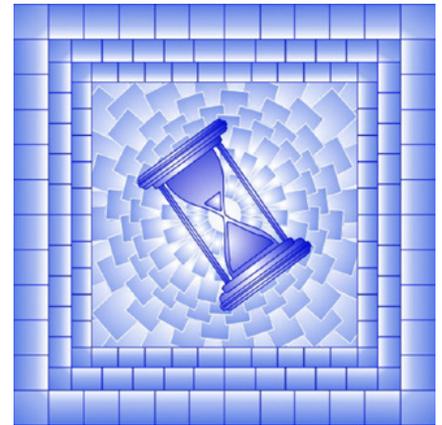


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# Technical Supplement for the April 2020 Consumer Price Index



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# Technical Supplement for the April 2020 Consumer Price Index

## 1. Background

The COVID-19 outbreak, declared a pandemic on March 11, has caused federal, provincial/territorial and municipal governments across Canada to take measures to limit its spread and reduce its impact. By April, all provinces and territories had declared a state of public health emergency and measures were enacted across the country to restrict the movement of people, order the temporary closure of businesses and introduce payment deferral programs to reduce the financial impact on consumers. The collection and compilation of the April 2020 Consumer Price Index (CPI) were impacted by these measures as in-person field collection was conducted remotely, and imputation strategies were required to address an increased number of temporary business closures and out-of-stock products. These strategies were implemented according to international guidelines, and following consultation with other national statistical organizations.

## 2. General approach

The CPI basket quantities<sup>1</sup> reflect the most recent basket weights from the 2017 reference period, and these weights are used to estimate quantities consumed for upper level index aggregation. While some of the expenditure patterns reflected by these weights have been influenced by COVID-19, the basket quantities for the CPI remain those of the 2017 basket for three primary reasons:

- The CPI is a fixed-basket index. Therefore, its quantities do not require adjustment to account for a specific consumption pattern that prevails at some point during the life of a basket;
- There is no clear indication yet of whether there is a long-term impact of COVID-19 on consumer expenditure patterns or whether this impact is transitory in nature;
- There are no current statistical survey data to inform the magnitude of any change in consumption at the level required for CPI calculation.

The overall response rate in the April 2020 reference month, where an observed price was received, was 82.9%, compared with 95.3% in April 2019 (Table 1). Prices normally collected in the field by interviewers were obtained via Internet or phone. Other routine modes of price collection, such as the use of retail scanner data, webscraped data and administrative data, were carried out as usual.

Two main imputation treatments were applied to prices that could not be collected due to the increased number of temporary business closures and out-of-stock products:

1. Where a CPI sub-component was not available for consumption (such as haircuts or motion picture showings), monthly price movements were imputed using a relative from a donor commodity category, with the All-items CPI (excluding these imputed categories) used as a default.
2. Where an outlet was temporarily closed or a product offering had no observable price due to it being out of stock in specific outlets (such as toilet paper or cleaning products), missing prices were imputed with the average price movement of observed prices for that commodity, by region; or, imputed from a neighbouring geography or other specific donor, case depending.

1. The CPI uses the Laspeyres formula, which is consistent with the fixed basket concept. The Laspeyres formula expresses the change in the cost between period 0 and period t of buying a fixed basket of products, by aggregating the prices of the products in the basket using quantities consumed from the price reference period 0 as weights. Statistics Canada. 2019. [Canadian Consumer Price Index Reference Paper](#), section 6.24.

**Table 1**  
**Consumer Price Index product and outlet availability, field, scanner and web scraped data collection modes, April 2020 and April 2019**

	Basket weight at link month	Average rate of out of stock product offerings		Average rate of temporarily closed outlets		Average rate of prices received as scheduled	
		April					
		2020	2019	2020	2019	2020	2019
		percent					
<b>Total</b>	<b>100.00</b>	<b>13.9</b>	<b>4.4</b>	<b>3.2</b>	<b>0.3</b>	<b>82.9</b>	<b>95.3</b>
Food and non-alcoholic beverages	16.48	11.3	1.8	1.3	0.1	87.5	98.1
Shelter	27.36	9.0	2.4	5.2	0.9	85.7	96.7
Household operations, furnishings and equipment	12.80	20.2	6.2	1.9	0.2	77.9	93.6
Clothing and footwear	5.17	15.1	14.1	9.0	0.4	75.9	85.4
Transportation	19.95	1.8	0.9	7.6	1.4	90.6	97.7
Health and personal care	4.79	28.6	3.0	6.4	0.1	65.0	96.9
Recreation, education and reading	10.24	14.8	5.7	5.7	0.5	79.5	93.7
Alcoholic beverages, tobacco products and recreational cannabis	3.21	9.3	1.9	1.1	2.8	89.6	95.3

Source: Consumer Prices program.

## 2.1 Treatment of sub-components with limited or no availability for consumption

In April, a number of products and services in the CPI basket were not available for consumption due to the closure of non-essential businesses. These products and services comprise 4.71% of the CPI basket (Table 2).

For goods and services which were generally unavailable for consumption in April, monthly price movements were imputed from the All-items CPI (excluding imputation targets) from their respective geographic strata. This approach has the effect of removing goods and services not available for consumption from the CPI.<sup>2</sup>

In some cases, it can be assumed that consumers diverted their expenditures in a specific way. For these sub-components, a monthly price movement was imputed using a donor commodity. This approach was used for alcoholic beverages served in licensed establishments, where there is evidence that consumers shifted their alcohol consumption from licensed establishments to their homes. In this case, alcoholic beverages purchased from stores was used as the donor commodity.

