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# Counting the Calories.

Examining the Relationship Between Beverage  
Consumption and the Canadian Diet



## **Counting the Calories: Examining the Relationship Between Beverage Consumption and the Canadian Diet**

Michael Grant

### **Preface**

The Conference Board of Canada is tracking the progress of the Canadian Beverage Association's (CBA) Balance Calories Initiative (BCI). The initiative endeavours to reduce the number of calories that Canadians ingest from liquid refreshment beverages (LRBs) over the 2015 to 2025 time period.

The Balance Calories Initiative targets a 20 per cent reduction in per capita LRB calories per day over this time period. Previous Conference Board of Canada reports on the BCI have noted that it is on track to achieve its target. Yet, the forces driving lower LRB calories are not well-understood. Similarly, there is poor understanding of the relationship between LRB consumption and unhealthy weights. A major goal of the CBA is assisting Canadians in addressing this core issue.

This report analyzes beverage consumption trends from Statistics Canada's Canadian Community Health Survey–Nutrition to shed light on the forces driving lower LRB consumption and calories over time.

To cite this report: Grant, Michael. *Counting the Calories: Examining the Relationship Between Beverage Consumption and the Canadian Diet*. Ottawa: The Conference Board of Canada, 2018.

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## Acknowledgements

Michael Grant authored this report under the auspices of Food Horizons Canada, a special initiative of The Conference Board of Canada that is housed in the Board's Industry Strategy and Public Policy Division. The report was produced under the direction of Associate Director Dr. Jean Charles Le Vallée, who also contributed to the cross-country analysis (see the Cross-Country Check-Up section).

The author thanks internal reviewer Alison Howard and external reviewers Brian Sterling and a second anonymous reviewer for their helpful comments. A draft of the report also benefited from comments made by staff of the Canadian Beverage Association. The author also thanks the editor, Connie Vanderwaardt, for her thoughtful attention to detail.

This report was financially supported by the Canadian Beverage Association. The views expressed in this report are solely those of The Conference Board of Canada.

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## Explanation of Calories vs. calories

We capitalize Calories to indicate a specific measure, namely kilocalories. When we are discussing calories more generically, then there is no need to capitalize.

For example:

142.5 Calories is the per capita daily LRB calories

... but ...

The number of calories that Canadians receive from beverages has been falling over time.

Calories or kcal indicate a measure: e.g., 142.5 Calories.

No capital C necessary anywhere else.

Calories is 1,000 calories or kcal.

When we look at food labels, they are expressed in Calories.

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## EXECUTIVE SUMMARY

# Counting the Calories: Examining the Relationship Between Beverage Consumption and the Canadian Diet

### At a Glance

- The Conference Board of Canada is tracking the progress of the Canadian Beverage Association's (CBA) Balance Calories Initiative (BCI). The initiative endeavours to reduce the number of calories that Canadians ingest from liquid refreshment beverages (LRBs) over the 2015 to 2025 time period. LRB calories take the form of sugar.
- This report analyzes beverage consumption trends from Statistics Canada's Canadian Community Health Survey–Nutrition (CCHS–Nutrition), for 2004 and 2015, to shed light on the forces driving lower LRB consumption and calories over time.
- CCHS–Nutrition corroborates industry data that show falling LRB calories per capita between 2004 and 2015.
- The trend of diminishing LRB calories applies across Canada's provinces and regions. It also applies across age groups. As well, overweight and obese Canadians are getting fewer of their daily calories from LRBs in 2015 than they did in 2004.

**The Conference Board of Canada is tracking the progress of the Canadian Beverage Association’s (CBA) Balance Calories Initiative (BCI). The initiative endeavours to reduce the number of calories that Canadians ingest from liquid refreshment beverages (LRBs) over the 2015 to 2025 time period. The initiative targets a 20 per cent reduction in per capita LRB calories per day over this period.**

Industry data suggest that the BCI is on its way to achieving its target. Yet there are few sources of data to corroborate industry data. Also, industry data do not allow us to understand the nuanced relationship between LRB calories and weight, which is the core issue that the CBA’s BCI seeks to address.

Statistics Canada’s Canadian Community Health Survey–Nutrition is one potentially reliable source for data corroboration and further analysis. This report analyzes beverage consumption trends from Statistics Canada’s Canadian Community Health Survey–Nutrition to shed light on the forces driving lower LRB consumption and calories over time.

## The Trend Line of Consumption of Beverage Calories Is Declining

The CCHS–Nutrition data support industry data in terms of beverage calories per capita. There has been a modest shift in the average calorie per serving that explains part of the trend. For instance, the average calories of fruit drinks dropped from 139.8 kcal/serving to 116.6 kcal/serving.

A more important trend was the substitution from high- to low-calorie beverages. Even though the 2015 CCHS–Nutrition survey covers over 3.5 million more Canadians than the 2004 survey, full-calorie fruit drink servings fell by over 4.4 million. Similarly, full-calorie soft drink servings declined by almost 4.0 million. Less pronounced decreases were seen

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Excess weight is a significant and growing problem in Canada.

in relatively high-calorie fruit juices and tomato and vegetable juices. These results follow similar findings based on GlobalData market data, which estimate that lower LRB calories/per capita/day are being driven by consumer preferences for lower-calorie beverages.

## Other Factors Contribute to the Growing Numbers of Overweight Canadians

At its core, the Balance Calorie Initiative is an effort to address concerns about unhealthy weights among Canada's population. Overweight Canadians are at greater risk of a variety of chronic and life-threatening conditions—including cancer, diabetes, and cardiovascular disease. CCHS–Nutrition findings support the notion that excess weight is a significant and growing problem in Canada.

The report shows that excess weight is related to various factors from an aging population to changes in metabolism, appetite, food preferences, and the level and intensity of exercise. Excess weight is also related to caloric intake though Canadians are getting fewer calories from LRBs. According to CCHS–Nutrition data, overweight and obese Canadians obtain even fewer of their daily calories from LRBs than the average Canadian does. Equally important, overweight and obese Canadians have followed the general trend of fewer daily LRB calories. In 2015, overweight Canadians consumed 45 per cent fewer LRB calories and obese Canadians consumed 41 per cent fewer, compared with 2004.

## All Age Groups Follow the Lower-Calorie Trend

As Canadians age, they decrease their consumption of LRBs in favour of non-LRBs. In addition, their LRB consumption moves away from fruit juices toward other beverage categories that offer lower-calorie alternatives, like bottled water, diet sodas, and low-calorie vitamin waters.

The combination of lower LRB consumption and reduced calorie formats partly explains why LRB calories/day has decreased as Canadians age.

Yet even among Canadian youth, the trend is toward lower LRB calories. This could be due to either smaller servings or fewer calories per serving. For children drinking fruit juices, lower per capita LRB calories have been mostly driven by fewer calories per serving. Whereas, for fruit drinks, it is mostly driven by fewer servings/capita. Full-calorie soft drink consumption is down significantly for both age groups, as is tomato and vegetable juice consumption among adolescents and fruit drinks among children.

## Lower LRB Calories Apply Across Canada

All provinces/regions follow the general trend toward fewer LRB calories/day. This includes provinces where obesity rates have increased, such as Saskatchewan and Manitoba. Provinces that recorded especially large declines in calories from LRBs included Alberta (from 148.4 to 73.2 Calories/capita/day) and British Columbia (from 126.2 to 53.3 Calories/capita/per day).

Declines in LRB calories/capita/day are partly due to falling per capita consumption and partly due to reduced calories. Although consumption per capita is down in all provinces/regions, average calories are down even more. This suggests that consumer choices are driving lower LRB calories/capita/per day across all provinces/regions of Canada.



## Introduction

**The Canadian Beverage Association (CBA) has engaged The Conference Board of Canada to track the performance of its Balance Calories Initiative (BCI). The initiative endeavours to reduce the calories that Canadians obtain from liquid refreshment beverages (LRBs). The CBA's BCI targets a 20 per cent reduction in LRB calories/capita/day between 2015 and 2025.**

LRBs include most of the packaged beverages that Canadian purchase at grocery stores, convenience stores, and institution kiosks. Beverages such as soft drinks (carbonates), packaged juices, waters, and energy drinks are included in LRBs. However, dairy, made-to-order hot and cold beverages (teas and coffees) and alcoholic beverages are excluded. As most calories in LRBs are in the form of sugar, the CBA effectively seeks to reduce the amount of sugar that Canadians ingest through packaged beverages.

The Conference Board of Canada's initiative tracking began by establishing a baseline. The Board's baseline report confirmed the industry's estimate of 142.5 LRB Calories/capita/day in 2014.<sup>1</sup> The baseline report also noted that LRB calories/capita/day had fallen 20 per cent between 2004 and 2014. Given the baseline, the CBA targets a further 20 per cent reduction to 114.0 LRB Calories/capita/day by 2025.

The Conference Board's first tracking report showed that the BCI is on its way to achieving its target.<sup>2</sup> The report shows that LRB Calories/capita/day was 133.9 in 2015 and 128.0 in 2016. That means that the CBA has achieved almost half its caloric target in the first two years of the initiative.

<sup>1</sup> Grant, *Canadian Beverage Association: Baseline Report*.

<sup>2</sup> Grant, *Canadian Beverage Association: 2017 Tracking Report*.

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Market forecasts suggest there is a limit to which consumers are willing to substitute full-calorie beverages with no- and low-calorie beverages.

Market data allow us to understand the beverage choices that drive lower LRB calories/capita/day. Over the last two decades, Canadians have switched from consuming full-calorie beverages to lower-calorie beverages—initially in the form of low-calorie soft drinks (carbonates). But, more recently, consumers have turned to no- and low-calorie packaged waters. The Conference Board's baseline report expressed skepticism that this form of beverage substitution was sufficient for the BCI to reach its target on its own. Market forecasts suggest that there is a limit to which consumers are willing to substitute full-calorie beverages with no- and low-calorie beverages.

However, top-line market data do not allow us to understand the underlying forces that drive consumer beverage choices. The Board's tracking report notes that average LRB calories are highly variable over time. Although 2016 saw the steepest drop in average LRB calories since 2012, this reduction was followed in 2013 by a steep rise. A precipitous decline between 2000 and 2005 was followed by an equally sharp increase between 2005 and 2009. It is not clear which forces are behind these changes.

The baseline report also notes that the LRB calories/capita/day are an imperfect metric for addressing the underlying concern—i.e., too many calories resulting in excess weight. Proposals have been made to restrict distribution of and tax LRBs across various jurisdictions (national, provincial/state, and municipal) in Canada and the United States. These proposals are based on the premise that LRBs are a major factor driving the rising rates of overweight and obese citizens. That premise has yet to be examined closely against the Canadian evidence, which raises questions as to whether LRB tax policies are likely to be an effective population health measure.

## About This Report

This report uses Statistics Canada's Canadian Community Health Survey–Nutrition (CCHS–Nutrition) survey cycles for 2004 and 2015 to explore how LRBs' contribution to Canadians' diets are changing over time. The report's introduction is followed by a review of the top-line

dietary trends revealed by the CCHS—Nutrition survey data (see the Top-Line Numbers section). Next is an analysis of the diets of overweight and obese Canadians with particular focus on LRB's role within these diets (Beverages and Weight section). The Age and Gender section considers the implications of population aging for overall dietary trends and LRB consumption. The Cross-Country Check-Up section presents regional/provincial differences in LRB consumption. And, the report concludes with implications for the BCI.

## The Top-Line Numbers

Our tracking of the BCI is based on market data gathered by GlobalData.<sup>3</sup> Although GlobalData is a robust source of LRB market data, we wanted to corroborate these data through other sources.

