MEASURING SUSTAINABLE DEVELOPMENT

APPLICATION OF THE GENUINE PROGRESS INDEX TO NOVA SCOTIA

# WOMEN'S HEALTH IN ATLANTIC CANADA
# JANUARY 2003 UPDATE

# VOLUME 2: DETERMINANTS OF HEALTH: INTRA-PROVINCIAL DIFFERENCES

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# DETERMINANTS OF HEALTH
# INTRA-PROVINCIAL DIFFERENCES

We have long suspected that provincial averages mask deep differences in health status within each of the four Atlantic Provinces. Yet very limited information has been available to assess regional differences systematically. This deficiency has also hampered effective gender-based analysis, which must account for diversity and differences among sub-groups of women. In addition, it has impeded effective health policy and health service delivery, which seeks to target the specific needs of different population groups according to their particular circumstances and conditions.

The 2000/01 Canadian Community Health Survey (CCHS), with a total sample of 130,000 respondents throughout Canada, is the first systematic national effort to collect data at the sub-provincial level. It provides detailed first-time information for 139 health districts in Canada, including 6 in Nova Scotia, 7 in New Brunswick, 2 in PEI, and 6 in Newfoundland and Labrador. Information on health status, health behaviours, and health outcomes, can now be combined for the first time with detailed socio-demographic and socio-economic data to provide vital information to researchers and policy makers in order to target health interventions effectively. For each health district it is now possible to correlate health data with information on the percentages of Aboriginals, immigrants, and visible minorities within each health district, and with data on health determinants such as employment, income, housing, and education.

Because of the importance of this new data source released in 2002, we have devoted considerable space to a gender breakdown of CCHS results by health district for the four Atlantic provinces, comparing results with both provincial and Canadian averages. This volume notes some key “highs” and “lows” for particular health districts, but the detailed compilation of results by health district is available in a set of expanded appendices, which are available separately from GPI Atlantic. Time and resources did not allow a systematic analysis of these data for this report, but we hope that the descriptive information contained in this chapter and in the detailed tables in the appendices will provide researchers with the tools they need to explore intra-provincial differences more systematically. This is hopefully also a small step towards more detailed future gender-based analyses that account for the diversity among Atlantic Canadian women.

The Canadian Community Health Survey provides a wide range of information on the causes of health and disease, health outcomes, rates of death and disease, and health service utilization. In this chapter we attempt simply to identify areas of strength and weakness among the 21 health regions in the Atlantic region. More detailed analysis will be necessary to translate these findings into policies that can improve women’s health, particularly in those health districts where the needs are greatest.

Most of the data for the indicators examined in this chapter are from Statistics Canada’s *Health Indicators,* catalogue no. 82-221-XIE, available at: www.statcan.ca/english/freepub/82-221-XIE/00502/toc.htm. The data will be presented here somewhat systematically and descriptively, rather than analytically, beginning with definitions wherever necessary, then citing the data sources for each indicator, and then presenting key results. The insert box that follows gives the descriptions and boundaries of the 21 Atlantic region health districts, which will be referenced in this chapter.

## Health Districts in Atlantic Canada *(Note 1)*

**Nova Scotia** *(Note 2)*
Zone 1 Lunenburg, Queens, Shelburne, Yarmouth, and Digby Counties.
Zone 2 Annapolis and Kings Counties, including Annapolis Royal, Middleton, Kentville, Berwick, and Wolfville.
Zone 3 Cumberland, Colchester, and East Hants Counties.
Zone 4 Pictou, Antigonish, Guysborough, and Richmond Counties, including New Glasgow, Antigonish, and Port Hawkesbury.
Zone 5 Cape Breton Island (excluding Port Hawkesbury area). This zone includes the counties of Cape Breton, Victoria, and Inverness.
Zone 6 Halifax Regional Municipality, including eastern shore to Sheet Harbour, and West Hants County, including Windsor *(Note 4)*.

**Prince Edward Island** *(Note 3)*
Urban: Charlottetown and Summerside
Rural areas of PEI

**New Brunswick**
Region 1: Moncton region (*Note 4)*
Region 2: Sussex / Saint John region (*Note 4)*
Region 3: Fredericton region (*Note 4)*
Region 4: Edmundston region
Region 5: Campbellton region
Region 6: Bathurst region
Region 7: Miramichi region

**Newfoundland**
Region 1: St. John's: Conception Bay South to Seal Cove to St. Shott's (*Note 4)*
Region 2: Eastern: Peter's River to Holyrood; Bonavista and Burin Peninsulas; Clarenville area to Port Blandford
Region 3: Central: Terra Nova National Park to Sandy lake, including coastal communities from Eastport to Purbeck's Cove; The Buchans area and the Connaigre Peninsula to McCallum and Recontre East
Region 4: Western: Recontre West to Port au Port Peninsula to Bartlett's Harbour; Jackson's Arm to Channel - Port Aux Basques including Howley, Hampden and the Beaches
Region 5: Grenfell: New Ferrole to St. Anthony to Harbour Deep; Coastal Labrador south of Black Tickle
Region 6: Labrador: Central and Western Labrador; Coastal Labrador including Black Tickle and points North

## NOTES

1) For the sake of consistency, all 21 Atlantic health districts defined here are referred to as "health districts" in order to distinguish these from the use of the term "region" to describe the Atlantic provinces as a whole. However, in Nova Scotia and PEI, the "health districts" described above do not necessarily correspond to the health boards and health authorities legislatively constituted by the provincial governments.

2) The nine legislated health districts in Nova Scotia have relative small populations. To produce reliable and comparable health indicators, therefore, Nova Scotia has defined six "health zones" for statistical purposes. These relate to the province's administrative health region boundaries as follows:

- Zone 1 is referred to here as "South-Southwest (NS1)" in the text and is abbreviated as "South-SW (NS1)" in figures. South-Southwest (NS1) includes both the South Shore and Southwest Nova Scotia, and corresponds to District Health Authorities (DHA) 1 and 2.
- Zone 2 is called "the Valley" or "Annapolis Valley (NS2)" in the text and is abbreviated as "Valley (NS2)" in figures. This corresponds to DHA 3.
- Zone 3 is referred to as "Colchester-Cumberland-East Hants (NS3)" in the text and is abbreviated as "Colch-Cumb-E.Hants (NS3)" in figures. This corresponds to DHAs 4 and 5.
- Zone 4 is called "Pictou-GASHA (NS4)" in the text and figures. GASHA stands for "Guysborough Antigonish Strait Health Authority". Pictou-GASHA (NS4) corresponds to DHAs 6 and 7.
- Zone 5 is called "Cape Breton (NS5)" in the text and figures and includes all of Cape Breton Island except for Richmond County. This corresponds to DHA 8.
- Zone 6 is called "Capital (NS6)" and corresponds to DHA 9.

3) PEI has also defined these health districts for statistical purposes only. The rural and urban regions defined here bear no resemblance to the boundaries of the five actual administrative health regions in the province.

4) Throughout the socio-economic section of this volume, in order to point towards potential urban-rural differences, we have labelled those health districts with the largest population centres in the Atlantic region as "urban," even though many of them contain large rural populations. Those health districts containing the major urban centres with the largest populations in Atlantic Canada are St. John's (NF1) (173,000); Central (NS6) (359,000); Cape Breton Regional Municipality (NS5) (109,000); Charlottetown and Summerside (PEI Urban) (74,000); Moncton (NB1) (118,000); Sussex/Saint John (NB2) (183,000); and Fredericton (NB3)(81,000).[1] All other health districts have been labelled "rural" for comparative purposes.

5) It should be noted that the distinction in Note 4 above does not correspond to the rate of urban residency within each health district. In that context, urban residency is defined by Statistics Canada as the percentage of each health district's population living in areas with at

[1] For population figures, see Statistics Canada's 2001 Community Profiles, available at: http://www12.statcan.ca/english/Profil01/PlaceSearchForm1.cfm.

least 1,000 people and with a population density of at least 400 people per square kilometre. By that definition, the Labrador (NF6) health district, for example, has a higher rate of urban residency (74.9%) than the Fredericton health district (45%), even though Labrador's entire population is less than 28,000. This analysis, based on degree of urban/rural residency within each health district is provided separately in section 1.1.2 of this volume.

Due to space limitations, the charts in this volume highlight key results at the provincial and health district level, but cannot present results for all health districts on each indicator. Readers are referred to the comprehensive spreadsheets and tables in the appendices, available separately from GPI Atlantic, for detailed statistics for all 21 health districts in the Atlantic region for each of the indicators presented here.

Finally, one additional caveat is essential. While the Canadian Community Health Survey provides extraordinarily useful detail at the health district level never before available, it is questionable whether the level of analysis really represents the "community." For example, the Central health district (NS6) includes rural areas as far afield as Sheet Harbour. Cape Breton (NS5) includes industrial Cape Breton, but also rural areas on the rest of the Island, which may have a sharply different health profile than Sydney or Glace Bay. The Fredericton health district (NB3) contains the provincial capital city and a major university, but the district's 55% rural population likely has a very different health profile than the capital.

Although a health district analysis certainly cuts through some of the grosser misconceptions that exist when relying on provincial averages, there is no doubt that even health district averages conceal major disparities within each health district. The analysis in this volume demonstrates the enormous utility of distinguishing, for example, between the health profiles of Central (NS6) and Cape Breton (NS5), between The Valley (NS2) and South-Southwest (NS1), between the St. John's area and most of rural Newfoundland; and between southern and northern New Brunswick. But such distinctions are still broad, and should be regarded only as a first step in assessing deeper intra-provincial differences.

Fortunately, new data sources are becoming available that will allow finer distinctions that correspond more accurately to the notion of "community." The Newfoundland and Labrador Community Accounts now provide comparable health, employment, income, and other vital information for 400 communities in that province.[2] GPI Atlantic's own surveys in Glace Bay, Kings County, and the Halifax Inner City provide detailed information for those areas on a wide range of social, economic, health, and environmental indicators.[3] Through such initiatives, it is possible that Atlantic Canada will pioneer the further and deeper development of intra-provincial analyses and health profiles, to which the CCHS has made such a valuable contribution.

[2] For this remarkable data source, please see www.communityaccounts.ca.
[3] The Community GPI survey can be obtained at: http://www.gpiatlantic.org/community.shtml. Results will also be posted on this web site as they become available in 2003.

# 1. Determinants of Health and Disease

This section provides an overview of some of the key determinants of health in the 21 Atlantic region health districts. Indicators include basic demographic characteristics, socio-economic determinants of health, two major social-psychological determinants, a range of health behaviours and lifestyle indicators, several areas of secondary prevention including screening and immunization, and one indicator of environmental conditions relating to women's health.

Statistics Canada's health indicators database does not provide gender breakdowns for all demographic and socio-economic determinants by health district. The agency extracts this information largely from Census and administrative data, adjusting it for health district boundaries, in order to provide a basic demographic and socio-economic profile of each health district. On the other hand, the Canadian Community Health Survey data on health behaviours, health status, and other indicators are available by gender.

In this section, gender breakdowns are therefore provided wherever the data allow. Where this is not possible, the demographic and socio-economic information remains important background for a gender analysis of other indicators, as it allows assessment of results for sub-groups of women. For example, the knowledge that the Labrador health district is 29% Aboriginal, presented in section 1.1.4 below, though not presented with gender breakdown, is vital information for assessment of health behaviour, health status, disease, and mortality results in later sections.

## 1.1 Demographics

This section outlines the demographics of the different health districts with respect to age, population density (rural vs. urban population), and dependency ratio (the ratio of elderly and young people to the working age population.) As a first step to addressing the ethnic and cultural diversity of the region, data on the Aboriginal population are also presented.

### *1.1.1 Population 65 and older*

**Data Sources**

Statistics Canada, Demography Division. Data are derived from the 1996 Census and 2001 Census, from administrative sources on births, deaths, and migration, and from Statistics Canada, *CANSIM II* Database, including Table 109-5005, "Population, by age group and sex, Canada, provinces, territories and health regions, annual." Provincial population statistics used in this section can be accessed at Statistics Canada,
http://www12.statcan.ca/english/census01/products/standard/popdwell/Table-PR.cfm
http://www.statcan.ca/english/Pgdb/demo02.htm
http://www.statcan.ca/Daily/English/020926/d020926b.htm.

Health district demographic data can be obtained from Statistics Canada, http://www.statcan.ca/english/freepub/82-221-XIE/00502/community/community1.htm[4]

In July, 2002, Canada's population was 31.4 million. The four Atlantic Provinces combined comprised 7.6% of this total population, or 2.4 million. Between the 1996 Census and the 2001 Census, Canada's population grew by 4%, while Newfoundland's fell by 7%, New Brunswick's by 1%, and Nova Scotia's by 0.1%. PEI was the only Atlantic province to see a slight population gain of 0.5%.[5]

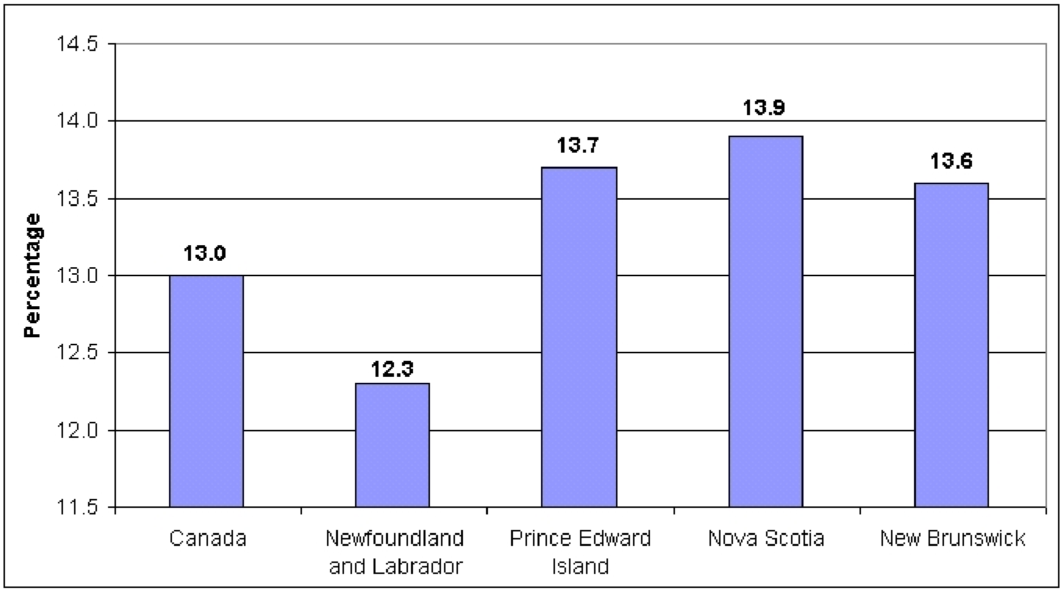
Canada's population is aging, and all three Maritime provinces have a higher percentage of elderly residents than the national average (Figure 1). According to the 2001 Census results, 14% of Nova Scotia's population is now 65 or older, up from 13% in 1996.[6] By 2011, nearly 16% of Nova Scotians will be 65 and older, and by 2036 this will rise to more than 28%. The population over 80 will triple from 3% in 1996 to 9% in 2036.[7] The province now has a median age of 38.8, the highest in the country.[8]

Under conventional scenarios, these demographic trends are projected to stretch health care resources beyond the breaking point. Twenty-five years ago, with just 11% of the population, the elderly already occupied one-third of all hospital beds in Canada, and consumed one-quarter of total health care expenditures. As their proportion in the population increases, according to traditional analyses, this disproportionate consumption of health services will escalate.[9] According to more optimistic scenarios, the aging of the population requires more concerted health promotion efforts that can reduce the incidence of chronic illness and enhance independence in old age.[10]

As women generally live longer than men, senior women constitute a larger percentage of the total population than senior men (Figure 2).

[4] This last web address is Statistics Canada's health indicator site. For demographic data, go to "population," then to Statistics Canada's *CANSIM* data base, and then to the 1998 data.
[5] Statistics Canada, *CANSIM II* Database, table 051-001, and Statistics Canada, "Population and Dwelling Counts, for Canada, Provinces and Territories, 2001 and 1996 Censuses - 100% Data," available at: http://www12.statcan.ca/english/census01/products/standard/popdwell/Table-PR.cfm. January 21,2003
[6] *The National Post,* 17 July, 2002, page A9.
[7] Lilley, Susan, and Joan Campbell, *Shifting Sands: The Changing Shape of Atlantic Canada: Economic and Demographic Trends and their Impacts on Seniors,* Health Canada, March, 1999, page 6, table 2.
[8] *The National Post,* 17 July, 2002, page A9.
[9] Wolinsky et al., "Health Services Utilization among the Noninstitutionalized Elderly," *Journal of Health and Social Behavior,* 24: 325-337, 1983.
[10] See for example Fries, James, "Aging, Natural Death, and the Compression of Morbidity," *The New England Journal of Medicine* 303 (3): 130-135, July 17, 1980; American Federation for Aging Research (AFAR), *Putting Age on Hold,* Alliance for Aging Research, 1996; The Institute of Medicine, *Extending Life, Enhancing Life: A National Research Agenda on Aging,* National Academy Press, Washington D.C., 1991.

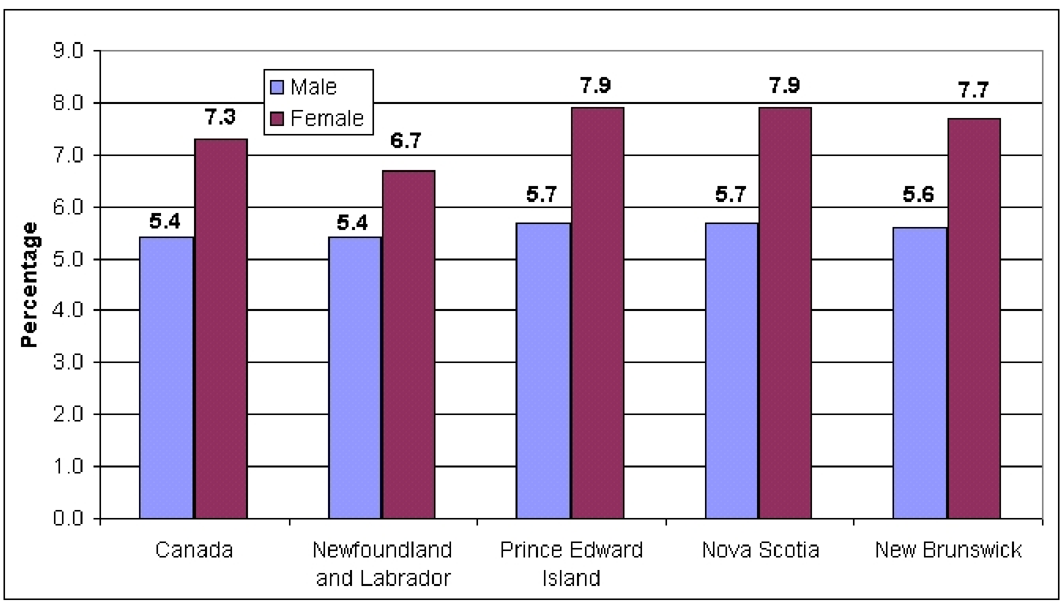
**Figure 1. Percentage of the Population 65 Years and Older, Canada and Atlantic Provinces, 2001 (%)**




Note: Proportions for senior men and women are given as a percentage of *total* population (male plus female), not as a percentage of all men or all women respectively. This allows the male and female percentages to be summed to indicate the total percentage of seniors in the population.

Source: Statistics Canada, 2001 Census, Demography Division.

**Figure 2. Population 65 years and older, male and female, as percentage of total population, Canada and Atlantic provinces, 2002, (%)**




Note: Proportions for senior men and women are given as a percentage of *total* population (male plus female), not as a percentage of all men or all women respectively. This allows the male and female percentages to be summed to indicate the total percentage of seniors in the population.

Source: Statistics Canada*, CANSIM II*, 2002.

The following charts indicate the percentage of men and women 65 and older, as a percentage of the total population within each health district.[11] This is vital information for district health authorities and provincial governments, as health districts with a higher proportion of seniors are likely to require more health services for a wide range of chronic illnesses.

Because women tend to live longer than men, there are 35% more female seniors in Canada than male seniors. Health districts with relatively short average life expectancies (e.g. Labrador) can therefore expect to see a much smaller disproportion of senior women compared to senior men than districts with relatively long average life expectancies.

Both Grenfell (NF5) and Labrador (NF6) have significantly fewer seniors as a proportion of total population than the Canadian average or other parts of the province. As noted in the insert box above, the Grenfell health district (NF5) includes coastal Labrador south of Black Tickle as well as northern Newfoundland from New Ferrole to St. Anthony to Harbour Deep. The Labrador health district comprises central and western Labrador, coastal Labrador including Black Tickle, and points north.

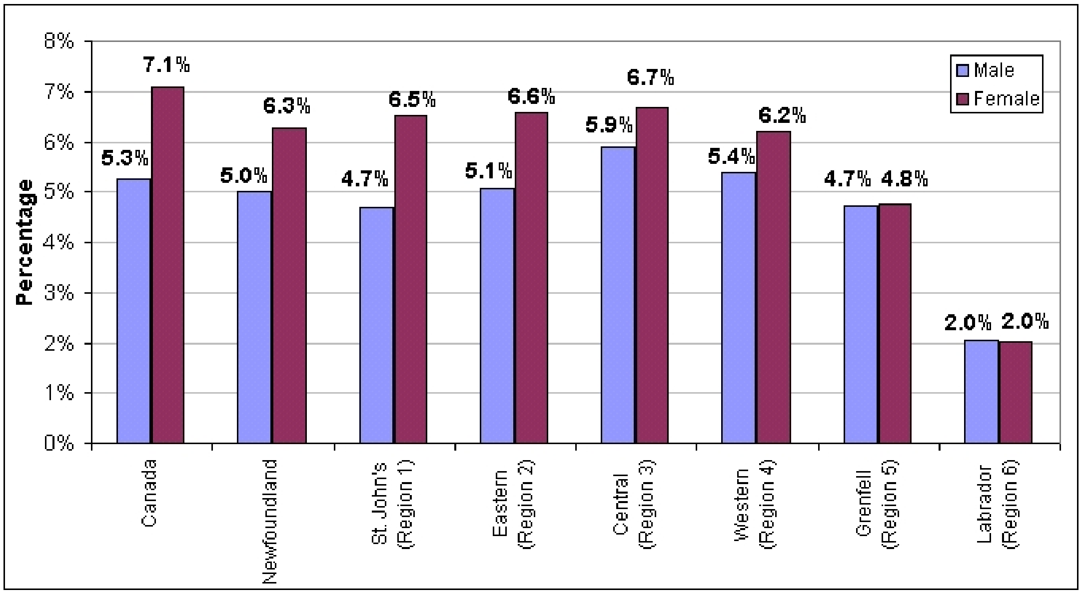
Both health districts also have a correspondingly smaller disproportion between senior men and women than St. John's, for example, which has 40% more senior women than senior men (Figure 3). Labrador as a whole has a relatively young population, with significantly higher birth rates and higher rates of premature mortality than provincial and national averages.

Note that the most recent demographic data released by Statistics Canada for health districts are from 1998 and, in some cases, from 1996. Health district data in the following charts are therefore not directly comparable to more recent (2001 and 2002) demographic data provided at the provincial level. To avoid confusion, each chart indicates the date of the data provided.

In Nova Scotia and PEI, all health districts except Central (NS6) and rural PEI have higher proportions of seniors than the Canadian average. The South-Southwest area (NS1) has an unusually high proportion of seniors, one-third higher than the Canadian average and 56% higher than in Central (NS6) (Figure 4). In New Brunswick, all health districts except Fredericton (NB3) and Bathurst (NB6) have higher proportions of seniors than the Canadian average (Figure 5).

[11] Please note that proportions for senior men and women are given as a percentage of *total* population (male plus female), not as a percentage of all men or all women respectively. This allows the male and female percentages to be summed to indicate the total percentage of seniors in the population.

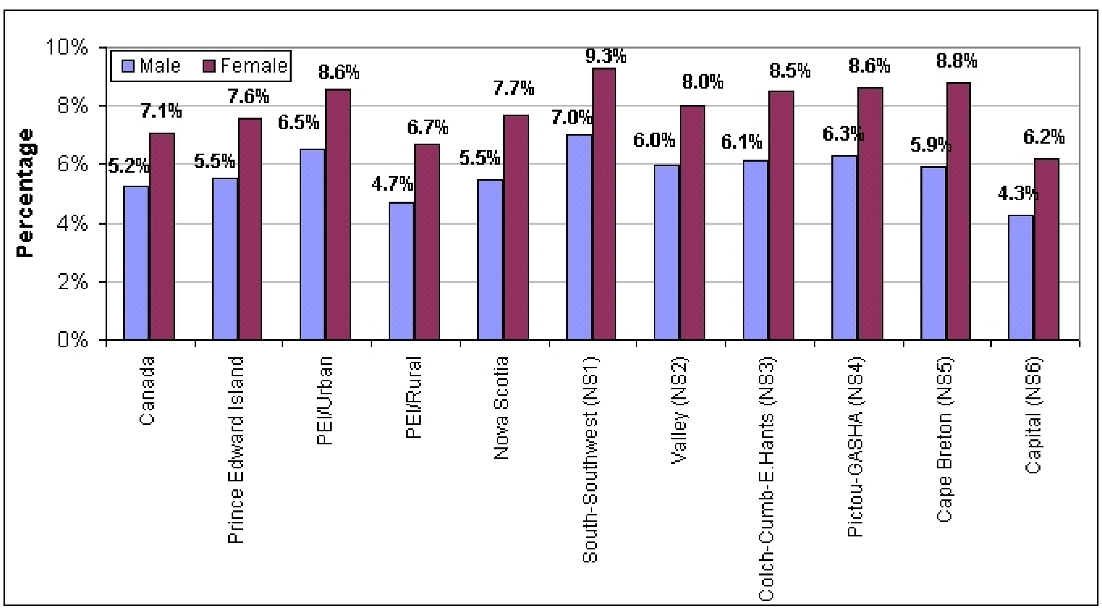
**Figure 3. Population 65 years and older, male and female, as percentage of total population, Canada, Newfoundland and Labrador, and health regions, 1998, (%)**




Note: Proportions for senior men and women are given as a percentage of total population (male plus female), not as a percentage of all men or all women respectively. This allows the male and female columns to be summed to give the total number of seniors as a percentage of the total population.

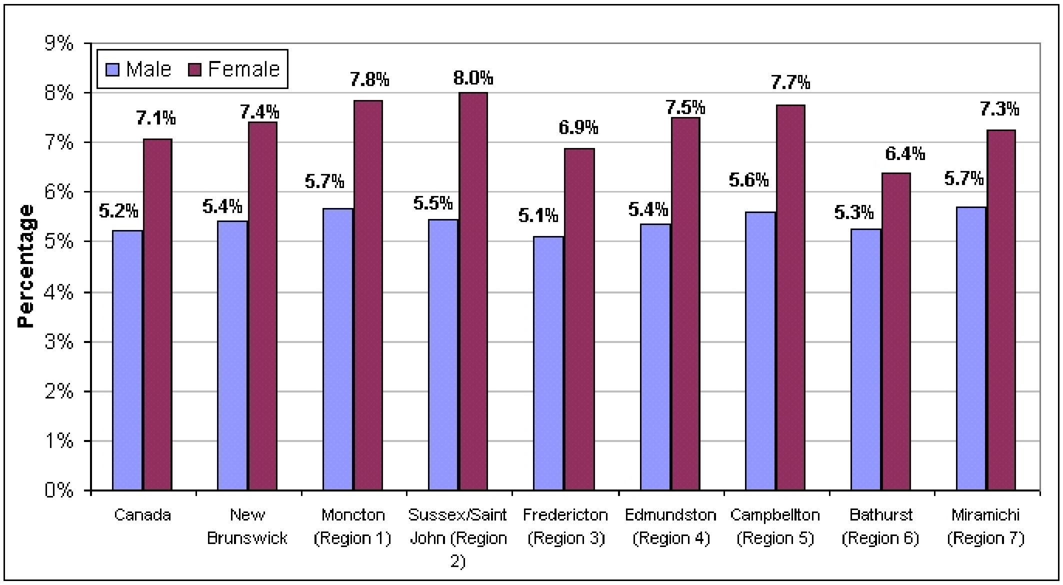
Source: Statistics Canada, Demography Division. Data are derived from the Census and from administrative sources on births, deaths, and migration 1998.

**Figure 4. Population 65 years and older, male and female, as percentage of total population, Canada, Prince Edward Island, Nova Scotia, and health zones and regions, 1998, (%)**




Source: Statistics Canada, Demography Division. Data are derived from the Census and from administrative sources on births, deaths, and migration 1998.

**Figure 5. Population 65 years and older, male and female, as percentage of total population, Canada, New Brunswick, and health regions, 1998, (%)**




Source: Statistics Canada, Demography Division. Data are derived from the Census and from administrative sources on births, deaths, and migration 1998.

As noted, a larger number of seniors in a health district's population can produce greater demands on health services. That, in turn, has policy implications for provincial governments in their allocation of health care resources, and for decisions on appropriate location of hospital, physician, and ambulance services.

### *1.1.2 Urban and rural populations*

**Definition**

Statistics Canada defines urban areas as having a minimum population of 1,000 and a population density of at least 400 people per square kilometre.[12] Needless to say, this definition has nothing to do with the presence of large urban areas. Labrador is classified below as 75% "urban," even though its entire population is less than 28,000[13], whereas the Fredericton health district is classified as only 45% urban, though it contains the province's capital city with a population of 81,000.

**Data Source**

Statistics Canada, 2001 Census and 1996 Census

[12] Statistics Canada, http://www.statcan.ca/english/freepub/82-221-XIE/00502/defin4.htm#79.

[13] Electoral Boundaries Commission for the Province of Newfoundland and Labrador, population figures available at: http://www.elections.ca/scripts/fedrep/newfound/proposals/rcr_e.htm.

**Results**

According to the 2001 Census, the rural population comprises only 20.3% of the total population in Canada, down from 22.1% in the 1996 Census. The four Atlantic provinces have higher rates of rural residency than any other province in the country. The rural population in Prince Edward Island comprises 55% of the total population (Table 1).

**Table 1. Percentage of population living in urban and rural areas, Canada and Atlantic provinces, 2001, (%)**[14]

| | Total Population 2001 | Urban Population 2001 | | Rural Population 2001 | |
|---|---|---|---|---|---|
| | | Total | % of Total | Total | % of Total |
| Canada | 30,007,094 | 23,908,211 | 79.7 | 6,098,883 | 20.3 |
| Newfoundland and Labrador | 512,930 | 296,196 | 57.7 | 216,734 | 42.3 |
| Prince Edward Island | 135,294 | 60,675 | 44.8 | 74,619 | 55.0 |
| Nova Scotia | 908,007 | 507,009 | 55.8 | 400,998 | 44.2 |
| New Brunswick | 729,498 | 367,902 | 50.4 | 361,596 | 49.6 |

Source: Statistics Canada, 2001 Census.

Because 2001 Census data are not yet available by health district, 1996 census data are used to provide information on the proportion of the population living in urban areas within each health district. As the Romanow Commission specifically recognized, rural areas have less access to both basic and specialized health resources than urban areas.[15] Examining the rural-urban mix in each health district therefore allows a comparison of both health outcomes and ease of access to health services such as screening, according to the proportion of the population living in rural and urban areas.[16]

Figure 6 below shows the percentage of the population within each Atlantic health district living in urban areas, according to the 1996 Census.

Because the rural-urban mix is a key indicator of health status, highlighted in the Romanow report, and because of the Atlantic region's high rate of rural residency, the following two charts provide more detail on the health districts with the lowest and highest rates of rural residency in Atlantic Canada.

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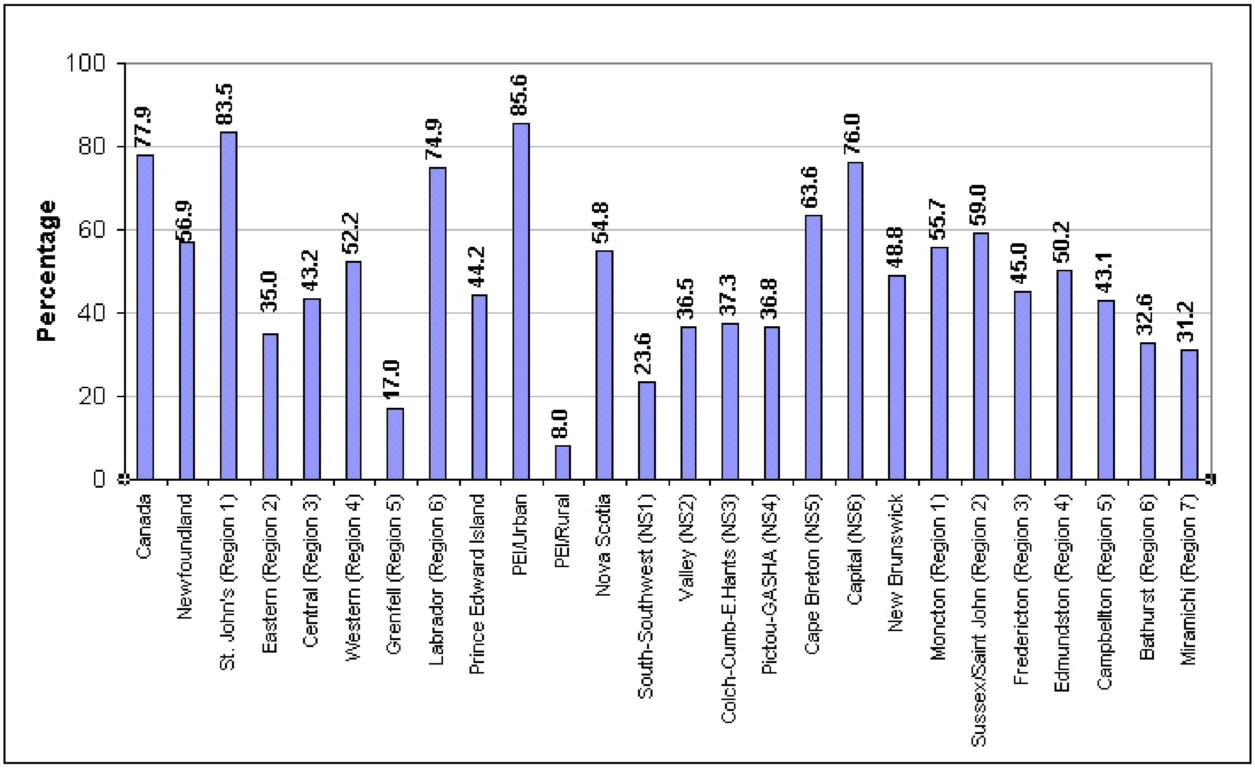
[14] Statistics Canada, http://www12.statcan.ca/english/census01/products/standard/popdwell/Table-UR-D.cfm?T=1&PR=10&SR=1&S=1&O=A

[15] Statistics Canada, 2001 Census, cited in Romanow, Roy, *Building on Values: The Future of Health Care in Canada, Final Report,* Commission on the Future of Health Care in Canada, November, 2002, page 160.

[16] Statistics Canada, http://www.statcan.ca/english/freepub/82-221-XIE/00502/defin4.htm#79

**Figure 6. Percentage of total population living in urban areas, Canada, Atlantic provinces, and health districts, 1996, (%)**



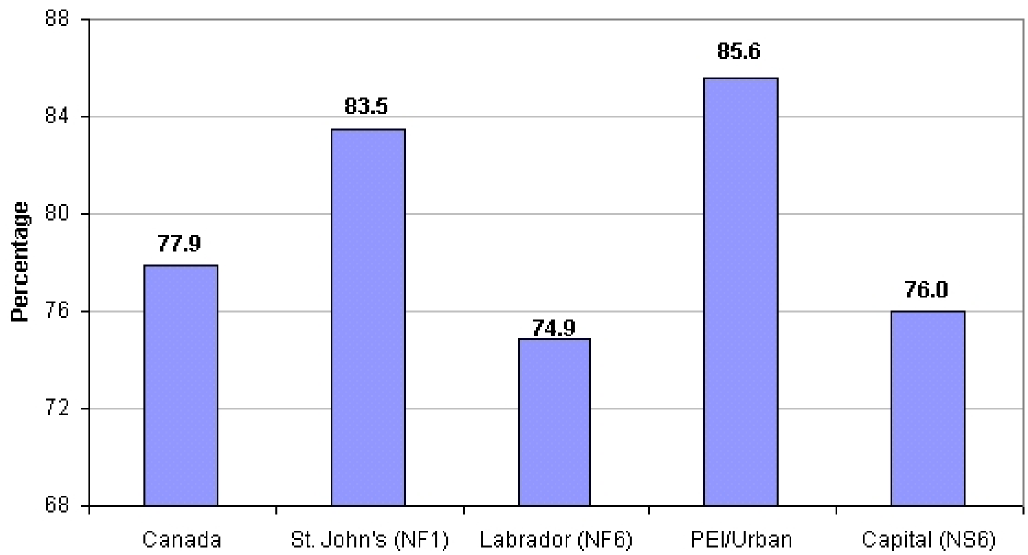

Source: Statistics Canada: 1996 Census.

In Canada as a whole, nearly 80% of the population lives in urban areas. Among the 21 health districts in Atlantic Canada, only four have a comparable proportion of the population living in urban areas – St. John's (NF1), Labrador (NF6), the PEI urban health region (Charlottetown and Summerside), and Central (NS6) (Figure 7).

Again, it is important to remember that Statistics Canada's definition of this indicator may exclude large cities from the "most urban" category, and include sparsely populated regions. Thus Labrador has fewer than 28,000 residents, of whom 75% live in towns of more than 1,000 with a population density of at least 400 per square kilometre. By contrast Moncton has 117,000 residents, but the health district is only 56% urban; Saint John has 123,000 but the health district is only 59% urban; and Fredericton has 81,000, but the health district is only 45% urban.

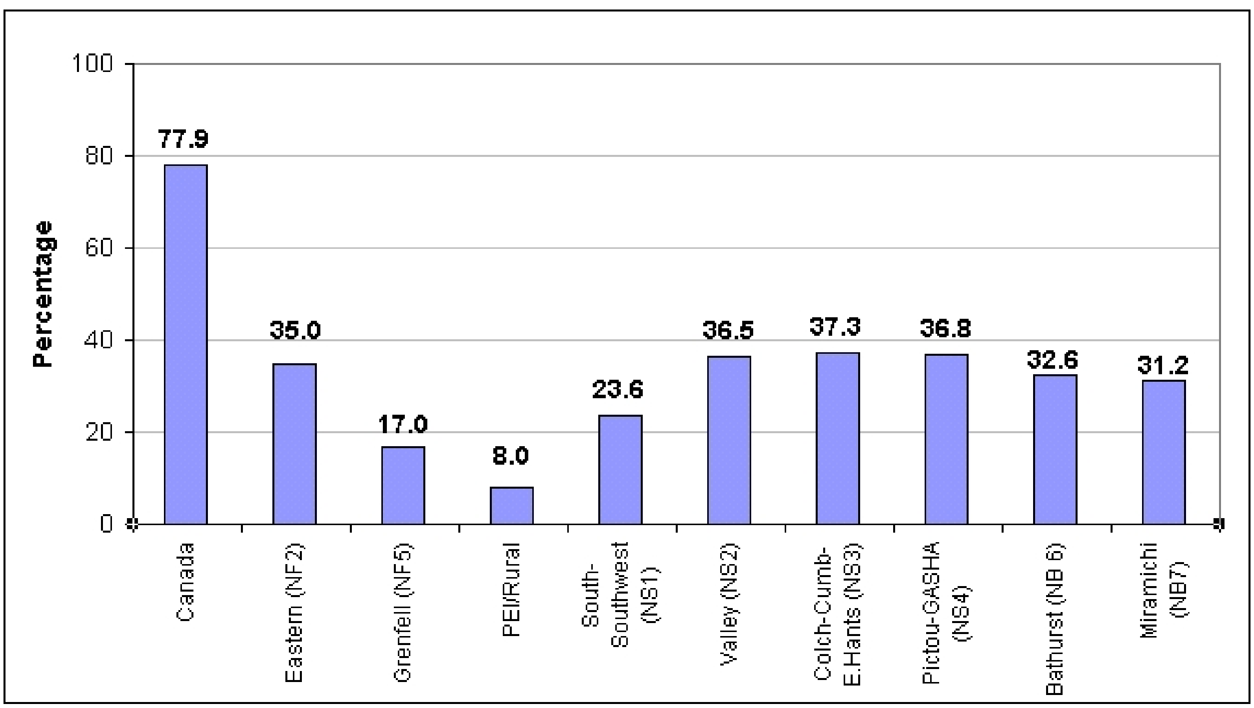
Most health districts in Atlantic Canada have a majority of the population living in rural areas. Figure 8 below indicates the most rural health districts in the Atlantic region. Nine of the twenty-one health districts in the region have less than 40% of their total population living in urban centres. In the rural PEI health district (all of PEI outside Charlottetown and Summerside), 92% of the population lives in rural areas.

**Figure 7. Atlantic Canada health regions in which the percentage of total population living in urban areas is comparable to that in Canada, 1996, (%)**




Source: Statistics Canada: 1996 Census.

**Figure 8. Atlantic health regions with less than 40% of total population living in urban areas, 1996 (% living in urban areas)**




Source: Statistics Canada: 1996 Census.

The Romanow Commission noted that life expectancy in rural communities is less than the national average, disability and accident rates are usually higher in smaller communities, and the more remote a community is the less healthy the population. Because of its high rate of rural residency, the Atlantic region may benefit from implementation of the Romanow Commission's recommendation for policy initiatives designed to overcome rural-urban disparities and barriers in accessing health services in rural areas, particularly primary care.[17]

However, to assess the health impacts of rural-urban discrepancies more accurately, GPI Atlantic recommends that reliance not be placed solely on the health district data reported by Statistics Canada in its health indicators analysis. As noted, the Statistics Canada definition classifies some sparsely populated health districts as highly urban, while other districts containing major cities are classified as largely rural. For that reason, we have supplemented the Statistics Canada rural-urban data in this volume with notes on rural-urban differences that account for the presence of the region's largest cities.

### *1.1.3 Dependency Ratio*

**Definition**

"The dependency ratio is the combined child population (aged 0 to 14) and elderly population (aged 65 and over) to the working age population (aged 15 to 64). This ratio is usually presented as the number of dependents for every 100 people in the working age population."[18] "Dependency" refers to the fact that these age groups are more likely to be socially and/or economically dependent on working-age Canadians.

**Data Sources**

Statistics Canada, Demography Division. Data are derived from the 1996 Census and from administrative sources on births, deaths, and migration.

**Results**

Prince Edward Island and most of Nova Scotia, with the exception of Central (NS6), have a higher ratio of dependants than the Canadian average of 47.1 persons per 100 people in the working age population. Rural PEI has 51.7 dependents for every 100 working age Islanders, and both South-Southwest (NS1) and New Glasgow/ Antigonish (NS4) have 51.1.

Dependency ratios for the Atlantic provinces are shown in Figure 9 below. Health districts with significantly higher ratios of dependants are shown in Figure 10, and health districts with markedly lower dependency ratios are shown in Figure 11.

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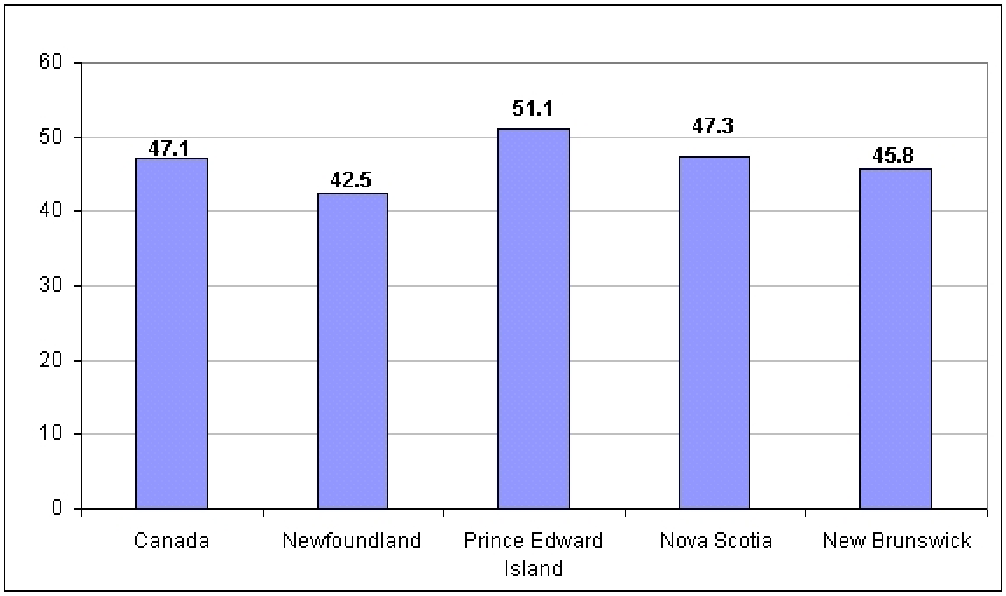
[17] Romanow, Roy, *Building on Values: The Future of Health Care in Canada, Final Report,* Commission on the Future of Health Care in Canada, November, 2002. Available at: http://www.healthcarecommission.ca/Suite247/Common/GetMedia_WO.asp?MediaID=1183&Filename=HCC_Chapter_7.pdf. See also Volume 1 of this report, chapter 7, on access to health services in rural areas.
[18] Statistics Canada, http://www.statcan.ca/english/freepub/82-221-XIE/00502/defin4.htm#78

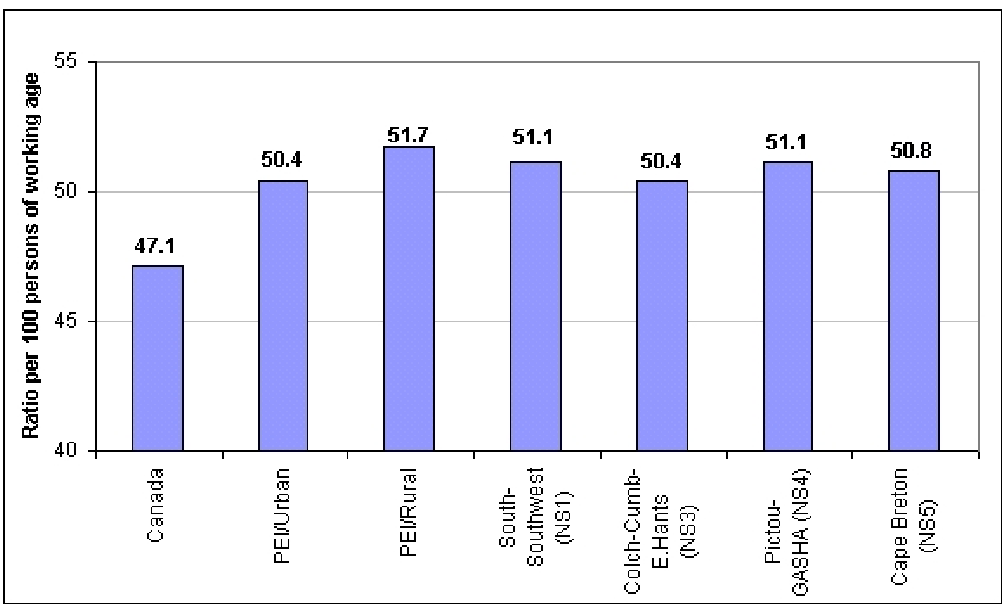
Because of their high proportions of seniors, four of Nova Scotia's six health districts have dependency ratios higher than the national average, while all health districts in Newfoundland and Labrador have dependency ratios below the national average. Because of its shorter average life expectancy, Labrador (NF6) has only 37 dependants per 100 people in the working population, compared to 47.1 in Canada as a whole.

### Figure 9. Dependency ratio, Canada and Atlantic provinces, 1996



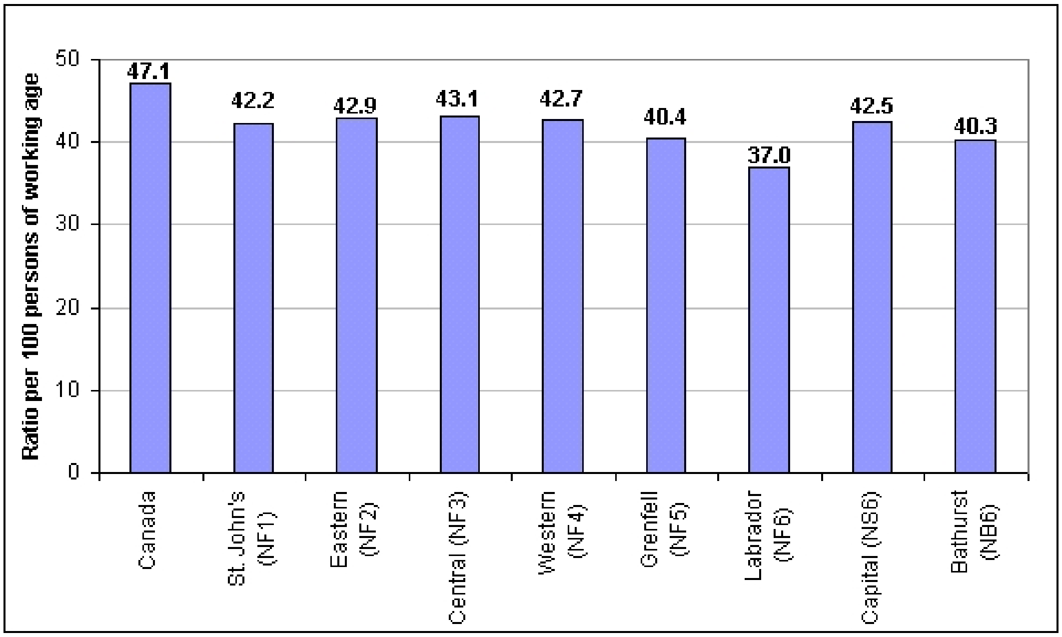

Source: Statistics Canada, Demography Division, 1996 Census, and 1998 administrative data on births, deaths, and migration.

### Figure 10. Atlantic Canada health regions with high dependency ratios, 1998, (%)




Source: Statistics Canada, Demography Division, 1996 Census, and 1998 administrative data on births, deaths, and migration.

**Figure 11. Atlantic Canada health districts with dependency ratios markedly lower than the national average, 1998, (%)**

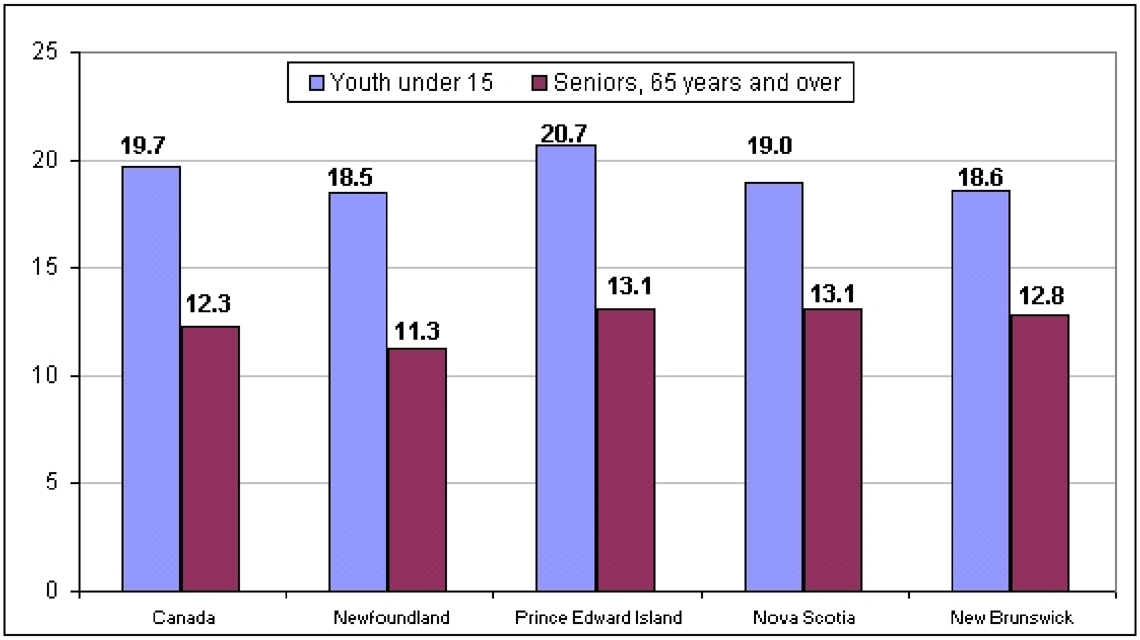



Source: Statistics Canada, Demography Division, 1996 Census, and 1998 administrative data on births, deaths, and migration.

Figures 12, 13, and 14 below break down the components of the dependency ratio to indicate the percentage of seniors aged 65 and older, and the percentage of children under 15. Note that the ratios in Figures 12, 13, and 14 below are all expressed as a proportion of the total population, rather than as a proportion of the working-age population as in Figures 9, 10, and 11 above. The three Maritime provinces have higher percentages of elderly residents than the Canadian average. Newfoundland and Labrador has a smaller ratio of seniors to the total population than Canada and the other Atlantic provinces (Figure 12).

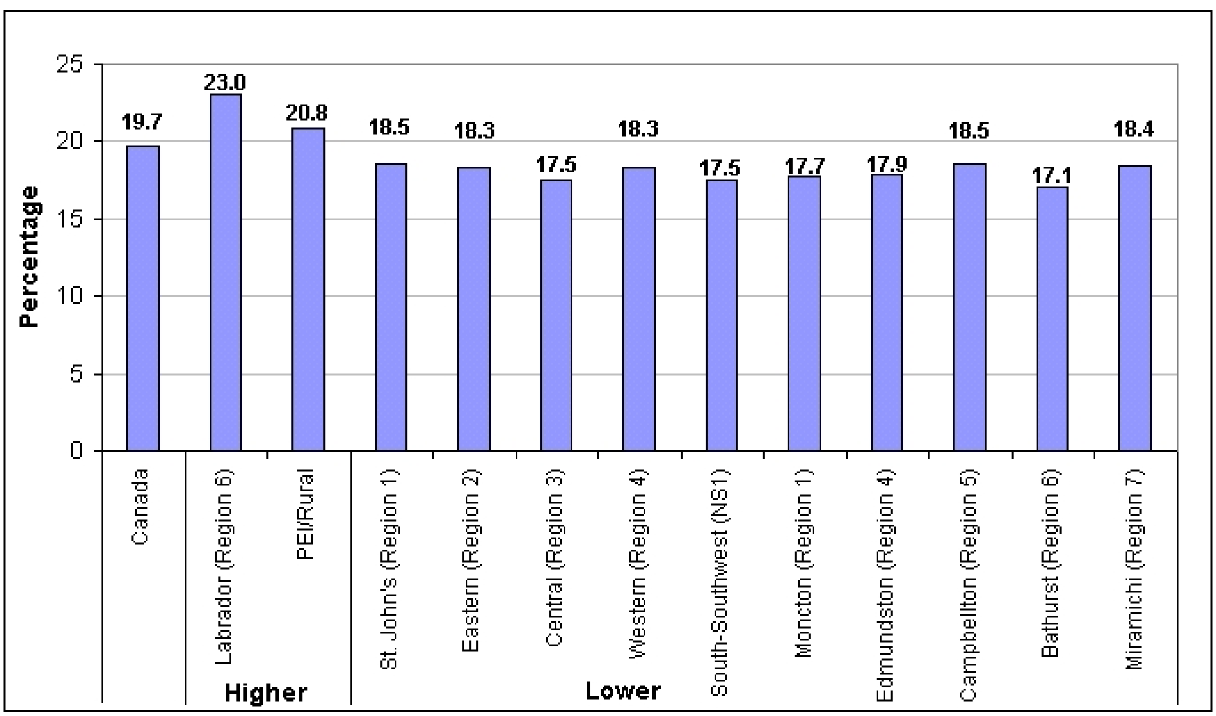
Among health districts in the Atlantic provinces, only two have markedly lower proportions of elderly residents than the national average – Labrador (NF6) and Grenfell (NF5 – which includes part of Labrador). With the exception of Central (NS6), as noted above, all Nova Scotia health districts have higher proportions of seniors than in Canada as a whole. Labrador (NF6) has a significantly higher percentage of those under 15 (23%) compared with the national average (19.7%) and a significantly lower percentage of those 65 and older (4%) than the national average (12.3%). In Grenfell (NF5), seniors comprise 9.3% of the total population (Figures 13 and 14).

**Figure 12. Seniors and youth as a percentage of the total population, Canada, and Atlantic provinces, 1998, (%)**



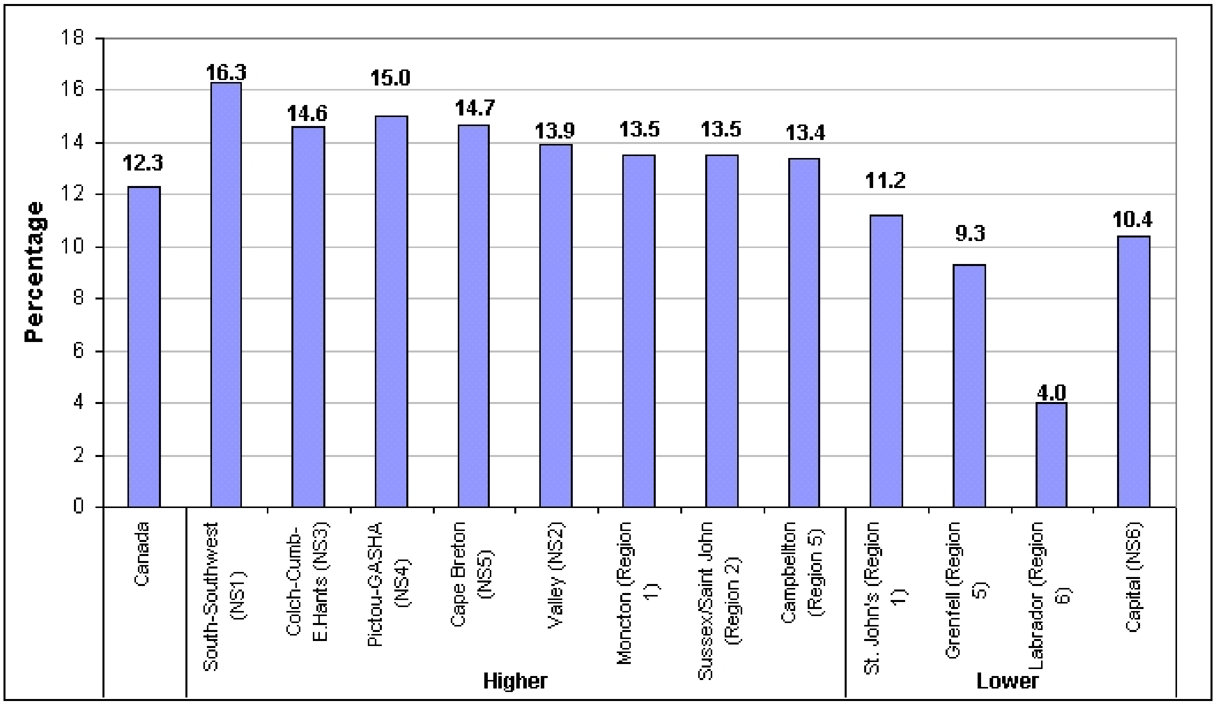

Source: Statistics Canada, Demography Division, 1996 Census, and 1998 administrative data on births, deaths, and migration.

**Figure 13. Percentage of children, aged 0-14, to total population, selected health districts, Atlantic Canada, 1998, (%)**




Source: Statistics Canada, Demography Division. Data are derived from the 1998 administrative sources on births, deaths, and migration

**Figure 14. Percentage of seniors, aged 65 and older, to total population, selected health districts, Atlantic Canada, 1998, (%)**




Source: Statistics Canada, Demography Division. Data are derived from the 1998 administrative sources on births, deaths, and migration.

Due to the aging of the Canadian population and the sharp increase in the senior population, the working age population has begun to decline in comparison to the number of dependants.[19] The rural areas in Nova Scotia, and three of the seven health regions in New Brunswick, in particular, have aging populations markedly larger than the national average, as a percentage of total population.

These demographic changes not only increase the demand for health care services. They also affect women disproportionately, as they are the primary care givers. Those health districts with higher than average proportions of seniors, such as South-Southwest (NS1) in Nova Scotia, can therefore expect to see increasing demands placed on caregivers. This demographic information can therefore help policy makers target respite services and supports for caregivers.

### *1.1.4 Aboriginal Population*

**Definition**

The Aboriginal population includes "those persons who reported identifying with at least one Aboriginal group (e.g. North American Indian, Métis, or Inuit) and/or those who reported being a

[19] Statistics Canada, *The Daily,* March 13. 2001, available at: http://www.statcan.ca/Daily/English/010313/d010313a.htm.

