Children's Fruit "Juice" Drinks and FDA Regulations: Opportunities to Increase Transparency and Support Public Health

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Objectives. To compare children's drink products that contain or purport to contain juice and evaluate labels in light of US Food and Drug Administration (FDA) regulations.

Methods. In 2019, we analyzed federal law for drinks that contain or purport to contain juice by using LexisNexis and FDA's Web site, identified top-selling children's "juice" drinks in fruit punch flavors, gathered labels in store and online, and extracted data from the principal display and information panels.

Results. FDA regulations permit a wide range of names, claims, and fruit vignettes on drinks that contain or purport to contain juice, reflecting the product's flavor and not necessarily its ingredients. We identified 39 brands of children's drinks, including 100% juice (n = 7), diluted juices (n = 11), juice drinks (n = 8), fruit-flavored drinks (n = 8), and flavored waters (n = 5), with nonuniform statements of identity; vitamin C and low-sugar claims; and fruit vignettes representing 19 fruits. Many products contained added sugar and nonnutritive sweeteners but little to no juice.

Conclusions. Principal display panels rendered it difficult to differentiate among product types, identify those with added sweeteners, and distinguish healthier products. Revised labeling regulations are warranted to support public health. (*Am J Public Health.* 2020;110:871–880. doi:10.2105/AJPH.2020.305621)

Because of their contribution to obesity and other chronic diseases, sweetened drinks are the primary target of food and nutrition policies aimed at improving public health.[1–4] Yet, sugary drinks are responsible for more than one half of US children's total added sugar intake (which is approximately 300 calories per day).[5]

In September 2019, the American Heart Association, American Academy of Pediatrics, Academy of Nutrition and Dietetics, and American Academy of Pediatric Dentists issued a consensus statement on healthy beverage consumption for children up to age 5 years, recommending no drinks with added sugars or nonnutritive sweeteners and limited juice (up to 0.5 cups/day starting at 1 year and 0.75 cups/day at 4 years).[3] Additional leading health and nutrition experts recommend that children up to age 13 years avoid all beverages containing added sugars or nonnutritive sweeteners and no more than 6 to 8 ounces of juice through age 18 years.[6,7] Yet, US sales of children's drinks, defined as drinks that companies marketed as intended for children, totaled $2.2 billion in 2018,[8] with fruit-flavored and juice drinks the most common sugar-sweetened beverages consumed.[9]

Previous research found that of the 34 top-selling brands of sweetened children's drinks in the United States in 2018, 65% contained added sugars, 74% contained nonnutritive sweeteners, and 38% contained both types of sweeteners.[8] However, caregivers may not understand that these drinks contain added sugar or nonnutritive sweeteners.[8] Surveys and qualitative research indicate that the majority of parents believe that nonnutritive sweeteners are not safe for children.[10–12] Yet, 21 out of 28 of the top-selling sweetened children's fruit drinks and flavored waters contained nonnutritive sweeteners.[8] Moreover, in studies of parents' perceptions, they rated sugar-sweetened fruit drinks and flavored waters as significantly healthier and less likely to cause disease than regular and diet sodas.[10,13]

To increase transparency for drink labels, the US Food and Drug Administration (FDA) issued regulations in 1993 to establish name and labeling requirements for juices and beverages that purport to contain juice through advertising or labeling, such as by depicting fruit or having fruit flavors.[14] However, these requirements do not appear to be adequate.[15,16] When faced with lawsuits on food labels, courts regularly observe that potentially confusing labels are valid under FDA regulations, noting, for instance: "a product may be labeled as 'fruit-flavored' or 'naturally flavored,' even if it does not contain fruit or natural ingredients."[15(p1102–1103)]

In an attempt to address concerns over confusing labels, in 2016 the FDA issued a report explaining why consumers "probably think" their "lemon drink" from a "package picturing fresh lemons" was made with lemons or lemon juice, but it does not necessarily contain either, and rather may be flavored with natural or artificial lemon flavoring.[16] The report recommends that consumers should not rely on product names, pictures on the packaging, or the taste of foods

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or beverages but rather must inspect the ingredient list if one "cares if the food actually includes a certain ingredient."[16] Thus, even the FDA concedes that its labeling requirements for front of packages (called the principal display panel [PDP]) do not clearly convey product and ingredient information to consumers.

Given the wide range of drinks marketed to and consumed by children that contain or purport to contain juice,[8] it is important that caregivers are able to differentiate among product types and identify drinks that are recommended for children. However, there is a gap in the research on whether FDA regulations and the resulting names and statements on the PDP for these beverages enable consumers to identify healthier products. To fill this gap, we researched current labeling regulations and examined the labels and ingredients of the top-selling children's drinks that contain or purport to contain juice. We identified opportunities for the FDA to revise its regulations to ensure transparency and suggested avenues for future research and policy evaluation to support public health.

