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## IN THIS ISSUE



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# INFORMATION UPDATE

## January, 2003

## For all owners/operators of hot tubs, spas and whirlpools

In August 2001, a 13-year-old drowned after becoming entrapped on the drain at the bottom of a hot tub. Following the coroner's investigation of this tragedy, Ontario's Chief Coroner made a number of recommendations to prevent such tragedies in the future. In response, the province enacted regulatory requirements for new or renovated hot tubs, spas and whirlpools, as follows:

**Section A: Requirements for NEW hot tubs, spas and whirlpools**

**All new public spa installations or existing facilities undergoing renovations, requiring building permits,** must comply with the Ontario Building Code (OBC). As of November 3, 2002, an amendment to the OBC (O. Reg. 220/02) mandated a number of measures intended to minimize the risk of injury or death in these facilities, including:

1. emergency shut-off switch, telephone and signage;
2. vacuum release device connected to the water suction system;
3. special drain covers designed to reduce the risk of body entrapment;
4. minimum of two separately located suction outlets (drains); and
5. limits on the water flow velocity in the piping of the water jets system.

These measures do not reflect all of the provisions in O. Reg. 220/02. The full set requirements of the OBC for public spas should be read in their entirety, and owners, operators, designers, installers, etc., should consult with the local building department for more information.

**Section B: Requirements for EXISTING hot tubs, spas and whirlpools**

Ontario's Chief Coroner also recommended that **existing hot tubs, spas and whirlpools** be retrofitted to reduce the risk of entrapment to the users of these facilities. The recommendations for retrofitting include the following:

1. A clearly marked emergency shut-off switch complete with audible and visual alarm, separate from the hot tub's timing device, is installed on a wall adjacent to the hot tub. A sign containing the words "**IN THE EVENT OF EMERGENCY, PUSH EMERGENCY BUTTON AND USE EMERGENCY PHONE, AUDIBLE AND VISUAL SIGNAL WILL ACTIVATE**" should be posted above the switch in letters 25 mm high with a 5 mm stroke;

***And* at *least one of the following:***

I. A vacuum-limit mechanism or vacuum-limit device for each pump attached to the hot tub; **or**

II. All suction outlets are fitted with cover plates designed to reduce the risk of body entrapment; **or**

III. Installation of at least two separately located suction outlets for each pump attached to the hot tub.

**If you have further questions or require clarification, please contact your local Public Health Inspector or an accredited hot tubs, spas and whirlpools association.**

# INVASIVE MENINGOCOCCAL DISEASE IN ONTARIO, JANUARY 1, 1998 TO DECEMBER 31, 2002

## Introduction

Invasive meningococcal disease (IMD) is designated as a reportable disease in Ontario in Regulation 559/91 under the *Health Protection and Promotion Act.* From 1998 to 2002 inclusive, 51 to 106 cases of IMD were reported annually in Ontario, resulting in an incidence rate of 0.44 to 0.9 per 100,000 population.

This report describes the epidemiology of IMD in Ontario over the period 1998 to 2002 inclusive. The data for 2002 is current as of January 13, 2003; however, the final number of cases of IMD in 2002 may actually be greater, due to reporting delays.

## Background

Invasive meningococcal disease (IMD) is caused by the bacterium *Neisseria meningitidis*, a gram-negative diplococcus.[1] IMD is manifested most often as meningitis or septicemia (meningococcemia). *Neisseria meningitidis* is carried in the human nasopharynx. Data from the United Kingdom (2002) indicate that carriage rates differ by age, with carriage rates being lowest in children under 5 years of age (2%) and highest in persons 15 to 19 years of age (25%).[2] IMD is transmitted from person to person through respiratory droplets or secretions from the nose and throat of infected persons.[3] Household and intimate contacts of a case of IMD are at increased risk of developing this disease;[4] the attack rate has been estimated to be 500 to 1000 times greater than in the general population.[5]

Meningococcal disease is classified by serogroup according to the characteristics of the polysaccharide capsule.[6] Thirteen serogroups have been defined along with 20 serotypes and 10 subtypes. In Canada, the serogroups most often associated with IMD are B and C, followed by serogroups Y and W-135. Outbreaks of disease have been due to serogroup C.[4] The majority of IMD cases are sporadic.

Risk factors for IMD include the following: a recent viral infection, exposure to cigarette smoke, and overcrowded housing.[2,5,6] Selected indicators of a poor prognosis include very old or very young age, a short period of time between the onset of symptoms and admission to hospital, increasing or widespread skin lesions and shock.[5]

A preliminary diagnosis of IMD can often be made on clinical grounds. Laboratory confirmation consists of the identification of the organism *N. meningitidis* in cerebrospinal fluid (CSF) and/or blood culture. Prior antibiotic use may interfere with the recovery of bacteria from blood or CSF; however, polymerase chain reaction (PCR) or antigen detection methods are generally not affected.

## Methodology

In Ontario, cases of IMD are reportable if they meet the following surveillance case definition for IMD[8]:

1. isolation of *Neisseria meningitidis* from a normally sterile site;

or

2. signs and symptoms of meningococcemia (purpura fulminans) without culture confirmation;

or

3. signs and symptoms of meningitis with one of the following:

(a) antigen detection from the CSF or serum

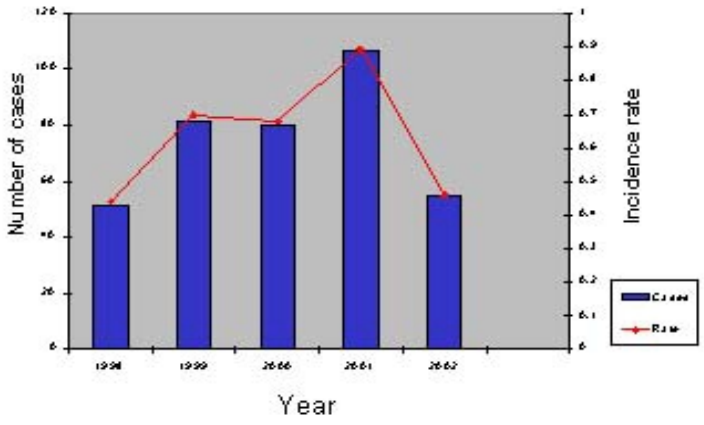
(b) Gram negative diplococci in CSF, blood or skin lesions.

Provincial local public health units provide data, for the surveillance of IMD, to the Ministry of Health and Long-Term Care (MOHLTC). Cases are routinely entered in the Reportable Disease Information System (RDIS) by health unit staff and transmitted to the MOHLTC every week. The quality of the data depends on the complete and accurate reporting and recording of disease, and the timely transmission through the RDIS.

## Incidence

The number of cases of IMD in Ontario for the years 1998 to 2002, and the overall incidence rates for IMD (per 100,000 population) are presented in Figure 1 below. Population estimates for 1998 to 2002 were based on the 1996 census population.

**Figure 1: Invasive meningococcal disease, Ontario, incidence rates, 1998 to 2002***

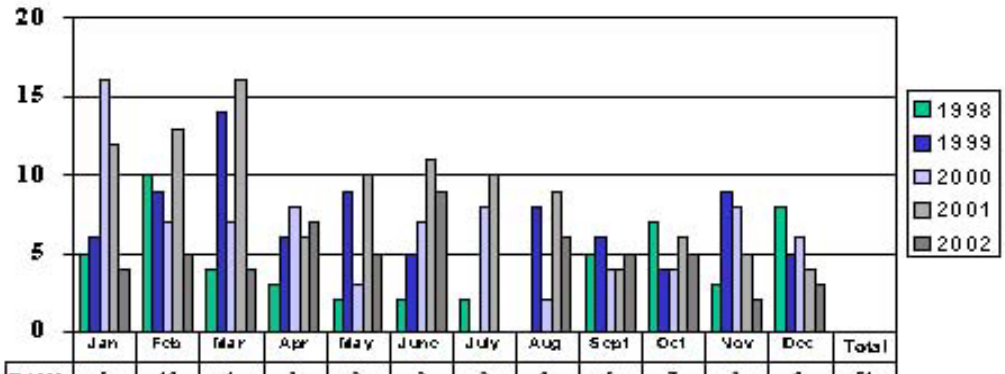



*Source: Reportable Disease Information System (RDIS)
Note: The total number of cases for 2002 may be underestimated due to late reporting

## Seasonal Distribution

During the period 1998 to 2002, in Ontario, IMD was usually more common during the winter months (Figure 2). For the years 1998 to 2001, more than one third of IMD cases occurred in the first 3 months of the year. Thirty-seven per cent of cases were reported from January to March in 1998, 35.8% in 1999, 37.5% in 2000 and 38.7% in 2001. In 2002, only 24.5% of cases occurred in the first 3 months of the year with 38% of cases reported for the second quarter of the year. However, as noted before, data for 2002 are still preliminary as additional reports for the last quarter may be received at a later date.

