

# Obesity in Newfoundland and Labrador

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# Table of Contents

Obesity .....	3
Epidemiology of obesity .....	3
What is obesity and how is it measured? .....	5
Health consequences of obesity .....	6
Tracking for obesity .....	7
Causes for the increasing prevalence of obesity .....	7
Determinants of obesity .....	10
Obesity and Health Services Utilization Patterns .....	10
Epidemiology of obesity in NL .....	11
Obesity in the NL Health Boards .....	14
Is obesity a preventable condition? .....	15
Local Prevention Efforts .....	16
What is the medical treatment for obesity? .....	17
Local Treatment Options .....	18
Conclusions and Discussion .....	19
Bibliography .....	21

## **Obesity**

Obesity is described as an “epidemic” by the World Health Organization due to its increasing world-wide prevalence over a relatively short time period (1). Obesity is the most common metabolic condition in economically developed countries (2) and is considered to be the second leading avoidable cause of mortality for adults in Western countries after smoking (3).

Over the past two decades there has been a significant increase in the prevalence of obesity in the Canadian population as measured by body mass index (BMI). According to the National Population Health Survey (NPHS 1994) and the Canadian Community Health Survey (CCHS 2003), approximately 15% of Canadian adults aged 20-64 years were classified as obese, compared to 13% for the same population in 1994. In Canada the annual cost of health care related to over-weight and obesity-related conditions in adults has been estimated to be between \$1.8 and \$3.5 billion and this estimate does not include children (2).

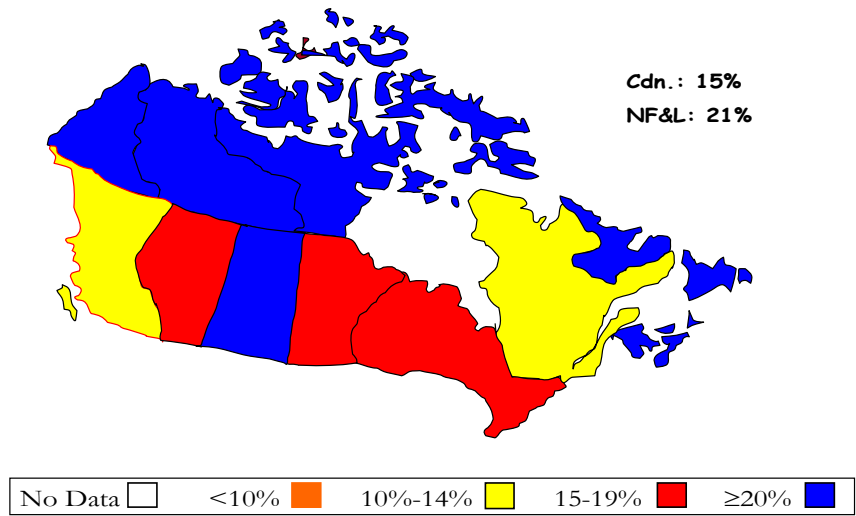
## **Epidemiology of obesity**

In Canada, between 1985 and 2003 the prevalence of adult obesity increased three-fold. In 1985, according to the Health Promotion Survey, approximately 5.6% of the adult population aged 20-64 years was classified as obese. According to the Canadian Community Health Survey, in 2003, 14.9% of Canadians in this same age-range were considered obese (Figure 1). Increases in the prevalence of obesity in Canada are comparable to other western developed countries, although Canada does have slightly lower rates than both the United States and the United Kingdom (Figure 2). Over this same time period, there has been a significant increase in the prevalence of obesity in Canadian children. A study by Tremblay et al. (4) examined the prevalence of overweight and obese children, using three national surveys administered between 1981 and 1996. The study concluded that between 1981-1996 the percentage of overweight boys increased from 15% to 29% and the percentage of overweight girls increased from 15% to 24%. During the same period the prevalence of obesity increased from 5% to 13% for boys and from 5% to 11.8% for girls (Figure 3). A study by Willms in 2003 found a similar prevalence for overweight and obese children: 33% of boys and 26% of

girls measured overweight and 10% of boys and 9% of girls measured obese. These findings suggest that over a 15-year period the prevalence of childhood overweight and obesity has more than doubled, although there are no statistically significant differences between boys and girls (5).