Fortunately, Statistics Canada's CCHS—Nutrition surveys provide an alternative source. The CCHS—Nutrition program directly surveys Canadians on what they eat and drink. It is a unique dataset that helps us to corroborate the GlobalData market trends.

This direct survey method is, in many ways, preferable to market data that estimate individual consumption from shipments or retail sales. One of the challenges in deriving consumption from market surveys is that the purchaser may differ from the consumer (e.g., one person in the household does the shopping).

The only way to use market data to attain individual consumption is through some form of averaging. For instance, the BCI targets per capita LRB consumption. Yet we know that consumption varies considerably by, for example, age. In addition, estimating consumption from shipments data ignore waste in the supply chain, so may actually overestimate consumption.

3 GlobalData, *Canada Calorie Consumption Evolution*.

As a large-scale, direct, and statistically significant measure of actual consumption, the CCHS–Nutrition survey is a good source of market data corroboration and allows us to explore the reality of consumption variability across the population. This section reviews the CCHS–Nutrition dietary trends survey data for 2004 and 2015.

## About the CCHS–Nutrition Survey

The CCHS–Nutrition survey is a companion survey to the Canadian Community Health Survey (CCHS). The CCHS has been conducted biannually between 2001 and 2005 and annually since 2007. The CCHS collects data on a wide range of population health topics that include smoking, physical health, mental health, and use of health services.

There has been growing interest in the relationship between diet and health. Yet the biannual CCHS survey does not cover diet. So a separate survey, called the Canadian Community Health Survey–Nutrition (CCHS–Nutrition), was designed to look at diets. The CCHS–Nutrition project is a collaboration between Statistics Canada, Health Canada, and provincial health ministries. The survey is complex and costly to design and execute. The complexity and expense mean that, unlike the CCHS, CCHS–Nutrition is only conducted periodically. To date, there have been two surveys; one in 2004 and another in 2015.

CCHS–Nutrition is a large-scale, representative survey of Canadian eating habits. In 2015, it targeted 24,000 survey responses at the national level. Sub-national sampling is sufficiently large to generate robust estimates at the provincial (e.g., Ontario) or regional (e.g., Atlantic Canada) levels. Similarly, a stratified sample method facilitates age group estimation. The questionnaire also asks about weight and height, so it is possible to use the findings to explore the relationship between excess weight (body mass index) and food consumption. (See “Note on CCHS–Nutrition Data Reporting.”)

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## Note on CCHS–Nutrition Data Reporting

Statistics Canada only reports CCHS–Nutrition data when the sample size is sufficiently large to ensure reliable estimates. This policy affects the granularity of data, especially for sub-aggregations. For beverage consumption by age, the policy affects the size of the age cohorts.

For sub-regions, it affects whether we can report on provinces or groups of provinces. Also, Statistics Canada does not provide data for the Northwest Territories, Nunavut, and Yukon. This also affects the granularity of the beverages that are covered under each province/region. In 2015, ready-to-drink (RTD) beverages, sports drinks, energy drinks, vitamin water, and other beverages are reported. At the provincial level, soft drinks, fruit juices, fruit drinks, and tomato and vegetable juices have sufficiently large sample sizes to allow reporting.

For age, we were provided with data on 1–13, 14–18, 19–30, 31–50, and 51 and over age cohorts. For sub-regions, we were provided with data for Atlantic Canada, Quebec, Ontario, Manitoba/Saskatchewan, Alberta, and British Columbia.

For some beverage categories, we estimated consumption based on other parameters, as Statistics Canada did not publish data by age or by regional breakdown for niche category beverages. Where estimation was required, we note the estimation method at the bottom of the tables.

Sources: The Conference Board of Canada, Statistics Canada.

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The robustness of survey estimates is directly related to sample size. The most statistically reliable estimates are at the national level.<sup>4</sup> Sub-population estimates—for instance, provinces or dietary variables—have wider margins of error (called the coefficient of variation or CV) and are less reliable. For example, Statistics Canada says “very good or excellent self-perceived health” had a CV of 1.3 per cent at the Canada level and no higher than 4.6 per cent at the provincial level.<sup>5</sup>

<sup>4</sup> Statistics Canada, *Canadian Community Health Survey–Nutrition*.

<sup>5</sup> Ibid.

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Population health is related to the nutritional content of food. Thus, Statistics Canada has to convert from food consumption to nutritional content.

Dietary variables like “excludes gluten from diet” had wider margins of error with a CV of 9.1 per cent at the national level and up to 29.5 per cent in some provinces.<sup>6</sup>

The CCHS–Nutrition questionnaire asks Canadians what they ate over the previous 24-hour period (called the “24-hour diet recall”). The 2015 sample includes Canadians aged 1 year and older (parents/guardians either answer for or help children). CCHS–Nutrition is rare among Statistics Canada surveys in terms of questionnaire detail and the demands it places on respondents to recall recent behaviours. Executing the survey and imputing consumption and nutrients is a highly complex endeavour.

Every day, Canadians consume a wide variety of foods across a range of package and serving sizes. Respondents may not remember everything that they ate or the serving sizes. Statistics Canada uses a food model booklet to help respondents recall and describe the amount of food that they consumed. The booklet contains pictures of various sizes of glasses, mugs, bowls, spreads, and circles. In addition, it includes a grid, two wedges, and a page of shapes or pieces of meat.<sup>7</sup>

A 24-hour period is not indicative of a diet over a longer time period. Diet varies from day to day, month to month, and season to season. Statistics Canada acknowledges this and says that the CCHS–Nutrition survey data cannot be used to calculate the long-term diet of any respondent.

Statistics Canada deals with 24-hour diet variability through two strategies. One is through a second interview. About 37 per cent of respondents participated in a second interview. Statistics Canada uses a statistical model to reconcile the first and second interview data to obtain a better estimate of an actual 24-hour diet. The second strategy is to group respondents together. Individual data variability is smoothed through grouping, and margins of error are reduced.

Although actual food consumption is interesting on its own account, the real purpose of the survey is to say something about

6 Ibid.

7 Statistics Canada, *Canadian Community Health Survey (CCHS)–Nutrition 2015: First Interview, AMPM\_R4*.

population health. Population health is related to the nutritional content of food. Thus, Statistics Canada has to convert food consumption into nutritional content.

Statistics Canada uses a computer algorithm to convert CCHS–Nutrition questionnaire answers on diet into nutritional components. The algorithm is based on Health Canada’s Canadian Nutrient File (CNF)—a database that separates about 6,500 foods into their nutritional components. In reporting on foods, Statistics Canada uses the Bureau of Nutritional Science (BNS) food nomenclature, which categorizes the CNF foods into 200 specific foods and beverages, and then into 80 food and recipe subcategories.<sup>8</sup>

## Comparing CCHS–Nutrition and GlobalData

We set out to use the CCHS–Nutrition data to corroborate the GlobalData market data. Yet, it is important to understand the difference between corroboration and comparison. Different data sources may be used to corroborate trends over time if they consider the same phenomenon in a consistent manner. In order to be comparable, the data sources need to use substantially the same methodology to generate data across time.

In the case of CCHS–Nutrition and GlobalData, the data sources can be used for corroboration because both surveys look at beverage consumption in a consistent way over time. But, the surveys use different concepts, data organization, and methods to generate data. Therefore, their results are *not* strictly comparable. For instance, we can’t strictly compare the CCHS–Nutrition estimates of calories per day to those estimated from GlobalData market data.

There are two key methodological differences that affect comparability. The first relates to beverage definitions. The BCI benchmark report corresponds to the industry’s definition of liquid refreshment beverages (LRBs), which are typically packaged and dispensed beverages purchased through grocery stores, restaurants, convenience shops,

<sup>8</sup> Recipes differ from foods in that they are a combination of foods that create a unique dish. For instance, a cafe latte is a recipe including the food’s milk and coffee. Recipe metrics capture the use of foods in unique dishes where individual foods are a component of the recipe.

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In 2015, Statistics Canada added beverage categories to account for the growing popularity of LRBs, such as vitamin water, sports drinks, and energy drinks.

and institutions. Notably, LRBs do not include dairy, made-to-order hot and cold teas and coffees, or alcoholic beverages.

Statistics Canada's definition is based on all beverages consumed at the time of the survey. Statistics Canada's concept differs significantly in a number of beverage categories. The teas and coffees category includes all kinds of teas and coffees, including those prepared in the home. Conversely, LRBs include only packaged ready-to-drink (RTD) teas and coffees—a small portion of total tea and coffee consumption.

CCHS's water category includes all kinds of water, including tap water. Again, this estimate is likely to be considerably larger than the plain and flavoured packaged waters that are included in LRBs. In fact, in 2015, Statistics Canada added beverage categories to account for the growing popularity of LRBs, such as vitamin water, sports drinks, and energy drinks.

A second source of statistical discrepancy is due to sampling and estimation. GlobalData estimates are based on industry shipments adjusted for imports and exports. The estimates essentially assume that domestic shipments are equivalent to domestic consumption. Domestic shipments are averaged across the population to produce an estimate of consumption per capita/day. Data on calories for different kinds of beverages are used to generate LRB calories/per capita/day, which is what the BCI targets.

In contrast, Statistics Canada directly measures daily consumption on the day of the survey. Survey responses are immediately translated into their nutritional components, which include calories. Therefore, CCHS–Nutrition directly measures LRB calories/day. The sampling population allows us to easily convert this to LRB calories/per capita/day.

Based on GlobalData, in 2004, we calculate LRB Calories/per capita/day to be 179.0, and in 2015 to be 133.9. Yet the similar statistics based on CCHS–Nutrition are 147.7 and 82.0.<sup>9</sup> But as already noted, the different techniques used mean that these numbers are not strictly comparable.

9 Based on GlobalData calorie consumption and a special data run of Statistics Canada's CCHS–Nutrition dataset.



Significantly, however, the GlobalData *trend* of falling LRB Calories/per capita/day is corroborated by the CCHS–Nutrition survey.

## Top-Line Dietary Trends

Statistics Canada made efforts to ensure methodological consistency between the 2004 and 2015 CCHS–Nutrition survey cycles. But the 2015 survey had to create new beverage categories to account for market changes. Nevertheless, the 2004 and 2015 survey cycles are broadly comparable because they use substantially the same methodology.

A comparison of the 2004 and 2015 survey cycles reveal fundamental changes in Canadian diets over time. Table 1 summarizes the top-line data. Canadians consume fewer calories over time. The weight of consumed foods has dropped by just under 10 per cent on a per capita basis. Per capita daily calories have dropped by roughly the same percentage.

Also of interest is the nutritional content of diets. The policy concern about LRBs is that they may be a source of excess sugar. But, per capita sugar consumption has dropped by over 16 per cent between 2004 and 2015.

**Table 1**  
**Overall Diet Trends**  
(grams; kcal; percentage change)

	2004	2015	% change
<b>Sampling frame</b>	31,938,004	35,460,071	11
<b>Total consumption</b>			
Food amount—grams	93,730,492,929	95,389,446,473	2
Energy—kcal	64,382,512,615	64,277,449,677	0
Total sugars—grams	3,383,774,211	3,138,385,275	–7
Total carbohydrate—grams	8,115,938,765	7,811,286,989	–4
<b>Per capita consumption</b>			
Food amount—grams	3,021	2,765	–8
Energy—kcal	2,075	1,863	–10
Total sugars—grams	109	91	–17
Total carbohydrate—grams	262	226	–13

Note: In 2004, the sampling frame included all Canadians. But, in 2015, this was limited to those 1 year of age and over.

Sources: Statistics Canada; The Conference Board of Canada.