Treaty Indian or a Registered Indian as defined by the Indian Act and/or those who were members of an Indian Band or First Nation."[20]

**Data Sources**

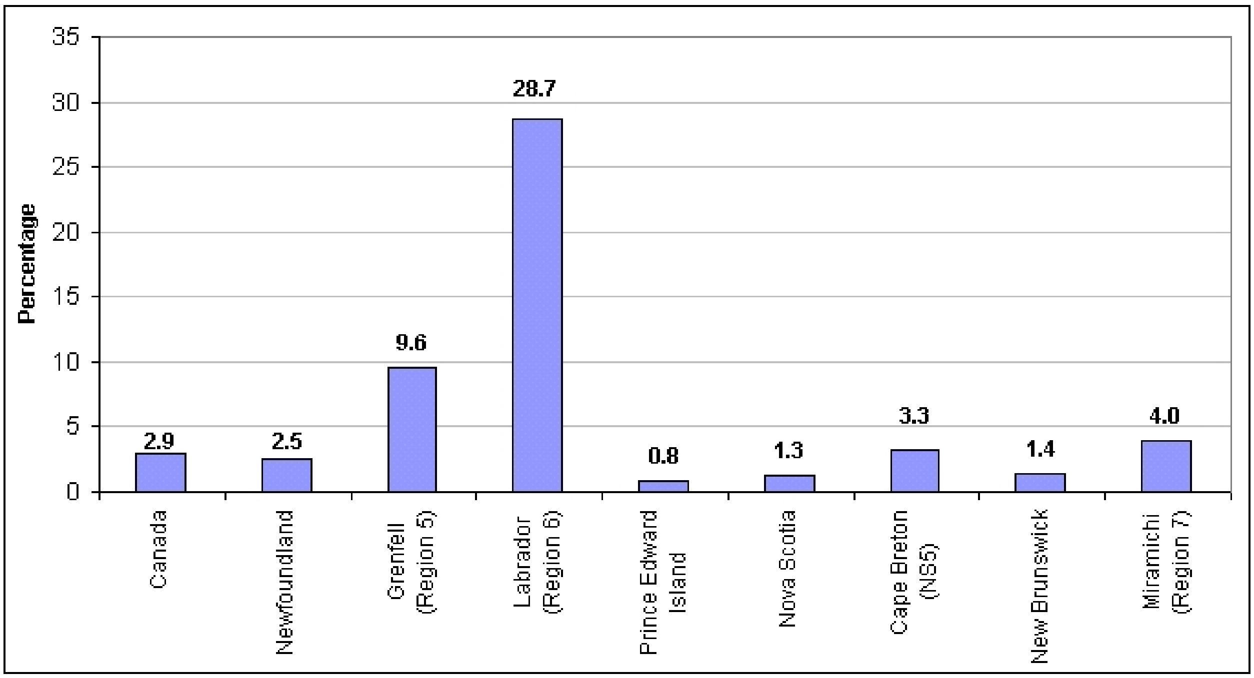
Statistics Canada, 1996 Census (20% sample), 1996 Census Coverage Studies, and Demography Division (population estimates).

**Results**

Statistics Canada notes that "the health status characteristics and non-medical determinants of Aboriginal people differ from the non-Aboriginal population. Knowing the proportion of Aboriginal people in a geographic area provides context to better interpret health indicators." In addition, understanding possible reasons for these differences is important in addressing the health needs of the Aboriginal population.

In Canada, 2.9% of the population is Aboriginal. Four health regions in Atlantic Canada exceed that proportion: Labrador (NF6) at 28.7% and Grenfell (NF5) at 9.6%, which also includes part of Labrador; Miramichi (NB7) in New Brunswick at 4%; and Cape Breton (NS5) at 3.3% in Nova Scotia (Figure 15).

**Figure 15. Aboriginal population as a proportion of total population Canada, Atlantic provinces, and health regions with a greater percentage of Aboriginal population than the Canadian average, 1996, ( %)**




[20] Statistics Canada, http://www.statcan.ca/english/freepub/82-221-XIE/00502/defin4.htm#80.

Aboriginals have high birth rates, consistently lower life expectancy, high rates of obesity and diabetes, and high rates of alcohol, smoking and substance abuse among young people.[21] This demographic information by health district is vital to health policy planners targeting particular interventions and allocating resources designed to improve health and prevent disease.

## 1.2 Socio-Economic Determinants

Basic socio-economic determinants in this section include education, unemployment, low income, housing affordability, lone parent families, crime rates, and decision latitude at work.

### *1.2.1 Education: Graduation Rates*

**Definition**

In the chart below, high school graduates are indicated as the proportion of the population aged 25 to 29 who have a high school graduation certificate. Post-secondary graduates are indicated as the proportion of the population aged 25 to 54 who have obtained a post-secondary certificate, diploma, or degree.[22] For gender breakdowns of educational attainment in the four Atlantic provinces, please see GPI Atlantic's 2000 statistical profile of women's health in Atlantic Canada.

**Data Source**

Statistics Canada, 1996 Census (20% sample)

**Results**

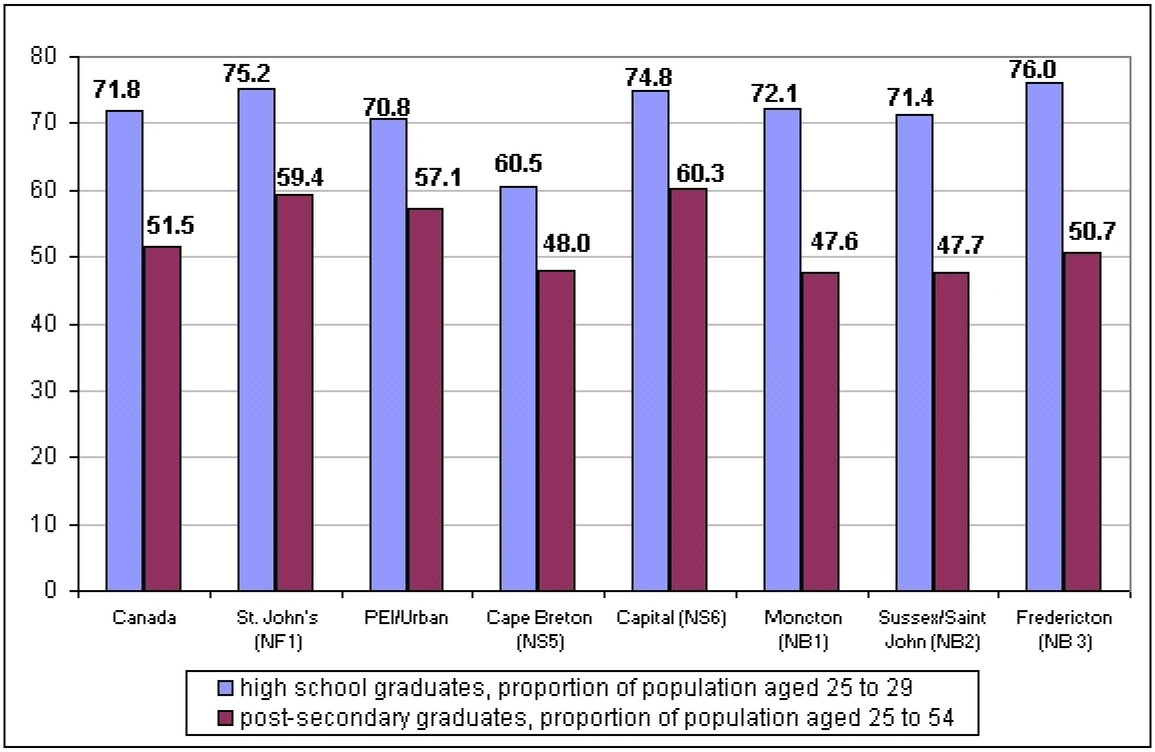
There are marked differences between health districts with major urban centres and those that are mainly rural, in the proportion of the population in Atlantic Canada with a high school degree and with a post-secondary degree. Health districts in the region with major urban centres have a comparable or higher rate of high school graduation than the Canadian average, while many rural health districts, with smaller towns and villages, have a lower rate.

Halifax (60%), St. John's (59%), and Charlottetown/Summerside (57%) also have significantly higher proportions of the population with post-secondary degrees than the Canadian average (51.5%). St. John's (75%), Halifax (75%), and Fredericton (76%) have higher rates of high school completion than the national average (72%) (Figure 16).

Cape Breton (NS5) is an urban exception, with a high school graduation rate of just 60.5%, well below the Canadian average. The Valley (NS2) is a rural exception, with the highest post-secondary graduation rate (53.9%) of any rural health district in Atlantic Canada, and higher than the national average (51.5%).

[21] Shah, C.P., *Public Health and Preventive Medicine in Canada,* fourth edition, 1998, p. 127
[22] Statistics Canada, http://www.statcan.ca/english/freepub/82-221-XIE/00502/defin2.htm#40

**Figure 16. Percentage of high school graduates (as percentage of population aged 25-29) and percentage of post-secondary graduates (as percentage of population aged 25-54), Canada and health districts with major urban centers in the Atlantic provinces, 1996, (%)**



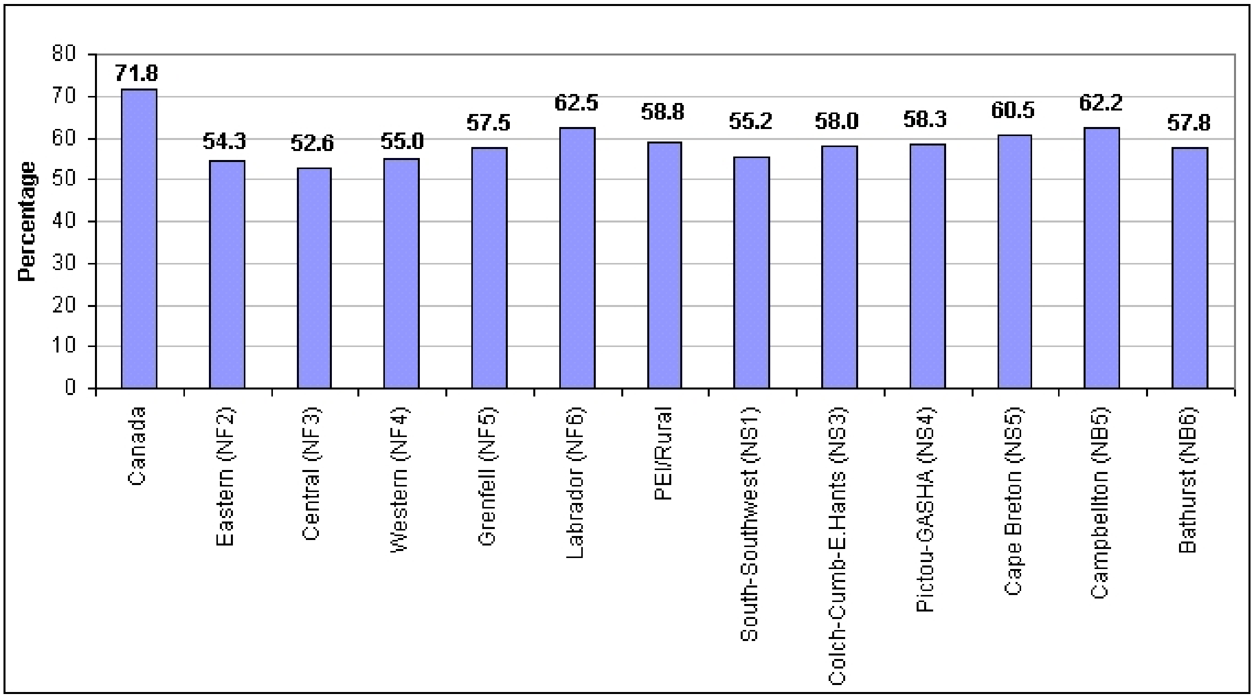

Source: Statistics Canada, 1996 Census (20% sample).

Figure 17 indicates health districts with a markedly lower proportion of the population aged 25 to 29 having completed high school than the national average. All of the rural health regions in Newfoundland, the PEI rural health district, four of the five rural health regions in Nova Scotia, and two of the four rural health regions in New Brunswick have comparatively low rates of high school completion. Newfoundland's central health region (NF3) has the lowest rate of high school completion at 52.6%, followed by the eastern region (54.3%), and western region (55%). The South-Southwest (NS1) district in Nova Scotia also has a significantly lower rate of high school completion (55.2%) than the national average (71.8%).

Figure 18 shows rural health districts – all in Newfoundland, New Brunswick, and rural PEI – with rates of post-secondary graduation that are significantly below the national average. Grenfell (NF5), (38%), Edmundston (NB4), (40.1%), Bathurst (NB6), (37.7%), and Miramichi (NB7), (39.9%), have rates of post-secondary education that are at least 20% lower than the Canadian average (51.5%).

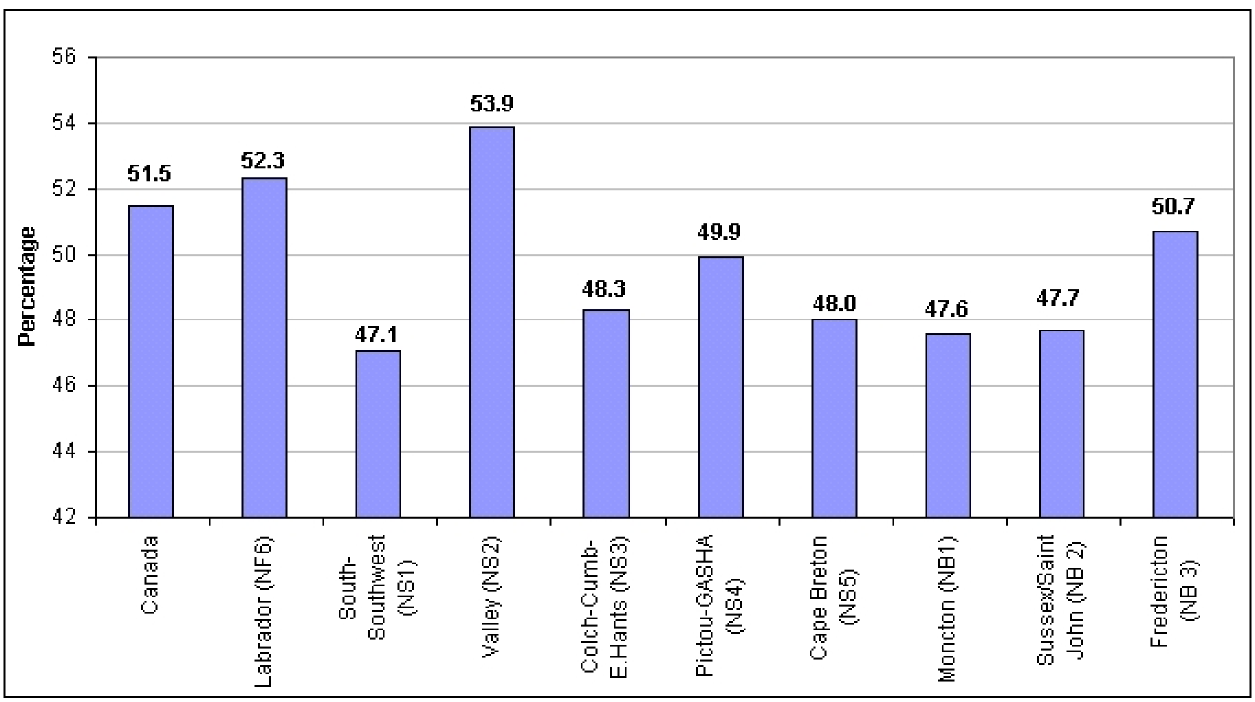
Figure 19 shows that health districts in rural Nova Scotia have somewhat higher rates of post-secondary graduation than their rural counterparts in the other Atlantic provinces. Labrador (52.3%) and Kings County (NS2), (53.5%), have higher rates of post-secondary graduation than the national average. As noted in Figure 16 above, Central (NS6), St. John's, and Charlottetown/Summerside have rates of post-secondary graduation substantially higher than the national average.

**Figure 17. Health regions with below-average rates of high school completion, Atlantic Canada, 1996, (%)**



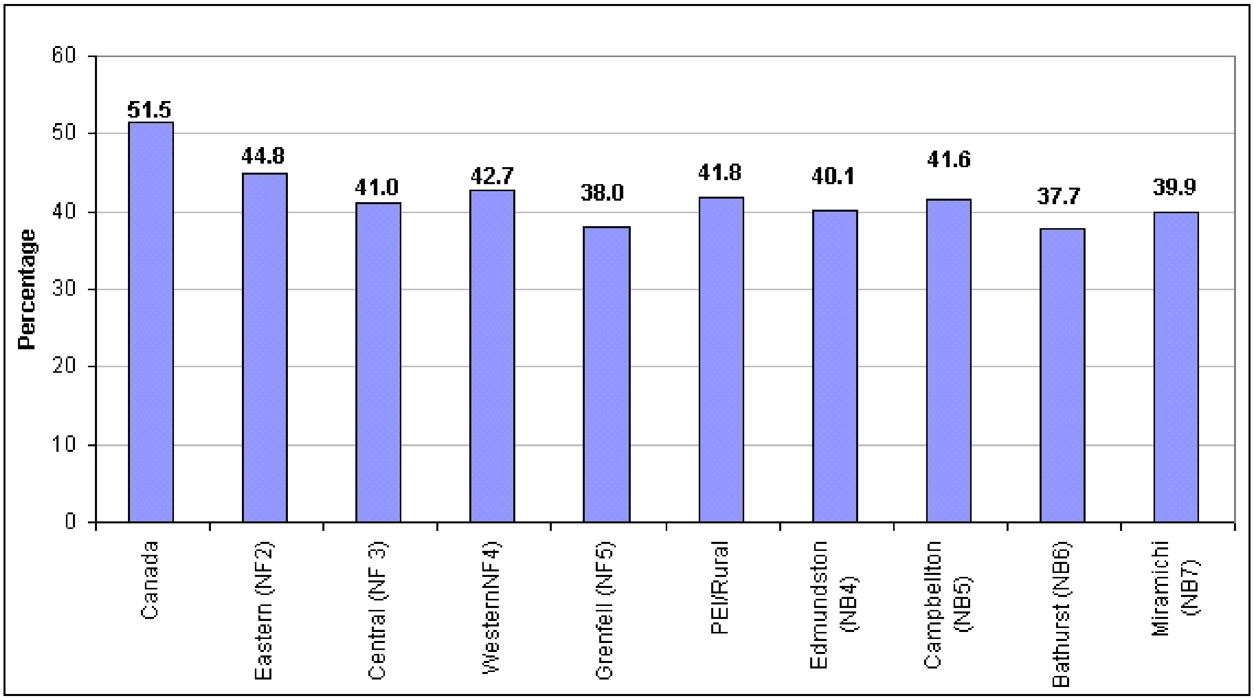

Source: Statistics Canada, 1996 Census (20% sample).

**Figure 18. Health districts in Atlantic Canada with relatively low rates of post-secondary graduation, compared with the national average, 1996 (%)**




Source: Statistics Canada, 1996 Census (20% sample).

**Figure 19. Health districts in Atlantic Canada with rates of post-secondary graduation that are closer to the national average, 1996, (%)**




Source: Statistics Canada, 1996 Census (20% sample)

## *1.2.2 Education: Average Number of Years of Schooling*

Education is positively associated with both economic status and favourable health outcomes and behaviours.[23]

**Definition**

The average number of years (or grades) of schooling at the elementary, secondary, post-secondary, and university levels, for the population aged 25 to 54.[24]

**Data Source**

Statistics Canada, 1996 Census (20% sample)

**Results**

The national average number of years of schooling is 13.2. Central (NS6) and Prince Edward Island are the only two areas where the average number of school years is comparable to the national average (13.6, and 13.2 respectively). Most of the Atlantic health districts range between 11.1 and 12.8 for average length of school years. Grenfell (NF5) has the lowest number of average school years at 10.8 years.

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[23] Statistics Canada, http://www.statcan.ca/english/freepub/82-570-XIE/01_11.pdf
[24] Statistics Canada, http://www.statcan.ca/english/freepub/82-221-XIE/00502/defin2.htm#42.

Further analytical work is required to assess the relationship between educational attainment, health behaviours, and health outcomes in Atlantic region health districts with lower and higher levels of schooling, taking into account a range of other mediating variables.

### *1.2.3 Unemployment*

Unemployed people tend to have poorer health than those who are employed.[25] According to Statistics Canada, "unemployed people suffer a disproportionate share of health problems, such as depression, morbidity and reduced life expectancy."[26]

**Definition**

The unemployment rate is defined as "the percentage of the labour force aged 15 and over who did not have a job during the reference period. The labour force consists of people who are currently employed and people who are unemployed but were available to work in the reference period and had looked for work in the past 4 weeks. The reference period refers to a one-week period (from Sunday to Saturday) that usually includes the 15th day of the month." [27]
This definition is clearly quite restrictive, and excludes many people who don't have a job, but who would prefer to work if they could find a suitable one. See volume 1 of this report for supplementary measures of unemployment that include discouraged workers and those who are underemployed.

**Data Source**

Statistics Canada, Labour Force Survey (special tabulations)

**Results**

All four Atlantic provinces have higher rates of unemployment than the Canadian rate of 7.2%. Newfoundland and Labrador, with an unemployment rate of 16.1% has more than double the national unemployment rate. The unemployment rate has declined steadily throughout Canada since the mid-1990s (Figure 20).

Major urban centres in Atlantic Canada generally show lower rates of unemployment than rural ones. But there are some notable differences even among some urban Atlantic health districts. In the urban region of Prince Edward Island, for example, the unemployment rate decreased steadily from 11.8% in 1996 to 8.8% in 2001. Industrial Cape Breton, on the other hand, has a very high unemployment rate (19.1% in Sydney).[28]

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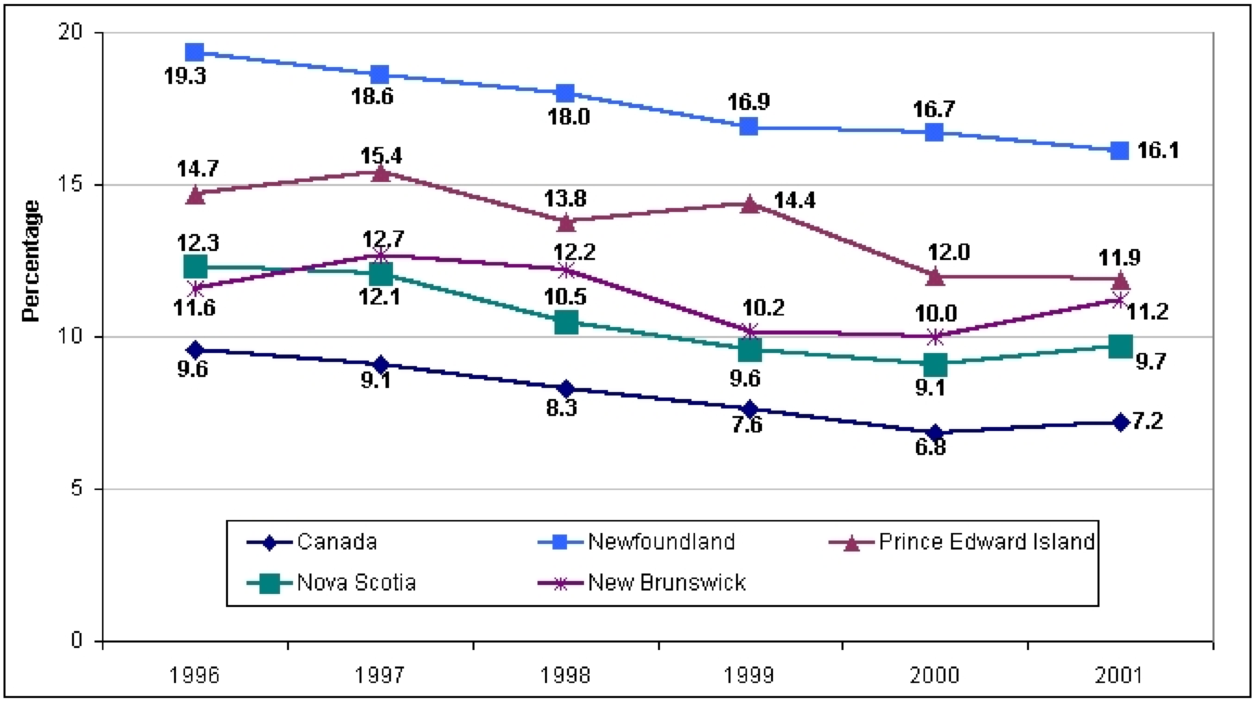
[25] Statistics Canada, http://www.statcan.ca/english/freepub/82-221-XIE/00502/defin2.htm#43; Canadian Public Health Association, *The Health Impacts of Unemployment: A Position Paper,* CPHA, Ottawa, 1996.
[26] Statistics Canada http://www.statcan.ca/english/freepub/82-570-XIE/01_11.pdf pg 32.
[27] Statistics Canada, http://www.statcan.ca/english/freepub/82-221-XIE/00502/defin2.htm#43.
[28] Statistics Canada, *CANSIM II* database, Table 282-0053; Statistics Canada, *Labour Force Survey 2001;* Statistics Canada, *Labour Force Historical Review 2002.*

**Figure 20. Unemployment rate, Canada and Atlantic Provinces, 1996 to 2001, (%)**



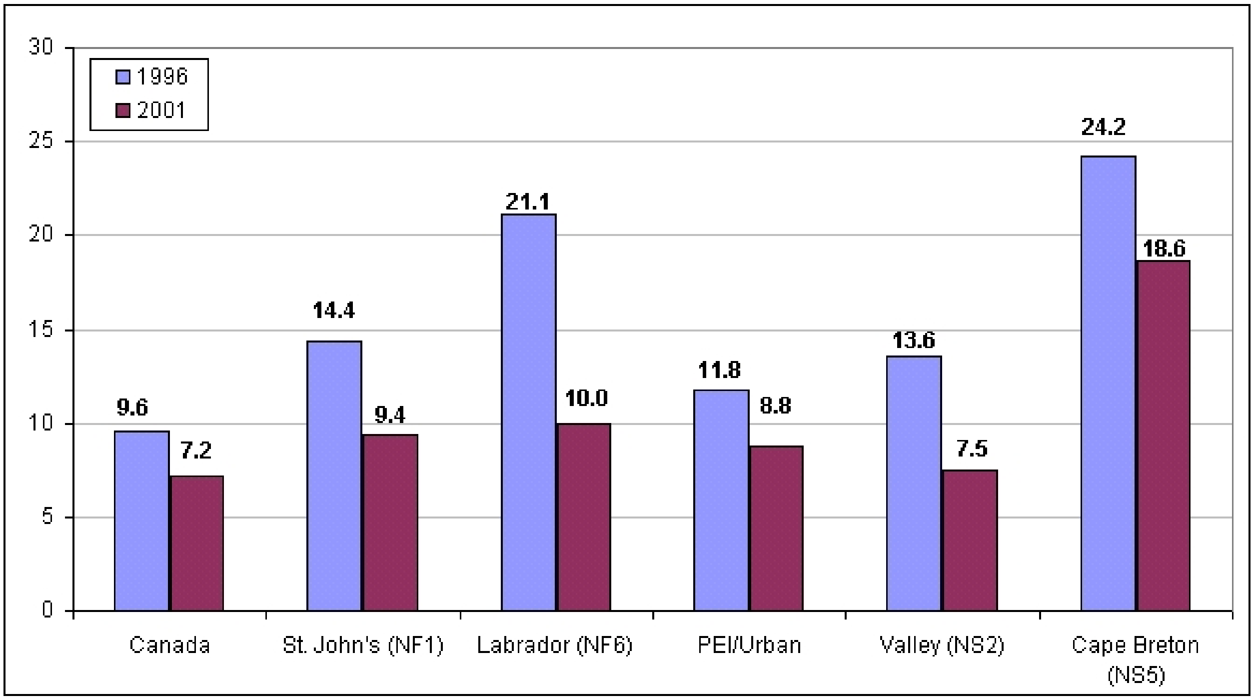

Source: Statistics Canada, Labour Force Survey (special tabulations), 1996-2001

The Cape Breton (NS5) health district as a whole had an unemployment rate of 24.2% in 1996. This fell to 19.7% in 1997, but has remained fairly steady since that time, with an unemployment rate of 18.6% in 2001 (Figure 21). Continuing high unemployment in industrial Cape Breton may be attributed in part to the demise of two key industries – steel and coal. Labrador (NF6) saw the sharpest decline in unemployment, from 21.1% in 1996 to 10% in 2001.

Although most health districts in Atlantic Canada have seen their unemployment rates decline since 1996, rural health districts in New Brunswick have not. All four rural health regions in New Brunswick had unemployment rates that were higher in 2001 than in 1996, with the sharpest increases in Edmundston (NB4) and Bathurst (NB6). Edmundston (NB4) saw unemployment rise from 8% in 1996 to 10.8% in 2001, and Bathurst (NB6) saw its unemployment rate soar from 13.3% in 1996 to 18.2% in 2001 (Figure 22).

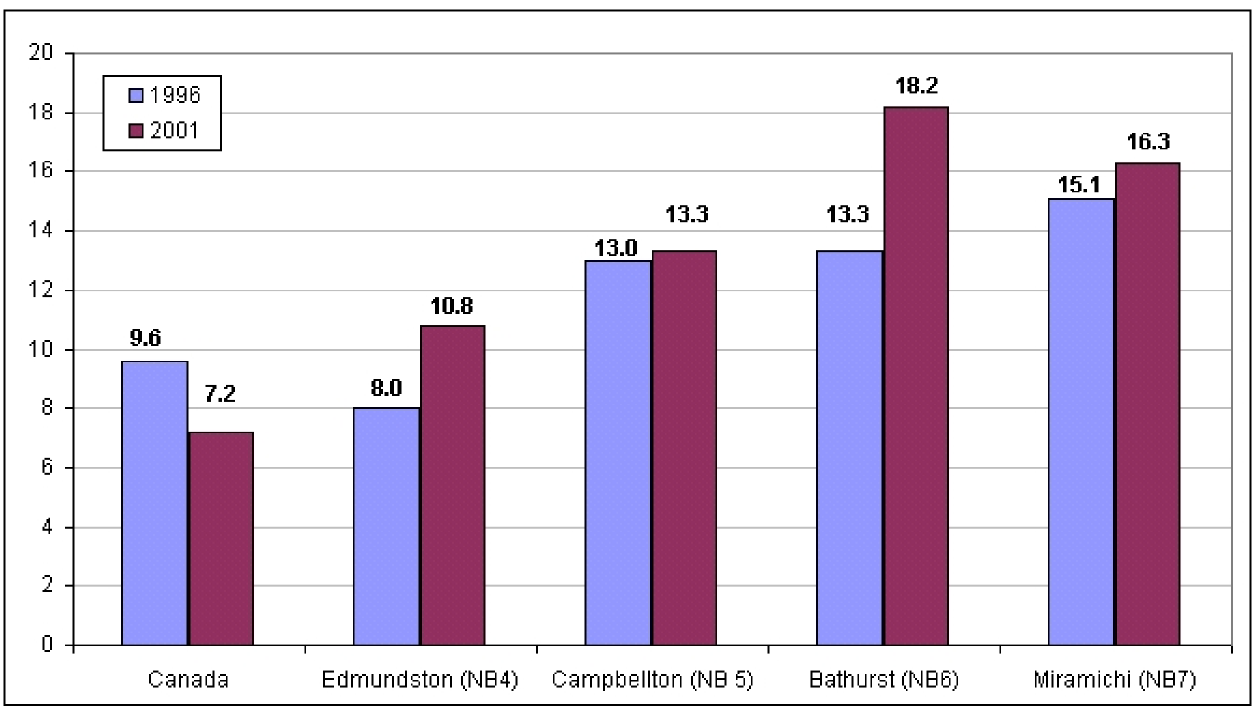
As noted earlier, time and resources did not permit explanatory analysis of these phenomena in this volume, but it is hoped that the descriptive data presented here will encourage further exploration of causal factors, and their impact on health outcomes.

**Figure 21. Declines in unemployment rates, selected health districts, Newfoundland and Labrador, Nova Scotia, and PEI, 1996 and 2001(%)**




Source: Statistics Canada, Labour Force Survey (special tabulations), 1996-2001.

**Figure 22. Increases in unemployment rates, rural health districts, New Brunswick, 1996 and 2001(%)**

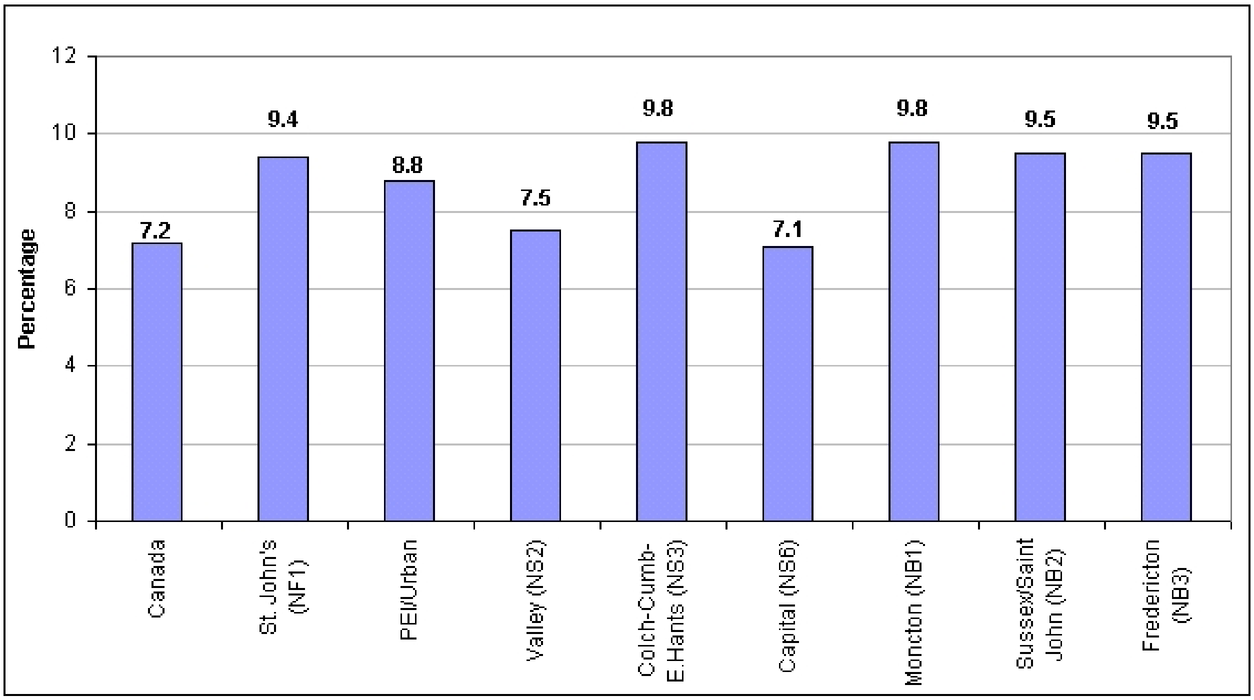



Source: Statistics Canada, Labour Force Survey (special tabulations) 1996-2001

The sharp disparity in 2001 unemployment rate across the Atlantic region's 21 health regions reveals both the danger of relying on provincial averages, and the necessity for sub-provincial analysis and policy interventions.

Although the Atlantic region generally has a significantly higher unemployment rate than the national average, eight health districts in the region, including six of the seven health districts with major urban centres, have an unemployment rate below 10%. Central (NS6) (7.1%) has marginally less unemployment than the national average (7.2%), and Kings County (NS2) has a comparable rate (7.5%). Both are less than half the Cape Breton rate (18.6%) (Figure 23).

**Figure 23. Health districts in Atlantic Canada with unemployment rates below 10%, 2001, (%)**

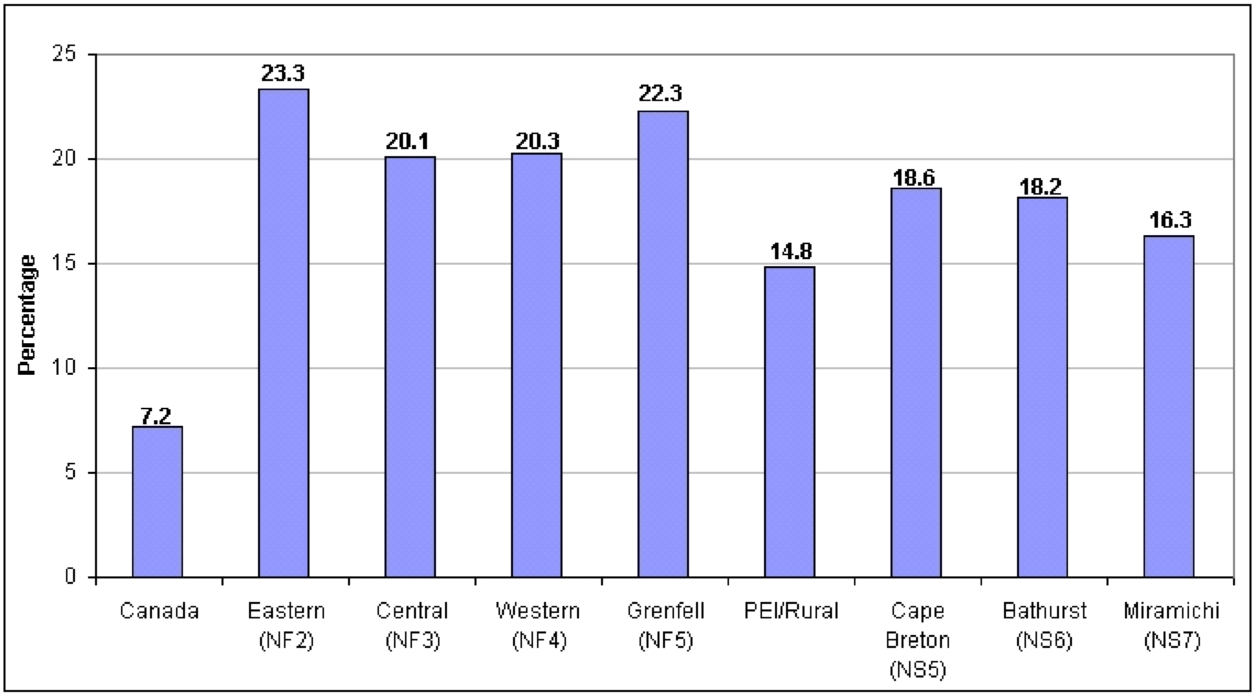



Source: Statistics Canada, Labour Force Survey (special tabulations) 2001

By contrast to these relatively lower rates, mostly in urban areas, eight of the 21 health districts in Atlantic Canada have unemployment rates that are at least double the national unemployment rate. In Newfoundland, all health districts except Labrador (NF6) and St. John's (NF1), had an unemployment rate that was more than twice the national rate in 2001. The Eastern (NF2) and Grenfell (NF5) districts have the highest unemployment rates in Atlantic Canada at 23.3% and 22.3% respectively.

In New Brunswick, Bathurst (NB6) (18.2%), and Miramichi (NB7) (16.3%) had the province's highest unemployment rates in 2001. In Nova Scotia, Cape Breton (NS5) had an unemployment rate of 18.6%, while the New Glasgow area health district (NS4) had an unemployment rate of 12.7%. Prince Edward Island's rural health region had an unemployment rate of 14.8% in 2001, twice the national rate, and considerably higher than the Charlottetown-Summerside rate of 8.8% (Figure 24).

**Figure 24. Health districts with unemployment rates at least double the national average, Atlantic Canada, 2001, (%)**




Source: Statistics Canada, Labour Force Survey (special tabulations), 2001.

### *1.2.4 Youth Unemployment Rate*

**Definition**

Statistics Canada defines the youth unemployment rate as the proportion of the "labour force aged 15 to 24 years who did not have a job during the reference period. The labour force consists of people who are currently employed and people who are unemployed but were available to work in the reference period and had looked for work in the past 4 weeks. The reference period refers to a one-week period (from Sunday to Saturday) that usually includes the 15th day of the month."[29]

**Data Source**

Statistics Canada, Labour Force Survey (special tabulations).

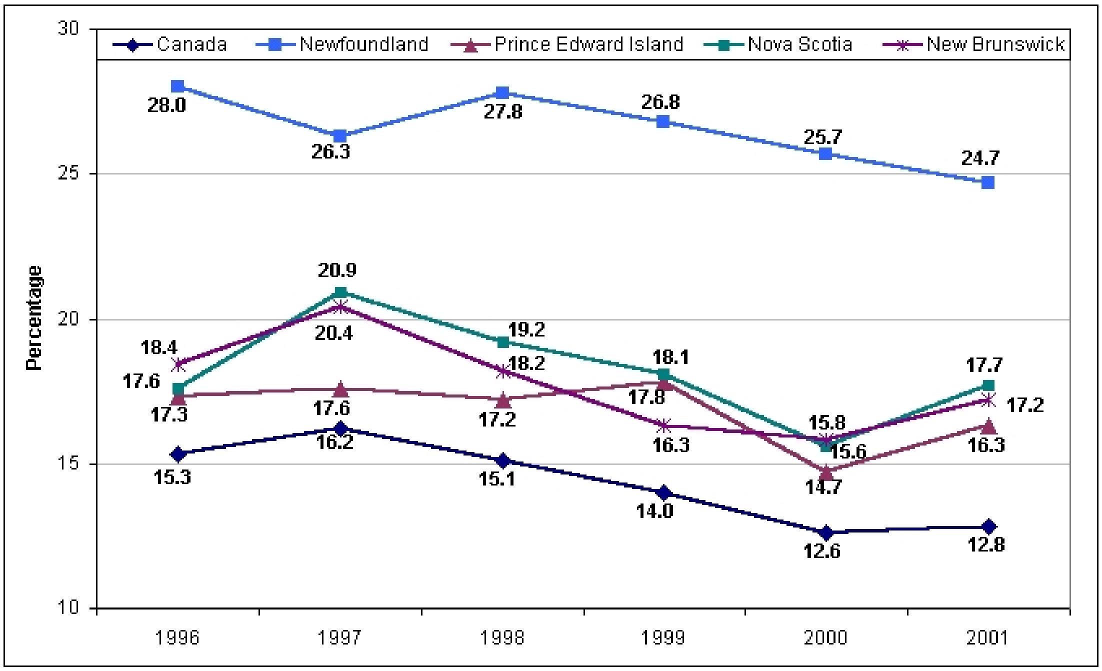
**Results**

The youth unemployment rate for Canada declined from 15.3% in 1996 to 12.8% in 2001. The three Maritime provinces saw a decline in youth unemployment from 1997 to 2000, but an increase between 2000 and 2001. Newfoundland and Labrador has seen a steady decline in youth unemployment since 1997, but still has the highest rate of youth unemployment in the country – nearly double the national rate.

[29] Statistics Canada, http://www.statcan.ca/english/freepub/82-221-XIE/00502/defin2.htm#43

In fact, all four Atlantic provinces had youth unemployment rates in 2001 substantially higher than the national rate (12.8%) – 24.7% in Newfoundland, 17.7% in Nova Scotia, 17.2% in New Brunswick, and 16.3% in Prince Edward Island. Nova Scotia's youth unemployment rate was marginally higher in 2001 than in 1996 (Figure 25).

**Figure 25. Youth unemployment for Atlantic Provinces and Canada between 1996 - 2001 (%)**



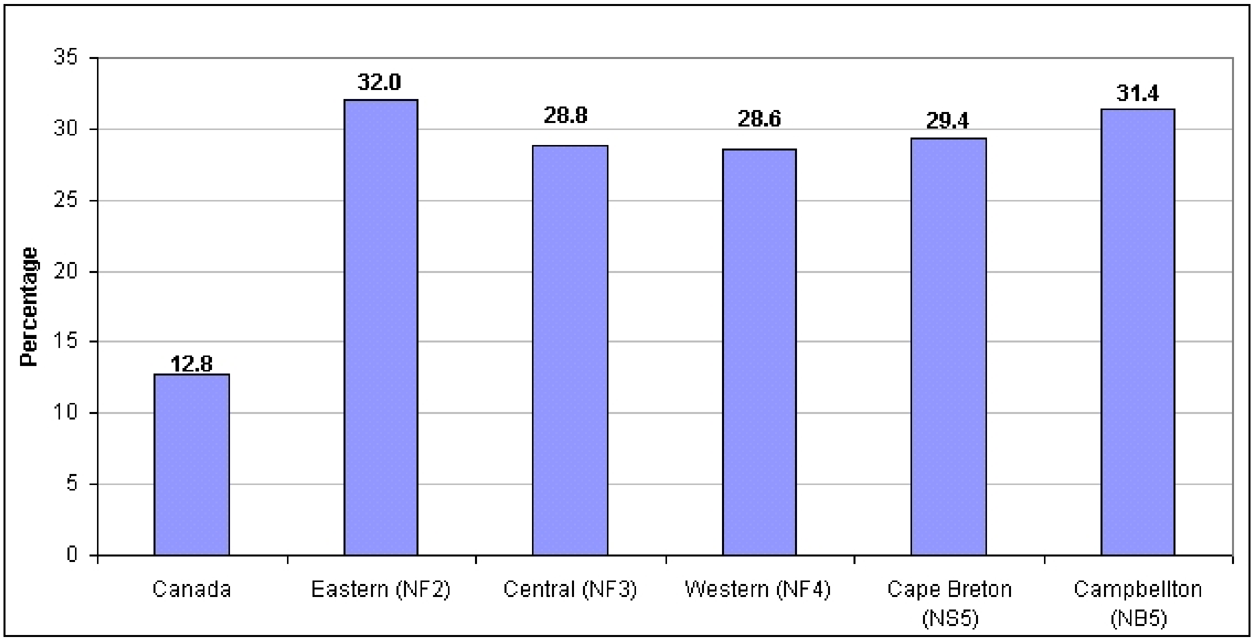

Source: Statistics Canada, Labour Force Survey (special tabulations) 1996-2001

As with other socio-economic indicators, there are sharp disparities in youth unemployment rates between different Atlantic region health districts. Health districts with youth unemployment rates more than double the national rate in 2001 were Newfoundland's Eastern (NF2), Central (NF3), and Western (NF4) regions, with rates of 32.1%, 28.8%, and 28.6% respectively; Cape Breton (NS5) at 29.4%; and Campbellton (NB5) region at 31.4% (Figure 26). Grenfell (NF5) and Labrador (NF6) data for this indicator are not available due to high sampling variability.[30]

By contrast, five health districts had youth unemployment rates in 2001 that were much more comparable to the national rate, and about half the rate of the five health districts noted in Figure 26 above. No Atlantic region health district had youth unemployment rates below the national average, but the two health districts with the lowest youth unemployment rates in Atlantic Canada were Central (NS6) (13.8%) and Moncton (NB1) (13.4%). All other health districts in Atlantic Canada had youth unemployment rates substantially higher than those noted in Figure 27 below.

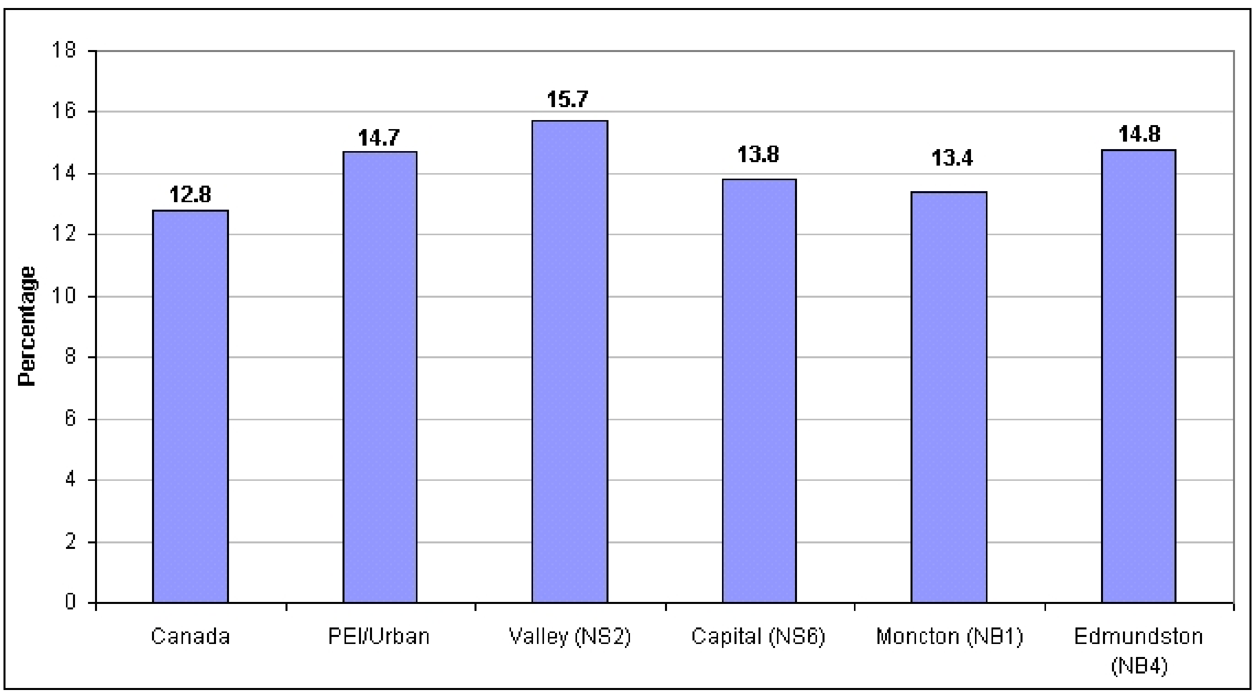
[30] Statistics Canada, http://www.statcan.ca/english/freepub/82-221-XIE/00502/tables/html/2242.htm, extracted January 20, 2003.

**Figure 26. Health districts in Atlantic Canada with youth unemployment rates more than double the national average, 2001, (%)**




Source: Statistics Canada, Labour Force Survey (special tabulations), 2001.

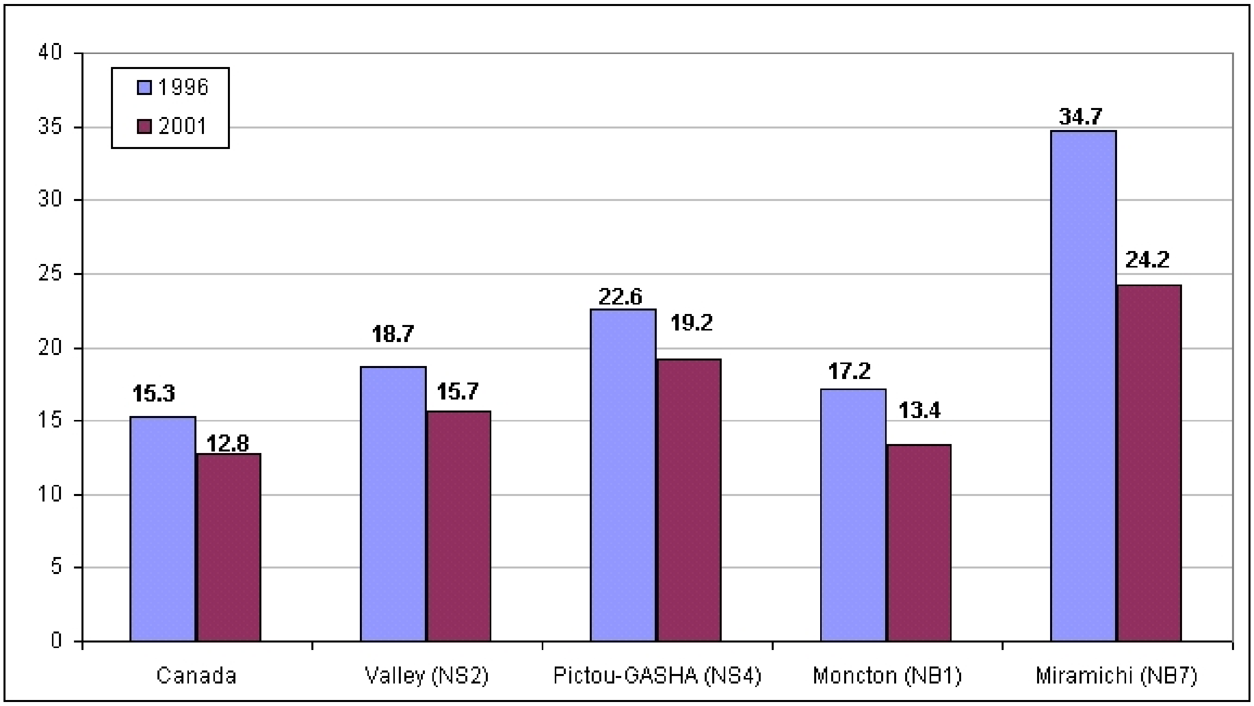
**Figure 27. Health districts in Atlantic Canada with youth unemployment rates that are comparable to the national average, 2001, (%)**




Source: Statistics Canada, Labour Force Survey (special tabulations), 2001.

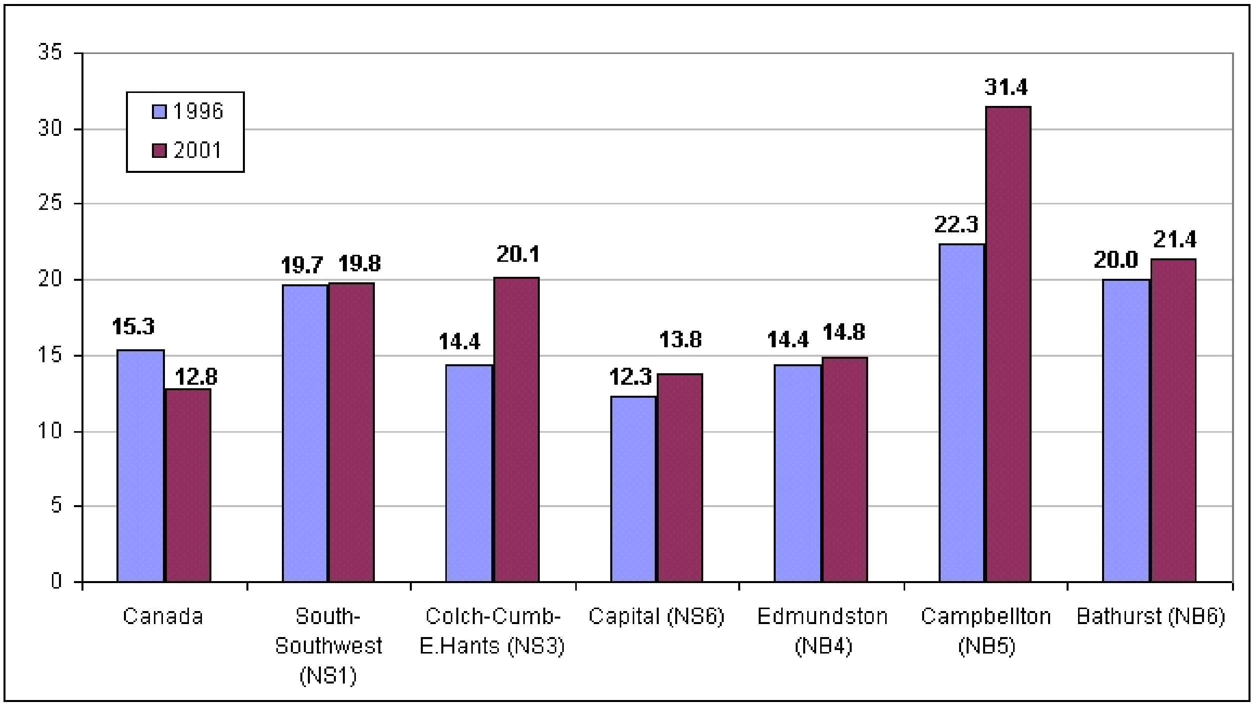
Similar disparities exist when examining trends over time. Some health districts have seen youth unemployment decline since 1996 (Figure 28) and some have seen youth unemployment increase (Figure 29). The sharpest decline in youth unemployment was in Miramichi (NB7) from 34.7% in 1996 to 24.2% in 2001. The sharpest increases were in Campbellton (NB5) from 22.3% in 1996 to 31.4% in 2001, and in Colchester-Cumberland-East Hants (NS3) from 14.4% to 20.1%.

**Figure 28. Declines in youth unemployment, selected health districts in Atlantic Canada, 1996 - 2001 (%)**




Source: Statistics Canada, Labour Force Survey (special tabulations) 1996-2001

**Figure 29. Increases in youth unemployment, selected health districts in Atlantic Canada, 1996 - 2001 (%)**




Source: Statistics Canada, Labour Force Survey (special tabulations) 1996-2001

### *1.2.5 Long-term Unemployment*

**Definition**

Statistics Canada defines long-term unemployment as the proportion of "the labour force aged 15 and over who did not have a job any time during the current or previous year (for example, the years 1995 and 1996 for the 1996 Census)."[31] It should be noted that this definition still refers to those actively looking for work, and does not include discouraged workers who have given up looking for work. See volume 1 for Statistics Canada's separate estimates for discouraged workers.

**Data Source**

Statistics Canada, 1996 Census (20% sample)

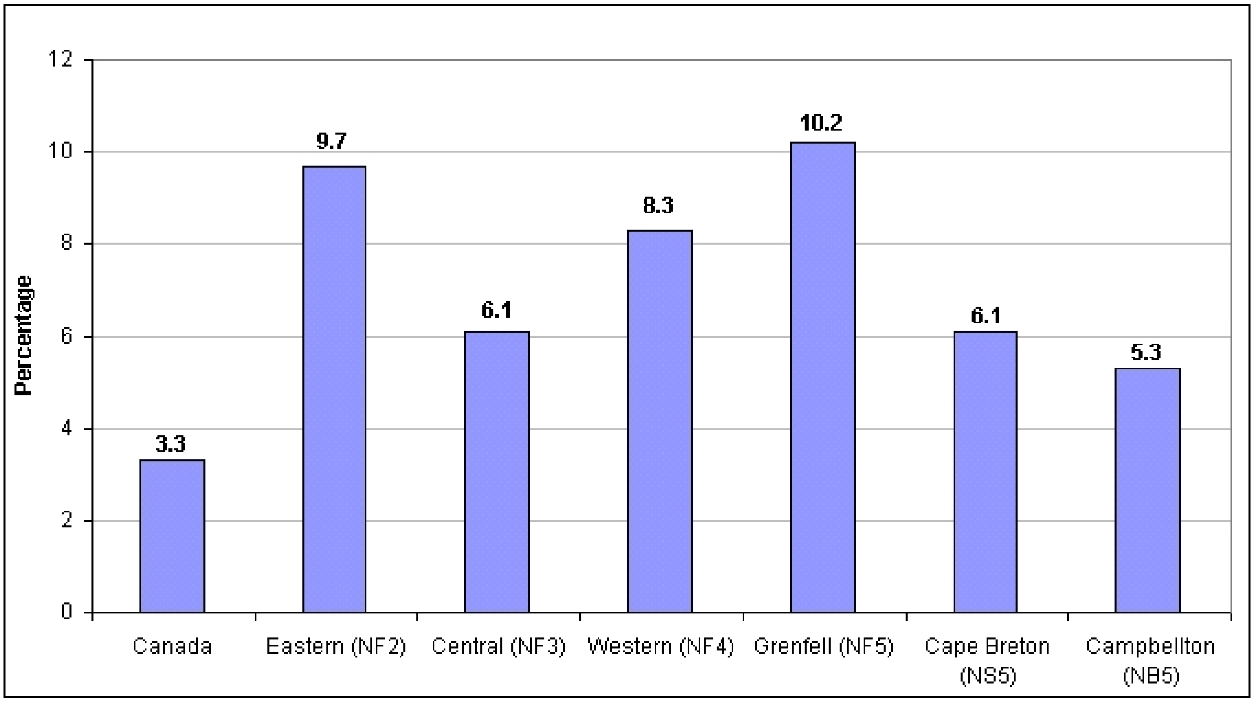
**Results**

Canada's long-term unemployment in 1996 was 3.3%. All of the Atlantic provinces except Prince Edward Island (2.0%) had higher long-term unemployment rates than the national average. Newfoundland had the highest long-term unemployment rate in the country, more than twice the national average, at 6.8%.

[31] Statistics Canada, http://www.statcan.ca/english/freepub/82-221-XIE/00502/defin2.htm#43

Again, there are significant disparities among health districts in Atlantic Canada. The highest rates of long-term unemployment in 1996 were in Newfoundland's rural areas and in Cape Breton. Grenfell (NF5) had the highest long-term unemployment rate in the Atlantic region at 10.2%, and the Central (NF3), Eastern (NF2), and Western (NF4) health districts of Newfoundland had long-term unemployment rates of 9.7%, 6.1%, and 8.3% respectively. Cape Breton (NS5) had a long-term unemployment rate of 6.1% (Figure 30).

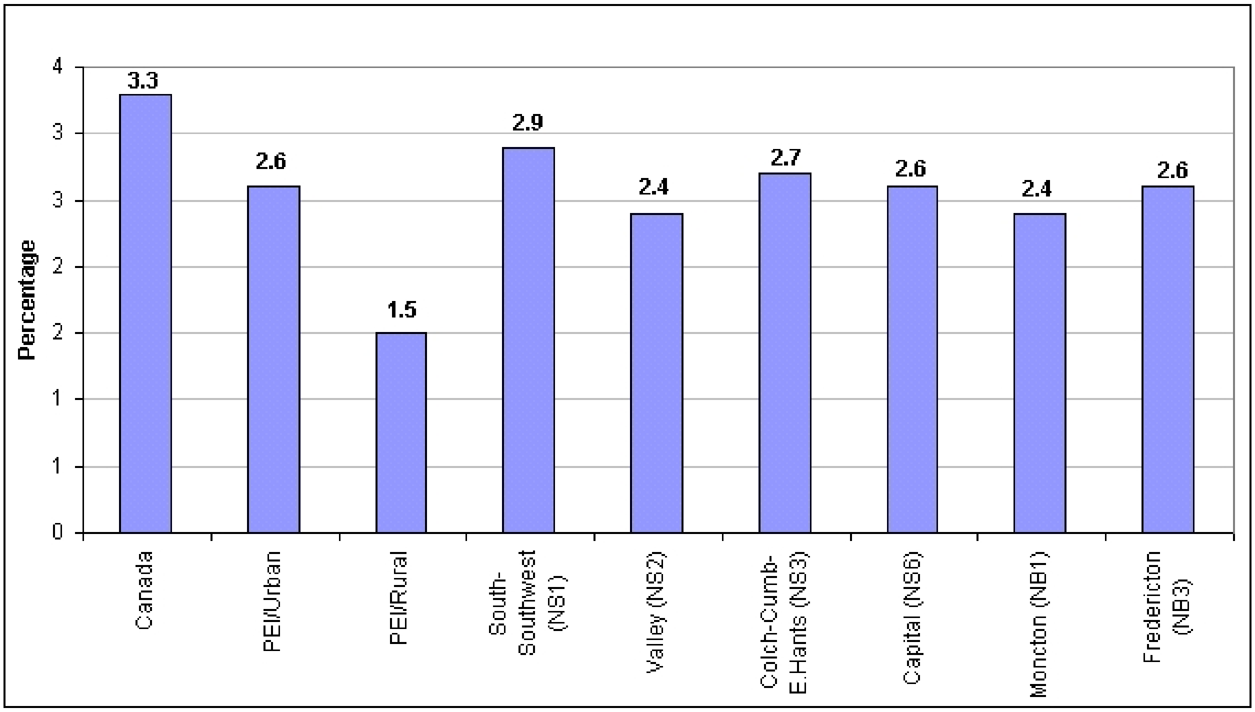
**Figure 30. Selected Atlantic region health districts with high rates of long term unemployment, 1996, (%)**




Source: Statistics Canada, 1996 Census, (20% sample).

