 75, 79 (2002); M.J. Larsen, *Prevention by Means of Fluoride of Enamel Erosion as Caused by Soft Drinks and Orange Juice*, 35 Caries Res. 229, 233 (2001) ("For the soft drinks, the calcium fluoride dissolved in them altered neither the depth nor the nature of the [erosion] lesions."). This differs dramatically from the effect fluoride treatment has on caries lesions. In addition, applying fluoride varnish to the teeth also has not succeeded in preventing dental erosion. *See* A.C. Magalhães et al., *Effect of an Experimental 4% Titanium Tetrafluoride Varnish on Dental Erosion by a Soft Drink*, 35 J. Dentistry 858, 860 (2007); *see also* Hughes, *Protective Effect of Fluoride Treatments*, *supra* n. 6, at 362 (pre-treatment of enamel protected against dental erosion but "the magnitude of the benefit was relatively small when considered alongside the benefits reported with calcium-modified soft drinks").

D. *Labeling Changes*

"Labeling can be used to warn against too frequent consumption and misuse of potentially erosive products . . . ."[534] An Ohio State dental professor, critical of a study linking non-cola drinks with dental erosion, stated that, "when most drinks — sports drinks, orange juice, carbonated beverages — are used the way they are *supposed to be*, it's not a problem."[535] But how are these drinks, specifically Mountain Dew, "supposed to be" used? They do not come with any warnings or directions. Even Dr. Casamassimo agreed that acidic drinks should not be sipped all day, including Mountain Dew:

> I'm a pediatric dentist and when we see someone who's on a sippy cup all day, that's an eating disorder just like bulimia — it's in the same category in terms of its effects on teeth . . *Or the older kid who sips Mountain Dew with a screw-top cap all day at school.*[536]

Concerning energy drinks, "children don't always know how much is too much."[537] At least one energy drink, the two-ounce 5-Hour Energy, gives some warning as it specifies "not to drink more than two a day, and none at all for a child under 12."[538]

On July 25, 2005, the Center for Science in the Public Interest (CSPI) filed a petition with the FDA to add warning labels to certain soft

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534. Grenby, *Lessening by Product Modification*, *supra* n. 425, at 227.

535. *Channel 10 News*, *E. J. Mundell*, "Popular Drinks Eat Away at Tooth Enamel," http://www.walb.com/Global/story.asp?S=4609393 (WALB Albany Mar. 9, 2006) (emphasis added). [Hereinafter, Mundell, *Eat Away Enamel*]; *see also* Pepsi's Second Statement, *supra* n. 508 ("impact of excessive or inappropriate consumption").

536. Mundell, *Eat Away Enamel*, *supra* n. 535 (emphasis added).

537. *Channel 6 News*, "5-Hours of Energy Too Much for Kids?" (WOWT – Omaha, Neb. Jan. 29, 2009) (TV broad., available at http://www.wowt.com/home/headlines/38678667.html).

538. *Id.* The actual label for 5-Hour Energy provides:

> RECOMMENDED USE: Drink one half (1/2) bottle (one ounce) for moderate energy. Drink one whole bottle (two ounces) for maximum energy. Do not exceed two bottles of 5-Hour Energy shots daily, consumed several hours apart. Use or discard any remainder within 72 hours (three days) after opening. Refrigeration not required.
>
> CAUTION: Contains caffeine comparable to a cup of the leading premium coffee. Limit caffeine products to avoid nervousness, sleeplessness, and occasional rapid heartbeat. You may experience a Niacin Flush (hot feeling, skin redness) that lasts a few minutes. This is caused by Niacin (Vitamin B3) increasing blood flow near the skin. Do not take if you are pregnant or nursing, or under 12 years of age.