CCHS–Nutrition 2015 data clearly show that Canadians obtain a higher percentage of consumed calories from other nutrients (such as fats and proteins) and less from sugar and carbohydrates than in 2004.<sup>10</sup> In fact, for all age and gender categories, the percentage of total calories from carbohydrates fell between 2004 and 2015.<sup>11</sup>

## The Role of Beverages in Diet

As discussed, CCHS–Nutrition beverage categories differ somewhat from the industry notion of LRBs. Furthermore, the 2015 CCHS–Nutrition survey cycle introduced new beverage variables to reflect product innovation.

Tables 2 and 3 look at beverage volumes for 2004 and 2015.

Table 2

### Statistics Canada’s Estimate of Daily Beverage Consumption, 2004 (grams; number of servings)

	Grams/serving	Servings	Total grams	Grams/capita
Tomato and vegetable juice	244.6	1,425,000	348,555,000	11.2
Fruit juice	189.0	19,604,400	3,705,231,600	119.4
Soft drinks—regular	395.6	10,551,100	4,174,015,160	134.5
Soft drinks—aspartame	385.2	3,476,900	1,339,301,880	43.2
Fruit drinks	282.5	8,073,100	2,280,650,750	73.5
Water	357.9	73,766,000	26,400,851,400	850.8
<b>Total</b>			<b>38,248,605,790</b>	<b>1,232.6</b>

Sources: Statistics Canada; The Conference Board of Canada.

Table 3

### Statistics Canada’s Estimate of Daily Beverage Consumption, 2015 (grams; number of servings)

	Grams/serving	Servings	Total grams	Grams/capita
Tomato and vegetable juice	228.7	935,400	213,925,980	6.2
Fruit juice	123.0	20,878,700	2,568,080,100	74.4
Soft drinks—regular	369.3	6,817,900	2,517,850,470	73.0
Soft drinks—aspartame	355.0	3,118,700	1,107,138,500	32.1
Fruit drinks	260.4	3,670,300	955,746,120	27.7

(continued ...)

10 Explained further in the Beverage and Weights and Age and Gender sections.

11 Statistics Canada, CANSIM table 105-2017.

Table 3 (cont'd)

**Statistics Canada's Estimate of Daily Beverage Consumption, 2015**

(grams; number of servings)

	Grams/serving	Servings	Total grams	Grams/capita
Water	347.8	91,791,100	31,924,944,580	925.5
Energy	421.2	199,000	83,818,800	2.4
Vitamin water	394.9	210,900	83,284,410	2.4
Sports drinks	573.0	484,800	277,790,400	8.1
<b>Total</b>			<b>39,732,579,360</b>	<b>1,151.8</b>

Sources: Statistics Canada; The Conference Board of Canada.

As with per capita daily calories, the CCHS–Nutrition data corroborate GlobalData findings, showing that Canadians have switched consumption away from full-calorie soft drinks and fruit juices toward low-calorie soft drinks and waters.

Table 4 looks at GlobalData's market data for 2004 and 2015. There is a clear consumption trend away from higher-calorie beverages toward more packaged water consumption and lower-calorie formats of certain beverages. Only energy drinks and RTD coffees (that have a small share of market) show a net increase toward the full-calorie category. Both inter- and intra-category substitution show clearly that Canadians are consuming fewer calories through beverages.

Table 4

**Industry Estimates of Changes in Market Volumes Between 2004 and 2015**

(change in millions of litres)

	Low <=40 kcal per 237 ml	Full >40 kcal per 237ml
Carbonates (soft drinks)	-43.6	-598.9
Packaged water—plain	1140.8	0.0
Enhanced and flavoured packaged water	80.0	53.0
Juice	0.0	-121.5
Nectars	15.0	-83.2
Iced/ready-to-drink tea	107.1	-1.2
Still drinks	-40.1	-88.1
Sports drinks	69.5	12.5
Energy drinks	13.7	92.7
Iced/ready-to-drink coffee	0.0	3.7

Sources: GlobalData; The Conference Board of Canada.

Tables 5 and 6 provide further detail supporting the finding that Canadians are getting fewer calories from beverages than in 2004. The CCHS–Nutrition data corroborates industry data in terms of beverage calories per capita. There has been a modest shift in the average calorie per serving that explains part of the trend. For instance, the average calories of fruit drinks dropped from 139.8 kcal/serving to 116.6 kcal/serving. This is likely related to industry initiatives to replace sugar with lower-calorie sweeteners, like coconut water. The average calories per serving for the first five beverages, covered in tables 2 and 3, went from about 89 Calories to 77 Calories.

A more important trend was the substitution from high- to low-calorie beverages. Even though the 2015 CCHS–Nutrition survey covers over 3.5 million more Canadians than the 2004 survey, full-calorie fruit drink servings fell by over 4.4 million. Similarly, full-calorie soft drink servings went down by almost 4.0 million. Less pronounced drops were seen in relatively high-calorie fruit juices and tomato and vegetable juices. These data corroborate our findings based on GlobalData market data, which estimate that lower LRB calories/per capita/day are being driven by consumer preferences for lower-calorie beverages. (See tables 5 and 6.)

**Table 5**  
**Calorie Profile by Beverages, Canada, 2004**  
(number of servings; kcal)

	<b>Servings</b>	<b>Servings without (w/o) kcal</b>	<b>kcal per serving</b>	<b>Total kcal</b>
Tomato and vegetable juice	1,425,000	–	55.4	78,945,000
Fruit juice	19,604,400	–	86.1	1,687,938,840
Soft drinks—regular	10,551,100	202,800	162.0	1,676,424,600
Soft drinks—aspartame	3,476,900	643,400	4.0	11,334,000
Fruit drinks	8,073,100		139.8	1,128,619,380
Water	73,766,000	73,766,000	–	–
<b>Total</b>	<b>116,896,500</b>	<b>74,612,200</b>		<b>4,583,261,820</b>
<b>Per capita</b>				<b>147.7</b>

Sources: Statistics Canada; The Conference Board of Canada.

**Table 6**  
**Calorie Profile by Beverages, Canada, 2015**  
(number of servings; kcal)

	Servings	Servings w/o kcal	kcal per serving	Total kcal
Tomato and vegetable juice	935,400	–	52.2	48,827,880
Fruit juice	20,878,700	–	58.6	1,223,491,820
Soft drinks—regular	6,817,900	207,000	151.2	999,568,080
Soft drinks—aspartame	3,118,700	593,400	6.6	16,666,980
Fruit drinks	3,670,300	–	116.6	427,956,980
Water	91,791,100	91,425,500	0.8	292,480
Energy	199,000	–	140.7	27,999,300
Vitamin water	210,900	–	71.5	15,079,350
Sports drinks	484,800	–	140.2	67,968,960
Ready-to-drink teas and coffees*	210,900	–	71.5	15,079,350
<b>Total</b>	<b>128,317,700</b>			<b>2,842,931,180</b>
<b>Per capita</b>				<b>82.4</b>

\*estimated by The Conference Board of Canada

Sources: Statistics Canada; The Conference Board of Canada.

## The Impact of Coffee

Coffee is often ignored when considering the role of beverages in calorie consumption. This omission is perplexing given that the Coffee Association of Canada states that coffee is the most consumed beverage in Canada.<sup>12</sup> As people age, they tend to substitute coffee for LRBs. Most importantly, coffees are frequently served with added calories in the form of sugar, cream, and flavouring.

Only a small portion of coffees are LRB—namely, ready-to-drink (RTD) packaged coffees. The vast majority of coffees are prepared in the home. The second most important source is quick service restaurants, like Tim Hortons and Starbucks. The CCHS–Nutrition dataset helps us understand the impact of coffees on Canadians’ calorie consumption.

Statistics Canada defines two kinds of coffee. Home-prepared coffees are covered under one category, while quick service restaurant and RTD coffees are covered under “recipes.”<sup>13</sup>

12 This paragraph is based on data from the Coffee Association of Canada’s, “Coffee Facts.”

13 Correspondence between Leslie Geran (Unit Head, Health Statistics, Statistics Canada) and Michael Grant, November 29, 2017.

Table 7 presents the CCHS–Nutrition data for coffee. Note that most coffees are served black with no added calories. Yet the calories per serving for both home prepared and recipe coffees have been increasing over time. Recipe coffees are particularly heavy in calories and these calories have been increasing significantly over time. For instance, recipe coffees increased calories/serving by over 35 per cent between 2004 and 2015.

**Table 7**  
**Calories in Coffee, Canada**  
(number of servings; kcal)

<b>2004</b>	<b>Servings</b>	<b>Servings w/o kcal</b>	<b>Servings with kcal</b>	<b>kcal per serving</b>	<b>Total kcal</b>
Coffee	24,635,400	18,230,196	6,405,204	8.0	6,405,212
Coffee recipe	1,235,400	84,600	1,150,800	84.7	97,449,744
<b>Total</b>					<b>103,854,956</b>
<b>Per capita</b>					<b>3.4</b>
<b>2015</b>					
Coffee	29,431,000	22,829,800	6,601,200	10.9	71,953,080
Coffee recipe	4,366,000	1,462,800	2,903,200	115.2	334,448,640
<b>Total</b>					<b>406,401,720</b>
<b>Per capita</b>					<b>11.8</b>

Sources: Statistics Canada; The Conference Board of Canada.

High-calorie coffee servings have increased faster than Canada’s population, meaning per capita high-calorie coffee consumption is growing. Between 2004 and 2015, Canada’s population increased by just over 12 per cent and yet recipe-level coffee consumption increased by over 253 per cent.<sup>14</sup>

Although most coffees are served in a low-calorie format, coffee consumption is a driver of higher calories over time. This contrasts with LRBs, which are a source of lower calorie consumption through time.

14 Population growth computed from Statistics Canada, CANSIM table 051-0001.

## Conclusion

The CCHS–Nutrition survey is Canada’s most comprehensive data source on Canadian diets. It directly surveys Canadians on what they eat and drink and is in many ways preferable to industry data that derive consumption from shipments. CCHS–Nutrition allows us to understand how beverage consumption varies by age and region. It also makes a direct connection between beverage consumption and healthy weight (body mass index).

The top-line data show that Canadians are getting fewer of their daily calories from sugars and carbohydrates and more from other nutrients, such as fats and proteins. The concern about LRBs relates to them as a source of sugar. But average sugar consumption is down between 2004 and 2015, partly due to consumers switching from full-calorie LRBs to no- and low-calorie LRBs. The same cannot be said for tea and coffee consumption, which tended to add more calories to Canadian diets between 2004 and 2015.

The Beverages and Weight section looks at the key question of the relationship between LRB consumption and healthy weights.

## Beverages and Weight

At its core, the Balance Calorie Initiative (BCI) is an effort to address concerns about unhealthy weights among Canada’s population. Overweight Canadians are at greater risk of a variety of chronic and life-threatening conditions, including cancer, diabetes, and cardiovascular disease. Especially concerning is that there are almost 5 million obese Canadians who are at the greatest risk of poor health because of their weight. However, the vast majority of Canadians are not at risk of dying prematurely because of their weight.<sup>15</sup> Furthermore, the overweight population that is at risk may or may not be in this condition due to beverage choices.

15 One study estimated that only 1 in 10 premature deaths are due to Canadians being overweight. See Lau and others, “2006 Canadian Clinical Practice Guidelines.” In another study, Statistics Canada linked data on health hazards to mortality. It found that the increased hazard index existed only for BMIs of over 35. BMIs of 25 to 30 had lower hazard index values than those under 25. Very high and very low BMIs are associated with an increased hazard index. See Sanmartin and others, *Linking the Canadian Community Health Survey*.

