

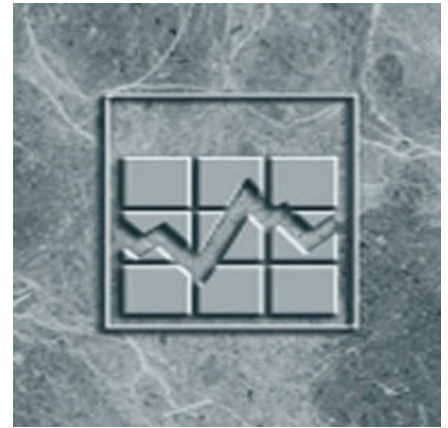
Catalogue no. 75F0002M
ISSN 1707-2840
ISBN 978-0-660-45906-6

Income Research Paper Series

Market Basket Measure Technical Paper: The other necessities component

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Release date: December 8, 2022



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Market Basket Measure Technical Paper: The other necessities component

by **Burton Gustajtis** and **Andrew Heisz**

The Market Basket Measure (MBM) establishes poverty thresholds based on the cost of a basket of food, clothing, shelter, transportation and other necessities for a family of four that reflects a modest, basic standard of living. A family with a disposable income below the appropriate MBM threshold for the size of the family and their region of residence is considered to be living in poverty.

This technical paper describes how the cost for “other necessities” is estimated in the 2018-base MBM. It provides a brief overview of the theory and application of techniques for estimating costs of “other necessities” in poverty lines and deconstructs the 2018-base MBM other necessities component to provide insights on how it is constructed. The aim of this paper is to provide a more detailed understanding of how the other necessities component of the MBM is estimated.

Introduction

The other necessities component estimates costs for goods and services that are not captured under the shelter, clothing, food, and transportation components (e.g., household items, personal care, reading materials, etc.). The methodology for pricing these other goods and services does not utilize the pricing of specific items as the other parts of the MBM. Doing so would be near impossible, as there are a large number of items that would potentially need to be priced, and many of the items would be considered necessities for some families but not for others. Consequently, the other necessities component is meant to approximate average expenditures on a wide range of other necessary goods and services, including those for cellular services.¹

The theory behind estimating the other necessities component

The MBM-2018 methodology uses price and quantity estimates to build costs for the shelter, clothing, food, and transportation components. In order to estimate the total poverty thresholds, the cost of necessary goods and services not covered within those components need to be estimated. There are a large number of goods and services that could be enumerated in the other necessities component. For example, anything from toilet paper to a telephone to a small amount for entertainment or cultural events could be included. In addition, the needs from family-to-family may vary according to a large number of factors. For example, male-only families would likely not need products used primarily by women, while adult-only households would likely not need school supplies for children. Therefore, since the products that could be included in a list of “other items” is so broad, rather than trying to enumerate them all, a more generic approach is used to get the final dollar amount for this component.

The most commonly used approach for estimating the income needed for goods and services, which are not directly enumerated under a poverty line methodology, is to base an amount on the observed Engel² coefficient. The Engel coefficient represents the share of income or expenditures that are committed to food. This approach allows a cost to be estimated for a non-specified list of items, while basing it on a minimum standard (i.e., minimum nutritional requirements) for a major consumption group.

For many poverty lines currently in use, the cost of a nutritious diet is divided by the Engel coefficient to yield the poverty line. For example, in the 1960s, the United States designated their official poverty line based on work by statistician Mollie Orshansky as:

$$Poverty\ Line = \frac{cost\ of\ nutritious\ food\ basket}{Engel\ coefficient}$$

1. For more information on the components of the MBM please see, [Towards an update of the Market Basket](#).

2. Engel's Law states that as income increases, families spend more on food, but at a decreasing rate. Therefore, the share of income spent on food goes down as income goes up. See [UNECE's Guide on Poverty Measurement](#) for more information.

Rearranging the terms yields the following formula:

$$\text{Poverty Line} = \text{cost of nutritious food basket} + \text{cost of nutritious food basket} \times \left(\frac{1}{\text{Engel coefficient}} - 1 \right)$$

Next, replacing the Engel coefficient with:

$$x = \frac{x_f}{x_f + x_o}$$

Where;

x is the ratio of food expenditures to total expenditures

x_f is food expenditures

x_o is non-food expenditures

And rearranging the terms once again yields the following:

$$\text{Poverty Line} = \text{cost of nutritious basket} + \text{cost of nutritious basket} \times \frac{x_o}{x_f} \quad (1)$$

In this manner, the cost of items other than food is obtained with reference to the consumption habits of the reference population using a multiplier $\left(\frac{x_o}{x_f} \right)$ drawn from an appropriate data source, such as an expenditure survey. More specifically, the size of this “other” component equals the cost of the food basket multiplied by the multiplier.