At the same time, eight Atlantic health districts, including four with major urban centres, had lower rates of long-term unemployment in 1996 than the national average. Rural PEI had the lowest rate of long-term unemployment in the region at 1.5% (Figure 31).

**Figure 31. Atlantic region health districts with lower rates of long term unemployment than the national average, 1996, (%)**




Source: Statistics Canada, 1996 Census, (20% sample).

## *1.2.6 Low Income*

"Higher income is associated with better health." [32]

**Definition**

Statistics Canada defines low-income rates as the proportion of "the population in economic families and unattached individuals with incomes below the Statistics Canada low-income cut-off (LICO). The cut-offs represent levels of income where people spend disproportionate amounts of money for food, shelter, and clothing. LICOs are based on family and community size; cut-offs are updated to account for changes in the consumer price index."

In the health district results that follow, low-income rates are presented separately for economic families and for unattached individuals. The term economic family "refers to a group of two or more persons who live in the same dwelling and are related to each other by blood, marriage, common-law or adoption."[33]

[32] Statistics Canada, http://www.statcan.ca/english/freepub/82-221-XIE/00502/defin2.htm#45.
[33] Statistics Canada. http://www.statcan.ca/english/freepub/82-221-XIE/00502/defin2.htm#45

**Data Source**

Statistics Canada, 1996 Census (20% sample)

**Results**

In 2000, Prince Edward Island had a low-income rate significantly below the national average. Nova Scotia and New Brunswick had rates slightly below the national average, and Newfoundland had a rate of low income that was higher than the national average (see volume 1, section 2.2.6, for provincial data on low-income rates by gender).[34]

The most recent available low-income data for health districts is from 1996. As with other socio-economic data, there are significant disparities in low-income rates among Atlantic Canada's health districts.

Among the seven health districts in Atlantic Canada with major urban centres, three – Cape Breton (NS5) (21.4%), St. John's (NF1) (18.1%), and Sussex/Saint John (NB2) (16.7%) – had a higher rate of low income among economic families in 1996 than the national average (16.3%).[35] The other four health districts with major urban centres, as well as Labrador (NF6), South-Southwest (NS1), and rural PEI, had low-income rates below the national average. Rural PEI's incidence of low income (9.4%) was 44% below the national average (Figure 32).

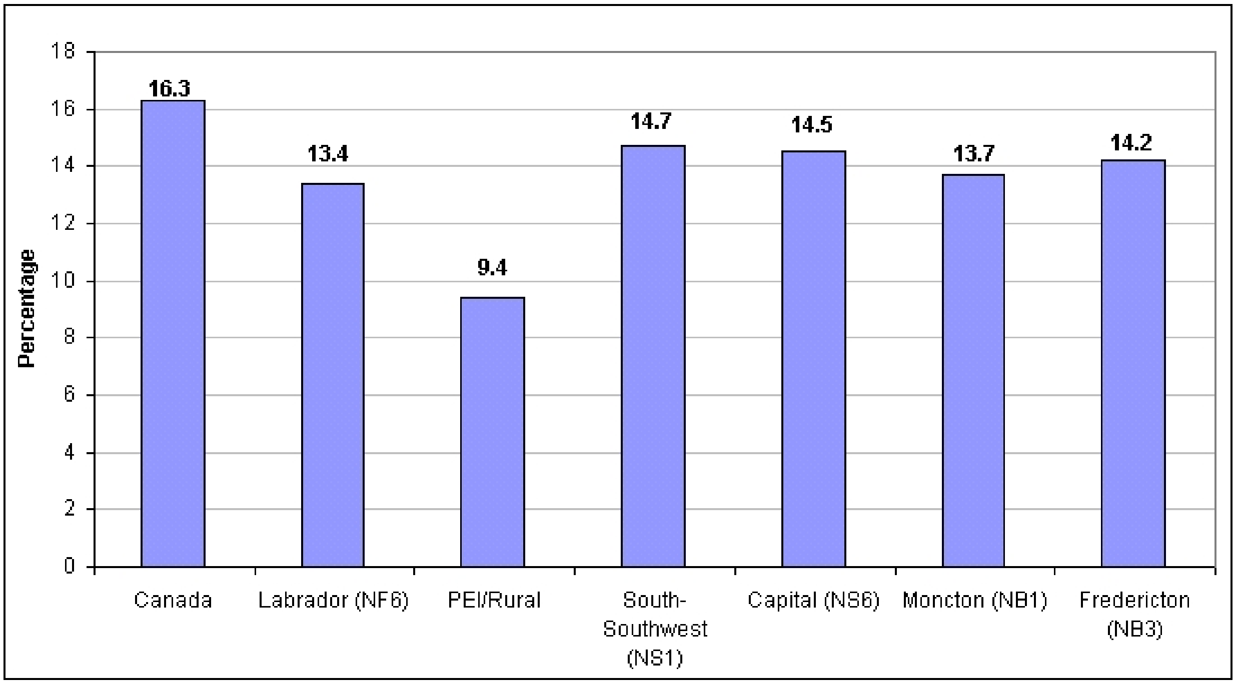
By contrast, nine health districts in Atlantic Canada had significantly higher proportions of economic families living below the low-income cut-off level in 1996 than the Canadian average. These included three of Newfoundland's five rural health districts, and all four rural health districts in New Brunswick. In Nova Scotia, only Cape Breton (NS5) had a higher proportion of economic families living below the low-income cut-off than the national average. Among Atlantic Canada's 21 health districts, Newfoundland's Western region (NF4) had the highest rate of low-income in 1996, at 23.2% (Figure 33).

Other health districts had rates of low income that were more comparable to the national average.

Far higher proportions of unattached individuals than economic families live below the low-income cut-off. Again, significant disparities existed among the health districts in 1996, with low-income rates among unattached individuals ranging from a low of 28.1% in Grenfell (NF5) to a high of 52.3% in Bathurst (NB6). Among those health districts with major urban centres, only St. John's (NF1) (46.9%) and Cape Breton (NS5) (47.9%) had a significantly higher rate of low-income among unattached individuals than the national average (42.2%) (Figures 34 and 35).

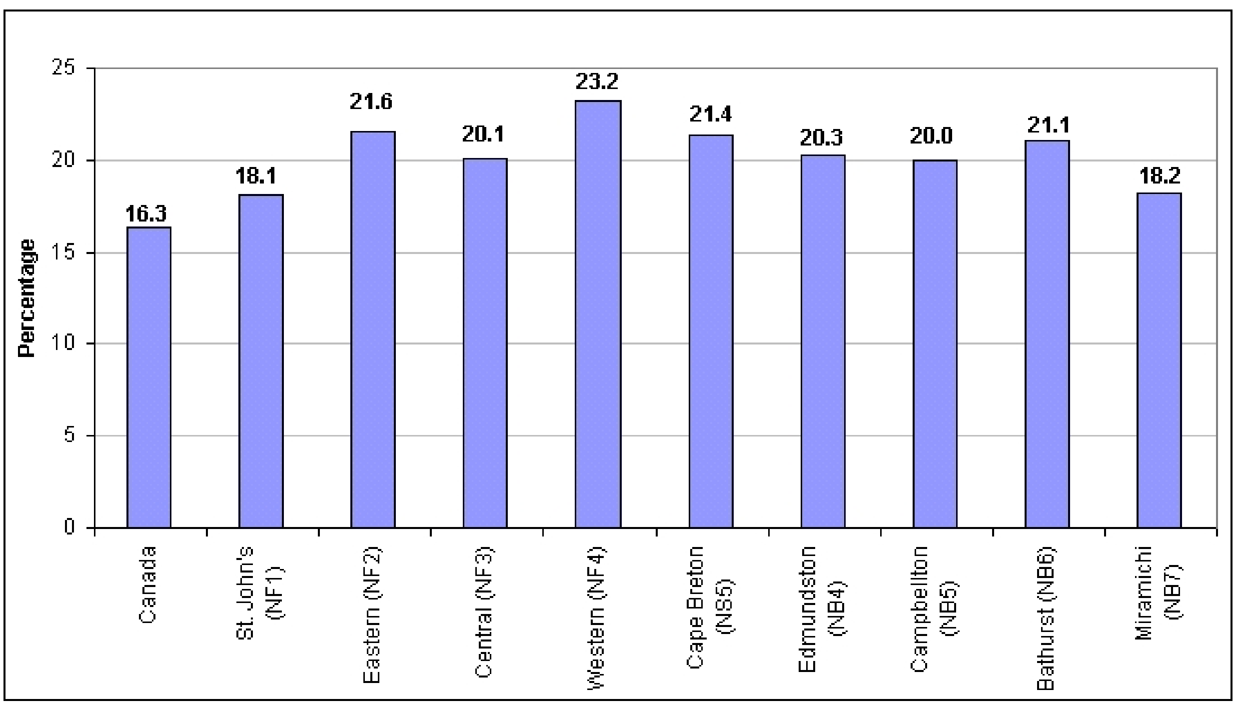
[34] Statistics Canada, *Income in Canada 2000,* catalogue no. 75-202-XIE.
[35] The six major urban health districts in Atlantic Canada are Halifax (NS), St. John's (Nfld), urban PEI (Charlottetown and Summerside), and Fredericton, Moncton, and Sussex/Saint John (NB).

**Figure 32. Selected health districts, Atlantic Canada, with lower rates of low income among economic families than the national average, 1996, (%)**



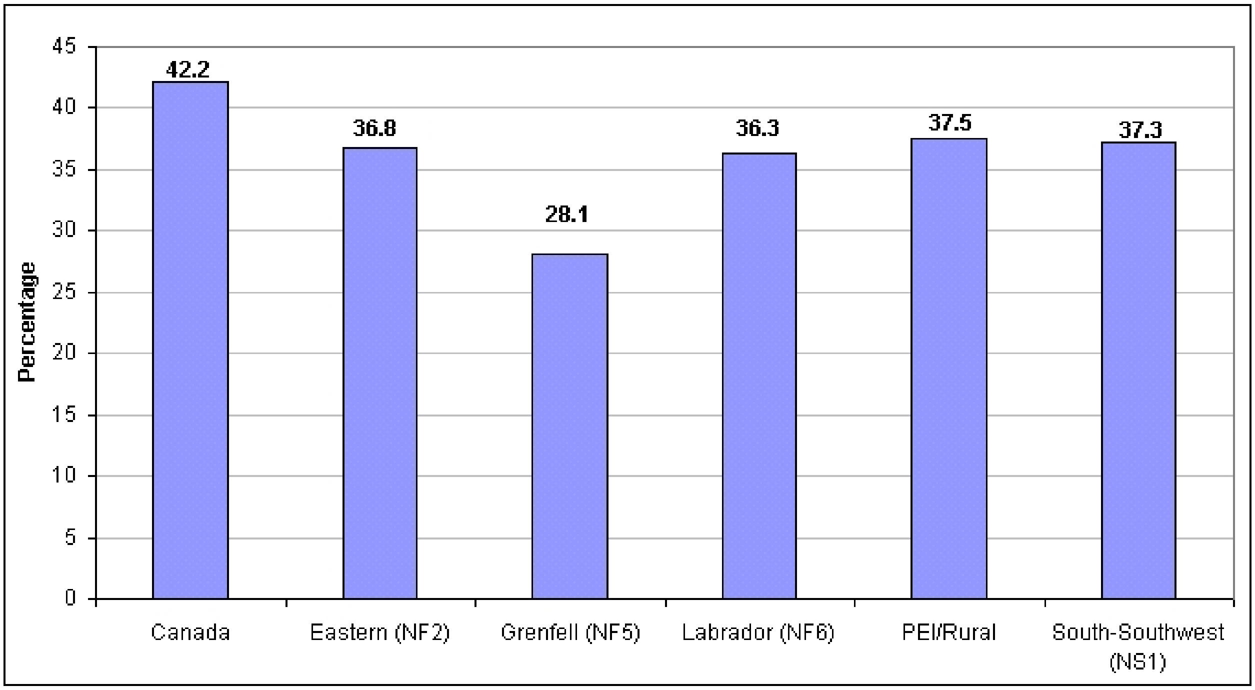

Source: Statistics Canada, 1996 Census (20% sample).

**Figure 33. Selected health districts, Atlantic Canada, with higher rates of low income among economic families than the national average, 1996, (%)**



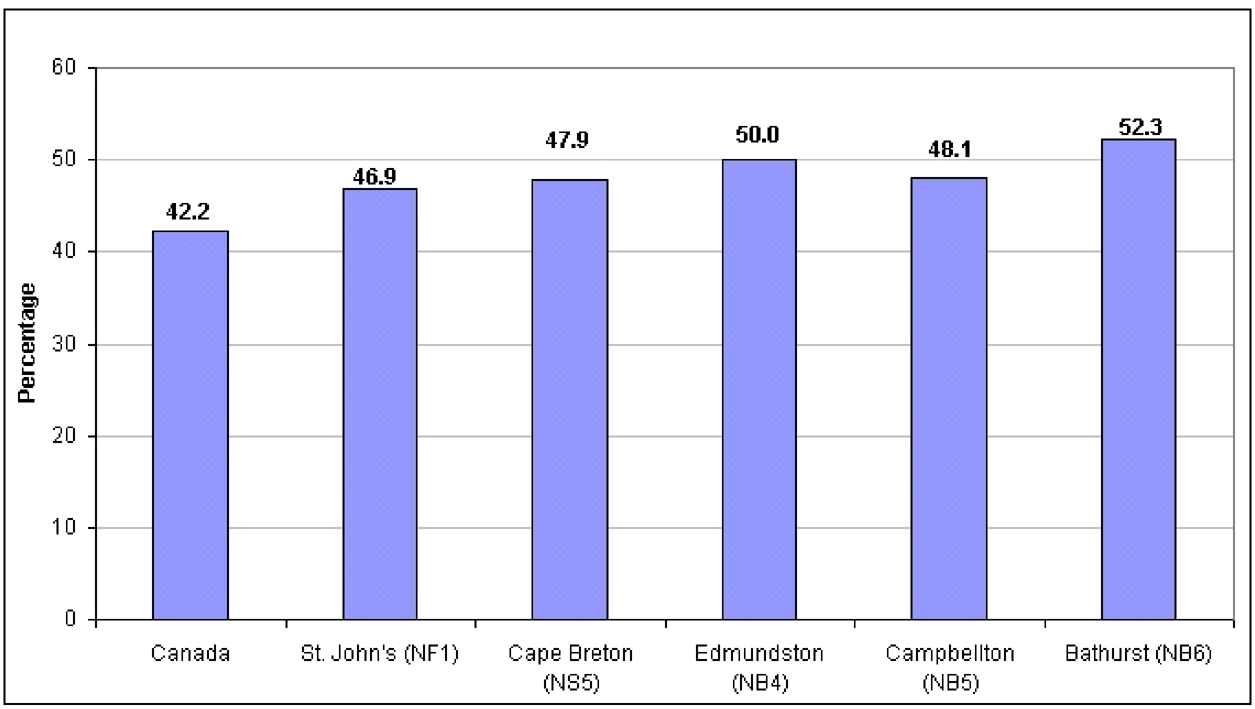

Source: Statistics Canada, 1996 Census (20% sample)

**Figure 34. Selected health districts, Atlantic Canada, with a lower proportion of low-income unattached individuals than the national average, 1996 (%)**




Source: Statistics Canada, 1996 Census (20% sample)

**Figure 35. Selected health districts, Atlantic Canada, with a higher proportion of low-income unattached individuals than the national average, 1996 (%)**




Source: Statistics Canada, 1996 Census (20% sample)

### *1.2.7 Children in Low Income Families*

Low income among children is a widely used measure of children at risk.[36] Low-income children are more likely to have low birth weights, poor health, less nutritious foods, higher rates of hyperactivity, delayed vocabulary development and poorer employment prospects.[37] Although they engage in less organized sports, poor children have higher injury rates, and twice the risk of death due to injury than children who are not poor.[38] A detailed analysis of both the National Longitudinal Survey on Children and Youth and the National Population Health Survey found that some 31 different indicators all showed that as family income falls, children are more likely to experience problems.[39]

**Definition**

Statistics Canada defines low-income rates among children as the proportion of "the population of children aged 17 and under living in economic families with incomes below Statistics Canada's low-income cut-offs (LICO). The cut-offs represent levels of income where people spend disproportionate amounts of money for food, shelter, and clothing. LICOs are based on family and community size; cut-offs are updated to account for changes in the consumer price index."[40]

**Data Source**

Statistics Canada, 1996 Census (20% sample).

**Results**

Volume 1 (section 2.2.3) of this report noted that rates of low income among children declined significantly across Canada and in all three Maritime provinces between 1997 and 2000, with Nova Scotia showing the sharpest drop in the country. In Atlantic Canada, only Newfoundland and Labrador showed no real change during this period, with 17.8% of children living below the low-income cut-off in 2000, compared to 17.6% in 1997.

In 2000, all three Maritime provinces had lower rates of low income among children than the national average of 12.5%. In Nova Scotia, 11.4% of children lived below the low-income cut-off (LICO), down from 18.1% in 1997; in New Brunswick 10.2% lived below the LICO, down from 12.7% in 1997, and in PEI 6.6% were below the LICO, down from 9.3% in 1997. In 2000, Newfoundland and Labrador had the highest rate of low income among children in the country, and PEI had the lowest rate in the country.

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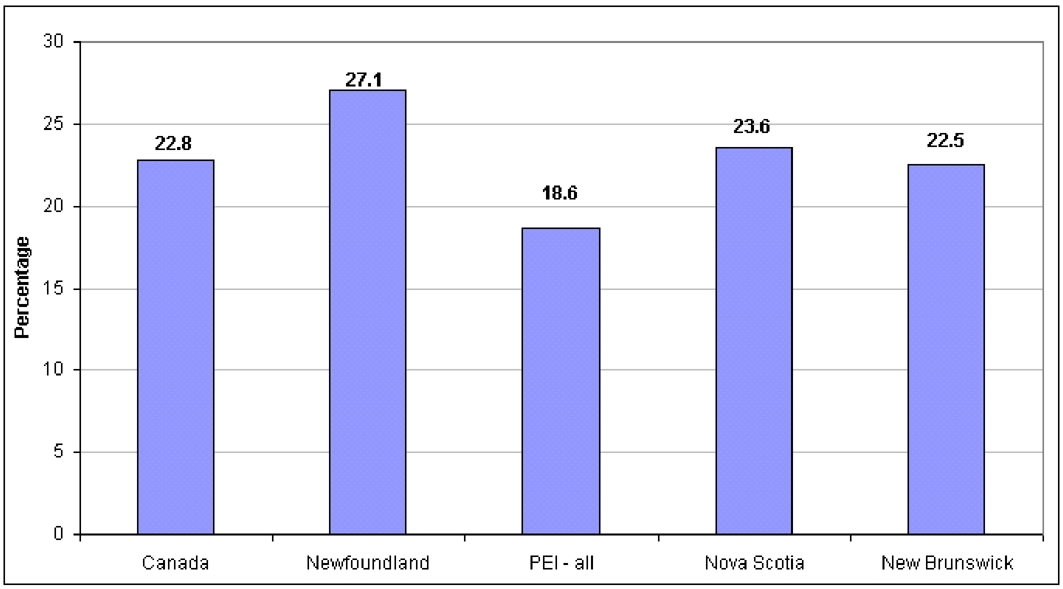
[36] Statistics Canada, http://www.statcan.ca/english/freepub/82-221-XIE/00502/defin2.htm#46
[37] ACPH, *Toward a Healthy Future,* page 85, and chapter 3.
[38] Barbara Morrongiello, "Preventing Unintentional Injuries Among Children," *Determinants of Health: Children and Youth,* Canada's Health Action: Building on the Legacy, Volume 1, National Forum on Health, 1998.
[39] David Ross, "Rethinking Child Poverty," *Insight, Perception,* 22:1, Canadian Council on Social Development, Ottawa, 1998, pages 9-11.
[40] Statistics Canada, http://www.statcan.ca/english/freepub/82-221-XIE/00502/defin2.htm#46

Because rates of low income have declined so significantly, those 2000 rates are not comparable to those given below for the health districts, since the most recent available data for the health districts are from the 1996 Census, and are based on 1995 income. For the sake of comparison, therefore, the 1996 provincial rates of low income among children (based on 1995 income) are given in Figure 36 below.

Although almost three times higher than in 2000, the 1996 PEI rate of low income among children (18.6%) was still the lowest rate in the country. Also in 1996, Newfoundland and Labrador had the highest rate of low income among children in the country.

**Figure 36. Children, aged 17 and under, living in low-income families (1995 income), as a proportion of children aged 17 and under living in economic families, Canada and Atlantic provinces, 1996.**



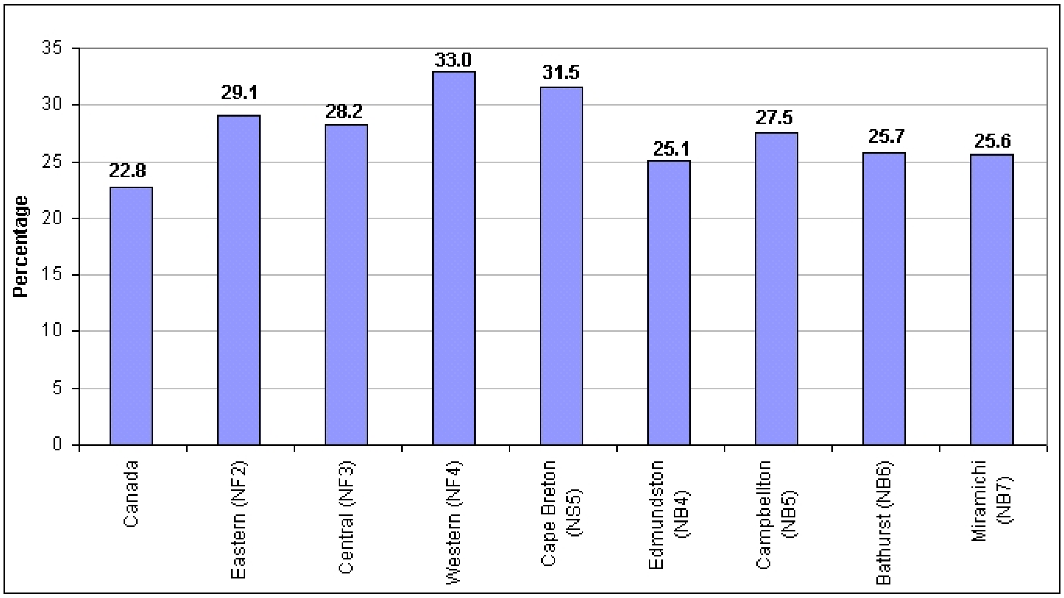

Note: Please see Volume 1, section 3.2.3 for updated rates of low income among children.

Source: Statistics Canada, 1996 Census, (20% sample).

In 1996, eight of Atlantic Canada's 21 health districts had significantly higher rates of low income among children than the national average. Most of these were in predominantly rural areas, including three in Newfoundland and four in New Brunswick. Newfoundland's Eastern region (NF2) (29.1%), Central region (NF3) (28.2%), and Western region (NF4) (33%), all had very high proportions of low-income children, as did Cape Breton (NS5) at 31.5% and Campbellton (NB5) at 27.5%. Cape Breton (NS5), with its major industrial centre, was the only Nova Scotia health district with a significantly higher rate of low-income children than the national average (Figure 37).

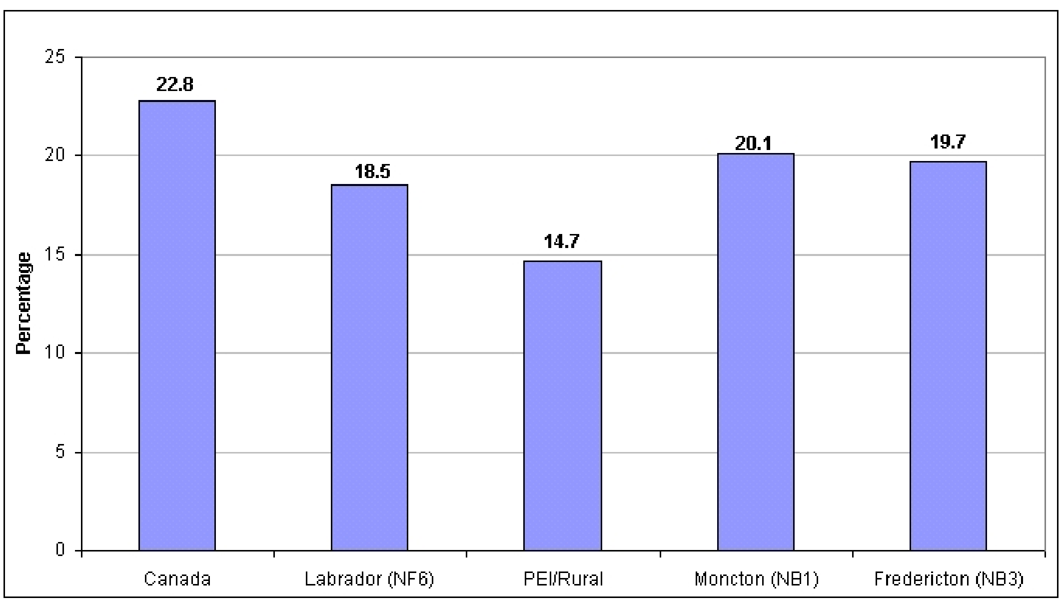
By contrast, four health regions in Atlantic Canada had fewer children 17 and under living in low-income families in 1996 than the national average (22.8%). Rural PEI had the lowest rate of low income among children 17 and under (14.7%) among all the health districts in the region. Interestingly, Labrador (NF6) also had a substantially smaller proportion of children living below the low-income cut-off than the national average (Figure 38). All other health districts had rates of low income among children that were comparable to the national average.

**Figure 37. Health districts in Atlantic Canada with a high percentage of children aged 17 and under living in low-income families (1995 income), as a proportion of children aged 17 and under living in economic families, 1996, (%)**




Source: Statistics Canada, 1996 Census, (20% sample).

**Figure 38. Health regions that have a lower percentage of children aged 17 and under living in low-income families (1995 income) than the national average, as a proportion of children aged 17 and under living in economic families, 1996 (%)**




Source: Statistics Canada, 1996 Census, (20% sample).

### *1.2.8 Average Personal Income*

**Definition**

The definition of average personal income used by Statistics Canada in its economic profiles of health districts is "pre-tax, post-transfer income for persons aged 15 and over who reported income."[41] It should be noted that this is different from the after-tax ("disposable") income levels used in GPI Atlantic's report on *Income Distribution in Nova Scotia* (2001).

In addition, the comparative wage rates used in volume 1 of this report use 2001 wage levels from Statistics Canada's *Labour Force Historical Review 2002*, rather than the 1995 income levels reported here from the 1996 Census. For the sake of comparison with health district incomes, the average incomes for the four Atlantic provinces, as reported in the 1996 Census, are indicated in Figure 39 below.

**Data Source**

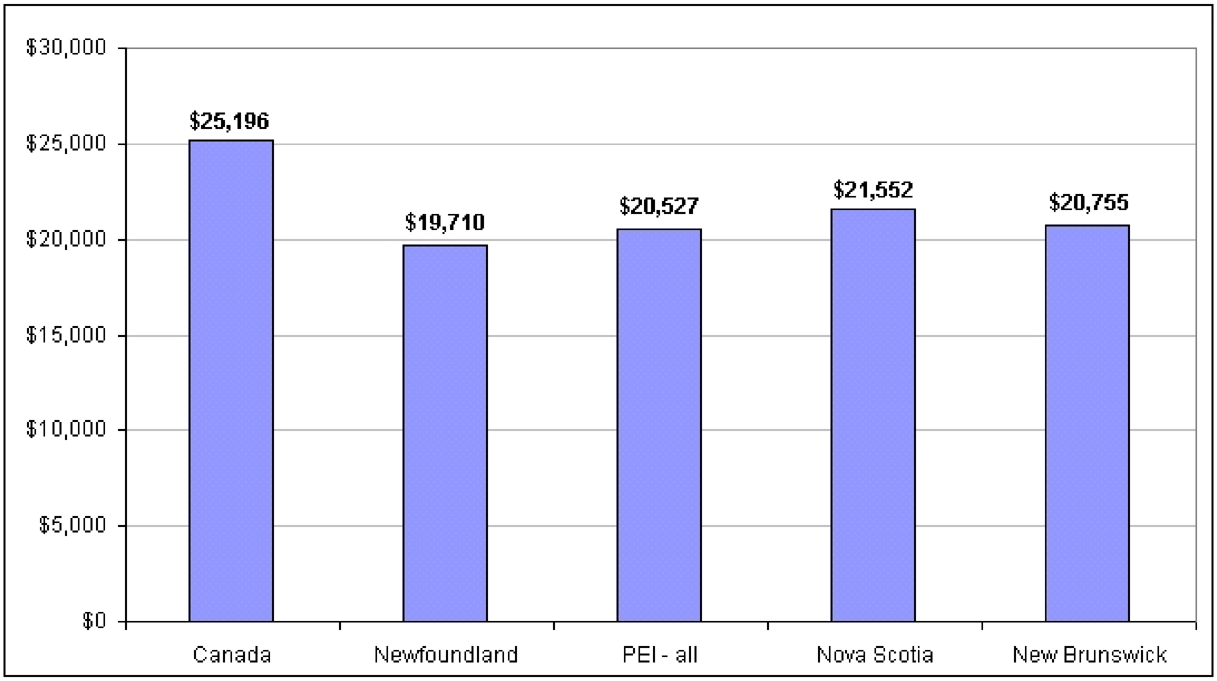
Statistics Canada, 1996 Census (20% sample).

**Results**

In 1996, all four Atlantic provinces and all health districts in Atlantic Canada, except Labrador (NF6) ($25,538), had lower average incomes than the national average of $25,196, but there are major disparities among the health districts. The lowest income among all health districts was in Grenfell (NF5) at $16,499. Six of the seven health districts with major urban centres had average incomes over $21,000 (Figure 40). Six health districts, including the other health district with a major urban centre (Cape Breton – NS5), had average incomes between $17,500 and $18,500 (Figure 41). The remaining seven health districts had incomes between $19,000 and $20,000.

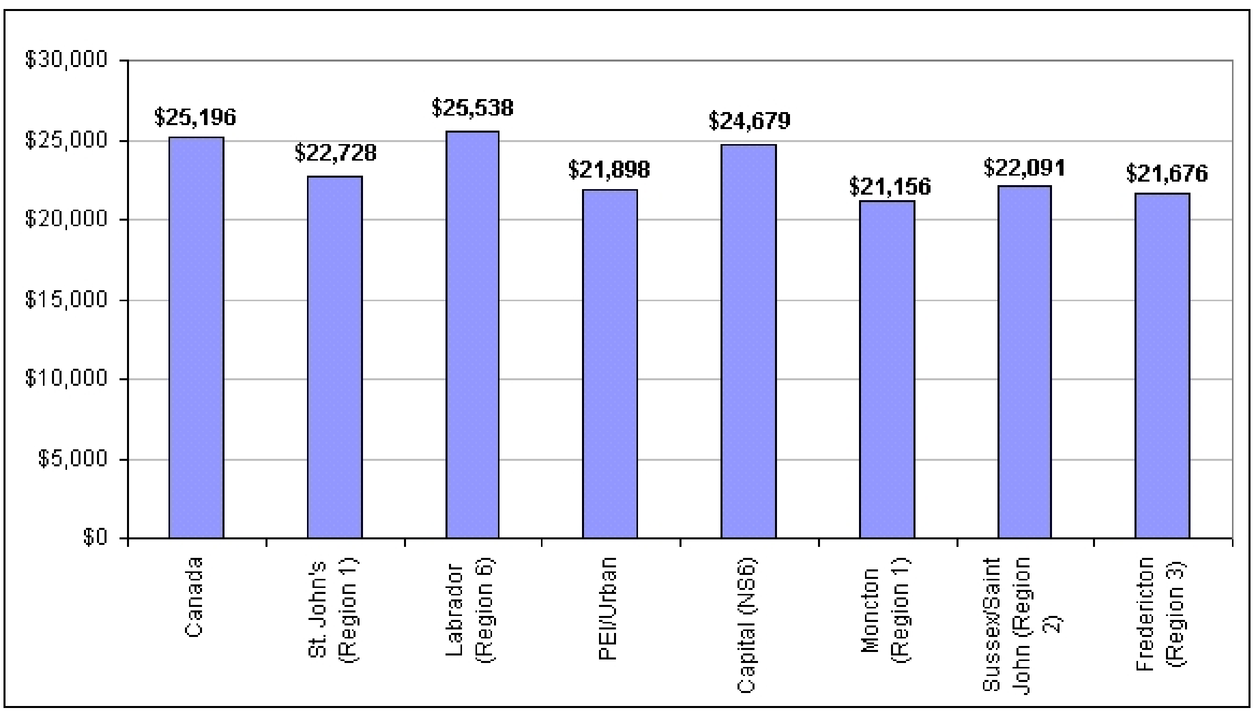
[41] Statistics Canada, http://www.statcan.ca/english/freepub/82-221-XIE/00502/defin2.htm#47

**Figure 39. Average personal income ( 1995 income), aged 15 and over, Canada and Atlantic Provinces, 1996 Census, ($)**



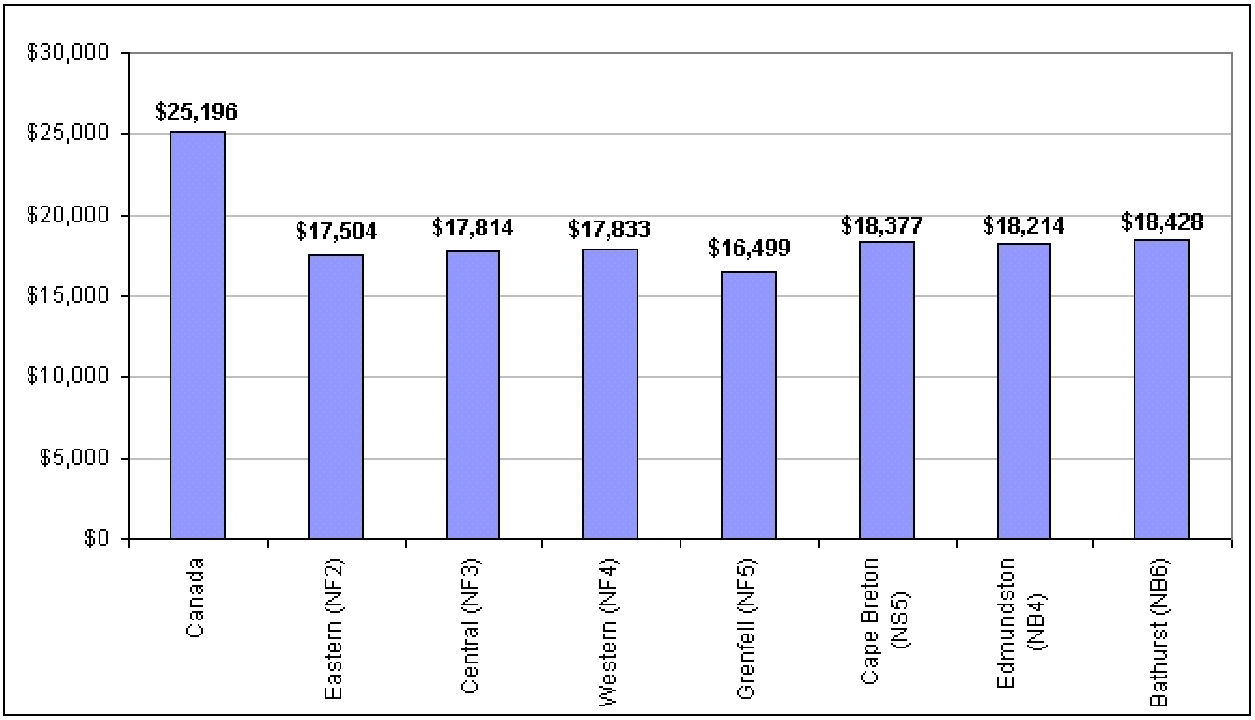

Source: Statistics Canada, 1996 Census (20% sample).

**Figure 40. Average personal income (1995 income), aged 15 and over, health districts with average income over $21,000, Atlantic Canada, 1996 Census, ($)**




Source: Statistics Canada, 1996 Census (20% sample).

**Figure 41. Average personal income (1995 income), aged 15 and over, health districts with average income under $18,500, Atlantic Canada, 1996 Census, ($)**




Source: Statistics Canada, 1996 Census (20% sample).

### *1.2.9 Housing affordability*

**Definition**

According to Statistics Canada, housing affordability problems are likely to exist for "households (renters, owners, and total) spending 30% or more of total household income on shelter expenses. Shelter expenses include payments for electricity, oil, gas, coal, wood or other fuels, water and other municipal services, monthly mortgage payments, property taxes, condominium fees and rent." [42]

Statistics Canada notes that when more than 30% of household income is spent on housing costs, "it is likely that inadequate funds will be available for other necessities such as food, clothing, and transportation. Housing affordability problems affect renters more than owners. Band housing on Indian reserves was not included in the calculation of housing affordability"[43]

**Data Source**

Statistics Canada, 1996 Census. (20% sample).

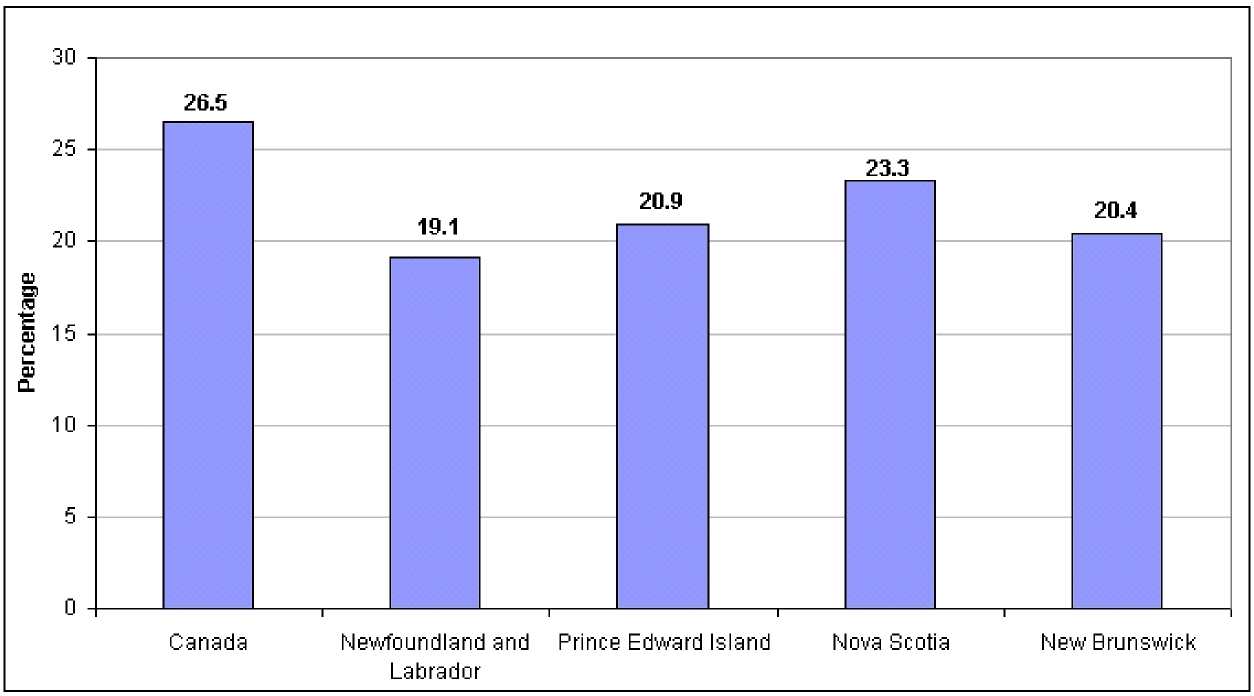
[42] Statistics Canada, http://www.statcan.ca/english/freepub/82-221-XIE/00502/defin2.htm#47
[43] Statistics Canada, http://www.statcan.ca/english/freepub/82-221-XIE/00502/defin2.htm#47

**Results**

A considerably higher proportion of Atlantic Canadians own their own homes than in Canada as a whole. According to the 1996 Census, owner occupied dwellings constituted 63.8% of all dwellings in Canada, but 77.2% in Newfoundland and Labrador, 72.2% in PEI, 70.7% in Nova Scotia, and 74% in New Brunswick.[44]

The high level of home ownership in the Atlantic provinces may help explain why fewer households experience housing affordability problems in the Atlantic region than in the rest of the country. In Canada as a whole, 26.5% of households spend 30% or more of their total household income on shelter expenses, more than in any of the four Atlantic provinces. Among the Atlantic provinces, Newfoundland and Labrador has the lowest proportion of total households spending 30% or more of total household income on shelter expenses (19.1%) (Figure 42).

**Figure 42. Households spending 30% or more of total household income (1995 income) on housing expenses, as proportion of all households, Canada and Atlantic provinces, 1996, (%)**



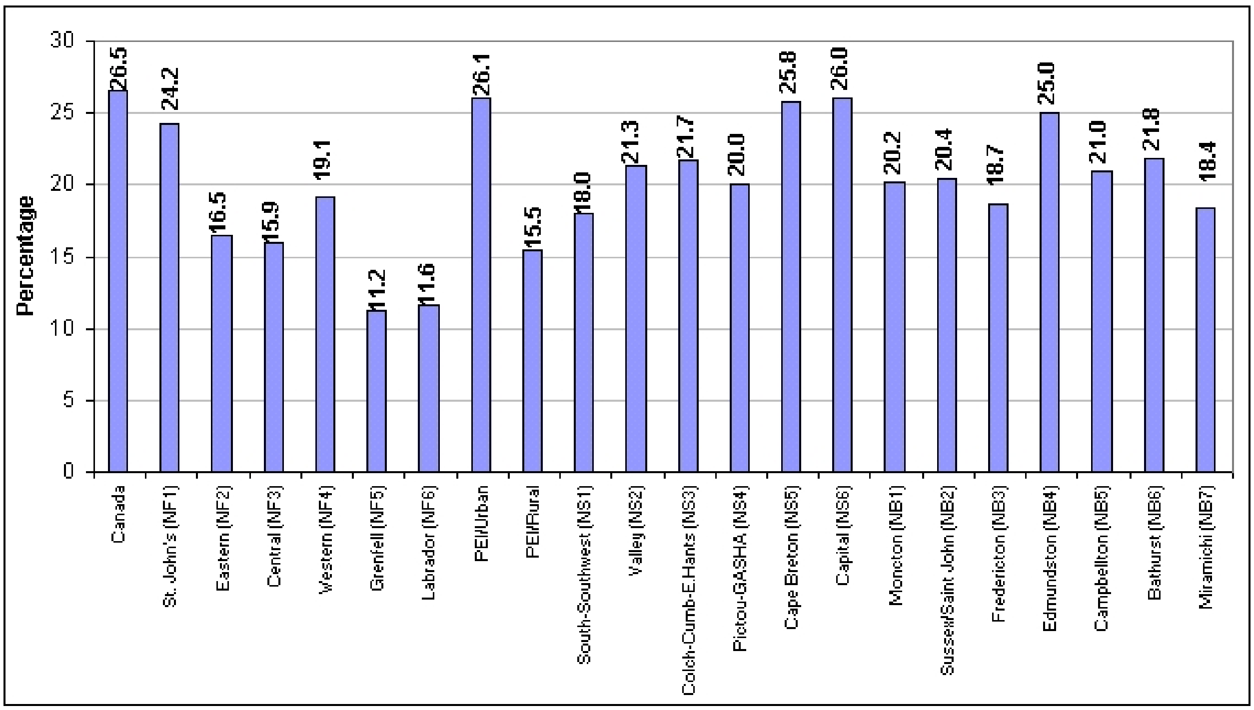

Source: Statistics Canada, 1996 Census (20% sample).[45]

[44] Statistics Canada, http://www.statcan.ca/english/freepub/82-221-XIE/00502/tables/html/2213.htm.
[45] Statistics Canada, http://www.statcan.ca/english/freepub/82-221-XIE/00502/tables/html/229.htm, extracted 26 January, 2003.

None of the 21 health districts in Atlantic Canada has as high a proportion of households spending 30% or more of total household income on shelter expenses as the Canadian average (26.5%). But some of the larger urban centres come close to the Canadian level, and tend to have greater housing affordability problems than rural health districts in the Atlantic region. This may be because they have a higher proportion of renters.

Central (NS6) (26%), Charlottetown/Summerside (26.1%), Cape Breton (NS5) (25.8%), Edmundston (NB4) (25%), and St. John's (NF1) (24.2%) are the only health districts that approach national levels of spending on shelter as a proportion of total income. The lowest levels of housing affordability problems are in rural Newfoundland and PEI. Grenfell (NF5) (11.2%) and Labrador (NF6) (11.6%) have the lowest proportion of households spending 30% or more of their income on shelter related expenses such as mortgage payments, property taxes, rent, and utilities (Figures 43, 44, and 45).

**Figure 43. Households spending 30% or more of total household income on housing expenses, as proportion of all households, health districts in Atlantic Canada, 1996, (%)**

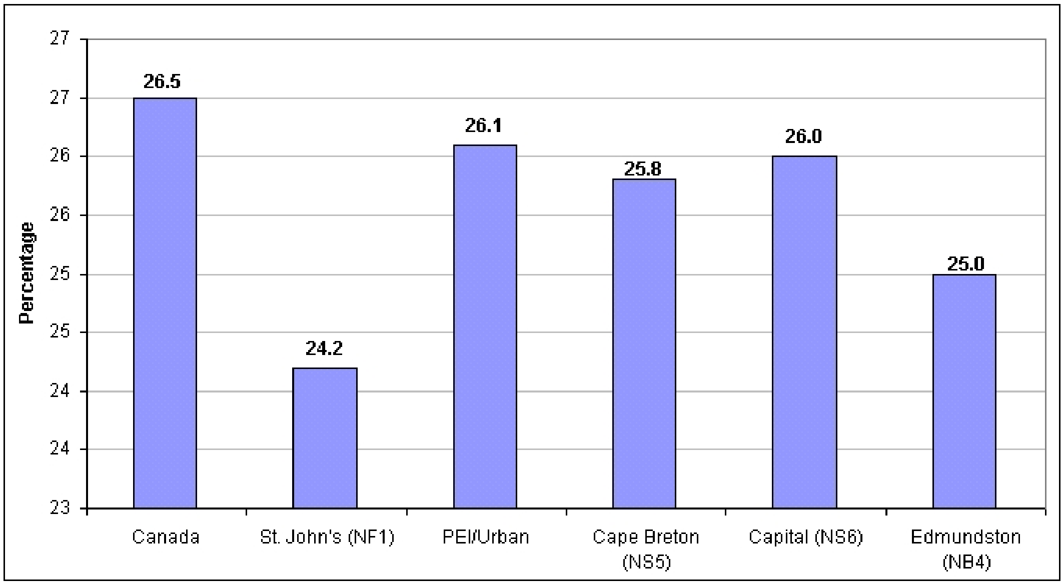



Source: Statistics Canada, 1996 Census (20% sample).[46]

As depicted in the below chart, five health districts have a similar percentage of total households spending 30% or more of total household income on shelter expenses. It is interesting to note that four of these are located in large urban centres.

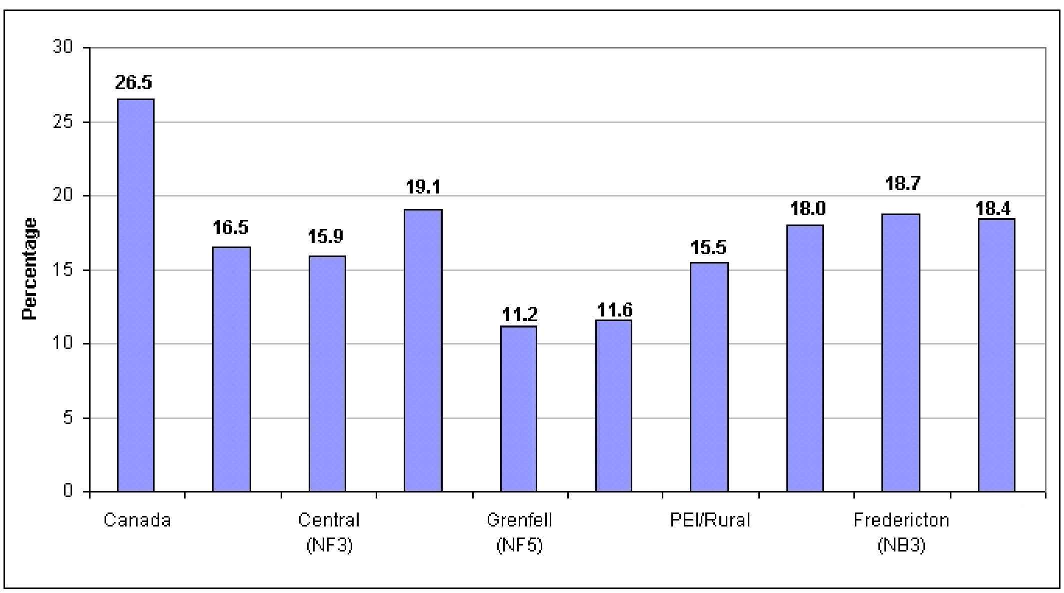
[46] Statistics Canada, http://www.statcan.ca/english/freepub/82-221-XIE/00502/tables/html/229.htm, extracted 26 January, 2003.

**Figure 44. Health districts in Atlantic Canada where the proportion of households spending 30% or more of total income (1995 income) on housing expenses is comparable to the national average, 1996, (%)**




Source: Statistics Canada, 1996 Census (20% sample).[47]

**Figure 45. Health districts in Atlantic Canada where the proportion of total households spending 30% or more of total income (1995 income) on housing expenses is markedly lower than the national average, 1996, (%)**




Source: Statistics Canada, 1996 Census (20% sample).[48]

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[47] Statistics Canada, http://www.statcan.ca/english/freepub/82-221-XIE/00502/tables/html/229.htm, extracted 26 January, 2003.

[48] Statistics Canada, http://www.statcan.ca/english/freepub/82-221-XIE/00502/tables/html/229.htm, extracted 26 January, 2003.

### *1.2.10 Lone Parent Families*

A Statistics Canada analysis of both the 1994/95 and 1996/97 National Population Health Surveys found that "lone mothers reported consistently worse health status than did mothers in two-parent families," and that longer-term single mothers had particularly bad health. Single mothers scored lower on two scales of "self-perceived health" and "happiness," and substantially higher on a "distress" scale. They had higher rates of chronic illness, disability days and activity restrictions than married mothers, and were three times as likely to consult a health care practitioner for mental and emotional health reasons.[49] Because female lone parent status is linked to poorer health outcomes, it is important for health districts to know the proportion of single mothers in their districts.

**Definition**

The percentages that follow indicate "the percentage of lone-parent families among all census families living in private households. A census family refers to married or common-law couple or lone parent with at least one never-married son or daughter living in the same household." [50]

**Data Source**

Statistics Canada, 1996 and 2001 Census, (20% samples).

**Results**

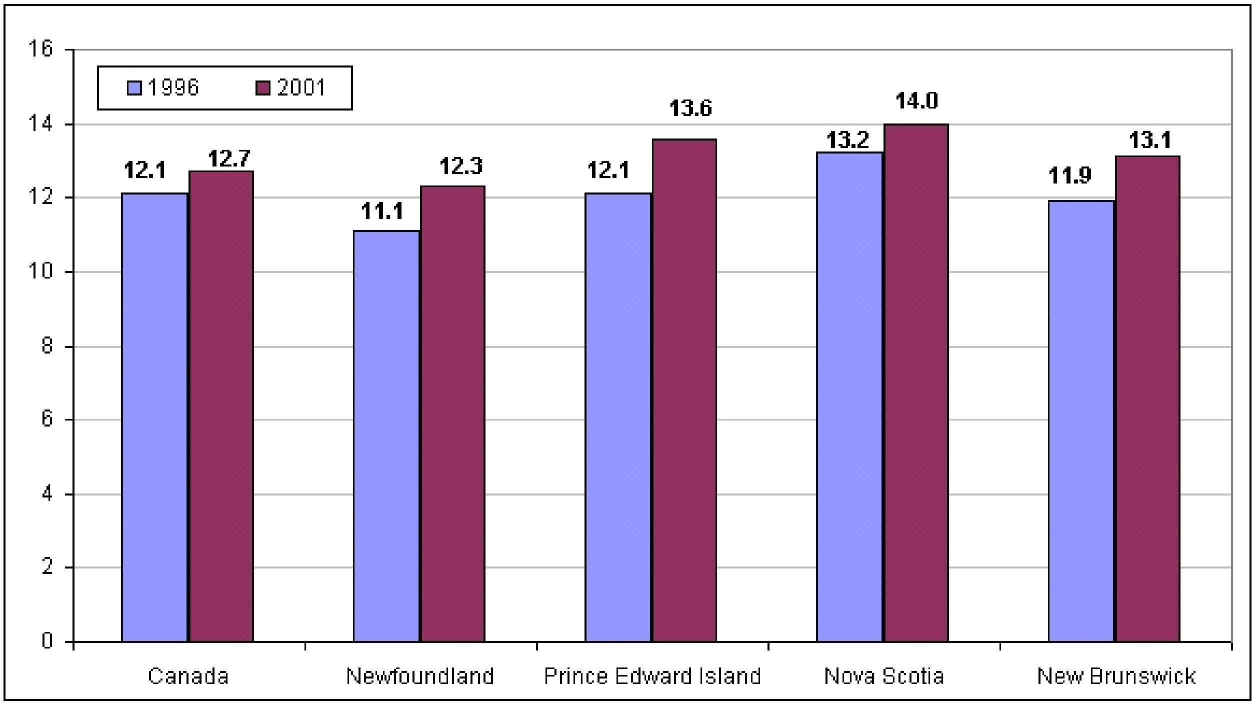
Nationwide, female lone parent families outnumber male lone parent families by about 5:1. In the 1996 Census, female lone parents constituted 12.1% of all census families in Canada, and male lone parents were 2.5%. Among the Atlantic provinces in 1996, Nova Scotia had the highest percentage of female lone parent families at 13.2% and Newfoundland has the lowest at 11.1%.

Across the country, and in all four Atlantic provinces, the ratio of female lone parent families to total census families increased between 1996 and 2001. In 2001, female lone parent families were12.7% of all census families in Canada, compared to 12.3% in Newfoundland and Labrador, 13.6% in PEI, 14% in Nova Scotia, and 13.1% in New Brunswick.

Figure 46 below provides the provincial ratios for both census years, 1996 and 2001. However, health district ratios are only available for 1996, as the 2001 census data had not yet been released for the health districts at the time this report went to press. For comparative purposes, therefore, the 1996 provincial figures should be referenced in relation to the remaining charts in this section.

[49] Claudio Perez and Marie Beaudet, "The Health of Lone Mothers," Statistics Canada, *Health Reports,* volume 11, no. 2, Autumn 1999, catalogue no. 82-003-XPB, pages 21-32.
[50] Statistics Canada, http://www.statcan.ca/english/freepub/82-221-XIE/00502/defin4.htm#84

**Figure 46. Female lone parent families as a percentage of all census families, Canada and Atlantic provinces, 1996 and 2001, (%)**[51]




Sources: Statistics Canada, 1996 Census and 2001 Census, (20% sample).

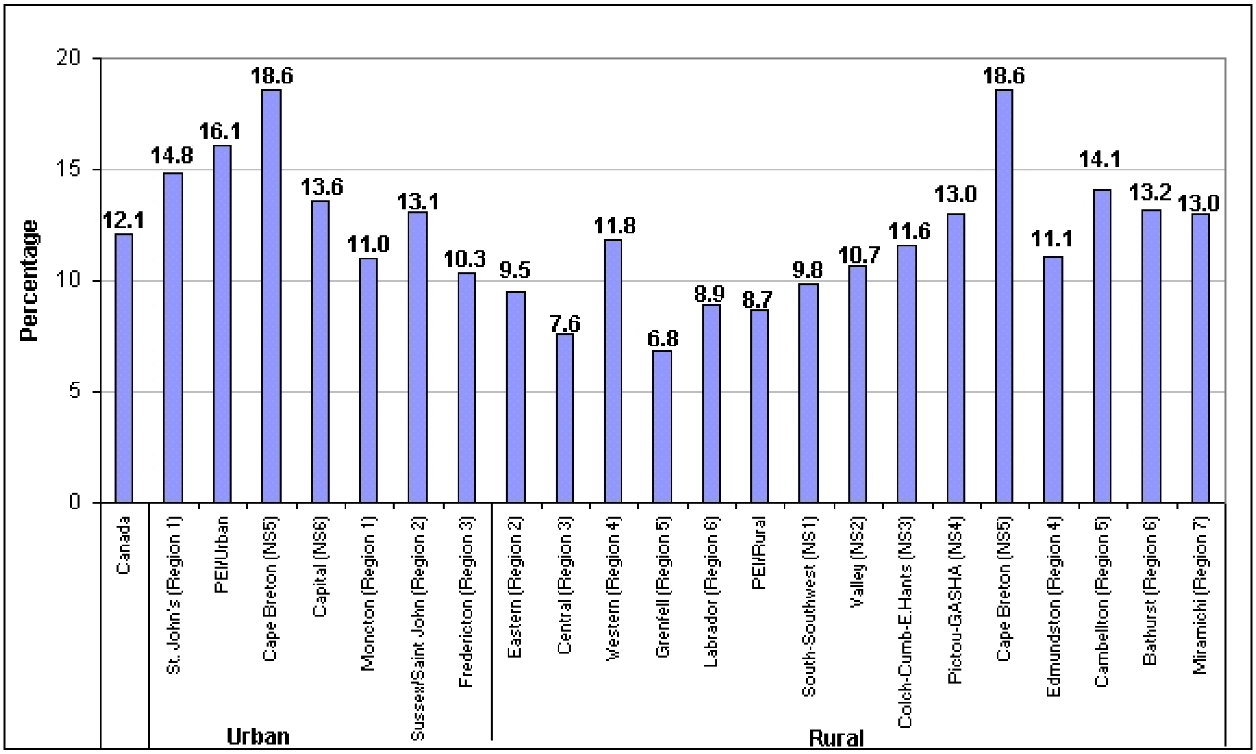
Again, provincial averages can be deceptive. For example, although Newfoundland and Labrador as a whole had 8% fewer single mothers in 1996 than the Canadian average, as a percentage of all families, the St. John's area had a 22% higher rate than the rest of Canada. In fact, health districts with major urban centres generally tend to have higher proportions of female lone parents than rural districts (Figure 47).

Cape Breton (NS5) had the highest proportion of female lone parent families in the region at 18.6% in 1996, a rate more than 50% higher than the national average. Charlottetown and Summerside had the second highest rate at 16.1% (Figure 48).

Eight health districts had substantially fewer single mothers than the Canadian average in 1996, with the Fredericton health district (NB3) the only health district with a major urban centre in that group. Grenfell (NF5) had the lowest percentage of lone mother families in the Atlantic region, at 6.8% (Figure 49).

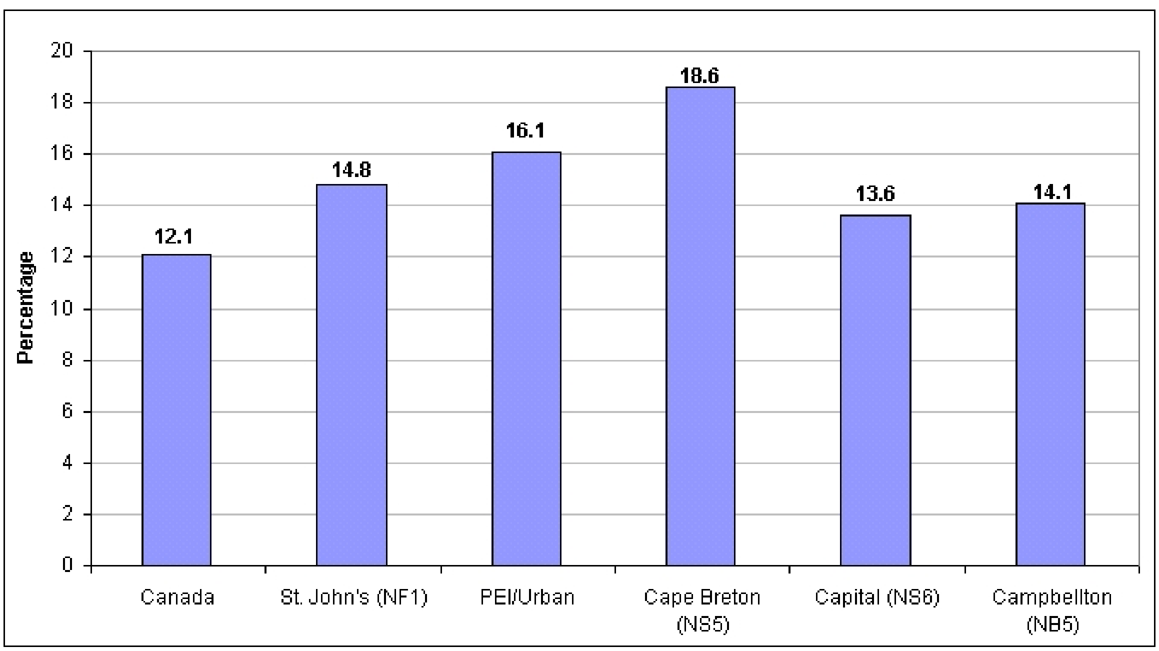
[51] Statistics Canada, Number of Children at Home (8) and Family Structure (7A) for Census Families in Private Households, for Canada, Provinces and Territories, 1981 to 2001 Censuses - 20% Sample Data http://www12.statcan.ca/english/census01/products/standard/themes/RetrieveProductTable.cfm?Temporal=2001&PID=55730&GID=355313&METH=1&APATH=3&PTYPE=55440&THEME=39&AID=0&FREE=0&FOCUS=0&VID=0&GC=99&GK=NA&SC=1&SR=1&RL=0&CPP=99&RPP=9999&D1=1&D2=0&D3=0&D4=0&D5=0&D6=0&d1=0

**Figure 47. Female lone parent families, urban and rural health districts, Atlantic Canada, 1996, (%)**



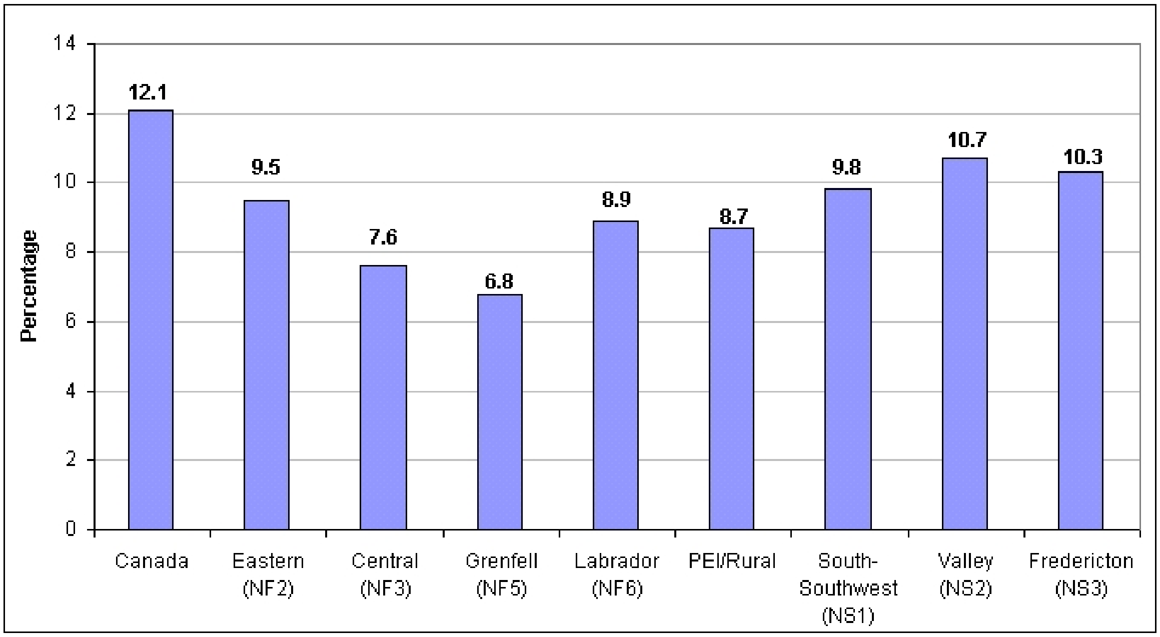

Sources: Statistics Canada, 1996 Census (20% sample)

**Figure 48. Atlantic health districts with highest percentages of female lone parent families, as a proportion of all census families, 1996, (%)**




Source: Statistics Canada, 1996 Census (20% sample)

**Figure 49. Atlantic health districts with lowest percentages of female lone parent families, as a proportion of all census families, 1996, (%)**




Source: Statistics Canada, 1996 Census, (20% sample).

