



Region of Waterloo  
PUBLIC HEALTH

A horizontal strip of four diverse children's faces, including a girl and three boys of various ethnicities, smiling and looking forward.

# Child Health Report Series

## Nutrition, Physical Activity and Health Outcomes

Technical Data Summary

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## Table of Contents

List of Tables .....	4
List of Figures .....	5
1.0 Technical Summary .....	6
2.0 Data Sources, Notes, and Limitations.....	7
2.1 Analysis Software.....	7
2.2 Data Sources .....	7
3.0 Indicators .....	10
3.1 Healthy Eating in Young Children .....	10
3.2 Healthy Eating in Adolescents .....	12
3.3 Leisure-time Physical Activity.....	16
3.4 Sedentary Activity (Screen Time).....	19
3.5 Chronic Diseases .....	21
3.6 Healthy Weights in Children.....	22
3.7 Healthy Weights in Adolescents (12-17 years) .....	23
3.8 Healthy Weights in Young Adults (18-19 years).....	24
References .....	26

## List of Tables

Table 1: Proportion of individuals aged 12 to 17 years by body mass index (BMI) category, Waterloo Region & Ontario, 2007/2008, 2009/2010, and 2011/2012 .....	23
Table 2: Proportion of individuals aged 18 to 19 years by body mass index (BMI) category, Waterloo Region & Ontario, 2007-2012 (combined).....	25

## List of Figures

Figure 1: Proportion of senior kindergarten students by child nutrition score category, Waterloo Region, 2010 .....	10
Figure 2: Proportion of senior kindergarten students who ate meals (breakfast, lunch, or dinner) with their family always, most of the time, sometimes, and never, Waterloo Region, 2010.....	11
Figure 3: Proportion of senior kindergarten students who ate breakfast always, most of the time, sometimes, and never, Waterloo Region, 2010 .....	12
Figure 4: Proportion of population aged 12 to 17 years who reported consuming vegetables and fruits five or more times per day, Waterloo Region and Ontario, 2007/2008, 2009/2010, and 2011/2012.....	13
Figure 5: Proportion of food insecure (moderate and severe) households by degree of food security, Waterloo Region and Ontario, 2007/2008, 2009/2010, and 2011/2012 .....	14
Figure 6: Proportion food insecure (moderate and severe) households with children under 18 years, household income, and overall, Waterloo Region and Ontario, 2007-2012 (combined)	15
Figure 7: Proportion of adolescents aged 11 to 18 years, by Healthy Eating Index (HEI) category, Waterloo Region, 2009 .....	16
Figure 8: Proportion of population aged 12 to 17 years, by leisure time physical activity category, Waterloo Region and Ontario, 2007/2008, 2009/2010, and 2011/2012.....	18
Figure 9: Proportion of the population aged 12 to 17 years who frequently used or viewed a screen during their leisure time, by type of sedentary activity, Waterloo Region & Ontario, 2007/2008 and 2011/2012.....	20
Figure 10: Proportion of individuals aged 12 to 17 years and older with one or more selected chronic diseases or conditions, Ontario, 2007/2008, 2009/2010, and 2011/2012 .....	21
Figure 11: Proportion of senior kindergarten students by body mass index (BMI) category and sex, Waterloo Region, 2010 .....	22
Figure 12: Figure 13. Proportion of individuals aged 12 to 17 years who had neither overweight nor obese body mass index (BMI), by municipality, Waterloo Region, 2007-2012 (combined)	24

## 1.0 Technical Summary

Local public health units in Ontario are mandated to work on reducing the burden of preventable diseases of public health importance, including chronic disease.

One of the ways Region of Waterloo Public Health (ROWPH) fulfills this mandate is through regular population health status assessment and surveillance. By measuring, monitoring, and reporting on the status of a population's health, particularly for priority populations, public health programs and services can be tailored to meet local needs and then evaluated for their health impact.

This technical data summary is one chapter in a series of brief health status reports that examine a specific sub-population of interest: children. The Nutrition, Physical Activity and Health Outcomes technical data summary provides information on indicators related to nutrition, physical activity and healthy weights among children and youth in Waterloo Region.

The technical data summaries are intended for audiences interested in knowing more about the data and evidence presented. To compliment this technical summary, an accompanying public product is available that highlights key findings and provides information on activities undertaken by Region of Waterloo Public Health in response to trends identified in this report. The accompanying public product is available at: [Region of Waterloo Public Health Website](#).

## **2.0 Data Sources, Notes, and Limitations**

### **2.1 Analysis Software**

Data analysis and visualization for this report were completed using SAS version 9.3 and Microsoft Excel 2010.

### **2.2 Data Sources**

#### **Canadian Community Health Survey (CCHS)**

Data on presence of vegetable and fruit consumption, body mass index (BMI), leisure time physical activity, screen time (sedentary activity), food insecurity, and chronic disease prevalence were obtained from the Canadian Community Health Survey (CCHS).

The CCHS is a national, largely telephone-based survey conducted by Statistics Canada that provides estimates of health determinants, health status and health system utilization at the national, provincial, regional, and health unit levels. The survey is conducted over a two-year, repeating cycle.

The CCHS target population includes household residents 12 years and older in all provinces and territories, and excludes those living on Indian Reserves, Canadian Forces Bases, institutions, some remote areas, and individuals or households without a telephone. CCHS data are self-reported and may be subject to recall bias and social desirability bias, which may result in an under or overestimate of the true prevalence in the population. Proxy responses were also excluded from analysis.

'Don't know', refused and not stated responses were removed from analysis when they represented less than five per cent of the sample. In removing these responses from the denominator, the assumption is that the missing values are random, which is not always the case.

The 'Townships' category combines responses from North Dumfries, Wellesley, Wilmot, and Woolwich townships. Estimates provided at the municipal level may not be representative of the given population as the CCHS sampling frame was not designed for analysis below the health region level.

Statistical significance is denoted using non-overlapping 95 per cent confidence intervals (CI). The terms 'significant' or 'significance' indicate a statistically significant difference. The superscript 'E' denotes high sampling variability, and estimates must be interpreted with caution. The 'F' denotes estimates which were suppressed due to unacceptably high sampling variability.

Statistics Canada's calibration of the household weights was done at the provincial level so analyses of household variables at the health unit level, as was done with the food insecurity

indicator, should be used with caution as calculations at the provincial level will produce more reliable results.

For BMI calculations, adolescents aged 12 to 17 years were categorized based on the Cole method, while adults aged 18 and older were categorized using the adult BMI classification method.

For Waterloo Region and Ontario analyses, data from CCHS cycle 4.1 (2007/2008), cycle 5.1 (2009/2010), and cycle 6.1 (2011/2012) were analyzed using SAS™ and the Statistics Canada bootstrap method (BOOTVAR program version 3.2).

### **Kindergarten Parents Survey (KPS)**

The Kindergarten Parent Survey (KPS) was a voluntary survey to be completed by the parents of children who have a completed Early Development Instrument (EDI) and attended senior kindergarten (SK) in the public, Catholic, French public and French Catholic school boards in Waterloo Region in 2010.