The MBM application of the theory

The MBM uses a similar formula to the traditional Orshansky formula, but with several modifications to incorporate more available data (e.g., new minimum standards).

As a review, the total threshold costs for the MBM are calculated in the following way:

$$\begin{aligned} & \text{MBM Poverty Line} \\ & = \text{cost of nutritious basket} \\ & + \text{cost of adequate clothing} + \text{cost of appropriate shelter} + \text{cost of transportation} \\ & + \text{cost of other necessities} \end{aligned}$$

where;

$$\begin{aligned} \text{Cost of other necessities} & = (\text{cost of nutritious basket} + \text{cost of adequate clothing}) \times \frac{x_{on}}{x_{fc}} \quad (2) \\ & + \text{cell phone service cost} \end{aligned}$$

In the terminology of the MBM, $\left(\frac{x_{on}}{x_{fc}}\right)$ is commonly called the “other multiplier”, and values for x_{on} and x_{fc} come from the Survey of Household Spending (SHS). The SHS is a national survey that gathers expenditure data of Canadians and is explained in more detail in the next section.

The above MBM equation (2) has been modified from the traditional Orshansky formula (1) in the following ways:

1. In addition to directly pricing the food component, the accuracy of pricing for basic needs is improved by directly pricing the clothing, shelter and transportation components.
2. The multiplier is only applied to the food and clothing components' costs, in order to remove the geographical variation that would arise if the shelter and transportation components' costs were also included in the formula.³ Consequently, the x_f in the traditional model is replaced by x_{fc} , and x_o is replaced by x_{on} . The food costs in formula (1) are at the national level, while in formula (2) are at the sub-national level.
3. Within the numerator of the multiplier (x_{on}), the expenditures on food, shelter, transportation, and clothing are removed and it only includes expenditure categories deemed to be necessary for meeting a basic modest lifestyle, thus reducing the size of the multiplier.⁴ This allows the numerator to better reflect the necessary expenditures not explicitly defined elsewhere.
4. The multiplier components (x_{on} and x_{fc}) are defined for families of four in the second decile of income at the Canada level. This permits the estimate of the multiplier to reflect more closely the expenditures of persons at risk of poverty, not those with large incomes nor those in deep poverty.
5. The multiplier does not account for cellular phone services as an “other necessity”.⁵ Therefore, a value is added in for this item.

Evolution over time of the Survey of Household Spending

To fully describe the remaining steps in calculating of the other necessities component, it is important to understand the evolution of the SHS, which is used to estimate the value of the other multiplier. Changes over time to the SHS have precipitated changes in the method for estimating the other necessities multiplier.

The SHS is a national survey that gathers information on the spending habits of Canadians. It looks at how much households pay for food, clothing, shelter, transportation, health care and other items.⁶

From 2000 to 2009, the SHS was an interviewer-based survey where respondents were asked to provide estimates of their annual purchases of items. The expenditure data were then mapped to expenditure categories for different products and services. The SHS used a custom product classification system for its expenditure categories.

For the MBM, up to the 2009 reference year, the other multiplier was estimated using a three-year moving average based on the reference year and the two sequential prior years. The moving average was used to smooth the multiplier value over time, by reducing the variation which mostly came from sampling variability in the SHS survey.

Starting in 2010, the SHS underwent a redesign⁷ which made changes to the questionnaire and introduced a two-week diary. Products and services were now collected with respect to reference periods designed to make it easier for respondents to recall their expenditures more accurately (e.g., last week, month or year). The expenditure categories in the redesigned SHS were also updated to a new custom product classification.⁸ These changes to the concepts, recall periods and mode of collection yielded changes to data collection, processing and estimation methods, which in turn created a break in the expenditure data series.

3. For example, the transportation component uses a weighted average of private and public transportation costs. Therefore, costs differences caused by the availability of different modes of transport would result in unwanted geographical variation had it been included in the formula.

4. For a complete list of expenditure categories found in the numerator (x_{on}) and denominator (x_{fc}), please see Table A.8 in [First Comprehensive Review of the Market Basket Measure of Low Income](#).