**Figure 1**

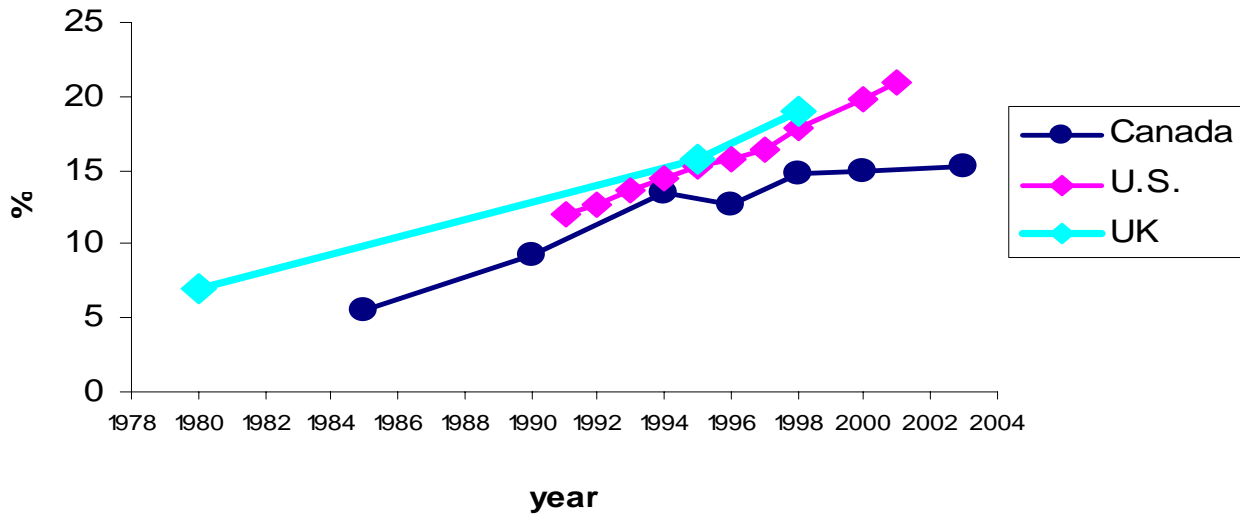
**Prevalence of obesity in Canada 2003**



Source: P.T. Katzmarzyk, Unpublished Results.  
Data from: Statistics Canada. *Health Indicators*, June, 2004.

**Figure 2**

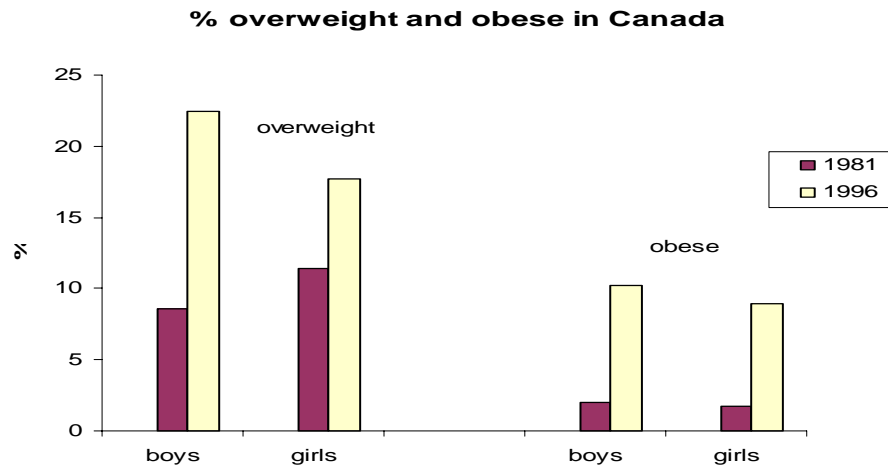
**Prevalence of Obesity**



Sources: CFS, NPHS, CCHS, BRFSS

**Figure 3**

Tremblay MS. et al.  
International Journal of Obesity Research, 2002



**What is obesity and how is it measured?**

Obesity is characterized by excessive adipose tissue or “body fat” caused primarily by an imbalance between energy intake and expenditure. Body fat can be measured many ways; however the most common non-invasive method is through the calculation of the body mass index (BMI). To calculate a BMI, an individual’s height and weight are required. Using these numbers, an index is calculated by dividing weight in kilograms by height in meters squared ( $\text{kg/m}^2$ ). There is a wide body of research that links increasing body mass index with increasing morbidity and mortality (6; 7). At either very low or very high values, BMI is associated with increasing health risk in terms of increased risk of mortality. As a result the World Health Organization (WHO) in collaboration with the International Obesity Task Force (IOTF) designed a classification system to separate BMI values into 4 main categories that correlate with increasing health risk. These categories and associated health risks are:

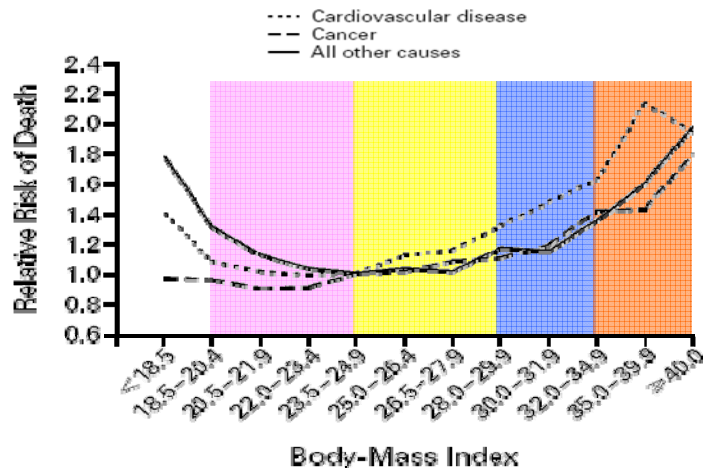
BMI ( $\text{kg/m}^2$ )	Descriptor	Risk of co-morbidities
<18.5	underweight	Increased risk
18.5 – 24.9	Normal weight	Low risk
25 – 29.9	Overweight	Increased risk
>30	Obese	Moderate-very severe risk

The “J” or “U” shaped graph below is typical of the associated increased health risk, with *either* increasing or decreasing BMI values (Figure 4). According to a study by Calle (6), as body mass index increases the relative risk of death by cardiovascular disease, cancers and all other causes increases. At a BMI of over 40 (described as morbidly obese), an individual is almost twice as likely to die from cardiovascular disease as a “normal weight” individual (BMI <25kg/m<sup>2</sup>).