The survey consists of an eight page questionnaire about the influences on children's developmental health at the time of school entry. The KPS's topic areas include: child health and development, child care, children's experiences before kindergarten, regular activities, services and programs accessed, kindergarten experiences, family and neighbourhood characteristics, and demographics.

Although the response rate for the 2010 KPS was approximately 58 per cent, caution should be taken when generalizing the results to Waterloo Region as the sample may not be representative of the general population. The representativeness of the parent population captured in the survey as compared to the complete parent population within the region suggests a skewed participation rate. The KPS was more often completed by parents self-identifying with higher levels of education and income compared to the region as a whole.

### **Nutrition, Environment in Waterloo Region, Physical Activity, Transportation and Health (NEWPATH)**

The NEWPATH research project was collaborative research project conducted in 2009 between ROWPH and the universities of British Columbia, Alberta and Waterloo. It was funded by the Canadian Institutes for Health Research, the Region of Waterloo, and Bombardier (via funding allocated to the Chair in Sustainable Transportation Systems at the University of British Columbia).

The project was designed to capture a snapshot of the built environment of Cambridge, Kitchener and Waterloo to allow for a complete and rigorous assessment of the built environment in Waterloo Region and its impact on travel patterns, physical activity rates, dietary consumption patterns and health.

NEWPATH collected data to measure the quality of the built environment and walkability, assess the relative quality of the food environment, and the travel patterns, physical activity rates, and dietary consumption patterns of local residents (4,902 people or 2,228 households) through an extensive survey about their family's demographic characteristics, normal physical activity patterns, walking rates, preferred features of the neighborhood, and motivations for shopping at different types of food stores. Residents also completed a two-day travel diary and some had their physical activity measured directly via accelerometers.

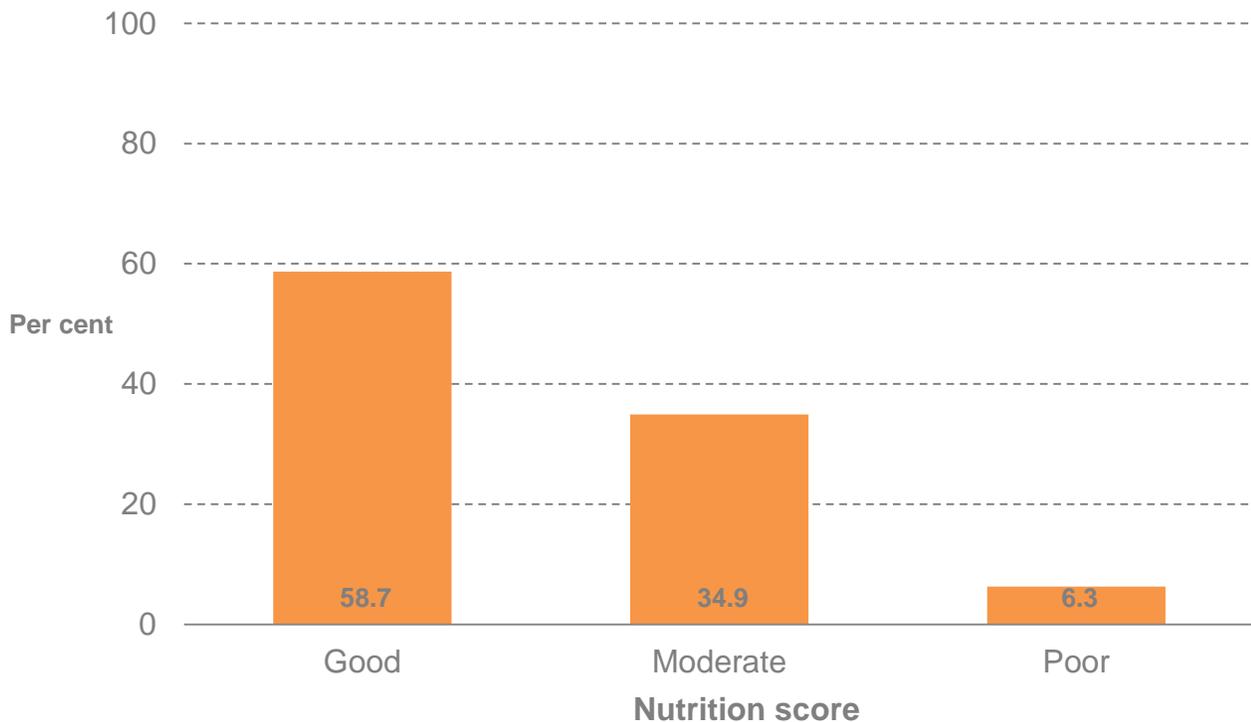
Key indicators derived from the NEWPATH data included a walkability index and food environment measures.

### 3.0 Indicators

#### 3.1 Healthy Eating in Young Children

The Kindergarten Parent Survey (KPS) was completed by parents of children attending senior kindergarten in Waterloo Region schools in 2010. According to the KPS results, almost fifty-nine per cent of children had good nutritional intake, thirty-five per cent had a moderate nutrition score, and six per cent had poor nutritional intake (Figure 1) (1). This nutrition intake, or Child Nutrition Score, is calculated by summing the breakfast, fruit/vegetable, and dairy intake for each child. Scores ranged from three to nine. Children who ate breakfast, as well as the recommended servings of vegetables/fruit and dairy every day received a score of three, while children who met requirements only some to none of the time received a score of nine. Scores of three or four were considered to be “good” nutrition, scores of five or six were “moderate” nutrition and scores above seven were considered to be “poor” nutrition.

