

# The Economic Burden

## Attributable to Low Fruit and Vegetable Consumption in Canada

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# Introduction

In March of 2016, H. Krueger & Associates Inc. produced a detailed (208 page) report for the Canadian Produce Marketing Association (CPMA) which focussed on providing a better understanding of current fruit and vegetable (F&V) consumption levels in Canada by sex, age and province placed in the context of consumption trends over the last decade, the health and economic benefits attributable to F&V consumption, and the health and economic benefits of increasing F&V consumption.<sup>1,2</sup>

The report produced in 2016 placed low fruit and vegetable consumption in the context of four other risk factors, namely, tobacco smoking, unhealthy weight, physical inactivity and alcohol consumption. In addition, the methodology underpinning the modelling was explained in detail.

## Methods

### Source of Risk Factor Exposure Data

Using the detailed methodology described in the 2016 report to update the analysis is no longer possible. The key data source for that analysis in assessing F&V consumption levels by sex, age and province was the Statistics Canada Public Use Microdata File containing detailed Canadian Community Health Survey (CCHS) data on F&V consumption. While the CCHS is ongoing, data on F&V consumption has been collected inconsistently since 2014.

Instead, the current analysis uses data collected in annual CPMA F&V consumption surveys between 2015 and 2021. The survey was

In the 2016 report, results in terms of F&V consumption and economic burden / benefits were calculated for 2013. In 2013, an estimated 27.6 million (78.4%) Canadians did not consume the recommended number of daily servings of fruits and vegetables. This low level of fruit and vegetable consumption was associated with an annual economic burden of \$4.4 billion.

**The 2016 report has been useful for the CPMA in their discussions with government officials and policy makers. As the report is based on 2013 data, however, the CPMA would like an updated version but without the incorporation of other risk factors or the detailed methodology.**

conducted in individuals ages 18 and older. A key question asked in these surveys is “On average, how many servings of fresh fruit and vegetables combined do you eat daily?” Based on their answers to the question, we grouped respondents into the following five risk factor categories:

1. Meet or exceed seven (7) servings of fruits and vegetables daily
2. 5-6 servings daily (or 1-2 servings below Canada’s 2007 Food Guide [CFG])
3. 3-4 servings daily (or 3-4 servings below CFG)
4. 1-2 servings daily (or 5-6 servings below CFG)
5. No servings daily (or 7 servings below CFG)



This data was collated into the following four regions: the Maritimes (Newfoundland & Labrador, Prince Edward Island, Nova Scotia and New Brunswick), Quebec, Ontario and the West (Manitoba, Saskatchewan, Alberta and British Columbia) (Appendix A).

### **Number of Individuals in Each Risk Factor Exposure Category**

To determine how many individuals were grouped into each of the five categories (by year and region), we multiplied the proportions in Appendix A by the population in each region in a given year (Appendix B).<sup>3</sup>

### **Economic Burden per Individual Attributable to Each Risk Factor Category**

By Risk Factor Category and Region in 2013

To determine the annual economic burden in 2013 (both direct and indirect costs) per individual attributable to low F&V consumption by level of consumption and region, we accessed the data used in the 2016 analysis and report and collated the data to fit the currently available risk factor exposure data by region (Appendix C).

### **Estimating Increased Costs between 2013 and 2021**

To estimate increased costs between 2013 and 2021, we accessed data on government health expenditures by province for each year and collated this data to fit the current regions.<sup>4</sup> We focused on expenditure data in the areas of hospitals, physicians, other professionals and drugs. In addition to an annual % increase in these costs, we calculated the percent increase in costs between 2013 and 2015 and between 2013 and 2021 (Appendix D).

### **Annual Economic Burden by Region**

#### **In 2015**

To estimate the annual economic burden attributable to low F&V consumption in 2015, we used the exposure data in 2015 (Appendix A), multiplied the proportions in each risk factor category in 2015 by the population in 2015 (Appendix B), increased the annual costs per individual attributable to low F&V consumption by the increase in healthcare costs between 2013 and 2015 (Appendix D) and then multiplied these updated costs by the number of individuals in each risk factor category in 2015 (Appendix E).

1 H. Krueger & Associates Inc. The Economic Benefits of Fruit and Vegetable Consumption in Canada. 2016. Canadian Produce Marketing Association.

2 Krueger H, Koot J, Andres E. The economic benefits of fruit and vegetable consumption in Canada. Canadian Journal of Public Health. 2017; 108(2): e152-61.

3 Statistics Canada. Table 17-10-0009-01 Population Estimates, Quarterly. Available online at <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1710000901>. Accessed September 2023.

The population estimates are based on the fourth quarter population estimates in each year.

4 Canadian Institute for Health Information. National health expenditure trends. Available online at <https://www.cihi.ca/en/national-health-expenditure-trends#data-tables>. Accessed September 2023.



## In 2021

To estimate the annual economic burden attributable to low F&V consumption in 2021, we used the exposure data in 2021 (Appendix A), multiplied the proportions in each risk factor category in 2021 by the population in 2021 (Appendix B), increased the annual costs per individual attributable to low F&V consumption by the increase in healthcare costs between 2013 and 2021 (Appendix D) and then multiplied these updated costs by the number of individuals in each risk factor category in 2021 (Appendix F).

### **Reasons for the Increase in Annual Economic Burden between 2015 and 2021**

Any observed change in the annual economic burden attributable to low F&V consumption between 2015 and 2021 will be largely attributable to three reasons; population growth, inflationary pressures (increasing healthcare costs) and changes in F&V consumption patterns. To calculate the impact of each of these three reasons we used the following approach:

1. Estimate the annual economic burden attributable to low F&V consumption in 2015 and 2021 by region (see above)
2. To calculate how much of the increase is due to population growth, we used the overall results for 2021 but changed the population values back to 2015. Using this approach, the difference in the overall economic annual burden observed for 2021 is attributable to population growth.
3. To calculate how much of the increase is due to inflationary pressures (increasing healthcare costs), we used the overall results for 2021 but changed the estimated annual economic burden per person in a specific F&V consumption category back to 2015 values. Using this approach, the difference in the overall economic annual burden observed for 2021 is attributable to inflationary pressures.
4. Once we determined how much of the increase between 2015 and 2021 is due to population growth and inflationary pressures, the remaining increase in the annual economic burden between 2015 and 2021 would be due to changes in F&V consumption patterns.

