

Article

Beverage consumption of children and teens

by Didier Garriguet

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Abstract

According to results from the 2004 Canadian Community Health Survey – Nutrition, children and teens get about one-fifth of their daily calories from beverages. As they get older, boys and girls drink less milk and fruit juice, and more soft drinks and fruit drinks. By ages 14 to 18, boys' average daily consumption of soft drinks matches their consumption of milk, and exceeds their consumption of fruit juice and fruit drinks. Beverage consumption by children and teens varies little by province, except in Newfoundland and Labrador where it tends to be comparatively high, and in British Columbia where it tends to be low.

Keywords

carbonated beverages, energy intake, milk, water consumption

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A substantial proportion of Canadians' daily calories come not from what they eat, but from what they drink. This is particularly true for children. According to results from the 2004 Canadian Community Health Survey (CCHS) – Nutrition (see *The data*), beverages make up almost 20% of the calories consumed by children and teens aged 4 to 18 (Table 1). At ages 1 to 3, beverages account for an even higher 30%.

Liquids, notably water, are essential to good nutrition. While some water comes from foods, most is derived from beverages. As well, beverages provide vitamins and minerals. However, beverages can also be a major source of sugar, and may contribute to excess calories. Sugar-sweetened drinks have been linked to weight gain and higher body mass index in children and teenagers.¹ Sweetened drinks, and even fruit juice, have been associated with an increased risk of tooth decay.²

This article is an overview of beverage consumption by Canadian children and teens aged 1 to 18. It examines the quantity and type of beverages consumed, differences by age and gender, and beverages' contribution to calorie and nutrient intake.

Water

More than 85% of all the beverages consumed by children and teens fall into five categories: water, milk, fruit juice, fruit drinks, and regular soft drinks.

Table 1
Percentage of daily calories derived from beverages, by gender and age group, household population aged 1 to 18, Canada excluding territories, 2004

Age group	Boys	Girls
	percent	
1 to 3	28.2	27.3
4 to 8	20.8 ^{*†}	18.1 [†]
9 to 13	18.1 [†]	18.0
14 to 18	20.0 [†]	19.0

* significantly different from estimate for girls of same age (p < 0.05)

† significantly different from estimate for same sex in preceding age group (p < 0.05)

Source: 2004 Canadian Community Health Survey – Nutrition.

Table 2
Percentage who consumed selected beverages the previous day, by gender and age group, household population aged 1 to 18, Canada excluding territories, 2004

Age group	Water		Milk		Fruit juice		Regular soft drinks		Fruit drinks	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
	percent									
1 to 3	71	71	87	88	62	58	8	6	29	28
4 to 8	72*	79 [†]	80* [†]	71 [†]	54 [†]	49 [†]	19 [†]	17 [†]	45 [†]	41 [†]
9 to 13	74	78	68 [†]	64 [†]	43 [†]	43 [†]	33 [†]	29 [†]	45	47 [†]
14 to 18	77	74	60* [†]	53 [†]	39	40	53* [†]	35 [†]	35 [†]	34 [†]

* significantly different from estimate for girls of same age ($p < 0.05$)

[†] significantly different from estimate for same sex in preceding age group ($p < 0.05$)

Source: 2004 Canadian Community Health Survey – Nutrition.

On a typical day, at least 70% of children and teens drink water (Table 2). The amount consumed rises steadily with age (Table 3). At ages, 1 to 3, children drink less water than milk, but by ages 4 to 8, the amounts are equal, and at ages 14 to 18, teens drink more water than any other beverage: an average of 780 grams a day for boys and 694 grams for girls. (In the CCHS, all beverages are reported in grams. Compared with volume, one gram of water is equal to one millilitre of water. Most beverages are slightly heavier than water, in the order of 1% or 2%.)

Milk

Drinking milk is generally associated with childhood. Indeed, milk makes up almost half of the beverages consumed by children aged 1 to 3, who average more than 450 grams a day

(Table 3), or about one and three-quarters servings from the “Milk Products” group of Canada’s Food Guide to Healthy Eating.³ Consumption drops at older ages, and starting at age 4, boys drink more milk than girls do. Boys’ daily consumption stabilizes at about one and a third servings of milk a day, but for girls, a second drop occurs in adolescence, with average daily consumption falling to less than one serving at ages 14 to 18.

The decline in milk consumption at older ages is attributable to fewer consumers rather than to less milk consumed by those who drink it (Table 2). While 87% of boys and 88% of girls aged 1 to 3 drank milk the day before the CCHS interview, at ages 14 to 18, the figures were 60% for boys and 53% for girls.