**Figure 4**

## Relationship Between BMI and Mortality in Women

Calle et al., *N Engl J Med* 1999;341:1097-105



### Health consequences of obesity

Excessive “body fat” in adults can lead to adverse metabolic effects on blood pressure, cholesterol, triglycerides and insulin resistance. It also impairs the functioning of many important organs and body systems, increasing the risk of developing multiple health problems, and the likelihood of early death (7; 8). More specifically, obesity is associated with health problems such as cardiovascular disease (9; 10; 11), many cancers, especially those hormonally driven, gallbladder disease, and Type 2 diabetes (12). In addition, obese individuals suffer social stigmatization, discrimination and psychological consequences (13; 14).

Several studies on obesity in children show an association between “excessive body fat” and adult-like cardiovascular risk factors, such as high blood pressure, dyslipidemia, abnormalities in left ventricular mass, hyperinsulinemia and/or insulin resistance (15; 16). In a study by Freedman et al. 58% of obese 5-10 year olds had at least one of these five cardiovascular risk factors and 25% had two or more. A systematic review of cardiovascular/obesity research concluded that childhood obesity is associated with adverse effects on the cardiovascular system, which are well known and similar to effects in adults (17). Obesity in childhood is associated with an increased incidence of asthma (18; 19). In addition, childhood obesity is associated with an increasing risk of type II diabetes(10;26), a disease that, until recently, was diagnosed only in adults. Obese children are more likely to experience psychological problems than their non-obese peers. Girls are more at risk than boys and psychological morbidity increases with age. Low self esteem and behavioral problems are associated with obesity (13; 21). Several studies have concluded that obesity in childhood/adolescence has adverse effects on long-term social and economic outcomes in young adulthood such as level of income and educational attainment (22; 23).

### **Tracking for obesity**

Obese children are more likely to become obese adults (1; 24; 25). According to the National Population Health Survey, a longitudinal survey of Canadians, between 1993/94 and 2002/03, one out of four overweight individuals had become obese; one out of three normal weight individuals had become overweight and only one in ten initially in the overweight range moved into the normal range. This Canadian data provides evidence for other research in this area and confirms that obesity “tracks” through life. Once excess weight is gained it is very difficult to lose.

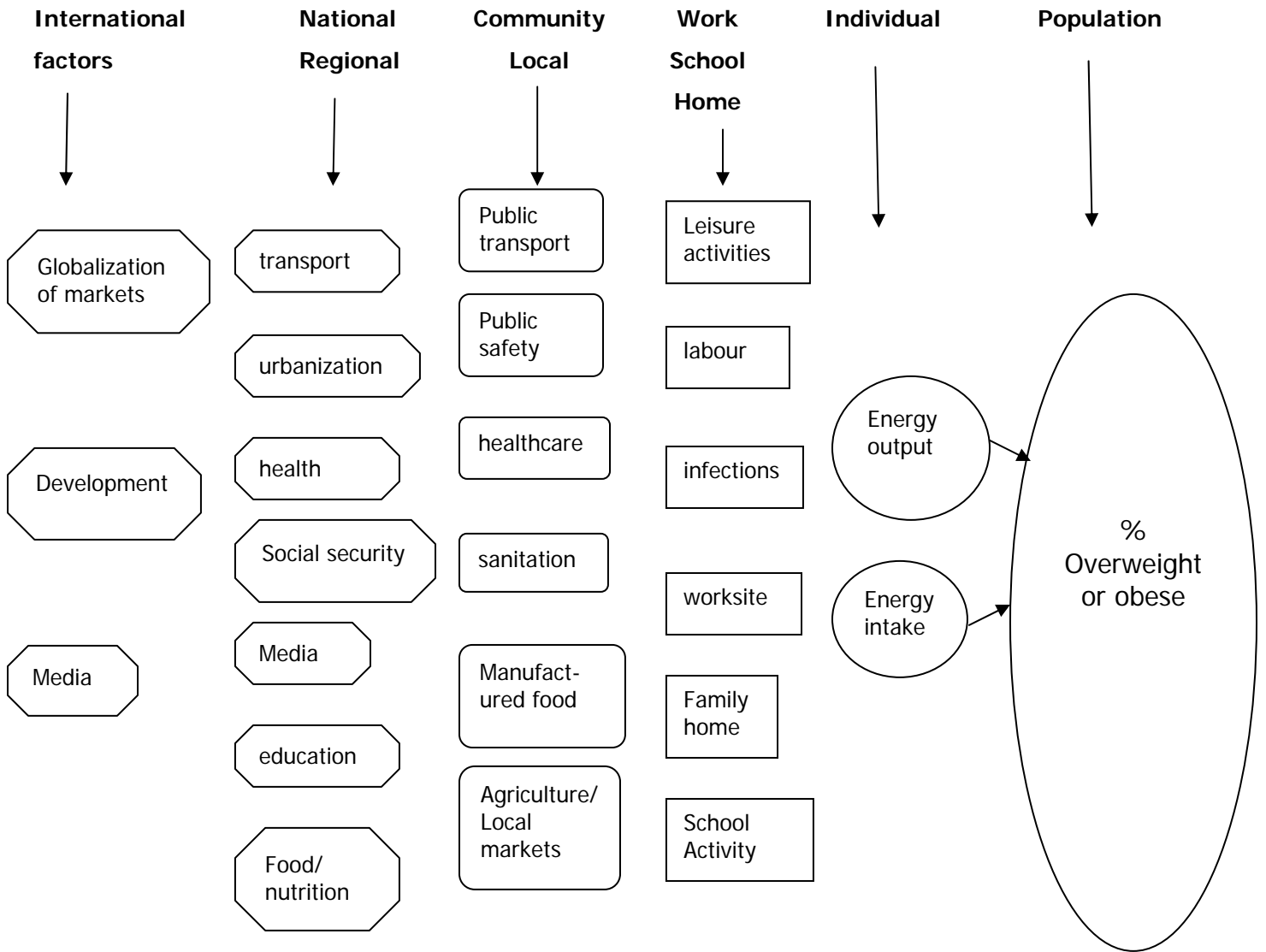
### **Causes for the increasing prevalence of obesity**