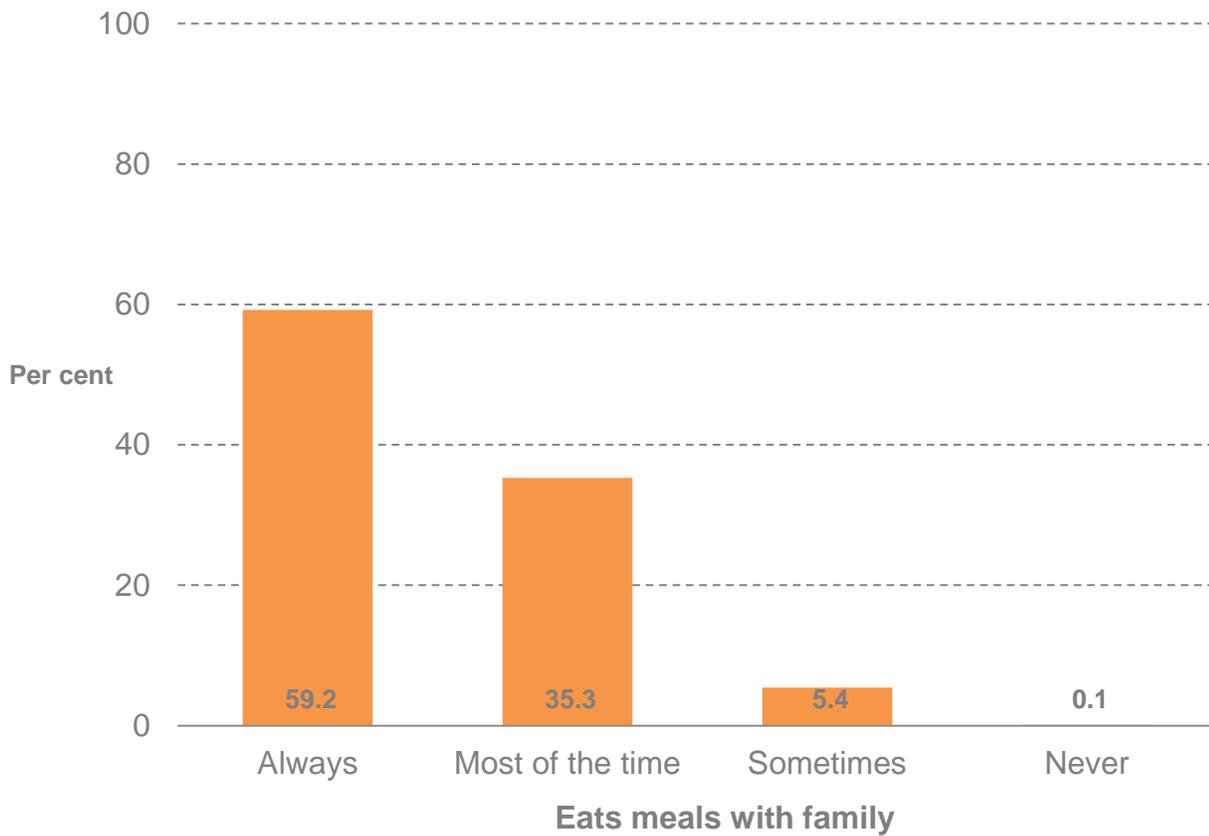
**Figure 1: Proportion of senior kindergarten students by child nutrition score category, Waterloo Region, 2010**



Source: Romagnoli, A. (2012). A Community Fit for Children. YMCA Ontario Early Years Centre. Waterloo ON.

In 2010, almost sixty per cent of senior kindergarten children in Waterloo Region ate meals (breakfast, lunch or dinner) with their family all of the time, while another thirty-five per cent ate meals with their family most of the time. About five per cent of children ate meals with their family some of the time (Figure 2) (1).

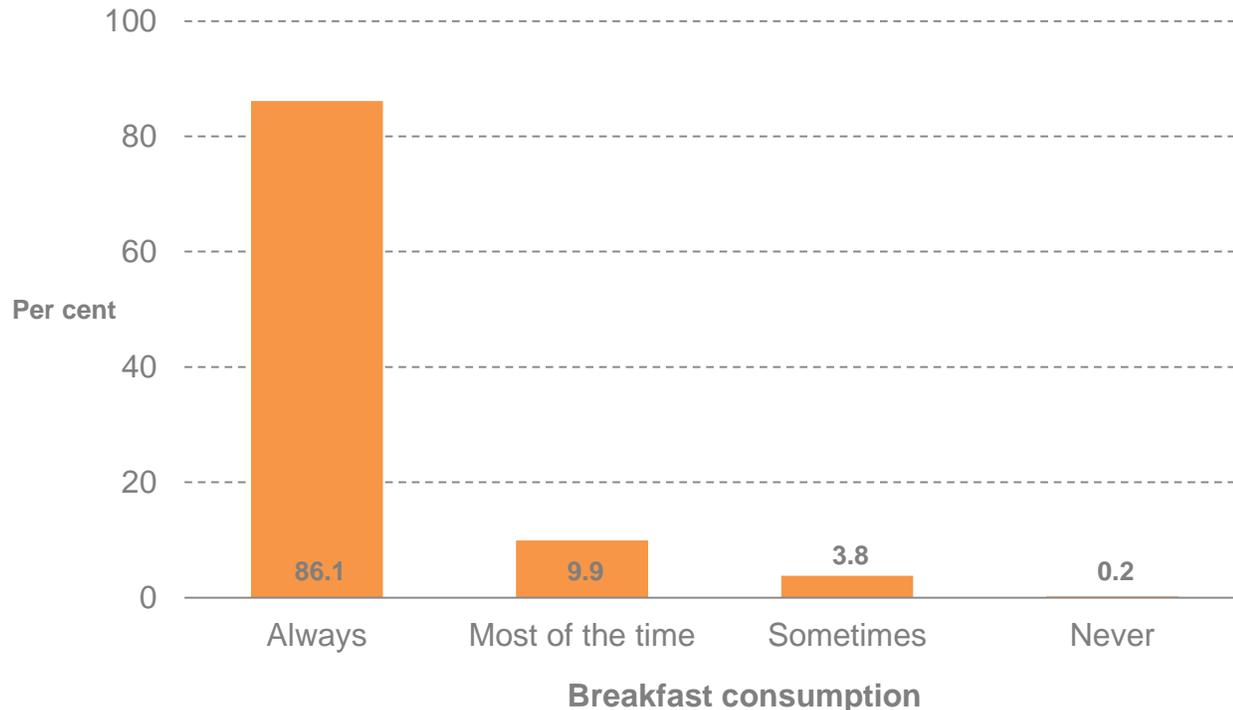
**Figure 2: Proportion of senior kindergarten students who ate meals (breakfast, lunch, or dinner) with their family always, most of the time, sometimes, and never, Waterloo Region, 2010**



Source: Romagnoli, A. (2012). A Community Fit for Children. YMCA Ontario Early Years Centre. Waterloo ON.

Locally, 86.1 per cent of senior kindergarten children ate breakfast every day, while 9.9 per cent ate breakfast most of the time. Almost four per cent of senior kindergarten children in Waterloo Region ate breakfast only some of the time (Figure 3) (1).

**Figure 3: Proportion of senior kindergarten students who ate breakfast always, most of the time, sometimes, and never, Waterloo Region, 2010**