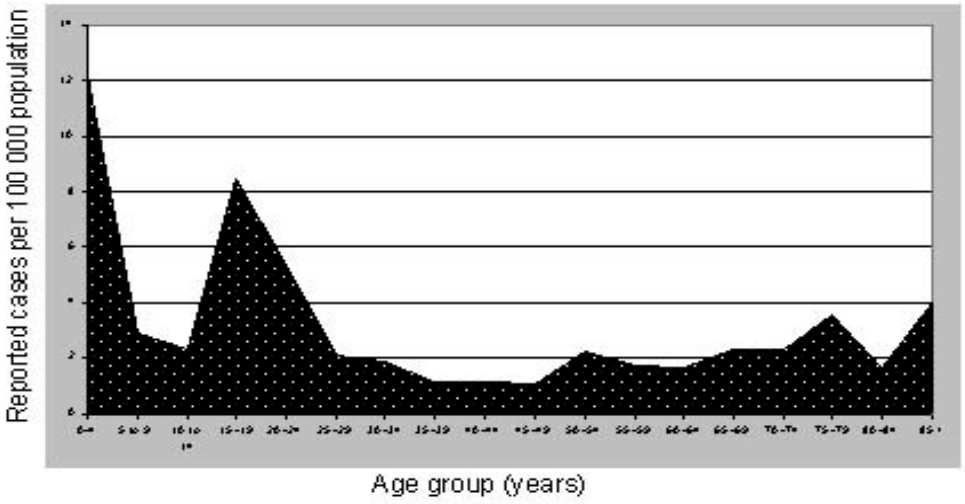
**Figure 2: Number of cases of invasive meningococcal disease reported per year, by month Ontario, 1998 to 2002***




| | Jan | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1998 | 5 | 10 | 4 | 3 | 2 | 2 | 2 | 0 | 5 | 7 | 3 | 8 | 51 |
| 1999 | 6 | 9 | 14 | 6 | 9 | 5 | 0 | 8 | 6 | 4 | 9 | 5 | 81 |
| 2000 | 16 | 7 | 7 | 8 | 3 | 7 | 8 | 2 | 4 | 4 | 8 | 6 | 80 |
| 2001 | 12 | 13 | 16 | 6 | 10 | 11 | 10 | 9 | 4 | 6 | 5 | 4 | 106 |
| 2002 | 4 | 5 | 4 | 7 | 5 | 9 | 0 | 6 | 5 | 5 | 2 | 3 | 55 |

*Source: Reportable Disease Information System (RDIS)
Note: The total number of cases for 2002 may be underestimated due to late reporting.

**Figure 3: Invasive meningococcal disease case reports, Ontario, 1998 to 2002,* by age group**




* Reported case with date of onset between January 1, 1998 and December 31, 2002
Source: Reportable Disease Information System (RDIS).
Denominator population estimates for 2000 are based on 1996 Census Population Data
Note: The number of cases for 2002 may be underestimated due to late reporting.

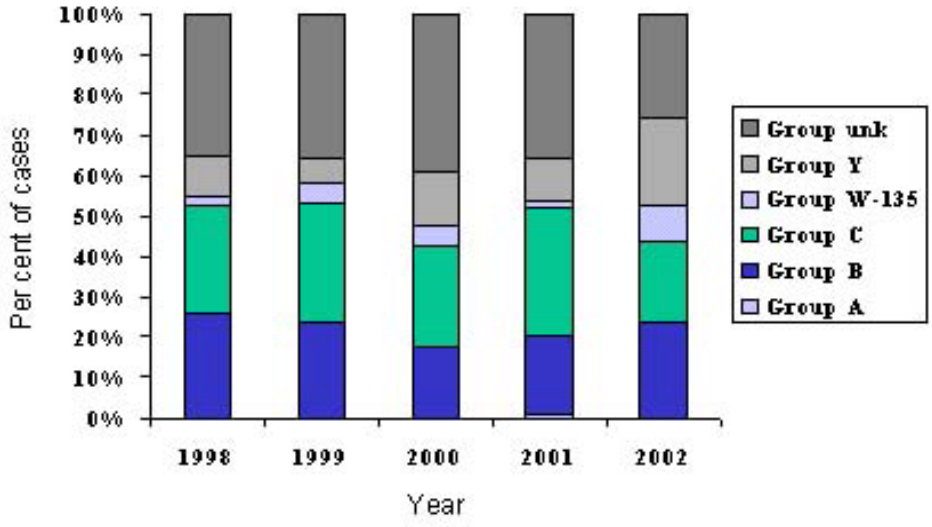
## Age Distribution

For the 5-year period 1998 to 2002, the overall rate of IMD notification was highest (12.15 per 100,000) for children 0 to 4 years of age (n=84). The second peak in notification was noted in 15 to 19 year olds (8.5 per 100, 000) (Figure 3).

## Distribution by Serogroup

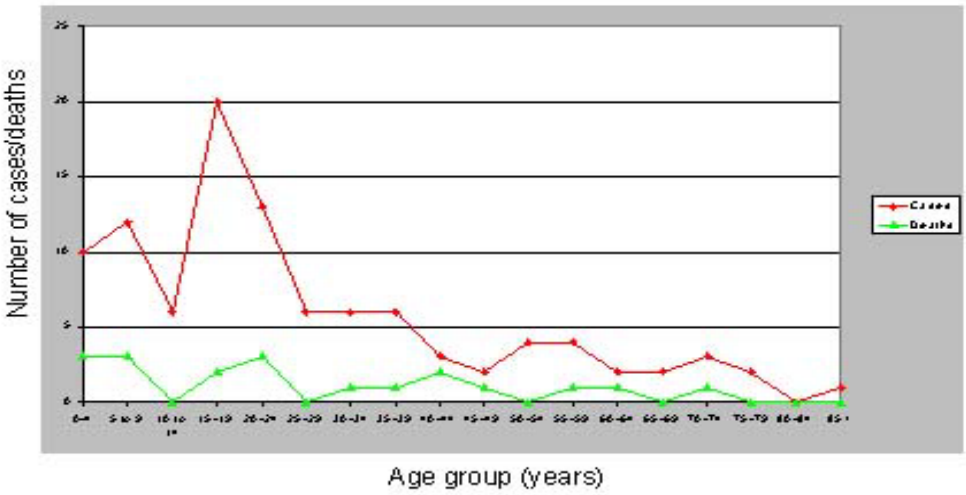
The laboratory identification of the specific serogroup, for reported cases of IMD, has increased from1998 to 2002. Specific serogroup information was available for 65% of laboratory-confirmed cases in 1998, compared with 75% of confirmed cases in 2002 (Figure 4). The distribution of the reported cases, by serogroup, is presented in Figure 4.

**Figure 4: Invasive meningococcal disease, Ontario, 1998 to 2002,* by year and serogroup**




* Notification where the date of onset was between January 1, 1998 and December 31, 2002.
Source: Reportable Disease Information System (RDIS). 2002 cases are underestimated due to late reporting.
Note: The number of cases for 2002 may be underestimated due to late reporting.

**Figure 5: Invasive meningococcal disease Group C, Ontario, 1998 to 2002,* by age group**



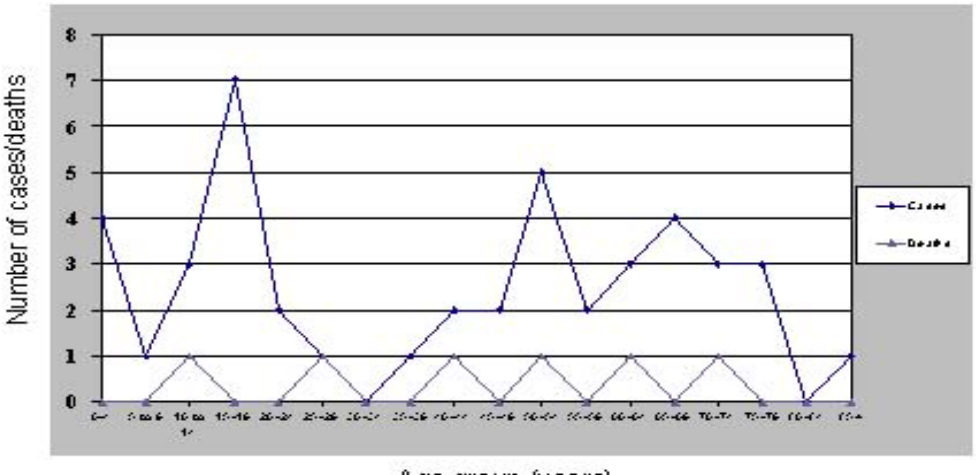

*Source: Reportable Disease Information System (RDIS)
Note: The total number of cases for 2002 may be underestimated due to late reporting.

Among the reported cases for which the serogroup was known, the occurrence of serogroup C IMD was greatest in the age groups 15 to 19 years, followed by the age groups 20 to 24, 5 to 9 years and 0 to 4 years (Figure 5). Serogroup Y cases occurred most often in 15 to 19 year olds, followed by 50 to 54 years olds, persons 65 to 69 and children aged 0 to 4 years old (Figure 6). Serogroup B occurred mainly in children 0 to 4 years of age (Figure 7), and represented 32% of the cases for which the serogroup was known in 2002. From 1998 to 2002, the number of known serogroup C cases, as a proportion of the total number of cases, for which the serogroup was known, per year, remained reasonably consistent (Figure 8).

In 1998, serogroup Y represented 15% of cases in which the serogroup was known; this increased to 22% in 2000, and 29% in 2002 (Figure 9). However, serogroup Y represented only 10% of cases in 1999 and 16% of cases in 2001.