*Discerning patterns: further research required*

The five indicators described above (low income, children in low income families, average personal income, housing affordability, and lone parent families), can affect health outcomes and behaviours. The links between income and health are well established, and female lone parents have far higher rates of low income than the general population.[52] But it is now essential for researchers to explore these links at the regional level.

Time and resources did not permit that analysis to take place for this report. But it is hoped that the descriptive data presented here will generate suggestive hypotheses. For example, it is clear that many of the same health regions exhibit consistent patterns across all five indicator groupings.

Cape Breton (NS5), for instance, has a lower average income, a higher proportion of single mothers, and higher rates of low income and housing affordability problems. By contrast, rural PEI and Fredericton are at the opposite end of the scale. Labrador exhibits the anomaly of relatively high incomes, affordable housing, and low rates of low income and female lone-parenthood, and yet has the lowest life expectancy of any health district in Atlantic Canada. These and other patterns now require in-depth exploration and analysis in order to identify and target appropriate region-specific interventions that can improve the health of Atlantic Canadians. This descriptive break-down is just a preliminary step in this process.

[52] Statistics Canada http://www.statcan.ca/english/freepub/82-570-XIE/01_11.pdf pg 25 January 24, 2003

### *1.2.11 Crime Rate: Adults and Youths Charged*

Statistics Canada's Health Indicators include crime rates as a "non-medical determinant of health." Both crime rates in general, and youth crime rates in particular, were also confirmed as key non-medical determinants of health at the Canadian Institute for Health Information's National Consensus Conference on Population Health Indicators.[53] Unfortunately, data for this indicator are not yet available at the health district level, so only provincial data can be provided below.

**Definition**

Statistics Canada reports crime rates according to "the number of youths (aged 12 to 17 years) or adults (aged 18 and over) charged with Criminal Code offences expressed as a rate per 100,000 youths or adults, for violent crimes, property and other crimes, and total. Violent crimes are 'person offences,' which include homicide, attempted murder, sexual and non-sexual assault, abduction, and robbery." [54] The crime rate is based on the number of incidents reported to or by the police.

Needless to say, this definition makes inter-provincial comparisons problematic, as reporting rates for different categories of crime may differ in different jurisdictions. In future development of this indicator, it would be highly desirable to rely as well on victimization surveys, such as those administered by Statistics Canada in its cycle of General Social Surveys, since these capture the incidence of unreported crime as well as reported crime. However, those data are currently available only on an infrequent basis, with 1999 the most recent survey data available, and the sample size does not allow reporting at the sub-provincial level.

**Data Source**

Statistics Canada, Canadian Centre for Justice Statistics, Uniform Crime Reporting Survey, 2000.

**Results**

The four Atlantic provinces report generally lower adult crime rates, and fewer violent crimes in particular, than the rest of Canada. But youth crime exceeds adult crime across the country, and Newfoundland and New Brunswick both report higher rates of youth crime than the national average. It is not clear to what extent results reflect different reporting rates in each province. Among adults, Canadian women commit only 17% as many violent crimes as men, and 27% as many property crimes (Table 2).

[53] *National Consensus Conference on Population Health Indicators: Final Report,* Canadian Institute for Health Information, Ottawa, 1999, pages 5 and B8.
[54] Statistics Canada, http://www.statcan.ca/english/freepub/82-221-XIE/00502/tables/html/49.htm.

**Table 2. Crime rates per 100,000, adults and youth, male and female, Canada and Atlantic provinces, 2000**

| | Violent Crimes 2000 Rate per 100,000 | | | | Property Crimes 2000 Rate per 100,000 | | | | Other Criminal Code Crimes 2000 Rate per 100,000 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Adults 18 and Older | | Youth 12 to 17 | | Adults 18 and Older | | Youth 12 to 17 | | Adults 18 and Older | | Youth 12 to 17 | |
| | male | fem | male | fem | male | fem | male | fem | male | fem | male | fem |
| **Can.** | 858 | 145 | 1,342 | 481 | 837 | 228 | 2,820 | 900 | 1,014 | 184 | 1,996 | 574 |
| **Nfld** | 742 | 130 | 1,393 | 463 | 692 | 218 | 3,214 | 664 | 804 | 102 | 2,130 | 594 |
| **PEI** | 551 | 59 | 528 | 97 | 673 | 109 | 2,399 | 341 | 598 | 63 | 1,375 | 195 |
| **NS** | 737 | 139 | 1,055 | 384 | 801 | 233 | 3,007 | 796 | 863 | 137 | 2,303 | 371 |
| **NB** | 682 | 98 | 1,378 | 437 | 782 | 237 | 3,184 | 1,037 | 825 | 101 | 2,249 | 657 |

Source: Statistics Canada, Canadian Centre for Justice Statistics, Uniform Crime Reporting Survey

### *1.2.12 Decision Latitude at Work*

Job strain, including lack of control over one's work circumstances, has been linked to stress and adverse health outcomes. A Statistics Canada study found particularly high levels of work stress, including high rates of job strain and physical and psychological demands and low levels of control, decision-making power, and supervisor support, in the service occupations in which women predominate. Women in these jobs reported higher levels of migraines and psychological distress than workers in other jobs.[55]

In the 1996/97 National Population Health Survey, more women reported high work stress levels than men in every age category. Women aged 20 to 24 were almost three times as likely to report high work stress than the average Canadian worker. Between 1991 and 1996, the percentage of women reporting they were "very satisfied" with their jobs dropped from 58% to 49%.[56]

In light of convincing evidence linking work control to health outcomes, the Canadian Institute for Health Information's National Consensus Conference on Population Health Indicators identified and confirmed decision latitude at work as a key non-medical determinant of health.[57]

**Definition**

Statistics Canada defines decision latitude at work according to "the degree of control that currently employed workers aged 15 to 74 have over their work circumstances." This is assessed

[55] Kathryn Wilkins and Marie Beaudet, "Work Stress and Health," Statistics Canada, *Health Reports,* volume 10, no. 3, Winter 1998, pages 47-62
[56] Health Canada, *Toward a Healthy Future: Second Report on the Health of Canadians,* Ottawa, 1999, page 57.
[57] *National Consensus Conference on Population Health Indicators: Final Report,* Canadian Institute for Health Information, Ottawa, 1999, pages 5 and B9.

according to whether these workers agree or disagree with the statements: "I have a lot to say about what happens in my job" and "my job allows me the freedom to decide how I do my job."[58]

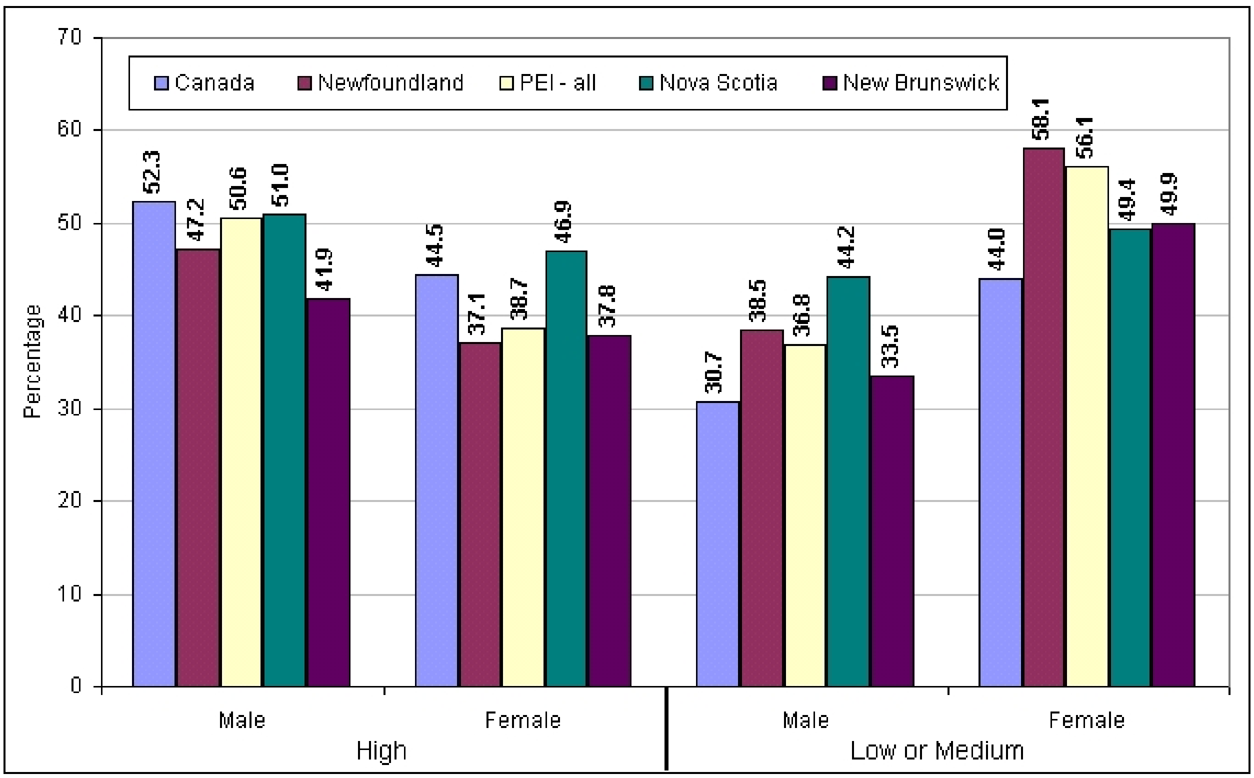
**Data Sources**

Statistics Canada, National Population Health Survey, 1994/95, cross sectional sample, health file; and Statistics Canada, Canadian Community Health Survey, 2000/01.

**Results**

Across the country more men than women have high decision latitude at work. However, the 1994/95 National Population Health Survey showed that Atlantic region men were less likely than other Canadians to have high decision latitude at work. Both men and women in the four Atlantic provinces were more likely than other Canadians to report low or medium decision latitude at work. Women in Newfoundland and Labrador had the lowest level of control over their work (Figure 50).

**Figure 50. Decision latitude at work, currently employed workers, aged 15 to 74, Canada and Atlantic provinces, 1994/95, (%)**




Source: Statistics Canada, National Population Health Survey, 1994/95, cross sectional sample, health file

[58] Statistics Canada, http://www.statcan.ca/english/freepub/82-221-XIE/00502/defin2.htm#49

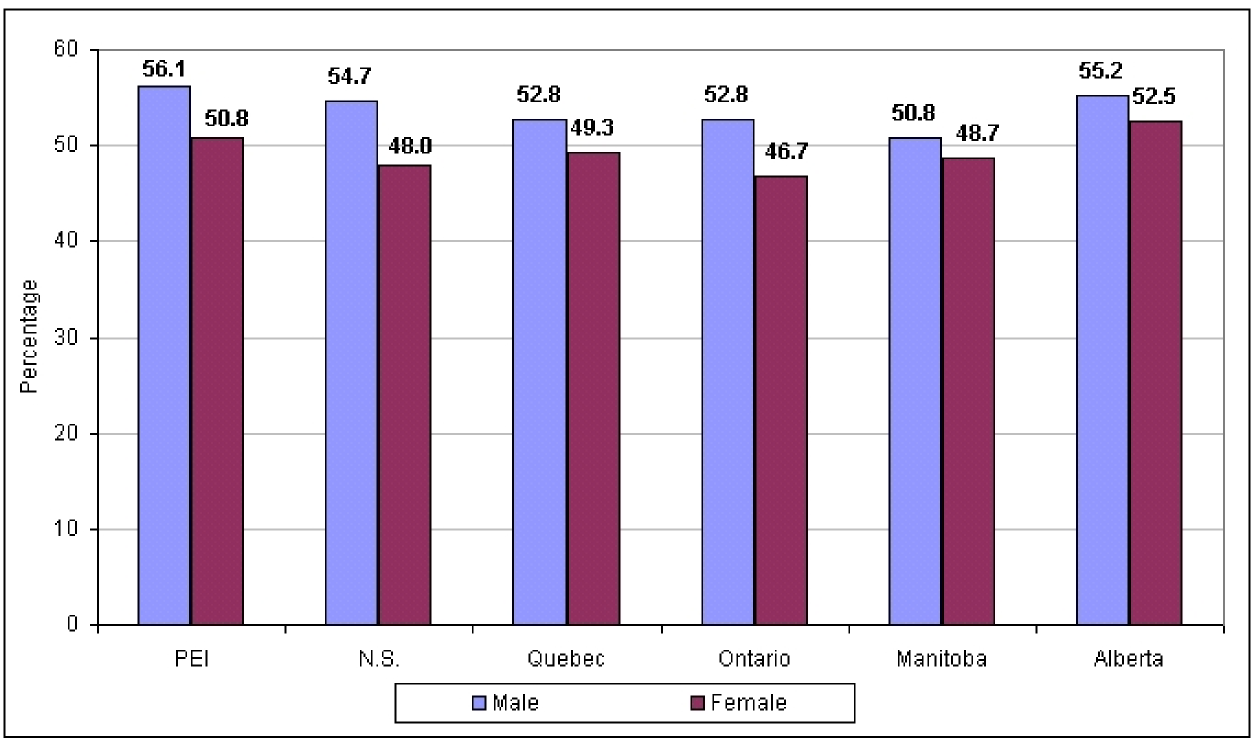
In the 2000/01 Canadian Community Health Survey, Statistics Canada only reported provincial results for this indicator for those provinces in which survey respondents in all health regions answered the "work stress" module. Thus 2000/01 provincial results are available for Prince Edward Island, Nova Scotia, Quebec, Ontario, Manitoba, and Alberta, but not for Newfoundland, New Brunswick, Saskatchewan, or British Columbia.

Among the six provinces for which estimates are given, Prince Edward Island men were more likely to report high decision latitude at work (56.1%) than men in any other province. PEI women were the second most likely to report high decision latitude at work (50.8%) after Albertan women (52.5%). By contrast, both Nova Scotian men and women were more likely to report low or medium decision latitude at work than workers in the other five provinces (Figures 51 and 52).

Both men and women in every health district in Nova Scotia were more likely to report low or medium decision latitude at work, compared to their counterparts in Prince Edward Island. Within Nova Scotia, men and women in the two urban centres, Halifax and Cape Breton, were more likely than their rural counterparts to report high decision latitude at work.

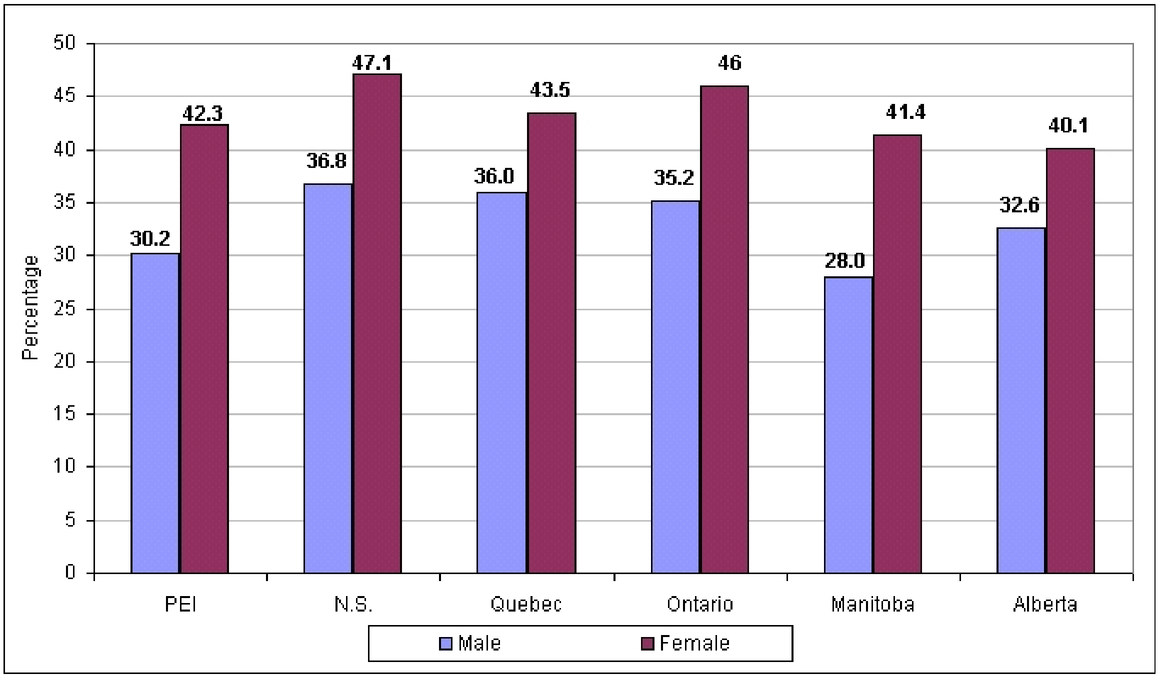
Among all Nova Scotian and PEI health districts, men and women in South-Southwest (NS1) have the lowest levels of decision latitude at work. Among women, those in rural PEI have the highest level of control over their work circumstances (Figures 53 and 54).

**Figure 51. Currently employed workers, aged 15-74, male and female, reporting high decision latitude at work, six provinces reporting results, 2000/01, (%)**



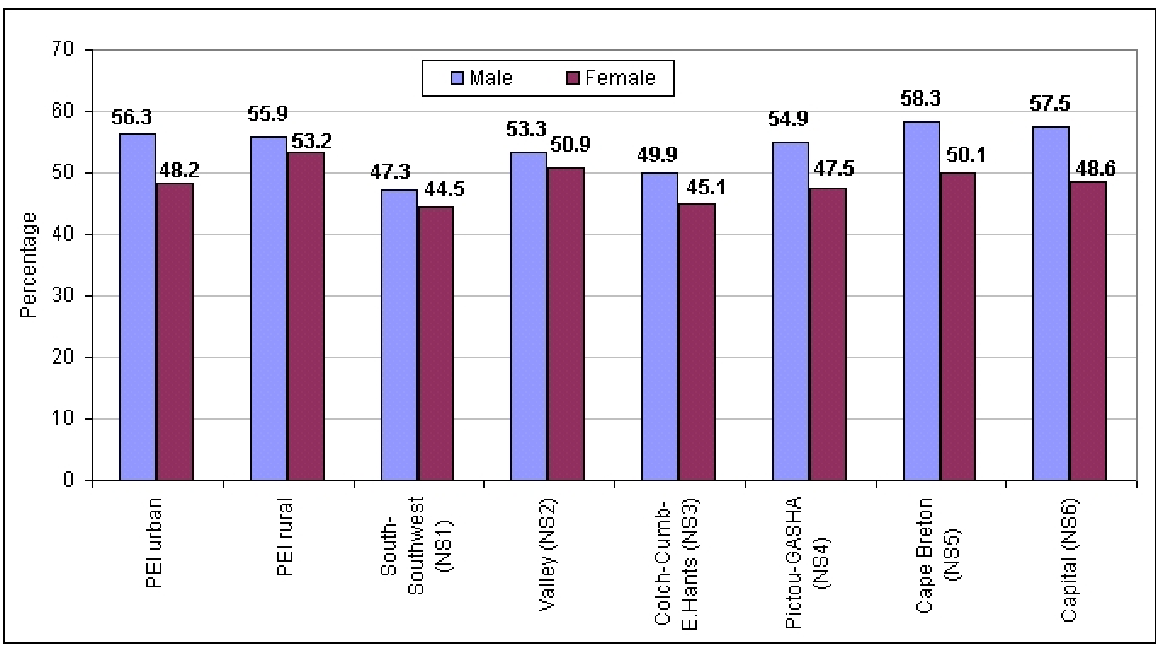

Source: Statistics Canada, Canadian Community Health Survey 2000/01

**Figure 52. Currently employed workers, aged 15-74, male and female, reporting low or medium decision latitude at work, six provinces reporting results, 2000/01, (%)**



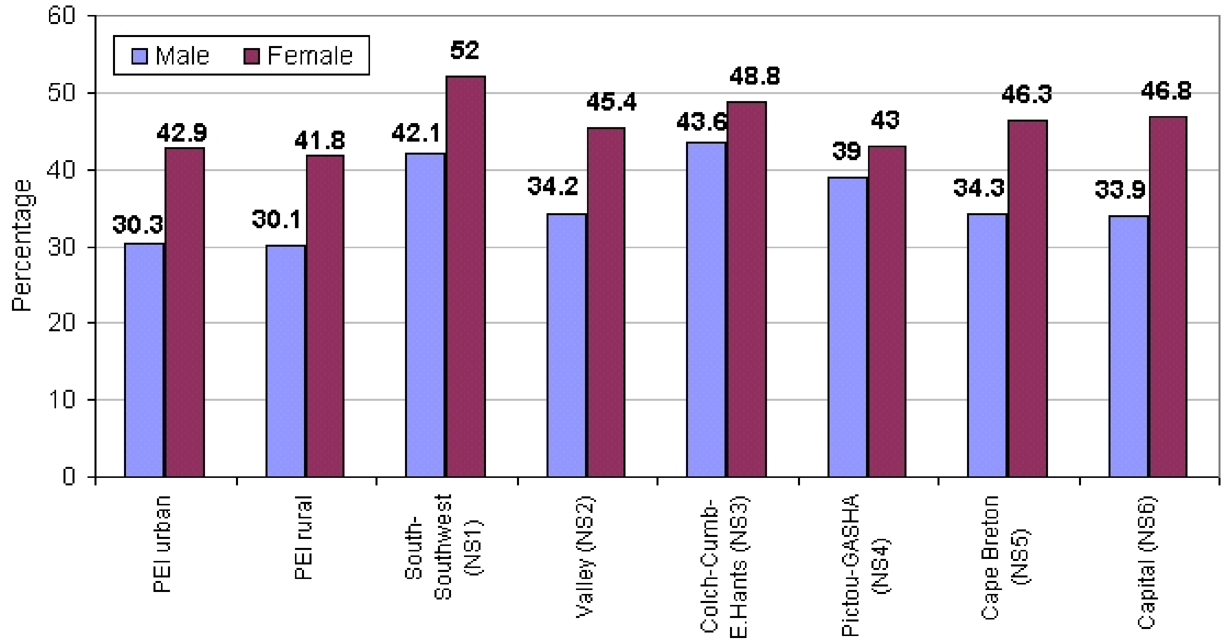

Source: Statistics Canada, Canadian Community Health Survey 2000/01.

**Figure 53. Currently employed workers, aged 15-74, male and female, with high decision latitude at work, health districts in PEI and Nova Scotia, 2000/01, (%)**[59]




[59] Statistics Canada http://www.statcan.ca/english/freepub/82-221-XIE/01002/tables/html/22106.htm, extracted January 20, 2003.

**Figure 54. Currently employed workers, aged 15-74, male and female, with low or medium decision latitude at work, health districts in PEI and Nova Scotia, 2000/01, (%)[60]**




Source: Statistics Canada, Canadian Community Health Survey, 2000/01

## 1.3 Social-Psychological Determinants

Two factors that directly affect women's physical and emotional health are life stress and degree of social support.

### *1.3.1 Life Stress*

Substantial research has found that stress negatively affects health, weakens the immune system, and increases susceptibility to a wide range of illnesses.[61] According to Richard Surwit of Duke University Medical Centre:

> *"Experiencing stress is associated with the release of hormones that lead to energy mobilizataion – known as the "fight or flight" response. Key to this energy mobilization is the transport of glucose into the bloodstream, resulting in elevated glucose levels, which is a health threat for people with diabetes."*[62]

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60 Statistics Canada http://www.statcan.ca/english/freepub/82-221-XIE/01002/tables/html/22106.htm, extracted January 20, 2003.

61 Chrousos, G.P, and P.W. Gold, 1992, "The concepts of stress and stress system disorders: Overview of physical and behavioral homeostasis," *Journal of the American Medical Association* 267: 1244-1252.

62 Surwit, Richard, et al. "Stress Management Improves Long-Term Glycemic Control in Type 2 Diabetes," *Diabetes Care,* 2002, 25: 30-34, cited at: http://www.healthjourneys.com/hotresearch.asp.

A study in Detroit, Michigan, found that those living in dangerous and high-stress neighbourhoods had higher hypertension levels than those living in low-stress neighbourhoods.[63]

Abundant evidence exists that stress is an independent risk factor for several chronic illnesses. However, more recent research has uncovered evidence on the physiological pathways between psychosocial stress, emotional arousal, and disease. Two stress-related neuroendocrine pathways can adversely affect the heart – the pituitary adrenal system, activated when there is depression, withdrawal, or loss of control, and the sympathetic adrenal medullary system, activated in response to the "fight or flight" syndrome.

According to one analysis:

> *"[R]epeated sympathetic hyperactivity and chronic oversecretion of stress hormones such as epinephrine, norepinephrine, and cortisol over a long span of time might lead, via mechanisms such as endothelial injury to the coronary arteries, to increased CHD risk in type A individuals compared to type B individuals."*[64]

Other pathophysiological pathways between mental and physical illness have been identified in adverse effects on the heart from the excretion of higher levels of testosterone by hostile and cynical individuals, and in depressive effects on the immune system due to isolation, negativity, and lack of trust. Depressed immunity, in turn, has been linked to a reduced ability to identify and reject tumour cells at an early stage.[65]

Work stress, which may derive from time pressures, work overload, high levels of responsibility, lack of control, and non-supportive superiors, has been particularly identified in many studies as an important predictor of hypertension and coronary heart disease. Male U.S workers with the highest levels of job strain were found to have four times the risk of heart attack as those with the lowest levels of strain, indicating a risk level equal to that of smoking and high blood cholesterol. And a large, prospective, six-year Swedish study similarly concluded that job strain predicted future heart disease independently of other risk factors in a population sample free of symptoms.[66]

The correlation between high stress and smoking is well documented. For example, among Canadians reporting very low stress rates, just 21% of women and 27% of men are smokers.

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[63] Kabat-Zinn, Jon, "Psychosocial Factors: Their Importance and Management," in Ockene, Ira, and Judith Ockene, *Prevention of Coronary Heart Disease,* Little, Brown, and Company, Boston, 1992, page 304.

[64] Kabat-Zinn, Jon, "Psychosocial Factors: Their Importance and Management," in Ockene, Ira, and Judith Ockene, *Prevention of Coronary Heart Disease,* Little, Brown, and Company, Boston, 1992, pages 312-313. Type A, or coronary-prone behaviour has been described as "keen and ambitious" with an "engine…always set at full speed ahead." It is characterized by "a sense of time urgency, impatience, competitiveness, drive, and intense desire to achieve." See Goldberg, Robert, "Coronary Heart Disease: Epidemiology and Risk Factors," in Ockene, Ira, and Judith Ockene, *Prevention of Coronary Heart Disease,* page 27.

[65] Kabat-Zinn, op. cit., page 314.

[66] Kabat-Zinn, Jon, "Psychosocial Factors: Their Importance and Management," in Ockene, Ira, and Judith Ockene, *Prevention of Coronary Heart Disease,* Little, Brown, and Company, Boston, 1992, page 305.

Among those reporting high stress rates, 45% of women and 46% of men are smokers, with an almost direct linear relationship between stress level and smoking prevalence for both sexes.[67]

In a wide-ranging review of the literature, the *American Journal of Health Promotion* found stress to be the most costly of all modifiable risk factors.[68] While there are many accepted methods of individual stress reduction, the evidence indicates that underlying social causes must be addressed if this important cause of disease is to be countered effectively.

**Definition**

Respondents to the Canadian Community Health Survey, 18 years and older, were asked to report their level of life stress according to whether they experienced "quite a lot" of stress or "some" stress, or whether they were "not at all" stressed.[69]

**Data Sources**

Statistics Canada, Canadian Community Health Survey, 2000/01, health file

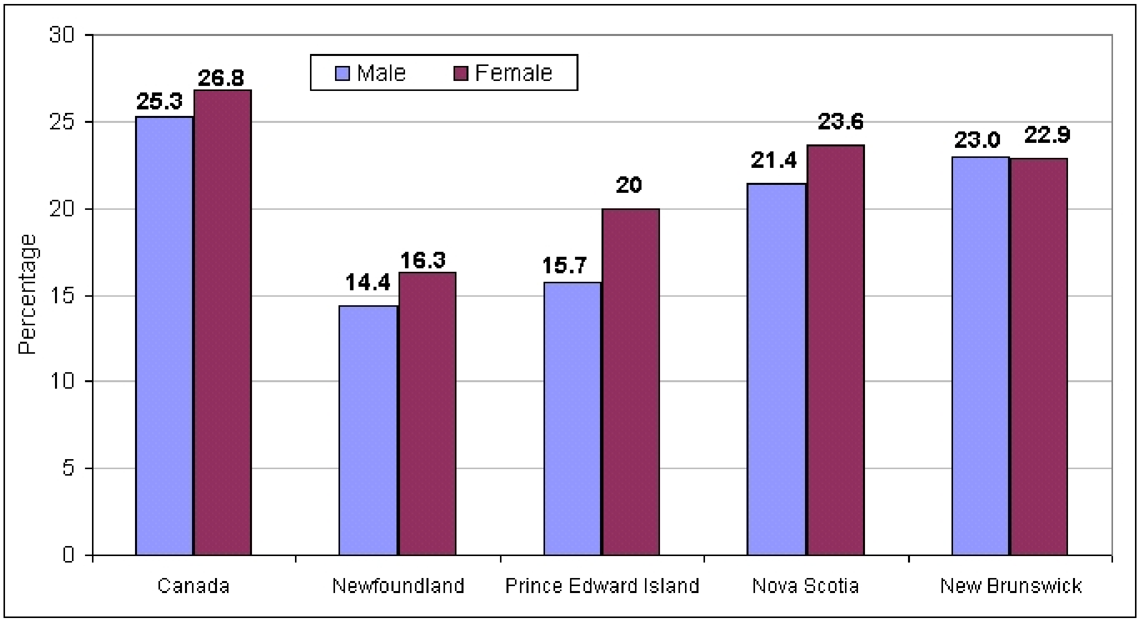
**Results**

More than one in four Canadians experiences "quite a lot" of life stress, with more women experiencing high levels of stress than men (26.8% compared to 25.3%). In the 2000/01 Canadian Community Health Survey none of the four Atlantic provinces registered as a high a rate of stress as the rest of Canada. As in previous population health surveys, Newfoundlanders in 2000/01 registered the lowest stress levels in the country, with Prince Edward Islanders recording the second lowest levels (Figure 55).

But the provincial averages conceal some sharp disparities. Women in Charlottetown and Summerside, for example, have far higher rates of stress than men in those towns. And the proportion of residents experiencing high levels of stress in Cape Breton (NS5), The Valley (NS2), Sussex/Saint John (NB2), and Campbellton (NB5) approaches national levels, while Edmundston (NB4), is the only health district in Atlantic Canada that substantially exceeds national stress levels. The lowest levels of stress are in rural Newfoundland and PEI (Figures 56, 57, and 58).

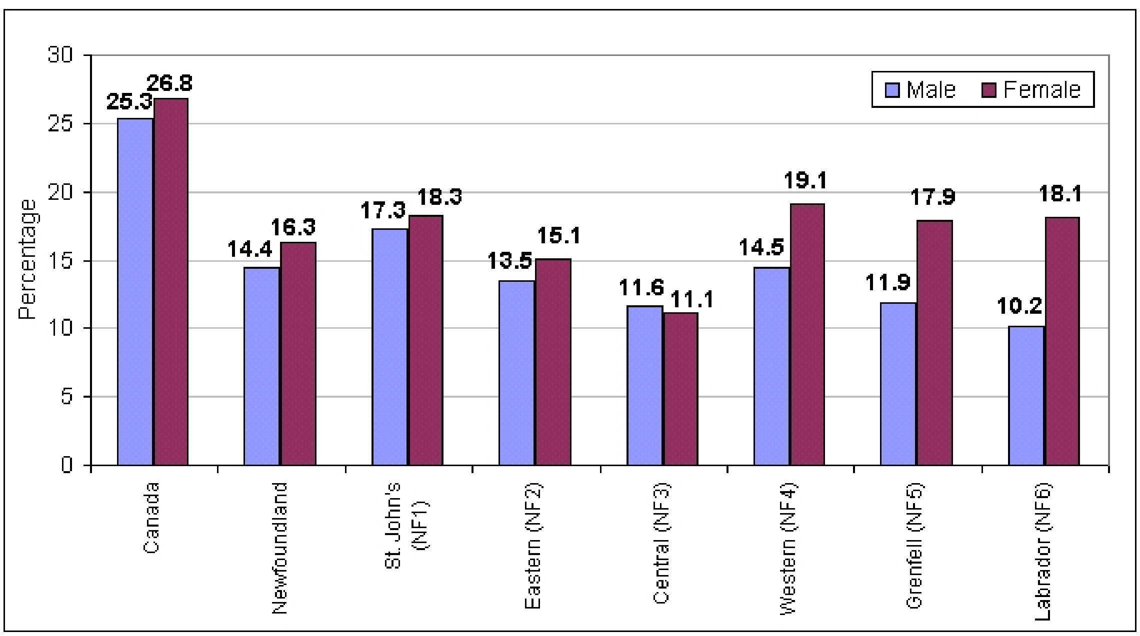
[67] Statistics Canada, *National Population Health Survey Overview, 1994-95,* catalogue no. 82-567, pages 10-11. See also Colman, Ronald, *The Cost of Tobacco in Nova Scotia,* GPI Atlantic and Cancer Care Nova Scotia, Halifax, October 1990, Figure 3, page 9.
[68] Goetzel, Ron (ed), "The Financial Impact of Health Promotion," *American Journal of Health Promotion* 15 (5), May/June 2001.
[69] Statistics Canada, http://www.statcan.ca/english/freepub/82-221-XIE/00502/defin2.htm#54a

**Figure 55. Percentage of the population, aged 18 and over, reporting "quite a lot" of life stress, Canada and Atlantic Provinces, 2000/01, (%)**




Source: Statistics Canada, Canadian Community Health Survey, 2000/01, health file.

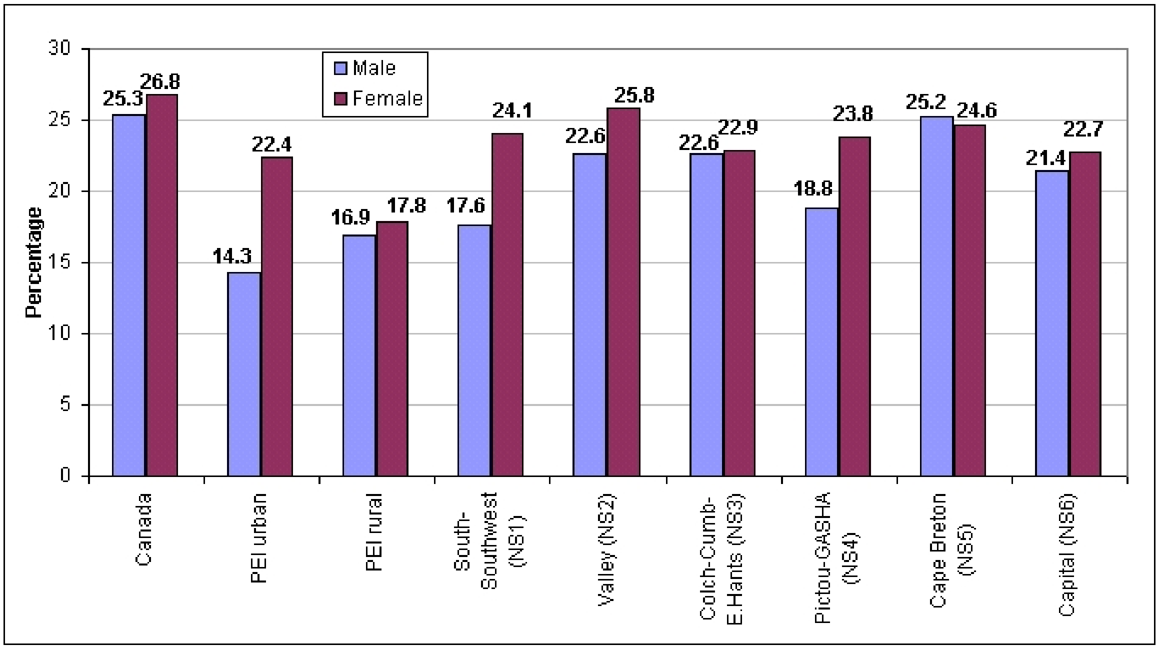
**Figure 56. Percentage of the population, aged 18 and over, reporting "quite a lot" of life stress, health districts in Newfoundland and Labrador, male and female, 2000/01, (%)[70]**




Statistics Canada, Canadian Community Health Survey

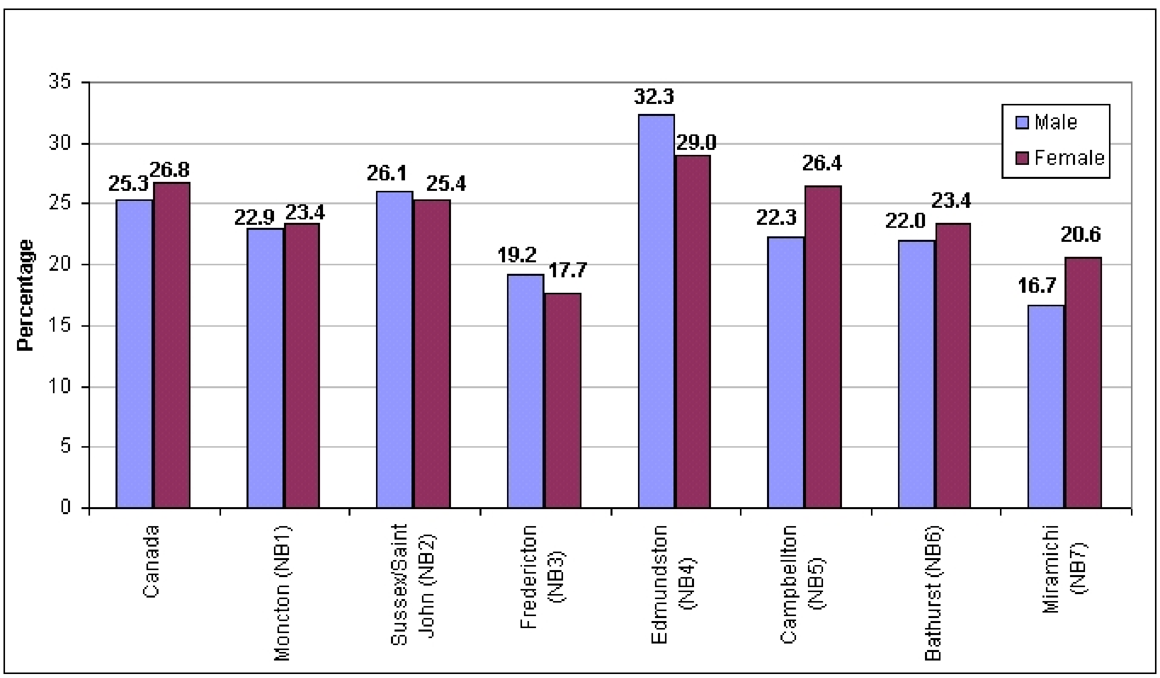
[70] Data for men in the central (NF3), western (NF4), Grenfell (NF5), and Labrador (NF6) health districts, and for women in the central and Grenfell districts, have a coefficient of variation (CV) from 16.6% to 33.3%) and should be interpreted with caution.

**Figure 57. Percentage of the population, aged 18 and over, reporting "quite a lot" of life stress, health districts in Prince Edward Island and Nova Scotia, male and female, 2000/01, (%)**




Source: Statistics Canada, Canadian Community Health Survey 2000/01.

**Figure 58. Percentage of the population, aged 18 and over, reporting "quite a lot" of life stress, health districts in New Brunswick, male and female, 2000/01, (%)**




Source: Statistics Canada, Canadian Community Health Survey 2000/01

### *1.3.2 Social Support*

According to Health Canada:

> *"Families and friends provide needed emotional support in times of stress, and help provide the basic prerequisites of health such as food, housing and clothing. The caring and respect that occur in social networks, as well as the resulting sense of well-being, seem to act as a buffer against social problems. Indeed, some experts in the field believe that the health effect of social relationships may be as important as established risk factors such as smoking and high blood pressure.*[71]

Strong social support has also been show to improve resilience and aid recovery from illness. Conversely, lack of social support from family, friends and communities is linked to higher rates of cardiovascular disease, premature death, depression, and chronic disability.[72]

Statistics Canada's National Population Health Surveys and Canadian Community Health Survey have tested social support levels by questions such as whether respondents had someone to confide in, count on in a crisis, count on for advice, and make them feel loved and cared for. Among household types, single parents were found to have significantly lower levels of social support than members of two-parent families. This indicator should therefore be linked to the single-parent indicator described earlier.[73] Social support was also identified and confirmed as a key non-medical determinant of health by CIHI's National Consensus Conference on Population Health Indicators.[74]

**Definition**

In the 1994/95 and 1996/97 National Population Health Surveys, this indicator was defined as the "level of perceived social support reported by population aged 12 and over, based on their responses to four questions about having someone to confide in, someone they can count on in a crisis, someone they can count on for advice, and someone who makes them feel loved and cared for."[75]

The 2000/01 Canadian Community Health Survey increased the questions to eight, and defined the indicator slightly differently as the "level of perceived social support reported by population aged 12 and over, based on their responses to eight questions about having someone to confide in, someone they can count on in a crisis, someone they can count on for advice, and someone with whom they can share worries and concerns."[76]

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71 Health Canada, *Toward a Healthy Future: Second Report on the Health of Canadians*, Ottawa, 1999*,* page 60.
72 Lyons, Renee, and Lynn Langille, *Healthy Lifestyle: Strengthening the Effectiveness of Lifestyle Approaches to Improve Health,* Atlantic Health Promotion Research Centre, Dalhousie University, prepared for Health Canada, Health Promotion and Programs Branch, April, 2000, pages 17-19.
73 Health Canada, *Toward a Healthy Future,* page 60; and Health Canada, *Statistical Report on the Health of Canadians,* Ottawa, 1999*,* page 22.
74 *National Consensus Conference on Population Health Indicators: Final Report,* Canadian Institute for Health Information, Ottawa, 1999, pages 5 and B9.
75 Statistics Canada, http://www.statcan.ca/english/freepub/82-221-XIE/00502/defin2.htm#54a
76 Statistics Canada, http://www.statcan.ca/english/freepub/82-221-XIE/01002/tables/html/2326.htm.

**Data Sources**

Statistics Canada, National Population Health Survey, 1994/95 and 1996/97, cross sectional sample, health file; Statistics Canada, National Population Health Survey, 1994/95 and 1996/97, cross sectional sample; Statistics Canada, Canadian Community Health Survey 2000/01.

**Results**

In the 1994/95 and 1996/97 National Population Health Surveys, provincial data for reports of "low" social support had a coefficient of variation (CV) greater than 33.3% and were suppressed due to extreme sampling variability. Fortunately the much larger sample size of the 2000/01 Canadian Community Health Survey allows provincial comparisons of low social support to be reported for the first time (Figure 59). However, provincial estimates were given by Statistics Canada only for those provinces in which survey respondents in all health districts answered the "social support" module of the survey. 2000/01 provincial results are therefore available for seven provinces, including all four Atlantic provinces, but not for Ontario, Manitoba, or Saskatchewan.[77]

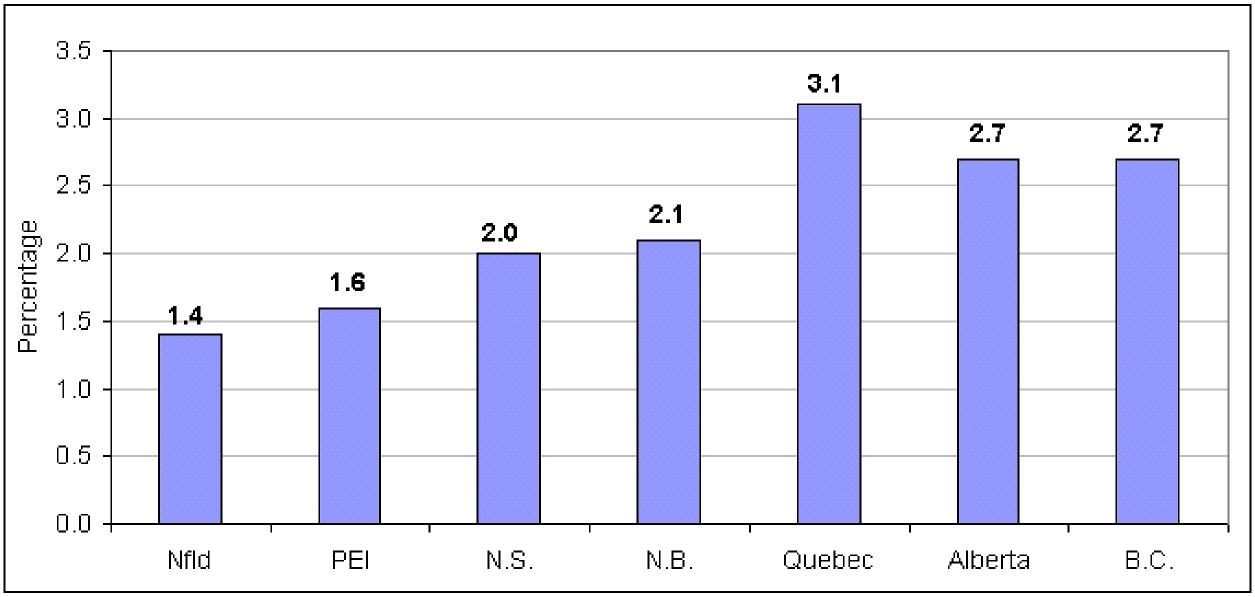
Both the earlier National Population Health Surveys (NPHS) and the most recent Canadian Community Health Survey (CCHS) show the Atlantic provinces leading the country in high levels of social support. Throughout Canada, women report higher levels of social support than men.

At this time, in light of the slightly different definitions noted above, it is not clear to the authors whether the 2000/01 CCHS results are comparable to the earlier 1994/95 and 1996/97 NPHS results. If they are, there would be appear to have been a slight decline in social supports among Atlantic Canadian women. Even if the results are not entirely comparable, it is clear that both Nova Scotian men and women have slipped by comparison with Newfoundlanders and Prince Edward Islanders in the degree to which they can rely on social supports. Because of the slight change in definition, however, results from the different surveys are presented separately below (Figures 59, 60, and 61).

The 2000/01 CCHS data, released December 23, 2001, allow the first assessment of social supports by health district. Social support levels are consistently high throughout Newfoundland and PEI. In Nova Scotia, the highest levels of social support are in the Pictou-GASHA (NS4) health district, with lower levels reported in the South-Southwest (NS1) and Colchester-Cumberland-East Hants (NS3) health districts. Women throughout Nova Scotia show markedly higher levels of social support than men. In New Brunswick, the Moncton and Miramichi health districts report somewhat lower levels of social support than in the rest of the province (Figures 62, 63, and 64).

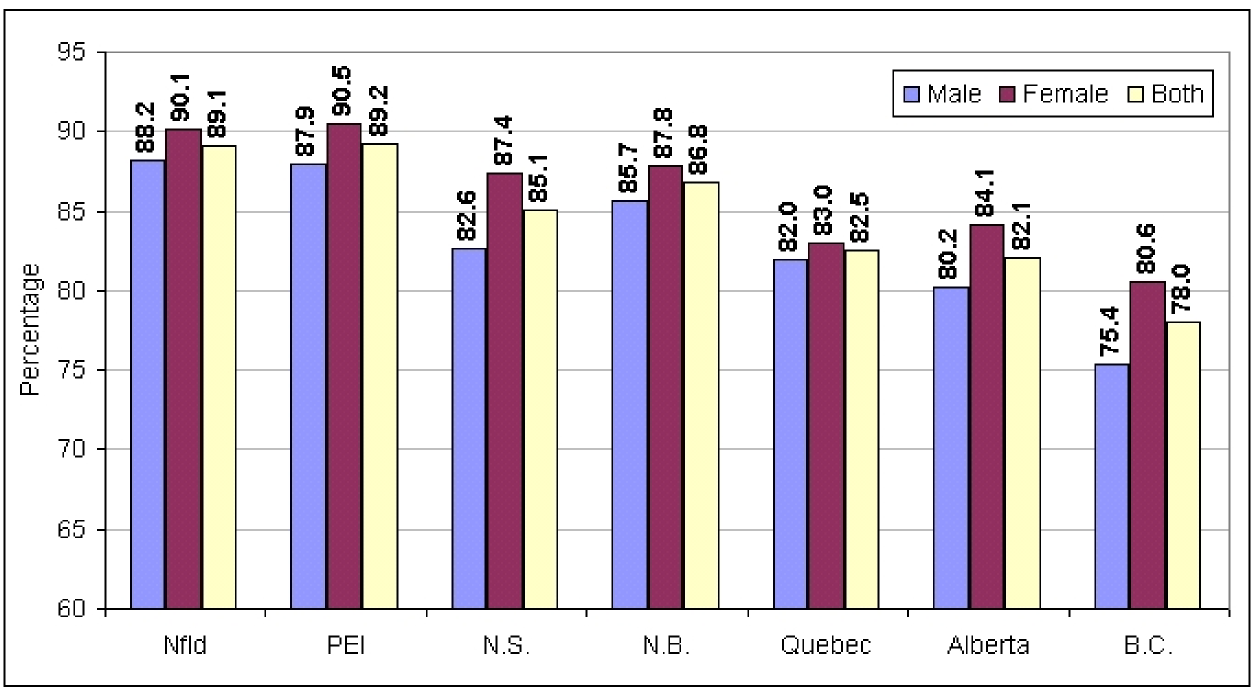
[77] These new data were released by Statistics Canada on 23rd December, 2002. See Statistics Canada, http://www.statcan.ca/english/freepub/82-221-XIE/01002/tables/html/2326.htm.

**Figure 59. Proportion of the population, aged 12 and over, reporting low levels of social support, selected provinces, 2000/01, (%)**




Source: Statistics Canada, Canadian Community Health Survey, 2000/01.[78]

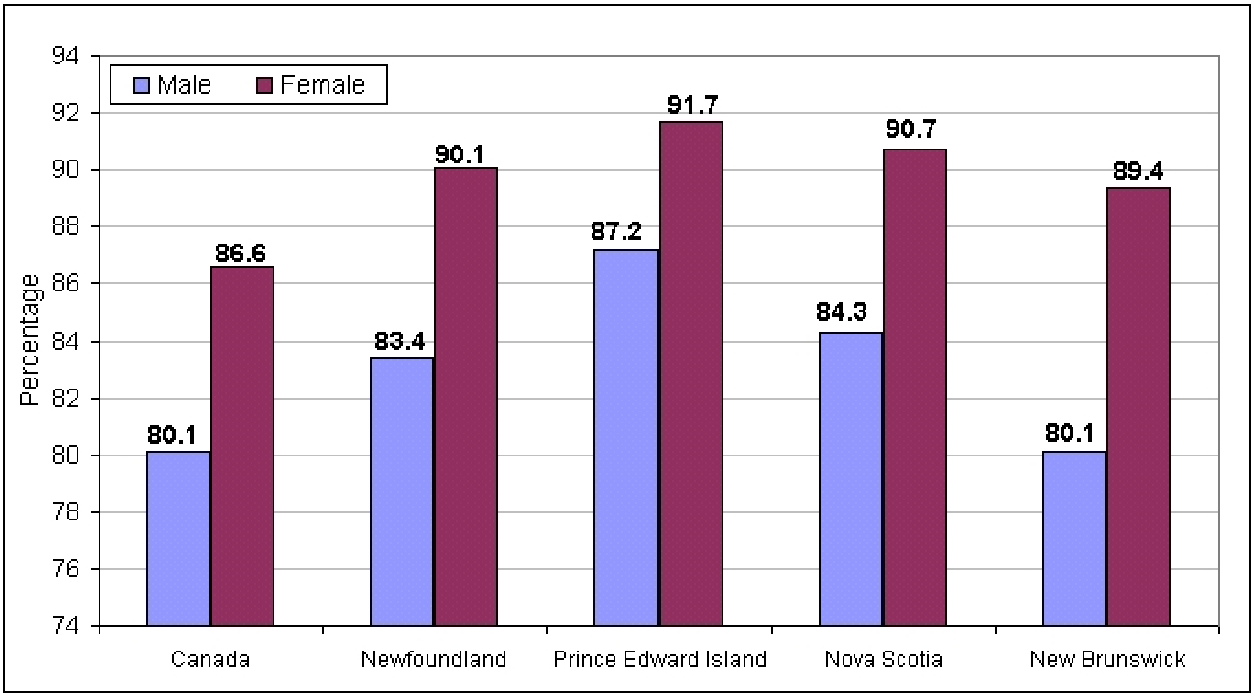
**Figure 60. Proportion of the population, aged 12 and over, reporting high levels of social support, selected provinces, 2000/01, (%)**




Source: Statistics Canada, Canadian Community Health Survey, 2000/01.

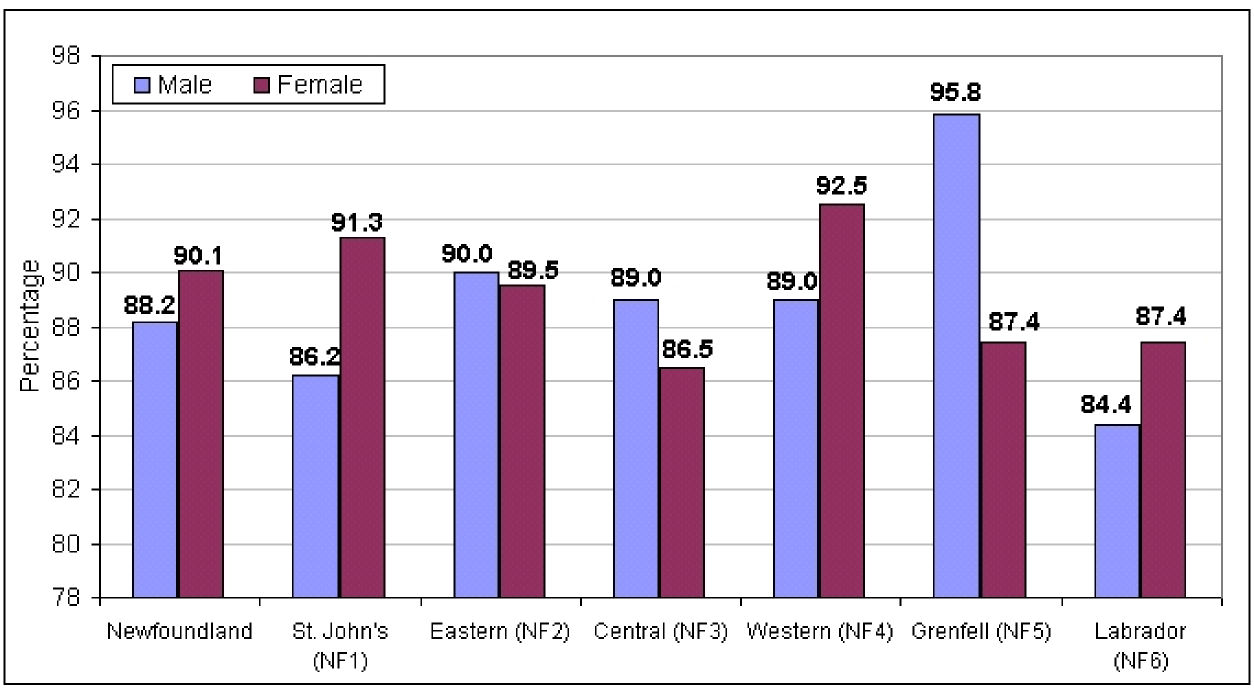
[78] Statistics Canada, http://www.statcan.ca/english/freepub/82-221-XIE/01002/tables/html/2326.htm, extracted 2 February, 2003. All 2000/01 charts in this section are derived from the same source.

**Figure 61. Proportion of the population, aged 12 and over, reporting high levels of social support, Canada and Atlantic provinces, 1996/97, (%)**



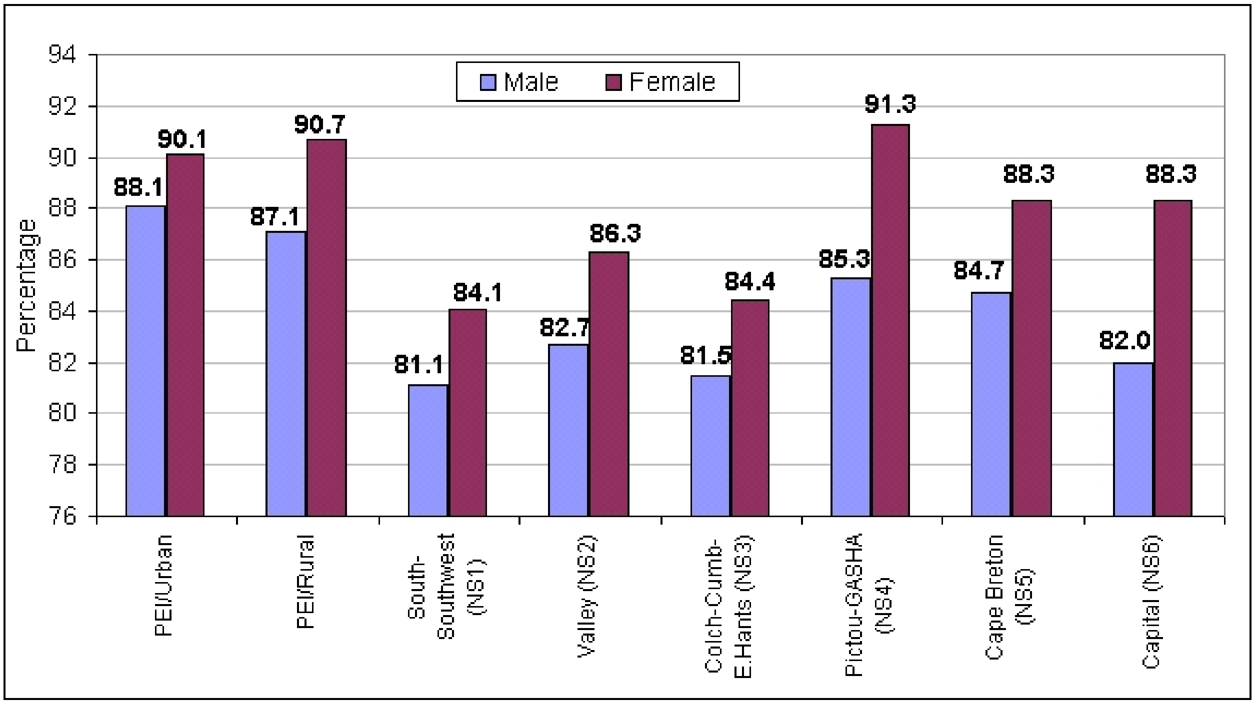

Sources: Statistics Canada, National Population Health Survey, 1994/95 and 1996/97, cross sectional sample, health file; Statistics Canada, National Population Health Survey, 1994/95 and 1996/97, cross sectional sample.