Fruit juice

Average daily fruit juice consumption is relatively stable among children and teens, varying between 171 and 200 grams for boys, and between 147 and 168 grams for girls (Table 3). At ages 1 to 8, boys drink more fruit juice than do girls. These amounts are equivalent to one and a half servings from the “Vegetables and Fruit” group of the Food Guide for boys, and one and a quarter servings for girls.

The overall stability in average daily intake hides the fact that at older ages, smaller proportions of children and teens drink fruit juice (Table 2). Around 60% of 1- to 3-year-olds had fruit juice the day before the CCHS interview; at ages 14 to 18, the figure was about 40%. The stability in average consumption for children and teens is due to greater consumption by those

Table 3
Average daily consumption (in grams) of selected beverages, by gender and age group, household population aged 1 to 18, Canada excluding territories, 2004

Age group	Total beverages		Water		Milk		Fruit juice		Regular soft drinks		Fruit drinks	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
	grams											
1 to 3	1,069*	994	248	238	459	450	200*	168	18 ^E	13 ^E	96	81
4 to 8	1,184* [†]	1,022	337 [†]	337 [†]	338* [†]	272 [†]	194*	157	68* [†]	47 [†]	161* [†]	134 [†]
9 to 13	1,505* [†]	1,299 [†]	509 [†]	483 [†]	332*	267	171	147	152* [†]	109 [†]	211 [†]	192 [†]
14 to 18	2,121* [†]	1,666 [†]	780* [†]	694 [†]	323*	222 [†]	192	165	376* [†]	179 [†]	198	175

* significantly different from estimate for girls of same age ($p < 0.05$)

[†] significantly different from estimate for same sex in preceding age group ($p < 0.05$)

^E use with caution (coefficient of variation 16.6% to 33.3%)

Source: 2004 Canadian Community Health Survey – Nutrition.

Table 4
Average daily consumption (in grams) by those who consumed selected beverages the previous day, by gender and age group, household population aged 1 to 18, Canada excluding territories, 2004

Age group	Water		Milk		Fruit juice		Regular soft drinks		Fruit drinks	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
	grams									
1 to 3	349	337	528	509	325	290	237 ^E	205 ^E	327	292
4 to 8	466 [†]	428 [†]	423 ^{*†}	381 [†]	360 [*]	318	358 ^{*†}	270	361	330
9 to 13	692 [†]	623 [†]	485 ^{*†}	414	402 ^{*†}	343	457 ^{*†}	380 [†]	468 ^{*†}	412 [†]
14 to 18	1,015 [†]	938 [†]	537 ^{*†}	421	489 ^{*†}	417 [†]	715 ^{*†}	514 [†]	574 [†]	510 [†]

* significantly different from estimate for girls of same age (p < 0.05)

† significantly different from estimate for same sex in preceding age group (p < 0.05)

^E use with caution (coefficient of variation 16.6% to 33.3%)

Source: 2004 Canadian Community Health Survey – Nutrition.

who continued to drink fruit juice at older ages, particularly 14- to 18-year-olds (Table 4).

Sweetened beverages

At older ages, children’s beverage consumption increases and becomes more varied. Water, milk and fruit juice account for about 85% of the beverages consumed by children aged 1 to 3, but at ages 14 to 18, the figure is just over 60%. Sweetened beverages—soft drinks and fruit drinks with less than 100% juice—make up most of the difference.

Consumption of sweetened beverages increases with age: more children choose these beverages, and those who drink them drink more. This is particularly true for regular soft drinks. Fewer than 10% of children aged 1 to 3 had a regular soft drink the day before the CCHS interview, but at ages 14 to 18, the percentages were 53% for boys and 35% for girls (Table 2). Boys’ average daily consumption of regular soft drinks climbs from 68 grams at ages 4 to 8 to 376 grams at ages 14 to 18; among girls, the rise is from 47 to 179 grams (Table 3). Moreover, among soft drink consumers, average daily intake is slightly more than 200 grams at ages 1 to 3, but at ages 14 to 18, 715 grams for boys and 514 grams for girls (Table 4).

Consumption of fruit drinks peaks at ages 9 to 13, with boys averaging 211 grams a day, and girls, 192 grams

(Table 3). However, among those who consume fruit drinks, daily intake is highest at ages 14 to 18, averaging more than 500 grams (Table 4).

In addition to water, milk, fruit juice and sweetened drinks, Canadian children and teens drink other beverages such as vegetable juice, tea and coffee. However, the amounts consumed tend

to be relatively small (Appendix Table A).

Calories, sugar and nutrients

Beverages are an important source of energy for children and teens, supplying up to 30% of daily calories. Sugar in fruit juice (fructose) and milk (lactose) provide calories. As well, milk contains

Figure 1
Percentage of daily calories derived from sweetened drinks and from milk and fruit juice, by gender and age group, household population aged 1 to 18, Canada excluding territories, 2004



[†] regular soft drinks and fruit drinks

Source: 2004 Canadian Community Health Survey – Nutrition.