This section considers the CCHS–Nutrition data related to beverages and weight. It begins by reviewing the CCHS–Nutrition approach to healthy weight. It then looks at the top-line trends between the 2004 and 2015 CCHS–Nutrition survey cycles. The factors behind unhealthy weight are explored. The section concludes with an examination of the specific role that LRBs play in unhealthy weight.

## Modern Life and Healthy Weights

Calories are a measure of energy. Food calories are a necessary source of energy that facilitate normal body function and activity. Excess weight is the result of an energy imbalance between consumed food calories and calories burned through body function, digestion, and activity.

In Canada’s early development, most people naturally burned calories through their daily activities, which often entailed hours of physical labour. Over time, technological development meant that machines performed many of physical tasks that used to be performed by humans. This effectively increased the relative importance of machine energy (fuels and electricity) in relationship to food energy to perform tasks. Consequently, many Canadians need fewer calories today than past generations. This may lead to an imbalance between energy consumption and expenditure, resulting in increasing weights.

The 2004 CCHS–Nutrition release notes that obesity rates had been climbing for 25 years. Between 1978–79 and 2004, the obesity rate among young people aged 12–17 increased from 3.0 to 9.0 per cent. Whereas the rate among young adults aged 25–34 increased from 9.0 to 21.0 per cent.<sup>16</sup> Thus, obesity is a long-term and growing health concern in Canada.

## The CCHS–Nutrition Approach to Healthy Weight

The CCHS–Nutrition dataset is unique in that it measures height and weight concurrently with diet. Height and weight measurements are used to compute body mass index (BMI), a measure of healthy weight.

<sup>16</sup> Statistics Canada, “Canadian Community Health Survey: Obesity Among Children.”



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It is not so much weight that is an indicator of health risks, but the contributions of muscle and fat to weight and the location of fat.

To our knowledge, the CCHS–Nutrition dataset is Canada’s only dataset that allows researchers to explore the direct connection between diet and healthy weight.

BMI is calculated by dividing weight (*w*: kilograms) by height (*h*: metres) and again by height (*h*: metres) ( $w/h/h$ ). A BMI between 18.5 and 25 is considered healthy. A BMI between 25 and 30 is an indication of someone being overweight. People with a BMI over 30 are considered obese.

## The Pros and Cons of BMI

The main advantage of BMI is the ease of data collection and computation. Data collection simply requires a weigh scale and a measuring tape. The procedure is not as costly or invasive as other measurement procedures like calipers, magnetic resonance imaging (MRI), or computer tomography (CT) scans.

Nevertheless, BMI is a controversial approach to gauging health risk. The causation between BMI and health is not well-understood. There is considerable debate in the medical profession of BMI’s relevance in predicting negative health outcomes.<sup>17</sup> Most evidence of health risk applies to obese people—yet overweight and obese people are frequently reported together.<sup>18</sup>

Although alternative measurement procedures are more costly than BMI, they are more accurate in pinpointing people at genuine risk of poor health. It is not so much weight that is an indicator of health risks, but the contributions of muscle and fat to weight and the location of fat. Alternative measures are much better at gauging this than BMI, which does not differentiate in the amount and location of fat or muscle mass. For these reasons, caution is advised when interpreting BMI as an indicator of the population at risk of poor health.

17 See Antonopoulos and others, “From the BMI Paradox.” The authors suggest that BMI does not capture the incidence of people with a healthy, protective, adipose tissue phenotype.

18 Ahima and Lazar, “The Health Risk of Obesity.”

## The Percentage of Canadians Who Are Overweight and Obese Is Increasing

CCHS–Nutrition BMI findings support the notion that excess weight is a significant and growing problem in Canada. The percentages of Canadians who are overweight and obese have increased since 2004. Especially concerning is that there are almost 5 million obese Canadians who are at the greatest risk of poor health because of their weight. Even though the majority of Canadians (adults and children) are not overweight, the large and growing percentage of those who are is cause for concern.<sup>19</sup> And the majority of adults are overweight.

Table 8 summarizes CCHS–Nutrition BMI data for 2004 and 2015. Increasing rates of overweight and obesity is an artifact of population aging. Historical data clearly show that the incidence of overweight and obese Canadians increases with age, with the most noticeable change occurring between adolescence and early adulthood.<sup>20</sup>

**Table 8**  
**Body Mass Index (BMI) Measures**  
(number of Canadians; per cent)

	Number		Percentage	
	2004	2015	2004	2015
<b>Adult (18 and over)</b>				
Surveyed population	23,985,100	27,643,000		
Underweight, measured BMI under 18.50	471,300	736,800	2.0	2.7
Normal weight, measured BMI 18.50 to 24.99	9,328,300	9,977,500	38.9	36.1
Overweight, measured BMI 25.00 to 29.99	8,646,800	9,553,700	36.1	34.6
Obese, measured BMI 30.00 or higher	5,538,700	7,375,000	23.1	26.7
Obese class I, measured BMI 30.00 to 34.99	3,656,400	4,751,600	15.2	17.2
Obese class II, measured BMI 35.00 to 39.99	1,230,900	1,840,900	5.1	6.7
Obese class III, measured BMI 40.00 or higher	651,300	782,500	2.7	2.8
<b>Youth (5–17)</b>				
Surveyed population	5,008,900	4,831,800		
Measured child BMI, neither overweight nor obese	3,289,000	3,340,100	65.7	69.1
Measured child BMI, overweight	1,053,200	910,900	21.0	18.9
Measured child BMI, obese	666,800	580,800	13.3	12.0

Sources: Statistics Canada; The Conference Board of Canada.

19 According to Statistics Canada, in 2015, 11,632,734 Canadians (of a covered population of 34,495,144) were overweight or obese.

20 Statistics Canada, "Canadian Community Health Survey: Obesity Among Children."

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Very few Canadians meet the Public Health Agency of Canada's established physical activity guidelines.

CCHS–Nutrition findings for 2004 and 2015 show that the number of Canadians aged 18 and over increased while the number of youth aged 5–17 fell. Indeed, hypothetically, if the shares of youth and adults had remained stable between 2004 and 2015, there would be 117,000 fewer overweight and over 76,000 fewer obese Canadians in 2015.<sup>21</sup>

A common concern is that full-calorie LRBs contribute to excess weight among youth. Yet the data show that overweight and obesity rates among this group have been falling over time. The youth population that was not overweight or obese increased by 3.0 percentage points between 2004 and 2015.

## Why Are Canadians Getting Fatter?

The energy imbalance that results in increasing weight can be attributable to two factors: a lack of exercise and excess calorie consumption. Although the CCHS–Nutrition survey helps us understand calorie consumption, it does not measure exercise. But other Statistics Canada surveys do measure exercise.

In 2011, the Public Health Agency of Canada established physical activity guidelines by age group.<sup>22</sup> For 3- to 4-year-olds, the guidelines recommend accumulating at least 180 minutes of physical activity, at any intensity, daily. According to the guidelines, ages 5 to 17 years need to accumulate at least 60 minutes of moderate- to vigorous-intensity physical activity every day. Finally, 18- to 79-year-olds need to accumulate 150 minutes of moderate- to vigorous-intensity aerobic physical activity, in bouts of 10 minutes or more, daily.

Data from the Canadian Health Measurement Survey show that very few Canadians meet these guidelines. (See Chart 1.) The rates of

21 Author's calculations: 2004 population shares applied to 2015 population means that there would have been 778,431 fewer adults and a similar number more youth in 2015. Applying the difference in overweight and obesity rates between adults and youth leads to this conclusion.

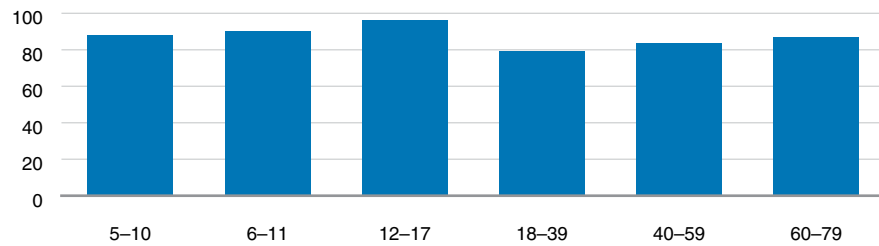
22 In 2016, these guidelines were replaced by the Government of Canada's *Canadian 24 Hour Movement Guidelines for Children and Youth, An Integration of Physical Activity, Sedentary Behaviour, and Sleep*. However, there are no data on the extent to which these are being followed. See Government of Canada, <https://www.canada.ca/en/public-health/services/health-promotion/healthy-living/physical-activity/24-hour-movement-guidelines-children-youth.html>.

guideline attainment decline from childhood to adolescence. Only in late adolescence and early adulthood do matters improve, before deteriorating again in later adulthood.

Chart 1

**Canadians Not Meeting Physical Activity Guidelines, 2015**

(age; per cent)



Source: Statistics Canada, CANSIM table 117-0019.

Although Chart 1 shows data for 2015, recent historical data are consistent with this chart. For example, a longitudinal dataset based on the National Population Health Survey showed a slight net increase in the number of Canadians who had become more active between 1995 and 2011. However, that increase in activity affected only about 10 per cent of the sample. By far, the highest percentage of the sample consisted of Canadians who were mostly sedentary through the entire period.<sup>23</sup>

The data suggest that calorie consumption is more variable than exercise. Therefore, excess calorie consumption is more likely to be behind increasing weights than changes in physical activity. Canadians remain overly inactive through time and are probably eating too much.

Yet we have noted that average calorie per capita consumption between the 2004 and 2015 surveys fell from 2,075 to 1,863 Calories per day. But averages may mask increasing calorie consumption among some Canadians. For instance, a sub-sample estimate based on 2004 CCHS–Nutrition data showed that obese men consumed an average

23 See Statistics Canada, CANSIM table 104-7040.

of 2,820 Calories/day, compared with 2,600 for non-obese men.<sup>24</sup> Obese men's diets also contained higher percentages of fat—especially saturated and mono-unsaturated fat—than the diets of non-obese men. Obese men also consumed fewer carbohydrates and fibre than non-obese men.

The analysis showed that obese women consumed an average of 2,160 Calories/day, compared with 1,970 for non-obese women. Obese women also tended to consume more fats and less fibre than non-obese women. The analysis suggests that excess calorie consumption in the form of fat is a key driver of increasing weights in Canada.

## Beverages and BMI

The key issue for policy-makers and the beverage industry is whether LRBs are an important contributor to increasing the number of overweight and obese Canadians. Tables 9 and 10 look at the LRB consumption habits of overweight (BMI = 25–30) and obese (BMI over 30) Canadians.

Table 9

### Statistics Canada's Estimate of Daily Beverage Consumption by BMI Class, Canada, 2004

(number of servings; kcal)

	Servings	Servings w/o kcal	Per serving kcal	Total kcal
<b>OVERWEIGHT BMI = 25–30</b>				
Tomato and vegetable juice	282,800		49.5	13,998,600
Fruit juice	2,993,800		84.6	253,275,480
Soft drinks—regular	1,719,600		169.5	291,472,200
Soft drinks—aspartame	637,000	107,448	4.3	2,277,074
Fruit drinks	1,064,300		150.0	159,645,000
Water	12,589,900	1,258,900	–	–
<b>Total</b>	<b>9,287,400</b>			<b>720,668,354</b>
<b>Per capita</b>				<b>138.4</b>
<b>OBESE BMI = OVER 30</b>				
Tomato and vegetable juice	168,000		66.5	11,172,000
Fruit juice	1,766,500		75.0	132,487,500
Soft drinks—regular	1,260,100		162.0	204,136,200

(continued ...)