**Figure 62. Proportion of the population, aged 12 and over, reporting high levels of social support, Newfoundland and Labrador and health districts, 2000/01, (%)**



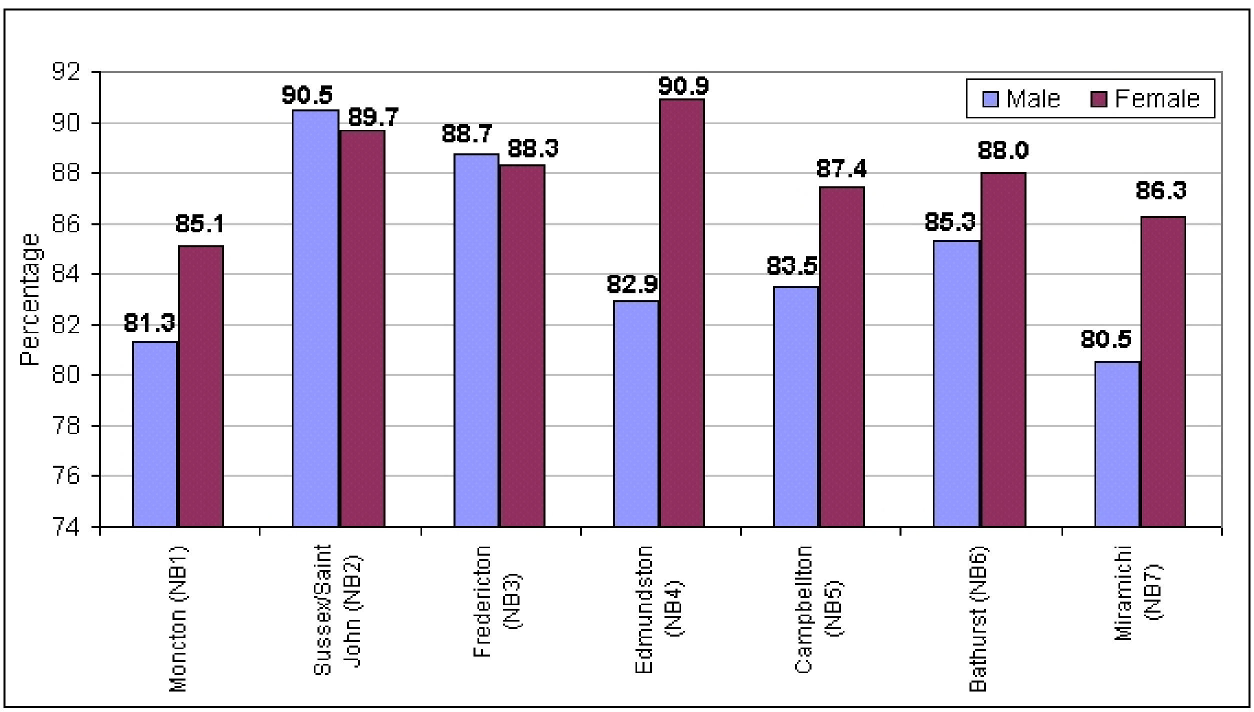

Source: Statistics Canada, Canadian Community Health Survey, 2000/01

**Figure 63. Proportion of the population, aged 12 and over, reporting high levels of social support, health districts in PEI and Nova Scotia, 2000/01, (%)**




Source: Statistics Canada, Canadian Community Health Survey, 2000/01.

**Figure 64. Proportion of the population, aged 12 and over, reporting high levels of social support, health districts in New Brunswick, 2000/01, (%)**




Source: Statistics Canada, Canadian Community Health Survey, 2000/01.

## 1.4 Health Behaviours/Lifestyle Determinants

*" The doctor of the future will give no medicine but will interest his patients in the care of the human frame, in diet, and in the cause and prevention of disease."*
Thomas Edison

One U.S. study found that more than 40% of deaths can be attributed to preventable causes, led by cigarette smoking, lack of exercise, and poor diet.[79] The U.S. Department of Health and Human Services concluded that up to 50% of chronic disease mortality is attributable to lifestyle factors that can be changed.[80] It noted that better control of 10 modifiable risk factors could prevent 40-70% of all premature deaths, and two-thirds of all cases of chronic disability.[81] And the U.S. Health Care Financing Administration estimates that behavioural risk factors contribute to 70% of the physical decline that occurs with aging.[82]

In an extensive review of the literature, Emory University's Carter Center found that three preventable precursors of premature death accounted for 46% of all deaths, nearly three-quarters of all preventable causes of death, and more than half of preventable hospital days. These three were tobacco (17% of all deaths; 27% of preventable deaths; 20% of preventable hospital days); high blood pressure (15% of all deaths; 24% of preventable deaths; 12% of preventable hospital days); and over-consumption of high-calorie, fatty foods, which can lead to obesity and high serum cholesterol, (14.5% of all deaths; 23% of preventable deaths; 20% of preventable hospital days.)[83]

High blood pressure has been estimated to account for 4% of preventable years of life lost before age 65; over-consumption of high calorie, fatty foods for 3.5%, and tobacco for 12.6% of all preventable years of life lost before age 65. Other preventable causes of death, such as alcohol abuse and injuries, account for fewer deaths than these three, but relatively more preventable years of life lost before age 65, because they frequently kill people at younger ages.[84]

An Australian study determined that modifiable risk factors accounted for 38% of the total burden of disease in that country, with tobacco accounting for 9.7%; physical inactivity for 6.7%; high blood pressure for 5.4%; obesity for 4.3%; lack of fruit and vegetables for 2.7%; high

[79] McGinnis, J.M., and Foege, W., "Actual Causes of Death in the United States," *Journal of the American Medical Association* 270 (19), 1993, pages 2207-2212.
[80] U.S. Department of Health and Human Services, *Healthy People 2000: National Health Promotion and Disease Prevention Objectives,* Washington, D.C., 1990, DHHS (PHS) publication no. 91-50213.
[81] U.S. Department of Health and Human Services, 1990, *Prevention '89/'90: Federal Programs and Progress,* Public Health Service, Washington D.C.
[82] U.S. Health Care Financing Administration, "Healthy Aging Project," Fact Sheet, 14 October, 1998, available at: http://www.os.dhhs.gov/news/press/1998pres/981014.html.
[83] Amler, Robert, and Bruce Hull (eds.), *Closing the Gap: The Burden of Unnecessary Illness,* Oxford University Press, New York and Oxford, 1987, pages 184-185.
[84] Amler, Robert, and Donald Eddins, "Cross-Sectional Analysis: Precursors of Premature Death in the United States," in Amler, Robert, and Bruce Hull (eds.), *Closing the Gap: The Burden of Unnecessary Illness,* Oxford University Press, New York and Oxford, 1987, pages 184-185.

blood cholesterol for 2.6%; alcohol for 2.1%; and illicit drugs, occupation, and unsafe sex for smaller proportions.[85]

Epidemiological studies demonstrate that these behavioural risk factors do not act in isolation, and that they are linked to deeper, underlying social causes. For this reason, data on health behaviours and lifestyle determinants of health are presented here in the context of the underlying social determinants of health described above.

Coronary heart disease, for example, is "a multifactorial disease, and a multiplicity of interacting factors are involved in its development."[86] Smoking, hypertension, high blood cholesterol, obesity, physical inactivity, and diabetes are all risk factors for heart disease, and those risks are more prevalent among lower socio-economic groups. Epidemiological evidence has linked poverty, unemployment, and low educational attainment to adverse lifestyle factors, including poor nutrition and high rates of smoking, obesity, and physical inactivity, all of which increase the risk of cardiovascular disease.[87]

Those in the lowest income bracket are two and a half times more likely to smoke than those in the highest income bracket. A study in Alameda County, California, found that those living in poor neighbourhoods had a 50% higher rate of hypertension than those living in affluent neighbourhoods, after controlling for age, race, risk factors, access to medical care, social interaction, and range of other variables.[88] Poor education, too, is linked to a range of risk behaviours, including smoking, obesity, poor nutrition, and lack of physical activity. For example, those with less than a high school education are 64% more likely to be overweight than those with a university degree.[89] In all these cases, there is a clear gradient by social class.[90]

The chain of causation can be long and involve many factors. For example, teenage pregnancy has been estimated to reduce high school completion rates by 50% and income by 80%.[91] These

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[85] Australian Institute of Health and Welfare, *Burden of Disease and Injury in Australia, 1999;* cited in National Public Health Partnership, *Preventing Chronic Disease: A Strategic Framework,* Melbourne, October, 2001, page 24.

[86] Ockene, Ira, and Judith Ockene, *Prevention of Coronary Heart Disease,* Little, Brown, and Company, Boston, 1992, page 10.

[87] See evidence cited in Colman, Ronald, *The Cost of Tobacco in Nova Scotia* GPI Atlantic, Halifax, October, 2000; and *The Cost of Obesity in Nova Scotia*, GPI Atlantic, Halifax, March, 2000; Health Canada, *Toward a Healthy Future: Second Report on the Health of Canadians*, Ottawa, September, 1999; Health Canada, *Statistical Report on the Health of Canadians*, Ottawa, September, 1999; Raphael, Dennis, *Inequality is Bad for our Hearts*, York University, 2001: "Inequality is bad for our hearts: why low income and social exclusion are major causes of heart disease in Canada" can be downloaded from http://depts.washington.edu/eqhlth/paperA15.html; Lyons, Renee, and Lynn Langille, *Healthy Lifestyle: Strengthening the Effectiveness of Lifestyle Approaches to Improve Health,* Atlantic Health Promotion Research Centre, Dalhousie University, prepared for Health Canada, Health Promotion and Programs Branch, April, 2000, page 17.

[88] Kabat-Zinn, Joh, "Psychosocial Factors: Their Importance and Management," in Ockene, Ira, and Judith Ockene, *Prevention of Coronary Heart Disease,* Little, Brown, and Company, Boston, 1992, page 304.

[89] Health Canada, *Statistical Report on the Health of Canadians,* Ottawa, 1999, page 267.

[90] Health Canada, *Toward a Healthy Future: Second Report on the Health of Canadians,* Ottawa, 1999, page 119, and Exhibit 5.7; Health Canada, *Statistical Report on the Health of Canadians,* Ottawa, September, 1999, page 267.

[91] Foege, William, Robert Amler, and Craig White, "Closing the Gap," *Journal of the American Medical Association* 1985; 254: 1355-1358, reprinted in Amler, Robert, and Bruce Hull (eds.), *Closing the Gap: The Burden of Unnecessary Illness,* Oxford University Press, New York and Oxford, 1987, page 206.

socio-economic disadvantages in turn may increase risk behaviours, susceptibility to chronic diseases, and use of health care services. Healthy lifestyle and behavioural choices may also be limited by the overwork that afflicts many higher income groups. Statistics Canada has linked longer work hours with higher rates of smoking and alcohol consumption, unhealthy weight gain, and lack of physical activity.[92]

It is clear, therefore, that education, income, employment and social status, work conditions, social networks, environmental exposure, and other social and economic factors can enhance or severely limit personal health choices, and profoundly influence the lifestyle choices that are the proximate causes of much chronic disease. Similarly, opportunities for healthy lifestyle choices are affected by gender roles and social inequities, including race and ethnicity, age, geographic location, and disabilities.

According to one recent analysis:

> *"Many of the behaviours that contribute to health conditions, whether good health or ill health, are clearly related to the* ***interdependence*** *between people's lifestyle and their social environment…. In real life, lifestyle is a product of some combination of choice, chance, and resources…. One's socio-cultural environment is a very powerful determinant of health.*
>
> *"In fact, Shields (1992) and other sociologists have suggested that lifestyles are essentially artifacts or reflections of culture, individual choice being a less important factor than societal determinants…. A reconstructed definition of lifestyle must incorporate components beyond diet, exercise and alcohol use in order to account for social conditions and processes such as socio-economic status and social relations."*[93]

In 1998, the World Health Organization noted that lifestyle is determined by the interplay between an individual's personal characteristics, social interactions, and socioeconomic and environmental living conditions. Because behaviour patterns are continually adjusted in response to changing social and environmental conditions, efforts to improve health must be directed not only at the individual, but also at the social and living conditions that contribute to these behaviours and lifestyles.[94]

Comprehensive efforts to prevent disease and improve population health have the potential not only to reduce the burden of premature death, disability, and suffering, but also to save money. A University of Michigan database on health risks and medical care costs for over two million

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[92] Shields, Margot, "Long Working Hours and Health," Statistics Canada, *Health Reports,* 11 (2): 33-48, Autumn, 1999; Heart and Stroke Foundation, *Annual Report Card on Canadians' Health,* Toronto, 2000. For increased rates of time stress among Canadians, see Statistics Canada, *Overview of the Time Use of Canadians 1998, General Social Survey* Cycle 12, Housing, Family and Social Statistics Division, special tabulation; and *The Daily,* November 9, 1998, catalogue no. 11-001E, pages 2-4;

[93] Lyons, Renee, and Lynn Langille, *Healthy Lifestyle: Strengthening the Effectiveness of Lifestyle Approaches to Improve Health,* Atlantic Health Promotion Research Centre, Dalhousie University, prepared for Health Canada, Health Promotion and Programs Branch, April, 2000, pages 7, 9 and 10. Reference for Shields (1992) is on page 38 of that report.

[94] Cited in Lyons and Langille, op. cit., page 10.

individuals indicates that excess risk factors account for about 25% of medical care costs.[95] Another analysis estimates that preventable illness constitutes 70% of the burden of illness and its associated costs, and predicts confidently that "we now have the knowledge that could improve population health and at the same time reduce medical claims costs by 20 percent or more."[96]

The capacity of healthier behaviours and lifestyle changes to reduce the lifetime burden of illness and its associated costs, depends in part on the "compression of morbidity" hypothesis, for which there is growing empirical evidence. It is argued that since the human life span is relatively fixed, a delay in the onset of chronic disease and the postponement of chronic infirmity can compress the lifetime illness burden into a shorter period nearer the age of death. According to this hypothesis, an aging population will not necessarily produce higher health care costs because a larger percentage of the population can expect to be healthy and independent for longer periods.[97]

This hypothesis will clearly produce more optimistic estimates of potential health care savings through improved health behaviours than one which assumes that health promotion and avoidance of risk factors simply transfer chronic illness costs to older age groups. Here it is sufficient to acknowledge that a consensus exists that a substantial portion of chronic illness is related to preventable risk factors, risk behaviours, and risk conditions. The epidemiological evidence further confirms that a reduction of these risks can help avoid or delay the onset of these illnesses. A growing body of evidence further indicates that health promotion efforts can reduce medical costs and productivity losses, with studies typically demonstrating a $4-$5 saving for every dollar invested in health promotion.[98]

According to the U.S. Secretary of Health and Human Services:

> *"We would be terribly remiss if we did not seize the opportunity presented by health promotion and disease prevention to dramatically cut health-care costs, to prevent the premature onset of disease and disability, and to help all Americans achieve healthier, more productive lives."*[99]

Unfortunately, conventional behavioural interventions aimed at healthier lifestyles, while effective for higher socio-economic groups, have proved remarkably ineffective in alleviating the deeper influences of poverty and social disadvantage. Even more broadly, analysts have noted that "health promotion strategies focused purely at individual health behaviours are yielding

95 Edington, Dee, "Emerging Research: A View from one Research Center," in Goetzel, Ron (ed.), "The Financial Impact of Health Promotion," *American Journal of Health Promotion* 15 (5), May/June 2001, pages 341-349.
96 Fries, James, Everett Koop, Jacque Sokolv, Carson Beadle, and Daniel Wright, "Beyond Health Promotion: Reducing the need and demand for medical care: Health care reforms to improve health while reducing costs," *Health Affairs* 17 (2), March/April, 1998, pages 71 and 73.
97 Fries, James, "Aging, Natural Death, and the Compression of Morbidity," *The New England Journal of Medicine,* 303 (3): 130-135, July 17, 1980.
98 Aldana, Steven, "Financial Impact of Health Promotion Programs: A Comprehensive Review of the Literature," in Goetzel, Ron (ed.), "The Financial Impact of Health Promotion," *American Journal of Health Promotion* 15 (5), May/June 2001, pages 296-320.
99 Louis W. Sullivan, in U.S. Department of Health and Human Services, 1990, *Healthy People 2000: National Health Promotion and Disease Prevention Objectives,* Public Health Service, Washington, D.C., page vi.

limited success."[100] Across North America, improvements in lifestyle behaviours (eating, drinking, smoking, and exercise patterns), and consequent declines in heart disease incidence and mortality, have occurred at a much lower rate among the less educated, less affluent, strata than among higher socio-economic groups.[101]

Evidence indicates that those who are marginalized do not attend smoking cessation and nutrition classes, do aerobics, join gymnasiums, or shop for healthy foods. A comprehensive $1.5 million 5-year cardiovascular disease prevention and lifestyle intervention program in St. Henri, a Montreal neighbourhood where 45% of families live below the poverty line, attracted only 2% participation. The only significant result, compared to a control group, was that more people had their blood cholesterol levels measured.[102] The researchers concluded:

> *"…unless or until basic living needs are ensured, persons living in low-income circumstances will be unlikely or unable to view CVD [cardio-vascular disease] prevention as a priority."*[103]

Similarly, admonitions to eat healthier foods will likely have less impact on low-income Canadians than on those with higher incomes. Low-income Canadians are more likely to be overweight and to have poorer diets than those with higher incomes, which may be due, in part, to cheaper pricing of poor-nutrient fast foods compared to higher quality healthy foods. For example, 40% of low-income Canadians believe that low-fat products are expensive, and 27% believe that grain products are expensive, compared to 32% and 8% respectively of those with high incomes.[104]

Because lifestyle interventions have been most successful in changing the behaviour of those with higher levels of education and income, and least effective for disadvantaged populations who have fewer options and less control over their lives, they have had the unintended effect of deepening health inequalities between socioeconomic levels.[105]

In sum, it is critical to examine the evidence on health behaviours and lifestyle determinants below within this broader socio-economic context, and to target interventions that consider both social and lifestyle determinants. In that regard, the capacity to analyze health behaviours and

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[100] Lyons, Renee, and Lynn Langille, *Healthy Lifestyle: Strengthening the Effectiveness of Lifestyle Approaches to Improve Health,* Atlantic Health Promotion Research Centre, Dalhousie University, prepared for Health Canada, Health Promotion and Programs Branch, April, 2000, page 7

[101] Stamler, Jeremiah and Rose, preface to Ockene, Ira, and Judith Ockene, *Prevention of Coronary Heart Disease,* Little, Brown and Company, Boston, 1992, page xiv.

[102] Raphael, Dennis, *Inequality is Bad for our Hearts,* York University, 2001: "Inequality is bad for our hearts: why low income and social exclusion are major causes of heart disease in Canada" can now be read and downloaded from http://depts.washington.edu/eqhlth/paperA15.html; and see "Having Healthy Heart is Often a Question of Income," *The Toronto Star,* 9 November, 2001, page F02.

[103] Cited in Lyons, Renee, and Lynn Langille, *Healthy Lifestyle: Strengthening the Effectiveness of Lifestyle Approaches to Improve Health,* Atlantic Health Promotion Research Centre, Dalhousie University, prepared for Health Canada, Health Promotion and Programs Branch, April, 2000, page 22.

[104] Health Canada, *Statistical Report on the Health of Canadians,* Ottawa, September, 1999, page 267.

[105] Lyons, Renee, and Lynn Langille, *Healthy Lifestyle: Strengthening the Effectiveness of Lifestyle Approaches to Improve Health,* Atlantic Health Promotion Research Centre, Dalhousie University, prepared for Health Canada, Health Promotion and Programs Branch, April, 2000, pages 23-25.

lifestyle determinants by health district is very useful to identify existing inequalities and needs, and to target interventions accordingly.

### *1.4.1 Dietary practices - consumption of fruits and vegetables*

Poor nutrition is an important contributing factor to obesity, which in turn is a major risk factor in hypertension, type 2 diabetes, coronary artery disease, gallbladder disease, stroke, hyperlipidemia, pulmonary embolism, colorectal cancer, endometrial cancer, and postmenopausal breast cancer.[106] In addition, unhealthy eating is a risk factor in its own right for many chronic illnesses. Health Canada estimates that the Canadian economy loses $6.3 billion a year to preventable diet-related disease.[107]

'Rich' diets, high in calories, cholesterol, saturated and total fats, and salt, and low in fibre, have been identified by analysts as "the *primary* and *essential* cause of epidemic CHD [coronary heart disease]":

> *"Rich diet is the pivotal mass exposure responsible for the coronary epidemic. Where rich diet does not prevail as a population wide trait, there is no CHD epidemic. This is the case even when high blood pressure and cigarette smoking are prevalent (witness Japan)."*[108]

Rich diets include an excessive proportion of foods with a high ratio of calories to essential nutrients, including high-fat animal products, dairy products, processed foods including processed meats, junk food, and foods with high proportion of refined sugars, including many baked goods. These foods are also frequently low in essential constituents like potassium, fibre, and anti-oxidant vitamins.

In addition to coronary heart disease, unhealthy eating contributes substantially to four other of the 10 leading causes of death – cancer, stroke, diabetes mellitus, and atherosclerosis:

> *"Nutritional risk factors for chronic illness include obesity, elevated serum cholesterol, and overconsumption of fats, sugar, sodium, and highly refined foods. Reduction of such consumption can help in the prevention of chronic diseases."*[109]

And an international review of evidence concurs that:

> *"In industrialized countries, excess intake of fat, salt, and simple sugar leads to obesity and increased levels of blood lipids and sugar, which, in turn, are risk*

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[106] Birmingham, C. Laird, et al., "The Cost of Obesity in Canada," *Canadian Medical Association Journal,* 23 February, 1999.

[107] Health Canada, "Nutrition Labelling: The Background," (October, 2000); available at http://www.hc-sc.gc.ca/english/archives/releases/2000/2000_103e.htm and following link to "Nutrition Labelling: Support for Healthy Eating"; for U.S. estimates of costs of diet-related diseases, see "Benefits of Nutrition Services – A Cost and Marketing Approach," *Ross Laboratories Report of the Seventh Ross Roundtable on Medical Issues*, August 18-19, 1986: 2-9, cited in Province of British Columbia (1996), *Cost Effectiveness/Value of Nutrition Services: An Annotated Bibliography,* Prevention and Health Promotion Branch, Ministry of Health, B.C., July, 1996, page 39.

[108] Stamler, Jeremiah and Rose, preface to Ockene, Ira, and Judith Ockene, *Prevention of Coronary Heart Disease,* Little, Brown and Company, Boston, 1992, pages xi and xii.

[109] Glanz, Karen, "Nutritional Intervention: A Behavioral and Educational Perspective," in Ockene, Ira, and Judith Ockene, *Prevention of Coronary Heart Disease,* Little Brown, and Company, Boston, 1992, page 232.

*factors for many conditions, including coronary heart disease, adult-onset diabetes, and hypertension."*[110]

Interestingly, these analysts argue that, like a sedentary lifestyle, such diets and their adverse health impacts are a cultural and historical phenomenon unique to modern times, and thus amenable to social rather than medical solutions:

> *"The twentieth-century American diet is…a new and unprecedented exposure for the human species. It is radically different from previous eating patterns; there has been no basis in prior human experience for evolutionary adaptation to this exposure…. Given the origins of the coronary epidemic in mass disturbances of human culture, it is clear that high-tech 'magic bullets' are not and cannot be the solution, be they drugs, surgical procedures, gene splicing, or whatever."*[111]

The good news is that this epidemic is reversible. In the words of a 12th century Chinese medical work: "When food is in order, the body is also in order."[112] Modern analyses, too, have confirmed that:

> *"Nutrition plays an important role in reducing the risk of coronary heart disease (CHD) and other chronic illnesses…. If it is true that abnormal serum lipids are the* sine qua non *of the atherosclerotic process, then the modification of diet to lower serum cholesterol and LDL levels is a crucial part of any program to lower CHD risk…. Control of cholesterol and lipoprotein levels can reduce both the risk of coronary artery disease and the severity of its consequences."*[113]

Therefore, according to the U.S. Surgeon-General, Dr. David Satcher:

> *"A major goal of Healthy People 2010 is reducing obesity, as well as improving the nutritional status and level of physical activity among all Americans."*[114]

Recommended dietary shifts include:

- reducing saturated fat and total fat consumption, as well as dietary cholesterol intake from animal products like high fat meat, dairy, and egg yolks;
- eating more complex carbohydrates and high fibre foods like whole grains, cereals, fruits and vegetables; and
- reducing consumption of sodium, caffeine, alcohol, sugar, and highly-processed foods.

In fact, public health campaigns have been successful in lowering per capita consumption of butter, dairy fat, lard, high-fat meats, and eggs across North America since the late 1960s, thereby reducing intake of cholesterol and saturated fats. Intake of fish, poultry, and fresh fruits

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110 Zevallos, Juan, et al., "An International Perspective on Coronary Heart Disease and Related Risk Factors," in Ockene, Ira, and Judith Ockene, *Prevention of Coronary Heart Disease,* Little, Brown, and Company, Boston, 1992, page 165.
111 Idem.
112 Cited in Goldberg, Robert, "Coronary Heart Disease: Epidemiology and Risk Factors," in Ockene, Ira, and Judith Ockene, *Prevention of Coronary Heart Disease,* Little, Brown, and Company, Boston, 1992, page 23.
113 Glanz, Karen, "Nutritional Intervention: A Behavioral and Educational Perspective," in Ockene, Ira, and Judith Ockene, *Prevention of Coronary Heart Disease,* Little Brown, and Company, Boston, 1992, pages 231-232.
114 Cited in *FYI from the NHLBI: Public Interest News from the Heart, Lung, and Blood Institute,* 1 (2), September 2000, page 1.

and vegetables has increased, while consumption of low-fat milk has more than doubled.[115] However average consumption levels still exceed the recommended goals of less than 300 mg/day of dietary cholesterol or less than 100 mg per 1,000 kilocalories of energy, and less than 10% of kilocalories for saturated fat intake, and less than 30% of kilocalories for total fat.[116]

Healthy school lunches, nutritional education and physical fitness programs, and brief physician advice to patients can be inexpensive and highly cost-effective ways of improving nutrition and controlling the obesity epidemic. In the longer term, warning labels and taxes on unhealthy foods akin to current anti-tobacco strategies may be necessary, along with economic incentives for healthy eating:

> *"Price subsidies, taxes, and other economic incentives and disincentives can be used to modify the production and usage of tobacco and various foodstuffs."*[117]

Since there is a high correlation between stress, long work hours, poor dietary habits and gains in overweight, Atlantic Canadians might also achieve health gains by following the lead of European countries that have created jobs by reducing work hours.[118]

As noted in the introductory remarks on health behaviours and lifestyle deteminants, lack of access to quality, healthy food, and functional illiteracy that impedes understanding of educational materials, may constitute serious barriers to healthy eating for those with low socio-economic status.

It should be noted that dietary practices were not included in the health indicators confirmed by CIHI's National Consensus Conference on Population Health Indicators, but were included in an illustrative list of indicators recommended for potential future development.[119]

Only one indicator of dietary practices is included here – fruit and vegetable consumption – due to data availability in Statistics Canada's Canadian Community Health Survey. Preventive health literature and nutrition guides generally recommend that between five and ten servings of fruit and vegetables be consumed daily, and this recommendation is taken here as the standard of measurement for this indicator.[120] While fruit and vegetable consumption is clearly only one aspect of good nutrition, as noted above, it will serve here as a temporary proxy for healthy eating, with the recognition that further development of nutrition indicators is essential.

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[115] Goldberg, Robert, "Temporal Trends and Declining Mortality Rates from Coronary Heart Disease in the United States," in Ockene, Ira, and Judith Ockene, *Prevention of Coronary Heart Disease,* Little, Brown, and Company, Boston, 1992, page 50.
[116] Stamler (1992), op. cit., page xiii.
[117] Zevallos, Juan, et al., "An International Perspective on Coronary Heart Disease and Related Risk Factors," in Ockene, Ira, and Judith Ockene, *Prevention of Coronary Heart Disease,* Little, Brown, and Company, Boston, 1992, page 165.
[118] Colman, op. cit., chapter 7.
[119] *National Consensus Conference on Population Health Indicators: Final Report,* Canadian Institute for Health Information, Ottawa, 1999, page 6.
[120] Health Canada, http://www.hc-sc.gc.ca/hpfb-dgpsa/onpp-bppn/food_guide_rainbow_e.html

**Definition**

Adequate fruit and vegetable consumption is assessed in the Canadian Community Health Survey for the "population aged 12 and over, by the average number of times per day that they consume fruits and vegetables."[121]

**Data Source**

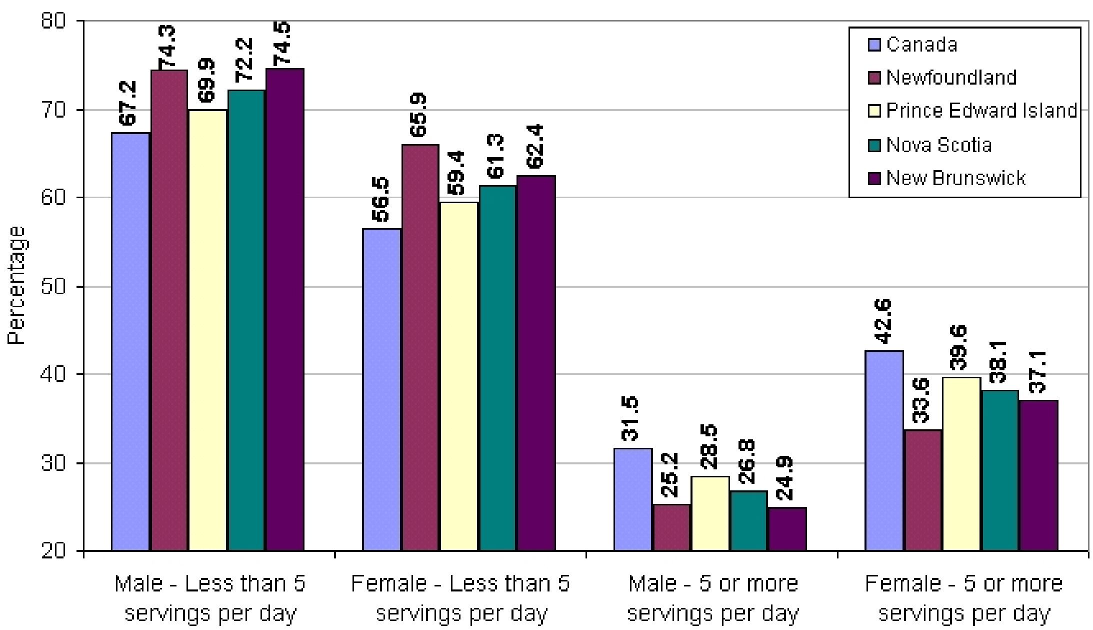
Statistics Canada, Canadian Community Health Survey, 2000/01, health file

**Results**

Most Canadians do not comply with the recommendation to consume between five and ten servings of fruits and vegetables daily. Across the country, women generally consume more fruits and vegetables than men. But more than two-thirds of Canadian men, and 57% of Canadian women do not meet the recommended requirement.

Atlantic Canadians eat less fruits and vegetables than other Canadians, with fewer than one-third eating enough fruits and vegetables for good health. Nearly three-quarters of Atlantic region men eat insufficient fruits and vegetables for good health. Prince Edward Islanders eat somewhat more fruits and vegetables than other Atlantic Canadians, and Newfoundlanders eat the least, but all four Atlantic provinces rank below the national average for adequate fruit and vegetable consumption (Figure 65).

**Figure 65. Fruit and vegetable consumption, population aged 12 and over, Canada and Atlantic provinces, 2000/01, (%)**




Source: Statistics Canada, Canadian Community Health Survey, 2000/01, health file.

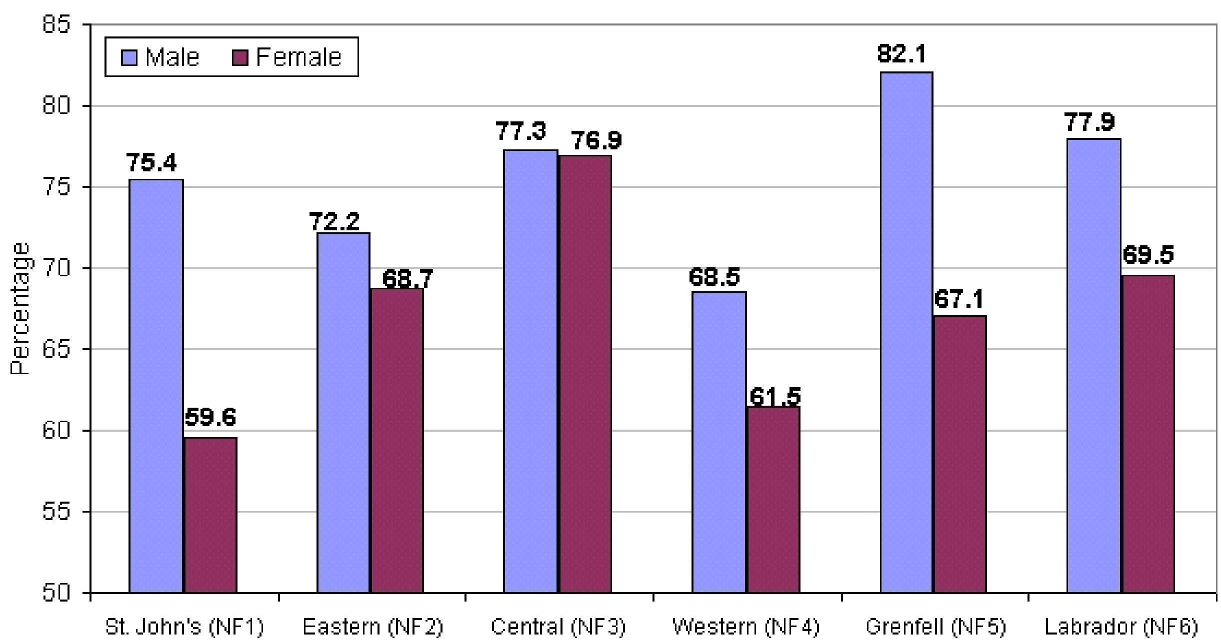
[121] Statistics Canada. http://www.statcan.ca/english/freepub/82-221-XIE/00502/defin2.htm#39a

In every one of the 21 Atlantic region health districts, women eat more fruits and vegetables than men. But there are some significant variations among women in the different health districts. Women in farming districts like the Annapolis Valley (NS2) and rural PEI tend to eat somewhat more fruits and vegetables than their counterparts in other parts of Atlantic Canada. Women in Cape Breton (NF5) and Campbellton (NB5) also eat somewhat more fruits and vegetables. In Newfoundland, however, women in St. John's (NF1) eat more fruits and vegetables than women in other parts of the province.

Of all the 21 health districts, however, Campbellton is the only one where women's rate of fruit and vegetable consumption matches the national average. As noted above, even the national average is not an appropriate target or objective, since well over half of Canadian women and more than two-thirds of Canadian men do not consume sufficient fruits and vegetables for optimal health.

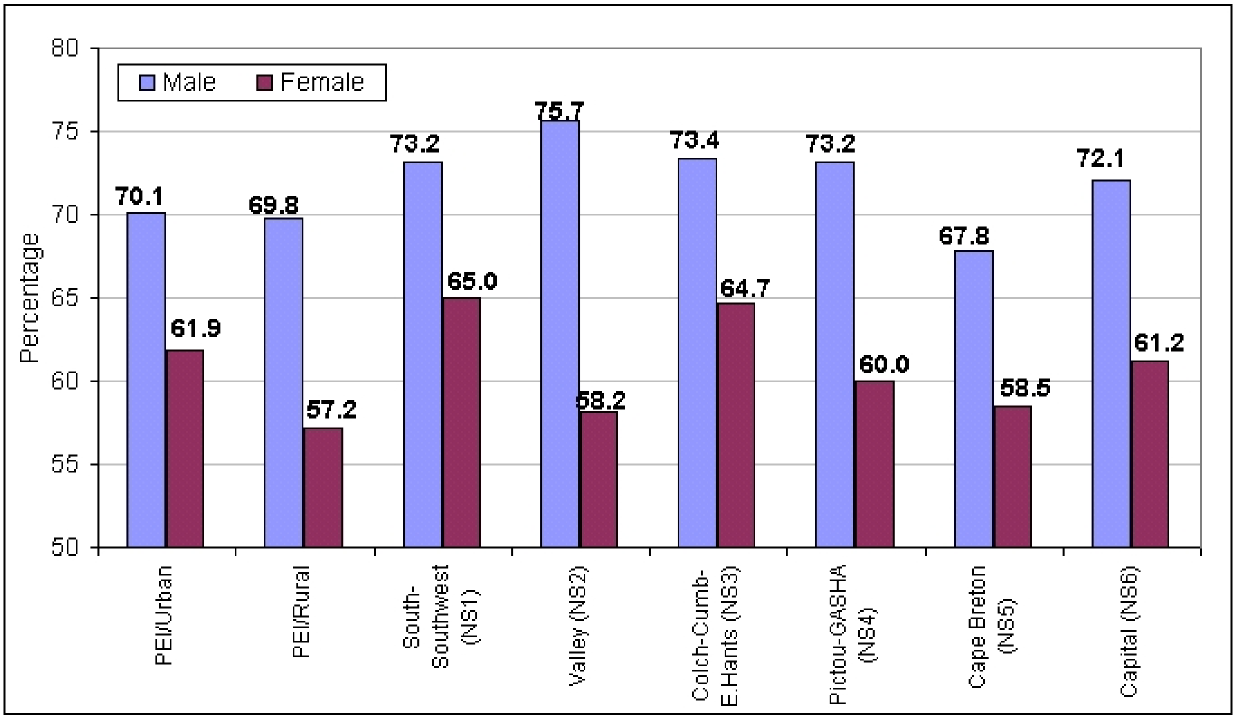
The lowest rates of fruit and vegetable consumption in Newfoundland and Labrador are in Grenfell (NF5) and central Newfoundland (NF3). The lowest rates in Nova Scotia are in South-Southwest (NS1) and Colchester-Cumberland-East Hants (NS3), while residents of the Fredericton (NB3) health district have the lowest rates of fruit and vegetable consumption in New Brunswick (Figures 66, 67, and 68).

**Figure 66. Proportion of the population, aged 12 and over, eating fewer than 5 servings of fruits and vegetables a day, Newfoundland health districts, (%)**



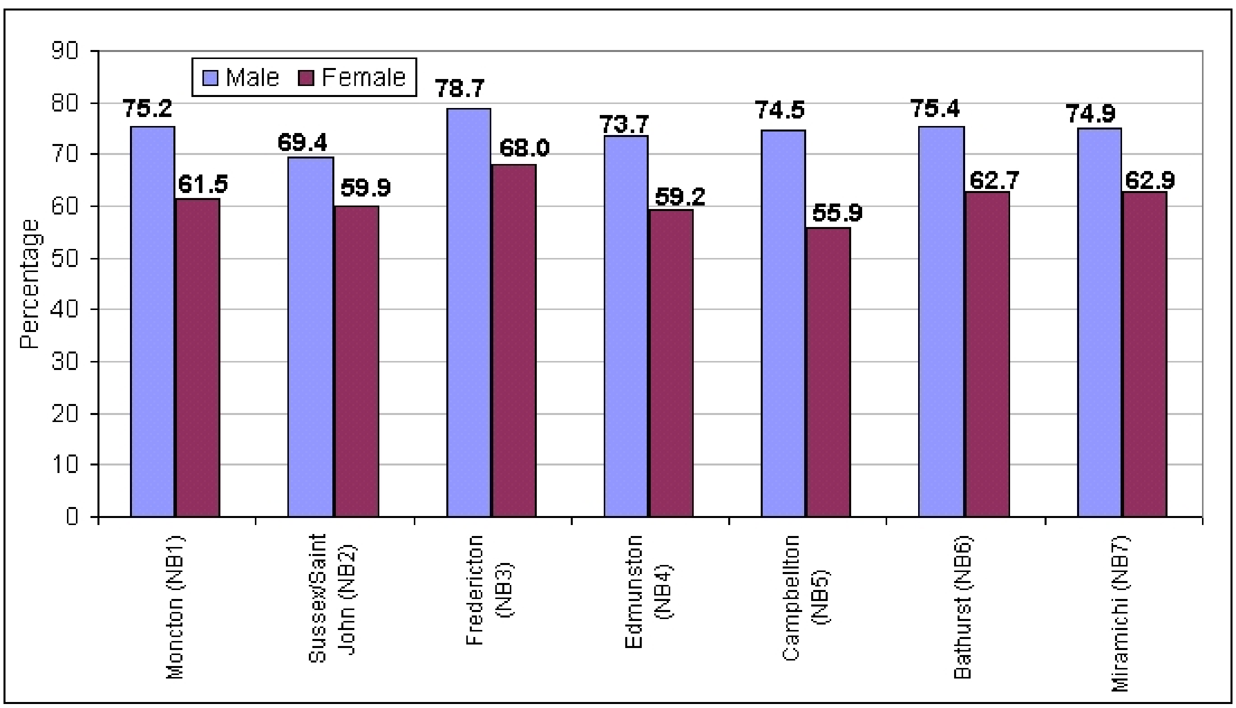

Source: Statistics Canada, Canadian Community Health Survey, 2000/01

**Figure 67. Proportion of the population, aged 12 and over, eating fewer than 5 servings of fruits and vegetables a day, health districts in PEI and Nova Scotia, (%)**




Source: Statistics Canada, Canadian Community Health Survey, 2000/01

**Figure 68. Proportion of the population, aged 12 and over, eating fewer than 5 servings of fruits and vegetables a day, New Brunswick health districts, (%)**




Source: Statistics Canada, Canadian Community Health Survey, 2000/01

## *1.4.2 Alcohol Consumption – Frequency of Heavy Drinking*

**Definition**

Heavy drinkers are defined as the proportion of the population, aged 12 and over, who are current drinkers and who report having had five or more drinks on one occasion, 12 or more times in the previous year.[122]

**Data Sources**

Statistics Canada, Canadian Community Health Survey, 2000/01, health file; Statistics Canada, National Population Health Survey, 1994/95, 1996/97 and 1998/99, cross sectional sample, health file; Statistics Canada, National Population Health Survey, 1996/97, cross sectional sample, North component.

**Results**

Atlantic Canadians are more likely to be heavy drinkers than other Canadians. More than one-third of Atlantic region men have five or more drinks on one occasion, 12 or more times a year, compared to 28% of Canadian men. Across the country, women are much less likely to be heavy drinkers than men, with men about 2.5 times as likely to be heavy drinkers as women. But one in nine Canadian women, and about one in seven Atlantic region women are heavy drinkers.

Within the Atlantic region, Newfoundlanders are the heaviest drinkers (41% of men and 16% of women), followed by Nova Scotians (37% of men, and 15% of women). Women in New Brunswick are the least likely to be heavy drinkers (11%). Only one-third of Newfoundland men never have five or more drinks on one occasion in a 12-month period, compared to 45% of Canadian men who never drink heavily (Figures 69 and 70).

Most Atlantic region health districts have higher rates of heavy drinking than the national average. For women, exceptions are all New Brunswick health districts except Moncton (NB1) and Fredericton (NB3), and The Valley (NS2) in Nova Scotia. In every other health district in Atlantic Canada, women are more likely to be heavy drinkers than in Canada as a whole.[123] For men, every health district in Atlantic Canada with the exception of Fredericton (NB3) has a higher proportion of heavy drinkers than the Canadian average.

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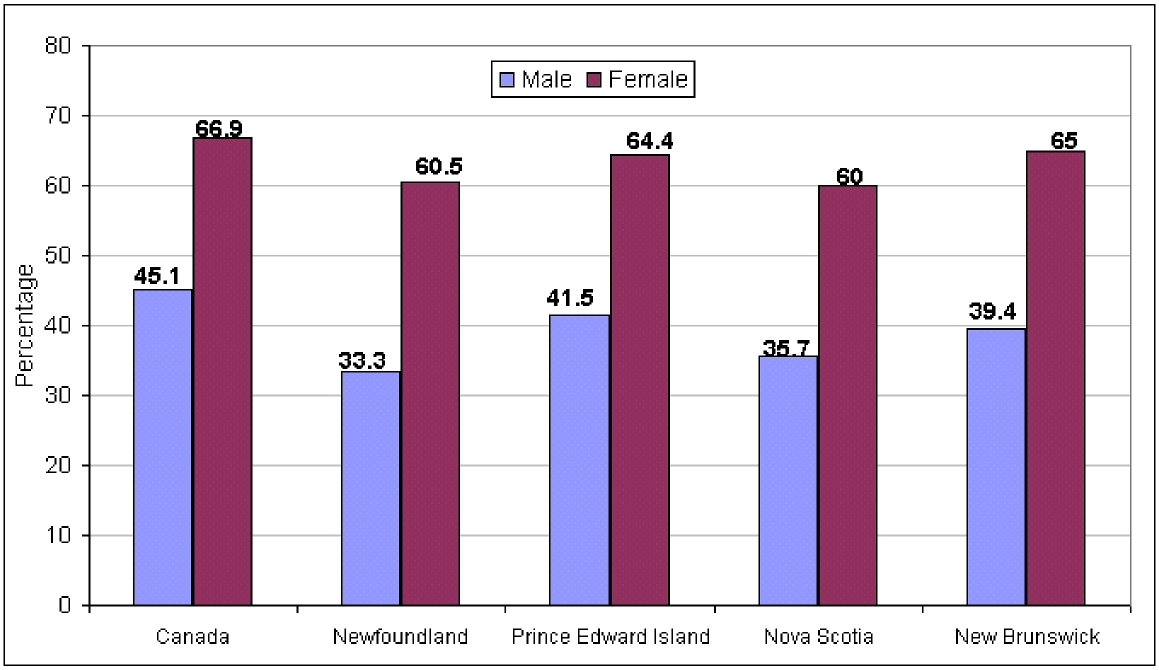
[122] *National Consensus Conference on Population Health Indicators: Final Report,* Canadian Institute for Health Information, Ottawa, 1999, page B-6. Statistics Canada health indicators web site defines the measurement tool as: “Population aged 12 and over who are current drinkers and who reported drinking 5 or more drinks on at least one occasion in the past 12 months” (http://www.statcan.ca/english/freepub/82-221-XIE/00502/37). Statistics Canada’s Canadian Community Health Survey, referenced in this section, provides data on the proportion of the population that consumed “five or more drinks, 12 or more times in the previous year. That is used in this section as the definition and yardstick of regular heavy drinking.

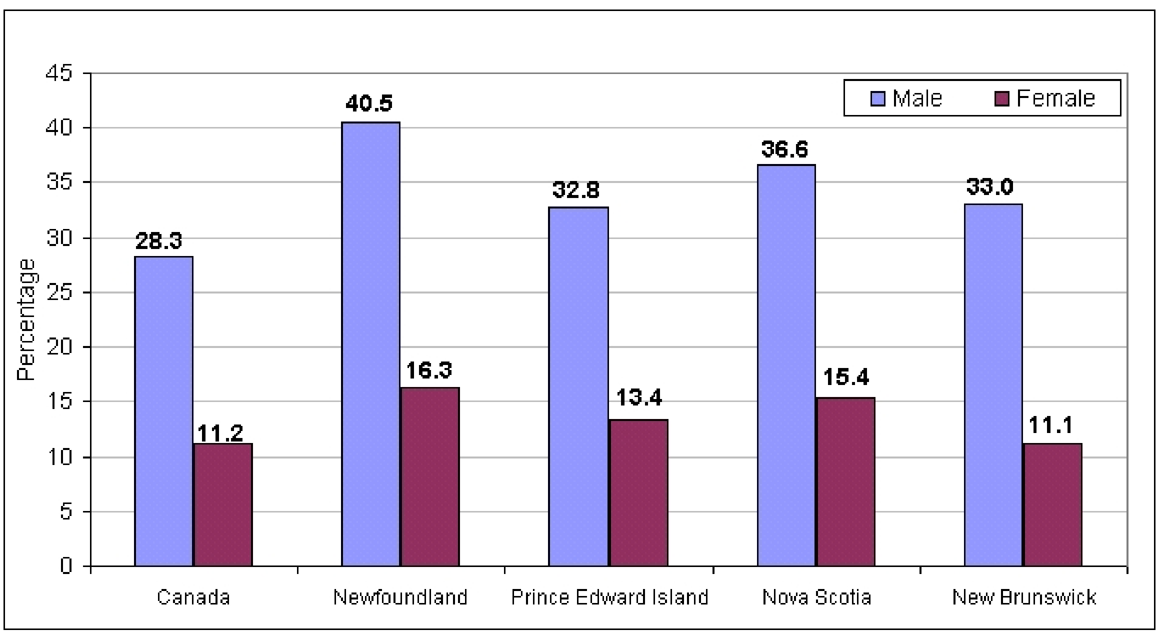
[123] Statistics Canada warns that the data for female rates of heavy drinking in these districts have a coefficient of variation (CV) from 16.6% to 33.3% and should be interpreted with caution.

**Figure 69. Proportion of the population, aged 12 and over, who never had five or more drinks on one occasion in the past 12 months, Canada and Atlantic provinces, 2000/01, (%)**




Source: Statistics Canada, Canadian Community Health Survey, 2000/01, health file.

**Figure 70. Proportion of the population, aged 12 and over, who consume five or more drinks on one occasion 12 or more times a year, Canada and Atlantic provinces, 2000/01, (%)**



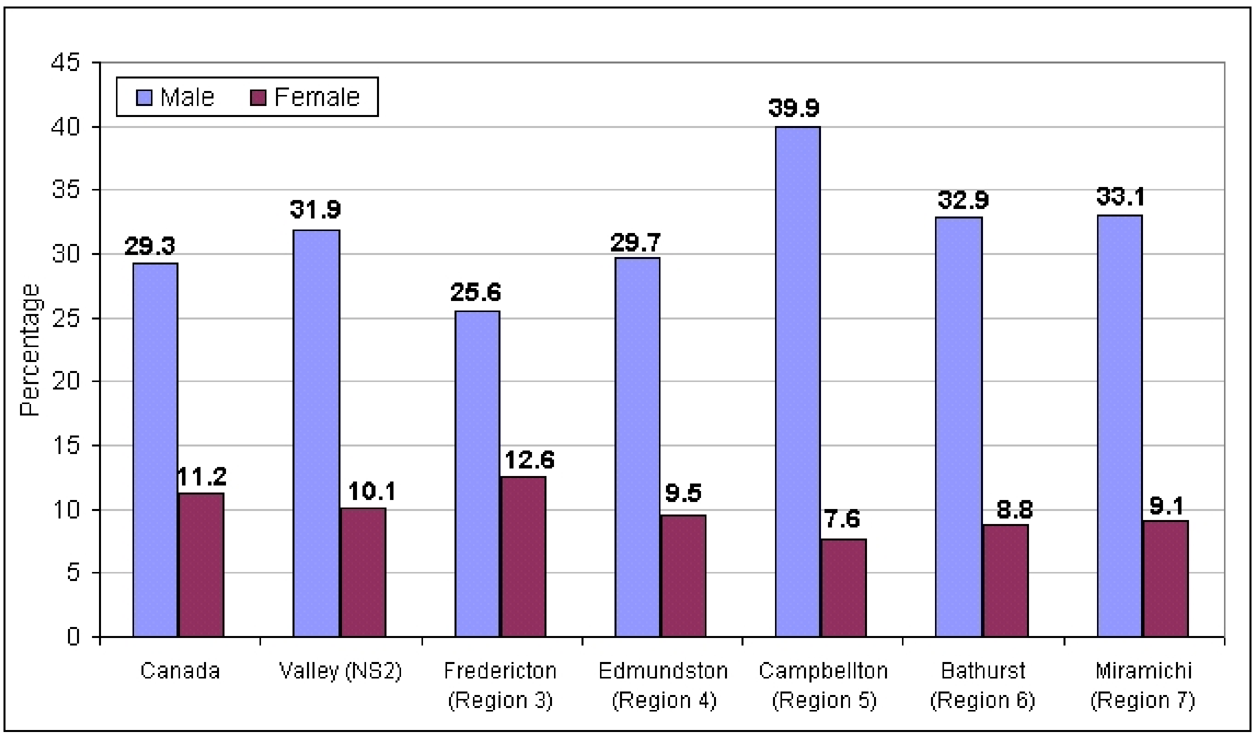

Source: Statistics Canada, Canadian Community Health Survey, 2000/01, health file.

There are some sharp disparities among the different health districts. Among women, for example, there are more than twice as many heavy drinkers in Cape Breton (NS5) as in the Annapolis Valley (NS2).[124] More than one in five women in Labrador (NF6) and Cape Breton (NS5) are heavy drinkers.

Nearly half of Labrador (NF6) men are heavy drinkers, as are about 40% of men in the other Newfoundland health districts. As well, 42% of men in Cape Breton (NF5) and Pictou-GASHA (NF4) are heavy drinkers; and the rate for men is close to 40% in South-Southwest (NS1), Moncton (NB1), and Campbellton (NB5). By contrast one-quarter of men in Fredericton (NB3) are heavy drinkers, the lowest rate in Atlantic Canada.

Figures 70 and 71 indicate health regions with markedly lower or higher rates of heavy drinking among men or women than the Canadian average. Figures 72, 73, 74, and 75 indicate heavy drinking rates for all Atlantic region health districts.

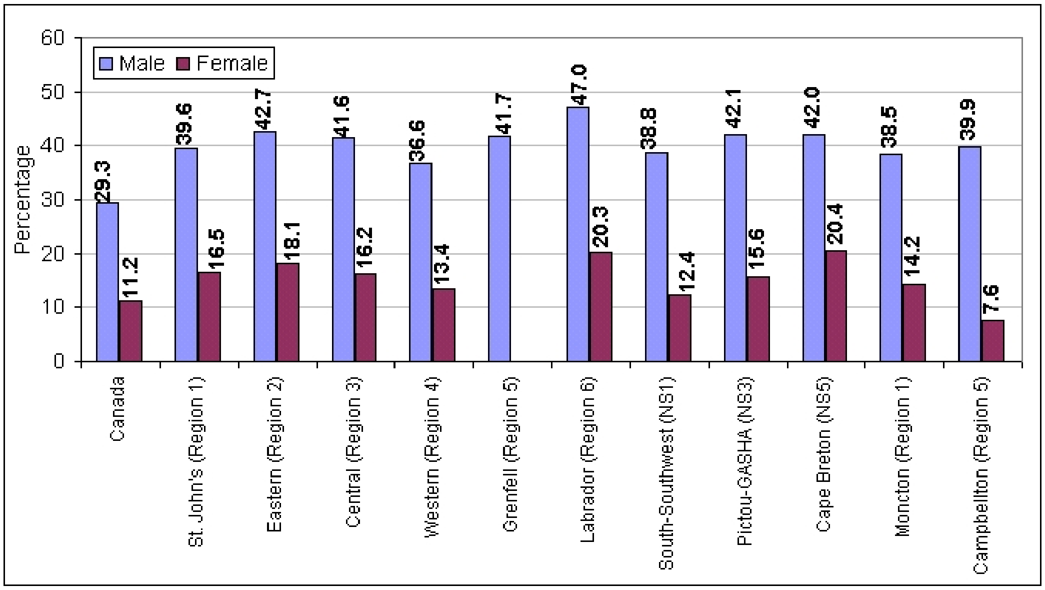
**Figure 71. Proportion of the population, aged 12 and over, who have five or more drinks on one occasion 12 or more times a year, Atlantic region health districts with rates lower than or comparable to the Canadian average, 2000/01, (%)**




Source: Statistics Canada, Canadian Community Health Survey, 2000/01, health file.

124 As noted, the female rate of heavy drinking in Kentville/Wolfville (NS2) (10.1%) should be interpreted with caution as these data have a CV from 16.6% to 33.3%.

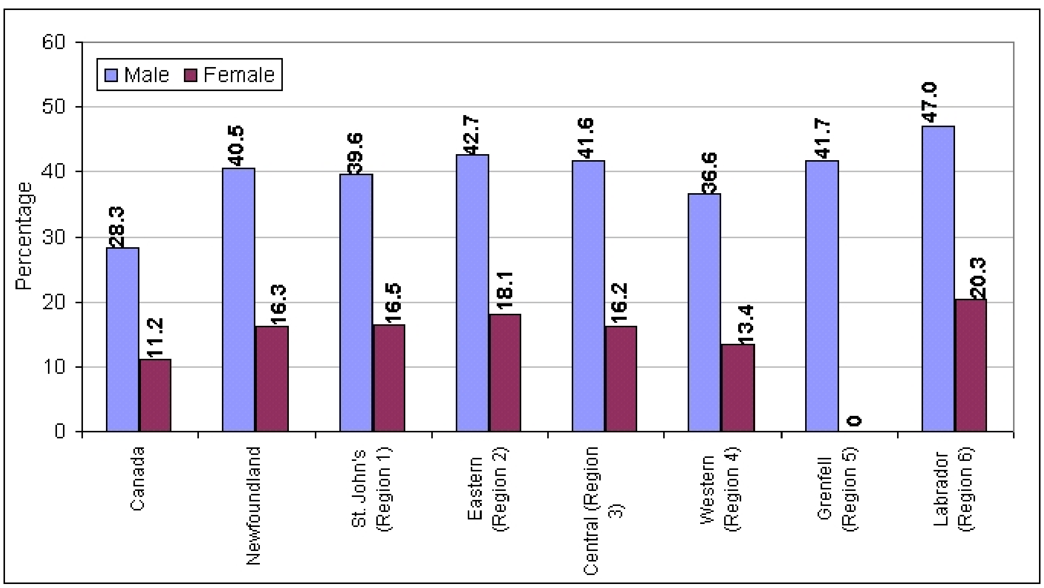
**Figure 72. Proportion of the population, aged 12 and over, who have five or more drinks on one occasion 12 or more times a year, Atlantic region health districts with rates markedly higher than the Canadian average, 2000/01, (%)**




Note: Data on female rates of heavy drinking in Grenfell (NF5) have a coefficient of variation (CV) greater than 33.3% and were therefore suppressed due to extreme sampling variability.

Source: Statistics Canada, Canadian Community Health Survey, 2000/01, health file.

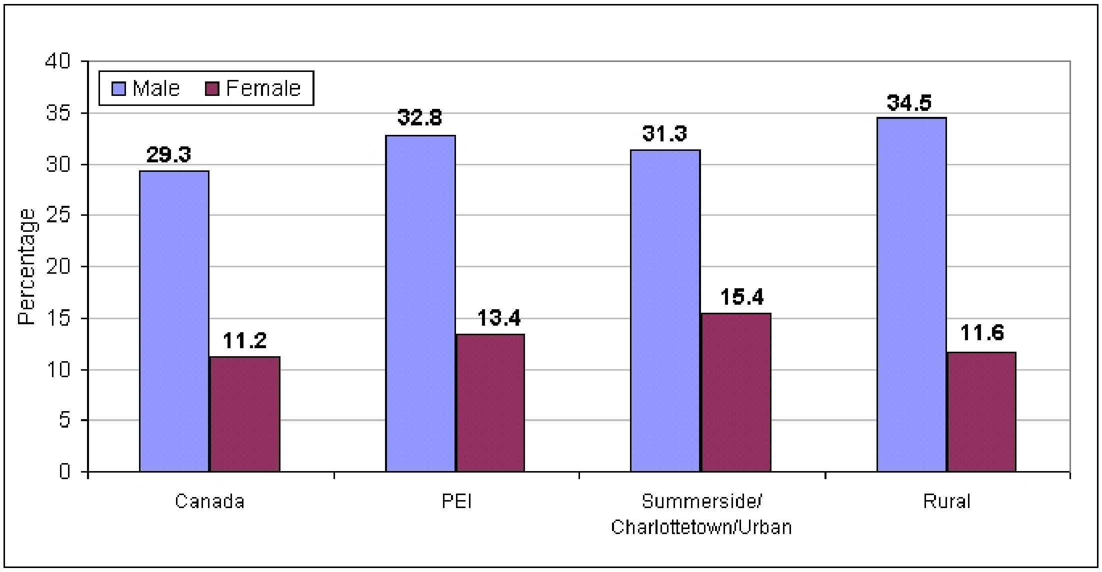
**Figure 73. Proportion of the population, aged 12 and over, who have consumed five or more drinks on one occasion 12 or more times in a year in the last 12 months, Newfoundland health districts, 2000/01, (%)**




Notes: Data for females in Central have a coefficient of variation (CV) from 16.6% to 33.3% and should be interpreted with caution. Data for females in Grenfell have a coefficient of variation (CV) greater than 33.3% and were suppressed by Statistics Canada due to extreme sampling variability.

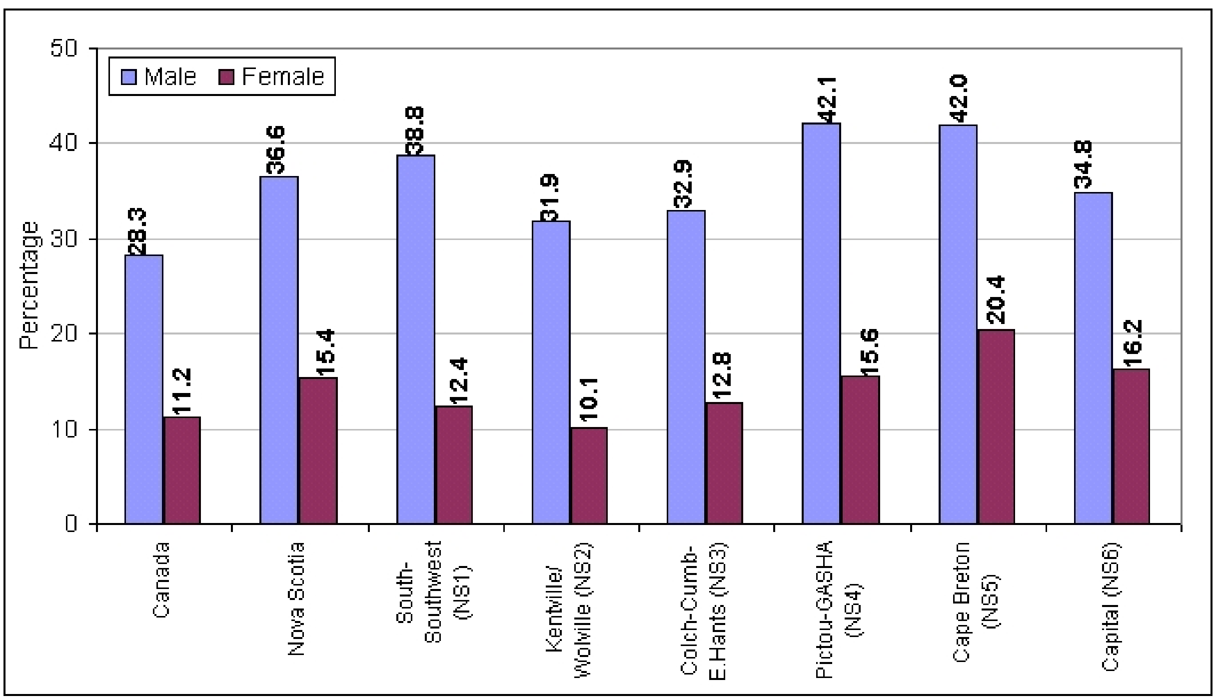
Source: Statistics Canada, Canadian Community Health Survey, 2000/01, health file.