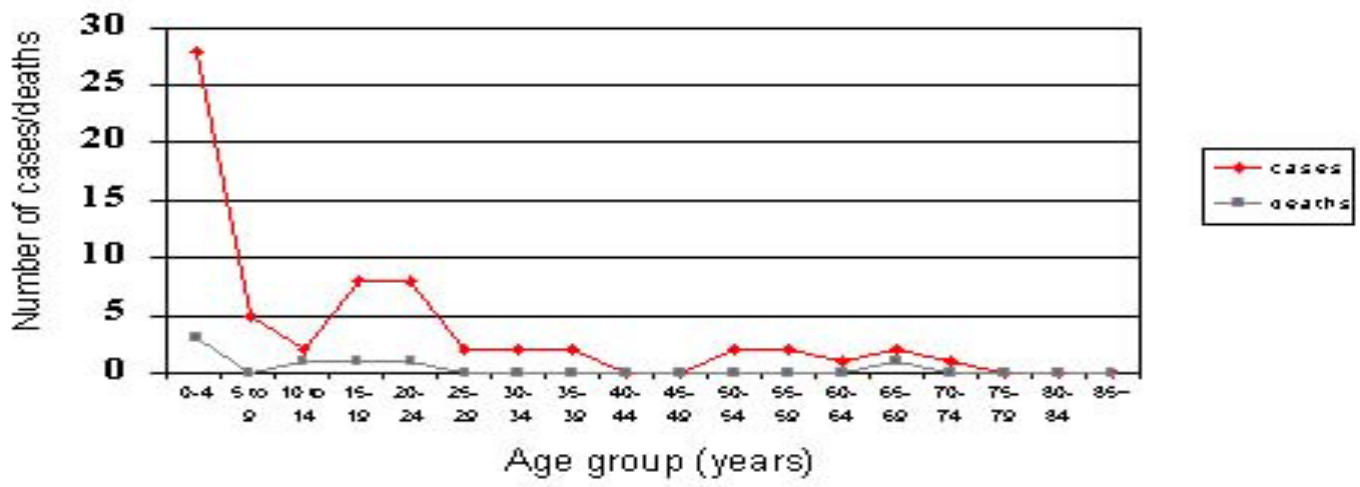
Serogroup W-135 is not common and accounted for 12% of cases in Ontario in 2002. There was only 1 case (2001) of serogroup A reported over the past 5 years (Figure 9).

**Figure 6: Invasive meningococcal disease Group Y, Ontario, 1998 to 2002,* by age group**



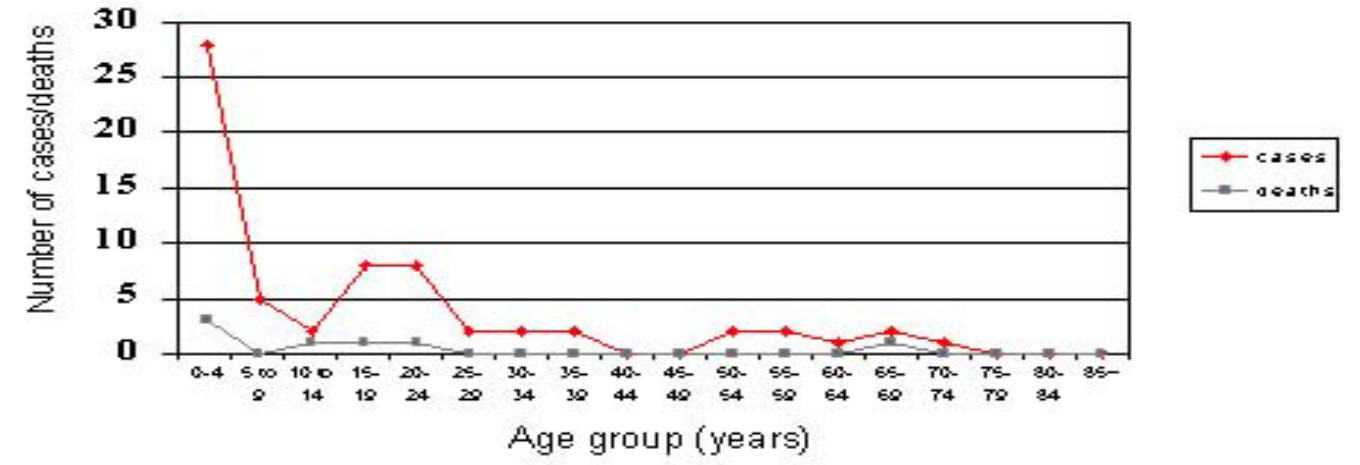

*Source: Reportable Disease Information System (RDIS)
Note: The total number of cases for 2002 may be underestimated due to late reporting.

## Figure 7: Invasive meningococcal disease Group B, Ontario, 1998 to 2002,* by age group



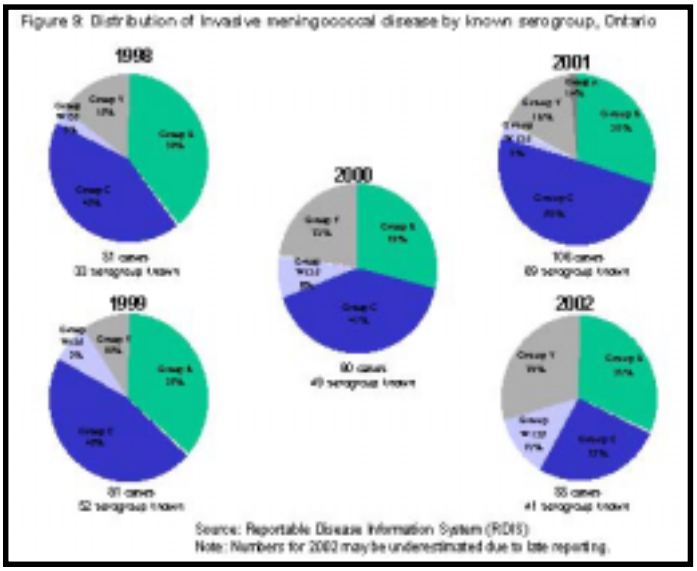

*Source: Reportable Disease Information System (RDIS).
Note: The number of cases for 2002 may be underestimated due to late reporting.

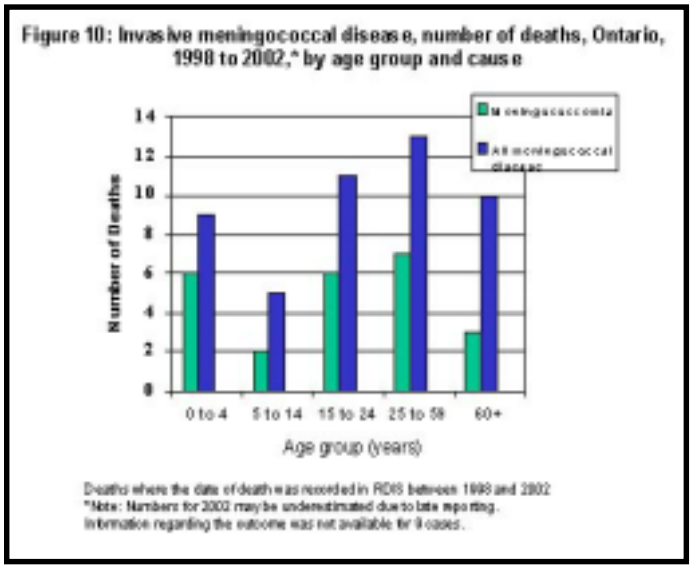

## Figure 7: Invasive meningococcal disease Group B, Ontario, 1998 to 2002,* by age group



*Source: Reportable Disease Information System (RDIS).
Note: The number of cases for 2002 may be underestimated due to late reporting.




## Case-Fatality Rates

Overall, in Ontario, the case fatality rate (CFR) for IMD over the 5-year period, 1998 to 2002, was 12.9% (48 deaths among 373 cases). Meningococcemia was reported, in RDIS, more often than meningitis or other manifestation of the disease, and was a more frequent cause of death for the following age groups: 0 to 4 years, 15 to 24 years and 25 to 59 years (Figure 10). As noted in Table 1 below, serogroup C was associated with a higher mortality than serogroup B. The overall CFR for known serogroup C was 18.6%, and for known serogroup B, 8.9%. For cases with known serogroup Y, the overall case fatality rate (13.6% for the 5-year period 1998 to 2002) was intermediate between the rates for serogroups B and C. The serogroup was unknown for 90 cases, therefore, caution should be used when interpreting these results.