24 Langlois, Guarague, and Findlay, "Diet Composition."

Table 9 (cont'd)

**Statistics Canada's Estimate of Daily Beverage Consumption by BMI Class, Canada, 2004**

(number of servings; kcal)

	Servings	Servings w/o kcal	Per serving kcal	Total kcal
Soft drinks—aspartame	616,300	78,495	4.0	2,145,842
Fruit drinks	623,700		149.0	92,931,300
Water	7,876,900	7,876,900		–
<b>Total</b>	<b>12,311,500</b>			<b>442,872,842</b>
<b>Per capita</b>				<b>133.2</b>

Sources: Statistics Canada; The Conference Board of Canada.

Table 10

**Statistics Canada's Estimate of Daily Beverage Consumption by BMI Class, 2015**

(number of servings; kcal)

	Servings	Servings w/o kcal	Per serving kcal	Total kcal
<b>OVERWEIGHT BMI = 25–30</b>				
Tomato and vegetable juice	148,100	–	45.3	6,708,930
Fruit juice	3,139,300	–	62.1	195,013,316
Soft drinks—regular	1,361,100		144.4	196,542,840
Soft drinks—aspartame	702,000	81,700	6.3	3,907,890
Fruit drinks	763,000	–	111.4	84,998,200
Water	18,351,300	18,351,300		–
Energy	39,800	–	140.7	5,599,860
Vitamin water	42,180	–	71.5	3,015,870
Sports drinks	60,700	–	117.3	7,120,717
Ready-to-drink teas and coffees*	42,180	–	71.5	3,015,870
<b>Total</b>	<b>24,649,660</b>			<b>505,923,493</b>
<b>Per Capita</b>				<b>76.1</b>
<b>OBESE BMI = OVER 30</b>				
Tomato and vegetable juice	146,200	–	49.4	7,222,280
Fruit juice	2,138,500	–	60.7	129,806,950
Soft drinks—regular	1,167,500		157.9	184,348,250
Soft drinks—aspartame	865,300	130,900	7.0	5,140,800
Fruit drinks	350,300	–	121.2	42,456,360
Water	13,583,900	13,583,900		–
Energy	49,500	–	167.8	8,306,100
Vitamin water	37,329	–	114.3	4,264,873
Sports drinks	43,700	–	156.3	6,830,310
Ready-to-drink teas and coffees**	37,329	–	71.5	2,669,024
<b>Total</b>	<b>18,419,558</b>			<b>391,044,946</b>
<b>Per capita</b>				<b>78.5</b>

\*estimated by The Conference Board of Canada based on sub-population share of regular soft drink consumption

\*\*estimate based on BMI shares of total tea/coffee market and ready-to-drink share of tea/coffee market

Sources: Statistics Canada; The Conference Board of Canada.

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Non-LRB sources of nutrients, such as fats and proteins, and sugars in other food sources, are likely behind increasing weights among Canadians.

The data show that Canadians are receiving less energy from LRB beverages. Recall that the CCHS–Nutrition data suggested that Canadians consumed LRB Calories/per capita/day of 147.7 in 2004 (Table 5) and 82.4 in 2015 (Table 6). According to CCHS–Nutrition data, overweight and obese Canadians obtain even fewer of their daily calories from LRBs than the average Canadian does: 76.1 Calories/per capita/day for overweight Canadians (BMI 25–30) and 78.5 Calories/per capita/day for obese Canadians (BMI above 30). Equally important, overweight and obese Canadians have followed the general trend of fewer daily LRB calories. Overweight Canadians consumed 45 per cent fewer LRB calories in 2015 compared with 2004 (from 138.4 to 76.1 Calories/per capita/day), and obese Canadians consumed 41 per cent fewer LRB calories in 2015 compared with 2004 (from 133.2 to 78.5 Calories/per capita/day).

This suggests that non-LRB sources of nutrients, such as fats and proteins, and sugars in other food sources, are likely behind increasing weights among Canadians. Although LRBs are a source of sugar, they represent a reduced share of total calorie consumption, both in the general population and among the overweight and obese.

Yet, since LRBs form a small percentage of total calories (82.4 of 1,863 Calories/per capita/day), the BCI, on its own account, is unlikely to be effective in achieving healthy weights in the Canadian population over time. If obese men consumed an average of 2,820 Calories in 2004, the 133 Calories that obese people received from LRBs only amount to around 5 per cent of their diet. Assuming the same number of daily LRB calories in 2015 suggests that LRBs only account for around 2 per cent of calories today. There isn't much more that LRBs can contribute to lowering calorie consumption among obese Canadians.

## Conclusion

Overweight and obese Canadians are at risk of a variety of chronic and life-threatening conditions, including diabetes, cardiovascular disease, and cancer. The data show that a growing number of Canadians are overweight and obese. Excess weight is a serious population health challenge.

The BCI is the LRBs industry's response to societal pressure to improve population health by reducing the numbers of overweight and obese Canadians. Yet the BCI is only likely to be effective in this objective if LRBs are a contributor to excess calorie consumption and if those calories are falling over time.

The data show that the number of daily calories that overweight and obese Canadians obtain from LRBs has fallen over time and continues to be in line with average LRB calorie consumption. Falling daily LRB intake is good news for fighting excess weight in Canada. Yet the small and falling share of LRB calories in total diet means that focusing solely on LRBs in the fight against obesity is unlikely to be an effective strategy going forward.

## Age and Gender

The previous section noted that the chance of a Canadian being overweight or obese increases with age. Aging and gender affects weight through changes in metabolism (basal metabolic rate), appetite, food preferences, and the level and intensity of exercise.

Age is one of the key sampling parameters for the CCHS–Nutrition surveys. Statistics Canada's sample frame for the surveys ensures large samples by age and gender. Large samples allow researchers to make statistically significant inferences of the impact of age and gender on diet. It also allows for statistically valid comparisons of the diets of different age and gender groups.

This section uses CCHS–Nutrition data from 2004 to 2015 to show how aging impacts overall diet and the role of beverages in diet.

## Population Aging

It is well-known that Canada has an aging population. The relatively large baby boom generation emerged from a sudden increase in birth rates between 1946 and 1965. Birth rates subsequently fell as more women



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Age and gender affect both the total amount of energy (calories) consumed, as well as the macronutrient content of diets.

entered the labour force and chose to have smaller families. The average number of children per woman during the baby boom period was 3.7, compared with about 1.7 in recent years.<sup>25</sup> Smaller families and improved longevity are behind Canada's aging population.

The baby boom generation, now between the ages 53 and 72, is larger than the generations following it. In 2015, the number of Canadians aged 65 and over exceeded those aged 0–14 for the first time.<sup>26</sup>

Population aging is reflected in surveys of the Canadian population. Unbiased random sampling results in relatively high numbers of older Canadians being sampled. For instance, the ratio of adults (18 and over) to youth (5–17) went from 4.8 to 5.7 between the 2004 and 2015 CCHS–Nutrition survey cycles.

Population aging and gender composition affects a wide variety of socio-economic phenomena, such as household composition, labour force participation, savings and expenditure habits, and health care costs. Today, women are much more likely to work, and to be employed in sedentary jobs.

## How Does Age and Gender Affect Diet?

The results of the CCHS–Nutrition surveys help us to understand how age and gender influence diet. Age and gender affect both the total amount of energy (calories) consumed, as well as the macronutrient content of diets.

In terms of calorie consumption, there is a clear trend toward young males consuming the highest number of daily calories. (See Table 11.) This reflects the energy needs of young adult males, who are the largest and most muscular of any age/gender group.

25 Statistics Canada, *Generations in Canada*.

26 Statistics Canada, *Infographic: Population Estimates*.

**Table 11**  
**Daily Average Calorie Consumption Varies by Age and Gender, 2015**  
(number of calories)

Age	Male	Female	Both sexes
1–3			1,308
4–8			1,657
9–13	2,024	1,843	
14–18	2,440	1,764	
19–30	2,427	1,655	
31–50	2,236	1,630	
51–70	2,081	1,578	
71 and over	1,795	1,416	

Source: Statistics Canada.

Muscle maintenance accounts for the most use of energy. Women generally have less muscle than men, which explains why they have lower energy needs.

As people age, they lose muscle mass and their metabolism slows, so they require fewer calories. A reduction in muscle mass reduces the need for energy and lowers the metabolic rate. The basal metabolic rate also decreases linearly with age.<sup>27</sup> In addition, physical activity consumes fewer calories as we age due to less muscle mass.

With decrease of energy needs, the intake of macronutrients also decreases. This explains why calorie consumption falls with age. But it also explains rising obesity rates among older Canadians because aging Canadians who do not cut back on calories are likely to gain weight.

We noted that average daily calorie consumption fell from 2,075 kcal in 2004 to 1,863 kcal in 2015 (Table 1). A portion of this reduction is due to population aging. We estimate that if the age structure was the same in 2015 as in 2004, average consumption in Canada would be over 16 Calories more per day.<sup>28</sup>

<sup>27</sup> Shimokata and Kuzuya, "Aging, Basal Metabolic Rate."

<sup>28</sup> Author's calculation based on maintaining the age profile of 2004 in 2015 and applying it to the 2015 average calories by age group.

## Macronutrient Profile

The Canadian macronutrient profile has changed between the 2004 and 2015 CCHS–Nutrition cycles.<sup>29</sup> In 2015, Canadians received more of their energy through protein and fats and less from carbohydrates. Youth (children and adolescents) reflected this trend as their energy needs in carbohydrates decreased from 54.6 per cent in 2004 to 53.4 per cent in 2015. Adults went from 49.1 per cent to 47.7 per cent in the same year.

Fat consumption as a share of total energy was stable, as a very slight decrease for youth (30.9 to 30.6 per cent) was offset by a slight increase (31.3 to 32.2 per cent) among adults.

For children and teenagers, the percentage of daily energy intake from protein increased from 14.6 per cent in 2004 to 15.6 per cent in 2015. But, for adults, it edged up from 16.5 to 17.0 per cent.

## Age and Beverage Consumption

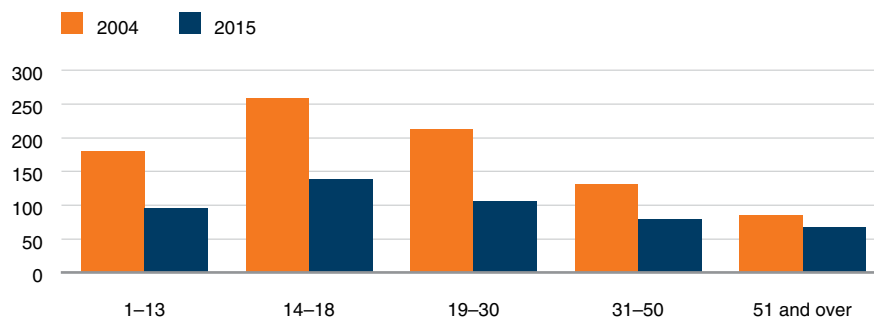
Chart 2 compares average LRB calories for 2004 and 2015 by age group. Average LRB calories tend to peak in adolescence and fall in adult years. This may explain why policy-makers sometimes target LRBs in an effort to fight childhood obesity. Those policies may have made sense in 2004 when LRB calories were relatively high and may have constituted upwards of 10 per cent of total calories for youth. But LRB calories by age have fallen considerably between 2004 and 2015. LRB calories may have fallen to around 5 to 8 per cent of the average adolescent diet.<sup>30</sup>

Tables 12 and 13 provide further detail on LRB beverage consumption trends. As Canadians age, they decrease their consumption of LRBs in favour of non-LRBs. In addition, their LRB consumption moves away from fruit juices toward other beverage categories that offer lower calorie alternatives, like bottled water, diet sodas, and low-calorie vitamin waters. The combination of lower LRB consumption and reduced calorie formats partly explains why LRB calories/day has decreased as Canadians age.