**Figure 74. Proportion of the population, aged 12 and over, who consumed five or more drinks on one occasion 12 or more times in a year in the last 12 months, Prince Edward Island health districts, 2000/01, (%)**




Source: Statistics Canada, Canadian Community Health Survey, 2000/01, health file.

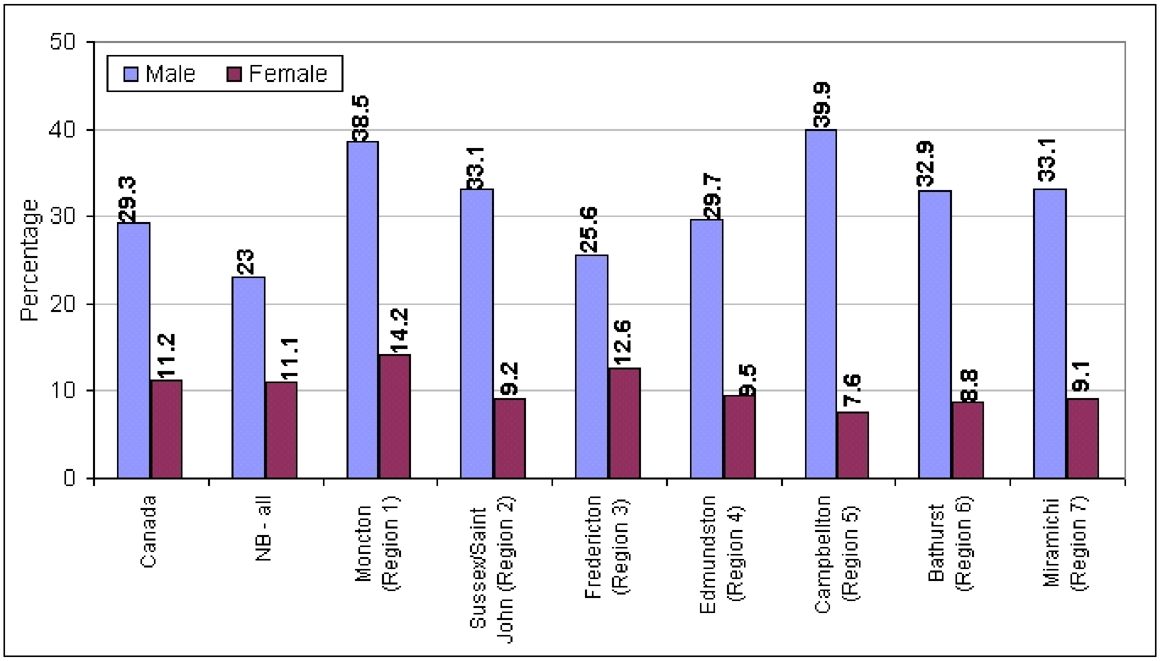
**Figure 75. Proportion of the population, aged 12 and over, who have consumed five or more drinks on one occasion 12 or more times in a year in the last 12 months, Nova Scotia health districts, 2000/01, (%)**




Note: Data for female rates of heavy drinking for South-Southwest (NS1), The Valley (NS2), and Pictou-GASHA (NS4) have a coefficient of variation (CV) from 16.6% to 33.3% and should be interpreted with caution.

Source: Statistics Canada, Canadian Community Health Survey, 2000/01, health file.

**Figure 76. Proportion of the population, aged 12 and over, who have consumed five or more drinks on one occasion 12 or more times in a year in the last 12 months, New Brunswick health districts, 2000/01, (%)**




Note: Data for female rates of heavy drinking in Sussex /Saint John, Edmundston, Campbellton, Bathurst, and Miramichi have a coefficient of variation (CV) from 16.6% to 33.3% and should be interpreted with caution.

Source: Statistics Canada, Canadian Community Health Survey, 2000/01, health file;

### *1.4.3 Smoking prevalence*

Tobacco is the only product sold legally that causes sickness and death when used exactly as intended. Worldwide, tobacco kills one in ten adults, and by 2030 it will kill one in 6, or 10 million people year – more than any other single cause of death.[125] Health Canada reports that 21% of all deaths in Canada are attributable to smoking – 45,000 preventable deaths a year – and that smoking is the leading preventable cause of sickness and death.[126] Ninety per cent of lung cancers are attributable to smoking, and tobacco is also a significant risk factor for other cancers, coronary heart disease, and respiratory illnesses.[127]

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[125] The World Bank, *Curbing the Epidemic: Governments and the Economics of Tobacco Control,* The World Bank, Washington, D.C., 1999, page 1.

[126] Health Canada, "Deaths in Canada due to Smoking," *Information Sheet,* Ottawa, 18 January, 1999; Health Canada, *Toward a Healthy Future: Second Report on the Health of Canadians,* Ottawa, 1999.

[127] Health Canada, *Toward a Healthy Future,* page 25; Health Canada, *Statistical Report on the Health of Canadians,* Ottawa, 1999, page 308; National Cancer Institute of Canada, *Canadian Cancer Statistics 2000,* Toronto 2000.

**Smoking Status Definition**

Smoking status is reported as the proportion of the "population aged 12 and over who reported being either a smoker (daily or occasional) or a non-smoker (former or never smoked)."[128]

**Data Sources**

Statistics Canada, Canadian Community Health Survey (CCHS), 2000/01, health file; Statistics Canada, National Population Health Surveys, 1994/95 and 1996/97, longitudinal sample, health file; Statistics Canada, Canadian Tobacco Use Monitoring Survey (CTUMS), 1999-2001. Historical information from Statistics Canada, 1985 and 1990 Health Promotion Surveys, and from Health Canada, *The National Strategy: Moving Forward: 2002 Progress Report on Tobacco Control*, using data from Labour Force Survey Supplement, 1965-1975, 1981-1986; Canada Health Survey, 1978; General Social Survey, 1991; Survey on Smoking in Canada, 1994.[129]

Please note that because both CCHS and CTUMS data are referenced in different charts, the 2000/01 results are not comparable between charts, and should be used only for comparative purposes within each chart. Some results refer to daily smokers, and some to "current" smokers, which includes daily and occasional smokers. This is indicated in the chart titles. In addition, the CCHS data refer to Canadians aged 12 and older, while the CTUMS data are for those 15 and older.

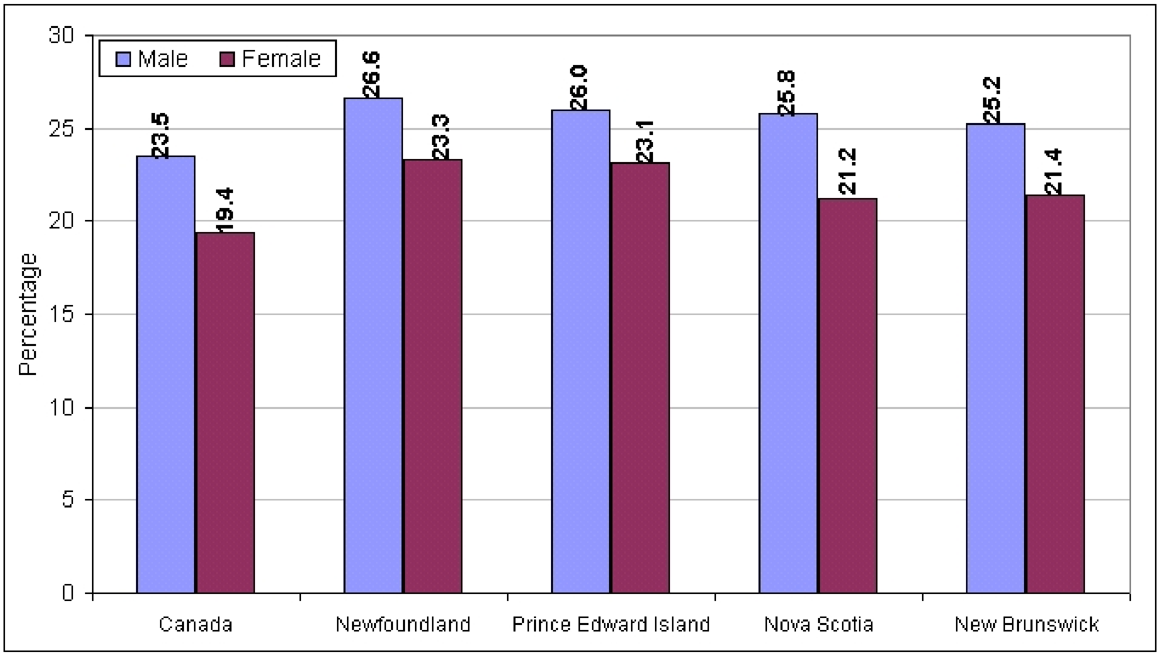
**Results**

Both men and women in all four Atlantic provinces are more likely to be smokers than other Canadians (Figure 77). Smoking rates in the Atlantic provinces have dropped by about one-third since 1985, but are still 50% higher than in British Columbia, which has the country's lowest smoking rates (Figure 78).

Across Canada, men are more likely to smoke than women. Although smoking rates have declined sharply in the last 30 years, female smoking rates started dropping later than male rates, and less rapidly; so the gap between male and female smokers has gradually narrowed. In 1970, 71% more men smoked than women (65% of men; 38% of women). By 2001, male rates had fallen by 63% and female rates by 47%, and the gender gap had narrowed to 20% (Figure 79).

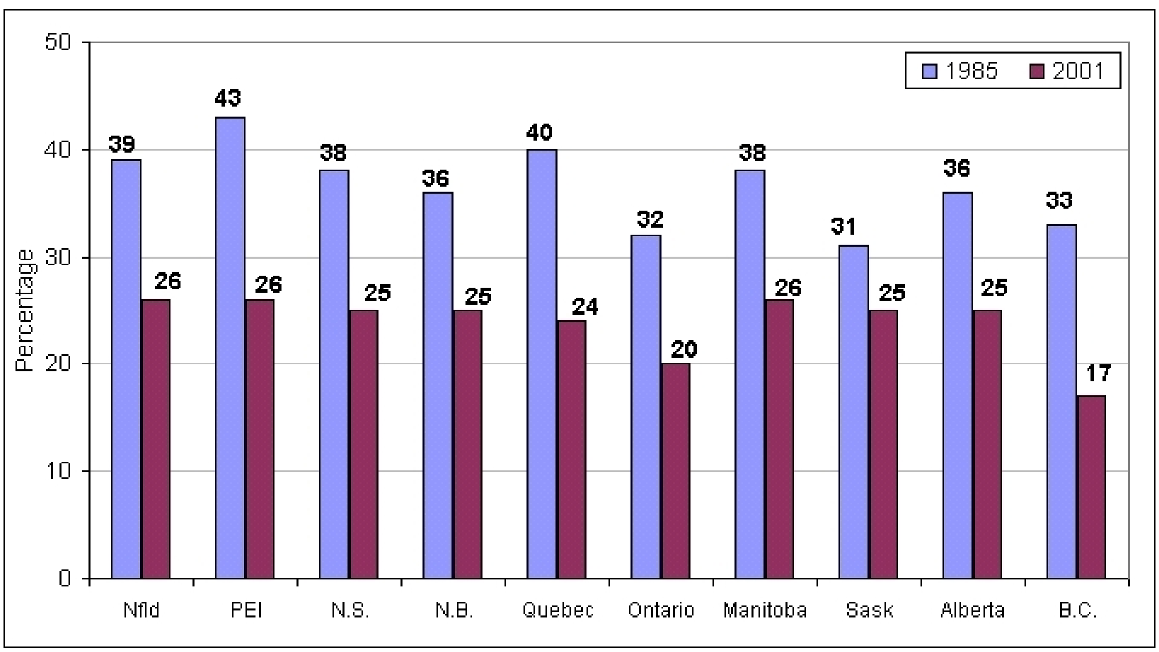
[128] Statistics Canada, http://www.statcan.ca/english/freepub/82-221-XIE/00502/defin2.htm#35a
[129] For historical trends since 1965, see Health Canada, http://www.hc-sc.gc.ca/hecs-sesc/tobacco/policy/prog02/prevalence.

**Figure 77. Proportion of the population, aged 12 and over, who are daily smokers, Canada and Atlantic provinces, 2000/01, (%)**




Source: Statistics Canada, Canadian Community Health Survey, 2000/01, health file.

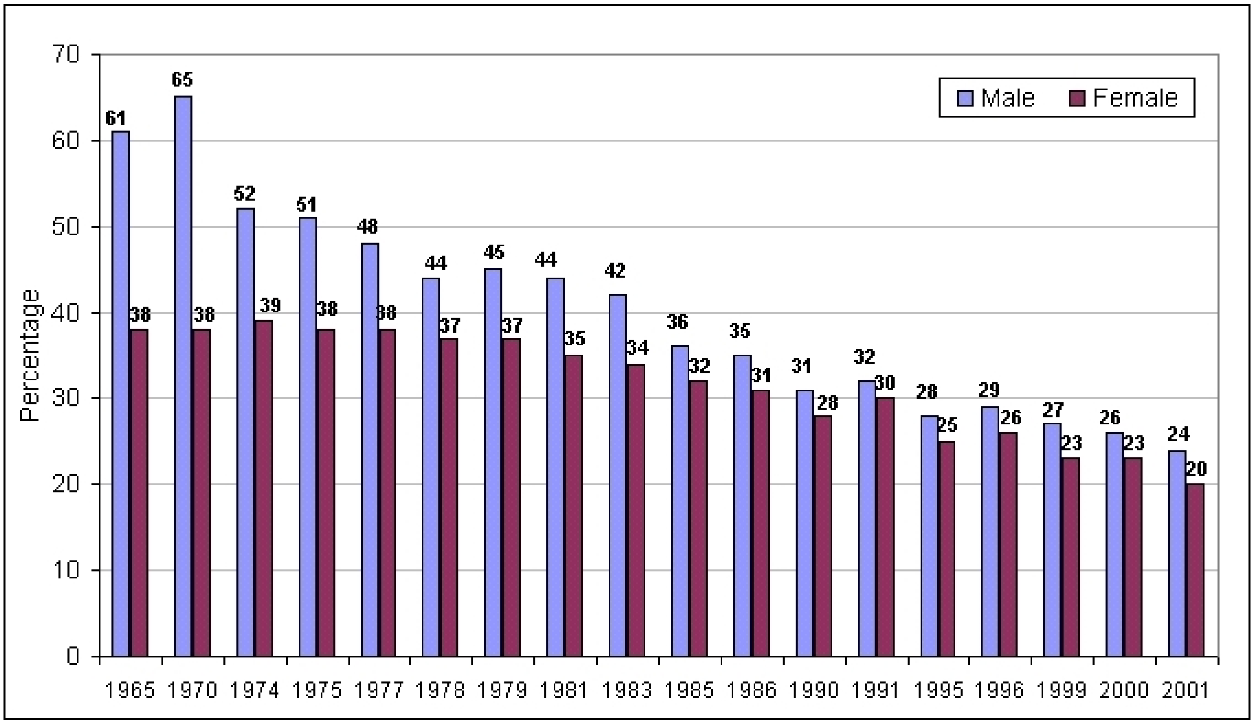
**Figure 78. Proportion of the population, aged 15 and over, who are current (daily + occasional) smokers, Canada and provinces, 1985 and 2001 (%)**




Source: 1985 General Social Survey; 2001 Canadian Tobacco Use Monitoring Survey[130]

[130] Health Canada Internet Site http://www.hc-sc.gc.ca/hecs-sesc/tobacco/research/ctums/2001/2001overview.html#fig1

**Figure 79. Proportion of the population, aged 15 and over, who are current smokers, Canada, 1965- 2001, (%)**




Source: Health Canada, http://www.hc-sc.gc.ca/hecs sesc/tobacco/policy/prog02/indicators.html#prevalence

The 2000/01 Canadian Community Health Survey provides data for daily smokers for all 21 Atlantic region health districts. Due to high sampling variability, data on occasional smokers for most health districts are not reported here. In some cases, these data on occasional smoking rates were suppressed by Statistics Canada due to extreme sampling variability. In most cases, data on occasional smoking rates by health district have a coefficient of variation (CV) from 16.6% to 33.3% and would therefore have to be interpreted with caution.

For the provinces as a whole, data on occasional smoking are more reliable. In Newfoundland and Labrador, 4.2% of men and 4% of women reported smoking occasionally; in PEI – 3.6% of men and 3.1% of women; in Nova Scotia – 4.4% of men and 5.1% of women; and in New Brunswick – 2.6% of men and 3.5% of women. Readers may wish to consider these occasional smoking rates, in addition to the rates for daily smokers provided below, to get a rough idea of the total number of current smokers (daily + non-daily) in each health district.

Three health districts stand out as having lower rates of daily smoking than the Canadian average for both men and women – Pictou-GASHA (NS4), Sussex/Saint John (NB2), and Bathurst (NB6). In addition The Valley (NS2) has lower than average rates for women but has extremely high rates for men, and Halifax has lower than average rates for men, but not for women. All other 16 health districts have higher rates of daily smoking for both men and women than the Canadian average.

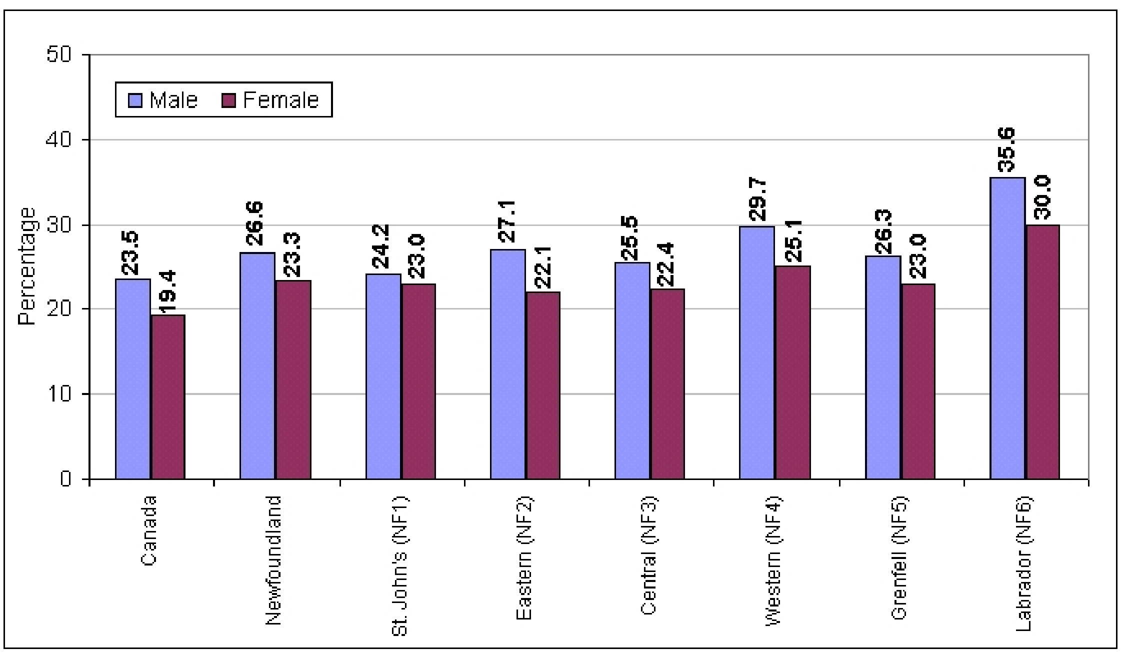
The highest daily smoking rates in Atlantic Canada are in Labrador (NF6) where 36% of men and 30% of women are daily smokers. The second highest rate in Newfoundland is in the western health district where 30% of men and 25% of women smoke daily. Women in all other health districts in the province have a smoking rate of 22-23%, and St. John's has the province's lowest male rate of daily smoking at 24% (Figure 80).

In Nova Scotia the highest rates of male daily smoking are in South-Southwest (NS1) (32%) and in The Valley (NS2) (31%). Indeed the Annapolis Valley stands out as having the greatest disparity between male and female rates of daily smoking, with more than twice as many men smoking daily as women. Female rates of daily smoking are lower in the Valley than in any other Atlantic region health district, but male smoking rates are among the highest in the region.

One in four Cape Breton (NS5) women smoke daily – the highest female smoking rate in Nova Scotia, and the second highest in the Atlantic region. Cape Breton also has the smallest male-female gap in daily smoking rates: 25.6% of Cape Breton men smoke daily, compared to 25.1% of Cape Breton women (Figure 81).

In New Brunswick, the highest male daily smoking rates are in Campbellton (NB5) (34%), Miramichi (NB7) (31%), and Edmundston (NB4) (28%), though the Campbellton data have a coefficient of variation (CV) from 16.6% to 33.3% and should be interpreted with caution. The highest rate of daily smoking among women in the province is in Moncton (NB1) (24%) (Figure 82).

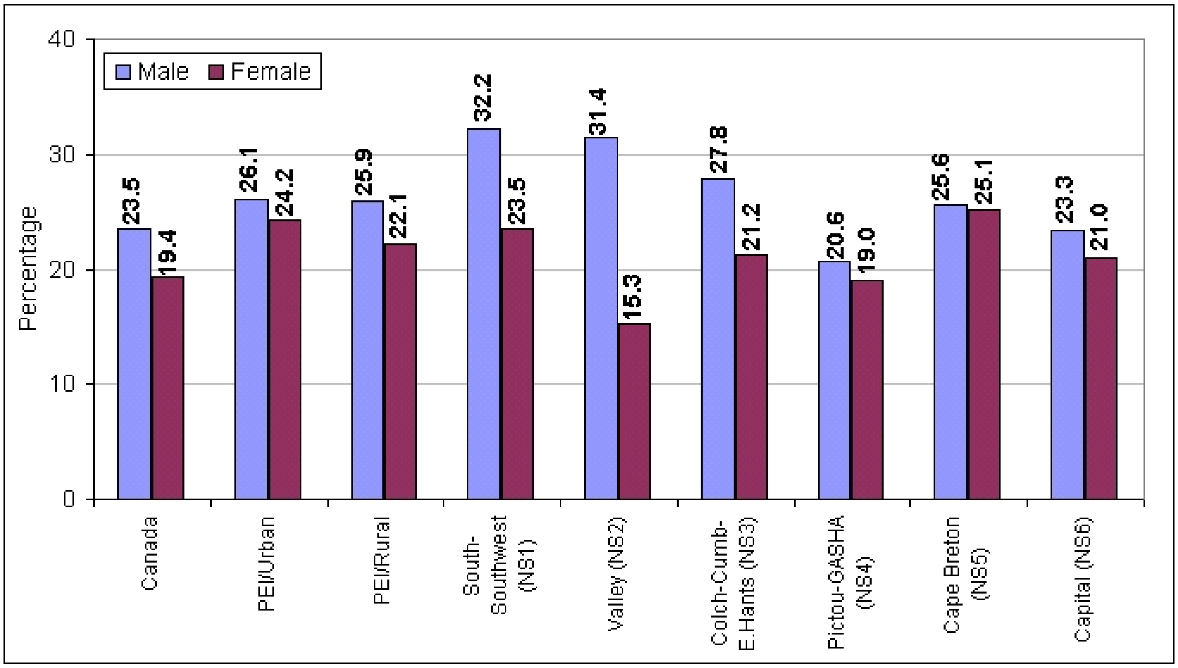
**Figure 80. Proportion of the population, aged 12 and over, who are daily smokers, Canada, and Newfoundland and Labrador health districts, 2000/01, (%)**




Note: Data for female daily smokers in Grenfell (NF5) have a coefficient of variation (CV) from 16.6% to 33.3% and should be interpreted with caution.

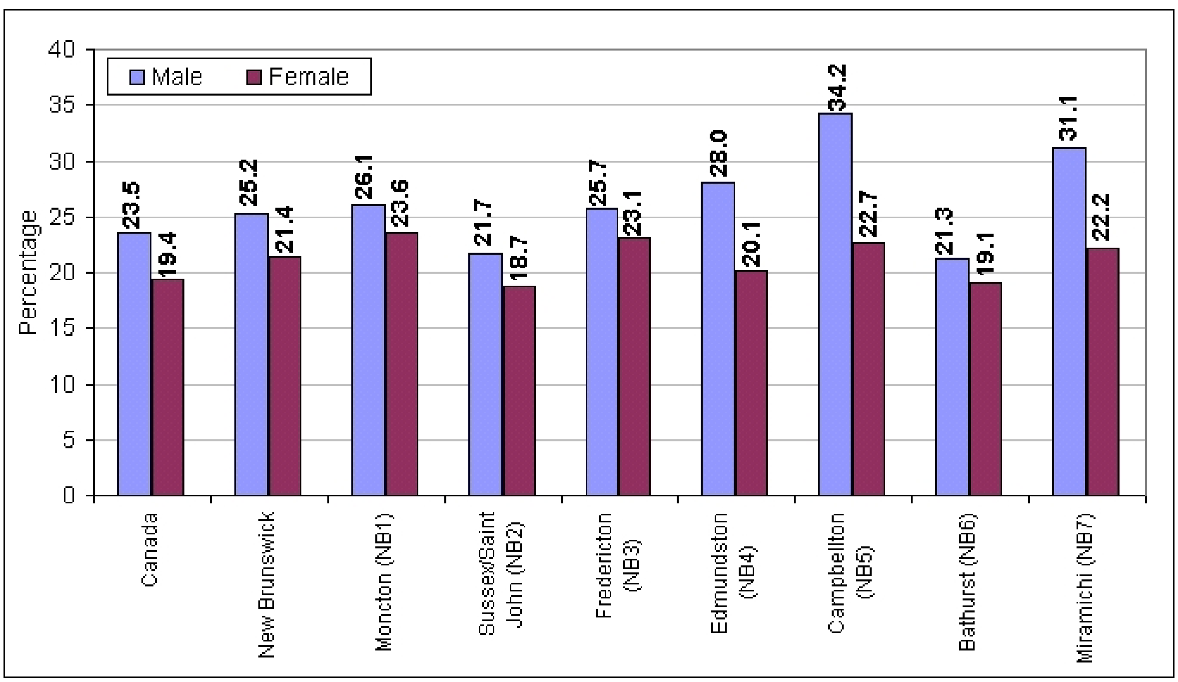
Source: Statistics Canada, Canadian Community Health Survey, 2000/01

**Figure 81. Proportion of the population, aged 12 and over, who are daily smokers, Canada, and PEI and Nova Scotia health districts, 2000/01, (%)**




Source: Statistics Canada, Canadian Community Health Survey, 2000/01

**Figure 82. Proportion of the population, aged 12 and over, who are daily smokers, Canada, and New Brunswick health districts, 2000/01, (%)**



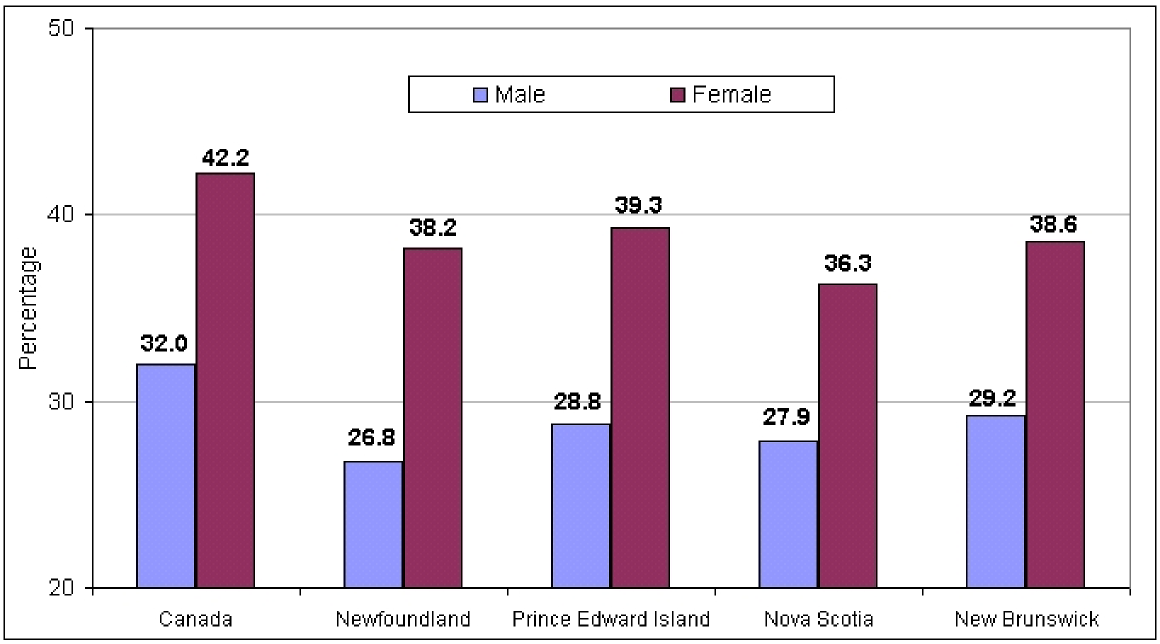

Note: Data for male daily smokers in Campbellton (NB5) have a coefficient of variation (CV) from 16.6% to 33.3% and should be interpreted with caution.

Source: Statistics Canada, Canadian Community Health Survey, 2000/01

The Canadian Community Health Survey also provides data on former smokers and those who have never smoked. Not surprisingly, in light of its historically high smoking rates, all four Atlantic provinces have smaller proportions of the population who have never smoked, and correspondingly higher proportions of former smokers than the Canadian average. About one in three Canadian men have never smoked, and 42% of Canadian women have never smoked, compared to about 28% of Atlantic region men and 38% of Atlantic region women (Figure 83).

Among the health districts in Atlantic Canada, the proportion of women who have never smoked is highest in Miramichi (NB7) (46.8%) and eastern Newfoundland (NF2) (46.5%). In all other Atlantic region health districts, women are more likely to have been smokers than the Canadian average. Only Sussex/Saint John (NB2) (33.9%) and Central (NS6) (32.9%) have higher proportions of men who have never smoked than the Canadian average (32%).

**Figure 83. Proportion of the population, aged 12 and over, who never smoked, Canada and Atlantic provinces, 2000/01, (%)**




Source: Statistics Canada, Canadian Community Health Survey, 2000/01, health file.

## *1.4.4 Age of Smoking Initiation*

As the tobacco industry has long understood, teenage smoking predicts adult behaviour. Statistics Canada has found that among 21-39 year-old daily smokers in Canada, 86% began smoking as teenagers. This confirms U.S. evidence that 90% of smokers in that country began the habit as teenagers, and 82% of daily smokers began smoking before age 18.[131]

[131] Jiajian Chen and Wayne J. Millar, "Age of Smoking Initiation: Implications for Quitting," Statistics Canada, *Health Reports,* volume 9, no. 4, Spring 1998, pages 38-46; U.S. Centers for Disease Control and Prevention, Office

Numerous studies have also shown that the earlier people start to smoke the more cigarettes they will smoke and the less likely they are to quit. Those who start smoking between 14 and 17 are 2.3 times as likely to smoke more than 20 cigarettes a day as those who start smoking at age 20 or more. Within 10 years, 42% of those who started smoking at age 20 or more had quit, compared to only 22% of those who started between 14 and 17, and just 18% of those who started smoking at 13 or less.[132]

In short, teenage smoking portends serious and costly health consequences in the future. For this reason, CIHI's National Consensus Conference on Population Health Indicators confirmed smoking initiation – the average age at which smokers begin smoking – as a key behavioural determinant of health.[133]

New evidence, recently published in the British Medical Association Journal, *Tobacco Control,* shows that teenagers can become addicted to smoking much more quickly than previously thought, with some 12 and 13-year-olds showing evidence of addiction within days of their first cigarette. The researchers suggested that adolescents may be more sensitive to nicotine than those who start smoking at a later age.

The lead researcher in this study, Dr. Joseph Di Franzia of the University of Massachusetts, commented:

> *The really important implication of this study is that we have to warn kids that you can't just fool around with cigarettes or experiment with cigarettes for a few days and then give it up. If you fool around with cigarettes for a few weeks, you may be addicted for life.*[134]

**Definition**

The Canadian Community Health Survey assesses the "age of initiation" of smoking for the "population aged 12 and over who reported being either a current or former smoker and who reported the age when they smoked their first cigarette."[135]

**Data Source**

Statistics Canada, Canadian Community Health Survey, 2000/01, health file

**Results**

Boys generally begin to smoke at younger ages than girls, and women are more likely than men to take up the habit later in life. Thus, among current or former smokers, 16.3% of Canadian

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of Smoking and Health, *Preventing Tobacco Use among Young People: A report to the Surgeon-General,* Department of Health and Human Services, Atlanta. 1994

[132] Jiajian Chen and Wayne J. Millar, "Age of Smoking Initiation: Implications for Quitting," Statistics Canada, *Health Reports,* volume 9, no. 4, Spring 1998, pages 38-46.

[133] Canadian Institute for Health Information, *National Consensus Conference on Population Health Indicators,* Ottawa, 1999, pages 5 and B6.

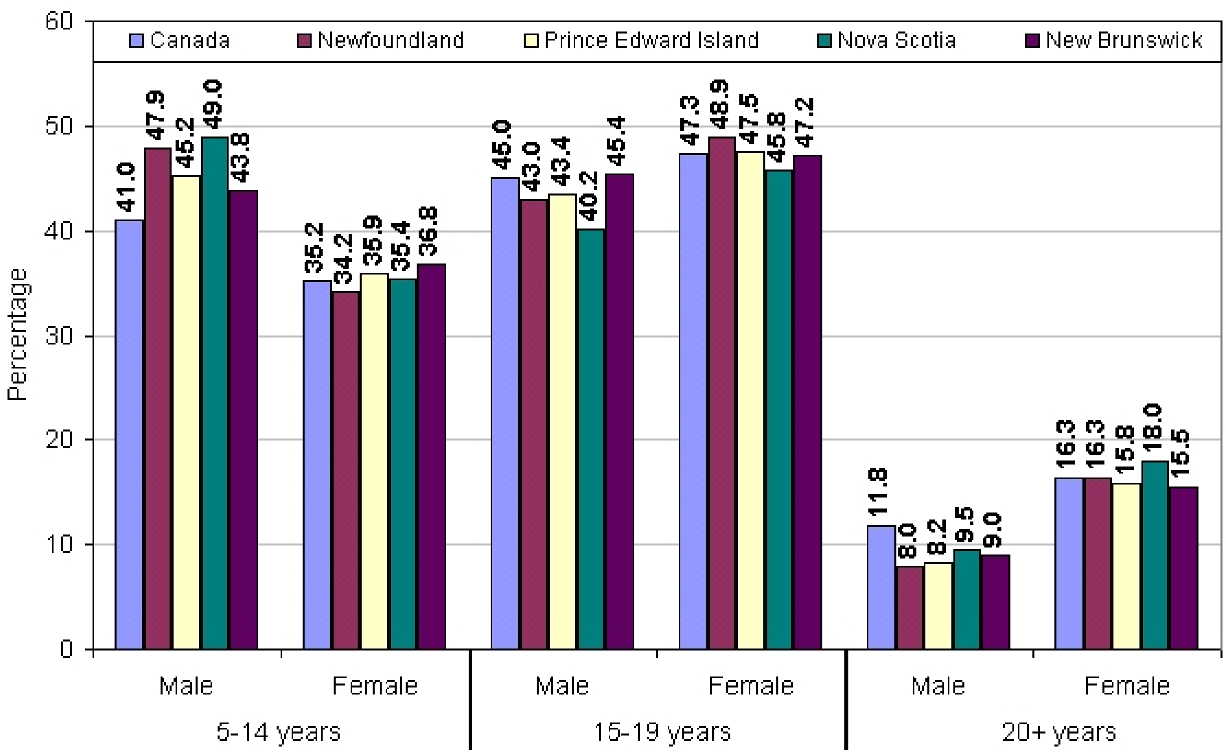
[134] The Halifax Daily News, 12, Sept., 2000, page 13, "Teens can get addicted to nicotine early – study."

[135] Statistics Canada, http://www.statcan.ca/english/freepub/82-221-XIE/00502/defin2.htm#35a

women started smoking at age 20 or over, compared to only 11.8% of men. By contrast, 41% of male current or former smokers began smoking under the age of 15, compared to 35.2% of women.

For women in the Atlantic provinces, the average age of smoking initiation is comparable to that in the rest of the country. But substantially more Atlantic region men started smoking at younger ages than men in the rest of the country. Nearly half of male current or former smokers in Nova Scotia and Newfoundland and Labrador began smoking under the age of 15, compared to 41% in the rest of Canada. Fewer than 9% of male current or former smokers in Atlantic Canada took up the habit after their teen years, compared to nearly 12% of men in the rest of the country (Figure 84).

**Figure 84. Proportion of the population aged 12 and over by age when initiated smoking for the Atlantic Provinces and Canada – 2000/01 (%)**




Source: Statistics Canada, Canadian Community Health Survey, 2000/01, health file.

Health district data for smoking initiation are not displayed here because of high sampling variability in some of the age categories, and readers are referred to the detailed appendices for specific health district information.

With the caveat, therefore, that care should be taken in interpreting these data due to high sampling variability, a few notes may be made on some apparent regional variations. Among current and former smokers, women in Charlottetown and Summerside (40.1%), Fredericton (NB3)(41.5%), and South-Southwest (NS1) (39.2%), were more likely to start smoking at young ages (under 15) than women in most other health districts. By contrast, a higher proportion of female smokers in Cape Breton (NS5)(21.9%) and Campbellton (NB5)(22.3%) began smoking after their teen years, compared to most other health districts.

### *1.4.5 Leisure Time Physical Activity*

> *"If you could bottle everything you get from physical activity and sell it at a pharmacy, it would go for a hefty price."*
>
> *George Sheehan, M.D.*[136]

> *"Physical activity is the crux of healthy aging. Nowhere is the gap wider between what we know and what we do than in the area of physical activity, and nowhere is the potential pay-off greater."*
>
> National Center for Chronic Disease Prevention and Health Promotion, USA[137]

Physical activity has been glowingly referred to as a "magic bullet" because of its proven benefits in preventing disease, improving health, and promoting independence and quality of life in old age.[138] The United Kingdom Minister for Public Health has called physical exercise the best buy in public health.[139] And the most substantial body of evidence for achieving healthy active aging relates to the beneficial effects of regular exercise.[140] Physical activity has been called "the most obvious of variables which might reduce overall lifetime morbidity" and the "cornerstone" of any strategy aimed at prolonging disability-free life expectancy.[141]

In 1992, the American Heart Association officially recognized physical inactivity as one of the four major modifiable risk factors for cardiovascular disease, along with smoking, high blood pressure, and elevated blood cholesterol.[142] However, because rates of physical inactivity in Canada (49%) are much higher than rates of smoking (22%), high blood pressure (11%), and elevated blood cholesterol (18%), an increase in physical activity may have great potential to

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136 Canadian Fitness and Lifestyle Research Institute, *The Research File,* 2000, Reference No. 00-01. This section adapted from Colman, Ronald, *The Cost of Physical Inactivity in Nova Scotia,* GPI Atlantic, Halifax, June, 2002.
137 National Center for Chronic Disease Prevention and Health Promotion, "Healthy Aging: Preventing Disease and Improving Quality of Life Among Older Americans," Atlanta, July, 2001, available at http://www.cdc.gov/nccdphp/aag-aging.htm.
138 Canadian Fitness and Lifestyle Research Institute, *The Research File,* 2000, Reference No. 00-01.
139 Cooper, Y. Royal College of Physicians, London, June, 2000, cited in Simey, Piers and Dawn Skelton, "Older people need to be encouraged to exercise," *British Medical Journal* 322 (7289), 31 March, 2001, page 796.
140 Andrews, Gary, "Promoting Health and Function in an Ageing Population," *British Medical Journal* 322 (7288), 24 March, 2001, pages 728-729.
141 Fries, James, "Physical Activity, the Compression of Morbidity, and the Health of the Elderly," *Journal of the Royal Society of Medicine* 89, 1996, pages 64 and 67.
142 American Heart Association, "Statement on Exercise: Benefits and recommendations for physical activity programs for all Americans, a statement for health professionals by the Committee on Exercise and Cardiac Rehabilitation of the Council on Clinical Cardiology, American Heart Association, *Circulation* 86, 1992, pages 340-344.

reduce the incidence of heart disease in Canada.[143] In Nova Scotia, the comparable prevalence rates for the major modifiable risk factors are: smoking – 25%; high blood pressure – 17%; high blood cholesterol – 19%; physical inactivity – 53%.[144]

A Harvard Medical School meta-analysis estimated that 22% of coronary heart disease in the U.S. could be attributed to physical inactivity.[145] This means that more than one-fifth of heart disease incidence could be avoided if everyone were physically active. Given that cardiovascular diseases cost the Nova Scotia economy $960 million a year, promotion of physical activity could potentially save substantial sums of money.

A 1999 Statistics Canada analysis of results from the National Population Health Survey, controlling for age, education, income, smoking, blood pressure, weight, and other factors, found that sedentary Canadians have *five times* the risk of developing heart disease as those who exercise moderately in their free time. The same analysis found that those with a low level of regular physical activity had 3.7 times the odds of developing heart disease compared to those who exercised moderately.[146]

The Harvard meta-analysis also found that 22% of colon cancer and osteoporotic fractures, 12% of diabetes and hypertension, and about 5% of breast cancer are attributable to lack of physical activity.[147] Physical inactivity is also linked to obesity, which is itself a risk factor for a wide range of chronic diseases. It is estimated that 19% of premature deaths in Canada are attributable to physical inactivity.[148]

In addition, physical activity provides protection against anxiety and depression. Statistics Canada found that sedentary Canadians are 60% more likely to suffer from depression than those who are active, and concluded that "physical activity has protective effects on heart health and

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[143] Statistics Canada and Health Canada, *Canadian Tobacco Use Monitoring Survey* 2001; Blood pressure from Statistics Canada, *Health Statistics 1999,* CD-Rom, Table 0060121.IVT; Cholesterol prevalence from Logan, Alexander, *Lowering the Blood Total Cholesterol Level to Prevent Coronary Heart Disease,* Canadian Task Force on Preventive Health Care, June, 1994, available at: http://www.ctfphc.org/Full_Text/Ch54full.htm; Inactivity prevalence from Statistics Canada, Canadian Community Health survey. Alternative measures of physical inactivity are available from Canadian Fitness and Lifestyle Research Institute, *2000 Physical Activity Monitor,* available at: http://www.cflri.ca/cflri/pa/surveys/2000survey/2000survey.html.

[144] Statistics Canada, *Canadian Tobacco Use Monitoring Survey* 2001; High blood pressure from Statistics Canada, *Health Statistics 1999,* CD-Rom, Table 0060121.IVT; High blood cholesterol from Heart Health Nova Scotia and Nova Scotia Department of Health, *The Nova Scotia Health Survey, 1995,* Halifax, 1995, page 40; Physical inactivity from Statistics Canada, Canadian Community Health survey. Alternative measures of physical inactivity are available from Canadian Fitness and Lifestyle Research Institute, *2000 Physical Activity Monitor,* available at: http://www.cflri.ca/cflri/pa/surveys/2000survey/2000survey.html.

[145] Colditz, G.A. (1999), cited in Canadian Fitness and Lifestyle Research Institute (CFLRI), "Physical Activity Pays Big Dividends," in *The Research File,* reference no. 00-01. A "meta-analysis" examines results from a large number of epidemiological studies. Statistical techniques are then used to estimate relative risks for particular behaviour patterns and the proportion of disease burden attributable to these risk behaviours, taking into account the findings of all studies examined as well as the sample sizes and methodologies of each study.

[146] Chen, Jiajian, and Wayne J. Millar, "Health Effects of Physical Activity," Statistics Canada, *Health Reports* 11 (1), Summer, 1999, catalogue no. 82-003-XPB, pages 21-30, especially, page 24.

[147] Colditz (1999), in CFLRI, op. cit.

[148] Canadian Fitness and Lifestyle Research Institute, "The Burden of Inactivity," *The Research File,* reference no. 98-01.

mental health that are independent of many other risk factors." Regular physical activity has also been shown to foster development of healthy muscles, bones and joints; to improve strength, endurance, and weight control; to improve behavioural development in children and adolescents; and to help maintain function and preserve independence in older adults.[149]

In sum, a very wide range of chronic diseases could be avoided through increased levels of physical activity in the population. Since the need and demand for medical services and their associated costs are directly linked to the prevalence of illness in society, a reduction in chronic ailments through higher levels of physical activity has the potential to reduce health care costs. Studies have demonstrated that regular exercisers have much less *overall lifetime morbidity* than those who are sedentary, indicating that avoided medical costs due to physical activity can be saved absolutely rather than simply deferred to older ages.[150]

United States health authorities have identified increasing physical activity as a key factor in controlling health care costs in that country, through the prevention of unnecessary illness, disability and premature death, and the maintenance of an improved quality of life into old age.[151] And the U.S. Surgeon-General has issued a "national call to action" to put increased physical activity on the same level as the use of seat belts and the discouragement of tobacco use, because of the strong evidence that it will produce comparable "clear and substantial health gains."[152]

The beneficial effects of physical activity on health have been confirmed by clinical studies identifying the potential biological mechanisms whereby physical activity can influence health. For example, physical activity may help prevent cardiovascular disease by improving the balance between myocardial oxygen supply and demand. It may protect against cancer by increasing the proportion of free radical scavenging enzymes and circulating T and B lymphocytes, thus improving immune function, and by increasing gastrointestinal motility and decreasing the transit time of ingested food.[153]

Physical activity can protect against overweight and diabetes by reducing body fat, increasing the resting metabolic rate and the rate of glucose disposal, and improving cell insulin sensitivity.

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[149] Chen and Millar, op. cit., pages 21-30; U.S. Department of Health and Human Services, *Physical Activity and Health: A Report of the Surgeon-General,* Atlanta, Georgia, 1996, pages 7-8; Prof. Robert Malina (University of Texas), "Physical Activity and Behavioural Development," in Norgan, op. cit., pages 101-120; Prof. Andrew Steptoe (St. George's Hospital Medical Centre, London, "Physical Activity and Psychological Well-being," in Norgan, op. cit., pages 207-229; William P. Morgan (ed.), *Physical Activity and Mental Health,* Taylor and Francis, Washington D.C., 1997.

[150] Fries, James, C. Everett Koop, Jacque Sokolov, Carson Beadle, and Daniel Wright, "Beyond Health Promotion: Reducing the Need and Demand for Medical Care," *Health Affairs* 17 (2), page 71; Fries, James, "Physical Activity, the Compression of Morbidity, and the Health of the Elderly," *Journal of the Royal Society of Medicine,* 89, 1996, page 67.

[151] David Satcher, M.D., Ph.D, Director, U.S. Centers for Disease Control and Prevention, and Philip R. Lee, M.D., Assistant Secretary for Health, in Forward to *Physical Activity and Health: A Report of the U.S. Surgeon-General*, op. cit.

[152] Audrey F. Manley, M.D., Preface to *Physical Activity and Health: A Report of the U.S. Surgeon-General*, op. cit.

[153] This summary is from Slattery, Martha, "How Much Physical Activity Do We Need to Maintain Health and Prevent Disease? Different Diseases – Different Mechanisms," in *Research Quarterly for Exercise and Sport* 67 (2), 1996, page 210.

Regular exercise in childhood can protect against osteoporosis in old age by promoting the development of bone mass, and at older ages it can help maintain bone mineral density. Physical activity can also safeguard mental health through reducing muscle tension (and thereby stress and anxiety) and through biochemical brain alterations and release of endorphins, thereby protecting against depression.[154]

**Definition**

There are a number of definitions of physical activity and inactivity that produce varying results when assessing trends in physical activity. The wide range of definitions of physical activity and inactivity depend on the different types of surveys, the different age groups to which these surveys apply, and the lack of standardization that currently exists in assessing the quantity and type of physical activity required for optimal health benefits.

The definition used here is from Statistics Canada's National Population Health Surveys (NPHS) 1994/95 and 1996/97, and the 2000/01 Canadian Community Health Survey (CCHS). Statistics Canada considers Canadians "physically inactive" or sedentary if they report a usual daily leisure-time energy expenditure of less than 1.5 kilocalories per kilogram of body weight per day (kcal/kg/day). Individuals are defined as "moderately active" if they expend 1.5-2.9 kcal/kg/day, and as "physically active" if they expend 3.0 or more kcal/kg/day.

Calculations are made based on individuals' reporting of the frequency and duration of different types of physical activity, using independently established values for the energy demands of each activity. Based on these criteria, "regular" physical activity (at the levels indicated) is defined as at least 15 minutes of leisure time physical activity 12 or more times per month. The NPHS and CCHS results apply to Canadians 12 and older.[155]

Other surveys have assessed physical activity levels according to whether respondents reported exercising three or more times weekly, once or twice weekly, less than once weekly, or never.[156]

Health Canada's 1998 publication, *Canada's Physical Activity Guide to Healthy Active Living*, calls for an hour of low-intensity activity every day, or 30-60 minutes of moderate-intensity activity, or 20-30 minutes of vigorous-intensity activity 4-7 days a week.[157] Only 34% of Canadians aged 25-55 currently meet these recommendations.[158]

The Canadian Fitness and Lifestyle Research Institute's (CFLRI) "physical activity profiles" rate Canadians according to whether their physical activity levels are sufficient for "optimal health benefits." Physical inactivity, according to this measure, is defined as less than 12.6 kilojoules

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[154] Idem.
[155] Health Canada, *Statistical Report on the Health of Canadians,* 1999, Ottawa, page 189; Heart and Stroke Foundation of Canada, *The Changing Face of Heart Disease and Stroke in Canada 2000,* Ottawa, 1999, page 107; Chen, Jiajian, and Wayne J. Millar, "Health Effects of Physical Activity," Statistics Canada, *Health Reports* 11 (1), Summer, 1999, catalogue no. 82-003-XPB, pages 21-30, definitions on page 23.
[156] Statistics Canada, *CANSIM database,* Matrix #M1011.
[157] Health Canada, *Canada's Physical Activity Guide to Healthy Active Living,* Ottawa, 1998.
[158] Canadian Fitness and Lifestyle Research Institute, *Meeting Guidelines. Progress in Prevention Bulletin 31*, Ottawa, 1998, available at: http://www.cflri.ca/cflri/resources/pub_pip.php.

(kJ)/kg of body weight per day of physical activity, the minimum judged necessary to obtain health benefits from physical activity.[159] The CFLRI results apply to Canadians 18 and older. The 2000 Physical Activity Monitor Survey ranked 61% of Canadians and 62% of Nova Scotians as not active enough to reap the health benefits of a physically active lifestyle.[160]

The CFLRI standard is higher than that used in the NPHS and CCHS. The variance in standards is seen by the disparity in physical inactivity rates between the 2000-2001 Canadian Community Health Survey (CCHS) on the one hand and the 2000 Canadian Fitness and Lifestyle Research Institute Physical Activity Monitor on the other. For Nova Scotia, for example, the 2000 CFLRI results show a 62% inactivity rate, whereas the CCHS results for 2000/01 show a 53% inactivity rate.[161]

Based on this comparison, the CFLRI standard therefore indicates a potential 17% higher rate of physical inactivity than would be derived using the NPHS / CCHS standard of <1.5kcal/kg/day, noted above. In short, the rates of physical activity and inactivity reported are very sensitive to the particular definitions of physical inactivity employed. The NPHS / CCHS standard used here is in line with the U.S. standards, and can be regarded as reasonably conservative.

Because there are so many definitions of physical activity and inactivity, an "international consensus group" was formed in 1998 to develop an internationally agreed upon set of measures of physical activity participation. The group has now developed and pilot-tested a set of International Physical Activity Questionnaires (IPAQ), with Canada one of 12 countries participating in the validation and reliability phase of the project.[162]

In the analysis below, whether Canadians are "physically active," "moderately active," or "physically inactive" is assessed by Statistics Canada for the "population aged 12 and over reporting level of physical activity, based on their responses to questions about the frequency, duration and intensity of their participation in leisure-time physical activity."[163]

**Data Sources**

Statistics Canada, Canadian Community Health Survey, 2000/01, health file; Statistics Canada, National Population Health Survey, 1994/95, 1996/97 and 1998/99, cross sectional sample, health file; Statistics Canada, National Population Health Survey, 1994/95 and 1996/97, cross sectional sample, North component.

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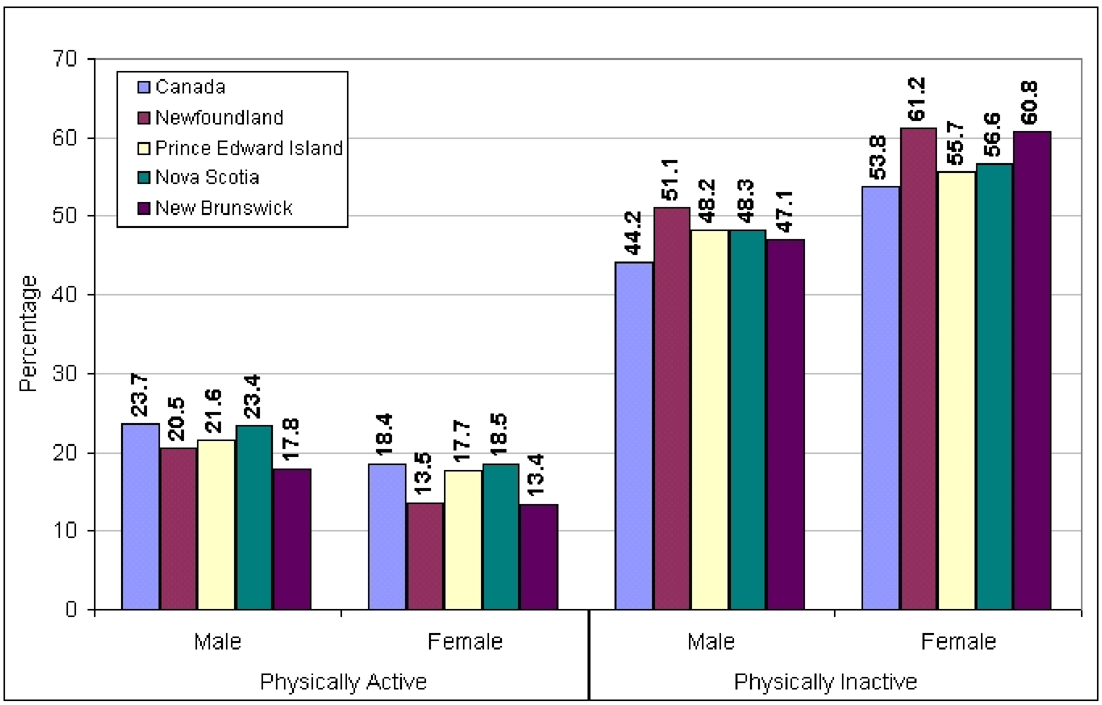
159 Katzmarzyk, Peter, Norman Gledhill, and Roy Shephard, "The Economic Burden of Physical Inactivity in Canada," *Canadian Medical Association Journal* 163 (11), November 28, 2000, page 1437.
160 Canadian Fitness and Lifestyle Research Institute, *2000 Physical Activity Monitor,* available at: http://www.cflri.ca/cflri/pa/surveys/2000survey/2000survey.html.
161 Caution must also be exercised in comparing CCHS and NPHS results, even though they both use the term "physical inactivity." The most recent CCHS results, as reported in Statistics Canada's May 2002 *Health Indicators,* include a 5% "physical activity not stated" category for Nova Scotia that is not included in the 1996/97 NPHS results recorded in the *Statistical Report on the Health of Canadians*.
162 Canadian Fitness and Lifestyle Research Institute, *International Consensus Project on Physical Activity Measurement,* Ottawa, available at: http://www.cflri.ca/cflri/research/ipaq.html.
163 Statistics Canada, http://www.statcan.ca/english/freepub/82-221-XIE/00502/defin2.htm#38.

**Results**

In Canada and in all the Atlantic provinces, men are more physically active than women, with 23.7% of men and 18.4% of women classified as physically active. Nearly half of all Canadians are classified as physically inactive, including 44.2% of men and 53.8% of women. The remaining respondents were classified as moderately active or did not state their level of activity.

Well over half of Atlantic Canadians are physically inactive, with more than six in ten Newfoundland and New Brunswick women classified as inactive. Every Atlantic province has higher rates of physical inactivity for both men and women than the Canadian average. Only in Nova Scotia are there as many men (23.4%) and women (18.5%) classified as physically active as in Canada as a whole. New Brunswick has the lowest proportion of active people, more than 25% below Canadian rates, and Newfoundland and Labrador has the highest rate of physical inactivity – 15% above the national average (Figure 85).

**Figure 85. Proportion of the population, aged 12 and over, classified as "physically active" and "physically inactive", Canada and Atlantic provinces, 2000/01, (%)**

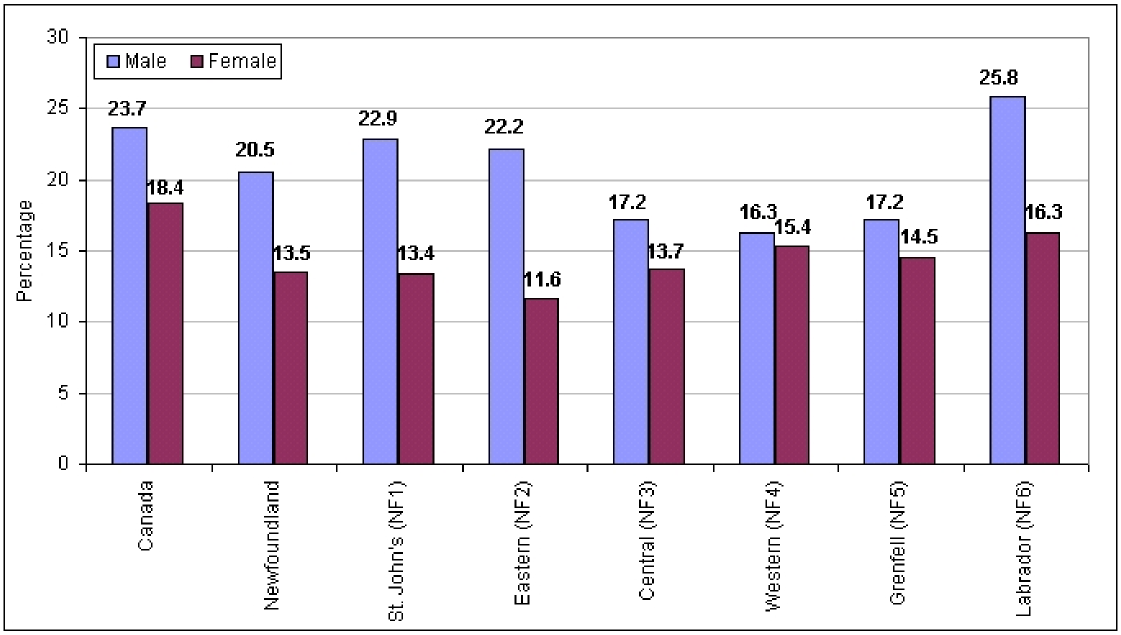



Source: Statistics Canada, Canadian Community Health Survey, 2000/01, health file.

*Health districts: rates of physical activity (Figures 86, 87, 88)*

Among the 21 Atlantic region health districts, only three – all in Nova Scotia – have higher rates of physical activity for both men and women than the Canadian average (23.7% of men; 18.4% of women). Those three are The Valley (NS2) – 26.5% of men, 20.9% of women; Central (NS6) – 25.4% of men, 18.9% of women; and Cape Breton (NS5) – 24.3% of men, 18.9% of women. Labrador (NF6) has 25.8% of men classified as physically active, while 19.6% of women in rural PEI are active (Figures 86 and 87).

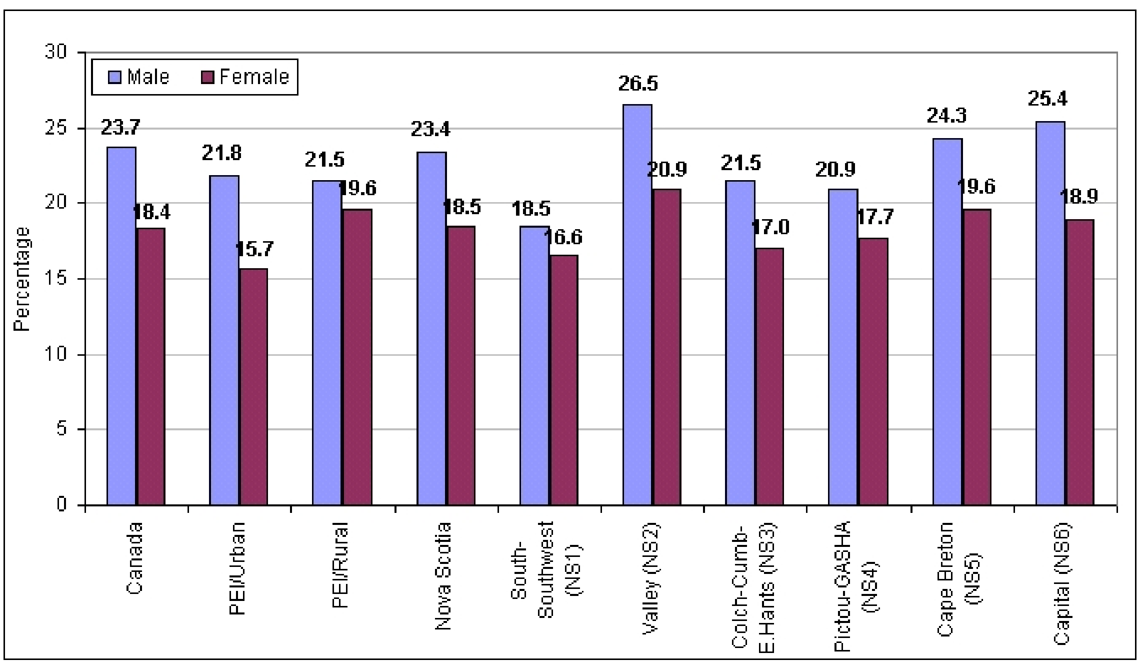
**Figure 86. Proportion of the population, aged 12 and over, classified as "physically active," Newfoundland health districts, 2000/01, (%)**




Note: Data for women in the eastern health district (NF2) and Labrador (NF6), for men in the western health district (NF4), and for both men and women in Grenfell (NF5) have a coefficient of variation (CV) from 16.6% to 33.3% and should be interpreted with caution.

Source: Statistics Canada, Canadian Community Health Survey, 2000/01, health file.