# Results

## Trend in Fruit and Vegetable Consumption between 2015 and 2021

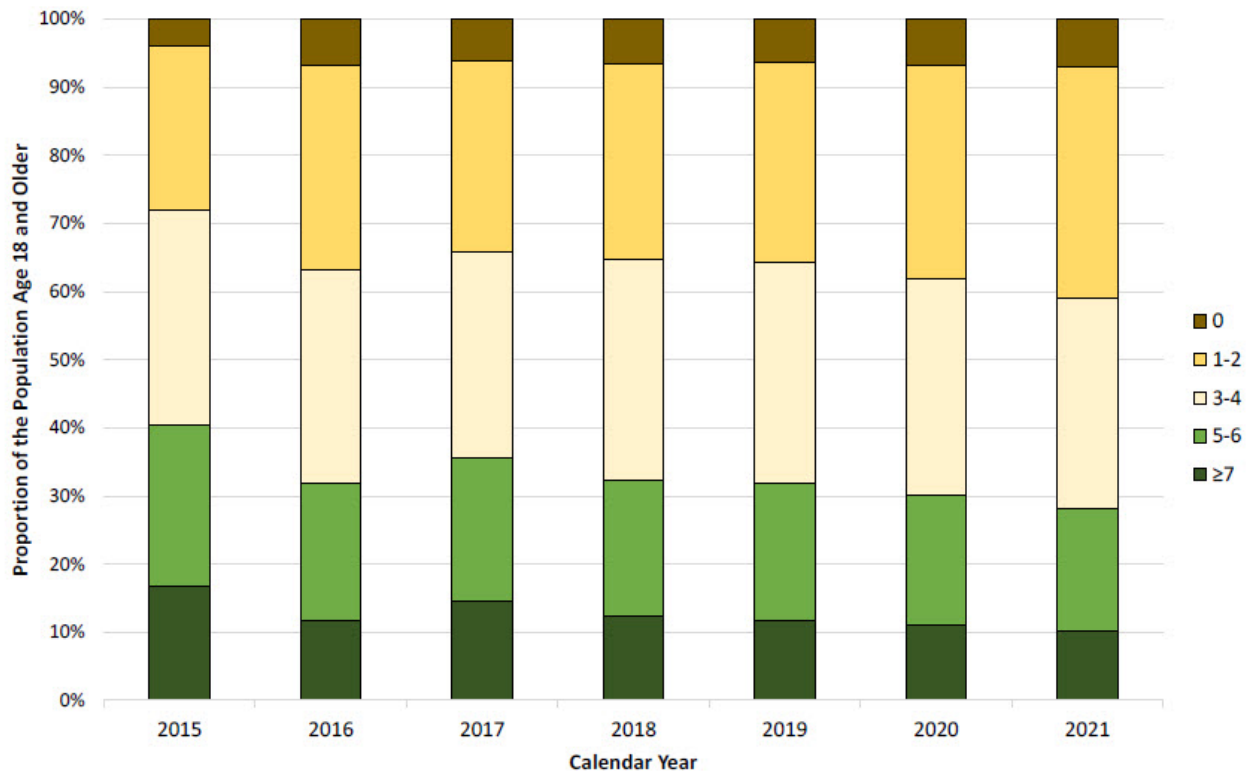
Canada

Based on the available data, the most important change in consumption patterns between 2015 and 2021 appears to be a decrease in the proportion of individuals consuming 7 or more servings of F&V per day and a notable increase in the proportion of individuals consuming just 1 or 2 servings of F&V per day. Across Canada, the proportion of

individuals consuming 7 or more servings of F&V per day decreased from 16.7% in 2015 to 10.3% in 2021. At the same time, the proportion of individuals consuming just 1 or 2 servings of F&V per day increased from 24.1% to 34.1% (Figure 1).

These shifts in F&V consumption patterns between 2015 and 2021 are observed in each of the four regions.

**Figure 1: Trends in Fruit and Vegetable Consumption in Canada**  
Daily Servings by Year  
2015 to 2021

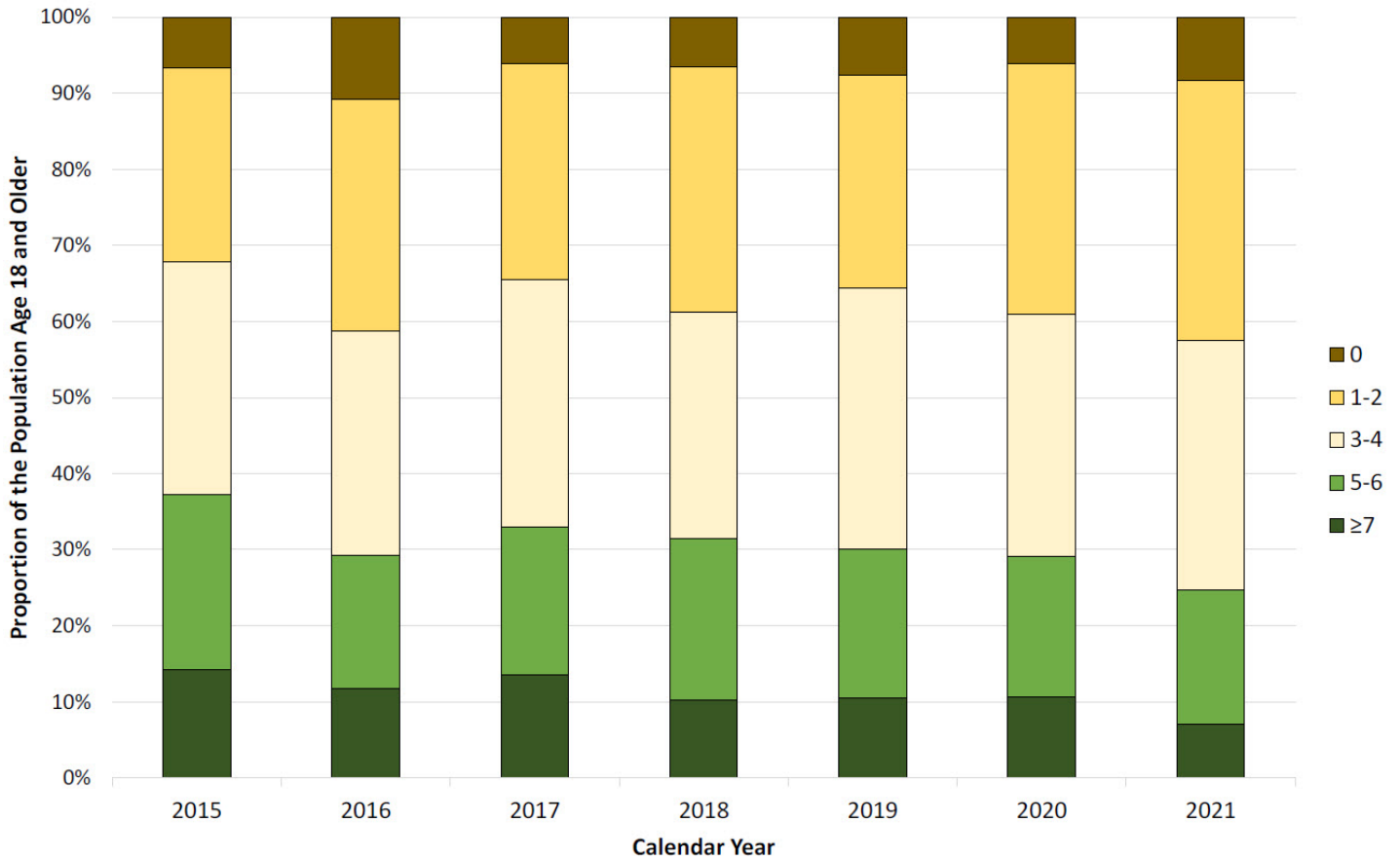


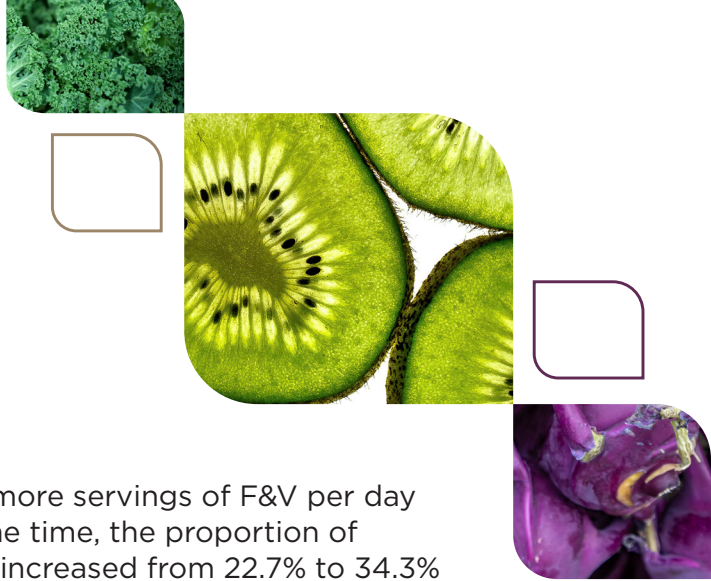


## Maritimes

In the Maritimes, the proportion of individuals consuming 7 or more servings of F&V per day decreased from 14.2% in 2015 to 7.0% in 2021. At the same time, the proportion of individuals consuming just 1 or 2 servings of F&V per day increased from 25.6% to 34.1% (Figure 2).