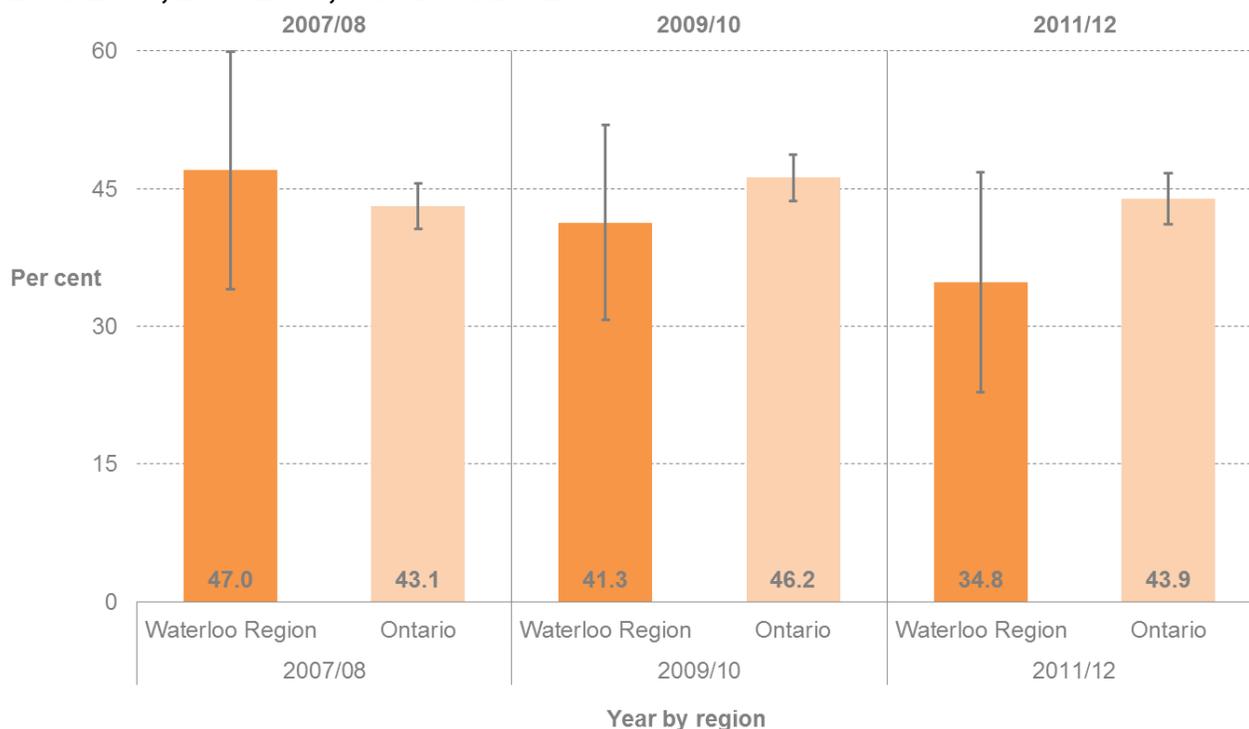
Source: Romagnoli, A. (2012). A Community Fit for Children. YMCA Ontario Early Years Centre. Waterloo ON.

### 3.2 Healthy Eating in Adolescents

The eating habits of adolescents were assessed using a variety of measures, including frequency of vegetable and fruit intake, household food insecurity, and the Healthy Eating Index (HEI) which assess adequacy of diet based on dietary recommendations from Canada's Food Guide. All of these indicators have limitations and serve only as a proxy measure of healthy eating among children and youth. For example, the frequency of vegetable and fruit intake does not account for serving sizes and total energy intakes. Another limitation in the use of vegetables and fruit as a measure of diet quality in children and adolescents is that a substantial proportion of the servings tend to come from juice instead of whole fruit or vegetables (2).

Daily vegetable and fruit consumption among youth aged 12 to 17 years is shown below for Waterloo Region and Ontario from 2007/2008 to 2011/2012 (Figure 4).

**Figure 4: Proportion of population aged 12 to 17 years who reported consuming vegetables and fruits five or more times per day, Waterloo Region and Ontario, 2007/2008, 2009/2010, and 2011/2012**



I = 95 per cent confidence interval.

Source: Canadian Community Health Survey (CCHS), 2007/2008, 2009/2010, 2011/2012 Statistics Canada, Share File, Ontario MOHLTC.

In 2011/2012, only a third of adolescents in Waterloo Region consumed vegetables and fruits five or more times per day, which was similar to the provincial proportion (Figure 4). The proportion of adolescents consuming vegetables and fruits five or more times per day has decreased over time in Waterloo Region, but the decrease was not statistically significant.

In 2011/2012, vegetable and fruit consumption in Waterloo Region's youth did not vary significantly by sex, municipality, or household income level; insufficient data did not permit for a comparison by immigration status (data not shown).

It is important to note that frequency of vegetable and fruit consumption is only an estimate for number of servings. Health Canada currently recommends between four to ten servings of vegetables and fruit every day, depending on age and sex.

Another indicator of healthy eating is food security, often reported as food insecurity. Household food insecurity attempts to measure the quality and quantity of food consumed. Households with food insecurity, particularly over the long-term, are less likely to meet daily nutrient intake guidelines. To derive the food insecurity of a household, a household member is

asked a series of 18 questions, ranging from worrying about running out of food, to children not eating for a whole day. These questions are then used to measure whether household members were able to afford the food they needed in the previous 12 months. Ten of the 18 questions are specific to the experiences of adults or the household in general, while eight are specific to the experiences of children in the household. Responses do not account for dieting or fasting for other reasons not related to food insecurity.

The proportion of households with children under the age of 18 that reported food insecurity is shown in Figure 5 for Waterloo Region and Ontario from 2007/2008 to 2011/2012.

**Figure 5: Proportion of food insecure (moderate and severe) households by degree of food security, Waterloo Region and Ontario, 2007/2008, 2009/2010, and 2011/2012**



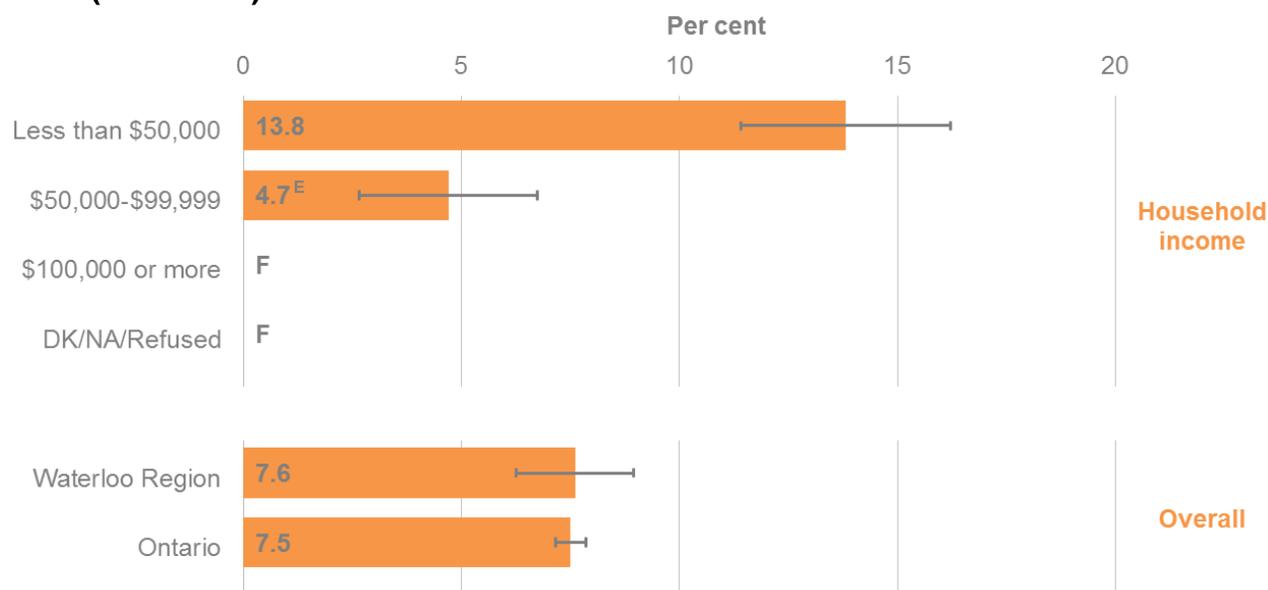
I = per cent confidence interval.

The superscript "E" denotes high sampling variability, and estimates must be interpreted with caution.