<sup>29</sup> See Geran and Tao, *Health Fact Sheets*. The data in this section are from this source.

<sup>30</sup> Based on average calories reported in Table 11 and average LRB calories.

**Chart 2**  
**Average Calories From LRBs by Age**  
(age; number of calories)



Sources: Statistics Canada; The Conference Board of Canada.

**Table 12**  
**Statistics Canada's Estimate of Daily Beverage Consumption by Age Group, Canada, 2004**  
(number of servings; kcal)

	Servings	Servings w/o kcal	Per serving kcal	Total kcal
<b>AGE 1-13</b>				
Tomato and vegetable juice	133,000		43.0	5,719,000
Fruit juice	4,653,700		81.4	378,811,180
Soft drinks—regular	1,257,700		126.5	159,099,050
Soft drinks—aspartame	135,000	35,700	3.1	307,830
Fruit drinks	2,975,600		131.1	390,101,160
Water	12,021,000	12,021,000	–	–
<b>Total</b>	<b>21,176,000</b>			<b>934,038,220</b>
<b>Per capita</b>				<b>180.9</b>
<b>AGE 14-18</b>				
Tomato and vegetable juice	168,000		64.0	10,752,000
Fruit juice	1,766,500		110.3	194,844,950
Soft drinks—regular	1,260,100		185.4	233,622,540
Soft drinks—aspartame	616,300	17,400	4.0	2,389,611
Fruit drinks	623,700		149.0	92,931,300
Water	4,768,600	4,768,600	–	–
<b>Total</b>	<b>9,203,200</b>			<b>534,540,401</b>
<b>Per capita</b>				<b>258.7</b>
<b>AGE 19-30</b>				
Tomato and vegetable juice	172,000		66.8	11,489,600
Fruit juice	3,009,600		120.3	361,964,592
Soft drinks—regular	2,561,400		182.1	466,430,940

(continued ...)

Table 12 (cont'd)

**Statistics Canada's Estimate of Daily Beverage Consumption by Age Group, Canada, 2004**

(number of servings; kcal)

	Servings	Servings w/o kcal	Per serving kcal	Total kcal
Soft drinks—aspartame	402,600	69,800	4.3	1,431,040
Fruit drinks	1,408,700		174.5	245,818,150
Water	12,777,600	12,777,600		–
<b>Total</b>	<b>20,331,900</b>			<b>1,087,134,322</b>
<b>Per capita</b>				<b>212.5</b>
<b>AGE 31–50</b>				
Tomato and vegetable juice	503,400		59.4	29,901,960
Fruit juice	5,111,100		83.0	424,221,300
Soft drinks—regular	3,403,600		165.8	564,316,880
Soft drinks—aspartame	1,214,500	266,200	4.4	4,172,520
Fruit drinks	1,695,000		151.9	257,470,500
Water	23,540,900	23,540,900		–
<b>Total</b>	<b>35,468,500</b>			<b>1,280,083,160</b>
<b>Per capita</b>				<b>131.0</b>
<b>AGE 51 AND OVER</b>				
Tomato and vegetable juice	567,700		50.5	28,668,850
Fruit juice	5,295,000		66.8	353,706,000
Soft drinks—regular	1,841,500		134.8	248,234,200
Soft drinks—aspartame	964,200	254,200	3.4	2,414,000
Fruit drinks	1,026,700		118.8	121,971,960
Water	20,663,300	20,663,300		–
<b>Total</b>	<b>30,358,400</b>			<b>754,995,010</b>
<b>Per capita</b>				<b>84.7</b>

Sources: Statistics Canada; The Conference Board of Canada.

Table 13

**Statistics Canada's Estimate of Daily Beverage Consumption by Age Group, 2015**

(number of servings; kcal)

	Servings	Servings w/o kcal	Per serving kcal	Total kcal
<b>AGE 1–13</b>				
Tomato and vegetable juice	94,000	–	35.8	3,360,500
Fruit juice	5,303,800	–	52.8	280,093,678
Soft drinks—regular	582,400		117.2	68,239,808
Soft drinks—aspartame	42,300	13,600	4.51	129,437
Fruit drinks	979,400	–	102.5	100,339,530
Water	13,434,400	13,386,300	4.2	203,463
Energy*	8,100	–	140.7	1,139,670

(continued ...)

Table 13 (cont'd)

**Statistics Canada's Estimate of Daily Beverage Consumption by Age Group, 2015**

(number of servings; kcal)

	Servings	Servings w/o kcal	Per serving kcal	Total kcal
Vitamin water*	18,981	–	50.5	958,541
Sports drinks	50,300	–	105.7	5,316,710
Ready-to-drink teas and coffees*	13,713	–	71.5	968,656
<b>Total</b>	<b>20,527,229</b>			<b>460,749,993</b>
<b>Per capita</b>				<b>95.0</b>
<b>AGE 14–18</b>				
Tomato and vegetable juice	31,800	–	72.8	2,315,358
Fruit juice	1,326,000	–	84.6	112,206,120
Soft drinks—regular	602,000		162.1	97,590,220
Soft drinks—aspartame	37,600	n.a.	7.6	285,760
Fruit drinks	321,400	–	141.1	45,346,326
Water	5,340,200	5,340,200		–
Energy*	33,000	–	167.8	5,537,400
Vitamin water*	19,191	–	114.3	2,192,572
Sports drinks	44,117	–	162.7	7,177,836
Ready-to-drink teas and coffees**	13,875	–	71.5	970,629
<b>Total</b>	<b>7,768,883</b>			<b>273,622,221</b>
<b>Per capita</b>				<b>140.3</b>
<b>AGE 19–30</b>				
Tomato and vegetable juice*	146,200	–	49.4	7,222,280
Fruit juice	3,250,200	–	61.1	198,619,722
Soft drinks—regular	1,256,800		161.1	202,445,344
Soft drinks—aspartame	226,000	n.a.	5.9	1,331,140
Fruit drinks	482,200	–	133.7	64,460,496
Water	12,419,700	12,419,700		–
Energy*	69,500	–	180.1	5,943,300
Vitamin water*	40,071	–	132.2	2,537,050
Sports drinks*	92,112	–	162.7	7,177,836
Ready-to-drink teas and coffees**	32,325	–	71.5	970,629
<b>Total</b>	<b>18,014,255</b>			<b>490,707,797</b>
<b>Per capita</b>				<b>106.4</b>
<b>AGE 31–50</b>				
Tomato and vegetable juice*	272,600	–	55.3	15,063,876
Fruit juice	5,050,200	–	63.6	321,243,222
Soft drinks—regular	2,305,500		153.6	354,170,910
Soft drinks—aspartame	943,000	157,500	7.3	5,765,570
Fruit drinks	859,800	–	132.2	113,691,354

(continued ...)

Table 13 (cont'd)

**Statistics Canada's Estimate of Daily Beverage Consumption by Age Group, 2015**

(number of servings; kcal)

	Servings	Servings w/o kcal	Per serving kcal	Total kcal
Water	29,520,900	29,520,900		–
Energy	69,700	–	103.9	7,241,830
Vitamin water*	73,805	–	65.4	4,826,847
Sports drinks	137,900	–	134.5	18,547,550
Ready-to-drink teas and coffees**	73,495	–	71.5	5,168,797
<b>Total</b>	<b>39,305,696</b>			<b>845,719,956</b>
<b>Per capita</b>				<b>79.4</b>
<b>AGE 51 AND OVER</b>				
Tomato and vegetable juice*	443,000	–	49.4	21,884,200
Fruit juice	5,948,600	–	60.7	361,080,020
Soft drinks—regular	1,864,300		157.9	294,372,970
Soft drinks—aspartame	1,276,500	372,600	7.0	6,327,300
Fruit drinks	993,000	–	121.2	120,351,600
Water	30,869,200	30,758,400	4.5	495,276
Energy*	20,500	–	167.8	3,439,900
Vitamin water*	59,052	–	64.3	3,797,044
Sports drinks	114,600	–	110.6	12,674,760
Ready-to-drink teas and coffees**	76,952	–	71.5	5,331,782
<b>Total</b>	<b>41,663,322</b>			<b>829,754,852</b>
<b>Per capita</b>				<b>66.7</b>

\*estimated by The Conference Board of Canada based on sub-population share of regular soft drink consumption

\*\*estimate based on age shares of total tea/coffee market and ready-to-drink share of tea/coffee market

Sources: Statistics Canada; The Conference Board of Canada.

Yet even among Canadian youth, the trend is toward lower LRB calories. This could be due to either fewer servings or less calories per serving. Table 14 looks at these trends for children (1 to 13) and adolescents (14 to 18) for the highest calorie LRB beverages. For children drinking fruit juices, lower per capita LRB calories have been mostly driven by fewer calories per serving; whereas, for fruit drinks, it is mostly driven by fewer servings/capita. Full-calorie soft drink consumption is down significantly for both age groups, as is tomato and vegetable juice consumption among adolescents and fruit drinks among children.

**Table 14**  
**Change in Servings/Capita and Calories/Serving, 2004 to 2015, by Age Group**  
(per cent)

	Age 1–13		Age 14–18	
	Servings/capita	Calories	Servings/capita	Calories
Tomato and vegetable juice	-24.7	-16.9	-81.1	-13.8
Fruit juice	-21.4	-35.1	-24.9	-23.3
Soft drinks—regular	-50.7	-7.4	-52.2	-12.6
Fruit drinks	-64.9	-21.9	-48.5	-5.3

Sources: Statistics Canada; The Conference Board of Canada.

## Conclusion

The Canadian population is aging as the baby boom generation enters its golden years. Population aging has significant implications for diets. As people age, they naturally require fewer calories as their metabolic rate declines. This partly explains why average calories/day has fallen between the 2004 and 2015 CCHS–Nutrition survey cycles.

Canadians' food and beverage preferences also change as they age. They are much less likely to favour relatively high-calorie fruit juices and sodas and prefer lower-calorie waters and sodas. They also are likely to drink more non-LRB beverages. Consequently, population aging results in lower LRB calories/day.

LRB calories tend to increase from childhood to adolescence and then decline as people age. This explains why policy-makers sometimes see LRBs as a factor in childhood and adolescence obesity. Yet childhood obesity has fallen between the 2004 and 2015 survey cycles. Falling LRB calories among children and adolescence have supported lower calorie intake among these groups. LRB calories form a lower share of total calories among children and adolescents. This raises questions as to whether targeting lower LRB calories among this group is likely to be effective in significantly lowering obesity rates among children and adolescents.



## Provincial Differences in LRB Consumption

Canada is a vast, relatively sparsely, populated country spread out over 5,500 kilometres (east to west) with a population of over 36 million people. Regions of the country have developed distinct characteristics based on their culture, geography, settlement patterns, and economic development.

These characteristics are reflected in diets and the role of beverages in diets. Dietary characteristics feed through into obesity rates and the incidence of diet-related chronic disease. This section reviews the literature on regional diets. It uses CCHS–Nutrition data to demonstrate how beverage consumption varies by region.

As discussed, the analysis is shaped by Statistics Canada reporting at the provincial/regional levels due to sampling and data quality considerations. In some instances, data are reported on a provincial basis (Quebec, Ontario, Alberta, and British Columbia) while in other cases, provinces are grouped (Atlantic Canada, and Manitoba/Saskatchewan). Quality considerations also affect the granularity of the beverages that can be reported for each province/region. Only soft drinks, fruit juices, fruit drinks, tomato, and vegetable juices have sufficiently large sample sizes to facilitate reporting at the provincial/regional levels.