5 Hour Energy, *How to use Original 5-Hour Energy Shots*, http://www.5hourenergy.com/healthfacts.asp (last accessed Mar. 3, 2009).

drinks."[539] According to the FDA's website, that petition is still pending, though the agency is required to act within 180 days.[540]

E. *Regulation of Advertising*

Groups in other countries, such as the United Kingdom, have likewise proposed limited advertising aimed at children.[541] As discussed, *supra*, the CSD industry has voluntarily agreed to limit its advertising towards children age 12 and under in both the U.S. and Europe. This self-regulation "follow[ed] calls for industry action by European lawmakers."[542] Moreover, "[c]onsumer groups, such as the European Consumers Association (BEUC), have expressed s[k]epticism and continued to call for legislation rather than self-regulation."[543]

Other corporations have also demanded limits on advertising directed toward consumers under the age of 12. For example, in 2007, Cartoon Network "made new policies limiting the amount of advertising targeted at children under the age of 12 that do not meet specific nutritional criteria."[544]

F. *Taxation*

Recently, the Governor of New York proposed an 18% sales tax on certain sugared beverages.[545] It was defeated with the help of the American Beverage Association, which called the idea a "money grab."[546] The industry was squarely against the New York tax,[547] and polls showed that

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539. *See Press Release, CSPI Calls on FDA to Require Health Warnings on Sodas*, Ctr. for Sc. in the Pub. Interest (July 13, 2005) (available at http://www.cspinet.org/new/200507131.html) (last accessed Mar. 2, 2009); U.S. FDA, Docket, *2005P-0282: Require Health Messages on Soft Drinks*, http://www.fda.gov/ohrms/dockets/dockets/05p0282/05p0282.htm (last accessed Mar. 2, 2009).

540. 21 C.F.R. § 10.30 (e)(2).

541. *See e.g.* Editorial Team, *Consumer Group Launches Ad Code*, Just-Drinks (Mar. 17, 2008) (Consumers International, representing consumers in 115 countries, and International Obesity Task Force want "a ban on all advertising of junk food to children under 16 on television up to a 9pm watershed.") (available at 2008 WLNR 5211170).

542. Editorial Team, *Drinks Producers in European Kids' Advertising Initiative*, Just-Drinks (Dec. 21, 2007) (available at 2007 WLNR 25220350) [hereinafter Editorial, *European Kids' Advertising Initiative*].

543. *Id.*

544. *Cartoon Network Sets Drinks Advertising Rules*, Just-Drinks (Aug. 20, 2007) (available at 2007 WLNR 16164353).

545. Sewell Chan, *A Tax on Many Soft Drinks Sets Off a Spirited Debate*, N.Y. A36 (NY Times Dec. 16, 2008) (available at http://www.nytimes.com/2008/12/17/nyregion/17sugartax.html) (last accessed Mar. 3, 2009) [hereinafter Chan, *Spirited Debate*].

546. *Id.*

547. Heather Landi, *A Taxing Issue: The Beverage Market Responds to a Proposed 'Obesity Tax' on Soft Drinks and Juices in New York*, 128 Bev. World 8 (2009) (available at 2009 WLNR 1227729).

the public also opposed the tax.[548] However, proponents of the tax believed that a tax on sugared beverages would improve the health of children.[549] Groups and lawmakers in other countries, such as Australia and the Philippines, have likewise proposed taxes on foods, including "sugary soft drinks" as a way to influence consumers to purchase healthier foods.[550]

Earlier attempts to tax sugared soft drinks have likewise failed. In 2002, California state senator Debra Ortiz introduced a bill to tax soft drinks bought by restaurants, saying that "the measure was aimed at helping curb 'a growing epidemic' of childhood obesity . . . ."[551] The bill would have exempted diet drinks and sodas with more than 10 percent natural juice.[552] But such taxes have been levied by the federal government and some states in the past.[553]

G. *Removal of CSDs from Food Programs*

In 2004, the state of Minnesota petitioned the USDA to allow it to remove "junk foods," including soft drinks, from its Food Stamp Program,[554] recently renamed the Supplemental Nutrition Assistance Program (SNAP).[555] In its letter to the USDA, Minnesota said, "[i]t is inconsistent to encourage healthy nutrition and simultaneously allow the purchase of

548. *Public Opposed to Soft Drink Tax*, Just-Drinks (Jan. 21, 2009) (available at 2009 WLNR 1166898).

549. *See e.g.* Governor David Paterson, *David Paterson Explains His Proposed Obesity Tax*, YouTube (available at *http://www.youtube.com/watch?v=_WFLHA7abmY&feature=related*); Richard F. Daines, M.D., N.Y. St.'s Health Commr., *Soda vs. Milk*, YouTube (available at http://www.youtube.com/watch?v=ARMgjdbY93o).