Source: Canadian Community Health Survey (CCHS), 2007/2008, 2009/2010, 2011/2012 Statistics Canada, Share File, Ontario MOHLTC.

The proportion of food insecure households with children under the age of 18 years in Waterloo Region has been relatively stable, ranging from 6.1 per cent in 2007/2008 to 8.6 per cent in 2011/2012 (Figure 5). Provincially, there were similar proportions of food insecure households for the same time periods.

**Figure 6: Proportion food insecure (moderate and severe) households with children under 18 years, by household income and overall, Waterloo Region and Ontario, 2007-2012 (combined)**



I = per cent confidence interval.

The superscript "E" denotes high sampling variability, and estimates must be interpreted with caution.

The superscript "F" denotes estimates which were suppressed due to unacceptably high sampling variability.

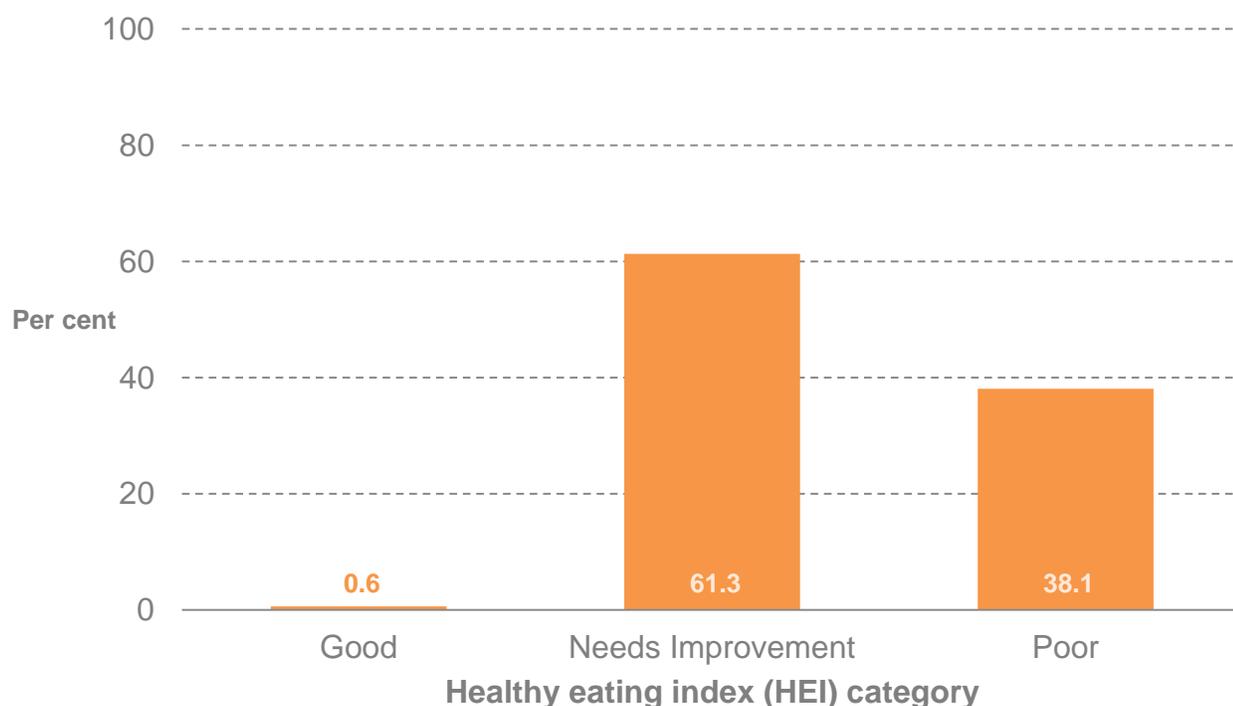
Source: Canadian Community Health Survey (CCHS), 2007/2008, 2009/2010, 2011/2012 Statistics Canada, Share File, Ontario MOHLTC.

From 2007 to 2012 (combined), food insecurity for households with children under age 18 years in Waterloo Region differed by household income level. Households earning less than \$50,000 were significantly more likely to be food insecure (13.8 per cent) than households earning \$50,000-\$99,999 (4.7 per cent) (Figure 6). Household food insecurity did not vary significantly by municipality or immigration status (data not shown).

Another measure of diet quality is the healthy eating index. In 2009, the Neighbourhood Environment in Waterloo Region: Patterns of Transportation and Health (NEWPATH) study was conducted in Waterloo Region. The NEWPATH study evaluated how different urban built environments impact a variety of quality of life factors including diet. The NEWPATH study included two day food records for 181 participants aged 11 to 18 years. The two day food records were then assessed for diet quality using the Healthy Eating Index adapted for Canada (HEI).

The HEI uses a points system to assess adequacy of diet based on dietary recommendations from Canada’s Food Guide such as consumption of total fruit, whole fruit, total vegetables, dark green and orange vegetables, legumes, total grains, whole grains, milk, meat, beans, and unsaturated oils. The HEI also awards points for moderation in dietary components that promote poor health such as saturated fats, sodium, solid fats, alcohol and sugar (3). The HEI classifies diets as “poor” (between 0 to 49 points) “needs improvement” (50-80 points) and “good” (81-100 points) (3).

**Figure 7: Proportion of adolescents aged 11 to 18 years, by Healthy Eating Index (HEI) category, Waterloo Region, 2009**



Source: Minaker L. NEWPATH study findings, 2012.

The mean HEI score of 53 shows that the average diet in adolescents aged 11 to 18 years in Waterloo Region is much closer to the “poor” category than the “good” category. Less than one per cent of the adolescents in the study consumed a diet consistent with current nutrition recommendations, or a “good” diet. Approximately one-third (38.1 per cent) of adolescents in the study ate a “poor” diet and two-thirds (61.3 per cent) consumed a diet that “needs improvement” (Figure 7). Therefore, nearly all adolescents in Waterloo Region (99.4per cent) consumed a diet that was either “poor” or “needs improvement”.

### 3.3 Leisure-time Physical Activity

To determine an individual’s activity level, respondents were asked a series of questions about participation in various types of leisure time physical activities (LTPA) over the previous three

months, including the frequency and duration of each activity. Based on their responses they were then categorized into three physical activity categories according to energy expenditure level:

- Active – average 3.0 or more kilocalories per kilogram of body weight per day (kcal/kg/day) (e.g., walking an hour or jogging 20 minutes a day)
- Moderately active – average 1.5-2.9 kcal/kg/day (e.g., walking 30 to 60 minutes a day or taking an hour-long exercise class three times a week)
- Inactive – average less than 1.5 kcal/kg/day (e.g., walking less than half an hour a day)

LTPA is often used as a proxy measure for overall physical activity; however, there are limitations to this indicator because it accounts for only a portion of total daily physical activity levels. There is substantial variation in total daily energy expenditures at school (educational physical activity) or the workplace (occupational physical activity), completing domestic chores, and undertaking active transportation. Differences in physical activity levels often explain individual differences in health-related outcomes.

The proportion of youth aged 12 to 17 years by self-reported leisure time physical activity category is shown below in Figure 8 for Waterloo Region and Ontario from 2007/2008 to 2011/2012.