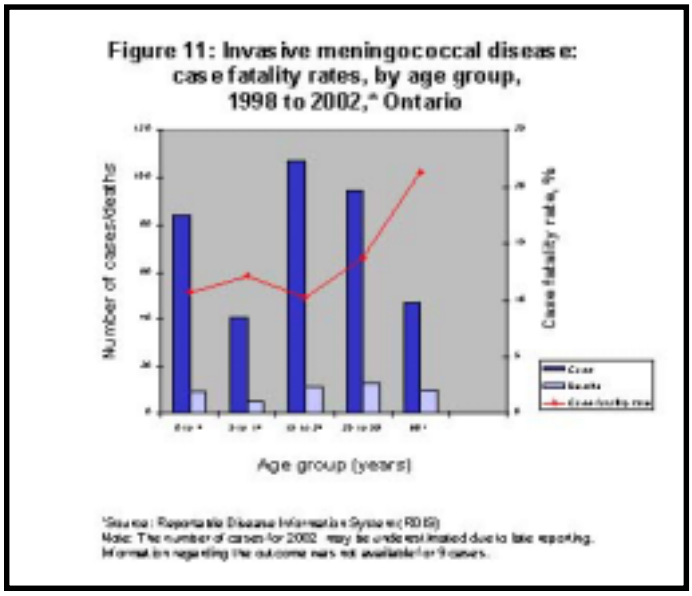



Table 1: Case-fatality by selected serogroup, 1998-2002

| Serogroup | 1998 | 1999 | 2000 | 2001 | 2002 | Overall CFR |
|---|---|---|---|---|---|---|
| B | 0 | 0 | 3/14 (21.4%) | 1/20 (5) | 3/13 (23%) | 7/79 (8.9%) |
| C | 0 | 7/24 (29.2%) | 4/20 (20%) | 4/33 (12.1%) | 4/11 (36.4%) | 19/102 (18.6%) |
| Y | 1/5 (20%) | 1/5 (20%) | 2/11 (18.2%) | 2/11 (18.2%) | 0 | 6/44 (13.6%) |

As shown in Figure 11, the overall CFR was also highest for cases 60 years of age and older.

## Summary

In Ontario, meningococcemia was a more frequent cause of death than meningococcal meningitis during the period 1998 to 2002. This is consistent with the review by Van Deuren et al., 2000.

The incidence rates for the serogroups have changed over time. In the U.S., the incidence rate for serogroup Y has increased from 2% of cases during 1988 to 1991 to one third of cases in the years1996 to 1998.[6] It is interesting to note that cases of IMD serogroup Y are increasing in Ontario; though, to date the other provinces and territories have not experienced this shift. In addition, serogroup A was common in the early part of the 20th century, but has been rare in industrialized countries since World War II.[6] In Canada, the rate for Serogroup B has shown more consistency over the years than has the rate for Serogroup C.[4] However, in Ontario, the proportion of cases with known serogroup B has decreased somewhat over the past 5 years, from a high of 39% in 1998 to a low of 29% in 2001. This change needs to be interpreted with caution, as the serogroup is not known for 90 cases.

Case fatality rates remain high for IMD, especially for serogroup C. Recognizing the high risk of developing

disease in household and intimate contacts of a case, as of July 2002, the MOHLTC has been providing publicly funded vaccines for close contacts of cases of vaccine preventable IMD, as recommended by the National Advisory Committee on Immunization.


## ACKNOWLEDGEMENT

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❑


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8. Reportable Disease Information System (RDIS), Case Definition, May 1996.


## ERRATUM

Please note the following corrections to the December 31, 2002 PHERO article "Summary Report of the 2001/02 Ontario Influenza and Respiratory Outbreak Surveillance Season"; additions/changes are bolded.

1. Page 202, table 2 "Influenza Cases by Health Unit and Region, Ontario, October 1, 2001 to April 30, 2002" should read as follows: Population for the Central West region of Haldimand & Norfolk Health Unit (2000 estimate) **105,000,** thus the influenza rate per 100,000 population was **6.7.**
2. Page 209 "Vaccination Rates in LTCFs and Hospitals All facilities", "Staff" section, paragraphs 1 and 2 should read as follows: Staff influenza immunization coverage rate was reported for 432 of 436 LTCFs. LTCF median coverage rate for this season was 86.4%, as compared to the previous season, which was 90.1%.

   **As of October 15, 2002, there were a total of 161 hospital corporations (of which 154 were designated as acute, chronic or rehabilitative hospitals and 7 were private non-psychiatric hospitals) and 238 sites (of which 231 were designated as acute, chronic or rehabilitative hospitals and 7 were private non-psychiatric hospitals) in Ontario.**

   The median vaccination rate of staff who worked in LTCFs that experienced respiratory outbreaks was 87.5% (range 0-100%). Staff influenza coverage was reported for 134 **hospitals** of 136 hospital **sites** operating under the *Public Hospital Act*.

# Communiqué

**Public Health Research, Education and Development Program**

MIDDLESEX-LONDON HEALTH UNIT

**Middlesex London Teaching Health Units**

# EATING HABITS, PHYSICAL INACTIVITY PATTERNS AND OVERWEIGHT OF CHILDREN IN FOUR LONDON ELEMENTARY SCHOOLS

## Introduction

Childhood overweight and obesity is emerging as a public health concern [1-2]. There is a likelihood that obesity in early years will persist through a life span [3-4]. It has been well documented that obesity contributes to an increased risk of hypertension, Type II diabetes, stroke, sleep apnea, and some cancers [5-7]. Moreover, childhood obesity has also been linked to an increasing prevalence of Type II diabetes and hypertension in children [8-9].

The term "overweight" refers to excess weight in relation to height, while "obesity" refers to an excessive amount of body fat or adipose tissue in relation to lean body mass. To accurately measure fat in the body is difficult. The ideal definition of obesity, based on per cent body fat, is impracticable for epidemiological and clinical use [10]. Although the word **overweight** may refer to a milder degree of excess fat than does **obesity**, no defined criteria exists to make this distinction. The terms are generally used interchangeably in the literature [11] and so in this paper. Since Canada doesn't have a definition for classifying overweight or obesity in children, the definition and criteria by the Centre for Disease Control and Prevention (CDC) was therefore used to classify overweight in this study[14]. Using the CDC body mass index (BMI)-for-age criteria, children with a BMI-for-age above the 95$^{th}$ percentile of the reference was defined as being "overweight", while a BMI-for-age between the 85$^{th}$ and 95$^{th}$ percentile being "at risk of overweight".

Although childhood obesity is such a public health problem, little has been known regarding the prevalence of overweight among children in the City of London. No existing mechanism or system is available to detect and monitor the overweight trend in children in this area. Since public health professionals have a mandate to prevent chronic diseases, an understanding of the prevalence of overweight and its contributing factors at the local level is crucial. Research is needed to help public health practitioners develop effective dietary and physical activity intervention programs to prevent the increasing epidemic of childhood overweight.

To determine the prevalence of overweight in children, a cross-sectional study was conducted in four elementary schools in the City of London in 2001. Information on the prevalence rates of overweight, and the eating and physical activity patterns of children was collected. This project was conducted in conjunction with placements for fourth year nutrition students from Brescia University College which were arranged through the Middlesex- London Health Unit.

## Objectives

Focusing on children in four elementary schools in the City of London, the objectives of this study were to i) assess the overall growth status; ii) determine the prevalence rate of overweight; iii) understand current eating and physical activity patterns; and iv) identify factors contributing to childhood overweight.

## Method

### Sample Selection

A convenience sample was from four elementary schools to represent diverse socioeconomic situations with one in an upper-income area, middle-income area, low-income area and a multicultural area. The socioeconomic status of each area was defined according to "Incidence of Low-Income"(ILI) based on data from the 1996 Census Canada [12]:

- ILI 3.3% - 14.3% = Upper-income
- ILI 14.3% - 26.9% = Middle-income area
- ILI 27%-44% = Low-income area

The study was approved by the Ethics Board of Brescia University College on the Use of Human Subjects. All students in these four schools were all invited to participate in the project. Parental consent was obtained prior to data collection. Students with positive parental consent were eligible subjects.

## Data Collection

1. Anthropometric Assessment of Grade 1-6 children

   Children's weights and heights were measured according to a standardized procedure [13]. Each child was asked to remove their shoes and any excessive clothing before entering the measuring room. In order to respect the privacy of the children, each child was measured by two nutrition students with no other children present. Weights and heights were measured twice and an average of the two values was calculated.

2. Questionnaire administered to Grades 5 and 6 children
   A self-administrated questionnaire was given to the Grades 5 and 6 children. The questions dealt with a variety of topics relating to obesity. The students were asked:

- What they ate yesterday for breakfast, lunch, supper and snacks;
- What their eating habits were (e.g., do they eat with family, eat 3 meals/day, eat out, etc.);
- What types of physical activities they enjoyed and how often;
- How much time they typically spent doing sedentary activities;
- Where they go for information about food, nutrition and health;
- Whether they have heard about Canada's Food Guide to Healthy Eating.

## Data analyses

The anthropometric data for each child was entered into Epi Info 2000 software developed by the Centre for Disease Control (CDC) of the United States. Height-for-age and BMI-for-age were calculated. The CDC age and sex-specific standards were used to calculate the height-for-age and BMI-for-age percentiles of each child. Normal height is defined as any height greater than the 5$^{th}$ percentile while stunting is defined as any value less than the 5$^{th}$ percentile [14]. BMI-for-age is defined as follows using CDC recommended cut-offs [14]:

- o <5$^{th}$ percentile = underweight
- o 5$^{th}$ – 85$^{th}$ percentile = normal
- o 85$^{th}$ – 95$^{th}$ percentile = at risk of overweight
- o >95$^{th}$ percentile = overweight

Data was analyzed using SPSS 10.0 for Windows. Questionnaires with missing values were excluded. The frequency of various responses to each question was calculated. Chi-square was used to determine associations of overweight and dietary/lifestyle factors.