METHODS

This research was conducted in 2019 and consisted of 3 parts.

Food and Drug Administration Regulations

To identify the law and gaps in the law related to the products at issue in this study, using LexisNexis and FDA's Web site, 1 author (J. L. P.) analyzed the FDA's authority and all existing federal labeling requirements for drinks containing or purporting to contain juice, including the US Code, FDA regulations, case law referring to the statutes and regulations identified, and the FDA's responses to comments on its 1993 rulemaking for these products.

Selection of Products

We identified the children's drinks for analysis in this study by utilizing previous research that relied on a market research firm's (IRI's) national sales data for brands with at least $10 million in sales in 2018.[8] Researchers visited the brands' Web sites to identify products marketed as specifically for children.[8] From that list, we selected all brands of children's drinks that contained or purported to contain juice.

To compare seemingly similar products across brands and categories, we identified "fruit punch"–flavored products. If a brand did not have a specific "fruit punch" flavor, we included the closest flavor (e.g., tropical punch) but excluded berry or vegetable punches as the marketing and types of juice and flavorings in these products were substantially different. We excluded products not sold in individual fruit-punch–flavored packaging (e.g., flavor variety packs), as well as carbonated products because they did not purport to contain juice. For flavored waters, because there were so few brands in this category, we randomly chose 1 flavor if fruit punch did not exist to include all brands.

Labels

To analyze labels of the products identified, researchers visited 2 Connecticut supermarkets in March 2019 and took photographs of the products. For products not available locally, researchers purchased them online or gathered product images from manufacturers' Web sites. For labels that were unavailable through these methods, in July to September 2019, we identified and compared the products' labels from at least 2 separate online sellers (Walmart, Instacart, Target, or Amazon) to ensure the identical information was displayed and retrieved those data. Data extracted from the PDP included the brand, flavor, statement of identity (a common or usual name or appropriately descriptive term for the product), statements related to sweeteners and vitamins or minerals, and images of fruit. Data extracted from the nutrition information panel included the percent juice declaration and ingredient list (Appendix A, extraction document, available as a supplement to the online version of this article at http://www.ajph.org).

RESULTS

The box on page 873 provides the definitions used in this article, including product categories and ingredient and labeling terms based on the current state of products and FDA regulations.

Food and Drug Administration Regulations

Congress granted the FDA broad authority to regulate food and beverage labeling.[24] The FDA issued specific regulations for beverages that contain or purport to contain juice.[14] A beverage purports to contain fruit juice if the product's advertising or labeling bears the name or pictorial representation of fruit or fruit juice, or the product's "color and flavor" gives the beverage the "appearance and taste" of containing fruit juice.[17]

FDA regulations require the PDP to display a statement of identity as "one of its principal features," which means it should be in bold type and in a size reasonably related to the most prominent text on the PDP.[23] For drinks that contain less than 100% juice, if the name of the product includes the word "juice," the statement of identity must also include a term such as "beverage," "cocktail," "diluted," or "drink."[18] Regulations do not differentiate between juice that is diluted (i.e., blend of juice and water without added sweeteners) and drinks that contain juice with added sugars or nonnutritive sweeteners. Therefore, their statements of identity are not required to be distinguishable.

The statement of identity must also reflect flavoring. Manufacturers must determine the product's "characterizing" flavor, which represents the product's taste, and whether any juice added matches that flavor.[19] If the drink contains an insufficient amount of an ingredient to independently characterize the food, the name on the label must include "flavored" or "naturally flavored."[19] If none of the natural flavor is derived from the product whose flavor is the characterizing flavor or it is only artificially flavored, the label must state "artificially flavored."[19,25] FDA regulations allow the term "fruit punch" when there are 3 or more distinguishable characterizing flavors or a blend of flavors with no primary recognizable flavor.[19]

The name of juice blends need not include the predominant juice but rather may reflect the flavor of the product (e.g., "raspberry and cranberry flavored juice drink" may be appropriate even if the predominant juice is apple).[18] Fruit vignettes, or images, also need