### Why Do We Care About Regional Difference?

The relationship between diet and health is widely acknowledged. Poor diets result in increasing health care costs.

In Canada, health costs are largely socialized through medicare. About 70 per cent of health care costs in Canada are funded by government.<sup>31</sup> Medicare is primarily funded and administered by provinces and territories. Canada effectively has 13 different medicare plans.<sup>32</sup> Health care is the single largest budget item for all provinces,

31 Canadian Institute for Health Information, *Data and Reports*.

32 Government of Canada, *Canada's Health Care System*.

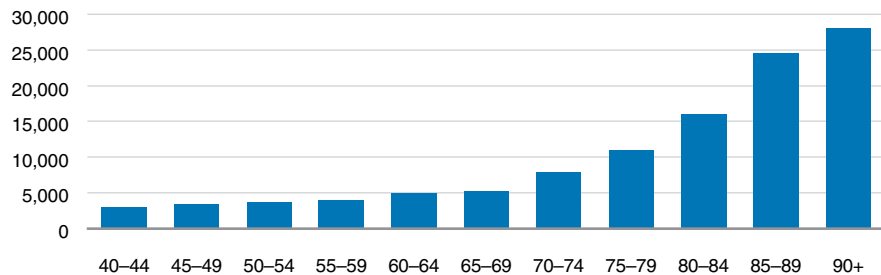
Health care costs rise precipitously after the age of 69.

accounting for anywhere between 34 and 45 per cent of spending.<sup>33</sup> These plans are co-funded by the federal government through transfers under the auspices of the *Canada Health Act*.

Health care costs rise precipitously after the age of 69. Seniors between the ages of 75 and 79 spend over \$11,000 per annum on health care, compared with less than \$3,000 for 40- to 44-year-olds.<sup>34</sup> (See Chart 3.) A Conference Board of Canada report estimates that by 2020, population aging will negatively impact provincial and territorial governments' fiscal position by \$12 billion a year because of increased health costs and reduced revenues.<sup>35</sup> That figure is expected to rise to \$103 billion by 2034. The federal government is estimated to see \$73 billion in increased annual Old Age Security (OAS) expenditures and lost revenues over the same time period. This would make the total figure for federal and provincial/territorial governments \$176 billion by 2034. Over the next 20 years, an average of 61 per cent of the cost increase will come from increased health and OAS spending, while the remaining 39 per cent will be due to lower government revenues.

**Chart 3**  
**Ageing Population Leads to Increasing Health Care Costs, Ontario, 2012**

(per capita government-funded health care by age; \$000s)



Source: Canadian Institute for Health Information.

33 Barua, Palacios, and Emes, *The Sustainability of Health Care Spending*.  
34 Hermus, Stonebridge, and Edenhoffer, *Future Care for Canadian Seniors*.  
35 Fields, MacDonald, and Stewart, *Quantifying the Long-Term Fiscal Impacts*. Please note that this is an unpublished custom report.

These trends are likely to create serious fiscal challenges and may undermine Canada's seniors' social contract. An analysis of health care costs over the long term (2016–30) found that the current trajectory of spending is unsustainable without changes in expenditures or taxes.<sup>36</sup>

Consequently, provincial/territorial governments are seeking ways to constrain rising health care costs. One strategy is to influence diets through various measures, including taxation. The effectiveness of these strategies depends on the extent to which they target the right people and the right behaviours. As beverages may be a target for these strategies, it is important to understand how beverage consumption varies by province/region.

## Regional Differences in Diets and Obesity

There has been considerable research undertaken into Canadian regional differences in diets. Differences that involve excess calorie consumption are behind variation in obesity rates between provinces.<sup>37</sup>

Chart 4 looks at obesity rates among adults. Obesity rates tend to be lower in cities and provinces where a higher portion of population resides in cities. This partly explains why obesity rates are lower in high population and urbanized provinces, such as British Columbia, Quebec, and Ontario. Between 2004 and 2015, obesity rates for adults (aged 18 and over) increased across all provinces. In some cases, these increases were significant. For instance, Saskatchewan's obesity rate increased from just over 30 per cent in 2004 to 45.9 per cent in 2015.

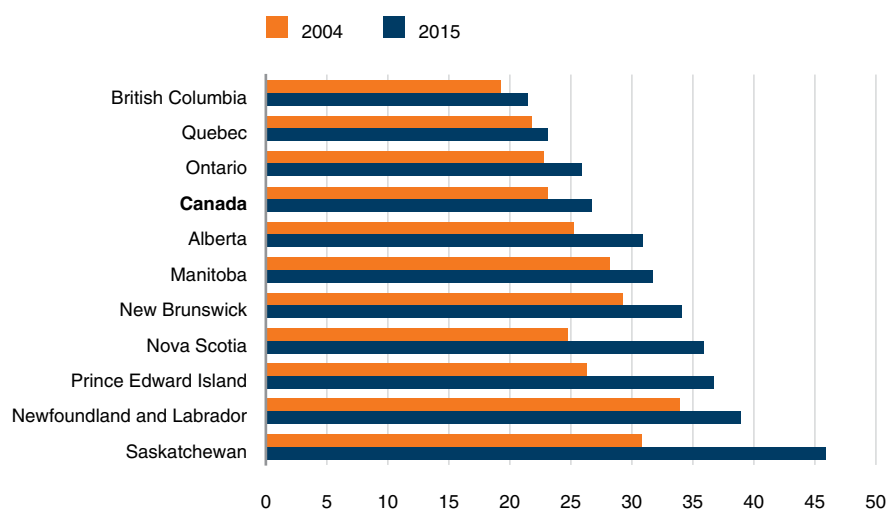
These increases in obesity rates do not reflect a general trend toward higher-calorie diets, but rather an increase in calories among a subset of the population. To illustrate, Table 15 shows the calorie intake profiles (by age and gender) for three provinces (Saskatchewan, Newfoundland and Labrador, and Manitoba) with above average obesity rates. In only a handful of cases (e.g., females aged 51–70 in Manitoba) are average

<sup>36</sup> Barua, Palacios, and Emes, *The Sustainability of Health Care Spending*.

<sup>37</sup> A Statistics Canada study found that excess calorie consumption was a more important driver of excess weight than the macronutrient content of diet. See Langlois, Garriguet, and Findlay, "Diet Composition."

daily calories consumed significantly greater than the Canadian average. In some cases (e.g., Saskatchewan males, aged 14–18), they are significantly below the Canadian average.

**Chart 4**  
**Obesity Rates, Age 18 and Over, Provinces**  
(per cent)



Source: Statistics Canada.

**Table 15**  
**Average Energy Intake (Calories) From Food, 2015, Canada and Selected Provinces, by Age and Gender**

(variance = province minus Canada)

Age	Canada	Sask.	Variance	N.L.	Variance	Man.	Variance
9–13, males	2,024	2,121	97	2,194	170	2,051	27
9–13, females	1,843	1,841	-2	2,028	185	1,938	95
14–18, males	2,440	2,104	-336	2,571	131	2,368	-72
14–18, females	1,764	1,614	-150	1,834	70	1,757	-7
19–30, males	2,427	2,076	-351	2,000	-427	2,454	27
19–30, females	1,655	1,693	38	1,682	27	1,486	-169
31–50, males	2,236	2,147	-89	2,234	-2	2,300	64
31–50, females	1,630	1,581	-49	1,510	-120	1,563	-67
51–70, males	2,081	2,056	-25	1,743	-338	2,120	39
51–70, females	1,578	1,634	56	1,462	-116	1,735	157
71 and over, males	1,795	1,606	-189	1,710	-85	1,833	38
71 and over, females	1,416	1,467	51	1,534	118	1,429	13

Source: Statistics Canada.

## The Role of LRBs in Diet

Tables 16 and 17 summarize beverage data for the 2004 and 2015 CCHS–Nutrition survey cycles. Although the analysis is limited to five beverages, these categories account for over 94 per cent of non-water beverage consumption and 95 per cent of the total calories consumed in 2015.<sup>38</sup>

**Table 16**

### Statistics Canada’s Estimate of Daily Beverage Consumption by Sub-Region, 2004

(number of servings; kcal)

	Servings	Per serving kcal	Total kcal
<b>CANADA</b>			
Tomato and vegetable juice	1,425,000	55.4	78,945,000
Fruit juice	19,601,600	86.1	1,687,697,760
Soft drinks—regular	10,348,300	161.9	1,675,389,770
Soft drinks—aspartame	2,833,500	3.98	11,277,330
Fruit drinks	8,073,100	139.8	1,128,619,380
<b>Total</b>	<b>42,281,500</b>		<b>4,581,929,240</b>
<b>Per capita</b>			<b>147.7</b>
<b>ATLANTIC CANADA</b>			
Tomato and vegetable juice	73,600	52.8	3,886,080
Fruit juice	1,284,800	86.5	111,109,504
Soft drinks—regular	939,600	159.0	149,377,608
Soft drinks—aspartame	272,600	3.8	1,035,880
Fruit drinks	617,000	140.7	86,811,900
<b>Total</b>	<b>3,187,600</b>		<b>352,220,972</b>
<b>Per capita</b>			<b>153.9</b>
<b>QUEBEC</b>			
Tomato and vegetable juice	698,000	48.9	34,132,200
Fruit juice	5,774,700	80.3	463,708,410
Soft drinks—regular	2,722,700	158.1	430,458,870
Soft drinks—aspartame	733,100	3.7	2,712,470
Fruit drinks	1,914,100	138.1	264,337,210
<b>Total</b>	<b>11,842,600</b>		<b>1,195,349,160</b>
<b>Per capita</b>			<b>162.2</b>

(continued ...)

38 Data are based on author’s calculation from CCHS–Nutrition data in tables 3 and 6 of this report. The percentages of total consumption and calories consumed were even higher in 2004 because of the introduction of new beverage categories in 2015 (e.g., vitamin waters and sport drinks).

Table 16 (cont'd)

**Statistics Canada's Estimate of Daily Beverage Consumption by Sub-Region, 2004**

(number of servings; kcal)

	Servings	Per serving kcal	Total kcal
<b>ONTARIO</b>			
Tomato and vegetable juice	375,600	66.9	25,127,640
Fruit juice	7,654,300	88.9	680,467,270
Soft drinks—regular	3,691,400	158.4	584,717,760
Soft drinks—aspartame	1,101,600	4.2	4,626,720
Fruit drinks	3,375,300	140.0	472,406,988
<b>Total</b>	<b>16,198,200</b>		<b>1,767,346,378</b>
<b>Per capita</b>			<b>145.1</b>
<b>MANITOBA/SASKATCHEWAN</b>			
Tomato and vegetable juice	59,300	59.6	3,534,280
Fruit juice	982,700	95.4	93,749,580
Soft drinks—regular	676,400	176.2	119,181,680
Soft drinks—aspartame	190,900	3.8	725,420
Fruit drinks	480,900	158.5	76,222,650
<b>Total</b>	<b>2,390,200</b>		<b>293,413,610</b>
<b>Per capita</b>			<b>145.4</b>
<b>ALBERTA</b>			
Tomato and vegetable juice	82,800	42.3	3,502,440
Fruit juice	1,471,800	96.4	141,881,520
Soft drinks—regular	1,085,000	187.8	203,763,000
Soft drinks—aspartame	236,300	4.5	1,063,350
Fruit drinks	791,900	140.3	111,103,570
<b>Total</b>	<b>3,667,800</b>		<b>461,313,880</b>
<b>Per capita</b>			<b>148.4</b>
<b>BRITISH COLUMBIA</b>			
Tomato and vegetable juice	135,800	64.3	8,731,940
Fruit juice	2,433,200	81.1	197,332,520
Soft drinks—regular	1,233,100	152.9	188,540,990
Soft drinks—aspartame	299,000	4.2	1,255,800
Fruit drinks	893,800	131.9	117,892,220
<b>Total</b>	<b>4,994,900</b>		<b>513,753,470</b>
<b>Per capita</b>			<b>126.2</b>

Sources: Statistics Canada; The Conference Board of Canada.