**Figure 2: Trends in Fruit and Vegetable Consumption in the Maritimes**  
Daily Servings by Year  
2015 to 2021

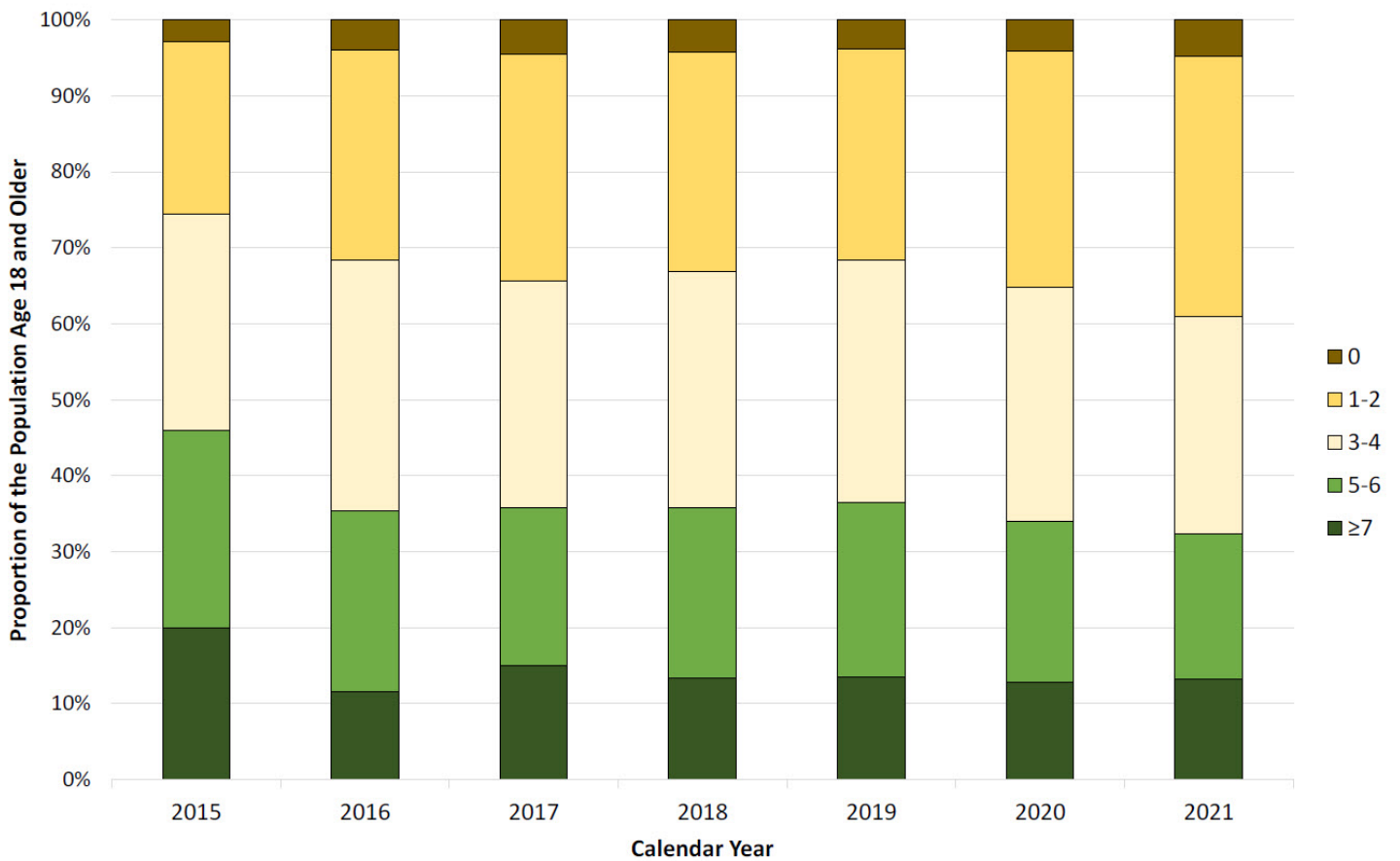




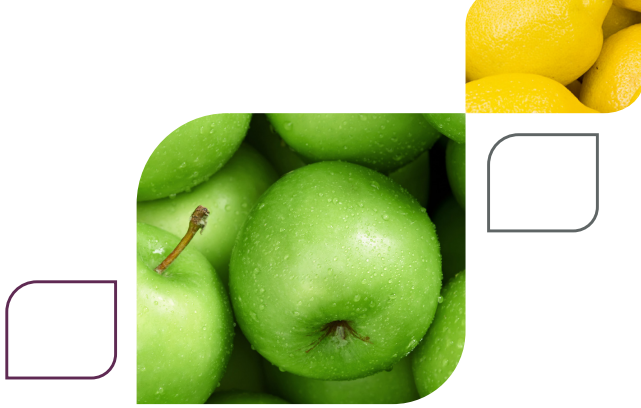
Quebec

In Quebec, the proportion of individuals consuming 7 or more servings of F&V per day decreased from 19.9% in 2015 to 13.2% in 2021. At the same time, the proportion of individuals consuming just 1 or 2 servings of F&V per day increased from 22.7% to 34.3% (Figure 3).