DEFINITIONS RELATED TO THE STATE OF REGULATIONS AND PRODUCTS: UNITED STATES, 2019

Term	Definition
Product categories	
100% juice	Juice expressed from a fruit or vegetable and no parts water, or a single-strength juice made from concentrate and water, or a blend of more than 1 single-strength juice. 100% juice may have added ingredients that do not add volume significant enough to diminish the juice's soluble solid content, such as sweeteners, preservatives, and vitamins; if added, this must be disclosed in or next to the statement of identity.[14,17]
Diluted juice	Single-strength juice or multiple juices blended with water but with no added sweeteners.[18] The product does not need to identify itself as diluted; the ingredient list and percent juice disclosed on the information panel are intended to notify consumers of the parts per juice and water. For example, 50% juice would mean 1 part juice and 1 part water.[14]
Flavored water	Drink with water in the statement of identity and with added flavors and that may or may not contain nutritive sweeteners, nonnutritive sweeteners, or juice.
Fruit-flavored drink	Drink with natural or artificial flavors intended to portray the taste of a fruit or multiple fruits and that contains added sugar, nonnutritive sweetener, or both, and ≤ 2% juice (generally ≤ 2% juice is added as flavoring).[14]
Juice drink	Beverage that contains more than 2% juice and less than 100% juice as an ingredient and added sugar, nonnutritive sweetener, or both. If the word "juice" is used to describe the product, it must also include a qualifying term such as "beverage," "cocktail," or "drink."[18]
Ingredient and labeling terms	
Added sugars	Sweeteners added to foods and beverages that contain calories, including sugar, sugar cane, honey, and high-fructose corn syrup.
Artificial flavor	Substance that functions to impart flavor that is not derived from a spice, fruit, fruit juice, vegetable, vegetable juice, edible plant, meat, fish, poultry, eggs, dairy, or fermentation products.[19]
Natural flavor	Substance that contains the flavoring constituents derived from a spice, fruit, fruit juice, vegetable, vegetable juice, edible plant, meat, fish, poultry, eggs, dairy, or fermentation products, whose significant function is flavoring rather than nutritional.[19]
Nonnutritive sweeteners	Sweeteners added to foods and beverages that do not contain calories, including sucralose, acesulfame potassium, neotame, and stevia, which are found in beverages. Some beverage manufacturers declare stevia a natural sweetener because it comes from a plant. Nonnutritive sweeteners are not considered flavors but may be considered flavor enhancers.[20] The Food and Drug Administration also calls these high-intensity sweeteners[21]; yet, certain regulations refer to foods sweetened with them as "artificially sweetened."[22]
Purport to contain juice	A food or drink purports to contain an ingredient if it "conveys, implies, or professes outwardly that it contains that ingredient" or if the food or drink "has the appearance of being, intending, or claiming to contain that ingredient."[14(p2897)] A beverage purports to contain fruit or vegetable juice if "the product's advertising, label, or labeling bears the name of, or variation on the name of, or makes any other direct or indirect representation with respect to, any fruit or vegetable juice, or the label or labeling bears any vignette (i.e., depiction of a fruit or vegetable) or other pictorial representation of any fruit or vegetable, or the product contains color and flavor that gives the beverage the appearance and taste of containing a fruit or vegetable juice."[17]
Principal display panel	The part of a label that is most likely to be displayed, presented, shown, or examined under customary conditions of display for retail sale. This is commonly referred to as the front of the package.
Statement of identity	Statement on packaged food and beverage that is (1) a name specified in or required by federal law, (2) the common or usual name of the food that describes the basic nature of the food or its characterizing properties or ingredients, or (3) an appropriately descriptive term.[23] The statement of identity must be 1 of the "principal features" on the principal display panel.[23]

not include all the fruit juices present in the drink.[14] The FDA explained that fruit vignettes should indicate that the product contains that fruit's juice or natural or artificial flavor.[14]

For products that are 100% juice, if non-juice ingredients are added such as sweeteners or vitamins, the label must include a disclosure identifying the product is "with added . . ." near the 100% juice statement.[17] Conversely, for drinks that contain less than 100% juice or no juice, such a statement is not required. Notably, the FDA does require the labels for products other than 100% juice to disclose added sweeteners on the PDP. For example, the FDA established standards of identity for "canned fruit cocktail"[26] and a separate naming requirement for "artificially sweetened canned fruit cocktail."[22] The FDA also issued regulations for "special dietary food," which must include statements on the PDP such as "Sweetened with nutritive sweetener(s) and nonnutritive sweetener(s)."[27] Based on these regulations, soft drink companies label soda with nonnutritive sweeteners as "diet," with courts stating, "a reasonable consumer would understand" that diet soda "contains artificial sweeteners."[28] We found no similar regulations or standardized terms for drinks that purport to contain juice with nonnutritive

sweeteners. We also found no regulations specifically defining or regulating drinks purporting to be water beverages that contain added sugar, nonnutritive sweetener, or both.