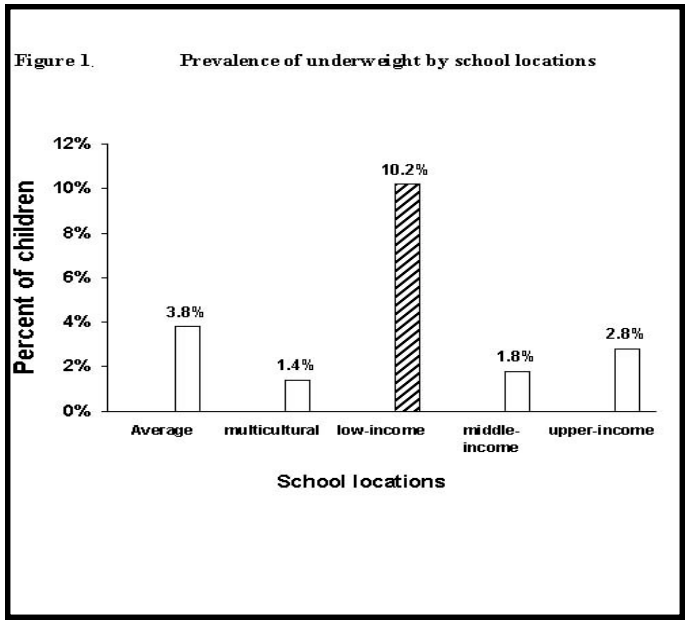
## Results

Of the 1155 eligible students, 617 obtained parental consent and participated in the study. This was an overall participation rate of 53.4%.

Of these 617 students, 234 in Grades 5 and 6 completed the questionnaire. Out of the 234 children, 189 have completed information on both anthropometric measurements and questionnaires.

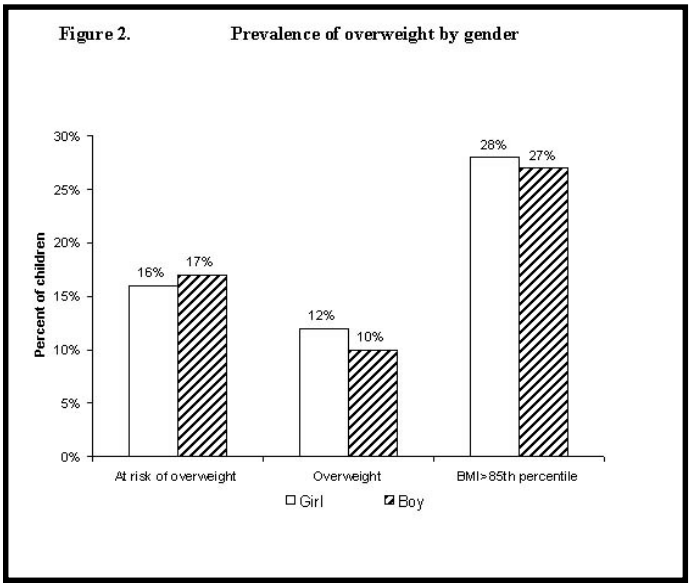
### Growth status of children

Only 3.8% of the children measured were underweight and another 3.8% were stunting (height < 5$^{th}$ percentile of the CDC height-for-age standard). Although the overall prevalence of undernutrition is generally low, further analysis showed that underweight was more prevalent in a school located in low-income area of the City (Figure 1). Ten per cent of children in this school were underweight, which is much higher than the average value (3.8%) of the total sample (Chi-Square = 18.8, p<0.01).

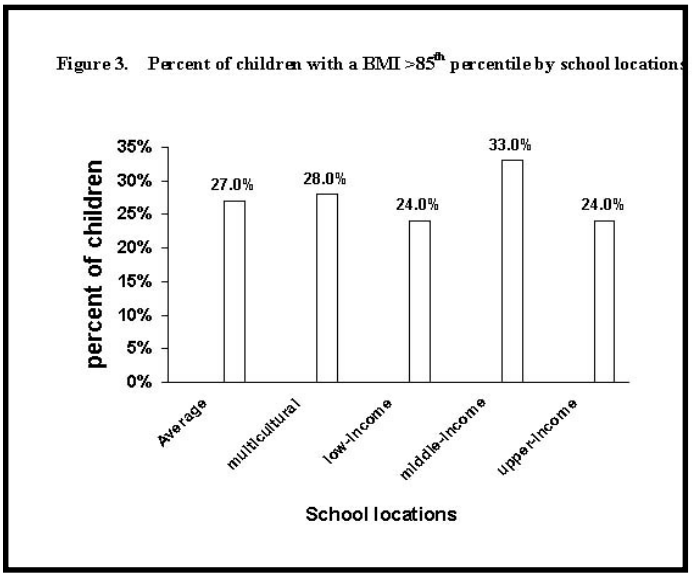



### Prevalence of Overweight

In contrast to underweight, overweight is prevalent in both boys and girls (Figure 2). Overall, 27.5% of children were at risk of being overweight or overweight (BMI > 85$^{th}$ percentile). Sixteen per cent of girls and 17% of boys were at risk of being overweight. While 12% of girls and 10% of boys fall under the category of overweight. Prevalence



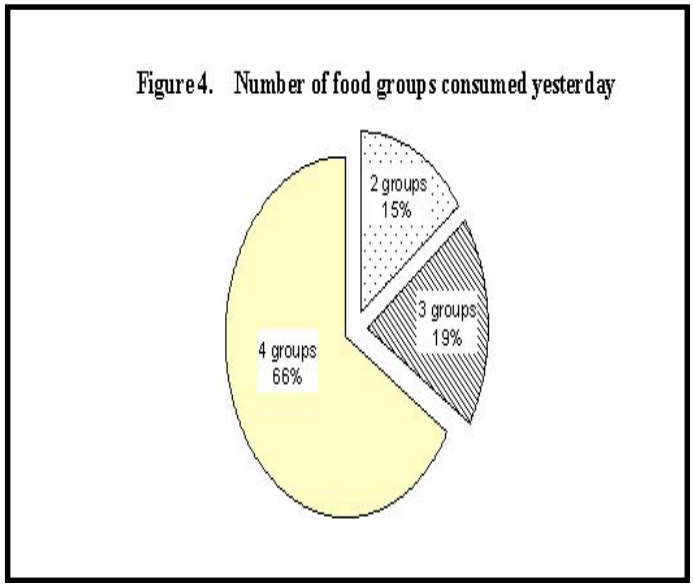

was similar between genders and across age groups. Prevalence was comparable among schools in areas with different socioeconomic status (Figure 3).




## Eating patterns of children in Grades 5 and 6

The questionnaire items on food habits focused on the types and frequency of consumption, rather than food quantity. It was assumed that children ate average portions on most occasions. The following describes the eating habits of the grade five and six students who participated, their consumption of nutritious and less-nutritious foods, as well as meal time behaviours.

**Food groups consumed the day prior to the survey:** Sixty-six per cent of children reported that they consumed four food groups the day prior to the survey, meeting the recommendation of Canada's Food Guide to Healthy

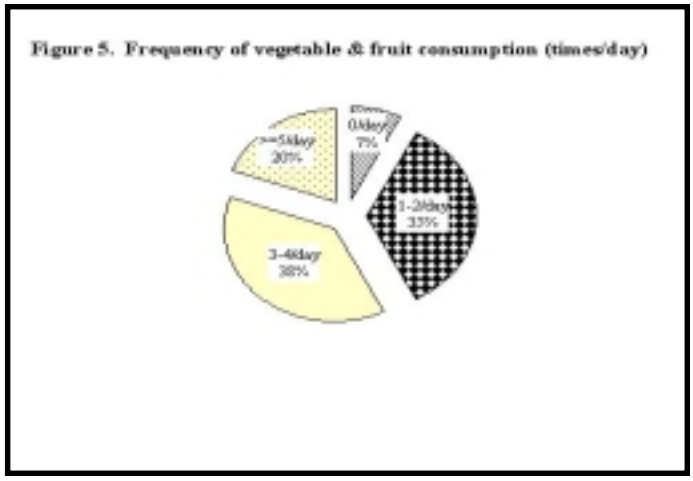



Eating. The other 34% of children consumed less than four food groups (Figure 4).

### Consumption of nutritious foods:

**Milk:** When examining food groups consumed the day prior to the survey, it was found that 15% of children did not drink milk. In response to the question 'how many cups of milk per day do you drink?, 12% reported '0', 48% reported drinking'1 to 2 glasses per day', and only 40% drank '3 or more glasses per day'.

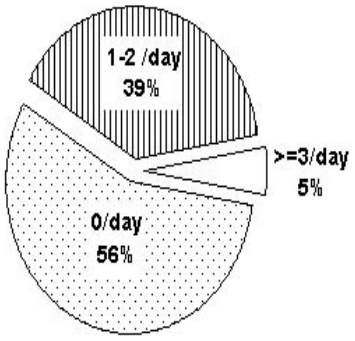
**Fruits and vegetables:** In response to the question **'**how many time per week do you eat fruits or vegetables?', only 50% and 48% reported consuming fruits and vegetables on a daily basis, respectively. When examining the frequency of fruit and vegetable consumption for yesterday, it was found that only 20% children consumed 5 or more times a day (Figure 5). Seven per cent didn't eat any fruits and vegetables at all. Among food items that children dislike, 77% of children reported that they dislike some types of vegetables.