The data

The data are from the 2004 Canadian Community Health Survey (CCHS) – Nutrition, which was designed to collect information about the food and nutrient intake of the household population. The CCHS excludes members of the regular Canadian Forces and residents of the three territories, Indian reserves, institutions and some remote areas, as well as all residents (military and civilian) of Canadian Forces bases. Detailed descriptions of the CCHS design, sample and interview procedures are available in a published report.⁴

This article is based on data from the “24-hour dietary recall” component of the 2004 CCHS. Respondents were asked to list all foods and beverages consumed during the 24 hours before the day of their interview (midnight to midnight). Interviewers used the “Automated Multi-pass Method,”^{5,6} with a five-step approach to help respondents remember what they had to eat and drink:

- quick list (respondents reported all foods and beverages consumed in whatever order they wished);
- questions about specific food categories and frequently forgotten foods;
- questions about the time of consumption and type of meal (for example, lunch, dinner);
- questions seeking more detailed, precise descriptions of foods and beverages and quantities consumed; and
- a final review.

A subsample of the population responded to a second 24-hour recall a few days later to help assess day-to-day variations in food and beverage intake. Information for children younger than 6 was collected from their parents, and interviews for children aged 6 to 11 were conducted with parental help. When parents were unable to provide details (for example, foods and/or beverages eaten at daycare or at school), they were asked to get as much information as possible from those who had been in charge of their children. The energy and nutrient content of the food and beverages was derived from Health Canada’s Canadian Nutrient File 2001b, Supplement.⁷

A total of 35,107 people completed the initial 24-hour dietary recall, and a subsample of 10,786 completed the second recall three to ten days later. Response rates were 76.5% and 72.8%, respectively. A total of 128 recalls were excluded for various reasons: invalid or “null” recalls, breastfeeding children and children younger than age 1. The first 24-hour recall for 14,493 children and teens aged 1 to 18 years was used for this study. The bootstrap method, which takes into account the complex survey design, was used to estimate standard errors, coefficients of variation, and confidence intervals.^{8,9} The significance level was set at $p < 0.05$.

The beverage categories are based in groupings created by Health Canada’s Bureau of Nutritional Sciences. Recipes and basic foods have separate categories. The categories were revised to eliminate double-counting. Beverages used in food recipes belonging to a non-beverage food category (milk in a cake recipe, for example) are excluded from the beverage categories.

The *water* category refers to municipal, bottled, well and distilled water consumed as such. It excludes water required to prepare another beverage (for instance, water in coffee is included in the coffee category).

The *milk* category includes all milk regardless of fat content, evaporated milk and milk added to tea or coffee. It also includes goat milk and infant formulas. Condensed milk and milk added to ready-to-eat or hot cooked cereals (on average, 45 grams of milk daily) are excluded.

The *fruit juice* category refers to 100% pure juice, and includes the juice portion of alcoholic beverages and juice recipes (concentrate and water). *Fruit and vegetable juice* is a different category, separate from *fruit juice* and also from *vegetable juice*.

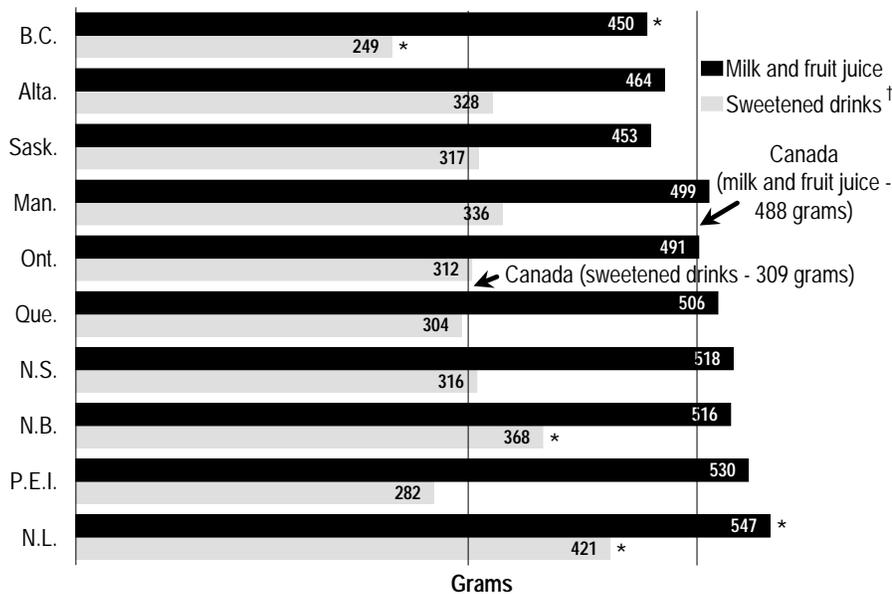
The *fruit drinks* category comprises beverages that contain less than 100% fruit juice. Together, *fruit drinks* and *regular soft drinks* make up the *sweetened beverages* category.