Health professionals and researchers agree that a proportion of obesity in the population is due to an inherited genetic predisposition and factors outside an individual’s control. It is purported that between 20-40% of the cases of obesity may be explained by genetics (G Sun, 2004). The tracking and surveillance of this relatively recent (<25 years) increase in obesity prevalence in developed countries, suggests that it is unlikely that genetics is the main contributor to the change in mean body weight (26; 27). Changing

lifestyles (social, behavioral, cultural, community) which promote an imbalance of energy intake and energy expenditure in most societies in the world are more likely to be the cause (Finegood, 2004). Although genetics research is crucial to understanding the root biological and genetic causes of obesity in order to inform treatment options, research on the burden of obesity and effective interventions to manage, prevent and reduce obesity is equally important. A synthesis paper by the Canadian Institutes of Health Research (CIHR) concluded that “obesity is a multi-factorial problem” and many factors are both associated with and predict obesity, including individual lifestyle choices, community structure, societal values, and public policy. The International Obesity Task Force published a framework to illustrate how **many** levels of a society, including the global environment can influence the prevalence of obesity at a population level (Figure 5). It is most likely a combination of these factors that promote an energy/expenditure imbalance in societies today. According to this framework, to have an impact on the prevalence of overweight or obesity in a population, policy makers need to identify and implement programs and policies that target different levels of influence (local, community, global). Introducing mandatory physical education classes and healthy food choices in schools; providing infrastructure for bike lanes, safe places to walk, recreation areas; and partnering with food manufactures to ensure food products low in fat, sugar and salt are available at affordable prices are examples of intervention efforts designed to have an impact on several levels of influence.



**Figure 5**  
"Causal Web"



## **Determinants of obesity**

It is well established that the health of individuals is not influenced solely by access to health care services, but by a variety of variables (28) that include individual characteristics (genetics, personal behavior patterns), environmental characteristics (workplace, school, home, pollution, water quality) and social characteristics of a society (government policy, income equality and access to employment and education opportunities). In addition research primarily conducted in England provides evidence that a "social gradient" exists with relation to health. People of higher social standing measured by level of income, education and type of employment live healthier and longer lives than individuals that are less well-off (Black report, Acheson report, Whitehall study, Kaplan and Lynch in Canada). Research on obesity supports these findings. Individuals with low levels of education and income, low levels of activity, who live in rural areas, are more likely to be either overweight or obese than their better-off, more active urban counterparts. In addition education appears to be the most influential variable after conducting statistical analyses (29).

## **Obesity and Health Services Utilization Patterns**

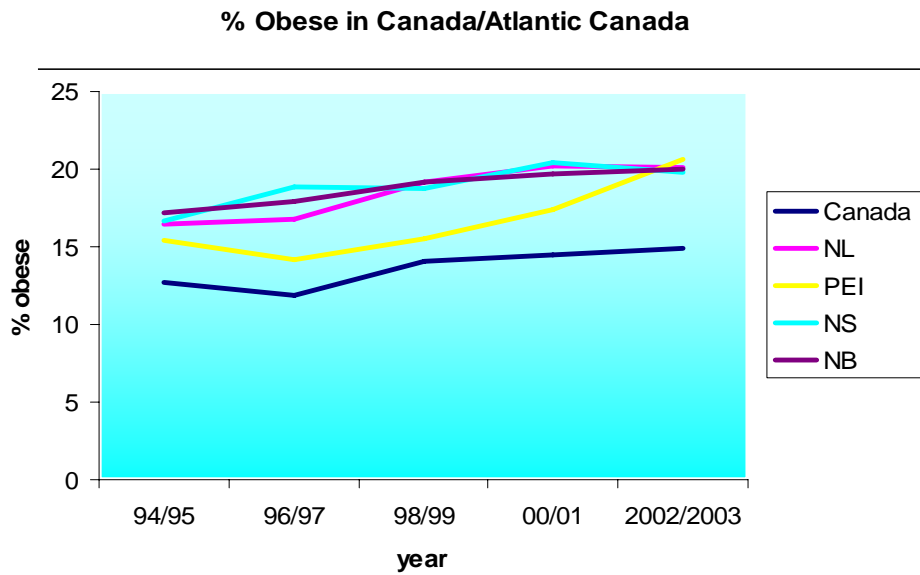
Many studies demonstrate increased health services utilization by obese individuals. A study published in the Canadian Medical Association Journal in 1999 by Trakas et. al. (30) using the National Population Health Survey (NPHS 1994), set out to determine: the prevalence of obesity in Canadians; the associated co-morbidities and the patterns of health system utilization by this population. The NPHS is a national survey administered to approximately 17 000 Canadians (random sample) aged 20-64 years. Information was collected on body-mass-index; health status scores and self-esteem. Healthcare utilization admissions and drug usage were determined for obese and non-obese individuals through both face-to-face and telephone interviews. Several findings are of interest. The obese population (as classified by a BMI > 30kg/m<sup>2</sup>) demonstrated: higher rates of GP visits and visits to mental health professionals and higher rates of disability days. The obese population was more likely to be taking heart medication,