5. For more information, please see the *Calculating the other component in the 2018-base* section in this paper.

6. For more information on the Survey of Household Spending, please see [Survey of Household Spending \(SHS\)](#).

7. For more information on the redesign of the Survey of Household Spending and comparability over time, please see [Survey of Household Spending Modelled Annual Statistics, 2010 to 2017](#).

8. For example, from one cycle to another SHS could add or split a product class to better reflect the products in the market. It does not follow any standard product (e.g., NAPCS or COICOP).

At the time, it was recognised that these changes introduced by the redesigned SHS could have an unknown effect on the other multiplier values, and the new values would need to be assessed before being implemented. Furthermore, it was decided that this evaluation would occur during the next comprehensive review. Accordingly, starting in the 2010 reference year, the other multiplier was set to be a weighted average of the 2008 (with a weight of 1/3) and 2009 (with a weight of 2/3) values. The resulting value (0.754) was then held constant and used for the 2010 to 2020 reference year thresholds of the 2008-base MBM. Table 1 shows the history of the annual ratios and multipliers, under the 2008-base MBM methodology.

Table 1
Annual ratios and multipliers used in the other necessities component, 2008-base MBM methodology

Year	annual ratio	multiplier
2010 to 2020	...	0.754
2009	0.783	0.742
2008	0.695	0.741
2007	0.748	0.758
2006	0.780	0.763
2005	0.745	...
2004	0.764	...

... not applicable

Source: Statistics Canada. Survey of Household Spending (SHS), custom tabulation.

Calculating the other necessities component in the 2018-base

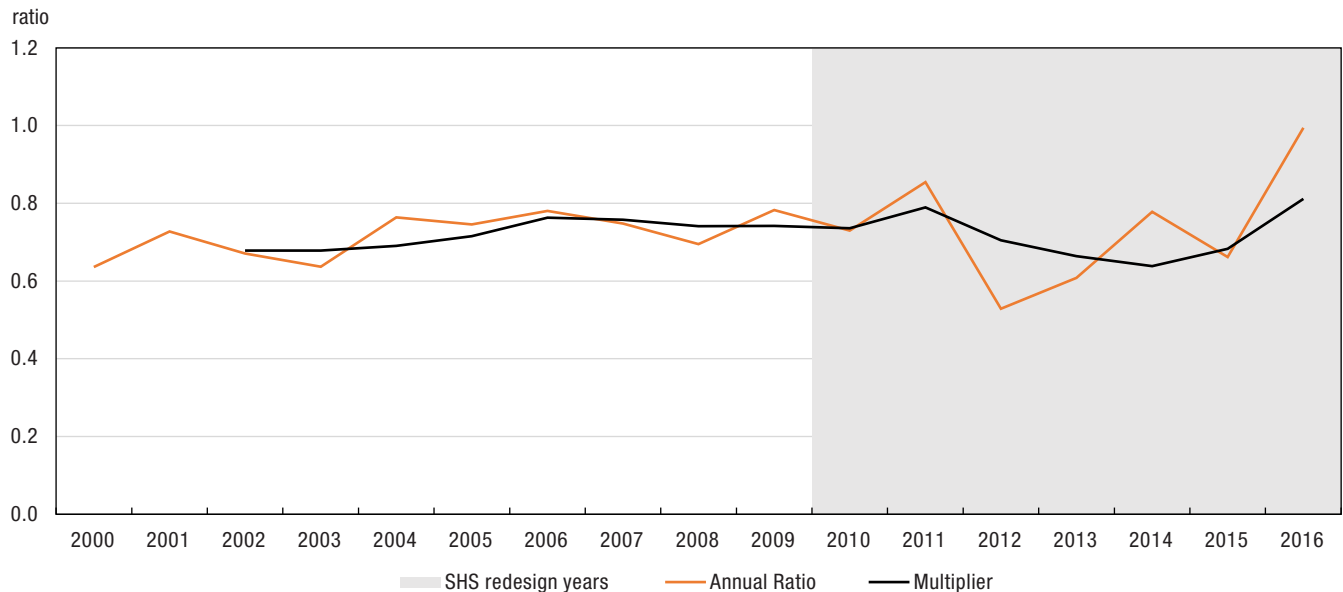
As indicated in the previous section, the other necessities multiplier in the 2008-base MBM was held unchanged from its reference-year 2010 value through to 2020, the last year the 2008-base MBM thresholds were available.