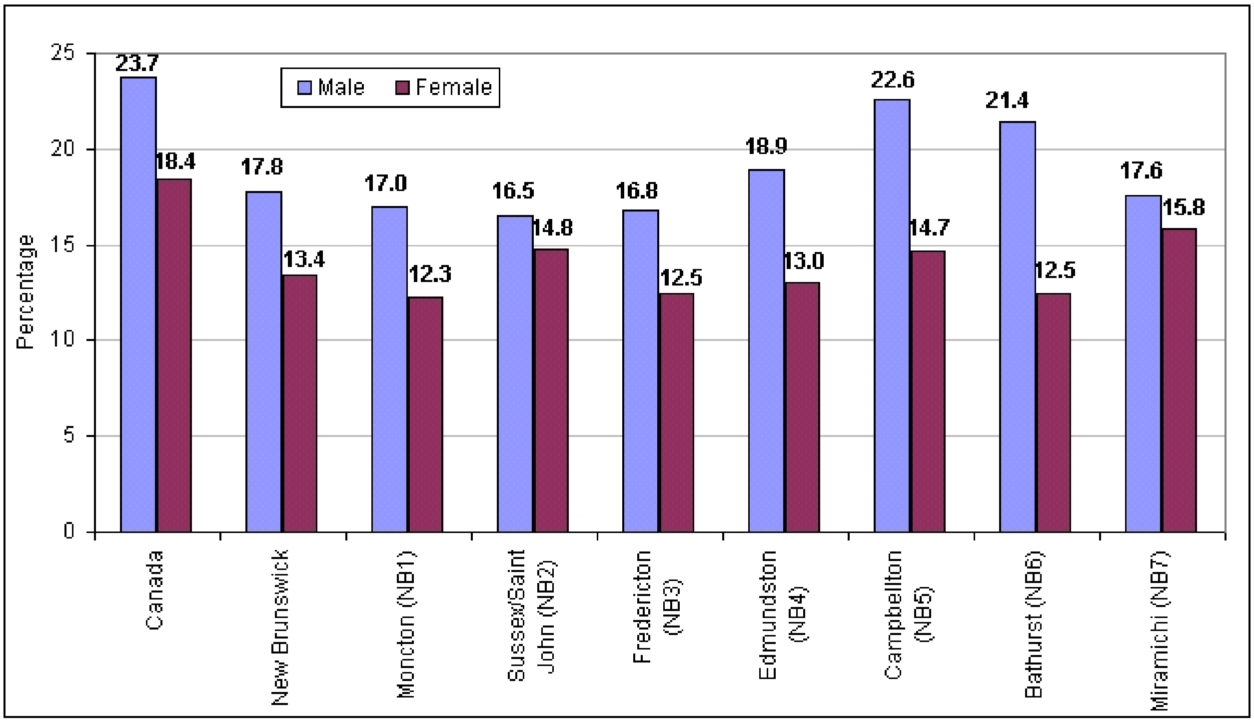
**Figure 87. Proportion of the population, aged 12 and over, classified as "physically active," PEI and Nova Scotia health districts, 2000/01, (%)**




Source: Statistics Canada, Canadian Community Health Survey, 2000/01, health file.

All other health districts in Atlantic Canada have lower rates of physical activity for both men and women than the Canadian average. Several New Brunswick health districts – including Moncton (NB1), Fredericton (NB3), Edumudston (NB4), and Bathurst (NB6) – have rates of physical activity for women that are about one-third below the national average, and among the lowest in the region. As well, all the New Brunswick health districts with major urban centres – Moncton (NB1), Sussex/Saint John (NB2), and Fredericton (NB3) – have low physical activity rates for men that are about 30% below the national average. In the New Brunswick health districts cited here, only about one in eight women and one in six men is classified as physically active (Figure 88).

**Figure 88. Proportion of the population, aged 12 and over, classified as "physically active," New Brunswick health districts, 2000/01, (%)**




Note: Data for women in the Edmundston (NF4) and Miramichi (NB7) health districts, and for both men and women in Campbellton (NB5) have a coefficient of variation (CV) from 16.6% to 33.3% and should be interpreted with caution.

Source: Statistics Canada, Canadian Community Health Survey, 2000/01, health file.

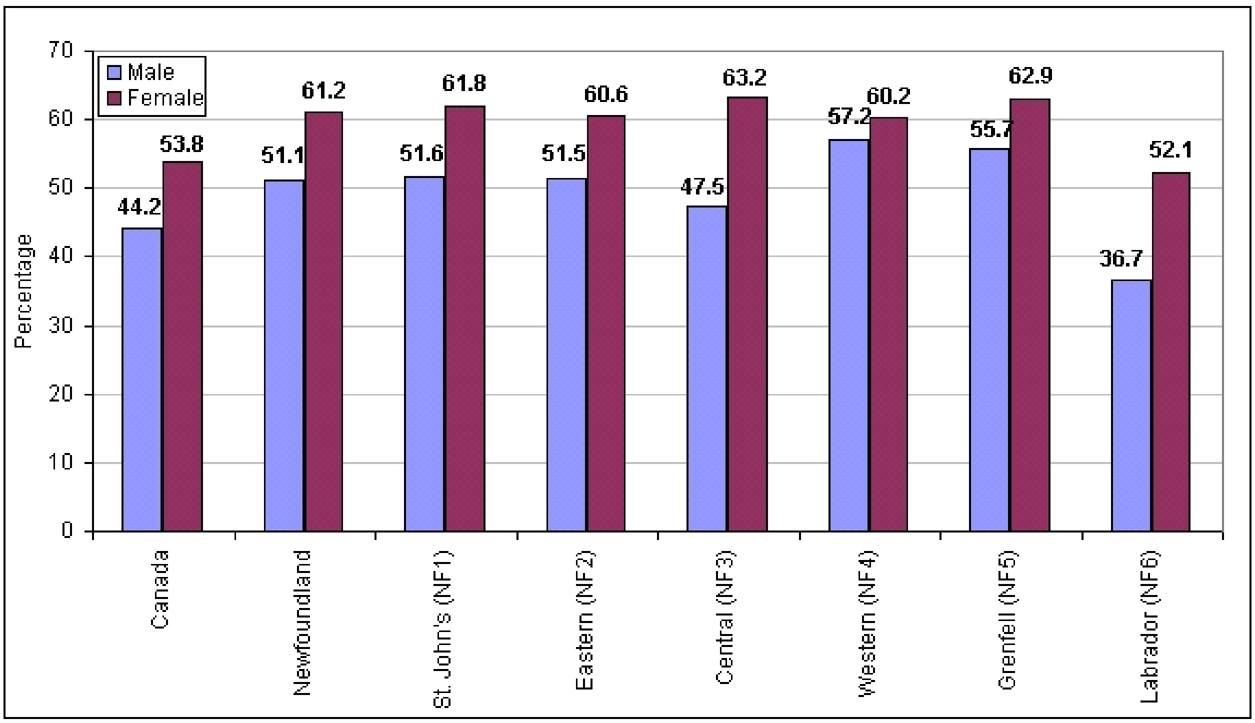
*Health districts: rates of physical inactivity (Figures 89, 90, 91)*

Only one health district in Atlantic Canada has physical inactivity rates lower than the Canadian average for both men and women – Labrador (NF6), where 36.7% of men and 52.1% of women are inactive, compared to 44.2% of men and 53.8% of women nationwide.

For women, only one other health district in the Atlantic region – The Valley (NS2)(53.3%) – has a marginally lower physical inactivity rate than the national average. All of the 19 other health districts have higher rates of physical inactivity for women than the Canadian average, with the highest female rates of inactivity in South-Southwest (NS1) (65.9%), and Moncton (NB1) (64.3%). In every Newfoundland health district except Labrador, and in five of the seven New Brunswick health districts, at least six out of ten women are classified as physically inactive.

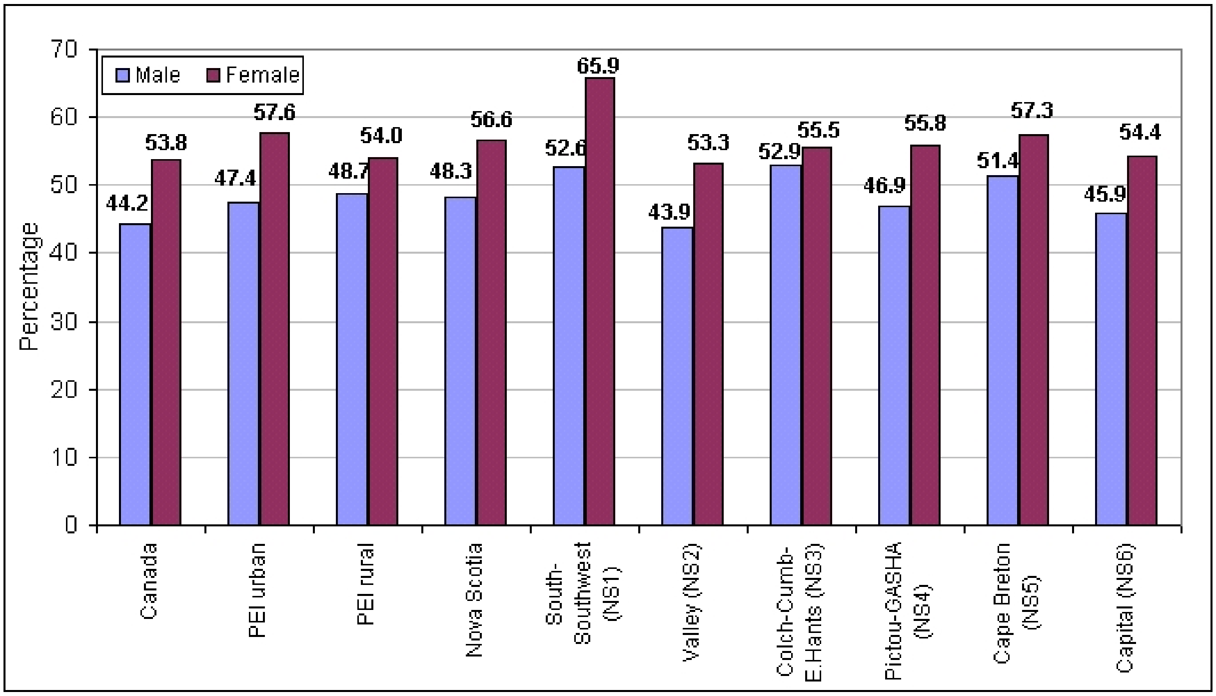
Aside from Labrador, there are three health districts that have slightly lower rates of physical inactivity for men than the Canadian average (44.2%). These are The Valley (NS2) (43.9%), Sussex/Saint John (NB2) (43.4%), and Campbellton (NB5) (42.8%). All other health districts have higher rates of physical inactivity for men, with the highest rates of male inactivity in Newfoundland's Western (NF4) and Grenfell (NF5) health districts (57.2% and 55.7% respectively), in South-Southwest (NS1) (52.6%), and Colchester-Cumberland-East Hants (NS3) (52.9%) in Nova Scotia, and in Miramichi (NB7) (52.5%) in New Brunswick (Figures 89, 90, and 91).

**Figure 89. Proportion of the population, aged 12 and over, classified as "physically inactive," Newfoundland health districts, 2000/01, (%)**



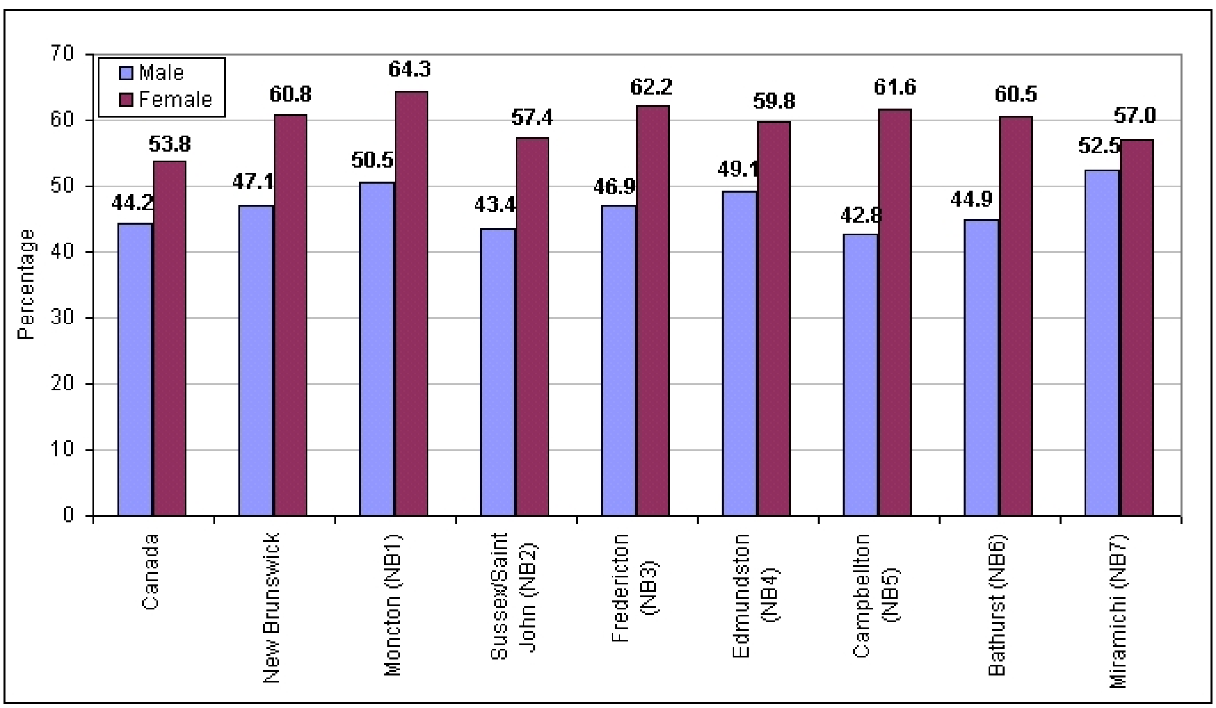

Source: Statistics Canada, Canadian Community Health Survey, 2000/01, health file.

**Figure 90. Proportion of the population, aged 12 and over, classified as "physically inactive," PEI and Nova Scotia health districts, 2000/01, (%)**




Source: Statistics Canada, Canadian Community Health Survey, 2000/01, health file.

**Figure 91. Proportion of the population, aged 12 and over, classified as "physically inactive," New Brunswick health districts, 2000/01, (%)**




Source: Statistics Canada, Canadian Community Health Survey, 2000/01, health file.

### *1.4.6 Healthy Weights*

Numerous studies have linked overweight and obesity to a wide range of health problems, especially cardiovascular disease, diabetes, hypertension, and some forms of cancer.[164] Body weights below the healthy weight range, with a body mass index (BMI) under 20, may also signal health problems, including eating disorders such as anorexia and bulimia.[165]

The American Cancer Society conducted the most comprehensive study ever done on obesity and mortality. Examining one million people, the study found that overweight people have a higher rate of premature death even if they don't smoke and are otherwise healthy. The results were adjusted for age, education, physical activity, alcohol use, marital status, use of aspirin and estrogen supplements, and consumption of fats and vegetables. Harvard University endocrinologist, Dr. JoAnn Manson, concludes:

> *The evidence is now compelling and irrefutable. Obesity is probably the second-leading preventable cause of death in the United States after cigarette smoking, so it is a very serious problem.*[166]

Another U.S. study found that obese individuals (BMI = >30) have a 50-100% increased risk of death from all causes compared with healthy-weight individuals (BMI = 20-24.9), with most of the increased risk due to cardiovascular disease.[167]

A Statistics Canada analysis of the 1996-97 National Population Health Survey data found that Canadians with a BMI of greater than 30 were four times as likely to have diabetes, 3.3 times as likely to have high blood pressure, 2.6 times as likely to report urinary incontinence, 56% more likely to have heart disease, and 50% *less* likely to rate their health positively than Canadians with an acceptable weight. Even at a lower BMI, between 25 and 30, Canadians had a significantly higher risk of asthma, arthritis, back problems, high blood pressure, stroke, diabetes, thyroid problems, activity limitations, and repetitive strain injuries.[168]

British Columbia medical researchers examined dozens of studies that assessed the relative risks for particular diseases in obese individuals (defined as those with a BMI of 27 or greater). From this they calculated the "population attributable fraction" (PAF) to estimate the extent to which the prevalence of each disease is specifically attributable to obesity. They found the strongest association with type 2 diabetes, more than half of which could be prevented by healthy weights. Similarly, 32% of all cases of hypertension, 30% of pulmonary embolisms, 21% of all cases of gallbladder disease, and 18% of all cases of coronary artery disease are attributable to obesity.[169]

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[164] Health Canada, *Statistical Report on the Health of Canadians,* Ottawa, 1999, page 264.
[165] Health Canada, *Toward a Healthy Future: Second Report on the Health of Canadians,* Health Canada, September, 1999, page 117.
[166] Cited in the *Halifax Chronicle-Herald,* October 9, 1999, page C1
[167] National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK), *Statistics Related to Overweight and Obesity,* available at: http://www.niddk.nih.gov/health/nutrit/pubs/statobes.htm
[168] Gilmore, Jason, "Body Mass Index and Health," *Health Reports,* Statistics Canada, catalogue no. 82-003, 11 (1), Summer, 1999, pages 31-43
[169] Birmingham, C. Laird, et al., "The Cost of Obesity in Canada," *Canadian Medical Association Journal,* February 23, 1999, pages 485-486.

The B.C. researchers also found that 27% of endometrial cancers (cancer of the lining of the uterus) were attributable to obesity, and that there are significant associations of overweight with postmenopausal breast cancer, colorectal cancer, stroke, and hyperlipidemia. A U.S. study found that women gaining more than 20 pounds from age 18 to mid-life doubled their risk of breast cancer, compared to women whose weight remained stable.[170] Links have also been found between obesity and other cancers, including gallbladder and renal cell (kidney) cancer.[171]

Other studies have linked obesity to hormonal disorders and menstrual irregularities, sleep apnea and other breathing problems, infertility and pregnancy complications, impaired immune function, stress incontinence, increased surgical risk, and psychological disorders such as depression.[172] A recent study of 41 children with severe obesity revealed that one-third had sleep apnea and another third had clinically abnormal sleep patterns. Another study reported that "obese children with obstructive sleep apnea demonstrate clinically significant decrements in learning and memory function." Among obese girls, puberty can begin before the age of 10, leading to a lifetime of endocrine disorders that can be emotionally devastating and costly to treat.[173]

A longitudinal study by researchers from the New England Medical Centre and U.S. Department of Agriculture Human Nutrition Research Centre in Boston followed 508 participants in the Harvard Growth Study conducted among Boston school children between 1922 and 1933. The researchers found that overweight teenagers were more likely to suffer from heart disease, colon cancer, arthritis or gout by age 70 than teenagers with healthy weights.

Regardless of whether they became overweight adults, these overweight teens were significantly more likely to have poorer health in later life. Indeed, by age 45, men who had been overweight as adolescents began to die at higher rates than those who had acceptable weights as teenagers. By age 70, their risk of death was twice as high.[174]

Other research suggests that weight gain can lead to the development of pseudo tumour cerebri, a brain tumour most common in women. A study of 57 patients with this tumour revealed that 90% were obese. A range of musculoskeletal disorders is also linked to obesity, including Blount's disease, a deformity of the tibia, and slipped capital femoral epiphysis, an orthopedic abnormality brought about by weight-induced dislocation of the femur bone. Both conditions are progressive and often require surgery.[175]

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[170] Huang, Z, S.E. Hankinson, Graham Colditz, et al., "Dual Effects of Weight and Weight Gain on Breast Cancer Risk," *Journal of the American Medical Association,* 1997; 278, pages 1407-1411.
[171] National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK), *Statistics Related to Overweight and Obesity,* available at: http://www.niddk.nih.gov/health/nutrit/pubs/statobes.htm, page 9.
[172] Ibid., page 1, and other studies cited in Gary Gardner and Brian Halweil, "Nourishing the Underfed and Overfed," chapter 4 in Worldwatch Institute, *State of the World 2000,* page 72.
[173] Critser, Greg, "Let Them Eat Fat: The Heavy Truths About American Obesity," *Harper's Magazine,* March 2000, pages 43-44.
[174] Study by Dr. Aviva Must and Dr. William Dietz published in the *New England Journal of Medicine,* 5 November, 1992, cited in the *Halifax Chronicle-Herald,* 5 November, 1992, page D8.
[175] Critser, Greg, "Let Them Eat Fat: The Heavy Truths About American Obesity," *Harper's Magazine,* March 2000, pages 43-44.

In short, there is a very wide range of chronic illnesses linked to obesity, many of which require ongoing treatment, produce significant suffering, and are costly to the health care system.

In 1997 the World Health Organization for the first time referred to obesity as a "global epidemic."[176] According to one estimate, obesity has increased by 400% in the western world in the last 50 years.[177] Given the close association between obesity and adult-onset diabetes, it is not surprising that the global population with this illness has jumped nearly five-fold from 30 million in 1985 to 143 million in 1998. The average age of diabetics is getting younger, and the global incidence of the disease is expected to double to 300 million by the year 2025.[178]

In March, 2000, the Worldwatch Institute in Washington D.C. published a report, entitled *Underfed and Overfed: The Global Epidemic of Malnutrition,* which found that for the first time in human history the number of overweight people in the world now equals the number of underfed people, with 1.1 billion in each group.[179]

Comparing specific countries, the report found that 56% of children in Bangladesh, 53% in India and 48% in Ethiopia are underweight, while 55% of U.S. adults, 57% of English adults and 50% of Germans are overweight (BMI = >25). Overweight is spreading even in the developing world, with 36% of Brazilians and 41% of Colombians now overweight. Indeed, 80% of the world's hungry children live in countries with food surpluses, indicating that unequal distribution rather than food scarcity is the primary cause of hunger.[180]

The Worldwatch report also found that one-fifth of U.S. children are now overweight or obese, a 50% increase since 1980. At the same time, a 1998 U.S. Department of Agriculture study found nearly one-fifth of American children are "food insecure" – either hungry, on the edge of hunger, or worried about being hungry.[181] According to the report authors, both the underfed and the overfed suffer from malnutrition, defined as a deficiency or excess in the nutrient intake necessary for health.

> *The hungry and the overweight share high levels of sickness and disability, shortened life expectancies, and lower levels of productivity -- each of which is a drag on a country's development.*[182]

Each year 20 million babies are born in the world with low birth weights due to maternal malnutrition, resulting in lifelong scars through impaired immunity, neurological damage, retarded growth and increased susceptibility to disease. Among the overweight, "obesity often

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[176] World Health Organization, *Obesity: Preventing and Managing the Global Epidemic,* Report of a WHO Consultation on Obesity, Geneva, 1997.
[177] Montignac, Michel, in The *Halifax Chronicle-Herald,* March 28, 2000, page A10.
[178] Gardner, Gary, and Brian Halweil, "Nourishing the Underfed and Overfed," chapter 4 in Worldwatch Institute, *State of the World 2000,* W.W. Norton and Co., New York, 2000 page 72.
[179] Gardner, Gary, and Brian Halweil, *Underfed and Overfed: The Global Epidemic of Malnutrition*, Worldwatch Paper # 150, Worldwatch Institute, Washington, D.C., 2000.
[180] Gardner, Gary, and Brian Halweil, "Nourishing the Underfed and Overfed," chapter 4 in Worldwatch Institute, *State of the World 2000,* W.W. Norton and Co., New York, 2000, page 60.
[181] Op. cit., page 62.
[182] "Chronic Hunger and Obesity Epidemic Eroding Global Progress," Worldwatch press release for Gardner and Halweil, *Underfed and Overfed,* Worldwatch Paper #150.

masks nutrient starvation," as calorie-rich junk foods squeeze healthy items from the diet. In Europe and North America, fat and sugar now account for more than half of total caloric intake.[183]

Although overweight is discussed here as a behavioural and lifestyle determinant of health, it is clearly associated with other health behaviours, including diet and physical activity. Indeed, obesity is classified as a disease in its own right in the official International Classification of Diseases (ICD-9: 278).[184] For that reason, CIHI's National Consensus Conference on Population Health Indicators confirmed overweight as a key indicator of "health conditions" rather than "health behaviours."[185]

**Definitions**

CIHI's National Consensus Conference on Population Health Indicators recognized that alternative definitions of overweight and obesity have created difficulties in comparing Canadian results with those in other countries, and the conference therefore recommended a review of these definitions.[186]

Overweight and obesity are best measured with special equipment; and obesity in particular requires the measurement of fat as well as relative weight. For that reason Health Canada's *Statistical Report on the Health of Canadians* does not use the term "obesity" at all.[187] Nevertheless, "Body Mass Index" (BMI) has become an internationally accepted indicator of relative weight, and is calculated by dividing weight in kilograms by height in metres squared.

There are both Canadian and international standards for BMI, and Statistics Canada currently reports results for both, to estimate whether the weight of individuals is within a healthy range for their height.

***Canadian Standard:*** According to Statistics Canada "[b]ody mass index (BMI) -Canadian standard, which relates weight to height, is a common method of determining if an individual's weight is in a healthy range based on their height. BMI is calculated as follows: weight in kilograms divided by height in metres squared. The index is: under 20 (underweight), 20-24.9 (acceptable weight), 25-27.0 (some excess weight) and greater than 27(overweight). The index is calculated for those aged 20 to 64 excluding pregnant women and persons less than 3 feet (0.914 metres) tall or greater than 6 feet 11 inches (2.108 metres)."[188]

According to this measure, a BMI of 20 to 24.9 means that this weight to height ratio confers no known health risk or likelihood of premature death. A BMI in this range translates into about 140

[183] Gardner and Halweil, Ch. 4, *State of the World 2000,* pages 63, 70 and 71.
[184] International Classification of Diseases; for obesity categories, see the e-MDs web site at: http://www.e-mds.com/services/icd9/index.html.
[185] CIHI, National Consensus Conference on Population Health Indicators: Final Report, Ottawa, 1999, pages 5 and B-3.
[186] Ibid., page 5.
[187] Federal, Provincial and Territorial Advisory Committee on Population Health (hereafter: ACPH), *Statistical Report on the Health of Canadians,* Health Canada, September, 1999, pages 264-265.
[188] Statistics Canada, http://www.statcan.ca/english/freepub/82-221-XIE/00502/defin1.htm#3

to 170 pounds for a 5-foot-10-inch man; and about 105 to 135 pounds for a 5-foot-2-inch woman. Beginning with a BMI of 25 (which is about150 pounds for a 5-foot-5 woman and 174 pounds for a 5-foot-10 man), researchers have found a gradually increasing risk of premature death and disease.[189]

Health Canada's *Statistical Report on the Health of Canadians* defines a BMI of between 25.0 and 26.9 as conferring a "possible health risk," and a BMI of 27.0 or greater as conferring a "probable health risk."[190]

***International Standard:*** This is the standard used by the World Health Organization, the National Institutes of Health in the United States, and other agencies.[191] Statistics Canada's official definition of the international standard is identical to that for the Canadian standard, except that the index classifications are significantly different:

According to Statistics Canada: "Body mass index (BMI-International standard), which relates weight to height, is a common method of determining if an individual's weight is in a healthy range based on their height. BMI is calculated as follows: weight in kilograms divided by height in metres squared. The index is: under 18.5 (underweight), 18.5-24.9 (acceptable weight), 25-29.9 (overweight) and 30 or higher (obese). The index is calculated for those aged 20 to 64 excluding pregnant women and persons less than 3 feet (0.914 metres) tall or greater than 6 feet 11 inches (2.108 metres)."[192]

To make matters of definition even more complicated, the *Canadian Medical Association Journal* and several international studies use the term obesity for measures of BMI of 27 or greater, and use that term even in the absence of separate measurements for body fat.[193] As noted above, the term "obesity" is frequently used as a medical term to describe epidemiological associations with overweight.

The index classifications are even more tenuous in light of the fact that BMI measurements are derived from self-reported data, which tend to under-estimate actual values by a factor of about 10%. In other words, a reported BMI of 27.0 may actually be closer to the WHO obesity standard of 30.0, and the prevalence of overweight and obesity in a given population is likely 10% higher than reported levels.[194]

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[189] American Cancer Society report published in *New England Journal of Medicine,* October, 1999, and cited in the *Halifax Chronicle-Herald,* October 9, 1999, page C1, based on longitudinal research on participants in the U.S. national Cancer Prevention Study from 1982 to 1996.

[190] Health Canada, *Statistical Report on the Health of Canadians,* Ottawa, 1999, pages 264-265.

[191] World Health Organization, *Physical Status: The Use and Interpretation of Anthropometry, Report of the WHO Expert Committee,* WHO Technical Report Series, No. 854, Geneva, 1995; Expert Panel of the National Institutes of Health, "Clinical Guidelines on the Identification, Evaluation and Treatment of Overweight and Obesity in Adults: Executive Summary," *American Journal of Clinical Nutrition,* 1998; 68 (4), pages 899-917; both sources cited in Jason Gilmore, "Body Mass Index and Health," *Health Reports,* Statistics Canada, catalogue no. 82-003, volume 11, no. 1, Summer, 1999, pages 33 and 42.

[192] Statistics Canada, http://www.statcan.ca/english/freepub/82-221-XIE/00502/defin1.htm#3

[193] See for example, Birmingham, C. Laird, et al., "The Cost of Obesity in Canada," *Canadian Medical Association Journal,* 23 February, 1999: 160 (4), page 484.

[194] Gilmore, op. Cit., page 35; J. Cairney, et al., "Correlates of Body Weight in the 1994 National Population Health Survey", *International Journal of Obesity,* 1998; 22, pages 584-591; R.J. Roberts, "Can Self-Reported Data

**Data Sources**

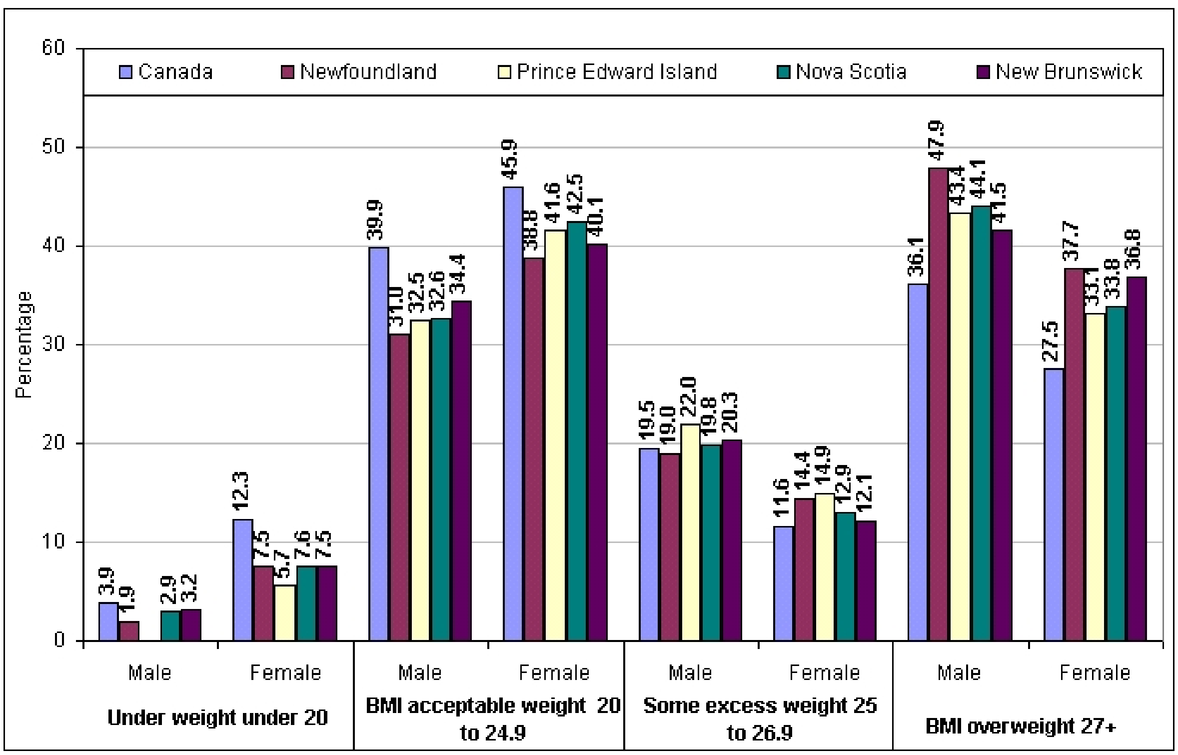
Statistics Canada, Canadian Community Health Survey, 2000/01, health file; Statistics Canada, National Population Health Survey, 1994/95, 1996/97 and 1998/99, cross sectional sample, health file; Statistics Canada, National Population Health Survey, 1994/95 and 1996/97, cross sectional sample, North component; Statistics Canada, National Longitudinal Survey of Children and Youth, 1994/95 and 1998/99.

**Results**

*Canadian Standard*

Across the country, and in Atlantic Canada, women are more likely to have an "acceptable weight" (BMI = 20-24.9) than men, with 46% of women and 40% of men in that range. All four Atlantic provinces have substantially higher rates of overweight than the Canadian average, with Newfoundland and Labrador registering the highest rates of overweight for both men and women. Counting men and women together, 43% of Newfoundlanders are overweight, as are 38% of Prince Edward Islanders, 39% of Nova Scotians and New Brunswickers, and 32% of Canadians (Figures 92 and 93).

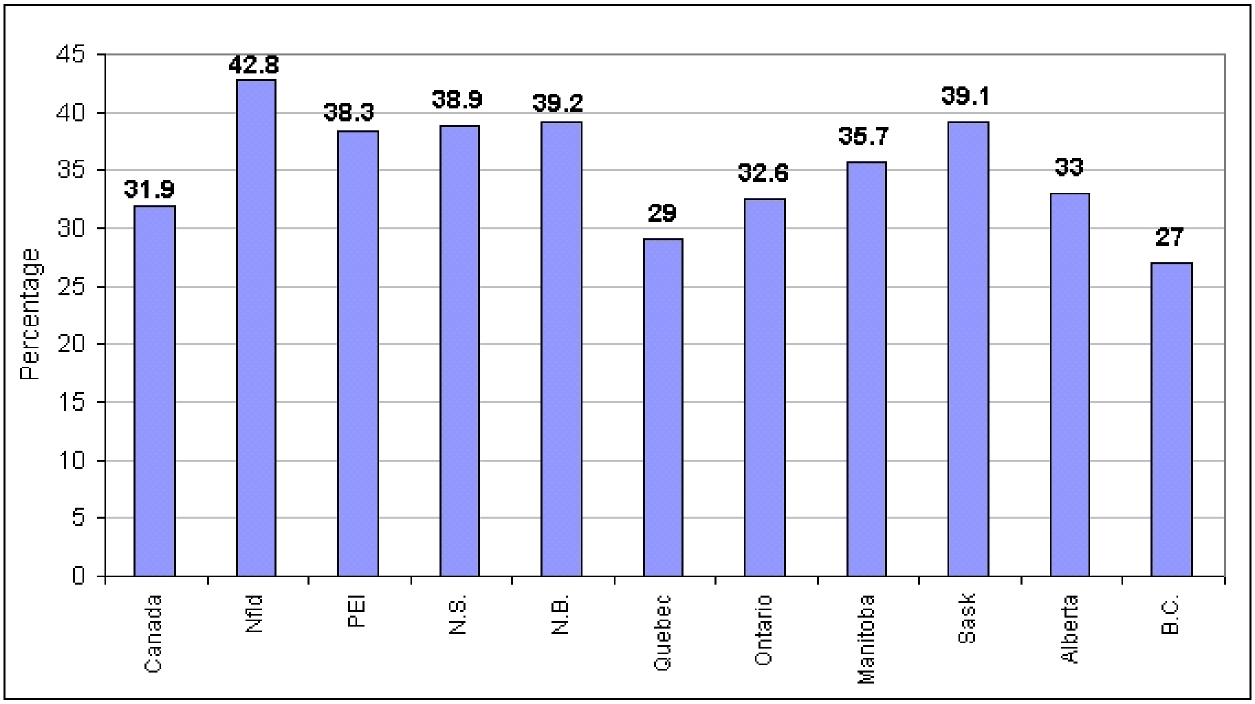
**Figure 92. Proportion of men and women, aged 20-64, excluding pregnant women, for four categories of BMI, Canadian standard, Canada and Atlantic provinces, 2000/01, (%)**




Source: Statistics Canada, Canadian Community Health Survey, 2000/01, health file.

Accurately Describe the Prevalence of Overweight?", *Public Health,* 1995, 109 (4), pages 275-284; A. Hill and J. Roberts, "Body Mass Index: A Comparison Between Self-Reported and Measured Height and Weight," *Journal of Public Health Medicine,* 1998, 20 (2), pages 206-210.

**Figure 93. Overweight Canadians (BMI = >27), aged 20-64, Canada and provinces, 2000/01, (%)**



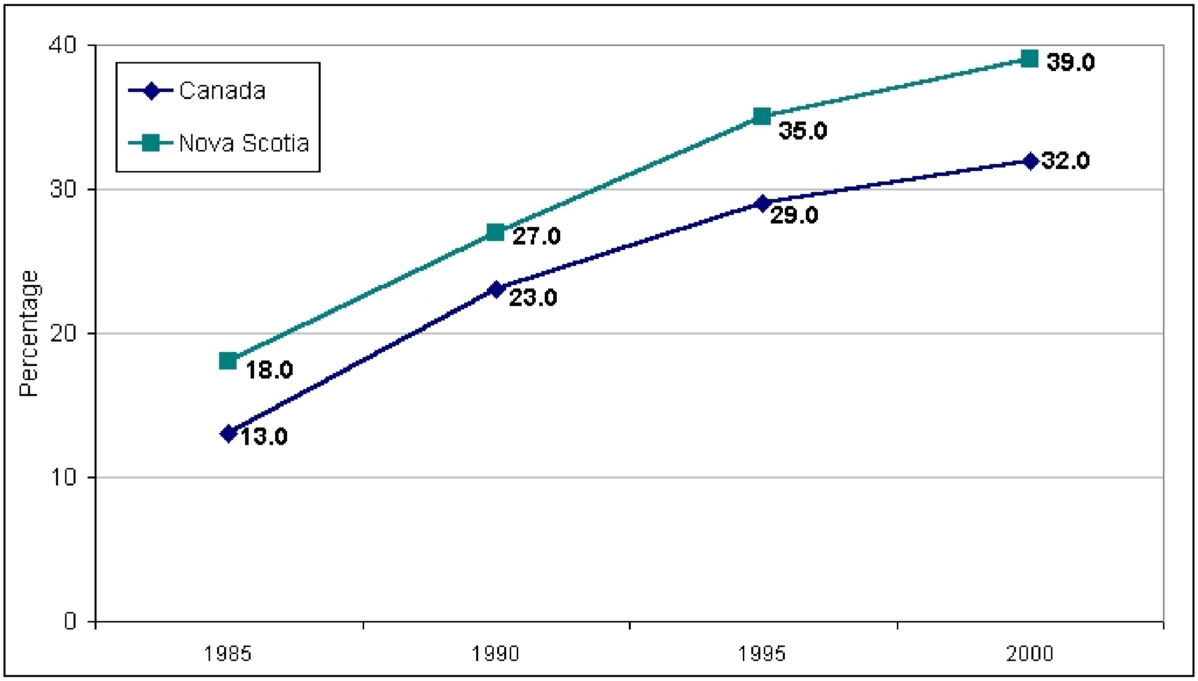

Source: Statistics Canada, Canadian Community Health Survey, 2000/01.

Across the country rates of overweight have more than doubled since 1985. The most recent results, however, indicate a significant decrease in overweight among New Brunswick men, from 48% in 1998/99 – the highest rate in the country – to 42% in 2000/01. For most other groups, rates of overweight continue to rise steadily. To illustrate national and Atlantic Canadian trends, Figure 94 indicates Canadian and Nova Scotian overweight rates at five-year intervals since 1985.

Without any exception, there is a higher proportion of overweight men and women in every one of the 21 health districts in Atlantic Canada than the Canadian average (36.1% of men; 27.5% of women.) The highest rates of overweight in Newfoundland and Labrador are in Grenfell (NF5) (57.7% of men, 52% of women), the Central health district (NF3) (55.6% of men, 45.2% of women), and in Labrador (NF6) (50.9% of men, 42.7% of women).

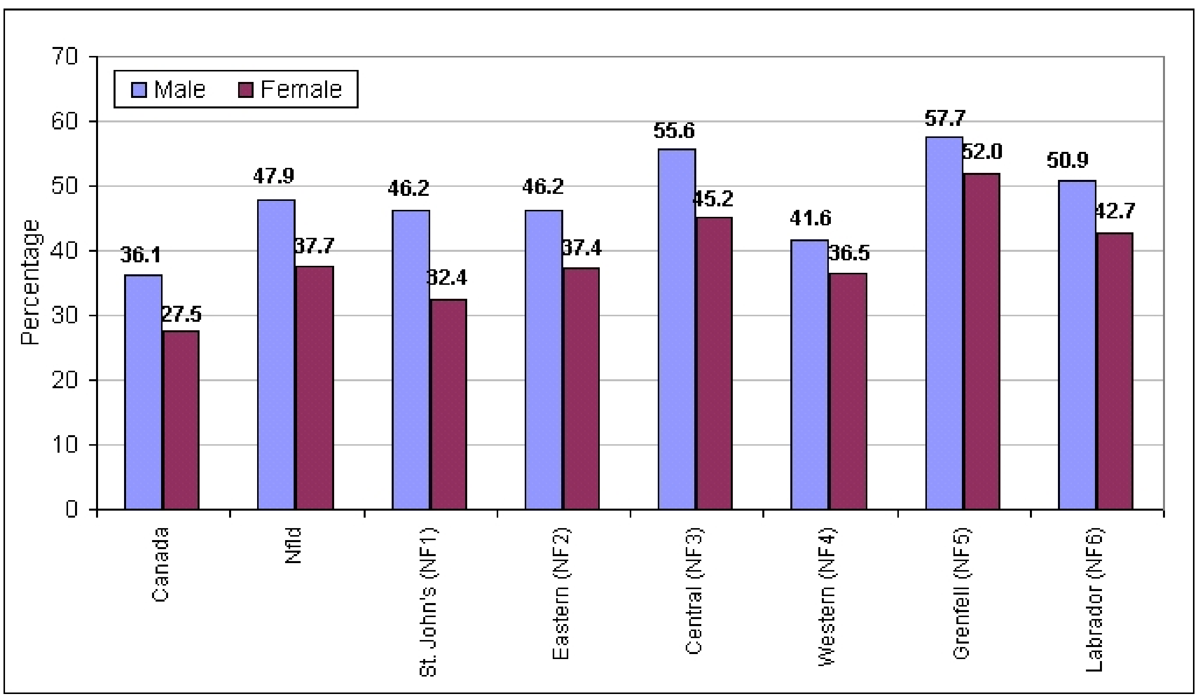
In Nova Scotia, the highest rates of overweight are in South-Southwest (NS1) (49.1% of men, 42.1% of women). Exactly half of all Cape Breton (NS5) men are overweight. Rural PEI has markedly higher rates of overweight (47.5% of men, 36.2% of women) than urban PEI (38.7% of men, 29.8% of women). In New Brunswick, the highest rate of overweight is in Miramichi (NB7) (47.5% of men, 41.4% of women) (Figures 95, 96, and 97).

**Figure 94. Overweight Canadians and Nova Scotians, (BMI = >27), aged 20-64, 1985-2000/01, (%)**



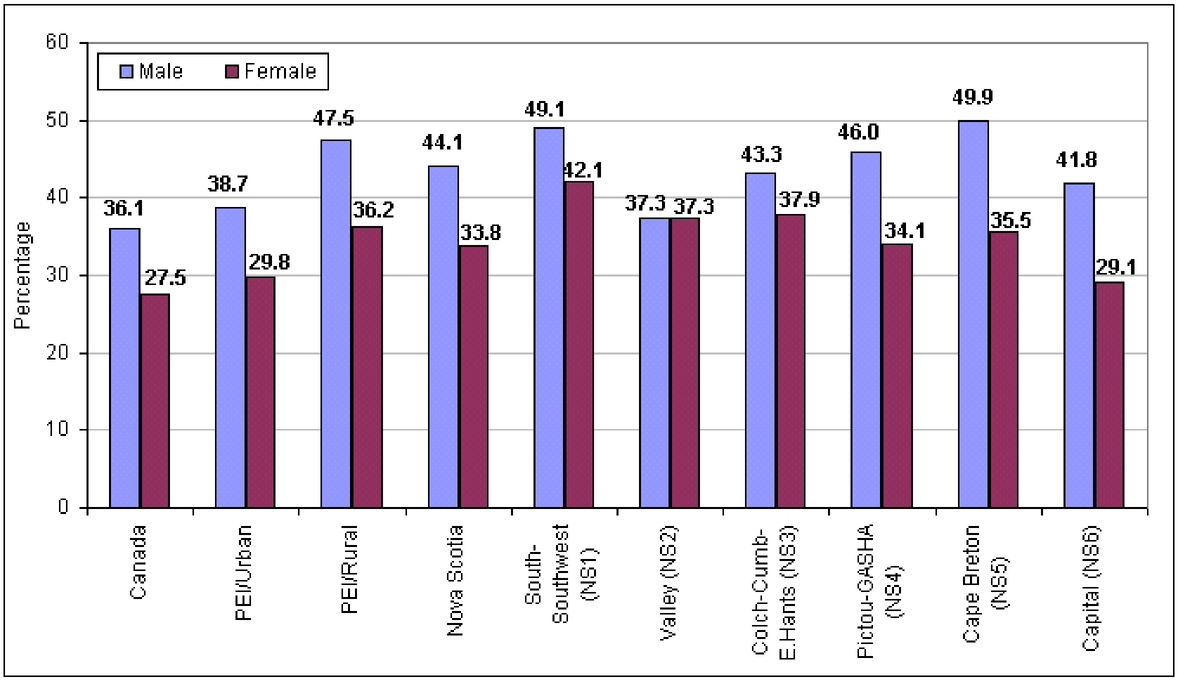

Sources: Statistics Canada, Health Indicators CD-ROM, 1999; Statistics Canada, National Population Health Survey, 1994/95; Statistics Canada, Canadian Community Health Survey, 2000/01

**Figure 95. Proportion of overweight men and women, (BMI = >27), aged 20-64, Newfoundland and Labrador health districts, 2000/01, (%)**



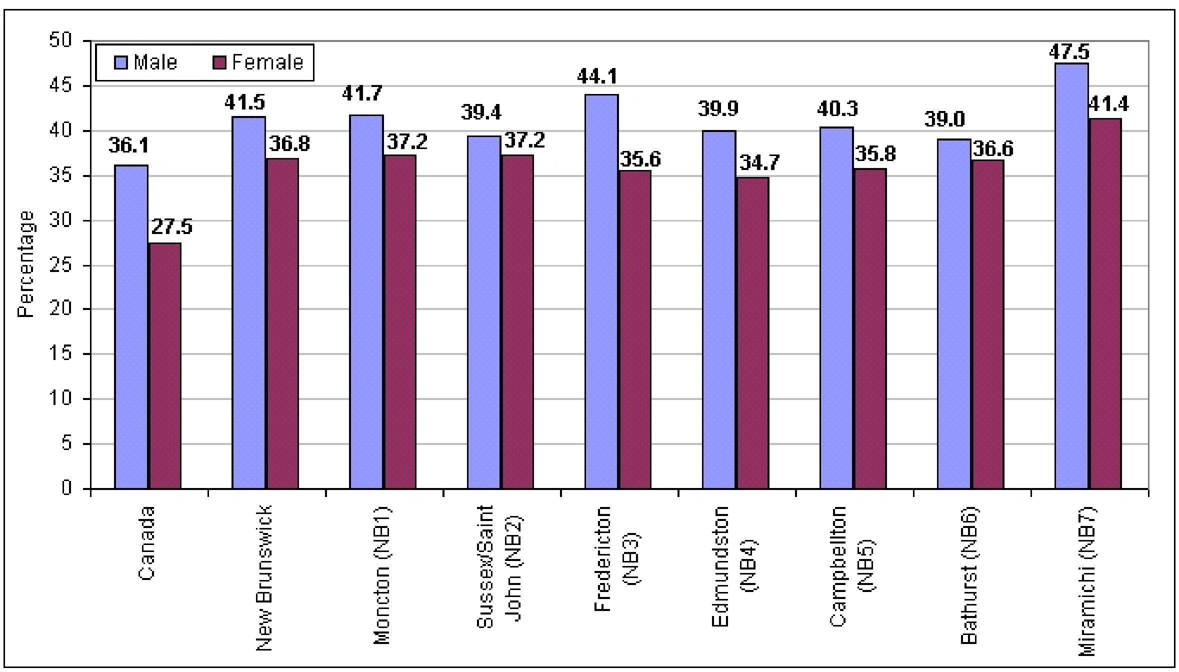

Source: Statistics Canada, Canadian Community Health Survey, 2000/01

**Figure 96. Proportion of overweight men and women, (BMI = >27), aged 20-64, PEI and Nova Scotia health districts, 2000/01, (%)**




Source: Statistics Canada, Canadian Community Health Survey, 2000/01

**Figure 97. Proportion of overweight men and women, (BMI = >27), aged 20-64, New Brunswick health districts, 2000/01, (%)**




Note: Data for overweight women in Campbellton have a coefficient of variation (CV) from 16.6% to 33.3%, and should therefore be interpreted with caution.

Source: Statistics Canada, Canadian Community Health Survey, 2000/01

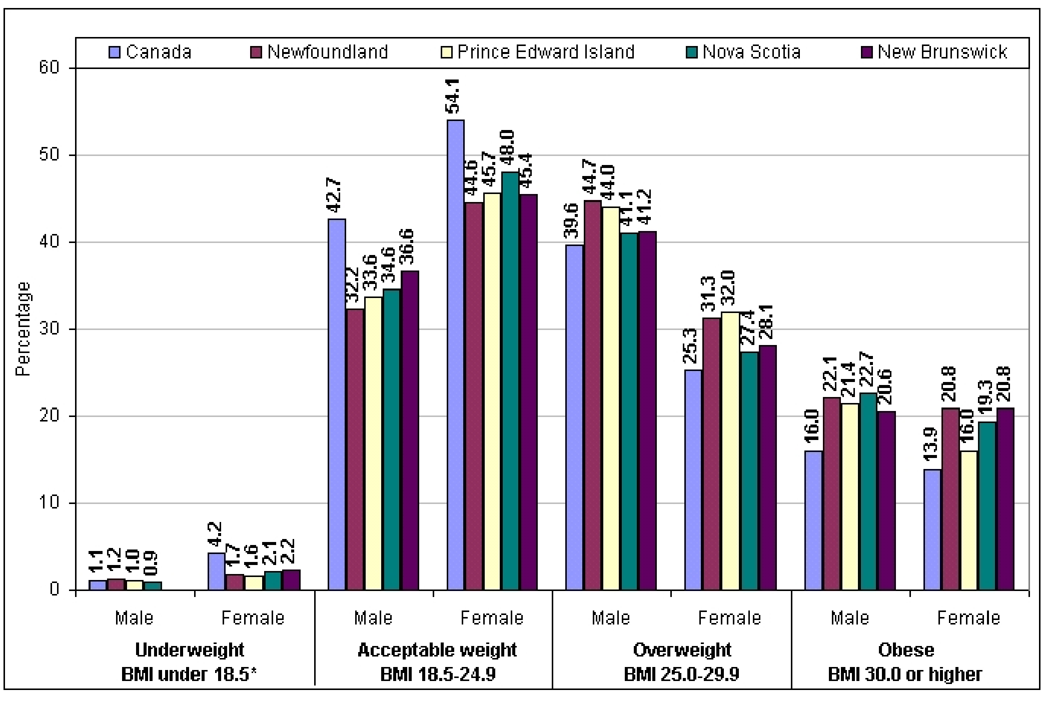
*International Standard*

Based on the international definitions, Statistics Canada's National Longitudinal Survey of Children and Youth found an alarming increase in overweight and obesity among Canadian children aged 2 to 11. The survey found that over one-third of Canadian children aged 2 to 11 were overweight in 1998/99, and of these, about half were obese. In 1994/95, 34% of children aged 2 to 11 were overweight, with an estimated 16% classified as obese. By 1998/99, 37% of children aged 2 to 11 were overweight, including 18% who were classified as obese.

As noted, the international standard has a broader definition of acceptable weights that includes some people listed as underweight in the Canadian standard. In Canada as a whole, 42.7% of men and 54.1% of women have an acceptable weight by this standard; just 1.1% of men[195] and 4.2 % of women are underweight, and 55.6% of men and 39.2% of women are either overweight or obese. In Canada, 16% of men and 13.9% of women are obese (BMI = >30).

According to the international standard, both men and women in all four Atlantic provinces have higher rates of overweight and obesity than the Canadian average. By this standard, more than one in five men in all four Atlantic provinces are classified as obese, as are more than one in five women in Newfoundland and Labrador and New Brunswick. In Nova Scotia, 19.3% of women are obese, and in Prince Edward Island, 16% of women are obese (Figure 98).

**Figure 98. Proportion of men and women, aged 20-64, excluding pregnant women, for four categories of BMI, international standard, Canada and Atlantic provinces, 2000/01, (%)**




*Note: All data for underweight, except for the 4.2% rate for Canadian women, have a coefficient of variation (CV) from 16.6% to 33.3% and should be interpreted with caution.

Source: Statistics Canada, Canadian Community Health Survey, 2000/01

[195] Data for underweight men have a coefficient of variation (CV) from 16.6% to 33.3% and should be interpreted with caution.

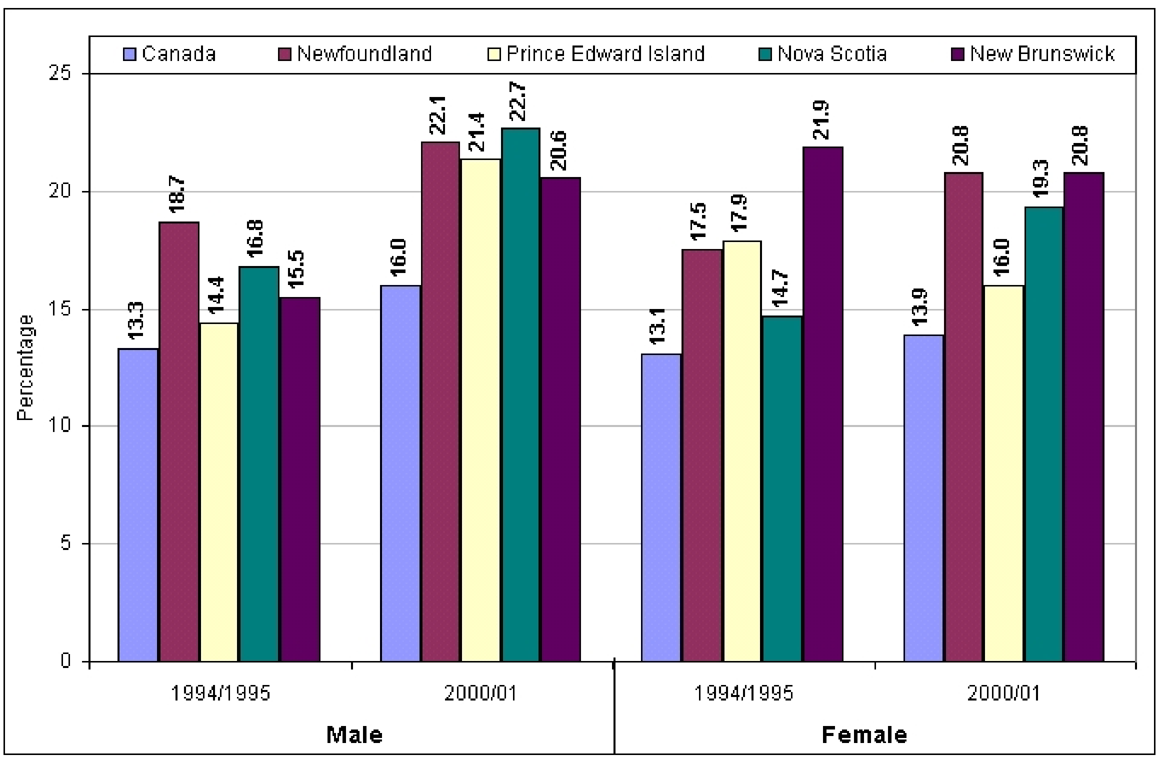
Rates of obesity have increased across the country and in all four Atlantic provinces, where rates of obesity are now about a third higher than they were in the mid-1990s. Nova Scotian men now have the highest rate of obesity in the country (22.7%), up from 16.8% in 1994/95, and more than 40% higher than the Canadian average (16%).

In PEI, male obesity soared from 14.4% in 1994/95 to 21.7% in 2000/01, and in New Brunswick, it climbed from 15.5% in 1994/95 to 20.6% in 2000/01. Newfoundland has the second highest rate of obesity in the country (22.1%), up from 18.7% six years earlier.

Among women, obesity rates also climbed sharply in Nova Scotia, from 14.7% of women in 1994/95 to 19.3% of women in 2000/01. Newfoundland and New Brunswick have the highest rates of female obesity in the country (20.8%). In 1994/95, 17.5% of Newfoundland women were obese, and in New Brunswick, the female obesity rate was actually slightly higher in 1994/95 (21.9%) than it is today.

In all of the last four national population health surveys (1994/95, 1996/97, 1998/99, and 2000/01), New Brunswick women have had the highest female obesity rate in the country. PEI saw a decline in female obesity, from 17.9% in 1994/95 to 16% in 2000/01, though this still remains above the national average (13.9%) (Figure 99).

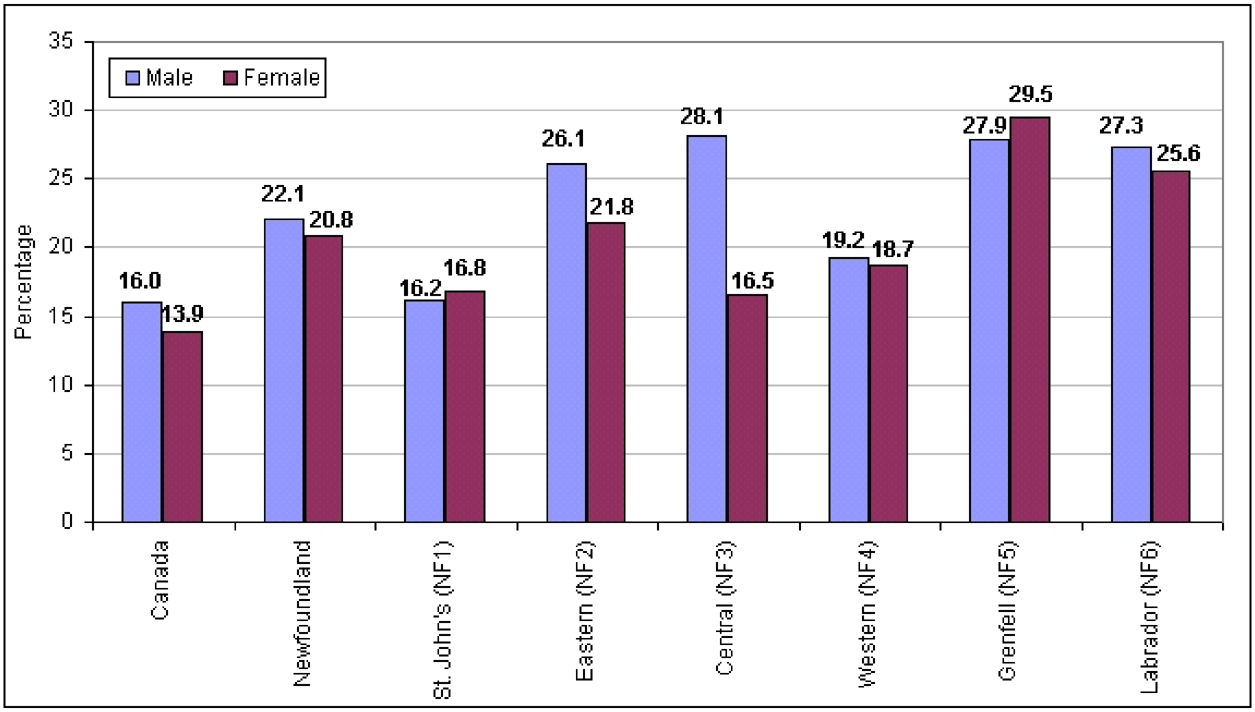
**Figure 99. Proportion of the population, aged 20-64, classified as obese (BMI = >30), international standard, Canada and Atlantic provinces, 1994/95 and 2000/01, (%)**




Sources: Statistics Canada, Canadian Community Health Survey, 2000/01, health file; Statistics Canada, National Population Health Survey, 1994/95, cross sectional sample, health file, and North component.

In every health district in Atlantic Canada, except for urban PEI, rates of obesity are higher than the national average (16% of men, 13.9% of women). In Charlottetown and Summerside, rates of obesity are almost identical to the national average (16.3% of men, 13.8% of women). But in rural PEI, rates of obesity are dramatically higher than in the cities – 25.8% of men and 18.1% of women (Figure 100).

**Figure 100. Proportion of obese men and women, (BMI = >30), aged 20-64, Newfoundland and Labrador health districts, 2000/01, (%)**




Note: Data for Grenfell (NF5) have a coefficient of variation (CV) from 16.6% to 33.3% and should be interpreted with caution.