**Figure 3: Trends in Fruit and Vegetable Consumption in Quebec**  
Daily Servings by Year  
2015 to 2021



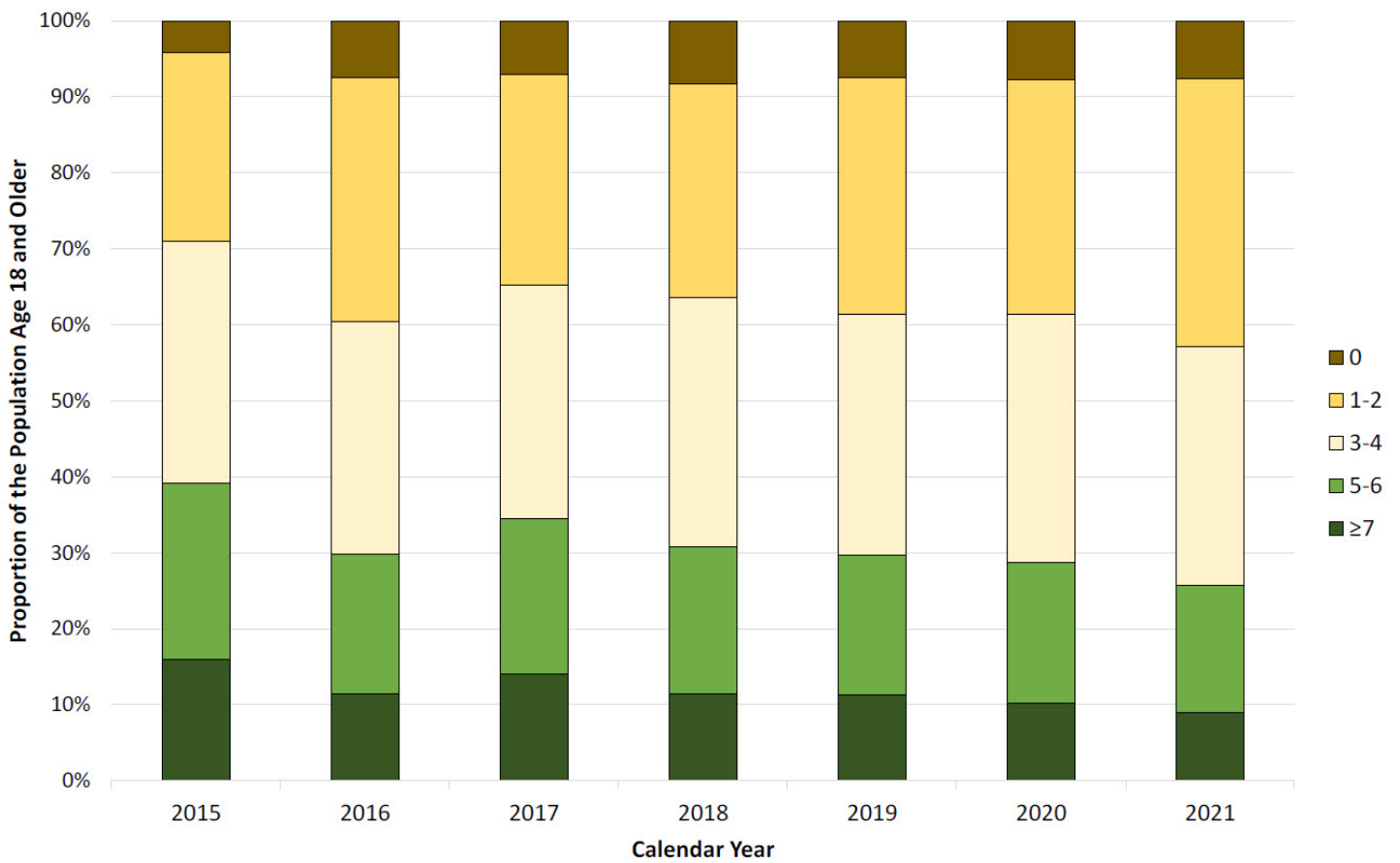




Ontario

In Ontario, the proportion of individuals consuming 7 or more servings of F&V per day decreased from 15.9% in 2015 to 9.0% in 2021. At the same time, the proportion of individuals consuming just 1 or 2 servings of F&V per day increased from 24.9% to 35.3% (Figure 4).

**Figure 4: Trends in Fruit and Vegetable Consumption in Ontario**  
Daily Servings by Year  
2015 to 2021



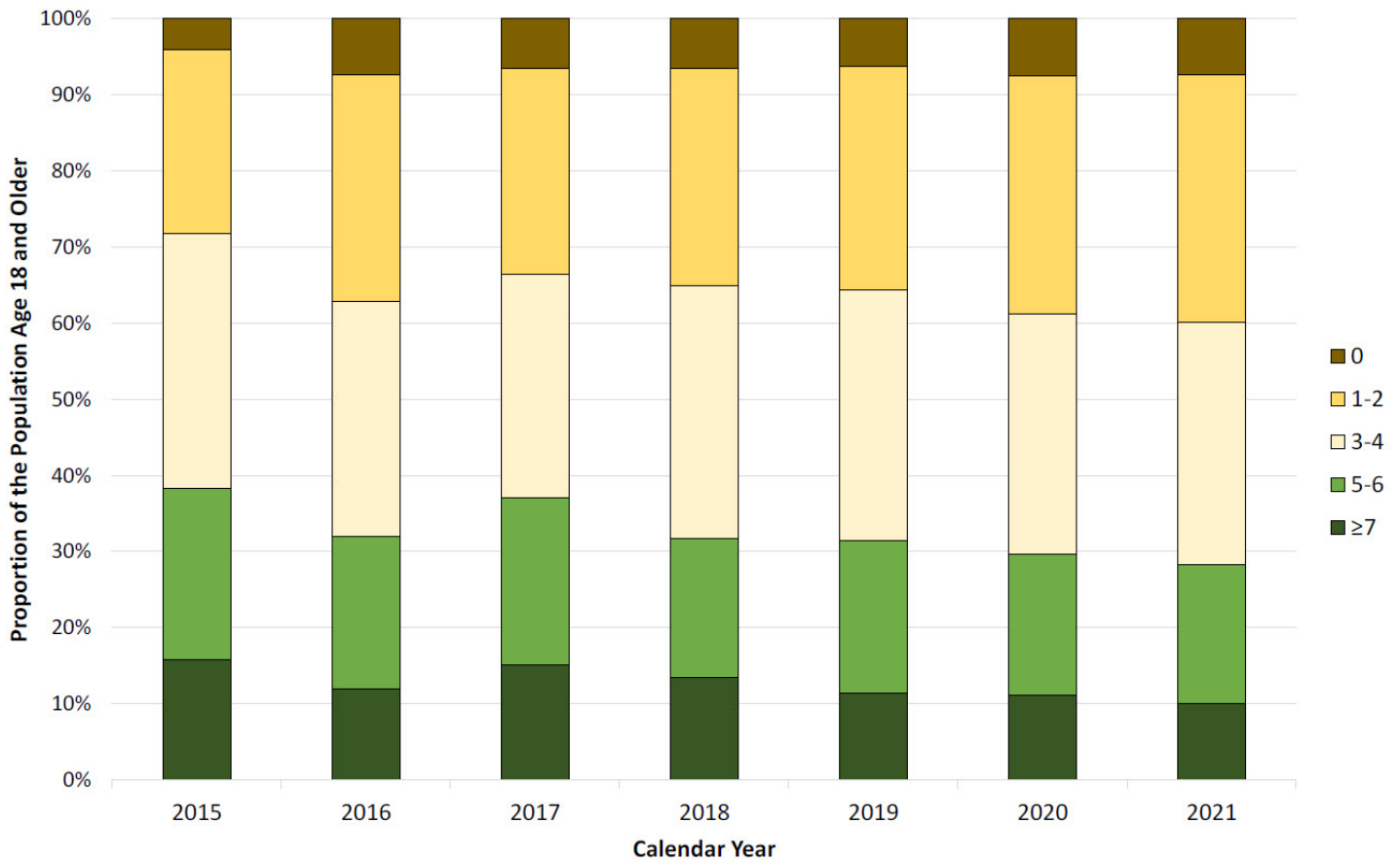
West

In the West, the proportion of individuals consuming 7 or more servings of F&V per day decreased from 15.8% in 2015 to 10.1% in 2021. At the same time, the proportion of individuals consuming just 1 or 2 servings of F&V per day increased from 24.0% to 32.5% (Figure 5).



**Figure 5: Trends in Fruit and Vegetable Consumption in the West**

Daily Servings by Year  
2015 to 2021





### Annual Economic Burden in 2015 and 2021

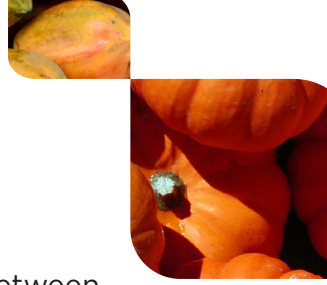
Between 2015 and 2021, the proportion of the Canadian population whose F&V consumption was below recommended levels increased from 83.3% (29.7 million Canadians) to 89.8% (34.4 million Canadians). As noted earlier, this increase is observed in each of the four regions (Table 1).

The annual economic burden attributable to low F&V consumption in Canada increased from \$4.94 billion in 2015 to \$7.95 billion in 2021 (+61.1%). This increase ranges from a low of 41.1% in the Maritimes to a high of 69.7% in Quebec (Table 1). Potential reasons for this increase will be discussed in the next section.

**Table 1: Economic Burden of Low Fruit & Vegetable Consumption**  
Canada and It's Regions

2015 and 2021

Region	2015	2021	Change	% Change
<i>Maritimes</i>				
% Below Recommended Consumption	85.8%	93.0%	7.2%	8.4%
Annual Economic Burden (in \$millions)	\$368	\$519	\$151	41.1%
<i>Quebec</i>				
% Below Recommended Consumption	80.1%	86.8%	6.7%	8.4%
Annual Economic Burden (in \$millions)	\$1,082	\$1,836	\$754	69.7%
<i>Ontario</i>				
% Below Recommended Consumption	84.1%	91%	7.0%	8.3%
Annual Economic Burden (in \$millions)	\$1,735	\$2,911	\$1,175	67.7%
<i>West</i>				
% Below Recommended Consumption	84.2%	89.9%	5.7%	6.7%
Annual Economic Burden (in \$millions)	\$1,752	\$ 2,687	\$934	53.3%
<i>Canada</i>				
% Below Recommended Consumption	83.3%	89.8%	6.5%	7.8%
Annual Economic Burden (in \$millions)	\$4,937	\$7,952	\$3,015	61.1%



## Reasons for the Increase in Annual Economic Burden between 2015 and 2021

The increase in the annual economic burden attributable to low F&V consumption between 2015 and 2021 is largely attributable to three reasons; population growth, inflationary pressures (increasing healthcare costs) and changes in F&V consumption patterns.