Vitamin and mineral statements for the products in this study must align with FDA regulations for all packaged food products.[20] During the 1993 rulemaking, the FDA determined that for drinks that were not 100% juice, a declaration stating that the product is 100% pure or natural would have "great potential to mislead," but that "100% vitamin C" statements would not be similarly misleading.[14] Also during the 1993 rulemaking, commenters urged the FDA to require disclosure of juice percentages on the PDP instead of on the information panel.[14] However, the FDA did (and still does) not have the authority to require this because Congress mandated the location.[29]

Beverage Products and Labels

We identified 39 brands of the following children's drinks in fruit-punch or similar flavors: 7 brands of 100% juice, 11 diluted juices, 8 juice drinks (drinks that contain < 100% juice and > 2% juice with added sugar, nonnutritive sweetener, or both), 8 fruit-flavored drinks (drinks with natural or artificial flavors intended to portray the taste of fruit and that contain added sugar, nonnutritive sweetener, or both, and ≤ 2% juice), and 5 flavored water drinks. Table 1 presents the findings for each product. All products disclosed the percent juice (including 0%) on the information panel confirming that manufacturers consider these products to be drinks that contain or purport to contain juice.

Table 2 summarizes the findings by product category. All 100% juices and diluted juices had apple juice concentrate as the first ingredient, and none contained added sweeteners. Diluted juices varied in juice content ranging from 38% to 72% and had different statements of identity, which included the terms juice beverage, juice drink, blend, from concentrate, naturally flavored, and flavored drink.

Juice drinks contained a smaller amount of juice (5% to 20%) and added sweeteners, including added sugar cane or sugar alone (n = 2), nonnutritive sweeteners alone (stevia or sucralose and acesulfame potassium; n = 3), or both high-fructose corn syrup and nonnutritive sweeteners (n = 3). Nonnutritive sweeteners were identified from the ingredient list and not indicated on the PDP except 1 product was named "Light." Juice drinks had a range of statements of identity—many of which were similar to diluted juices—including the terms juice drink, fruit drink, juice cocktail, blend, from concentrate, naturally flavored, and artificially flavored.

The fruit-flavored drinks contained 0% to 2% juice and high-fructose corn syrup alone (n = 1), nonnutritive sweeteners alone (n = 2), or both high-fructose corn syrup and nonnutritive sweeteners (n = 5). Statements of identity for fruit-flavored drinks were more uniform, including artificially flavored fruit drink, artificially flavored drink, and naturally and artificially fruit-flavored drink, with 1 exception: a Kool-Aid product was called "soft drink," although the ingredients were almost identical to other fruit-flavored drinks. The majority of juice drinks and fruit-flavored drinks had low or no sugar claims and claims about vitamin C (most commonly "100% vitamin C").

The flavored water brands had the following statements of identity: naturally flavored water beverage (n = 2), flavored water beverage (n = 2), and naturally flavored water drink (n = 1). Although flavored waters had different statements of identities than juice drinks and fruit-flavored drinks, they had almost identical ingredients with 10% juice and cane sugar (n = 1), 0% juice and added sugars and nonnutritive sweeteners (n = 3), or 0% juice and nonnutritive sweeteners (n = 1). One flavored water that displayed a "No artificial sweeteners" claim contained stevia extract, which is a nonnutritive sweetener manufacturers consider not artificial because it is derived from a plant. Water was the first ingredient in all juice drinks, fruit-flavored drinks, and flavored waters.

With 1 exception, all products in all categories pictured fruit on the PDP (Table 1; Appendix B, available as a supplement to the online version of this article at http://www.ajph.org). Even though the flavor names were generally consistent (e.g., fruit punch, tropical punch) there were 19 different types of fruit (including coconut) depicted on the PDP across products. However, not all products with fruit vignettes contained juice, and those that contained juice did not always contain juice from the fruits depicted (n = 10). For the products that did contain juice, apple was the primary juice present (n = 26), although apple was not always one of the fruits in the vignette (n = 6).

Some of the statements of identity were difficult to notice or read because of the same color text as background color, location on the package, small text size, or thin all-cap lettering (Appendix B, examples).

DISCUSSION

Clear and transparent labeling is essential to provide information to consumers and support caretakers' efforts to ensure healthy diets for young children. Yet, we identified numerous labeling practices that obscure the true nature of drinks purporting to contain juice and would make it difficult for consumers to identify healthier products. Labeling practices appear to be designed to blur the distinction between drinks recommended for children and those containing added sugar or nonnutritive sweeteners.[10,30] Nonetheless, many such practices aligned with FDA regulations.

First, certain words had no inherent meaning for the products evaluated because they were found on the labels of a wide range of products with varying ingredients: water, beverage, drink, naturally flavored, fruit-flavored, fruit punch. Yet, manufacturers' use of these terms was consistent with FDA regulations.