antihypertensive, diuretics, oral diabetes pills, antidepressants, diet pills, antibiotics, stomach remedies and pain relievers for arthritis and back pain. Similarly, a number of studies conducted in England, Australia and the United States report increased utilization of health services by this population (31-34).

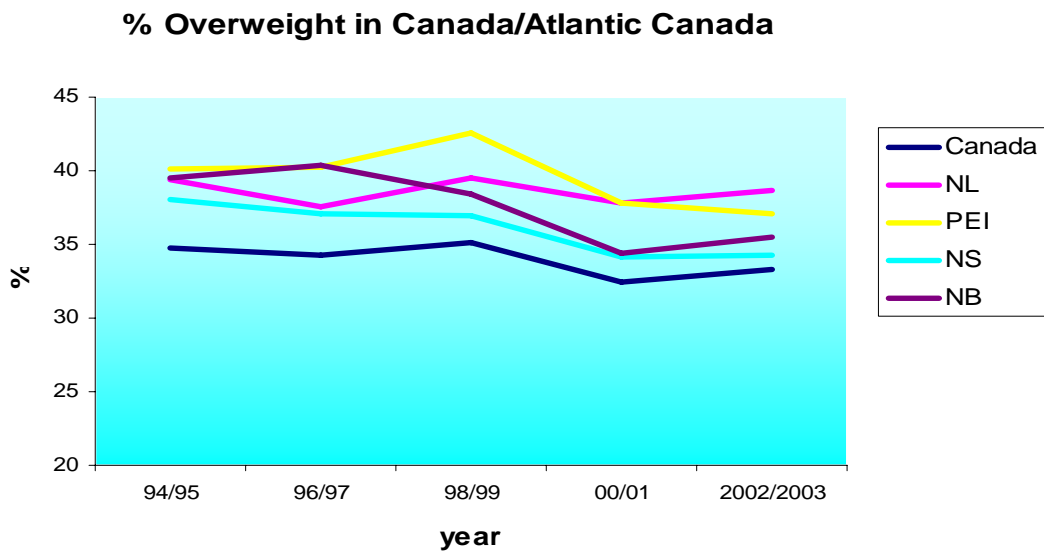
## **Epidemiology of obesity in NL**

Newfoundland and Labrador has the highest prevalence of overweight and obese adults in Canada. According to the 1994/1995 NPHS and the 2000/2001 CCHS, the overall prevalence of adult obesity in NL increased from 18% to 21% of the total population (Figure 6) compared to the national average increase in the total population of 13% to 15%. In 2003 the prevalence of overweight in Newfoundland and Labrador was 39% versus 33% in Canada. In this province two of every ten people are obese, four of ten are overweight and four of ten are considered to have a normal weight. Although this prevalence is comparable with the other Atlantic Provinces, Newfoundland and Labrador has the highest prevalence of obesity across the provinces after the Northwest Territories and Nunavut. The increasing prevalence of obesity in Newfoundland and Labrador is a major cause for concern. It is fundamental that we understand the true burden of obesity, in terms of individual health, its impact on society, and its impact on the health system in order to efficiently allocate scarce resources towards the prevention or overweight and obesity in the population.