Across Canada, the increase in annual economic burden between 2015 and 2021 is estimated at \$3.02 billion, from \$4.94 billion in 2015 to \$7.95 billion in 2021. Of this \$3.02 billion, \$0.54 billion (17.8%) is due to population growth, \$1.46 billion (48.5%) is due to inflation and \$1.02 billion (33.7%) is due to changes in F&V consumption patterns (Figure 6).

These proportions vary by region as follows (Figure 6):

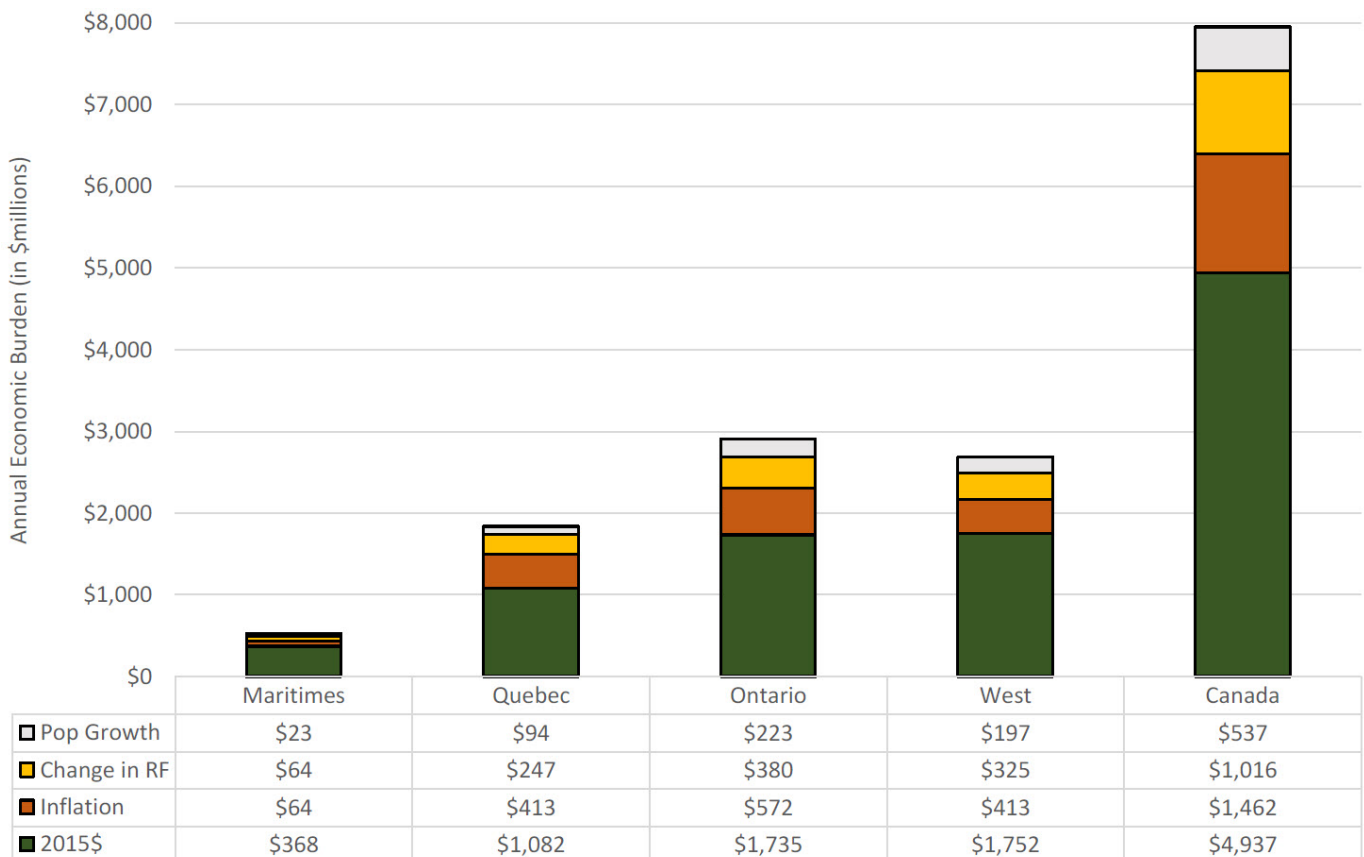
**Maritimes** - population growth (15.3%), inflation (42.4%), changes in F&V consumption patterns (42.2%)


**Quebec** - population growth (12.4%), inflation (54.8%), changes in F&V consumption patterns (32.8%)

**Ontario** - population growth (19.0%), inflation (48.7%), changes in F&V consumption patterns (32.3%)

**West** - population growth (21.0%), inflation (44.2%), changes in F&V consumption patterns (34.8%)

**Figure 6: Change in Annual Economic Burden Attributable to Low Fruit & Vegetable Intake**  
Canada and It's Regions,  
2015 to 2021





The region in which population growth had the highest impact on increasing costs is the West (21% of the total cost increase). Population growth, on the other hand, had the least effect in Quebec (12.4% of the total cost increase). Inflation (increasing healthcare costs), however, had the largest impact in Quebec (54.8% of the total cost increase) and the lowest impact in the Maritimes (42.4% of the total cost increase). Changes in F&V consumption patterns had the largest impact in the Maritimes (42.2% of the total cost increase) and the lowest impact in Ontario (32.3% of the total cost increase) (Figure 6).

# Summary and Limitations

## Summary

Between 2015 and 2021, the proportion of the Canadian population whose F&V consumption was below recommended levels increased from 83.3% (29.7 million Canadians) to 89.8% (34.4 million Canadians), with this increase observed in each of the four regions. During this same time period, the annual economic burden attributable to low F&V consumption in Canada increased from \$4.94 to \$7.95 billion. Population growth was responsible for 17.8% of this increase and inflation (increasing healthcare costs) for a further 48.5%. Most importantly for this current project, changes in F&V consumption patterns were responsible for 33.7%, or just over one billion dollars of this increase.

## Limitations

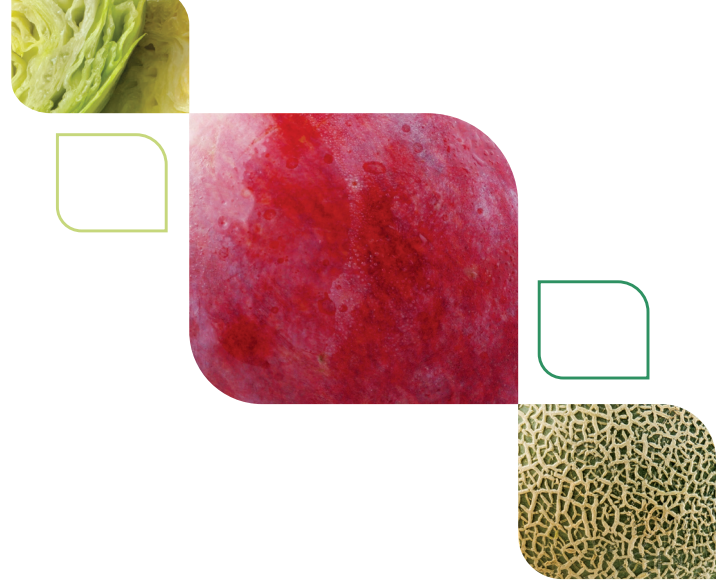
In the 2016 report, we found that 78.4% of Canadians (27.6 million) did not consume the recommended number of daily servings of F&V in 2013 and that this low level of F&V consumption was associated with an annual economic burden of \$4.4 billion in 2013.