**Figure 8: Proportion of population aged 12 to 17 years, by leisure time physical activity category, Waterloo Region and Ontario, 2007/2008, 2009/2010, and 2011/2012**



I = 95 per cent confidence interval.

The superscript “E” denotes high sampling variability, and estimates must be interpreted with caution.

Source: Canadian Community Health Survey (CCHS), 2007/2008, 2009/2010, 2011/2012 Statistics Canada, Share File, Ontario MOHLTC.

The proportion of youth within Waterloo Region that self-reported being active or moderately active in their leisure time has fluctuated over time, ranging between a high of 79.3 per cent in 2009/2010 and a low of 55.6 per cent in 2011/2012 (Figure 8). Ontario’s proportions have remained more stable than Waterloo Region’s over time. However, changes in Waterloo Region’s proportions may not reflect a true shift in reported behaviour due to a small sample size.

Among all youth in Waterloo Region who were engaged in either self-reported active or moderately active LTPAs, most were considered to be active compared to only moderately active (32.1 per cent versus 23.5 per cent in 2011/2012). This trend was similar for both Waterloo Region and Ontario for all time periods reported (Figure 8).

In 2011/2012, leisure time physical activity in youth did not vary significantly by sex, municipality, household income level, or immigration status (data not shown).

### **3.4 Sedentary Activity (Screen Time)**

Sedentary activities that involved using or viewing a screen, or screen time, were assessed by asking respondents about the usual number of hours in a typical week, in the past three months, they spent watching television (including videos), playing video games, and using a computer (including playing games and using the Internet). Respondents were asked to report leisure-time hours only and to exclude screen time related to activities at work or school. Sedentary activities were considered frequent if the accumulated time over a typical week in the past three months exceeded the following thresholds:

- Watching television or videos: 15 or more hours per week
- Playing video games: 11 or more hours per week
- Using a computer: 11 or more hours per week
- Total screen time from watching television or videos, or using a computer, or playing video games: 15 or more hours per week

Screen time is often used as a proxy measure for all sedentary activity; however, there are limitations to this indicator because it accounts for only a portion of total daily sedentary activities while awake. Other sedentary activities not accounted for in this measure include, for example, reading a book, doing homework, listening to music, and motorized transport. Also, there is an inherent assumption in this indicator that individuals are sedentary while spending leisure time in front of a screen, which may not always be the case. Some individuals may perform some physical activity during screen time (e.g., walking on a treadmill or playing on 'active' video game consoles that have been designed to promote movement and participant interaction).

The proportion of youth aged 12 to 17 years who frequently used or viewed a screen during their leisure time is shown below in Figure 9 for Waterloo Region and Ontario from 2007/2008 to 2011/2012.

**Figure 9: Proportion of the population aged 12 to 17 years who frequently used or viewed a screen during their leisure time, by type of sedentary activity, Waterloo Region & Ontario, 2007/2008 and 2011/2012**



I = 95 per cent confidence interval.

The superscript "E" denotes high sampling variability, and estimates must be interpreted with caution.

N/R indicates that the estimate was based on too small a sample size to be released.

Source: Canadian Community Health Survey (CCHS), 2007/2008, 2011/2012 Statistics Canada, Share File, Ontario MOHLTC.

There has been little change in the proportion of youth spending 15 hours or more per week using or viewing a screen in their leisure time. In 2007/2008, 64.7 per cent of youth used or viewed a screen in their leisure time 15 hours or more per week compared to 63.9 per cent in 2011/2012 (Figure 9). Similarly, there was no significant change in reported screen time behaviour observed for all of Ontario across the same time period.

While overall screen time has remained stable, the relative proportions of the different types of devices have shifted slightly for both Waterloo Region and Ontario (Figure 9). Since 2007/2008, the decrease in television and video watching (20.9 to 17.2 per cent) in Ontario

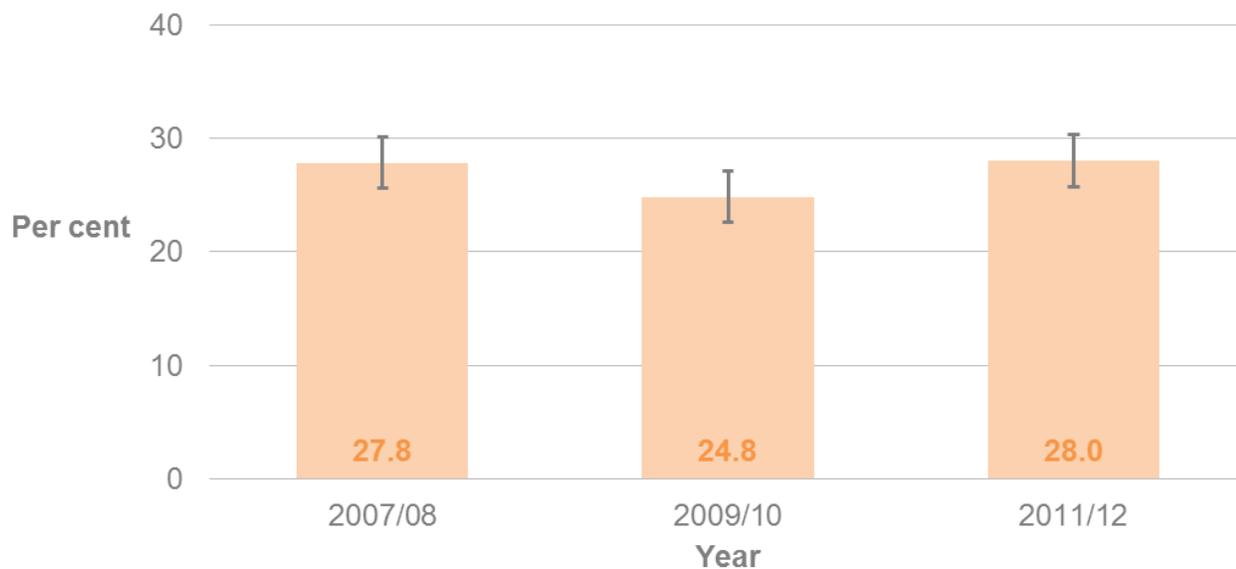
has been offset by the increase in video game use (9.7 to 13.5 per cent) and computer use (37.1 to 42.7 per cent) (Figure 9).

In 2011/2012, sedentary activities or screen time in Waterloo Region youth did not vary significantly by sex, municipality, and household income level; insufficient data did not permit for a comparison by immigration status (data not shown).

### 3.5 Chronic Diseases

The proportion of youth aged 12 to 17 years with a chronic condition or disease is presented below in Figure 10 for Ontario from 2007/2008 to 2011/2012.

**Figure 10: Proportion of individuals aged 12 to 17 years and older with one or more selected chronic diseases or conditions, Ontario, 2007/2008, 2009/2010, and 2011/2012**



┆ = 95 per cent confidence interval.

The superscript "E" denotes high sampling variability, and estimates must be interpreted with caution.

Source: Canadian Community Health Survey (CCHS), 2007/2008, 2009/2010, 2011/2012 Statistics Canada, Share File, Ontario MOHLTC.