## Consumption of less nutritious foods:

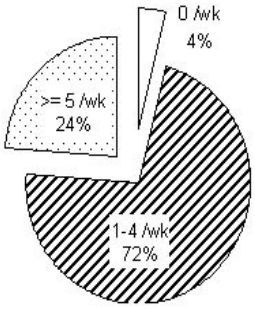
**Pop and soft drinks:** When responding to the question 'how many cans of pop or soft drink did you drink yesterday?', 39% of children reported 1 to 2 cans of soft drinks per day, while 5% drank 3 or more cans per day (Figure 6).

Figure 6. Consumption of Pop and Soft Drinks (cans/day)




**Junk food consumption**: In responding to the question ' how many times do you eat junk food, e.g., candies, pop, chips, chocolate bars per week?', only 4% children responded that they never eat junk food, most of them eat it 1 to 4 times a week, while 24% consumed on a daily basis (Figure 7).

Figure 7. Frequency of junk food consumption (times/week)




**Fats and sweets**: In this questionnaire, fats and sweets were defined as food items such as cake/cupcakes, pie, cookies, chips, doughnuts, French fries, candy, etc. Only 19% of children reported not eating any of these fats and sweets the day prior to the survey, while 43% consumed fats and sweets at least once.

## Mealtime behaviors:

**Breakfast skipping**: The frequency of breakfast skipping was examined. Ten per cent of children reported not eating any foods for breakfast the day prior to the survey. Seventy-six per cent reported eating breakfast 3 times or more per week.

**Eating-out:** Only 17% children said they did not eat out, while 82% reported eating out 1 to 4 times last week.

**Eating dinner around the table**: A question was asked 'how many times a week do you eat dinner at the table with your family?'; only 58% of children said they eat dinner around the table on a daily basis, while 6% reported never doing so.

## Physical activity patterns of children in Grades 5 and 6

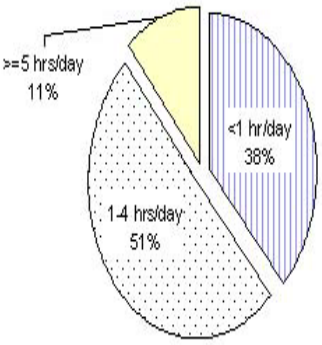
**Physical Education:** 98% of children declared participating in gym classes at school.

**Spare time activities:** This group of children tended to spend their spare time in a variety of activities, either active or sedentary. When asked about 'what activities do you do in your spare time?', 73% reported engaging in physical activities (walking, playing outdoor, sport etc.), 76% engaging in sedentary activities (viewing TV, use a computer, playing card games etc.) and 52% spending time studying (reading, doing home work, writing, etc).

**Hours spending outdoor:** In response to the question ' How long do you play outside each day?', 25% spend less than 1 hour per day, 61% spend 1 to 4 hours, 14% spend 5 hours or more per day.

**Hours watching TV:** When responding to the question **'**How long do you watch TV and/or use the computer each day?', half of the children reported spending 1 to 4 hours in TV viewing, while 11% spent 5 hours or more per day (Figure 8).

Figure 8. Duration of TV viewing and computer use per day



**Factors associated with overweight status of children in Grades 5 and 6**

The following three factors, i.e., consumption of an unbalanced-diet, frequent breakfast skipping and long hours of television viewing were found to be statistically associated with the overweight status of children in this sample.

**An unbalanced-diet:** More overweight children consumed an unbalanced-diet with less than four food groups than those that were not overweight (42% of overweight vs. 25% of non-overweight children, $p<0.05$, Table 1).

**Table 1. Association of food groups consumed and overweight status**

| Food groups consumed | Overweight | | Non-overweight | |
|---|---|---|---|---|
| | N | % | N | % |
| 2 groups | 12 | 20 | 13 | 9.7 |
| 3 groups | 13 | 21.7 | 21 | 15.7 |
| 4 groups | 35 | 58.3 | 100 | 74.6 |
| Chi-square & p values | Chi-square = 5.8, p = 0.053 | | | |

**Breakfast skipping:** Overweight status was found to be positively associated with breakfast skipping (Table 2). Compared to non-overweight children, less overweight children consumed breakfast on a daily basis (84% vs. 66%, $p<0.001$).

**Table 2. Association of the frequency of breakfast skipping and overweight status**

| Frequency of breakfast consumed | Overweight | | Non-overweight | |
|---|---|---|---|---|
| | N | % | N | % |
| Less than 1 time/wk | 3 | 5.4 | 4 | 3 |
| 1-2 times/wk | 16 | 28.6 | 17 | 12.8 |
| 3 times or more/wk | 37 | 66.1 | 112 | 84.2 |
| Chi-square & p values | Chi-square = 7.86, p < 0.005 | | | |

**Long hours of TV watching/computer use:** Compared to normal weight children, more overweight children watched TV 5 hours or more per day (5% of normal weight vs. 22% of overweight children, $p<0.001$).

**Table 3. Association of the duration of TV watching and overweight status**

| Duration of TV watching/ computer use | Overweight | | Non-overweight | |
|---|---|---|---|---|
| | N | % | N | % |
| Less than 1 hr/day | 17 | 28.8 | 54 | 36.6 |
| 1 to 4 hours/day | 29 | 49.2 | 74 | 54.8 |
| 5 hours or more/day | 13 | 22 | 7 | 5.2 |
| chi-square & p values | Chi-square = 12.96, p < 0.001 | | | |

## Children's nutrition knowledge:

Knowledge of Canada's Food Guide to Healthy Eating: Although 51.5% of children reported that they had heard of the Food Guide, only 29% thought it was shaped like a rainbow, while 64.5% said they did not know what shape it was. Children reported that their nutrition knowledge was learned from teachers (81%), parents (80.6%), and doctors (71.1%).

## Discussion

Overweight is a concern in this group of children. Unhealthy eating and sedentary lifestyles are evident. An unbalanced diet, frequent breakfast skipping and long hours of television viewing were identified as key factors to overweight in the study population. To tackle this public health problem, interventions are needed to promote healthy eating and active living in children in the community at large.

Approximately 30% of school-aged children in this sample were either at risk of overweight or overweight. The prevalence seems slightly lower than the national overweight prevalence in children aged 7-13 based on data from the 1996 National Longitudinal Survey of Children and Youth (NLSCY) (Table 4)[15]. However, two critical issues should be pointed out when comparing overweight prevalence between these two studies. First, the definitions of overweight and obesity used are slightly different [15]. In the current study, using the CDC BMI-for-age as a reference standard, children with BMIs between 85$^{th}$ and 95$^{th}$ percentile were classified as 'at risk of overweight' and those with BMIs above the 95$^{th}$ percentile "overweight". Though with similar BMI percentile cut-off points, Tremblay used a different BMI reference standard, i.e., the BMI dataset from the Canada Fitness Survey in 1981, to identify overweight and obesity of children from the NLSCY [15]. Second, the 1996 NLSCY BMI data were based on parents reported body weights and heights, which may lead to over or under estimations [15].

**Table 4. Comparisons of overweight prevalence (%)**

| | The current study | | The 1996 NLSCY [15] | |
|---|---|---|---|---|
| | Girls | Boys | Girls | Boy |
| BMI >85$^{th}$ percentile | 28 | 27 | 29 | 35 |
| BMI >95$^{th}$ percentile | 12 | 10 | 15 | 17 |

Although overweight is obviously a public health concern, under-nourishment, on the other hand, was noted another matter for children living in a low-income area of the City. Ten per cent of children in the low-income area were underweight. It was not possible to assess the degree to which the higher prevalence of underweight and stunting among children living in the low-income area may be due to nutritional deficits among recently arrived Canadians that arose in countries of origin (particularly causing stunting) rather than as a result of nutrition in Canada. The concurrence of both overweight and underweight seems a paradox. This may be attributed to the lack of nutritious foods in low-income families. Over-consumption of less nutritious foods of 'energy dense' or 'empty calories' might lead to being overweight, while the scarcity of foods at home could be the explanation of underweight in these children. Nevertheless, public health professionals should pay attention to children living in low-income areas to ensure adequate nutrition, growth and development.