During the “second comprehensive review”⁹ an analysis was conducted to determine whether a conceptually consistent multiplier could be estimated using post-2009 SHS data. The resulting estimates from the SHS had high variability from year-to-year and low precision (i.e., the estimates had a large standard error) as shown in Chart 1. However, while the estimates for the other necessities multiplier varied post-2009, their average was relatively close to the 2010 multiplier value. Therefore, a statistically informed choice was made to estimate the 2018-base MBM’s other necessities component using the original 2010 multiplier value (0.754).¹⁰

9. For more information on the second comprehensive review, please see [Report on the second comprehensive review of the Market Basket Measure](#).

10. During the first comprehensive review, a decision rule was developed to decide what other necessities components should be considered when adding items to the numerator of the other multiplier. However, this decision rule could not be supported by the redesigned SHS, and therefore it was not applied during the second comprehensive review.

Chart 1
Annual ratios and multipliers using SHS and redesign SHS data, Canada, 2000 to 2016



Note: In 2010 SHS was redesigned.
Source: Statistics Canada. Survey of Household Spending (SHS), custom tabulation.

In addition, the 2018-base MBM methodology made two adjustments to the other necessities component, compared to the 2008-base MBM methodology. First, it held the 2018 reference year’s other necessities component’s cost constant and updated it with the annual provincial all-items Consumer Price Index (CPI) to make yearly adjustments.¹¹ Second, cellular phone services expenditures¹² were added to the other necessities component’s costs.¹³ Specifically, pooled data from the SHS for the 2015 to 2017 period was used to create a benchmark estimate of annual spending on cellular services for families in the second income decile. Table 2 shows the amounts added for cell phone costs. A validation exercise was done, using advertised prices, which showed that these annual amounts could purchase modest talk and text plans, and in some provinces it also provided an amount sufficient for some data for families with two-to-three users.

Table 2
Average¹ annual cellphone expenses, by province, 2015-2017 SHS pooled data, 2018 constant dollars

	dollars
Newfoundland and Labrador	774
Prince Edward Island	1,003
Nova Scotia	1,115
New Brunswick	905
Quebec	833
Ontario	1,100
Manitoba	992
Saskatchewan	1,158
Alberta	1,311
British Columbia	1,121

¹ Averages are excluding households that reports a zero amount.
Source: Statistics Canada. Survey of Household Spending (SHS), custom tabulation.

11. In comparison, the 2008-base MBM methodology made yearly adjustments through the annual direct pricing of the food and clothing components, as well as through the changing multiplier value (up to 2009).
 12. At the time of the first comprehensive review (i.e., the 2008-base MBM), cell phones expenditures were not deemed to be a necessity and were not added to the expenditure categories used in the calculation of the multiplier.
 13. Statistics Canada is researching if it is statistically appropriate to define a separate telecommunications component.

Therefore, the value for the other component would be calculated for a family of four for any MBM region in reference year 2018 as follows:

1. Refer to Table 11-10-0066-01¹⁴ and choose an MBM region. Select the current dollar values for the food and clothing components in reference year 2018, multiply the sum of these by 0.754.
2. Adding to this amount the appropriate provincial cell phone expense value from Table 2, which produces the value of other necessities component for the base year (i.e., 2018).¹⁵
3. For other reference years, inflate or deflate this value using the annual provincial all-items CPI.

Deconstructing the other multiplier

To better understand the mechanics of the other necessities multiplier, this section provides a concrete example of how the multiplier was computed using 2009 SHS data and describes the impacts associated with making hypothetical changes to the multiplier's numerator.

The averages used in the multiplier include responses by second income decile families and include zero expenditures for a given category. Therefore, the numbers represent typical expenditure patterns of families in the second income decile. For some expenditure categories (e.g., sports events, performing arts, home security equipment, etc.) these items also tend to be purchased less often by second-decile families, so they make only a small difference to the multiplier and, consequently, the overall MBM threshold.¹⁶

The decision to use the second decile was originally made because, since 1980, the before-tax Low Income Cut-offs rate for the MBM reference family (i.e., four persons) had never exceeded 15% (the 15th percentile being the mid-point of the second income decile).¹⁷

Numerator: Average household expenditures on each of the 47 selected expenditure categories.

Denominator: Average expenditures on food purchased for consumption at home, average expenditures on selected clothing items/services and ½ the average expenditures on food purchased at restaurants and ½ the average expenditures on board paid to private households.