There are a number of key reasons why the current analysis is not directly comparable to the previous analysis. As noted earlier, the current analysis relies on data collected in annual CPMA F&V consumption surveys between 2015 and 2021. The previous analysis used Statistics Canada Public Use Microdata File containing detailed Canadian Community Health Survey (CCHS) data on F&V consumption between 2000 and 2013. The CCHS data allowed us to assess F&V consumption by sex and five-year-age group, including F&V consumption in children and adolescents between the ages of 1 and 17. The CPMA F&V consumption surveys are based on the population ages 18 and older. For the current analysis we assumed that F&V consumption in those ages 1-17 would be the same as those ages 18 and older.

In addition, in the previous analysis we had access to sufficient detail to remove the consumption of potatoes from overall F&V consumption. As noted in the 2016 report, we followed the lead of the World Health Organization in using this approach.<sup>5,6</sup>

5 Lock K, Pomerleau J, Causer L et al. The global burden of disease attributable to low consumption of fruit and vegetables: implications for the global strategy on diet. *Bulletin of the World Health Organization*. 2005; 83(2): 100-8.

6 Ezzati M, Lopez AD, Rodgers A et al. *Comparative Quantification of Health Risks - Global and Regional Burden of Disease Attributable to Selected Major Risk Factors*. 2004. World Health Organization. Available at <https://www.who.int/publications/item/9241580313>. Accessed October, 2023.



Although potatoes have a role in a healthy diet, they do not provide the same benefit in terms of preventing chronic disease as other non-starchy vegetables do.<sup>7,8,9</sup> The data available in the CPMA F&V consumption surveys did not allow us to remove the consumption of potatoes from overall F&V consumption.

Despite these differences, it is useful to note that we observed a declining trend between 2007 and 2013 in the proportion of the population consuming the recommended number of

servings of F&V. While the proportions observed in the current analysis are not directly comparable to the previous analysis, for the reasons noted above, it does appear that the declining trend in the proportion of the population consuming the recommended number of servings of F&V between 2015 and 2021 has continued.

7 Marmot M, Atinmo T, Byers T et al. Food, Nutrition, Physical Activity, and the Prevention of Cancer: a Global Perspective. 2007. World Cancer Research Fund International/American Institute for Cancer Research. Available at <http://discovery.ucl.ac.uk/4841/>. Accessed October, 2023.

8 Joshipura KJ, Ascherio A, Manson JE et al. Fruit and vegetable intake in relation to risk of ischemic stroke. *Journal of the American Medical Association*. 1999; 282(13): 1233-9.

9 Hu FB. Plant-based foods and prevention of cardiovascular disease: an overview. *The American Journal of Clinical Nutrition*. 2003; 78(3): 544S-51S.

# Appendix A: Proportion of the Population by Risk Factor Exposure Category

<b>Data for Canada</b>					
<b>F&amp;V Consumption Trends by Age 18+</b>					
<b># of Daily Servings</b>					
<b>Year</b>	<b>0</b>	<b>1-2</b>	<b>3-4</b>	<b>5-6</b>	<b>≥7</b>
2015	3.9%	24.1%	31.4%	23.7%	16.8%
2016	6.7%	30.2%	31.2%	20.2%	11.6%
2017	6.2%	28.1%	30.2%	21.0%	14.6%
2018	6.6%	28.7%	32.3%	19.9%	12.5%
2019	6.2%	29.5%	32.3%	20.1%	11.8%
2020	6.9%	31.2%	31.9%	19.0%	11.1%
2021	6.9%	34.1%	30.9%	17.8%	10.3%

<b>Data for Quebec</b>					
<b>F&amp;V Consumption Trends by Age 18+</b>					
<b># of Daily Servings</b>					
<b>Year</b>	<b>0</b>	<b>1-2</b>	<b>3-4</b>	<b>5-6</b>	<b>≥7</b>
2015	2.9%	22.7%	28.5%	26.0%	19.9%
2016	4.0%	27.6%	33.0%	23.9%	11.5%
2017	4.5%	29.8%	29.9%	20.8%	15.0%
2018	4.2%	28.9%	31.0%	22.4%	13.4%
2019	3.8%	27.8%	31.9%	23.0%	13.5%
2020	4.2%	31.1%	30.7%	21.3%	12.8%
2021	4.9%	34.3%	28.6%	19.1%	13.2%

<b>Data for the Maritimes</b>					
<b>F&amp;V Consumption Trends by Age 18+</b>					
<b># of Daily Servings</b>					
<b>Year</b>	<b>0</b>	<b>1-2</b>	<b>3-4</b>	<b>5-6</b>	<b>≥7</b>
2015	6.6%	25.6%	30.5%	23.0%	14.2%
2016	10.8%	30.5%	29.5%	17.5%	11.7%
2017	6.0%	28.5%	32.5%	19.3%	13.6%
2018	6.6%	32.3%	29.8%	21.1%	10.3%
2019	7.6%	28.0%	34.3%	19.6%	10.5%
2020	6.1%	33.0%	31.9%	18.4%	10.7%
2021	8.4%	34.1%	32.8%	17.7%	7.0%

<b>Data for Ontario</b>					
<b>F&amp;V Consumption Trends by Age 18+</b>					
<b># of Daily Servings</b>					
<b>Year</b>	<b>0</b>	<b>1-2</b>	<b>3-4</b>	<b>5-6</b>	<b>≥7</b>
2015	4.1%	24.9%	31.8%	23.2%	15.9%
2016	7.4%	32.2%	30.6%	18.4%	11.4%
2017	7.1%	27.7%	30.7%	20.5%	14.0%
2018	8.3%	28.1%	32.7%	19.4%	11.4%
2019	7.5%	31.0%	31.8%	18.4%	11.3%
2020	7.8%	30.8%	32.8%	18.4%	10.2%
2021	7.6%	35.3%	31.4%	16.7%	9.0%

<b>Data for the West</b>					
<b>F&amp;V Consumption Trends by Age 18+</b>					
<b># of Daily Servings</b>					
<b>Year</b>	<b>0</b>	<b>1-2</b>	<b>3-4</b>	<b>5-6</b>	<b>≥7</b>
2015	4.1%	24.0%	33.5%	22.6%	15.8%
2016	7.4%	29.7%	30.9%	20.1%	12.0%
2017	6.5%	27.1%	29.4%	22.0%	15.1%
2018	6.5%	28.6%	33.2%	18.3%	13.5%
2019	6.3%	29.3%	32.9%	20.0%	11.4%
2020	7.5%	31.3%	31.5%	18.5%	11.2%
2021	7.4%	32.5%	31.8%	18.3%	10.1%





## Appendix B: Total Population by Region and Year

<b>Total Population</b>					
<b>Year</b>	<b>Maritimes</b>	<b>Quebec</b>	<b>Ontario</b>	<b>West</b>	<b>Canada</b>
2013	2,370,995	8,124,660	13,558,528	11,041,936	35,211,866
2014	2,371,495	8,165,447	13,661,314	11,243,350	35,559,047
2015	2,371,688	8,190,014	13,757,688	11,384,722	35,822,894
2016	2,388,710	8,249,692	13,946,431	11,553,561	36,258,726
2017	2,401,282	8,336,460	14,150,783	11,710,065	36,721,223
2018	2,416,925	8,434,705	14,392,903	11,881,915	37,250,385
2019	2,439,729	8,542,964	14,636,131	12,065,755	37,810,038
2020	2,446,278	8,578,733	14,721,852	12,133,329	38,007,048
2021	2,482,527	8,630,187	14,901,607	12,283,251	38,426,473