The findings from the self-administrated questionnaire showed that unbalanced diets, low fruit and vegetable consumption, frequent junk food and soft drink consumption were common in Grades 5 and 6 children:

- Many children in the sample had an unbalanced diet. One-third of them consumed items from less than 4 food groups the day prior to the survey, not meeting the recommendation of Canada's Food Guide to Healthy Eating [16]. Consumption of an unbalanced diet was found to be associated with overweight. From the sample, 42% of the overweight children consumed less than 4 food groups, as compared to 25% of the non-overweight students. Breakfast is believed to be a key meal for children. Although only 10% of the children are frequent breakfast skippers, overweight children in this study were found to more likely skip breakfast and consume a few large meals than their non-overweight counterparts, which is consistent with that reported by Dwyer et al [17]. A potential explanation is that eating breakfast can reduce fat intake and limits snacking over the remainder of the day [18]. Research has shown that the distribution of energy intakes from different meals is related to an individuals' adiposity content [19]. A high proportion of energy intake at the dinner meal was associated with high adiposity content [19].
- Low intakes of vegetables and fruits have been reported for school aged children[20]. In the current sample, only half of children consumed fruits and vegetables on a daily basis. Of those that consumed vegetables and fruits, only 19% consumed 5 times or more per day. Although only information on the frequency, not the number of servings of fruit and vegetable consumption is available in the current study, some validation studies have suggested that the frequency of fruit and vegetable consumption is somewhat correlated to the numbers of servings [21]. If this is the case, one-fifth of the children in the present study did not meet the 5 servings of vegetables and fruit as recommended by Canada's Food Guide [16].
- Pop and soft drinks were common food items in this group of children. Nearly half (40%) of children consumed between 1 and 2 cans per day. These findings concur with the national level data, which indicates that on average 38% of school children at the Grade 6 level in 1998 were consuming soft drinks daily [20]. The consumption of "soft-drinks" by school age children has been associated with an increased caloric intake and a reduction in consumption of vegetable and fruit intake [22]. In addition, Ludwig et al found an association between intake of "sugar-sweetened" drinks (including sweetened fruit juices) and obesity in children [23]

Sedentary behaviours were observed in the study population. Television viewing and computer use were regular activities in these children's daily life. A positive association was found in this study, between the duration of television viewing/computer use and overweight status. Twenty-two per cent of the overweight children reported TV watching/computer use for 5 hours or more per day, as compared to only 5.2% of the non-overweight children. Increased television viewing was found to be associated with declining physical activity levels in children[24]. Television viewing has been theorized to contribute to overweight in two ways: 1) reduced energy expenditure, and 2) increased food intake, e.g., snacking while watching, or as a result of advertising [25]. When television viewing is a normal part of regular meal patterns, food intake may include increased "junk food", and fewer fruits and vegetables [26]. Only 58% of children in this study reported "eating dinner around the table" on a daily basis. This might be viewed as possible evidence towards the disruption of food group consumption, and increase in "junk food" and "sweets and fats" reported earlier, although, there was no measure to determine if in fact television was a regular part of meal habits in this study.

## Limitations of the study

There were a few limitations to this study that need to be addressed. First, this was a conventional sample, instead of a randomized sample, which limits the generalization of the results to the whole school-aged population. Second, issues pertaining to the questionnaire content and format were also apparent. For instance, the questionnaire only obtained information on the frequency of fruit/vegetable consumption, instead of numbers of servings. Value ranges (i.e., 1 to 4) for some questions were too broad, and hence limited information could be derived from the questionnaire. The present study failed to obtain information on the types and duration of physical activities.

## Implications of the study

Public health interventions are needed to prevent childhood overweight in the community-at-large. As parents, teachers and doctors were identified as the most influential to children's health behaviours, health promotion activities targeting children, along with parents and teachers can be an effective strategy. Public health programs should promote healthy eating and active living. Key messages should include increasing fruit and vegetable consumption, decreasing pop/soft drink consumption, consuming a balanced diet and eating breakfast on a daily basis, increasing physical activity levels and reducing TV viewing time.

Public health should also pay attention to children living in low-income areas to ensure adequate nutrition, growth and development.

## Conclusions

In conclusion, overweight was prevalent in this sample of elementary school children. Factors such as an unbalanced diet, long hours of television viewing and breakfast skipping were found to be statistically associated with overweight status. Both underweight and overweight occurred concurrently in children in the economic disadvantaged areas.

### ACKNOWLEDGEMENTS

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❑

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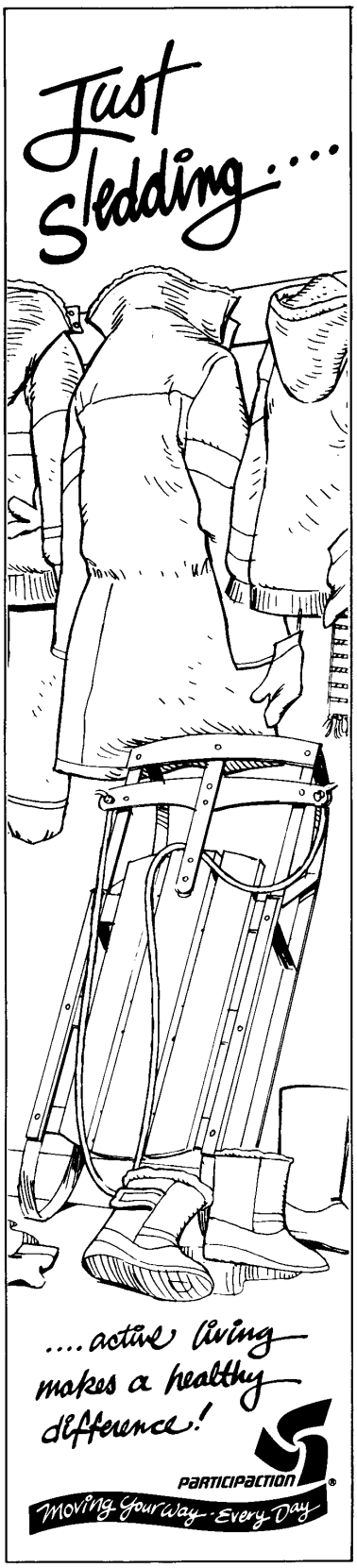

# Summary of Reportable Diseases in Ontario - November, 2002

| Health Units by Region | Population 2000 | AIDS | Campylo. | Chicken-pox | Chlamydia | Enceph./ Meningitis | GAS | Gonorrhea |
|---|---|---|---|---|---|---|---|---|
| Algoma | 125,109 | | 1 | 9 | 14 | | 1 | 1 |
| North Bay | 93,505 | | | 10 | 9 | | 1 | |
| Northwestern | 91,920 | | | 1 | 6 | | | 1 |
| Porcupine | 93,680 | | 1 | 25 | 5 | | | |
| Sudbury | 199,619 | | 2 | 3 | 28 | | | 1 |
| Thunder Bay | 158,698 | | 6 | | 25 | | | 2 |
| Timiskaming | 37,721 | | | | | | | |
| **Total - Northern** | **800,252** | | **10** | **48** | **87** | | **2** | **5** |
| Eastern Ontario | 194,945 | | 2 | 3 | 12 | | | 1 |
| Hastings & Prince Edward | 159,088 | | 4 | | 17 | | | |
| Kingston, Frontenac & Lennox | 180,225 | | | | 22 | 2 | 1 | |
| Leeds, Grenville & Lanark | 163,143 | | | | | | | |
| Ottawa | 779,274 | 1 | 18 | 49 | 95 | | 2 | 14 |
| Renfrew | 101,131 | | | 1 | 8 | | | |
| **Total- Eastern** | **1,577,806** | **1** | **24** | **53** | **154** | **2** | **3** | **15** |
| Durham | 512,271 | | 5 | | 51 | | 1 | 6 |
| Haliburton-Kawartha | 168,120 | | 5 | | 8 | | | |
| Muskoka-Parry Sound | 86,218 | | | 1 | 3 | | | |
| Peel | 1,008,163 | 1 | 30 | 217 | 90 | | | 18 |
| Peterborough | 128,881 | | 1 | 23 | 22 | 1 | 2 | 1 |
| Simcoe | 377,405 | | 11 | 41 | 15 | 3 | | 1 |
| Toronto - total | 2,542,844 | | 109 | 251 | 526 | 11 | 4 | 138 |
| *North* | *627,021* | | *24* | *114* | *122* | *1* | | *28* |
| *South* | *688,584* | | *35* | *43* | *180* | *5* | *3* | *60* |
| *West* | *509,302* | | *30* | *33* | *151* | *3* | *1* | *34* |
| *East* | *717,937* | | *20* | *61* | *73* | *2* | | *16* |
| York | 724,969 | | 29 | | 25 | 1 | 2 | 1 |
| **Total - Central East** | **5,548,871** | **1** | **190** | **533** | **740** | **16** | **9** | **165** |
| Grey Bruce | 157,664 | | 2 | | 5 | 1 | 1 | |
| Elgin-St. Thomas | 84,182 | | | 30 | 2 | | | |
| Huron | 61,097 | | 2 | 24 | 3 | | | |
| Chatham-Kent | 112,897 | | 1 | 19 | 15 | 1 | | 1 |
| Lambton | 131,643 | | | | | | | |
| Middlesex-London | 412,976 | | 2 | | 33 | 1 | 1 | 3 |
| Oxford | 102,561 | | 4 | | 6 | | | |
| Perth | 75,238 | | 7 | 7 | 2 | | | |
| Windsor-Essex | 381,672 | | 12 | 143 | 55 | 2 | | 4 |
| **Total - Southwest** | **1,519,930** | | **30** | **223** | **121** | **5** | **2** | **8** |
| Brant | 126,481 | | | 20 | 17 | | 1 | 1 |
| Haldimand-Norfolk | 109,536 | | 2 | | 4 | | | |
| Halton | 375,705 | | 14 | | 6 | | | |
| Hamilton | 498,553 | | 6 | 6 | 31 | 5 | 3 | 7 |
| Niagara | 423,600 | | 10 | | 29 | 1 | 2 | 4 |
| Waterloo | 446,833 | | 4 | | 25 | | | 1 |
| Wellington-Dufferin-Guelph | 241,777 | | 2 | 10 | 19 | | 1 | 1 |
| **Total - Central West** | **2,222,485** | | **38** | **36** | **131** | **6** | **7** | **14** |
| **November 2002** | **11,669,344** | **2** | **292** | **893** | **1,233** | **29** | **23** | **207** |
| *** Total YTD 2002** | - | **76** | **4,228** | **12,801** | **16,225** | **628** | **338** | **2,751** |
| *** Total YTD 2001** | - | **129** | **4,634** | **10,743** | **15,072** | **498** | **289** | **2,714** |

The Toronto City regions above are now defined as: North - former North York; South - former City of Toronto; West - former Etobicoke and City of York; East - former Scarborough and East York

* Adjusted for deletions and late reports.