Target population: Four person families in the second decile of income.

Table 3 provides an example, using 2009 SHS expenditures, of the typical amounts spent on the different expenditure categories that make up the numerator and denominator of the other necessities multiplier. The expenditure amounts ranged from \$1 for home security equipment to \$1,171 for personal care items. Therefore, although some items may seem more subjective or nonessential, their impacts on the multiplier and, consequently, the other necessities component costs are marginal. For example, removing expenditures associated with arts and entertainment (e.g., movie theatres, live sports events, live performing arts, and admission to museums and other activities), the numerator would decrease by \$306, which would change the 2009 annual ratio from 0.783 to 0.748. Doing a similar exercise to the 2008 ratio,¹⁸ holding all else constant, the other necessities multiplier currently in use would change from 0.754¹⁹ to 0.720,²⁰ which would result in the 2018-base MBM's other necessities component's annual costs decreasing, on average, about \$470 (4.0%) for reference year 2020 for a family of four. Although seemingly small, these additional amounts are intended to allow for social inclusion.

14. Statistics Canada. [Table 11-10-0066-01: Market Basket Measure \(MBM\) thresholds for the reference family by Market Basket Measure region, component and base year.](#)

15. Allowing for small differences due to rounding.

16. For an example of what an experimental other multiplier would have looked like using 2014 to 2016 redesigned SHS expenditure data, please see Table A.1 in the Appendix.

17. Please see [Constructing the Revised Market Basket Measure](#) for more information.

18. The 2008 annual ratio would change from 0.695 to 0.665.

19. $(0.783 + 0.783 + 0.695) / 3 = 0.754$

20. $(0.748 + 0.748 + 0.665) / 3 = 0.720$

Table 3
Expenditure categories in the numerator and denominator of the MBM other component multiplier and their average expenditures¹ by household², Canada, 2009

	dollars
Numerator	
Expenditure category description	
Purchase of telephones and equipment	33
Telephone services	467
Household cleaning supplies	258
Paper, plastic and foil household supplies	309
Other household supplies	71
Furniture	564
Rugs, mats and underpadding	17
Window coverings and household textiles	100
Room air conditioners, portable humidifiers and dehumidifiers	8
Microwave and convection ovens	12
Small electric food preparation appliances	23
Sewing machines, vacuum cleaners and other rug cleaning equipment	11
Other electric equipment and appliances	20
Attachments and parts for major appliances	6
Lamps and lampshades	57
Non-electric kitchen and cooking equipment	52
Cutlery, flatware and silverware	29
Non-electric cleaning equipment	30
Other household equipment, parts and accessories	74
Maintenance and repairs of furniture and equipment	13
Services related to furnishings and equipment	36
Other medicines and pharmaceutical products	141
Personal care	1,171
Sports and athletic equipment	148
Toys and children's vehicles	140
Electronic games and parts	169
Home entertainment equipment and services	488
Movie theatres	138
Live sports events	19
Live performing arts	29
Admission to museums and other activities	119
Rental of cablevision and satellite services	462
Bicycles, parts and accessories	40
Bicycle maintenance and repairs	4
Membership fees for sports and recreation facilities	149
Children's camps	71
Reading materials and other printed matter	117
Supplies	54
Textbooks	122
Service charges from banks	92
Contributions to charity	275
Postal and other communication services	28
Luggage	55
Home security equipment	1
Photographic goods and services	156
Internet services	340
Computer equipment and supplies	197
Numerator Total³	6,916

Table 3
Expenditure categories in the numerator and denominator of the MBM other component multiplier and their average expenditures¹ by household², Canada, 2009

	dollars
Denominator	
Expenditure category description	
Food purchased from stores	6,161
Women's and Girls' wear - Clothing	714
Women's and Girls' wear - Footwear	204
Women's and Girls' wear - Accessories	64
Men's and Boys' wear - Clothing	597
Men's and Boys' wear - Footwear	175
Men's and Boys' wear - Accessories	35
Children's wear - Clothing and cloth diapers	155
Children's wear - Footwear	21
Laundry and dry-cleaning service	22
Laundromats and self-service dry cleaning	122
Other clothing services	17
Board paid to private households ⁴	51
Food purchased from restaurants ⁴	1,046
Denominator Total³	8,834
Annual Ratio	0.783

1. Current dollars and it includes people that didn't report an expenditure.

2. Households are restricted to those with two adults and two children less than 18 years of age in the second decile of income.