## Appendix C: Annual Economic Burden per Individual with the Risk Factor

<b>Economic Burden of Low Fruit &amp; Vegetable Consumption Per Individual with the Risk Factor Canada and It's Regions in 2013</b>					
	Population with RF		Annual \$ per Individual with RF		
	%	#	Direct \$	Indirect \$	Total \$
<b>Maritimes</b>					
1-2 Servings Below Canada's Food Guide	18.36%	435,439	\$21.99	\$45.75	\$67.74
3-4 Servings Below Canada's Food Guide	31.06%	736,738	\$50.49	\$103.91	\$154.39
5-6 Servings Below Canada's Food Guide	29.76%	705,873	\$80.07	\$161.12	\$241.19
7 Servings Below Canada's Food Guide	6.32%	149,941	\$125.66	\$250.97	\$376.63
<b>Total - Below Recommended Consumption</b>	<b>85.49%</b>	<b>2,027,991</b>	<b>\$60.22</b>	<b>\$122.21</b>	<b>\$182.43</b>
<b>Quebec</b>					
1-2 Servings Below Canada's Food Guide	21.71%	1,770,416	\$19.58	\$41.84	\$61.42
3-4 Servings Below Canada's Food Guide	26.26%	2,141,150	\$45.56	\$96.37	\$141.93
5-6 Servings Below Canada's Food Guide	21.09%	1,719,954	\$75.17	\$155.00	\$230.17
7 Servings Below Canada's Food Guide	4.25%	346,476	\$117.29	\$234.82	\$352.11
<b>Total - Below Recommended Consumption</b>	<b>73.31%</b>	<b>5,977,996</b>	<b>\$50.54</b>	<b>\$105.12</b>	<b>\$155.66</b>
<b>Ontario</b>					
1-2 Servings Below Canada's Food Guide	21.47%	2,909,531	\$18.66	\$37.91	\$56.57
3-4 Servings Below Canada's Food Guide	31.41%	4,255,793	\$43.11	\$86.29	\$129.40
5-6 Servings Below Canada's Food Guide	21.81%	2,955,227	\$71.64	\$140.49	\$212.13
7 Servings Below Canada's Food Guide	4.35%	589,956	\$115.45	\$223.85	\$339.30
<b>Total - Below Recommended Consumption</b>	<b>79.04%</b>	<b>10,710,507</b>	<b>\$48.33</b>	<b>\$95.68</b>	<b>\$144.01</b>
<b>West</b>					
1-2 Servings Below Canada's Food Guide	23.23%	2,546,358	\$22.11	\$43.59	\$65.70
3-4 Servings Below Canada's Food Guide	30.06%	3,295,491	\$51.36	\$100.11	\$151.48
5-6 Servings Below Canada's Food Guide	22.31%	2,445,072	\$86.14	\$165.15	\$251.28
7 Servings Below Canada's Food Guide	4.93%	540,910	\$137.44	\$261.09	\$398.53
<b>Total - Below Recommended Consumption</b>	<b>80.54%</b>	<b>8,827,832</b>	<b>\$57.83</b>	<b>\$111.69</b>	<b>\$169.52</b>
<b>Canada</b>					
1-2 Servings Below Canada's Food Guide	21.87%	7,661,745	\$20.21	\$41.15	\$61.36
3-4 Servings Below Canada's Food Guide	29.77%	10,429,172	\$46.74	\$93.97	\$140.72
5-6 Servings Below Canada's Food Guide	22.34%	7,826,126	\$77.71	\$153.24	\$230.95
7 Servings Below Canada's Food Guide	4.64%	1,627,283	\$124.09	\$241.07	\$365.16
<b>Total - Below Recommended Consumption</b>	<b>78.61%</b>	<b>27,544,326</b>	<b>\$52.73</b>	<b>\$104.81</b>	<b>\$157.54</b>

*RF = Risk Factor*



## Appendix D: Increase in Healthcare Costs by Region – 2013 to 2021

<b>Government Health Expenditures (in million \$)</b>										
<b>Year</b>	<b>Maritimes</b>	<b>% Inc</b>	<b>Quebec</b>	<b>% Inc</b>	<b>Ontario</b>	<b>% Inc</b>	<b>West</b>	<b>% Inc</b>	<b>Canada</b>	<b>% Inc</b>
2013	\$7,286		\$20,200		\$37,356		\$32,003		\$96,844	
2014	\$7,426	1.9%	\$20,846	3.2%	\$38,341	2.6%	\$32,957	3.0%	\$99,570	2.8%
2015	\$7,569	1.9%	\$22,454	7.7%	\$38,896	1.4%	\$34,603	5.0%	\$103,521	4.0%
2016	\$7,613	0.6%	\$22,495	0.2%	\$39,610	1.8%	\$35,813	3.5%	\$105,531	1.9%
2017	\$7,837	2.9%	\$23,885	6.2%	\$41,372	4.4%	\$36,718	2.5%	\$109,810	4.1%
2018	\$8,044	2.6%	\$24,594	3.0%	\$43,235	4.5%	\$37,744	2.8%	\$113,618	3.5%
2019	\$8,295	3.1%	\$25,659	4.3%	\$44,610	3.2%	\$39,064	3.5%	\$117,628	3.5%
2020	\$8,347	0.6%	\$24,745	-3.6%	\$45,199	1.3%	\$39,208	0.4%	\$117,499	-0.1%
2021	\$8,636	3.5%	\$28,979	17.1%	\$48,414	7.1%	\$40,881	4.3%	\$126,911	8.0%
Total % Increase 2013 to 2015		3.9%		11.2%		4.1%		8.1%		6.9%
Total % Increase 2013 to 2021		18.5%		43.5%		29.6%		27.7%		22.6%