Second, statements of identity for these products were unclear. Many of them did not abide by FDA requirements to be a principal feature of the PDP and rather were difficult to notice or read because of placement on the package, or font size or color.[23] At the same time, the words used for the statements of identity did abide by FDA regulations, yet they provided little practical information and may increase consumer confusion if read. Products across categories with or without added sweeteners had statements of identity that did not enable comparisons within or across categories or brands, nor did they enable identification of healthier products. For example, the ingredients of flavored waters were almost indistinguishable from those of juice drinks and fruit-flavored drinks, yet their names and statements of identity

TABLE 1—Labels of "Fruit Punch" (or Similarly Flavored) Drinks Marketed to Children That Contain Juice or Purport to Contain Juice: United States, 2019

Product			Juice/Sweeteners			Principal Display Panel		
Brand/Subbrand	Flavor	Statement of Identity	Juice, %	Added Sugar	Nonnutritive Sweetener	Statement About Sweeteners and Vitamins/ Minerals	Fruit Pictures[a]	Pictured Fruit(s) >2% Ingredient as Juice or Concentrate
100% juice[b]								
Apple & Eve/ Sesame Street	Elmo's Punch	100% juice blend of 5 juices from concentrate with other added ingredients	100	No	No	No sugar added 100% vitamin C	Apple, pear, pineapple, cherry[c]	All
Capri Sun/100% Juice	Fruit punch	Flavored 100% juice blend from concentrate with added ingredient and other natural flavor	100	No	No	No added sugar No high-fructose corn syrup	Grape, cherry, apple[c]	All
Good 2 Grow/ 100% Juice	Fruit punch	100% apple pear grape juice from concentrate with natural fruit punch flavor	100	No	No	No sugar added Excellent source of vitamin C	Pear, grape, apple[c]	All
Juicy Juice	Fruit punch	100% juice flavored juice blend from concentrate with other natural flavors and added ingredients	100	No	No	No added sugar 120% vitamin C daily value per serving	Pear, apple, grapes[c]	All
Langers Disney	Fruit punch	100% juice a blend of 3 juices from concentrate with natural flavors and added ingredients	100	No	No	120% vitamin C With added vitamin C	Apple, orange, pineapple[c]	All
Minute Maid 100% Juice	Fruit punch	100% juice blend of 4 juices from concentrate with added ingredients	100	No	No	Good source calcium No sugar added 100% vitamin C	Apple, pineapple, grape[c]	Apple, grape
Mott's	Fruit punch	100% juice	100	No	No	No sugar added 100% daily value vitamin C per juice box	Grapes, apple, orange, cherries[c]	All
Diluted juices								
Apple & Eve/ Fruitables	Fruit punch	Naturally flavored juice beverage from concentrate	66	No	No	No sugar added	Apple, cherry, carrot, pineapple[c]	All
Apple & Eve Organic Quenchers	Fruit punch burst	Juice drink from concentrate	40	No	No	50% less sugar 100% vitamin C No sugar added	Apple, cherry, strawberry[c]	All
Capri Sun Organic	Fruit punch	Juice drink blend from concentrate	56	No	No	No added sugar No high-fructose corn syrup	Orange, apple, grape[c]	All
Good to Grow Fruit & Veggie Blend	Tropical fruit medley	Apple, carrot, and beet juice beverage from concentrate with natural tropical fruit flavors	72	No	No	No sugar added	Pineapple, mango, peach[c]	None
Honest Kids	Super fruit punch	Organic juice drink from concentrate	38	No	No	Sweetened only with fruit juice 100% vitamin C	Watermelon, grape, apple, strawberry[c]	All
Juicy Juice Fruitifuls	Punch splash	Flavored organic juice beverage blend from concentrate with other natural flavors	60	No	No	35% less sugar than the leading juice 100% daily vitamin C	Grapes, apples[c]	All