About one-quarter of Ontario adolescents reported that they had a chronic disease or condition which includes, asthma, migraines, anxiety disorder, back problems, mood disorder, arthritis/rheumatism, bowel disorder, diabetes, high blood pressure, heart disease, stomach/intestinal ulcers, cancer, and the effects of stroke. This proportion has remained stable over time, ranging between a low of 24.8 per cent in 2009/2010 to a high of 28.0 per cent in 2011/2012 (Figure 10).

From 2007 to 2012 the proportion of youth reporting one or more selected chronic diseases or conditions did not vary significantly by sex, municipality or household income level; insufficient data did not permit for a comparison by immigration status (data not shown).

### 3.6 Healthy Weights in Children

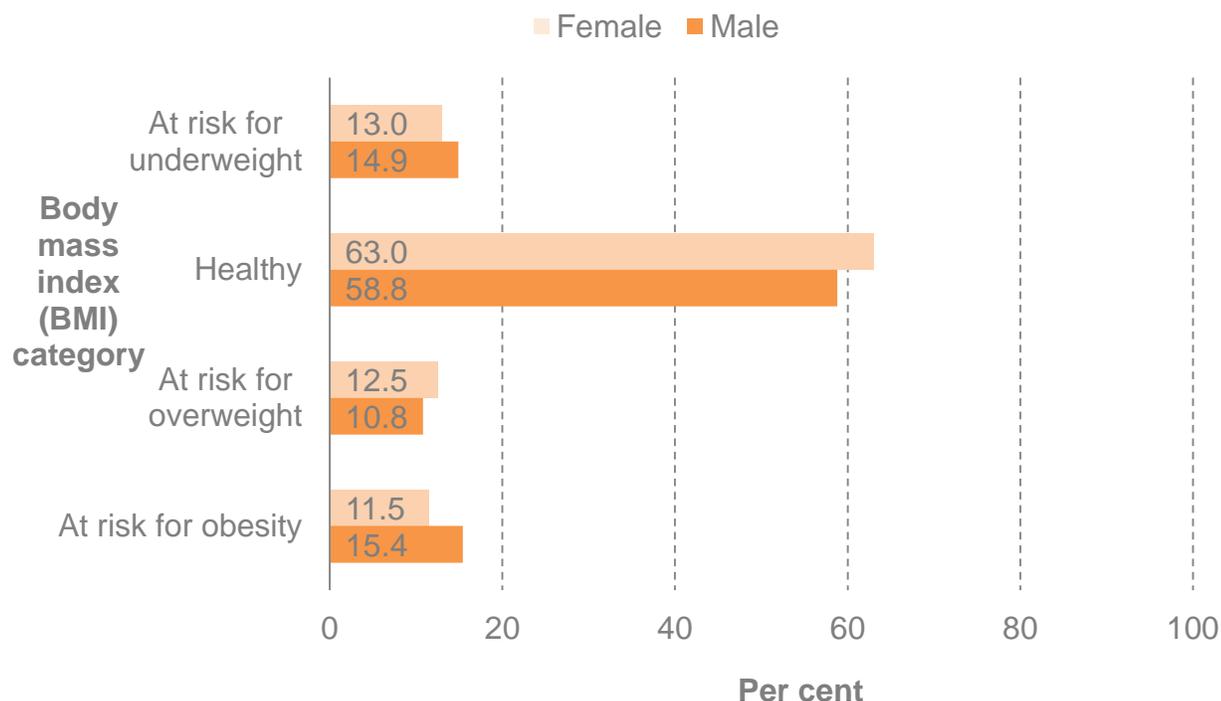
Body Mass Index (BMI) is a method of classifying body weight into health risk categories. BMI is calculated as weight in kilograms divided by height in metres squared.

BMI is recommended for use among Canadian adults aged 18 years and older except for pregnant and lactating women. BMI may not be an accurate measurement of health risk for children and young adults who have not reached full growth, adults who are naturally very lean, adults with a very muscular body build, and certain ethnic groups.

The voluntary Kindergarten Parent Survey (KPS) of 2010 asked parents of children in senior kindergarten about their child's height and weight to determine the child's BMI. Children were assigned to one of four categories:

- At risk for underweight
- Healthy
- At risk for overweight
- At risk for obesity

**Figure 11: Proportion of senior kindergarten students by body mass index (BMI) category and sex, Waterloo Region, 2010**



Source: Romagnoli, A. (2012). A Community Fit for Children. YMCA Ontario Early Years Centre. Waterloo ON.

In 2010, approximately two-thirds of senior kindergarten students in Waterloo Region reported being at a healthy body mass index (63.0 per cent of females and 58.8 per cent of males)

(Figure 11). Conversely, about one-quarter of senior kindergarten students (24.0 per cent of females and 26.2 per cent of males) were at risk for being overweight or obese.

### 3.7 Healthy Weights in Adolescents (12-17 years)

Self-reported BMI for youth aged 12 to 17 years is calculated for youth (adolescents) using the Cole method, which adjusts for differing degrees of BMI distribution by age, and contains the following categories:

- Neither overweight nor obese
- Overweight
- Obese

The proportion of youth aged 12 to 17 years by BMI category is shown below in Table 1 for Waterloo Region and Ontario from 2007/2008 to 2011/2012.

**Table 1: Proportion of individuals aged 12 to 17 years by body mass index (BMI) category, Waterloo Region & Ontario, 2007/2008, 2009/2010, and 2011/2012**

Place of residence	BMI category	2007/08 Per cent (95% CI)	2009/10 Per cent (95% CI)	2011/12 Per cent (95% CI)
Waterloo Region	Neither overweight nor obese	88.1 (CI: 81.0-95.2)	87.4 (CI: 81.6-93.3)	81.2 (CI:71.2-91.2)
	Overweight	F	10.5 (CI: 4.9-16.1) <sup>E</sup>	18.2 (CI:8.2-28.2) <sup>E</sup>
	Obese	F	F	F
	Overweight or obese	11.9 (CI:4.8-19.0) <sup>E</sup>	12.6 (CI: 6.8-18.5) <sup>E</sup>	18.8 (CI:8.8-28.8) <sup>E</sup>
Ontario	Neither overweight nor obese	79.7 (CI: 77.7-81.7)	80.1 (CI: 78.3-81.9)	79.0 (CI:76.7-81.2)
	Overweight	15.4 (CI: 13.8-17.0)	15.5 (CI: 13.8-17.2)	15.9 (CI:13.9-18.0)
	Obese	4.9 (CI: 3.7-6.2)	4.5 (CI: 3.6-5.4)	5.1 (CI:4.0-6.2)
	Overweight or obese	20.3 (CI: 18.3-22.4)	19.9 (CI: 18.1-21.7)	21.0 (CI:18.8-23.3)

CI = 95 per cent confidence interval.

The superscript "E" denotes high sampling variability, and estimates must be interpreted with caution.