## Appendix E: Annual Economic Burden in 2015

### Economic Burden of Low Fruit & Vegetable Consumption Canada and It's Regions in 2015

	Population with RF		Annual \$ per Individual with RF			Annual Economic Burden (in \$millions)		
	%	#	Direct \$	Indirect \$	Total \$	Direct \$	Indirect \$	Total \$
<b>Maritimes</b>								
1-2 Servings Below Canada's Food Guide	23.03%	546,152	\$22.84	\$47.52	\$70.37	\$12.5	\$26.0	\$38.4
3-4 Servings Below Canada's Food Guide	30.53%	724,180	\$52.45	\$107.94	\$160.39	\$38.0	\$78.2	\$116.2
5-6 Servings Below Canada's Food Guide	25.57%	606,500	\$83.18	\$167.37	\$250.56	\$50.5	\$101.5	\$152.0
7 Servings Below Canada's Food Guide	6.62%	156,906	\$130.54	\$260.72	\$391.25	\$20.5	\$40.9	\$61.4
<b>Total - Below Recommended Consumption</b>	<b>85.75%</b>	<b>2,033,738</b>	<b>\$59.69</b>	<b>\$121.23</b>	<b>\$180.92</b>	<b>\$121.4</b>	<b>\$246.5</b>	<b>\$367.9</b>
<b>Quebec</b>								
1-2 Servings Below Canada's Food Guide	25.98%	2,127,809	\$21.76	\$46.51	\$68.27	\$46.3	\$99.0	\$145.3
3-4 Servings Below Canada's Food Guide	28.48%	2,332,844	\$50.64	\$107.13	\$157.77	\$118.1	\$249.9	\$368.1
5-6 Servings Below Canada's Food Guide	22.70%	1,858,985	\$83.56	\$172.30	\$255.86	\$155.3	\$320.3	\$475.6
7 Servings Below Canada's Food Guide	2.89%	236,929	\$130.38	\$261.03	\$391.40	\$30.9	\$61.8	\$92.7
<b>Total - Below Recommended Consumption</b>	<b>80.06%</b>	<b>6,556,568</b>	<b>\$53.48</b>	<b>\$111.49</b>	<b>\$164.98</b>	<b>\$350.7</b>	<b>\$731.0</b>	<b>\$1,081.7</b>
<b>Ontario</b>								
1-2 Servings Below Canada's Food Guide	23.24%	3,197,844	\$19.43	\$39.48	\$58.91	\$62.1	\$126.2	\$188.4
3-4 Servings Below Canada's Food Guide	31.82%	4,378,032	\$44.89	\$89.85	\$134.74	\$196.5	\$393.4	\$589.9
5-6 Servings Below Canada's Food Guide	24.87%	3,422,028	\$74.60	\$146.28	\$220.87	\$255.3	\$500.6	\$755.8
7 Servings Below Canada's Food Guide	4.14%	569,479	\$120.21	\$233.08	\$353.29	\$68.5	\$132.7	\$201.2
<b>Total - Below Recommended Consumption</b>	<b>84.08%</b>	<b>11,567,384</b>	<b>\$50.35</b>	<b>\$99.67</b>	<b>\$150.02</b>	<b>\$582.4</b>	<b>\$1,152.9</b>	<b>\$1,735.3</b>
<b>West</b>								
1-2 Servings Below Canada's Food Guide	22.60%	2,573,033	\$23.91	\$47.13	\$71.04	\$61.5	\$121.3	\$182.8
3-4 Servings Below Canada's Food Guide	33.49%	3,812,652	\$55.54	\$108.25	\$163.78	\$211.7	\$412.7	\$624.5
5-6 Servings Below Canada's Food Guide	24.05%	2,737,809	\$93.13	\$178.56	\$271.70	\$255.0	\$488.9	\$743.9
7 Servings Below Canada's Food Guide	4.10%	466,442	\$148.61	\$282.31	\$430.91	\$69.3	\$131.7	\$201.0
<b>Total - Below Recommended Consumption</b>	<b>84.24%</b>	<b>9,589,936</b>	<b>\$62.31</b>	<b>\$120.39</b>	<b>\$182.70</b>	<b>\$597.6</b>	<b>\$1,154.5</b>	<b>\$1,752.1</b>
<b>Canada</b>								
1-2 Servings Below Canada's Food Guide	23.65%	8,444,839	\$21.60	\$44.10	\$65.70	\$182.4	\$372.4	\$554.8
3-4 Servings Below Canada's Food Guide	31.50%	11,247,708	\$50.18	\$100.83	\$151.01	\$564.4	\$1,134.2	\$1,698.6
5-6 Servings Below Canada's Food Guide	24.16%	8,625,323	\$83.02	\$163.62	\$246.63	\$716.0	\$1,411.3	\$2,127.3
7 Servings Below Canada's Food Guide	4.00%	1,429,756	\$132.29	\$256.80	\$389.10	\$189.1	\$367.2	\$556.3
<b>Total - Below Recommended Consumption</b>	<b>83.32%</b>	<b>29,747,625</b>	<b>\$55.53</b>	<b>\$110.43</b>	<b>\$165.96</b>	<b>\$1,652.0</b>	<b>\$3,285.0</b>	<b>\$4,937.0</b>

RF = Risk Factor

## Appendix F: Annual Economic Burden in 2021

<b>Economic Burden of Low Fruit &amp; Vegetable Consumption Canada and It's Regions in 2021</b>								
	Population with RF		Annual \$ per Individual with RF			Annual Economic Burden (in \$millions)		
	%	#	Direct \$	Indirect \$	Total \$	Direct \$	Indirect \$	Total \$
<b>Maritimes</b>								
1-2 Servings Below Canada's Food Guide	17.66%	438,442	\$26.06	\$54.23	\$80.29	\$11.4	\$23.8	\$35.2
3-4 Servings Below Canada's Food Guide	32.82%	814,672	\$59.84	\$123.16	\$183.01	\$48.8	\$100.3	\$149.1
5-6 Servings Below Canada's Food Guide	34.13%	847,259	\$94.91	\$190.97	\$285.89	\$80.4	\$161.8	\$242.2
7 Servings Below Canada's Food Guide	8.35%	207,371	\$148.94	\$297.48	\$446.42	\$30.9	\$61.7	\$92.6
<b>Total - Below Recommended Consumption</b>	<b>92.96%</b>	<b>2,307,743</b>	<b>\$74.31</b>	<b>\$150.63</b>	<b>\$224.93</b>	<b>\$171.5</b>	<b>\$347.6</b>	<b>\$519.1</b>
<b>Quebec</b>								
1-2 Servings Below Canada's Food Guide	19.09%	1,647,664	\$28.08	\$60.02	\$88.11	\$46.3	\$98.9	\$145.2
3-4 Servings Below Canada's Food Guide	28.60%	2,468,059	\$65.36	\$138.26	\$203.62	\$161.3	\$341.2	\$502.5
5-6 Servings Below Canada's Food Guide	34.25%	2,956,171	\$107.84	\$222.37	\$330.21	\$318.8	\$657.4	\$976.2
7 Servings Below Canada's Food Guide	4.86%	419,364	\$168.26	\$336.88	\$505.15	\$70.6	\$141.3	\$211.8
<b>Total - Below Recommended Consumption</b>	<b>86.80%</b>	<b>7,491,259</b>	<b>\$79.69</b>	<b>\$165.36</b>	<b>\$245.05</b>	<b>\$597.0</b>	<b>\$1,238.8</b>	<b>\$1,835.7</b>
<b>Ontario</b>								
1-2 Servings Below Canada's Food Guide	16.74%	2,494,184	\$24.18	\$49.14	\$73.32	\$60.3	\$122.6	\$182.9
3-4 Servings Below Canada's Food Guide	31.41%	4,681,040	\$55.87	\$111.84	\$167.71	\$261.5	\$523.5	\$785.1
5-6 Servings Below Canada's Food Guide	35.32%	5,262,678	\$92.85	\$182.07	\$274.92	\$488.6	\$958.2	\$1,446.8
7 Servings Below Canada's Food Guide	7.57%	1,127,717	\$149.63	\$290.12	\$439.75	\$168.7	\$327.2	\$495.9
<b>Total - Below Recommended Consumption</b>	<b>91.03%</b>	<b>13,565,618</b>	<b>\$72.19</b>	<b>\$142.38</b>	<b>\$214.56</b>	<b>\$979.2</b>	<b>\$1,931.4</b>	<b>\$2,910.7</b>
<b>West</b>								
1-2 Servings Below Canada's Food Guide	18.25%	2,241,713	\$28.24	\$55.68	\$83.92	\$63.3	\$124.8	\$188.1
3-4 Servings Below Canada's Food Guide	31.80%	3,906,325	\$65.61	\$127.89	\$193.50	\$256.3	\$499.6	\$755.9
5-6 Servings Below Canada's Food Guide	32.47%	3,988,402	\$110.03	\$210.96	\$321.00	\$438.9	\$841.4	\$1,280.3
7 Servings Below Canada's Food Guide	7.39%	907,971	\$175.57	\$333.53	\$509.10	\$159.4	\$302.8	\$462.2
<b>Total - Below Recommended Consumption</b>	<b>89.91%</b>	<b>11,044,410</b>	<b>\$83.11</b>	<b>\$160.14</b>	<b>\$243.25</b>	<b>\$917.9</b>	<b>\$1,768.6</b>	<b>\$2,686.5</b>
<b>Canada</b>								
1-2 Servings Below Canada's Food Guide	17.81%	6,822,003	\$26.58	\$54.24	\$80.82	\$181.3	\$370.1	\$551.4
3-4 Servings Below Canada's Food Guide	30.99%	11,870,096	\$61.32	\$123.39	\$184.72	\$727.9	\$1,464.7	\$2,192.6
5-6 Servings Below Canada's Food Guide	34.09%	13,054,509	\$101.63	\$200.60	\$302.23	\$1,326.7	\$2,618.8	\$3,945.5
7 Servings Below Canada's Food Guide	6.95%	2,662,422	\$161.36	\$312.86	\$474.22	\$429.6	\$833.0	\$1,262.6
<b>Total - Below Recommended Consumption</b>	<b>89.85%</b>	<b>34,409,030</b>	<b>\$77.47</b>	<b>\$153.64</b>	<b>\$231.10</b>	<b>\$2,665.6</b>	<b>\$5,286.4</b>	<b>\$7,952.0</b>

RF = Risk Factor

CPMA 



The Economic Burden Attributable to Low Fruit and Vegetable Consumption in Canada