Continued

TABLE 1—*Continued*

Product			Juice/Sweeteners			Principal Display Panel		
Brand/Subbrand	Flavor	Statement of Identity	Juice, %	Added Sugar	Nonnutritive Sweetener	Statement About Sweeteners and Vitamins/ Minerals	Fruit Pictures[a]	Pictured Fruit(s) >2% Ingredient as Juice or Concentrate
Juicy Juice Splashers	Fruit punch	Flavored organic juice beverage blend from concentrate with other natural flavors	44	No	No	50% less sugar than the leading juice No high-fructose corn syrup No artificial sweeteners	Raspberry, cherry, blackberry[c]	Cherry
Mott's For Tots	Fruit punch	Juice drink	53	No	No	40% less sugar (than 100% apple juice) With added vitamins A, C, E	Grapes, apple, cherries[c]	All
Old Orchard for Kids	Fruit punch	Reduced-sugar juice drink from concentrate	50	No	No	50% less sugar than 100% apple juice 100% daily value vitamin C	Grape, pear, pineapple, cherry[c]	All
R.W. Knudsen Family Sensible Sippers	Organic fruit punch	Flavored beverage from 7 juice concentrates	50	No	No	No	Pineapple, grape, apple, orange[c]	All
Tropicana Kids	Fruit punch	Flavored drink with other natural flavors	45	No	No	No	Apple, carrot, grape, strawberry, black currant[c]	All
			Juice drinks					
Apple & Eve/On the Go	Fruit punch	Fruit punch juice cocktail from concentrate	20	Cane sugar	No	No high-fructose corn syrup 100% vitamin C	Orange, cherries, pineapple[c]	Cherries, pineapple
Capri Sun/Juice Drink	Fruit punch	Fruit punch flavored juice drink blend	10	Sugar	No	35% less sugar than leading regular juice drinks No high-fructose corn syrup	Apple, orange, pineapple, grape, cherry	Apple, orange, pineapple, grape
Good to Grow	Fruit fusion	Fruit punch flavored juice beverage with other natural flavors and organic apple juice from concentrate	18	No	Stevia extract	No sugar added 75% less sugar versus our 100% juice	Orange, cherry, pineapple[c]	None
Hawaiian Punch	Fruit juicy red	Natural and artificial fruit flavored juice drink	5	High-fructose corn syrup	Sucralose	100% vitamin C	Orange, apple, pineapple, papaya, guava, apricot, passion fruit[c]	None
Hi-C	Flashin' fruit punch	Naturally and artificially flavored fruit drink	5	High-fructose corn syrup	Sucralose, acesulfame potassium	50% less sugar than regular Hi-C[d] 100% vitamin C	Orange, pineapple	All
Light Hawaiian Punch	Fruit juicy red	Natural and artificial fruit flavored juice drink	5	No	Sucralose, acesulfame potassium	Excellent source of vitamin C	Orange, apple, pineapple, papaya, guava, apricot, passion fruit[c]	None

Continued

TABLE 1—*Continued*

Product			Juice/Sweeteners			Principal Display Panel		
Brand/Subbrand	Flavor	Statement of Identity	Juice, %	Added Sugar	Nonnutritive Sweetener	Statement About Sweeteners and Vitamins/ Minerals	Fruit Pictures[a]	Pictured Fruit(s) >2% Ingredient as Juice or Concentrate
Minute Maid	Fruit punch	A 5% juice blend of grape pineapple pear apple juices from concentrate	5	High-fructose corn syrup	Sucralose	No	Grape, pineapple, pear, apple	Grape, pineapple
Robinson's Fruit Shoot	Fruit punch	Naturally flavored juice drink from concentrate	10	No	Sucralose, acesulfame potassium	No sugar added	Cherry, orange, apple, grape, black currant[c]	Apple
				Fruit-flavored drinks				
Fruit Rush	Fruit punch	Artificially flavored fruit drink	<1	High-fructose corn syrup	Sucralose, acesulfame potassium	No	Cherry, pineapple, orange, cherry[c]	None
Kool-Aid Multi Serve	Tropical punch	Artificially flavored drink[e]	0	High-fructose corn syrup	No	100% daily value vitamin C	Orange, lime, lemon, grape, cherry	None
Kool-Aid/Bursts	Tropical punch	Soft drink	0	High-fructose corn syrup	Sucralose	75% less sugar than leading regular sodas	Cherry, lime, grape	None
Kool-Aid/ Jammers	Tropical punch	Artificially flavored drink	0	High-fructose corn syrup	Sucralose	55% less sugar than leading regular sodas 100% daily value of vitamin C	Grape, lemon, cherry, orange, lime	None
Kool-Aid/Zero Sugar Jammers	Tropical punch	Zero-calorie artificially flavored drink	0	No	Sucralose, acesulfame potassium	Zero sugar 100% daily value of vitamin C	Grape, lemon, cherry, orange, lime	None
Little Hug	Fruit punch	Naturally and artificially fruit flavored drink	0	High-fructose corn syrup	Sucralose, acesulfame potassium	75% less sugar than other leading fruit-flavored drinks 2 grams per pouch	Oranges, cherries	None
Mondo Squeezers	Primo punch	Artificially flavored drink	0	No	Sucralose, acesulfame potassium	No high-fructose corn syrup	Lime, grape, pineapple, strawberry, cherry, orange	None
Sunny D	Fruit punch	Artificially flavored fruit punch	2	High-fructose corn syrup	Sucralose	100% daily value of vitamins C, B6, and B12	Cherry, orange, peach, apple[c]	Apple
				Flavored waters				
Apple & Eve/ Water Fruits	Fruit punch frenzy	Naturally flavored water beverage	10	Cane sugar	No	No artificial sweeteners	Apple, orange, coconut, cherry[c]	All
Capri Sun/Roarin' Waters	Fruit punch wave natural flavor with other natural flavor	Flavored water beverage	0	Sugar	Stevia extract	50% less sugar than the average leading fruit juices	Cherries, orange, apple	None