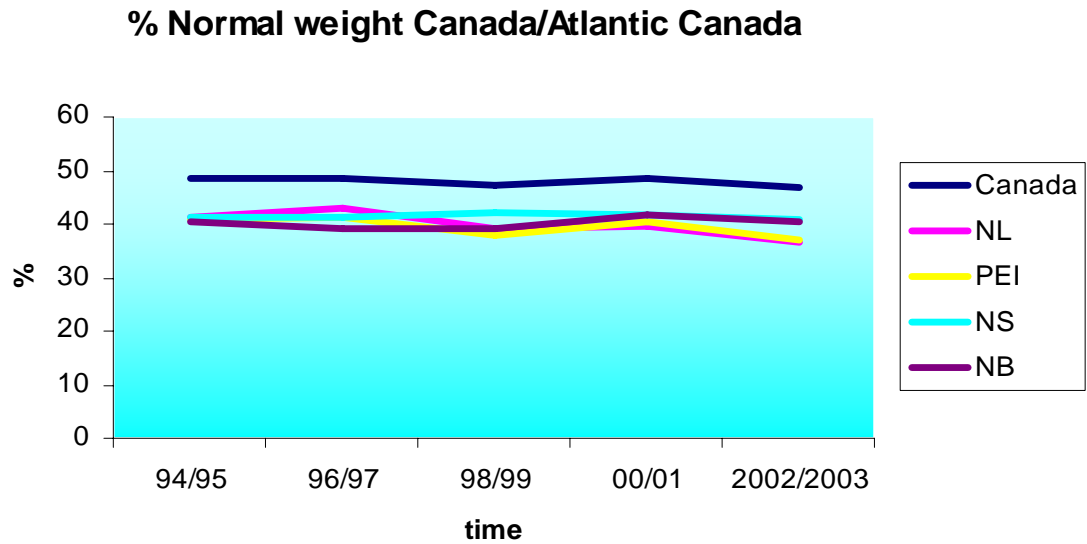
**Figure 6**



**Figure 7**



**Figure 8**



The results of a study published in the Canadian Medical Association Journal (26 by Canning et al. reported that 25% of children (aged 3.5-5 years) who participated in their Preschool Health Check in Newfoundland and Labrador were already either overweight or obese. These results provide a valid report of body mass index for children in NL as they are based on real measurements and not self-reported survey data. Canning et al. compared the 1997 measurement results to measurements taken of children attending their Preschool Health Check in 1984. Over this time period (13 years), the number of overweight children increased by 28%, and the number of obese children increased by 175% (Table 1).

**Table 1**

**Prevalence of obesity and overweight in NL children\***

P.Canning M.Courage L.Frizell  
Memorial University

	<b>1984 % (781)</b>		<b>1997 %* (4171)</b>		<b>Increase %</b>
	overweight	<b>obese</b>	overweight	<b>obese</b>	
All	13.8	<b>2.9</b>	17.7	<b>8.0</b>	175%
Boys	13.7	<b>2.8</b>	16.8	<b>7.8</b>	178%
Girls	14.0	<b>3.1</b>	18.5	<b>8.2</b>	165%

\*CMAJ, Aug 2004

## Obesity in the NL Health Boards

According to the Canadian Community Health Survey in 2003, the prevalence of overweight and obesity in adults aged between 18 to 64 years across health regions in NL shows large variation. Health and Community Services Eastern region and Grenfell Regional Health Services have the highest prevalence of overweight at 42.65% and 47.4%, respectively. The Eastern health board and the Health Labrador Corporation have the highest rates of obesity at 23.4% and 26.2 %, respectively (Table 2).

**Table 2**

Prevalence of overweight and obesity in the NL community boards

	NL	HCSSJ*	HCSE*	HCSC*	HCSW*	GRHS**	HLC**
<b>overweight</b>	<b>38.6</b>	37.1	<b>42.6</b>	37.5	36.2	<b>47.4</b>	39.1
<b>obese</b>	<b>20.1</b>	17.5	<b>23.4</b>	21.2	18.3	21.9	<b>26.2</b>

\*HCSSJ-Health & Community Services St. John's, Eastern, Central, Western, \*\*Grenfell Regional Health Services, \*\*Health Labrador Corporation

Note: these rates are for the original Health & Community Services Boards, not the newly formed Regional Integrated Health Boards as Statistics Canada has not updated its geographical regions.