3. Please note individual category expenditure values may not add up to the total due to rounding.

4. Only 50% of this expenditure value is used.

Source: Statistics Canada. Survey of Household Spending (SHS), custom tabulation.

Conclusion

This technical paper describes how the cost for “other necessities” is estimated in the 2018-base MBM. It provides a brief overview of the theory and application of techniques for estimating costs of “other necessities” in poverty lines and deconstructs the 2018-base MBM other necessities component to provide insights on how it is constructed. The paper is intended for use by persons interested in the details of how the other necessities component is estimated. Persons interested in contacting Statistics Canada on the topic of the MBM are encouraged to do so by sending an email to:

statcan.market.basket.measure-mesure.du.panier.de.consommation.statcan@statcan.gc.ca.

Appendix

Table A.1
Expenditure categories in the numerator and denominator of an experimental MBM other component multiplier and their average expenditures¹ by household², Canada, 2014 to 2016

	2014	2015	2016
	dollars		
Numerator			
Expenditure category description			
Telephones and equipment	66	87	200
Landline telephone services	379	391	306
Household cleaning supplies and equipment	149	191	259
Paper, plastic and foil supplies	262	285	396
Other household supplies	200	46	161
Furniture	854	375	591
Rugs, mats and underpadding	22	8	25
Curtains and interior blinds	0	1	0
Linens	5	40	4
All other household furnishings	6	44	0
Room air conditioners, portable humidifiers and dehumidifiers	58	18	9
Microwave ovens	10	11	12
Other electric equipment and appliances (including parts and attachments)	339	59	1,283
Lamps and lampshades	1	0	0
Non-electric kitchen and cooking equipment	29	139	113
Other household equipment, parts and accessories	58	147	797
Maintenance and repairs of household furnishings and equipment	0	0	0
Services related to household furnishings and equipment	66	130	88
Non-prescribed medicines and pharmaceutical products	137	465	590
Personal care	1,231	1,010	1,857
Sports, athletic and recreation equipment	268	8	0
Children's toys	352	54	1,178
Video game systems and accessories (excluding for computers)	125	25	0
Home entertainment equipment and services	443	167	151
Movie theatres	201	38	75
Live sporting events	236	0	2
Live performing arts events	1,058	0	0
Admission fees to museums, zoos and other sites	22	84	126
Television and satellite radio services (including installation, service and pay TV charges)	586	566	487
Bicycles, parts and accessories	67	27	80
Bicycle maintenance and repairs	0	0	0
Dues and fees for sports and recreation facilities	208	297	346
Children's camps	140	207	103
Reading materials and other printed matter	73	99	203
School supplies	60	62	4
Textbooks	53	39	121
Service charges for banks and other financial institutions	224	268	154
Charitable contributions	245	287	475
Postal, courier and other communication services	57	2	105
Photographic goods and services	94	92	114
Internet access services	629	597	699
Computer equipment and supplies	427	225	372
Numerator Total³	9,439	6,593	11,488

Table A.1
Expenditure categories in the numerator and denominator of an experimental MBM other component multiplier and their average expenditures¹ by household², Canada, 2014 to 2016

	2014	2015	2016
	dollars		
Denominator			
Expenditure category description			
Food purchased from stores	7,800	6,013	6,542
Clothing (women and girls)	1,234	938	1,657
Footwear (women and girls)	381	313	439
Accessories (women and girls)	131	95	196
Clothing (men and boys)	769	650	1,074
Footwear (men and boys)	333	324	349
Accessories (men and boys)	55	16	82
Clothing and cloth diapers	289	226	173
Footwear (children)	76	20	82
Laundry and dry-cleaning services	41	23	12
Laundromats and self-service dry cleaning	66	14	66
Clothing rental, tailoring, alteration services and other clothing services	0	34	0
Child care offered in private households ⁴	32	447	114
Food purchased from restaurants ⁴	1,872	2,136	1,656
Denominator Total³	12,127	9,959	11,556
Annual Ratio	0.778	0.662	0.994
Other necessities multiplier	0.811

... not applicable

1. Current dollars and it includes people that didn't report an expenditure.

2. Households are restricted to those with two adults and two children less than 18 years of age in the second decile of income.

3. Please note individual category expenditure values may not add up to the total due to rounding.

4. Only 50% of this expenditure value is used.

Source: Statistics Canada. Survey of Household Spending (SHS), custom tabulation.

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