Continued

TABLE 1—*Continued*

Product			Juice/Sweeteners			Principal Display Panel		
Brand/Subbrand	Flavor	Statement of Identity	Juice, %	Added Sugar	Nonnutritive Sweetener	Statement About Sweeteners and Vitamins/ Minerals	Fruit Pictures[a]	Pictured Fruit(s) >2% Ingredient as Juice or Concentrate
Capri Sun/Sport	Fruit frenzy natural flavor with other natural flavor	Flavored water beverage	0	Sugar	Stevia extract	No high-fructose corn syrup No artificial sweeteners	Pineapple, orange, cherry	None
Fruit Shoot/ Hydro	Raspberry and apple with other natural flavors	Naturally flavored water beverage	0	No	Acesulfame potassium, sucralose	Zero sugar	Raspberry, apple	None
Tum E Yummies	Fruit punch party with other natural flavors	Naturally flavored water drink	0	High-fructose corn syrup	Sucralose	No	No	NA

Note. NA = not applicable.

[a]As shown from left to right or by prominence.

[b]For 100% juices, we included 1 subbrand from each brand because the ingredient and nutrition content of 100% juice products did not vary substantially.[8]

[c]For these products, the first juice present in the ingredient list is apple.

[d]The full statement on packages of this product states "50% less sugar fewer calories than regular Hi-C," but Coca-Cola no longer makes a version of Hi-C that is 50% more sugar or calories than this type. See Coca-Cola Product Facts, Hi-C, available at: https://www.coca-colaproductfacts.com/en/products/hi-c/poppin-pink-lemonade/6-oz.

[e]The words "artificially flavored" are separated from "drink."

indicated that they were different, potentially creating an impression of healthfulness for products with "water" in the name.[10]

Third, 38 of the 39 products in this study had fruit vignettes on their labels. Although fruit punch was the characterizing flavor, many products lacked fruit juice, juice from the fruit pictured, or multiple fruit juices, which the term "fruit punch" may signify to some consumers. For all product categories in this study, FDA regulations permit the naming and use of fruit vignettes that reflect the drink's flavor regardless of the product's ingredients. For products that did contain juice, apple juice was the primary juice. It is unclear whether consumers understand that fruit flavors, names, and images do not necessarily reflect fruit or juice as an ingredient.

Fourth, 100% juice is the only product in this analysis required to include statements on the PDP related to added sweeteners, and none of them included sweeteners. For other products, it would not be possible to identify which contained added sugars or nonnutritive sweeteners from the PDP alone. Such transparency exists for regular and diet soda, but not for similarly unhealthy drinks directly marketed for children. Products containing sugar or sugar cane touted "no high fructose corn syrup" and every product type displayed low- and no-sugar claims. Similarly, a "No artificial sweeteners" claim found on products containing stevia extract may lead consumers to believe they contain no nonnutritive sweeteners. Consumers who do read the information panel would need knowledge of nonnutritive sweetener chemical names to identify their inclusion.

This study highlighted a need for future regulatory action and further research. FDA has the authority to revise a wide range of labeling requirements, including standardizing the common and usual names for products, differentiating between ingredient versus flavor disclosures, and directly addressing misleading labels.[31] Statements of identity should be visible, uniform within product categories, and meaningfully convey information to assist consumers to make comparisons within and across product categories. Standardized PDP labeling of added sweeteners for all beverages is also necessary so consumers can identify drinks with added sugars or nonnutritive sweeteners. Nonnutritive sweetener disclosures are especially warranted now that the Nutrition Facts label is required to disclose added sugars, which may encourage manufacturers to replace added sugars with nonnutritive sweeteners. Research into the most appropriate labeling term (e.g., zero calorie or diet sweeteners) is necessary.[21]

Transparent product labeling could also help consumers identify healthier products and may encourage manufacturers to produce a wider range of them. Diluted juices (100% juice and water with no added sweeteners) have less juice and total sugar than do 100% juice[8] and align with expert recommendations.[3,6] Yet, their statements of identity and labeling claims were similar to those of juice drinks, making it difficult to distinguish them from products with added sugar, nonnutritive sweeteners, or both. FDA should update its regulations to ensure that these products are identifiable as a blend of juice and water without added sweeteners.