# Summary of Reportable Diseases in Ontario - November, 2002

| Health Units by Region | Population 2000 | PPNG | Hepatitis A | Hepatitis B | Hepatitis C | Hib | Influenza | Measles | Meningo-coccal |
|---|---|---|---|---|---|---|---|---|---|
| Algoma | 125,109 | | | | 5 | | | | |
| North Bay | 93,505 | | | | 1 | | | | |
| Northwestern | 91,920 | | | | 3 | | | | |
| Porcupine | 93,680 | | | | | | | | |
| Sudbury | 199,619 | | | 1 | 5 | | | | |
| Thunder Bay | 158,698 | | | 1 | 8 | | | | |
| Timiskaming | 37,721 | | | | | | | | |
| **Total - Northern** | **800,252** | | | **2** | **22** | | | | |
| Eastern Ontario | 194,945 | | | | 2 | | | | 1 |
| Hastings & Prince Edward | 159,088 | | | | 1 | | | | 1 |
| Kingston, Frontenac & Lennox | 180,225 | | | 1 | 1 | | | | |
| Leeds, Grenville & Lanark | 163,143 | | | | | | | | |
| Ottawa | 779,274 | 1 | | 1 | 42 | | 1 | | |
| Renfrew | 101,131 | | | | | | | | |
| **Total- Eastern** | **1,577,806** | **1** | | **2** | **46** | | **1** | | **2** |
| Durham | 512,271 | | | | | | 1 | | |
| Haliburton-Kawartha | 168,120 | | | | 7 | | | | |
| Muskoka-Parry Sound | 86,218 | | | | 1 | | 1 | | |
| Peel | 1,008,163 | | 2 | | 26 | | 1 | | |
| Peterborough | 128,881 | | | | 5 | | | | |
| Simcoe | 377,405 | | | | 18 | | | | |
| Toronto - total | 2,542,844 | 7 | 7 | | 130 | | 4 | | |
| *North* | *627,021* | | | | *35* | | *1* | | |
| *South* | *688,584* | *7* | *4* | | *46* | | *2* | | |
| *West* | *509,302* | | *2* | | *29* | | *1* | | |
| *East* | *717,937* | | *1* | | *20* | | | | |
| York | 724,969 | 1 | | | 4 | | 5 | | |
| **Total - Central East** | **5,548,871** | **8** | **9** | | **191** | | **12** | | |
| Grey Bruce | 157,664 | | | | 2 | | | | |
| Elgin-St. Thomas | 84,182 | | | | | | | | |
| Huron | 61,097 | | | | 1 | | | | |
| Chatham-Kent | 112,897 | | | | 30 | | | | |
| Lambton | 131,643 | | | | | | | | |
| Middlesex-London | 412,976 | 1 | | | 6 | | | | |
| Oxford | 102,561 | | | | | | 1 | | |
| Perth | 75,238 | | | | | | | | |
| Windsor-Essex | 381,672 | | | | 12 | | | | |
| **Total - Southwest** | **1,519,930** | **1** | | | **51** | | **1** | | |
| Brant | 126,481 | | | | | 1 | | | |
| Haldimand-Norfolk | 109,536 | | | 1 | 3 | | | | |
| Halton | 375,705 | | | 1 | 6 | | 5 | | |
| Hamilton | 498,553 | | | | 5 | | 1 | | |
| Niagara | 423,600 | | | 1 | 22 | | | | |
| Waterloo | 446,833 | | | | | | | | |
| Wellington-Dufferin-Guelph | 241,777 | | | | 2 | | 4 | | |
| **Total - Central West** | **2,222,485** | | | **3** | **38** | **1** | **10** | | |
| **November 2002** | **11,669,344** | **10** | **9** | **7** | **348** | **1** | **24** | | **2** |
| *** Total YTD 2002** | - | **179** | **141** | **102** | **4,532** | **5** | **2,197** | | **52** |
| *** Total YTD 2001** | - | **176** | **160** | **170** | **5,008** | **6** | **768** | **6** | **103** |

The Toronto City regions above are now defined as: North - former North York; South - former City of Toronto; West - former Etobicoke and City of York; East - former Scarborough and East York

* Adjusted for deletions and late reports.

# Summary of Reportable Diseases in Ontario - November, 2002

| Health Units by Region | Population 2000 | Mumps | Pertussis | Rubella | Salmon. | Shigellosis | Syphilis (Prim/Sec) | VTEC |
|---|---|---|---|---|---|---|---|---|
| Algoma | 125,109 | | 1 | | 2 | | | |
| North Bay | 93,505 | | 1 | | 1 | | | |
| Northwestern | 91,920 | | | | | | | |
| Porcupine | 93,680 | | 1 | | | | | |
| Sudbury | 199,619 | | 1 | | 1 | | 1 | |
| Thunder Bay | 158,698 | | | | 1 | | | 1 |
| Timiskaming | 37,721 | | | | | | | |
| **Total - Northern** | **800,252** | | **4** | | **5** | | **1** | **1** |
| Eastern Ontario | 194,945 | | 1 | | 4 | | | 1 |
| Hastings & Prince Edward | 159,088 | | 1 | | 2 | | | |
| Kingston, Frontenac & Lennox | 180,225 | | 1 | | | | | |
| Leeds, Grenville & Lanark | 163,143 | | | | | | | |
| Ottawa | 779,274 | | 4 | | 14 | 3 | 1 | |
| Renfrew | 101,131 | | | | | | | |
| **Total- Eastern** | **1,577,806** | | **7** | | **20** | **3** | **1** | **1** |
| Durham | 512,271 | | | | 8 | 2 | 1 | 1 |
| Haliburton-Kawartha | 168,120 | | 1 | | 3 | | | 1 |
| Muskoka-Parry Sound | 86,218 | | 2 | | | 2 | | |
| Peel | 1,008,163 | | 1 | | 17 | 2 | | 3 |
| Peterborough | 128,881 | 1 | 4 | | 1 | | | |
| Simcoe | 377,405 | | 1 | | 2 | | | |
| Toronto - total | 2,542,844 | | 4 | | 28 | 16 | 20 | 2 |
| *North* | *627,021* | | *2* | | *8* | | *1* | |
| *South* | *688,584* | | | | *7* | *9* | *18* | *1* |
| *West* | *509,302* | | *1* | | *11* | *3* | *1* | *1* |
| *East* | *717,937* | | *1* | | *2* | *4* | | |
| York | 724,969 | | 3 | | 6 | 1 | | |
| **Total - Central East** | **5,548,871** | **1** | **16** | | **65** | **23** | **21** | **7** |
| Grey Bruce | 157,664 | | | | 1 | | | |
| Elgin-St. Thomas | 84,182 | | 2 | | | | | |
| Huron | 61,097 | | | | | | | |
| Chatham-Kent | 112,897 | | | | 2 | | | |
| Lambton | 131,643 | | | | | | | |
| Middlesex-London | 412,976 | | | | 1 | | | |
| Oxford | 102,561 | | 1 | | | | | 1 |
| Perth | 75,238 | | | | | | | |
| Windsor-Essex | 381,672 | | | | 8 | | | |
| **Total - Southwest** | **1,519,930** | | **3** | | **12** | | | **1** |
| Brant | 126,481 | | | | 1 | | | 2 |
| Haldimand-Norfolk | 109,536 | | | | | | | |
| Halton | 375,705 | | 1 | | 1 | 2 | | |
| Hamilton | 498,553 | | | | 5 | 1 | | 3 |
| Niagara | 423,600 | | 1 | | 7 | 2 | | 6 |
| Waterloo | 446,833 | | | | 5 | | | |
| Wellington-Dufferin-Guelph | 241,777 | | | | 1 | | | 1 |
| **Total - Central West** | **2,222,485** | | **2** | | **20** | **5** | | **12** |
| **November 2002** | **11,669,344** | **1** | **32** | | **122** | **31** | **23** | **22** |
| *** Total YTD 2002** | - | **11** | **443** | **2** | **2,237** | **824** | **147** | **356** |
| *** Total YTD 2001** | - | **13** | **426** | **15** | **2,369** | **210** | **22** | **326** |

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