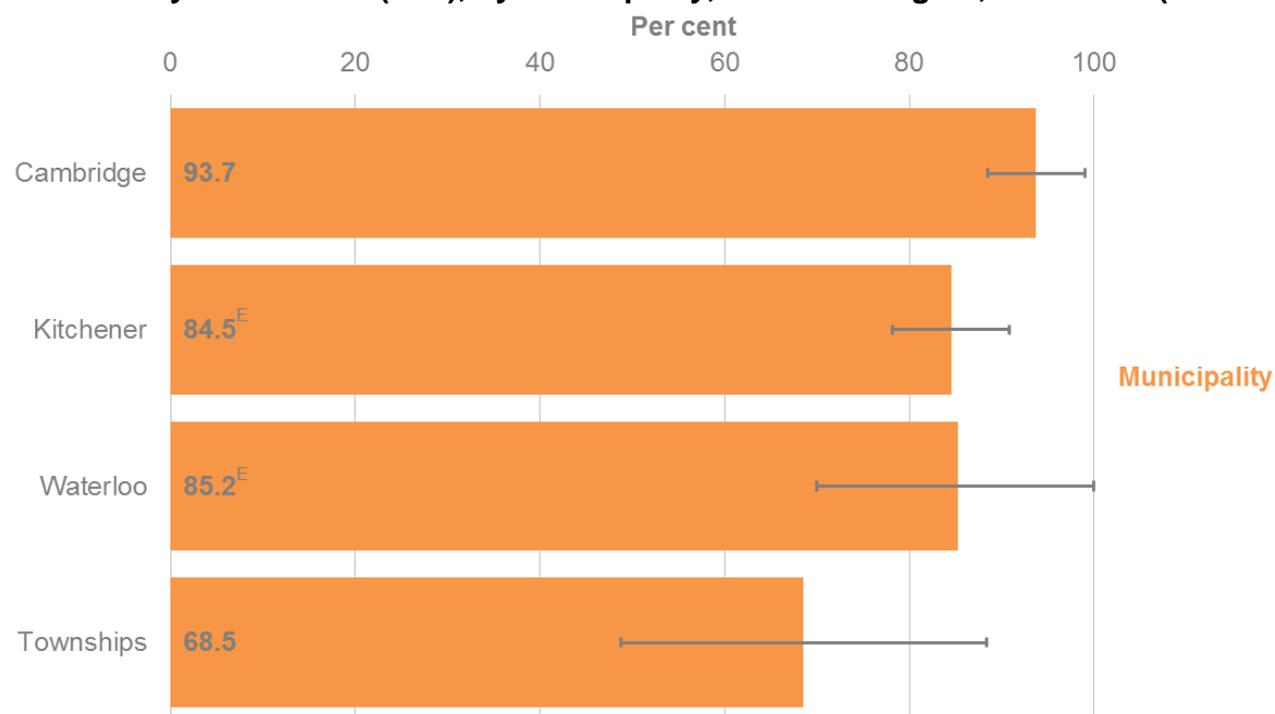
The superscript "F" denotes estimates which were suppressed due to unacceptably high sampling variability.

Source: Canadian Community Health Survey (CCHS), 2007/2008, 2009/2010, 2011/2012 Statistics Canada, Share File, Ontario MOHLTC.

The proportion of Waterloo Region youth that reported being neither overweight nor obese declined, although not significantly, from 88.1 per cent in 2007/2008 to 81.2 per cent in

2011/2012 (Table 1). For the same time period, approximately four-fifths of Ontario youth reported being neither overweight nor obese, and these proportions remained relatively stable between 2007/2008 and 2011/2012.

**Figure 12: Proportion of individuals aged 12 to 17 years who had neither overweight nor obese body mass index (BMI), by municipality, Waterloo Region, 2007-2012 (combined)**



± = 95 per cent confidence interval.

'Townships' category combines responses from North Dumfries, Wellesley, Wilmot, and Woolwich townships.

The superscript "E" denotes high sampling variability, and estimates must be interpreted with caution.

Source: Canadian Community Health Survey (CCHS), 2007/2008, 2009/2010, 2011/2012 Statistics Canada, Share File, Ontario MOHLTC.

In 2011/2012 the proportion of youth that reported neither an overweight nor obese BMI was significantly higher in Cambridge (93.7 per cent) compared with the townships of Woolwich, Wellesley, Wilmot and North Dumfries combined (68.5 per cent) (Figure 12). Proportions of overweight or obese youth in Waterloo Region did not vary significantly by sex, household income level, or immigration status (data not shown).

### 3.8 Healthy Weights in Young Adults (18-19 years)

Self-reported BMI for adults aged 18 years and older is calculated as weight in kilograms divided by height in metres squared and then assigned to one of the following categories:

- Underweight: BMI < 18.5
- Healthy weight: BMI = 18.5 - 24.9
- Overweight: BMI = 25.0 - 29.9

- Obese: BMI  $\geq$  30

For the purposes of comparison with younger respondents, underweight and healthy weight respondents were grouped in to a combined category of “neither overweight nor obese.” The proportion of young adults 18 and 19 years by BMI category is explored below in Table 2 for Waterloo Region and Ontario from 2007 to 2012 (combined).

**Table 2: Proportion of individuals aged 18 to 19 years by body mass index (BMI) category, Waterloo Region & Ontario, 2007-2012 (combined)**

Place of residence	BMI category	BMI values	2007-2012	
<b>Waterloo Region</b>	Neither overweight or obese	<25.0	69.4 (CI: 58.6-80.2)	
	Overweight	25.0-29.9	25.4 (CI: 14.9-36.0) <sup>E</sup>	
	Obese	$\geq$ 30.0	N/R	
	<b>Overweight or obese</b>	<b><math>\geq</math>25.0</b>	<b>30.6 (CI: 19.8-41.4)<sup>E</sup></b>	
<b>Ontario</b>	Healthy weight	<25.0	75.7 (CI: 73.6-77.9)	
	Overweight	25.0-29.9	17.5 (CI: 15.6-19.4)	
	Obese	$\geq$ 30.0	6.8 (CI: 5.5-8.0)	
	<b>Overweight or obese</b>	<b><math>\geq</math>25.0</b>	<b>24.3 (CI: 22.1-26.4)</b>	

I = 95 per cent confidence interval.

The superscript “E” denotes high sampling variability, and estimates must be interpreted with caution.

N/R indicates that the estimate was based on too small a sample size to be released.

Source: Canadian Community Health Survey (CCHS), 2007/2008, 2009/2010, 2011/2012 Statistics Canada, Share File, Ontario MOHLTC.

Nearly a third (30.6 per cent) of Waterloo Region adults aged 18 and 19 years reported being overweight or obese for the period spanning 2007 to 2012 (combined), and this did not differ significantly from the provincial proportion (24.3 per cent) (Table 2).

For the time period 2007 to 2012 (combined) the proportion of young adults, aged 18 and 19 years, with a self-reported BMI of neither overweight nor obese did not vary significantly by sex, municipality, and household income level; insufficient data did not permit for a comparison by immigration status (data not shown).

## References

1. Romagnoli,A. (2012). A Community Fit for Children. YMCA Ontario Early Years Centre. Waterloo ON.
2. Black,J.L. and Billette,J. (2013). Do Canadians meet Canada's Food Guide's recommendations for fruits and vegetables? Applied Physiology, Nutrition, and Metabolism;38:234-242.
3. Garriguet D. Diet quality in Canada. Health Rep 2009 Sep;20(3):41-52.