550. *See e.g.* Lena Zak, *Up the Taxes on Unhealthy Food, Says AMA*, Food Mag. 1 (June 1, 2008) ("Australian Medical Association . . . has said that higher taxes should be imposed on junk foods and sugary soft drinks while fruit and vegetables should be subsidised.") (available at 2008 WLNR 11061626); *see Michelle v. Remo*, *Proposed Tax on Sugar Opposed*, Philip. Daily Inquirer 2 (Dec. 19, 2008) (available at 2008 WLNR 25050569) (lawmakers proposed 10% tax on sugar used to make soft drinks met with opposition from the soft drink industry).

551. *State Sen. Debra Ortiz, D-Sacramento, Introduced a Bill to Tax Restaurants and other Retailers for Soft Drinks They Purchase*, Nation's Rest. News Daily 1 (Mar. 1, 2002) (available at 2002 WLNR 14113453).

552. *Id.*

553. *See History of Soft Drinks*, *supra* n. 18, at 264-267, 268 (federal soft drink taxes in 1921, 1932; state taxes in S.C., 1925; Ky., 1936).

554. Patrick Howe, *State Asks to Ban Junk Food from Food Stamp Program*, Duluth News-Trib. (Mar. 12, 2004) (available at 2004 WLNR 19226844) [hereinafter Howe, *Ban Junk Food*].

555. Meg Haskell, *Dentist: Taxpayers Shouldn't Fund Soda*, Bangor Daily News (Me.) 1 (Nov. 13, 2008) (available at 2008 WLNR 22648845) [hereinafter *Taxpayers Shouldn't Fund Soda*].

candy and soft drinks with food stamps."[556] Unfortunately, the USDA denied its petition.[557]

Since that time, numerous groups across the country have championed this idea, including the American Dental Association, which "endorsed a resolution in support of banning the use of food stamps to purchase soda and other sugary drinks" at its annual meeting in 2008.[558] In the fall of 2008, Maine also considered this issue. According to "pediatric dentist and public health advocate Jonathan Shenkin, president-elect of the Maine Dental Association . . . Maine should add soda to the short list of items that cannot be purchased with the taxpayer-funded food stamp benefit."[559] Shenkin elaborated on his reasons for wanting to exclude sodas:

> [I]t's not uncommon for [me] to see children as young as 3 or 4 years old who need to have all their deciduous teeth extracted due to advanced dental decay.
> It is absolutely the worst-case scenario of oral health[.] [M]any of these children, as well as their parents, consume several cans of soda every day, exposing their teeth to a steady bath of sugar and acid that promotes tooth decay. [T]he state has a financial interest in the issue since MaineCare, the state's Medicaid program, pays for treating dental disease, obesity and related health problems in low-income children and adults.[560]

Excluding soft drinks from SNAP will make a difference. A recent study of pre-school children in North Dakota found no link between obesity and beverage consumption.[561] In that study, children had high intakes of milk, and the much younger children had "low intakes of fruit juices, soda, and diet soda."[562] Children ages 2 to 5 consumed less soda daily than the same age group consumed in the 1994 USDA food intake survey.[563] The researchers surmised: "It is possible that the low intakes of soda, diet soda, and fruit drinks we observed may be explained in part because WIC [Women, Infants and Children (WIC)] mothers are not provided with vouchers for these beverages."[564]

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556. Howe, *Ban Junk Food, supra* n. 554.

557. Jane Black, *Government Struggles to Deal With Hunger, Obesity*, Wash. Post (Dec. 24, 2008) (available at 2008 WLNR 24612051).

558. Haskell, *Taxpayers Shouldn't Fund Soda, supra* n. 555, at 1.

559. *Id.*

560. *Id.*

561. P.K. Newby et al., *Beverage Consumption is Not Associated with Changes in Weight and Body Mass Index Among Low-Income Children in North Dakota*, 104 J. Am. Dietetic Assn. 1086, 1092 (2004) [hereinafter Newby, *Beverages and BMI*].