Total beverages includes all of the above categories, as well as *tea* and *coffee* (excluding added items such as cream), *milk-based beverages* (mix of milk and a powder, eggnog, and milkshakes), *other types of milk* (soy and rice beverages, buttermilk), *diet soft drinks*, *beer* (alcoholic and non-alcoholic), *spirit*, *liqueurs*, *wine*, and *coolers*.

The methods used to gather information about food and beverage consumption are generally associated with some under-reporting. The 24-hour dietary recall is not immune to this problem, even when the Automated Multiple-pass Method, which maximizes respondent recall, is used. Another report¹⁰ estimated calorie under-reporting at close to 10% for CCHS respondents aged 12 or older. Under-reporting of beverages will strongly correlate with that of energy.

It is possible that some traces of a beverage category are found in another category in cases where it is impossible to separate certain ingredients in a mixture.

Figure 2
Average daily consumption (in grams), by type of beverage and province, household population aged 1 to 18, Canada excluding territories, 2004



* significantly different from estimate for Canada ($p < 0.05$)

† regular soft drinks and fruit drinks

Source: 2004 Canadian Community Health Survey – Nutrition.

estimated 7% of Canadian adolescents are deficient in vitamin C.¹²

Milk accounts for a considerable share of children’s and teens’ daily intake of vitamins and minerals: vitamin D (45% to 69%), calcium (29% to 51%), vitamin B₁₂ (21% to 48%), vitamin A (21% to 35%), riboflavin (19% to 40%), phosphorus (17% to 37%), potassium (13% to 30%) magnesium (11% to 27%), and zinc (9% to 25%) (data not shown). The steady drop in girls’ milk consumption in older age groups is of concern, as a significant proportion of adolescent girls have inadequate intake of vitamin A, magnesium and zinc, and low intakes of potassium and calcium.^{3,13}

Interprovincial differences

Children’s and teens’ beverage consumption varies little from one province to another. However, compared with the Canadian average, beverage consumption is significantly high in Newfoundland and Labrador (Figure 2), particularly of fruit juice by children younger than 9 and of regular soft drinks by 9- to 18-year-olds (data not shown). On the other hand, beverage consumption in British Columbia is significantly below the Canadian average. ■

lipids in the form of saturated fats. Calories from fruit drinks and soft drinks come mostly from added sugars.

During early childhood, milk and fruit juice contribute far more daily calories than do sweetened drinks. The gap narrows as children get older, and almost evens out at ages 14 to 18 (Figure 1). Although this shift is not reflected in total calories derived from

beverages, it affects the contribution of beverages to vitamin and mineral intake.

Fruit juice alone contributes substantially to children’s requirements for vitamin C. Depending on their age, children obtain 50 mg to 72 mg of vitamin C a day from fruit juice, well above the estimated requirement of 13 mg to 63 mg.¹¹ However, an

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Appendix Table A**Average daily consumption (in grams) of selected beverages, by age group and gender, household population aged 1 to 18, Canada excluding territories, 2004**

Beverage	1 to 3		4 to 8		9 to 13		14 to 18	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
	grams							
Total beverage consumption	1,069	994	1,184	1,022	1,505	1,299	2,121	1,666
Water	248	238	337	337	509	483	780	694
Milk	459	450	338	272	332	267	323	222
Milk-based beverages	18	13 ^E	39	40	42	34	44	36
Other types of milk	18 ^E	10 ^E	F	F	6 ^E	F	F	3 ^E
Fruit juice	200	168	194	157	171	147	192	165
Fruit drinks	96	81	161	134	211	192	198	175
Regular soft drinks	18 ^E	13 ^E	68	47	152	109	376	179
Diet soft drinks	F	F	4 ^E	6 ^E	24 ^E	17	16	37
Vegetable juice	F	F	F	F	8 ^E	F	F	8 ^E
Tea	7 ^E	F	31 ^E	15	44	39	80	80
Coffee	F	F	F	F	4 ^E	3 ^E	37	48

^E use with caution (coefficient of variation 16.6% to 33.3%)

F too unreliable to be published

Note: Fruit and vegetable juice and alcoholic beverages (beer, spirit, wine, cooler) are included in total beverage consumption.**Source:** 2004 Canadian Community Health Survey – Nutrition.