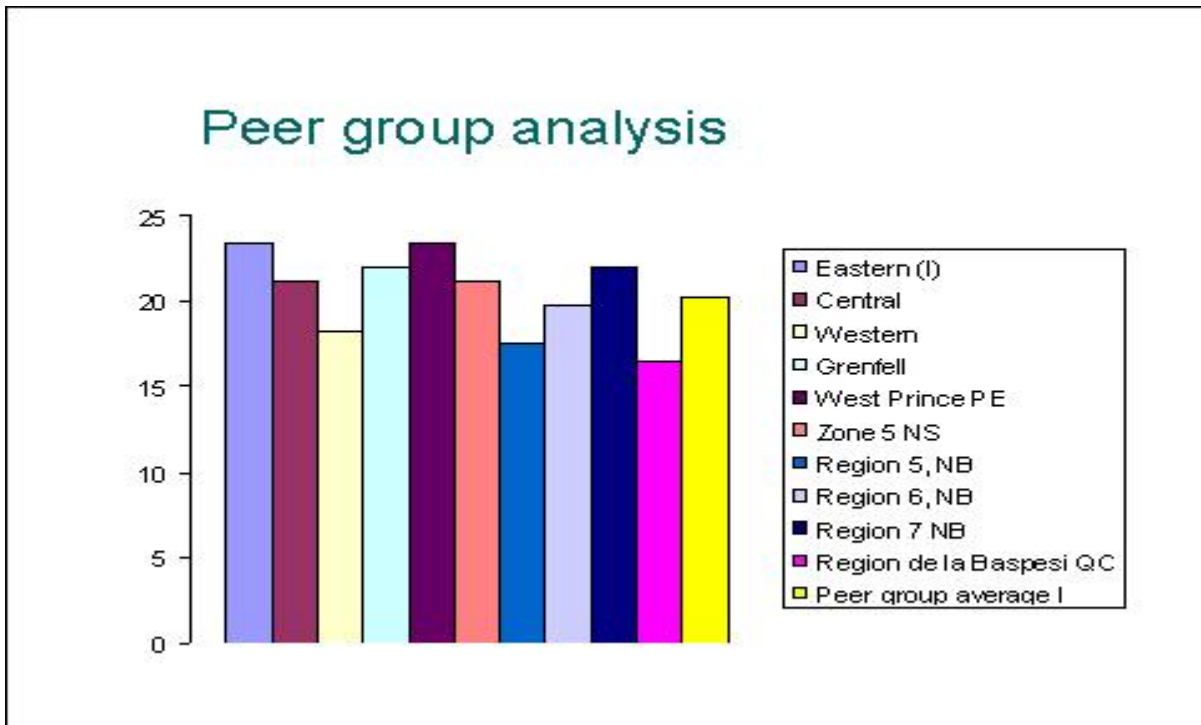
## Peer group analysis

Although the prevalence of obesity doubled in most western countries over the last 25 years, large variations exist between countries, within a country and within a particular geographic area. Within Canada the prevalence of obesity increases from East to West. Newfoundland and Labrador has the highest prevalence of obesity after the Territories. Little research has been conducted to investigate explanations for these differences; however factors such as income, education and employment are associated with the prevalence of obesity through an inverse relationship (i.e. the higher the level of education the less likely one is to be obese). It is suggested that social determinants may explain some of the variation. However, using a peer group analysis these associations become less straightforward. Statistics Canada compares similar geographic regions across Canada. Similar is defined by using several variables such as: population change over time; demographic structure; social status of the individuals; economic status; ethnicity; housing; urbanization; income equality and

labour market conditions. When these regions are compared the relationship between social status and obesity is reduced. Figure 9 illustrates the difference in the prevalence of obesity across “similar” regions in Canada. The prevalence varies from 17% for a region in Quebec, to 24% for the Central region of Newfoundland. More research is needed to understand these variations so that effective programs and policy can be implemented.

**Figure 9**

Prevalence of obesity in “similar” regions across Canada 2003



### Is obesity a preventable condition?

A report by the Canadian Institutes of Health Research in 2003 “Addressing Childhood Obesity: The Evidence for Action” compiled and critically appraised systematic reviews on the prevention and treatment of obesity. It concluded that current evidence is insufficient to support health prevention or promotion programs focused on promoting people to eat less and take more exercise. Other studies aimed at preventing obesity in school-age children concluded there is some doubt as to whether obesity is preventable in school-age children using currently available intervention strategies (23;27;37). The

few successful interventions were resource intensive and complex and more likely to come from the United States and therefore limited in generalizability to the Canadian setting. Although there appears to have been little success in *targeted interventions* to promote increased activity and health eating a study by the Canadian Institute of Health Information (CIHI) published in 2005 demonstrated that schools in Nova Scotia participating in coordinated programs that promoted healthy eating and increased physical activity had significantly lower rates of overweight and obesity than schools that had no such identified program (35). These results provide some evidence that an overall policy approach may be more may be more successful than targeted interventions.

## **Local Prevention Efforts**

In NL there is a pilot study underway in Central Newfoundland called “Active Schools” based on a successful program introduced throughout the Thames Valley School Board in Ontario in 1998. The program is a concerted attempt to implement Health Canada’s Physical Activity Guide for Youth and Children which recommends 30 minutes of physical activity per day. Participating schools aim for 180 minutes of physical activity in a six day cycle. Most schools have two 40 minute gym classes a cycle which leaves 100 minutes to be divided between the remaining four days. Therefore an extra 20 minutes of activity is included in each regular school day outside regular a gym classes. Initial feedback has been positive from both teachers and students. As well as increased levels of physical activity in the schools, there has been a reduction in problem behaviors in the classroom as well as improved academic performance.

In Newfoundland the “Active Schools” initiative is a collaborative partnership between representatives from health and education in an effort to increase the health of students in the schools of Lewisporte/Gander District. A group of stakeholders made up of local physicians, dieticians, fitness leaders, and health promotion professionals formed the Active Living Committee in Gander in the fall of 2003. Their mandate was to raise the community’s awareness of physical inactivity as a serious health risk. A subcommittee initiated contact with the local school board to discuss concerns and to advocate for policy change towards adopting the “Active Schools” model in some of its elementary



schools for the 2004 school year as a pilot project. A presentation was made to the Safe and Healthy Schools Committee which led to a second presentation at a retreat of all the school principals and administrators from the Lewisporte Gander School District. This resulted in four school principals expressing a desire to pilot the "Active Schools" Model in their schools beginning in September 2004. Contact was made with a principal in the Thames Valley School Board in Ontario who gives presentations to health care professionals interested in the "Active Schools" Program. A number of community partners expressed their support of the project including Health and Community Services-Central, Central East Health Care Institutions Board, Lewisporte/Gander School District, Nine Wing Gander, Canadian Diabetes Association, Coalition for Active Living, Newfoundland Medical Association, College of Family Physicians and the Canadian Pediatric Society. The pilot project is being evaluated by a group of researchers in the Department of Kinesiology and Human Kinetics.

### **What is the medical treatment for obesity?**

Few treatment strategies for obesity have been found to work. The interventions supported by research are surgery for the morbidly obese, drugs and multi-component weight loss programs consisting of diet, exercise and behavioral therapy (36;37;38). These studies were conducted with adults in clinical settings and have resulted in modest weight loss in the long-term (39).