562. *Id.* at 1091, 1092 ("Daily intakes of soda and diet soda were low for both (males and females)").

563. *Id.*

564. *Id.*

The WIC program does not cover soft drinks. Instead:

> The [USDA], which administers the food stamp program, already bans the purchase of "foods of minimal nutritional value" in its school lunch program and [ ] [WIC]. WIC recipients are given vouchers for specific nutrient-rich foods. School subsidies require adherence to USDA nutrition standards. Soda, whether sweetened with sugar or artificially, as well as carbonated drinks enhanced with traces of vitamins or minerals, are excluded from both programs.[565]

WIC excludes CSDs and so should SNAP. Minnesota should consider re-petitioning the USDA. Other states should consider petitioning as well.

H. *Consumer Education*

"[D]ietary advice and preventative care [are] mandatory for patients who frequently consume soft drinks."[566] Slogans such as "Sip All Day, Get Decay"[567] and "Got Rot?"[568] are already being used by dentists[569] and dental associations[570] as they try to spread the message about the harmful effects of soda drinks. More needs to be done to spread the message about the dangers associated with CSDs.

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565. Haskell, *Taxpayers Shouldn't Fund Soda, supra* n. 555, at 1.

566. Sánchez, *Salivary pH Change, supra* n. 403, at 255.

567. *See e.g. Sip All Day, Get Decay*, Minn. Dental Assn., http://www.wda.org/categories/13-consumer-awareness/subcategories/21-soft-drinks/documents/38-sip-all-day-get-decay; *Sip All Day, Get Decay* (brochures available, S.D. Dental Assn., http://www.sddental.org/default.asp?navid=70&record=8); *Sip All Day, Get Decay*, Wis. Dental Assn., http://www.mndental.org/public_home/educational_activities/sip_all_day_get_decay/; *Stop the Pop, Mo.*Dental Assn., http://www.modental.org/mx/hm.asp?id=stopthepop.

568. Julie Deardorff, *Reasons to Avoid Sugary Treats are Good and Plentiful*, Chi. Trib. Q9 (Oct. 29, 2006) (campaign by Ill. St. Dental Socy. "to warn people about the link between soft drinks and cavities") (available at 2006 WLNR 18767087); *Got Rot? The Hard Truth About Soft Drinks*, Ill. St. Dental Socy., http://www.isds.org/publicInfo/kidsActivities/gotrot/gotrot.asp.

569. *See e.g. Pop and Cavities in a Can*, Family Gentle Dental ("Mountain Dew-20 oz is the worst pop, it contains 19 tsps of sugar and 93 milligrams of caffeine . . . nearly equivalent to adult dose of NoDoz.****") (available at http://www.dentalgentlecare.com/diet_soda.htm).

570. *See e.g.* Am. Dental Assn., Jt. Rpt. of the Am. Dental Assn. Council on Access, Prevention and Inter-prof. Rel. and Council on Sci. Affairs to the H. of Delegates: Response to Res. 73H-2000 (Oct. 2001) (available at http://www.ada.org/prof/resources/topics/topics_softdrinks.pdf); *Soft Drinks Affect Dental Health*, Haw. Dental Assn., http://www.hawaiidentalassociation.net/dentistrytodaydetails.asp?ID=21; *Oregon Dental Assn.*, http://www.oregondental.org/i4a/pages/index.cfm?pageid=3353 (against "pouring contracts" between soft drink manufacturers and schools); *Keep a Watchful Eye on Sugary Beverage Consumption*, Penn. Dental Assn., http://www.padental.org/AM/Template.cfm?Section=home&CONTENTID=4590&TEMPLATE=/CM/ContentDisplay.cfm; *see supra* n. 567 (listing dental associations with campaigns against soft drinks).

IX. Conclusion

Consumption of CSDs can lead to serious medical and dental problems. These problems are entirely preventable. No one has to experience "Mountain Dew Mouth." PepsiCo's belated, perhaps cynical, donation of a single van for a mobile dental clinic does not prevent the damage and only treats a tiny fraction of those who suffer. PepsiCo and other manufacturers should do more. If they do not, the rest of us should, in the various ways proposed in this article.