A significant number of international flights were suspended in April. Of the five sectors represented in the air transportation index, flights in two sectors (Southern and Asia-Pacific) were determined to be missing due to the low level of flight operations between Canada and these destinations. The monthly price movement in these two sectors was imputed from the movement in the remaining three sectors (Domestic, Trans-border and Trans-Atlantic). In the remaining sectors, suspended flights were excluded from the CPI calculation, mirroring the approach used in February and March.

2. The average where the missing values have been replaced with the average of non-missing values is equal to the average of non-missing values.

**Table 2**  
**Imputation donors for select products and services unavailable, or partially unavailable for consumption in April 2020**

Sub-component	Sub-component basket weight at link month (%)	Imputation donor
<b>Household operations, furnishings and equipment</b>		
Child care services	0.15	All-items
Housekeeping services	0.31	All-items
<b>Transportation</b>		
Air transportation	0.35	Affected sub-components imputed from parent, air transportation
<b>Health and personal care</b>		
Personal care services	0.93	All-items
<b>Recreation</b>		
Recreational services	0.13	All-items
Travel tours	1.21	All-items
Spectator entertainment	0.35	All-items
Use of recreational facilities and services	0.62	All-items
<b>Alcoholic beverages, tobacco products and recreational cannabis</b>		
Beer served in licensed establishments	0.34	Beer purchased from stores
Wine served in licensed establishments	0.13	Wine purchased from stores
Liquor served in licensed establishments	0.19	Liquor purchased from stores

Source: Consumer Prices program.

Special consideration was given to other indices where the availability of services was limited or where demand may have shifted significantly:

- Table service restaurants were closed in April, but most remained open for takeout;
- Dental care services and eye care services were closed for routine care, but open for emergency care;
- Day-care centres and nurseries were largely closed, but were allowed to remain open for regular service in some provinces, and were available on an emergency basis in all provinces;
- Traveller accommodation and taxi service remained available, although physical distancing measures may have significantly reduced demand.

As prices for these services were still available for collection, they represent a valid price movement for the purposes of the CPI. Consequently, no donor imputation was necessary.

## 2.2 Treatment of temporarily closed outlets

As a general principle, prices that were not collected due to temporary outlet closures were effectively excluded from CPI calculation. Where a sufficient number of prices was collected to produce a reliable estimate, price movements were imputed from the average monthly movement of the collected prices within the same commodity class and geographic stratum.

Where the number of collected prices was insufficient<sup>3</sup> to provide a reliable estimate, the price movement was imputed from a donor from the same commodity class in a neighbouring geographic stratum.

Of the eight major components, the clothing and footwear index was the most affected by missing outlets: 11.21% of stores were temporarily closed and equivalent prices for products from these outlets could not be obtained through phone or Internet pricing.

## 2.3 Treatment of out of stock products

Where outlets were open for price collection, but products were out of stock (Table 3) and unavailable for price collection, price movements were primarily imputed from the average movement of collected prices within the commodity class and geographic stratum.

3. Where there were three or fewer prices observed and the rate of missing prices was 60% or higher, or the expected number of prices was fewer than three and no prices were collected, the number of observed prices was determined to be too small to provide a reliable estimate of the price movement.

**Table 3**  
**CPI sub-components with an out-of-stock rate above 30%, April 2020**

Sub-component	Basket weight at link month (%)
Non-prescribed medicines	0.46
Recreational cannabis	0.53
Eye care goods	0.32
Seeds, plants and cut flowers	0.29
Personal soap	0.08
Paper supplies	0.43
Other health care goods	0.16
Other personal care supplies and equipment	0.34
Toiletry items and cosmetics	0.58
Oral-hygiene products	0.10

Source: Consumer Prices program.

Additional consideration was given to products whose prices are generally stable over time, or where the April out-of-stock rate was similar to the out-of-stock rate observed in the past, indicating minimal impact related to COVID-19. Prices for these products were, in some cases, carried forward from the previous month. Subject matter expertise and available market intelligence were used as the basis of determining the appropriate treatment.

## 2.4 Additional considerations

Certain sub-components of the CPI relate to consumer expenditures which may be affected by deferral programs designed to minimize the financial impact of COVID-19 on Canadians, such as rent or mortgage deferral programs. These types of programs are not considered to introduce downward price change with respect to the CPI, and are therefore not included in its calculation for two primary reasons:

- For the majority of goods and services, including rent and mortgage interest cost, the CPI follows the acquisitions approach, meaning that, for a given month, observed prices relate to the transaction cost in the time period in which the legal ownership of a good or service passes to the consumer;<sup>4</sup>
- There are no current data indicating the scope of these programs and it remains unclear how many Canadians may be temporarily paying lower prices as a result.

As of this publication, the economy has begun to reopen, to varying degrees, in some provinces. Additional documentation will be released should any of the treatments outlined above change prior to the release of the May 2020 CPI.

## 3. Conclusion

The COVID-19 pandemic presented a number of challenges to the collection and calculation of the Consumer Price Index in April 2020. The treatments outlined above were implemented to ensure the CPI remains reflective of prices faced by consumers, for the products and services that were available for consumption in April. The CPI remains a robust indicator of price change in Canada.

4. Statistics Canada. 2019. [Canadian Consumer Price Index Reference Paper](#), section 3.27.