Future research is needed to identify consumers' perception of labeling terms and statements, including whether consumers can differentiate among product types, distinguish between flavor and ingredient statements, and determine whether names (such as water), fruit images, and statements on the PDP affect perceptions of healthfulness, including whether vitamin statements, such as 100% vitamin C, mislead consumers to believe these are derived from fruit rather than fortification across all product types. These

TABLE 2—Summary of Drink Labels by Category of "Fruit Punch" (or Similarly Flavored) Drinks Marketed to Children That Contain Juice or Purport to Contain Juice: United States, 2019

Product Category (No. of Products Evaluated)	Statements of Identity (Key Words)	Juice Percent Range	Added Sugars	Nonnutritive Sweeteners	Most Common Statements Related to Sweeteners and Vitamins or Minerals	Contain >0% Juice, No. (%) of Products	Apple is First Juice Ingredient, No. (% of Products Containing Juice)
100% juice (7)	100% juice; 100% juice blend from concentrate	100	None	None	No sugar added 100% vitamin C	7 (100)	7 (100)
Diluted juice (11)	Juice drink; juice beverage; blend; naturally flavored; from concentrate	38–72	None	None	No sugar added No high-fructose corn syrup Less sugar than [other] juice 100% vitamin C	11 (100)	11 (100)
Juice drinks (8)	Juice drink; fruit drink; juice cocktail; naturally flavored; artificially flavored; blend; from concentrate	5–20	Cane sugar; sugar; high-fructose corn syrup	Stevia extract; sucralose; acesulfame potassium	No sugar added No high-fructose corn syrup Less sugar than [other drinks] 100% vitamin C	8 (100)	5 (63)
Fruit-flavored drinks (8)	Artificially flavored fruit drink; artificially flavored drink; naturally and artificially fruit-flavored drink	0–2	High-fructose corn syrup	Sucralose; acesulfame potassium	Less sugar than [other drinks] 100% vitamin C	2 (25)	2 (100)
Flavored waters (5)	Naturally flavored water beverage; flavored water beverage; naturally flavored water drink	0–10	Cane sugar; sugar; high-fructose corn syrup	Stevia extract; sucralose; acesulfame potassium	No artificial sweeteners Zero or low sugar claims	1 (20)	1 (100)

questions are especially important in the context of fruit-flavored products because the characterizing flavors and images are associated with health and nutrition.[30,32] Future regulations should align with these study results.

This study also highlighted the need to examine additional policies that are relevant to the products evaluated. For example, most sugary beverage taxes implemented in US cities and international countries apply to the drinks identified with added sugars.[1] Fewer taxes apply to products with nonnutritive sweeteners; evidence from the United Kingdom showed that consumption of these drinks increased when only sugar-sweetened beverages were taxed.[33] Some taxes do not apply to drinks that contain both juice and added sugar; such an exclusion may warrant further investigation as the majority of children's drinks contain both.[9] Notably, studies that evaluated the impact of sugar-sweetened beverage taxes across beverage categories found that companies did not pass the tax through to consumers on flavored water or fruit drinks to the same extent as they did with regular soda in France[1] and Berkeley, California,[34] and that consumption of sweetened fruit drinks did not change after implementation of the Berkeley[35] and Philadelphia, Pennsylvania,[1] taxes. Additional research and policy evaluation are necessary to determine how different taxing strategies affect purchase and consumption of various products including those evaluated in this study that may seem healthy but are primarily composed of water, added sweeteners, and apple juice.

Limitations

Limitations of this study include that we did not examine labels for every drink in the market. However, focusing on fruit-punch–flavored products allowed us to compare labeling for seemingly similar drinks across product types, and we found wide variation in ingredients and nutritional quality.

Conclusions

Health and nutrition experts recommend that children do not consume drinks with added sugar or nonnutritive sweeteners, yet drinks containing both represent a major portion of beverages consumed by children. Caregivers may reasonably rely on the statements and images on the PDP when deciding whether a drink is healthful for children. However, this study found that labeling practices for drinks across product categories were virtually indistinguishable, making it impossible for caregivers to identify the primary ingredients in these products without carefully inspecting the nutrition facts panel and ingredient list on the back of the package. The FDA should revise its regulations to ensure the labels for drinks containing or purporting to contain juice are clear and not misleading to support children's health. AJPH

CONTRIBUTORS

Both authors conceptualized the article and led or conducted research for the article. J. L. Pomeranz wrote the first draft of the article. J. L. Harris contributed to all versions of the article.

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CONFLICTS OF INTEREST

The authors have no conflicts of interest to declare.

HUMAN PARTICIPANT PROTECTION

Human participant protection was not needed because there were no human participants involved in this study.

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