Table 17

**Statistics Canada's Estimate of Daily Beverage Consumption by Sub-Region, 2015**

(number of servings; kcal)

	Servings	Per serving kcal	Total kcal
<b>CANADA</b>			
Tomato and vegetable juice	935,400	52.2	48,827,880
Fruit juice	20,878,700	58.6	1,223,491,820
Soft drinks—regular	6,611,000	151.2	999,583,200
Soft drinks—aspartame	2,525,300	6.6	16,666,980
Fruit drinks	3,635,900	116.6	423,945,940
<b>Total</b>	<b>34,586,300</b>		<b>2,712,515,820</b>
<b>Per capita</b>			<b>78.6</b>
<b>ATLANTIC CANADA</b>			
Tomato and vegetable juice	59,500	31.1	1,850,450
Fruit juice	1,088,900	67.5	73,500,750
Soft drinks—regular	600,100	153.8	92,295,380
Soft drinks—aspartame	279,400	6.5	1,816,100
Fruit drinks	320,400	116.8	37,422,720
<b>Total</b>	<b>2,348,300</b>		<b>206,885,400</b>
<b>Per capita</b>			<b>90.6</b>
<b>QUEBEC</b>			
Tomato and vegetable juice	479,300	49.4	23,677,420
Fruit juice	7,127,600	60.5	431,219,800
Soft drinks—regular	1,482,700	146.1	216,622,470
Soft drinks—aspartame	758,500	6.3	4,778,550
Fruit drinks	813,200	121.0	98,397,200
<b>Total</b>	<b>10,661,300</b>		<b>774,695,440</b>
<b>Per capita</b>			<b>96.6</b>
<b>ONTARIO</b>			
Tomato and vegetable juice	202,400	59.4	12,022,560
Fruit juice	7,390,400	83.0	613,403,200
Soft drinks—regular	2,548,000	165.8	422,458,400
Soft drinks—aspartame	839,400	4.4	3,693,360
Fruit drinks	1,500,600	151.9	227,941,140
<b>Total</b>	<b>12,480,800</b>		<b>1,279,518,660</b>
<b>Per capita</b>			<b>95.4</b>
<b>MANITOBA/SASKATCHEWAN</b>			
Tomato and vegetable juice	32,900	62.4	2,052,960
Fruit juice	1,010,900	64.5	65,203,050
Soft drinks—regular	575,500	156.3	89,950,650
Soft drinks—aspartame	195,500	8.2	1,603,100

(continued ...)

Table 17 (cont'd)

**Statistics Canada's Estimate of Daily Beverage Consumption by Sub-Region, 2015**

(number of servings; kcal)

	Servings	Per serving kcal	Total kcal
Fruit drinks	310,900	112.0	34,820,800
<b>Total</b>	<b>2,125,700</b>		<b>193,630,560</b>
<b>Per capita</b>			<b>86.8</b>
<b>ALBERTA</b>			
Tomato and vegetable juice	65,900	65.7	4,329,630
Fruit juice	2,089,200	51.4	107,384,880
Soft drinks—regular	872,400	159.5	139,147,800
Soft drinks—aspartame	305,000	6.5	1,985,550
Fruit drinks	378,700	115.7	43,815,590
<b>Total</b>	<b>3,711,200</b>		<b>296,663,450</b>
<b>Per capita</b>			<b>73.2</b>
<b>BRITISH COLUMBIA</b>			
Tomato and vegetable juice	95,500	62.6	5,978,300
Fruit juice	2,171,600	51.6	112,054,560
Soft drinks—regular	532,400	147.3	78,422,520
Soft drinks—aspartame	147,500	6.9	1,017,750
Fruit drinks	312,100	134.7	42,039,870
<b>Total</b>	<b>3,711,200</b>		<b>239,513,000</b>
<b>Per capita</b>			<b>53.3</b>

Sources: Statistics Canada; The Conference Board of Canada.

Note that all provinces follow the general trend toward fewer LRB calories/day. This includes provinces where obesity rates have increased, such as Saskatchewan and Manitoba. Provinces that recorded especially large declines in calories from LRBs included Alberta (from 148.4 to 73.2 Calories/capita/day) and British Columbia (from 126.2 to 53.3 Calories/capita/day).

Ontario had the smallest dip, from 145.1 to 95.4 Calories/per capita/day. This puts the province above the 2015 national average (78.6 Calories/capita/day) when it was below the previous national average in 2004 (147.7 Calories/capita/day). Similarly, Manitoba and Saskatchewan's average consumption (86.8 Calories/capita/day) is now also above the 2015 national average. Elsewhere, LRB consumption in both Quebec and Atlantic Canada remain above the national average in 2015, as was the case in 2004. Quebec had the highest average LRB consumption across all regions in 2015 (96.6 Calories/capita/day).



Declines in LRB calories/capita/day are partly due to falling per capita consumption and partly due to reduced calories. Although consumption per capita is down in all provinces, average calories are down even more. This suggests that some combination of industry efforts to introduce low calorie beverages combined with consumer choices are driving lower LRB calories/per capita/per day across all provinces/regions of Canada. (See Table 18.)

**Table 18**  
**Change in Servings/Capita and Average Calories**  
(per cent)

	2004		2015		% Change	
	Servings/capita	Average calories	Servings/capita	Average calories	Servings/capita	Average calories
Canada	1.36	147.7	1.00	78.6	-26.5	-46.8
Atlantic Canada	1.39	153.9	1.03	90.6	-25.9	-41.4
Quebec	1.61	162.2	1.45	96.6	-9.9	-40.4
Ontario	1.33	145.1	0.93	95.4	-30.1	-34.3
Manitoba/ Saskatchewan	1.18	145.4	0.95	86.8	-19.5	-40.3
Alberta	1.18	148.4	0.92	73.2	-22.0	-50.7
British Columbia	1.23	126.2	0.72	53.3	-41.5	-57.8

Sources: Statistics Canada; The Conference Board of Canada.

## Conclusion

Canada's health care system is heavily socialized and operated at the provincial level. As such, dietary factors that may result in chronic conditions are of special interest to Canada's provinces. Some provinces have seen significant increases in obesity rates, which are of particular concern to health care policy-makers.

The analysis of regional/provincial data clearly shows that, to greater or lesser degree, all regions and provinces have followed the trend toward lower LRB calories/per capita/day. Although beverage consumption per capita is down across all regions/provinces, a likely factor behind falling LRB calories is consumer's selection of lower-calorie beverage options. (See Tables 5 and 6.)

## Conclusion and Key Findings

It is important for initiatives, like the Canadian Beverage Association's Balance Calories Initiative (BCI), to accurately track progress toward their stated goal, in this case, a 20 per cent reduction in LRB calories/per capita/day by 2025. In addition, the industry needs to understand the forces driving beverage calorie consumption and its relationship to the core issue—i.e., excess weight among Canadians.

Although existing industry data allow for top-line tracking of trends, the data are limited in terms of understanding the forces behind beverage consumption and the relationship between beverage consumption and excess weight. Also, it helps to use other data sources to corroborate industry trends.

There are actually few good sources for beverage data corroboration and deeper analysis of trends. The Canadian Community Health Survey–Nutrition dataset for 2015 was released at a critical juncture in the BCI.

The CCHS–Nutrition dataset is one of the best sources for beverage industry data corroboration. In addition, it is the only data source that allows us to explore the relationships between diet, aging, and excess weight. Given its periodic nature, we do not know if another CCHS–Nutrition dataset will be released before the end of the BCI. It would certainly help if CCHS–Nutrition data were collected more frequently—e.g., every five years. This would help us continue to corroborate industry data.

The following summarize the key findings of this report.

### **CCHS–Nutrition Corroborates Finding of Falling Beverage Calories**

Although not strictly comparable to industry market data (GlobalData), the CCHS–Nutrition dataset corroborates the industry data finding of falling LRB calories/capita/day over time. This is due to product innovation and consumers adopting low-calorie beverage offerings.

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For the BCI, the real issue is whether increasing rates of excess weight are due to beverage consumption.

In particular, per capita consumption of high-calorie fruit juices has fallen significantly between 2004 and 2015. Only relatively small market share energy drinks and RTD coffees show a net increase toward higher calories; all other beverages show a movement toward lower-calorie beverage options.

## **Overweight and Obese Canadians Obtain Fewer Daily Calories From LRBs Than Canadians Overall**

The CCHS–Nutrition data allow researchers to directly observe the relationship between food consumption and excess weights, as measured by body mass index (BMI).

The percentage of Canadians who are overweight has been rising since 2004. There are now over 5 million Canadians who are overweight as measured by BMI. This is entirely due to increasing rates of overweight adults, as the percentage of children who are neither overweight or obese has increased between 2004 and 2015.

But for the BCI, the real issue is whether increasing rates of excess weight are due to beverage consumption. The CCHS–Nutrition dataset shows that the number of daily calories that overweight and obese Canadians obtain from LRBs has fallen over time and continues to be in line with average LRB calorie consumption. This is because overweight and obese Canadians have been reducing the number of calories that they receive through LRBs, in keeping with the overall trends. Overweight Canadians consumed 45.0 per cent and obese Canadians consumed 41.0 per cent fewer LRB calories in 2015 as compared to 2004. More importantly, overweight and obese Canadians actually obtain even fewer of their daily calories from LRBs than the average Canadian does.

The data suggest that other food sources, population aging, and low activity levels are potential factors behind increasing rates of obesity.

## Population Aging a Force for Lower LRB Consumption and Calories

Much is made of Canada's aging population. Population aging is behind a significant increase in health care costs.

The basal metabolic rate declines with age, which means people require fewer calories as they age. Most Canadians cut their calorie consumption in line with this reduced need, which partly explains why average calorie consumption has fallen over time. But Canadians who maintain their calorie consumption as they age are at risk of excess weight, which helps explain the rising rates of overweight and obese Canadian adults.

In terms of beverages, there is a clear trend toward LRB calories increasing from childhood to adolescence and then steadily falling as people age. Yet, over time, all age groups have lowered their LRB calories/capita/day. As Canadians age, they decrease their consumption of LRBs in favour of non-LRBs. In addition, their LRB consumption moves away from fruit juices toward other beverage categories such as bottled water, diet sodas, and low-calorie vitamin waters. The combination of lower LRB consumption and reduced calorie formats partly explains why LRB calories/day has decreased as Canadians age.

Even Canadian youth are consuming fewer LRB calories than in 2004. This is mostly due to fewer calories per serving. The exception is fruit drinks, where the decrease is mostly driven by fewer servings/capita. Full-calorie soft drink consumption is down significantly for both youths and adults, as is tomato and vegetable juice consumption among adolescents and fruit drinks among children.

## Trends Hold Across Canada

Rising health care costs are a special concern of provinces because health care is typically the largest expenditure item in provincial budgets—approaching half of provincial spending in some cases. Some provinces, like Saskatchewan, have seen rapid increases in the percentage of their population that are overweight and obese.

All provinces and regions analyzed in this report follow the trend toward lower LRB calories/capita/day, partly because of lower consumption per capita/day. But a more important factor is lower average LRB calories per serving. This suggests that consumers are switching to lower-calorie LRBs and receiving more of their beverage calories from non-LRB beverages.

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## APPENDIX A

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PUBLICATION 9675 | 9676  
PRICE: Complimentary