There is some evidence to support the treatment for childhood obesity through specialty clinics (40). This "treatment" is limited to children defined as "clinically obese" (based on specific medical criteria) and children where the affected child and family appear willing to make the necessary lifestyle changes to promote healthy active living. In this instance the focus of treatment is child-centered and family-based. The objective of these clinics is to: manage and resolve co-morbidities and aim for behavioral change (not weight loss); encourage healthier eating, increased activity and a reduction of television watching. A crucial element in obtaining behavior change is to involve the family in the monitoring of eating and activity, and in making the necessary lifestyle changes.

## Local Treatment Options

In September, 2005 the Healthcare Corporation of St. John's opened an "Obesity Lifestyle Clinic" at the Janeway Children's Hospital. This Clinic is resourced by an interdisciplinary team and includes: a Pediatric Endocrinologist; a Pediatrician in Adolescent Medicine; a Nurse Practitioner; a Dietician; a Physiotherapist; a Recreation Therapist; a Social worker and a Clinical Psychologist. The Clinic is an assessment and intervention health service for children and adolescents (12-17 yrs) with obesity, as well as their families. The purpose is to promote lifestyle changes to improve healthy active living. Patients are identified by their family doctors or pediatricians and referred to the Lifestyle Clinic for evaluation, assessment and treatment. Referred patients are sent a package of information to be completed and returned before an initial consultation appointment is confirmed with the Lifestyle team. The package of information includes:

- surveys on dietary intake
- surveys on physical activity
- surveys on self esteem
- a letter and lab slip advising of specific lab tests that must be conducted before the first consultation.

The patient is selected for the clinic based on the information returned in the startup package and specific criteria including, but not limited to, the client being between the ages of 12 and 17 with a body mass index in the 95<sup>th</sup> percentile (classified as obese), and commitment from a parent or guardian to attend all Clinic meetings and any further treatment. The development of the clinic has arisen from an increasing number of obese children being seen in regular pediatric clinics, and a feeling that the "standard of care" (referral to a dietician for nutrition counseling) is not adequate for treating this complex health problem. As of June 2005, the clinic had been running for nine months.

According to Dr. Tracey Bridger:

"The Lifestyle Clinic has been up and running since September 2004 and is held every Thursday afternoon. We receive referrals mostly from general pediatricians, sub-specialists, and family doctors. Each patient is seen by a team of health professionals with the Lifestyle Clinic: MD/Nurse practitioner, dietitian, physiotherapist, psychologist/Social worker. Initially, we opened the clinic to youth aged 12-18y. However, we receive numerous consults for children <12y. These

children are usually then seen in the endocrine clinic by Dr. Bridger, the endocrinologist with the Lifestyle Team. There are plans in the future to open the clinic up to all children/youth. The biggest obstacle is one of manpower. For this program to work properly, each child/youth and their family must be seen frequently in order to learn about healthy eating, active living, and how to improve motivation/behavioral changes. This is very labor intensive. So far, the clinic seems to be running successfully, though we have not yet completed our formal assessment. We are getting numerous referrals and have a good patient load. As with any new program, we've been trying to improve things as we go and are currently embarking on an updated treatment program, which we plan to offer to both children and youth. Of course, the resource issue remains our biggest challenge. The Lifestyle Clinic is a worthwhile and important program; we hope that with the proper resources we will be able to bring it to the next level so that many more children/youth and their families throughout the province can benefit".

## **Conclusions and Discussion**

The rising prevalence of obesity is a global concern for all societies. In Canada, the Atlantic region, particularly Newfoundland and Labrador is of most concern with higher than average overweight and obesity rates when compared to the rest of the country. Both childhood and adult obesity are associated with adverse health consequences which can both decrease quality of life and life expectancy. The cost of adult obesity has been estimated to be \$1.8 billion in Canada and several studies have shown increased utilization of health care resources (hospital and physician visits, drug utilization) by obese populations. The health services utilization patterns and the cost of obesity in Newfoundland and Labrador are presently being studied by a team of researchers from Memorial University and the NL Centre for Health Information.

The causes of this "epidemic" are multi-factorial. The relatively short time-period associated with the increase in obesity provides evidence for environmental change versus change in the genetics of the population. Although there is no question that genetics plays an important role in predisposing certain individuals to gain excess weight, and allows our bodies to store excess energy, researchers agree that the changing environment (> past 25 years) has more of an influence on any individual's

consumption and activity patterns than our genetic profiles. Due to the ineffectiveness of the clinical treatment and the “tracking” of obesity, it is important that the focus of research and policy be in the areas of prevention and health promotion. A study published recently by the Canadian Population Health Initiative (36) entitled “Overweight and Obesity in Canada, a Population Health Perspective” reviewed extensively the research published on successful population health interventions. It concluded that interventions at the population level can only be successful if:

- there is an integrated, multidisciplinary coordinated approach to policy by the many stakeholders and policy actors (government, health professionals, national organizations, community groups, public)
- it includes a range of complementary actions (Healthy School policies, work-site exercise facilities, food manufacturing buy-in) aimed at
- individuals, groups, communities and institutions and public policy.

In addition the report suggested that for obesity prevention efforts to be both successful and sustainable it is mandatory to have “political buy-in” or political will. To implement population based interventions, dedicated resources (time, money, staff) must be committed to social change. New programs must be integrated into existing structure and programs to ensure long-term sustainability. Analysis of major public health successes such as smoking, seatbelt legislation and education around HIV/AIDS demonstrate that population health interventions can work. These evaluations should be used to help guide prevention efforts and on-going health promotion in this area.

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