Source: Statistics Canada, Canadian Community Health Survey, 2000/01

In Newfoundland and Labrador, there are sharp differences in obesity rates between St. John's (NF1) and most rural regions. In Grenfell (NF5), Labrador (NF6), and the Central health district (NF3), rates of male obesity are more than 70% higher than in St. John's, and in the Eastern district (NF2) they are 60% higher. In all of these health districts, between 26% and 28% of men are classified as obese. The highest rates of female obesity in Newfoundland and Labrador are in Grenfell (NF5) (29.5%) and Labrador (25.6%) (Figure 100).[196]

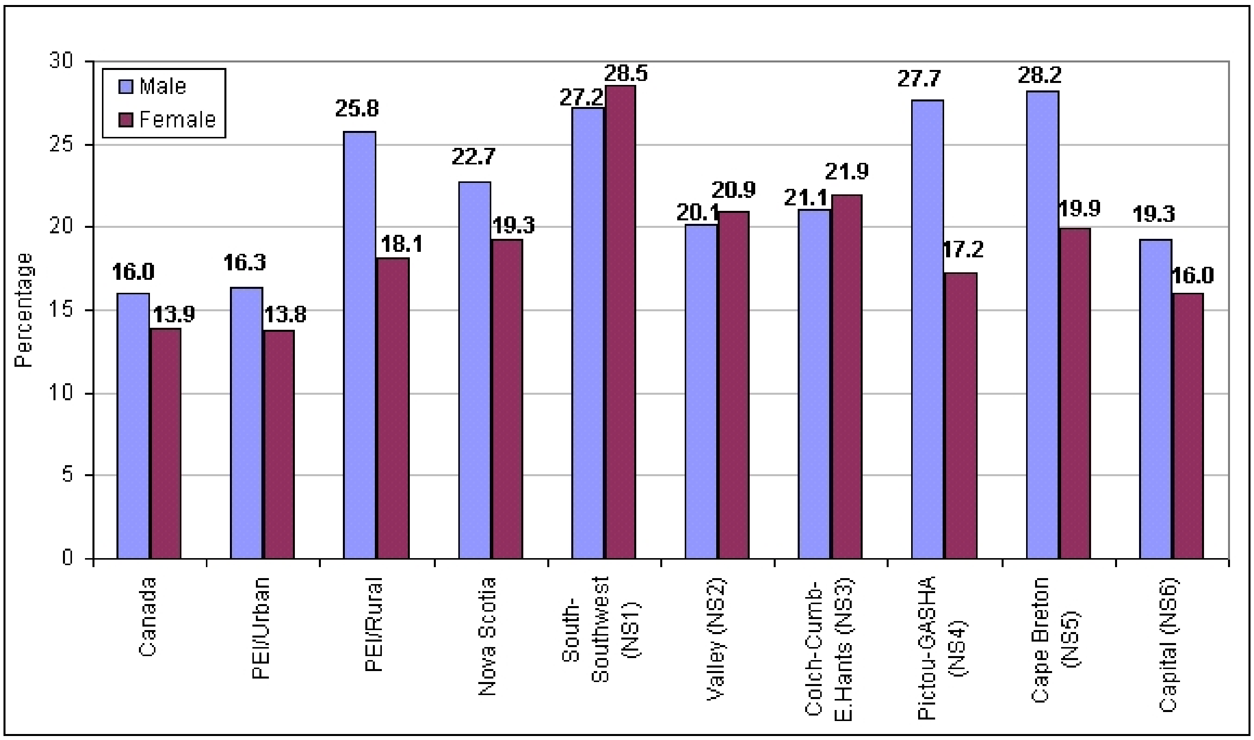
In Nova Scotia, the highest rates of obesity for both men and women are in South-Southwest (NS1), where 27.2% of men and 28.5% of women are classified as obese – well over one-quarter of the population in that area. High rates of male obesity also occur in Cape Breton (NS5) (28.2%) and in Pictou-GASHA (NS4) (27.7%). In fact, Cape Breton has the highest rate of male

[196] Data for Grenfell (NF5) have a coefficient of variation (CV) from 16.6% to 33.3% and should be interpreted with caution.

obesity in the Atlantic region. One in five women in Colchester-Cumberland-East Hants (NS3) (21.9%), the Annapolis Valley (NS2) (20.9%) and Cape Breton (NS5) (19.9%) are also obese (Figure 101).

In New Brunswick, the highest rates of obesity are in Miramichi (NB7) (28.1% of men, and 23.7% of women). In five of New Brunswick's seven health districts, at least one in five women is classified as obese – 24.8% in Campbellton (NB5), 23.1% in Moncton (NB1), 20.2% in Fredericton (NB3), and 20% in Sussex/Saint John (NB2).[197] In Bathurst (NB6), 19% of women are obese. In fact, New Brunswick is the only province in Canada with a higher rate of obesity for women than for men (Figure 102).

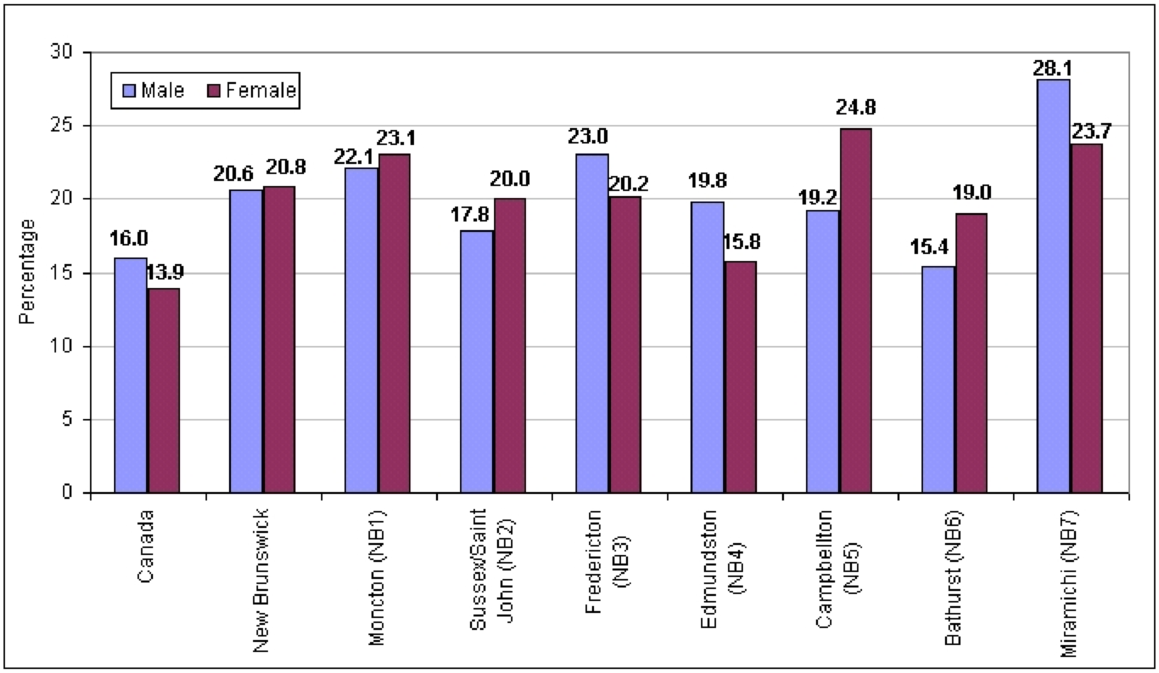
**Figure 101. Proportion of obese men and women, (BMI = >30), aged 20-64, PEI and Nova Scotia health districts, 2000/01, (%)**




Source: Statistics Canada, Canadian Community Health Survey, 2000/01.

197 Data for Campbellton (NB5) have a coefficient of variation (CV) from 16.6% to 33.3% and should be interpreted with caution.

**Figure 102. Proportion of obese men and women, (BMI = >30), aged 20-64, New Brunswick health districts, 2000/01, (%)**




Note: Data for men and women in Campbellton (NB5) and for men in Bathurst (NB6) have a coefficient of variation (CV) from 16.6% to 33.3% and should be interpreted with caution.

Source: Statistics Canada, Canadian Community Health Survey, 2000/01.

## 1.5 Secondary Prevention – Screening and Immunization

The Canadian Institute for Health Information's National Consensus Conference on Population Health Indicators classified secondary prevention (mammogram screening, Pap smears, and immunization) under the category of "health system performance: accessibility."[198] But these indicators are included here as determinants of health because of their proven capacity to prevent disease, to avoid premature mortality, and to detect disease at an early enough stage to allow effective treatment.

### *1.5.1 Screening*

Canadian women have a one in nine lifetime risk of breast cancer, the most common cancer to afflict women. One in 25 Canadian women will die from breast cancer, and the incidence of breast cancer has been rising steadily. Because of the relatively young age at which women die from breast cancer, it results in 98,000 potential years of life lost each year in Canada. The three Maritime provinces have among the highest rates of breast cancer incidence in the country.[199]

[198] Canadian Institute for Health Information, *National Consensus Conference on Population Health Indicators: Final Report,* Ottawa, 1999, pages 5 and B-10.
[199] National Cancer Institute of Canada, *Canadian Cancer Statistics 2001,* Toronto, April, 2001.

Early detection of breast cancer through mammograms has been shown to reduce mortality in women age 50-69, and the breast cancer mortality rate is now at its lowest since 1950.[200] The Advisory Committee on Population Health reports that:

> *The dramatic increase in mammography use is a positive example of how public education combined with efficient screening practices can make a dramatic difference in the use of proven preventive measures.*[201]

In 1990 just 47% of Canadian women 50 and over had ever had a mammogram. By 1996-97, the figure was 75%. Currently, mammography screening is recommended every two years for women aged 50-69, and the likelihood that a woman has had a mammogram increases with age, peaking at age 50-59. [202]

Cervical cytology screening with a Pap smear reduces the incidence of and mortality from cervical cancer. As a result of the widespread adoption of this simple screening procedure, cervical cancer incidence and mortality rates have fallen dramatically across the country. Between 1969 and 1998, the age-standardized incidence rate fell from 21.8 to 8.3 cases per 100,000, and the mortality rate from 7.4 to 2.2 deaths per 100,000. Indeed, most cases of invasive cervical cancer today occur in women not previously screened *or* not screened recently. Pap smears are recommended every three years for women aged 18 and over.[203]

**Mammography Screening Definition**

Statistics Canada reports the proportion of women aged 50-69 who report receiving a screening mammogram within the last two years, either for routine screening or for other reasons.[204]

**Data Sources**

Statistics Canada, Canadian Community Health Survey, 2000/01, health file; Statistics Canada, National Population Health Survey, 1996/97, cross sectional sample, health file.

**Pap Smear Definition**

Statistics Canada reports on the proportion of women, aged 18 to 69, who report having had a Pap smear within the last three years.[205]

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[200] Idem; and Health Canada, *Toward a Healthy Future: Second Report on the Health of Canadians,* Ottawa, 1999, page 147

[201] Health Canada, *Toward a Healthy Future,* page 154; Health Canada, *Statistical Report on the Health of Canadians,* Ottawa, 1999*,* pages 82-85.

[202] Health Canada, *Statistical Report,* pages 83- 84.

[203] Judy Lee, Greg Parsons, Jane Gentleman, "Falling Short of Pap Test Guidelines," Statistics Canada, *Health Reports,* pages 9-19, esp. page 11, Health Canada, *Toward a Healthy Future,* pages 146-147, Health Canada, *Statistical Report on the Health of Canadians,* page 79.

[204] Statistics Canada, http://www.statcan.ca/english/freepub/82-221-XIE/00502/defin3.htm#56; Canadian Institute for Health Information, *National Consensus Conference on Population Health Indicators: Final Report,* Ottawa, 1999, page B-10.

[205] Statistics Canada, http://www.statcan.ca/english/freepub/82-221-XIE/00502/defin3.htm#56; Canadian Institute for Health Information, *National Consensus Conference on Population Health Indicators: Final Report,* Ottawa, 1999, page B-10.

**Data Sources**

Statistics Canada, Canadian Community Health Survey, 2000/01, health file; Statistics Canada, National Population Health Survey, 1994/95, 1996/97 and 1998/99, cross sectional sample, health file; Statistics Canada, National Population Health Survey, 1994/95 and 1996/97, cross sectional sample, North component

**Results**

*Routine Mammogram*

Nearly 70% of Canadian women, aged 50-69, reported having received a mammogram within the last two years. Of these, 51.8% received routine screening, and the remaining 17.7% received a mammogram for other reasons. Here we report only on routine screening, as this is the best indicator of the use of mammograms for preventive purposes.

All four Atlantic provinces have lower rates of routine mammogram screening than the rest of Canada. Newfoundland has the lowest rate in the country (41.7%), New Brunswick the second lowest (45%), Nova Scotia the third lowest (46.6%), and Prince Edward Island the fourth lowest (47.3%). The other provinces, in ascending order, are British Columbia (49.9%), Manitoba (50.1%), Alberta (50.8%), Quebec (53.2%), Saskatchewan (53.4%), and Ontario (53.5%).

Newfoundland and Labrador has the largest proportion of women, aged 50-69, who have not received a mammogram in the last two years (35.4% compared to the national average of 26.2%) (Figure 103). This may be part of the reason why Newfoundland and Labrador has a lower incidence of cancer than the national average, but a higher rate of cancer mortality.[206]

Data on screening rates for health districts, provided by the Canadian Community Health Survey, can help provincial and district health authorities to identify areas in particular need of these services, and of appropriate educational tools. Figure 104 indicates sharp regional variations in mammogram screening rates. Only two out of the 21 Atlantic region health districts have screening rates higher than the national average – South-Southwest (NS1) (58.6%) and Bathurst (NB6) (54.8%).

By contrast, less than a third of women, aged 50-69, in Grenfell (NF5) and Cape Breton (NS5) reported a routine mammogram screening in the last two years, as did 34% of women in Newfoundland's Western health district (NF4).[207] These three districts have a screening rate that is 35-40% lower than the national rate. The same three health districts have remarkably high proportions of women, aged 50-69, who have not received a mammogram for at least two years for any reason – 45% in Cape Breton (NS5) and the Western health districts (NF4), and 57% in Grenfell (NF5).[208] Surprisingly, for an urban area, St. John's (NF1) also registers a low rate of routine mammogram screening (39.3%), nearly 25% lower than the national average.

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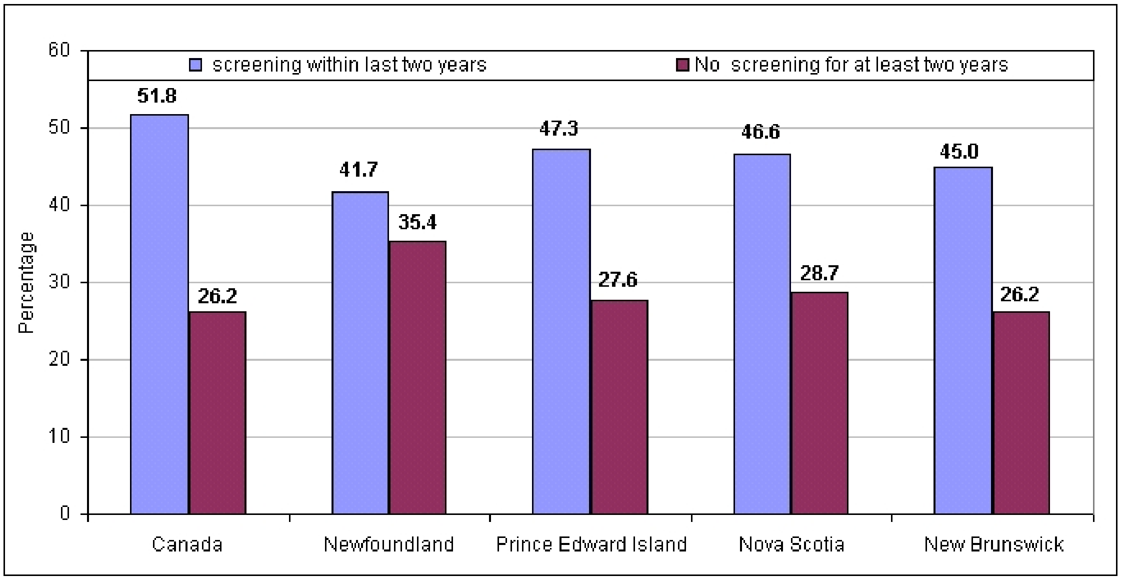
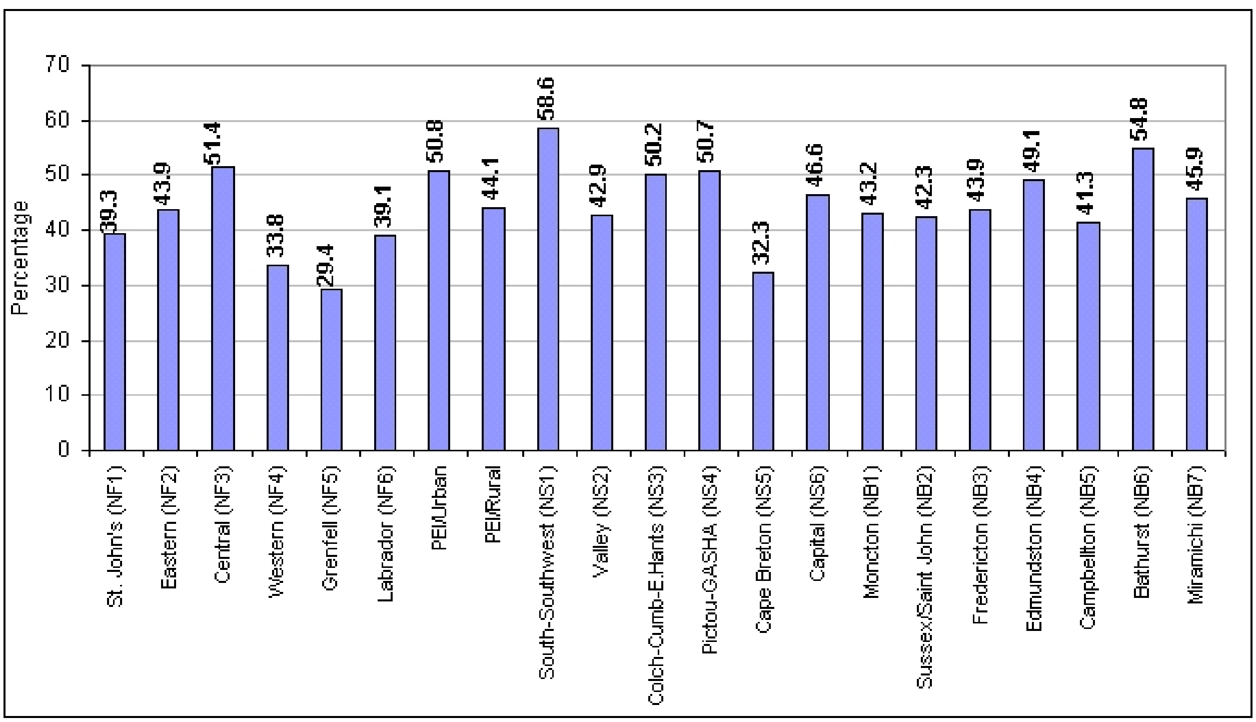
[206] National Cancer Institute of Canada, *Canadian Cancer Statistics 2002,* Toronto, 2002.
[207] Data for the Western (NF4) and Grenfell (NF5) health districts in Newfoundland and Labrador have a coefficient of variation (CV) from 16.6% to 33.3% and should be interpreted with caution.
[208] Again, data for the western (NF4) and Grenfell (NF5) health districts in Newfoundland and Labrador have a coefficient of variation (CV) from 16.6% to 33.3% and should be interpreted with caution.

**Figure 103. Proportion of women, aged 50 to 69, who have received a routine screening mammogram within the last two years, and those who have not received a mammogram for at least two years, Canada and Atlantic provinces, 2000/01, (%)**




Source: Statistics Canada, Canadian Community Health Survey, 2000/01

**Figure 104. Proportion of women, aged 50 to 69, who have received a routine screening mammogram within the last two years, Atlantic region health districts, 2000/01, (%)**




Note: Data for the Western (NF4), Grenfell (NF5), and Labrador (NF6) health districts in Newfoundland and Labrador have a coefficient of variation (CV) from 16.6% to 33.3% and should be interpreted with caution.

Source: Statistics Canada, Canadian Community Health Survey, 2000/01.

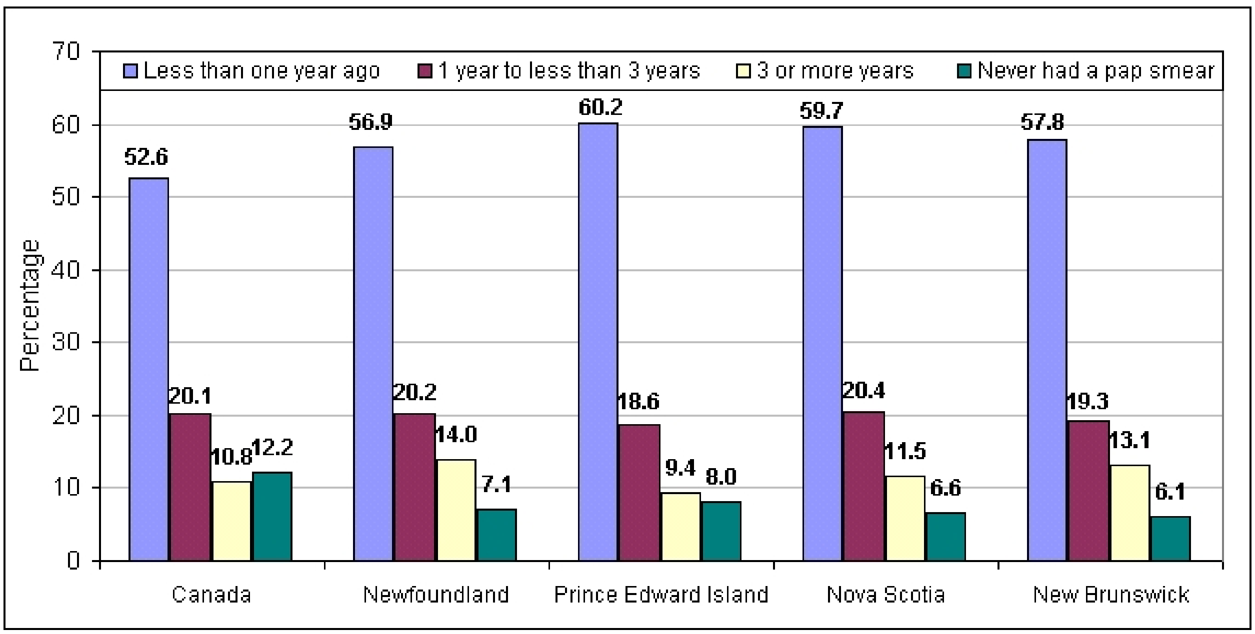
*Routine Pap Smear*

Among Canadian women aged 18-69, 52.6% have had a Pap smear test within the last year, and 72.7% have had a Pap smear within the last three years, as medically recommended. All four Atlantic provinces have higher proportions of women, 18 and over, who have had a Pap smear within the last year, and within the last three years.

In Newfoundland, 56.9% of women, aged 18 and over, have had a Pap smear within the last year, and 77.1% have had one within the last three years. In Prince Edward Island, the rates are 60.2% and 78.8% respectively; in Nova Scotia 59.7% and 80.1%; and in New Brunswick 57.8% and 77.1% (Figure 105).

In fact, Nova Scotia has the highest proportion of women, aged 18-69, in the country, who have received a Pap smear test within the last three years. PEI has the second highest rate of Pap smear testing in Canada, and Newfoundland and New Brunswick together have the third highest rate.

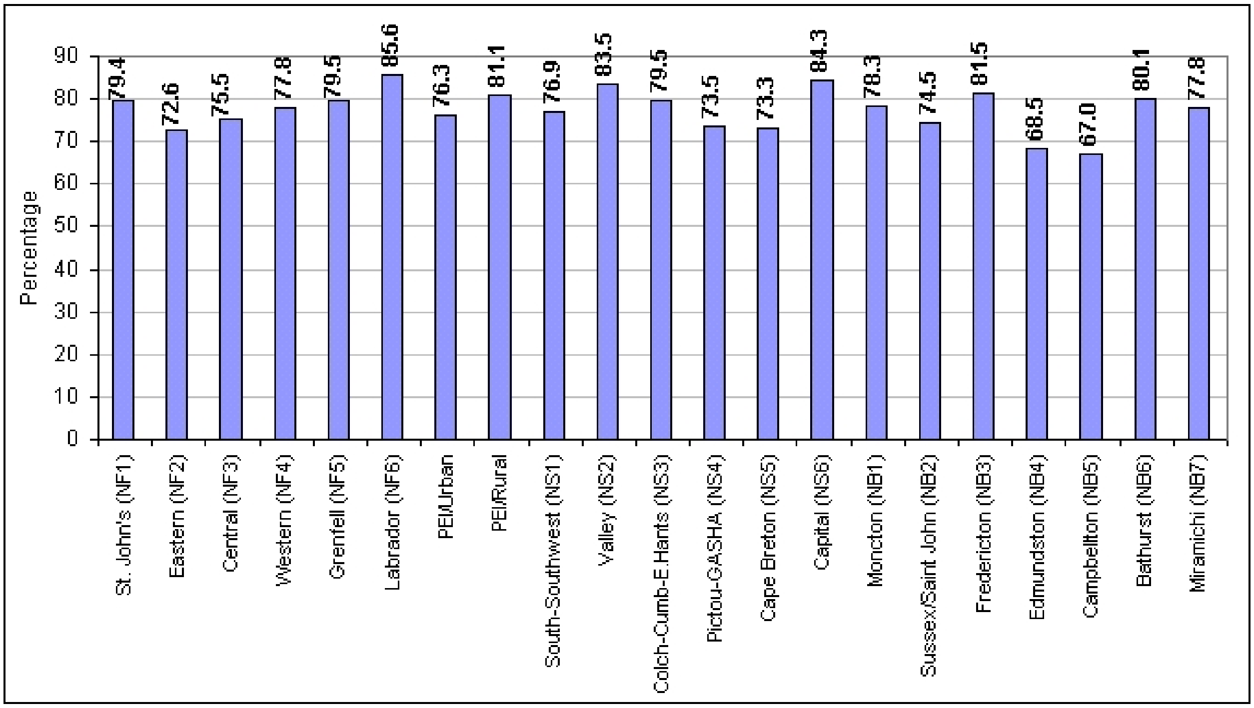
**Figure 105. Pap smear testing, as percentage of women aged 18 to 69, Canada and Atlantic provinces, 2000/01, (%)**




Source: Statistics Canada, Canadian Community Health Survey, 2000/01, health file.

With the exception of Edmundston (NB4) (68.5%) and Campbellton (NB5) (67%), all Atlantic region health districts have rates of Pap smear testing within the last three years that are comparable to, and mostly considerably better than, the national average (72.7%). Some health districts – Labrador (NF6) (85.6%), Central (NS6) (84.3%), and The Valley (NS2) (83.5%) have rates of Pap smear testing that are well above the national average.

**Figure 106. Proportion of women, aged 18 to 69, who have received a Pap smear test within the last three years, Atlantic region health districts, 2000/01, (%)**




Source: Statistics Canada, Canadian Community Health Survey, 2000/01, health file.

### *1.5.2 Immunization*

The National Consensus Conference on Population Health Indicators confirmed two immunization indicators in its "health system performance: accessibility" category – influenza immunization for those aged 65 and over, and childhood immunization. But it recognized that there were limited data availability for childhood immunization.[209] For that reason, only influenza immunization is considered here. Time and resources did not permit a health district breakdown of this indicator, but readers are referred to the appendices for this detailed information, and to Statistics Canada's health indicators web site at: http://www.statcan.ca/english/freepub/82-221-XIE/01002/tables/html/3216n.htm.

**Definition**

In the 1996/97 National Population Health Survey and the 2000/01 Canadian Community Health Survey, Statistics Canada assessed influenza immunization rates for the population aged 65 and over, according to respondents' reports on when they had their last influenza immunization (flu shot).[210]

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[209] Canadian Institute for Health Information, *National Consensus Conference on Population Health Indicators: Final Report,* Ottawa, 1999, page 5.
[210] Statistics Canada, http://www.statcan.ca/english/freepub/82-221-XIE/00502/defin3.htm#55

**Data Sources**

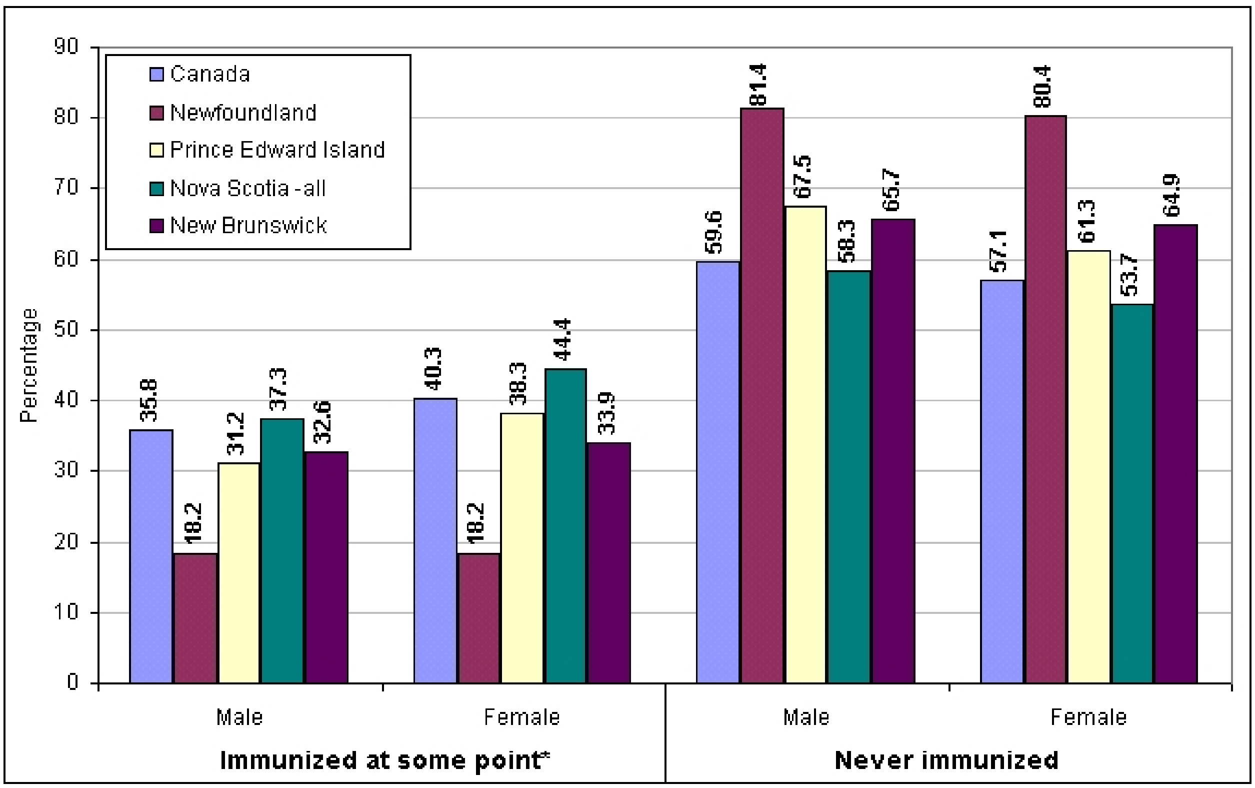
Statistics Canada, Canadian Community Health Survey, 2000/01, health file; Statistics Canada, National Population Health Survey, 1996/97, cross sectional sample, health file

**Results**

Canadian women, 65 and over, are more likely than senior men to have had a flu shot – 29.1% of women and 22.4% of men within the last year, and 40.3% of women and 35.8% of men at any time. Conversely, men are slightly more likely than women never to have had a flu shot. Nova Scotia and Prince Edward Island have a similar gender gap; New Brunswick has only a small male-female gap; and in Newfoundland, senior women and men are equally likely to have had a flu shot.

Nova Scotia has a higher rate of influenza immunization than the national average, but the other three Atlantic provinces have lower rates, with Newfoundland seniors less than half as likely as other Canadians to have had a flu shot (Figure 107).

**Figure 107. Proportion of men and women, 65 and over, immunized and never immunized for influenza, Canada and Atlantic provinces, 2000/01, (%)**




*Note: immunized includes those immunized less than a year ago and more than a year ago

Source: Statistics Canada, Canadian Community Health Survey, 2000/01, health file.

## 1.6 Environmental Indicators

CIHI's National Consensus Conference on Population Health Indicators proposed several environmental indicators for potential future development – exposure to second-hand smoke, air quality, water quality, toxic waste, and ecological footprint. However, none of these were confirmed at the May, 1999 conference as possible to compile from existing, comparable data sources.[211]

Since that time, Statistics Canada's Canadian Community Health Survey has gathered data on one of those recommended indicators – exposure to second-hand smoke – and this is therefore the only environmental determinant of health reported here. GPI Atlantic has independently compiled reports on water quality and ecological footprint, and will soon release new reports on air quality and solid waste resources, thereby hopefully contributing to CIHI's effort to develop these particular indicators.[212]

Health Canada has recognized environmental factors as key determinants of health:

> *"The physical environment is an important determinant of health in its own right. At certain levels of exposure, contaminants in our air, water, food and soil can cause a variety of adverse health effects, including cancer, birth defects, respiratory illness and gastrointestinal ailments. In the built environment, factors relating to housing, indoor air quality, and the design of communities and transportation systems can significantly influence our physical and psychological well-being.*
>
> *"The physical environment is also linked to other determinants of health. Active living requires green spaces, clean water and protection from exposure to excessive ultraviolet rays. Healthy eating depends on the availability of safe, nutritious foods. Healthy working conditions require safe workplaces that maximize comfort, productivity and well-being. Healthy child development can be dramatically affected by the physical environment because children are particularly vulnerable to environmental contaminants."*[213]

Health Canada has also recognized the links between poverty and likelihood of exposure to environmental hazards. It notes that the prevalence of childhood asthma, which is highly sensitive to airborne contaminants, has increased sharply in the last two decades. And it cites the World Health Organization's acknowledgement that unsustainable development pose serious threats to health – including climate change, stratospheric ozone depletion, and natural resource depletion.[214] Health Canada states:

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[211] Canadian Institute for Health Information, *National Consensus Conference on Population Health Indicators: Final Report,* Ottawa, 1999, page 6.
[212] For these reports, please visit the GPI Atlantic web site at: www.gpiatlantic.org.
[213] Health Canada, *Toward a Healthy Future: Second Report on the Health of Canadians,* Ottawa, 1999, page 96.
[214] Health Canada, *Toward a Healthy Future,* pages 96-97, citing World Health Organization, *Health and Environment in Sustainable Development: Five years after the Earth Summit,* Geneva, 1997.

> *"[T]here is a growing realization that Canada also has a global responsibility to protect and strengthen the world's environmental resource base. Air pollution and other environmental problems aren't restricted by national boundaries. Sustaining the health of the planet for future generations is our ultimate challenge."*[215]

In sum, the following discussion on exposure to second-hand smoke represents only a tiny fraction of the work that still remains to be done on environmental determinants of health. Yet it is, to date, the only environmental factor developed and reported by Statistics Canada in its current health indicator series, and thus represents an important first step in the development of the environmental determinants of health proposed at the CIHI National Consensus Conference on Population Health Indicators.

### *1.6.1 Exposure to Second-Hand Smoke*

Second-hand smoke contains over 4,000 different chemicals, of which 1,200 are known to be harmful to humans, including more than 50 known carcinogens and 103 chemicals identified as poisonous to humans. The chemical compounds in tobacco smoke include toxic heavy metals, pesticides, and dangerous chemicals like carbon monoxide, vinyl chloride, formaldehyde, hydrogen cyanide, radionuclides, benzene and arsenic.[216]

Because many jurisdictions in Atlantic Canada – both provincial and municipal – are currently adopting and considering legislation to ban second-hand smoke in public places, we have expanded this introductory section to provide legislators with a convenient summary of the known medical evidence on links between second-hand smoke and health. This material is adapted from an earlier GPI Atlantic report on *The Economic Impact of Smoke-Free Workplaces.*[217]

The U.S. Environmental Protection Agency has classified environmental tobacco smoke as a "Group A carcinogen," a classification reserved only for those compounds shown to cause cancer in humans based on studies of human populations.[218] Environmental tobacco smoke

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[215] Health Canada, *Toward a Healthy Future,* page 95.

[216] Ontario Tobacco Research Unit, University of Toronto, (2001), *Protection from Second-Hand Tobacco Smoke in Ontario: A review of the evidence regarding best practices,* Toronto, May, 2001, page 37; Hasbach, Ann, (1998), "Is Your Workplace a Threat to Your Health?", *Consulting-Specifying Engineer,* Denver, supplement on workplace protection, pages 28-33; Smoke-Free Kings (2000), *Smoke-Free By-laws: Questions and Answers,* October, 2000.

[217] Colman, Ronald, *The Economic Impact of Smoke-Free Workplaces,* GPI Atlantic, Halifax, October, 2001.

[218] For summaries of health risks due to second-hand smoke, see Health Canada, *Statistical Report on the Health of Canadians,* page 65; United States Environmental Protection Agency (1993 and 1994), *Respiratory Health Effects of Passive Smoking: Lung Cancer and Other Disorders,* National Institutes of Health, National Cancer Institute, Smoking and Tobacco Control Mongraph 4 (NIH publication 93-3605), Bethesda, Maryland, August, 1993, and "Setting the Record Straight: Secondhand Smoke is a Preventable Health Risk," EPA publication no. 402-F-94-005, June, 1994; Nova Scotia Department of Health, *Smoke-Free Places: Towards Healthier Communities in Nova Scotia: A Discussion Paper,* 1997; National Research Council, Committee on Passive Smoking, Board on Environmental Studies and Toxicology, *Environmental Tobacco Smoke: Measuring Exposures and Assessing Health Effects,* National Academy Press, Washington D.C., 1986. Health Canada, "Passive Smoking: Nowhere to Hide," available at http://www.hc-sc.gc.ca/hppb/tobaccoreduction/factsheets/passive.htm. For a comprehensive set

(ETS) causes more mortality than all other known environmental toxins combined,[219] and increases the risk of death from heart disease by 20%-30% for non-smokers married to smokers.[220]

Six major scientific reviews by national scientific and government agencies in the 1990s identified fifteen diseases or conditions as known or suspected to be caused by exposure to second-hand smoke. These include four developmental diseases or conditions, seven respiratory diseases or conditions, three cancers, and coronary heart disease. Recent research has also implicated ETS as a possible cause of breast cancer and stroke.[221]

Those most at risk of illness and death due to exposure to second-hand smoke are:

a) Infants and children of smokers, who incur significant risks of respiratory infections, ear problems, asthma, and sudden infant death syndrome. For example, second-hand smoke increases the risk of chronic middle-ear infection in children of smokers by 3.5 times, and the risk of asthma and asthma wheeze by more than 50%.[222]
b) Spouses of smokers who have a higher risk of lung cancer and heart disease.[223]
c) Employees exposed to second-hand smoke in the workplace.[224]

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of references, see footnotes 106-124 in Report to the Minister of Health from Expert Panel on the Renewal of the Ontario Tobacco Strategy, *Actions Will Speak Louder than Words,* February, 1999.

[219] Hyland, Andrew, and Cummings, Michael, (1999), "Consumer Response to the New York City Smoke-Free Air Act," *Journal of Public Health Management and Practice* 5(1): 28-36, January, 1999, page 28, citing US Environmental Protection Agency, (1992), *Respiratory Health Effects of Passive Smoking: Lung Cancer and Other Disorders,* Publication no. EPA 600/6-90/006F, Washington DC.

[220] Heart and Stroke Foundation of Canada, (1994), *Environmental Tobacco Smoke: Behind the Smokescreen,* Ottawa.

[221] Ontario Tobacco Research Unit, University of Toronto, (2001), *Protection from Second-Hand Tobacco Smoke in Ontario: A review of the evidence regarding best practices,* Toronto, May, 2001, pages v and vi.

[222] US Environmental Protection Agency, (1993), op. cit., California Environmental Protection Agency, Office of Environmental Health Hazard Assessment, (1997), *Health Effects of Exposure to Environmental Tobacco Smoke,* Sacramento; Report to the Minister of Health from Expert Panel on the Renewal of the Ontario Tobacco Strategy. (1999), op. cit., Mitchell, E.A. et al., (1993), "Smoking and sudden infant death syndrome," *Pediatrics* 91: 1893-1896; Cohen-Klonoff, H.S., et al., "The effect of passive smoking and tobacco exposure through breast milk on sudden infant death syndrome," (1995), *Journal of the American Medical Association* 273: 795-798; Lister, Susan and Jorm, Louisa, (1998), "Parental smoking and respiratory illnesses in Australian children aged 0-4 years: ABS 1989-90 National Health Survey results, *Australian and New Zealand Journal of Public Health,* 22: 781-786, Canberra, December, 1998.

[223] Stockwell, H.G. et al., (1992), "Environmental tobacco smoke and lunch cancer risk in nonsmoking women," *Journal of the National Cancer Institute* 84: 1417-1422; Fontham, E.T., et al., (1994), "Environmental tobacco smoke and lung cancer in nonsmoking women: A multicenter study," *Journal of the American Medical Association* 271: 1752-1759; Hackshaw et al., op. cit., Kawachi, I., et al., (1997), "A prospective study of passive smoking and coronary heart disease," *Circulation* 95: 2374-2379; Law, M.R., et al., (1997), "Environmental tobacco smoke exposure and ischaemic heart disease: an evaluation of the evidence," *British Medical Journal* 315: 973-980.

[224] American College of Occupational and Environmental Medicine (ACOEM), (2000), *Epidemiological Basis for an Occupational and Environmental Policy on Environmental Tobacco Smoke,* July 30, 2000, available at http://www.acoem.org/paprguid/papers/etspaper.htm; Boffetta et al. (1998), op. cit., Wells, A.J., (1998), "Heart disease from passive smoking in the workplace," *Journal of the American College of Cardiology* 31: 1-9; Hammond, S.K., et al., (1995), "Occupational exposure to environmental tobacco smoke," *Journal of the American Medical Association* 274: 956-960; Thompson B. et al., (1995), "ETS exposure in the workplace," *Journal of Occupational and Environmental Medicine* 37: 1086-1092; Mannino, D.M., (1997), "Environmental tobacco smoke exposure in the home and worksite and health effects in adults: Results from the 1991 National Health Survey," *Tobacco Control* 6: 296-305; Repace, J.L., et al., (1980), "Indoor air pollution, tobacco smoke and public health,"

Restaurant, bar and casino workers are exposed to the highest levels of environmental tobacco smoke of any occupational or demographic group, and they have less protection from second-hand smoke than any other group of employees.

Cotinine, the major metabolite of nicotine, is the most common biologic marker of ETS exposure.[225] Casino workers in a well-ventilated Atlantic City casino were found, at the end of their shifts, to have a geometric mean serum and urine cotinine level attributable to ETS exposure of 1.85 ng/mL. This is between *three* and *six* times higher than other workers exposed to ETS at work (0.32 - 0.65 ng/mL.).[226]

Levels of environmental tobacco smoke in restaurants are about 1.6-2.0 times higher than in office workplaces that do not have total smoking bans, and 1.5 times higher than in residences with at least one smoker. ETS levels in bars are 3.9-6.1 times higher than in offices and 4.5 times higher than in residences with a smoker. [227]

Summarizing that evidence, which is based on ambient air survey data on ETS levels in more than 1,000 offices, more than 400 restaurants, and more than 600 homes, Dr. Michael Siegel of the University of California concludes:

> *"Environmental tobacco smoke is a significant occupational health hazard for food-service workers. To protect these workers, smoking in bars and restaurants should be prohibited."*[228]

While most regulatory efforts have focused on protecting the public in general, and restaurant and bar patrons in particular, from the effects of environmental tobacco smoke, Siegel points out that restaurants are also workplaces. Restaurant and bar employees spend a much longer time

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*Science,* 208: 464-472; Eisner, Mark, et al., (1998), "Bartenders' Respiratory Health After Establishment of Smoke-Free Bars and Taverns," *Journal of the American Medical Association,* 280 (22): 1909-1914, December 9, 1998; Siegel, Michael (1993), "Involuntary Smoking in the Restaurant Workplace: A Review of Employee Exposure and Health Effects*," Journal of the American Medical Association*, 270 (4), July 28, 1993; Dimich-Ward H., et al., (1997), "Analysis of nicotine and cotinine in the hair of hospitality workers exposed to environmental tobacco smoke," *Journal of Occupational and Environmental Medicine* 39: 946-948.

[225] Biologic monitoring of exposure to ETS is most commonly conducted by measuring cotinine in the serum and/or urine. Cotinine, the major metabolite of nicotine, has a half-life of 16-20 hours, and therefore reflects exposure to nicotine from the previous one to two days. (Trout D., et al., (1998), "Exposure of casino employees to environmental tobacco smoke," *Journal of Occupational and Environmental Medicine* 40: 270-276, page 271.) There are no other significant sources of cotinine aside from tobacco smoke, and so it is regarded as a reliable indicator of ETS exposure in non-smokers.

[226] Trout D., et al., (1998), "Exposure of casino employees to environmental tobacco smoke," *Journal of Occupational and Environmental Medicine* 40: 270-276; study conducted for the Division of Surveillance, Hazard Evaluation and Field Studies, U.S. National Institute for Occupational Safety and Health. On excess ETS exposure of food service employees, see Gerlach, K., et al., (1997), "Workplace smoking policies in the United States: results from a national survey of over 100,000 workers," cited in Glantz, Stanton and Smith, Lisa, (1997) "The Effect of Ordinances Requiring Smoke-Free Restaurants and Bars on revenues: A Follow-Up," *American journal of Public Health* 87 (10): 1687-1693), footnote 19, pages 1692-1693.

[227] Siegel, Michael, (1993), "Involuntary Smoking in the Restaurant Workplace: A Review of Employee Exposure and Health Effects," *Journal of the American Medical Association* 270 (4), July 28, 1993; Trout, D., op. cit.; Eisner (1998), op. cit.

[228] Siegel, op. cit., page 490.

exposed to ETS than do patrons, and their exposure is more likely to result in adverse health effects for them:

> *"Public health efforts to regulate smoking in bars and restaurants can no longer focus only on protecting the patron. Food-service workers must be afforded the same public health protection as other workers."*[229]

For this reason, Health Canada recommends that 100% smoke-free bans in workplaces include *all* workplaces, including the hospitality sector.[230]

*Second-hand smoke and lung cancer*

Nearly 30 years ago, the U.S. Surgeon-General, Jesse L. Steinfeld, concluded that the very high carcinogenicity of cigarette smoke created a probable risk of lung cancer for nonsmokers.[231] It took 15-20 more years for that evidence to be scientifically validated beyond any reasonable doubt, and for leading scientific and health agencies throughout the world to confirm the causal link between environmental tobacco smoke and lung cancer.

These agencies include:

- The World Health Organization (1986 and 1999),
- The U.S. National Academy of Sciences of the National Research Council (1986),
- The Australian National Health and Medical Research Council (1987),
- The U.K. Department of Health and Social Security (1988),
- The U.S. Environmental Protection Agency (EPA) (1992),
- The U.S. Public Health Service (1986),
- The U.S. National Institute for Occupational Safety and Health (1991),
- The American College of Occupational and Environmental Medicine (1993 and 2000),
- The California Environmental Protection Agency (1997),
- The Australian National Health and Medical Research Council (1997),
- The United Kingdom Scientific Committee on Tobacco and Health (1998)
- The U.S. National Toxicology Program *(Ninth Annual Report on Carcinogens, 2000)*.[232]

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[229] Siegel, op. cit., page 493.

[230] Health Canada, *The Economics of Workplace Smoking Restrictions,* available at: http://www.hc-sc.gc.ca/hppb/tobacc…tions/workplace/work/wplcsmk05.htm.

[231] Steinfeld, Jesse L. (1972), "The public's responsibility: A bill of rights for the non-smoker," *Rhode Island Medical Journal* 55, 124-126, cited in Burns, David M. (1992), "Environmental Tobacco Smoke: The Price of Scientific Certainty," *Journal of the National Cancer Institute,* 84 (18): 1387-1388, September 16, 1992.

[232] Hackshaw, A. K., Law, M.R., and Wald, N.J., (1997) "The accumulated evidence on lung cancer and environmental tobacco smoke," *British Medical Journal,* 315: 980-988, October 18, 1997, footnotes 1-4; and Burns, op. cit., footnotes 1-5, American College of Occupational and Environmental Medicine, Position Statement, July 30, 2000, available at http://www.acoem.org/paprguid/papers/etspaper.htm; National Toxicology Program, *Ninth Annual Report on Carcinogens,* available at http://ehis.niehs.nih.gov/roc/ninth/known/ets.pdf.; the conclusions of six of these major scientific reviews are summarized in Ontario Tobacco Research Unit, University of Toronto (2001), *Protection from Second-Hand Smoke in Ontario: A review of evidence regarding best practices,* May, 2001, pages 1-20.

These reviews, carried out by panels of respected, independent scientists or by government agencies with review by scientific expert panels, have all been scientifically rigorous and scrupulous in their methodologies and procedures.

For example, the California Environmental Protection Agency's comprehensive five-year study on the health effects of exposure to ETS was peer reviewed by California's Scientific Review Panel, a body created under California law to provide independent peer review of many scientific aspects of the state's toxic air contaminants and air pollution programs. The California EPA also held public workshops, solicited input from all interested parties including the tobacco industry, and made drafts of the report available for public comment and criticisms.[233]

In addition to the 12 official reports listed above, more than 40 scientific studies have now established the causal role of ETS in the induction of lung cancer. What is remarkable is the high degree of consensus that has emerged from all these published studies on the health hazards of second-hand smoke.[234] It is necessary to emphasize here both the scientific rigour of those studies and their broad agreement on the health effects of ETS because of the tobacco industry's consistent denials and because its strategy of choice has been to find fault with some aspect of each study's methodology.

A 1997 *British Medical Journal (BMJ)* review of "the accumulated evidence on lung cancer and environmental tobacco smoke" concluded that non-smokers living with a smoker have an excess lung cancer risk of 24%. Positive and negative adjustments for bias, misclassification, and diet produced an adjusted excess risk of 26%.[235] The 1998 report of the United Kingdom Scientific Committee on Tobacco and Health similarly concluded that ETS exposure is a cause of lung cancer, and that those with long-term exposure have an increased risk of 20-30%.[236]

Epidemiological evidence in both the U.S. and Europe demonstrates that the increase of lung cancer risk from workplace exposure is generally the same as that for household exposure.[237]

However, as noted above, the excess risk of lung cancer is considerably higher for restaurant, bar and casino workers, who are exposed to much higher levels of ETS than other workers. Six separate epidemiological studies that controlled for active smoking found an average excess lung cancer risk of 50% for food-service workers compared with the general population. This is double the excess risk facing workers in other workplaces that do not prohibit smoking.[238]

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[233] Ontario Tobacco Research Unit, University of Toronto (2001), *Protection from Second-Hand Smoke in Ontario: A review of evidence regarding best practices,* May, 2001, page 4.
[234] Ibid., page 1.
[235] Hackshaw, et al., op. cit.
[236] Ontario Tobacco Research Unit, University of Toronto (2001), *Protection from Second-Hand Smoke in Ontario: A review of the evidence regarding best practices,* Toronto, May, 2001, page 7.
[237] Wells, A.J., "Lung cancer from passive smoking at work," (1998), *American Journal of Public Health* 88: 1025-1029; ACOEM, (2000), op. cit., page 3. The 12-centre case-control study of lung cancer and ETS in seven European countries found an excess risk of 16% for exposure to spousal ETS, and 17% for exposure to workplace ETS (Boffetta, et. al., 1998, op. cit.)
[238] Siegel, op. cit., page 490; Dimich-Ward, H., et al., (1988), "Occupational Mortality among Bartenders and Waiters," Canadian Journal of Public Health 79: 194-197; Hyland, Andrew, and Cummings, Michael, (1999), "Consumer Response to the New York City Smoke-Free Air Act," *Journal of Public Health Management and Practice* 5 (1): 28-36, January, 1999, footnotes 4-11, page 35.

Twenty separate studies have now found a dose-response relation between intensity and duration of exposure to ETS on the one hand and lung cancer risk on the other. On average, the risk for a non-smoker increases by 23% for every 10 cigarettes smoked per day by a spouse, and by 88% if the spouse smokes 30 a day. Lung cancer risk increases by an average of 11% for every 10 years of exposure to ETS in the home, and by 35% for 30 years exposure.[239] Up to one-quarter of lung cancer deaths in non-smokers are related to second-hand smoke.[240]

Although the vast majority of studies to date have been on spousal exposure to ETS, this dose-response relationship is now being confirmed in the workplace as well. A recent case-control study in German workplaces found a statistically significant dose-related excess lung cancer risk among exposed workers (odds ratio: 1.93; confidence interval 1.04-3.58).[241]

As well, biochemical evidence has now confirmed earlier epidemiological evidence. Four studies have found urinary cotinine concentration in non-smokers living with smokers to be, on average, three times the levels found in non-smokers living with non-smokers. Nicotine from tobacco smoke is the only source of cotinine. Relative to non-smokers with no exposure to environmental tobacco smoke (urinary cotinine zero), non-smokers living with a smoker have a 42% higher risk of lung cancer based on this biochemical marker.[242]

In summary, the most recent studies strongly confirm the conclusions of national and international scientific and medical committees and organizations a decade earlier, that passive smoking is a cause of lung cancer (See section 1.2 above.) Based on all the available evidence, the *BMJ* review concluded:

> *"The epidemiological and biochemical evidence on exposure to environmental tobacco smoke, with the supporting evidence of tobacco specific carcinogens in the blood and urine of non-smokers exposed to environmental tobacco smoke, provides compelling confirmation that breathing other people's tobacco smoke is a cause of lung cancer…. All the available evidence confirms that exposure to environmental tobacco smoke causes lung cancer….*
>
> *The similarity of the direct estimate of lung cancer due to environmental tobacco smoke and the indirect estimate from extrapolating from the risk in smokers, the evidence of a dose-response relation, the inability of bias or confounding to explain the association, and the presence of tobacco specific carcinogens in the blood and urine of non-smokers lead to an inescapable conclusion that exposure to environmental tobacco smoke is a cause of lung cancer."*[243]

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[239] Hackshaw et al., op. cit.
[240] Heart and Stroke Foundation of Canada, (1994), *Environmental Tobacco Smoke: Behind the Smokescreen,* Ottawa.
[241] Kreuzer, M., et al. (2000), "Environmental tobacco smoke and lung cancer: a case-control study in Germany," *American Journal of Epidemiology* 151: 241-250; ACOEM, op. cit., page 3.
[242] Hackshaw, et al., op. cit.
[243] Idem.

*Second-hand smoke and other cancers*

In 1992, the United States Environmental Protection Agency concluded that environmental tobacco smoke is a *"Group A human carcinogen, the EPA classification 'used only when there is sufficient evidence from epidemiological studies to support a causal association between exposure to the agents and cancer'."*[244]

The finding was confirmed in the Ninth Report on Carcinogens of the U.S. National Toxicology Program, which in 2000 added ETS to its official list of 41 known human carcinogens, which includes substances such as asbestos, coke oven emissions, radon, and mustard gas:

> *"Environmental tobacco smoke (ETS) is known to be a human carcinogen based on sufficient evidence of carcinogenicity from studies in humans that indicate a causal relationship between passive exposure to tobacco smoke and human lung cancer. Studies also support an association of ETS with cancers of the nasal sinus."*[245]

This classification by the National Toxicology Program is highly significant, because regulatory bodies, including occupational health and safety agencies, often use its classifications for their own regulatory control action. These agencies generally recognize that there is no safe level of exposure to known human carcinogens, and recommend no exposure to known human carcinogens. In short, the classification requires concerted action to eliminate involuntary exposure to tobacco smoke.[246]

Not only has second-hand smoke been classified as a known human carcinogen in its own right, but at least eight other substances on the National Toxicology Program's list of 41 known human carcinogens are also components of tobacco smoke. These include 4-aminobiphenyl, arsenic, benzene, 1,3-butadiene, cadmium, chromium VI, 2-naphthylamine, and vinyl chloride.[247] In addition, the International Agency for Research on Cancer has determined that there is sufficient evidence of carcinogenicity in animals for 43 chemicals in tobacco smoke.[248]

It has been estimated that second-hand smoke may actually cause more than three times as many deaths due to other cancers than due to lung cancer.[249] But because lung cancer is so specific to cigarette smoking, and because other cancers have a far greater range of potential triggers,

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[244] United States Environmental Protection Agency (1992), *Respiratory Health Effects of Passive Smoking: Lung Cancer and Other Disorders,* Office of Research and Development, EPA/600/6-90/006F, December, 1992, cited in Ontario Tobacco Control Unit, University of Toronto, *Protection from Second-Hand Tobacco Smoke in Ontario: A review of the evidence regarding best practices,* Toronto, May, 2001.

[245] U.S. Department of Health and Human Services, Public Health Service, National Toxicology Program (2000), *Ninth Report on Carcinogens,* Washington, DC, available at: http://ehis.niehs.nih.gov/roc/ninth/known/ets.pdf.

[246] Ontario Tobacco Control Unit, University of Toronto, *Protection from Second-Hand Tobacco Smoke in Ontario: A review of the evidence regarding best practices,* Toronto, May, 2001, page 20.

[247] Ibid., page 8.

[248] Ontario Tobacco Research Unit, University of Toronto, (2001), *Protection from Second-Hand Tobacco Smoke in Ontario: A review of the evidence regarding best practices,* Toronto, May, 2001, page 37.

[249] Glantz, Stanton, and William Parmley, (1995) "Passive Smoking and Heart Disease: Mechanism and Risk," *Journal of the American Medical Association,* 273 (13), April 5, 1995; Glantz, Stanton, and William Parmley, (1991), "Passive Smoking and Heart Disease: Epidemiology, Physiology, and Biochemistry," *Circulation* 83 (1), January, 1991, Clinical Progress Series, pages 1-12.

research in this area has lagged the ETS-lung cancer studies, and the evidence is more recent. As noted earlier, this is not surprising, as lung cancer was also the first disease definitively associated with active smoking, with other associations proven more recently.

Because of the multiple causes of other cancers, biochemical evidence has been critical in recent research, and considerable efforts have focused on the emerging role of carcinogen biomarkers and molecular epidemiology. This incorporation of carcinogen biomarkers into epidemiological studies can potentially provide greater specificity in linking exposure and disease than conventional techniques.[250]

Carcinogens in environmental tobacco smoke are inhaled and pass into the blood where they can be metabolically activated. If elevated levels of particular carcinogens are found in the blood and urine samples of non-smokers exposed to ETS, higher risks can therefore be expected for the types of cancer associated with those particular carcinogens.

Elevated blood levels and urinary concentrations of tobacco-specific carcinogens, including DNA and haemoglobin adducts, have in fact been found in non-smokers exposed to ETS for all three major classes of carcinogens in tobacco smoke – polynuclear aromatic hydrocarbons (PAHs), nitrosamines, and aromatic amines.[251]

Certain tobacco-specific PAHs found in ETS, such as benzo[a]pyrene, are well-established respiratory carcinogens, while a haemoglobin adduct like 4-aminobiphenyl (4-ABP), also present in ETS, is a potent bladder carcinogen. Three separate studies have found 4-ABP-hemoglobin adduct levels in non-smokers exposed to ETS to be 14%-20% of the levels in smokers, with levels of 4-ABP adducts increasing significantly with increased ETS exposure.[252]

Interestingly, the 14% figure is roughly proportional to the estimated ratio of mortality rates for passive and active smoking, and the dose-response relationship indicates that restaurant, bar and casino workers are at higher risk for bladder and other cancers than other workers, due to their higher levels of ETS exposure. The authors of one study concluded:

> *"Nonsmokers may receive a nontrivial dose of carcinogens from environmental tobacco smoke proportional to their exposure to environmental tobacco smoke…. The relationship between environmental tobacco smoke exposure and 4-ABP-hemoglobin adduct levels supports epidemiological evidence that environmental tobacco smoke is carcinogenic to passive smokers."*[253]

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[250] Hecht, Stephen, (1994), "Environmental Tobacco Smoke and Lung Cancer: the Emerging Role of Carcinogen Biomarkers and Molecular Epidemiology," *Journal of the National Cancer Institute,* 86 (18), September 21, 1994, page 1369; Crawford, F.G., et al., "Biomarkers of environmental tobacco smoke in preschool children and their mothers," *Journal of the National Cancer Institute* 86: 1398-1402.

[251] Idem.; Hackshaw, et al., op. cit., Mclure, M., et al., (1989), "Elevated blood levels of carcinogens in passive smokers," *American Journal of Public Health* 79: 1381-1384; Hecht, S., et al., (1993), "A tobacco-specific lung carcinogen in the urine of men exposed to cigarette smoke," *New England Journal of Medicine* 329: 1543-1546; Bartsch H., et al., (1990), "Carcinogen haemoglobin adducts, urinary mutagenicity and metabolic phenotype in active and passive cigarette smokers," *Journal of the National Cancer Institute* 82: 1826-1831; Crawford, et al., op. cit.

[252] Hammond, S.K., et al., (1993), "Relationship between environmental tobacco smoke exposure and carcinogen-hemoglobin adduct levels in nonsmokers," *Journal of the National Cancer Institute* 85: 474-478.

[253] Idem.

Second-hand smoke has also been linked to other cancers, such as nasal sinus cancer and cervical cancer.[254] However, it must be acknowledged that epidemiological evidence on the relationship between ETS and other cancers is still being gathered and lags the evidence on ETS and lung cancer by about two decades.

Interestingly, as research continues, new studies continue to reinforce the results of the major international scientific agencies described here, and none have called into question the basic findings that ETS causes lung cancer, nasal sinus cancer, heart disease, and other ailments. Instead, the new research points to previously unrecognized effects of exposure to second-hand smoke, including stroke and breast cancer.

A large Canadian study by the Canadian Cancer Registries Epidemiology Research Group (2000) found that both active *and* passive smoking about doubled the risk of breast cancer in pre-menopausal women. Among post-menopausal women, active smoking increased the risk of breast cancer by 50%, and exposure to second-hand smoke increased the risk by 20%. Dose-response relationships were observed for both active smoking and exposure to second-hand smoke. These results are confirmed by nine published studies that have controlled properly for second-hand smoke exposure. Taken together, the results also show almost a doubling of breast cancer risk with *both* long-term active smoking *and* regular exposure to second-hand smoke.[255]

The elevated levels of known tobacco-related carcinogens in the blood and urine of non-smokers exposed to ETS constitute strong "circumstantial" evidence that argues for immediate protective action. Such action is warranted on the grounds that the mechanisms and pathways between ETS exposure and other cancers are well known and physiologically and biochemically plausible. One study notes:

> *"Long-term exposure to ETS exerts carcinogenic effects by increasing the cumulative risk that a carcinogenic molecule from ETS will damage a cell and then initiate or promote the carcinogenic process."*[256]

That process applies to many cancers other than lung cancer. Further molecular epidemiological studies hold the promise to link the 50 known human and animal carcinogens in ETS to particular cancers with a far greater degree of specificity than is possible today.

### *ETS and Heart Disease*

Just as it took longer to establish the links between active smoking and heart disease than between smoking and lung cancer, so the evidence on ETS and heart disease is also correspondingly more recent. As noted above, this is largely because the many risk factors in

[254] National Cancer Institute Monograph #10, *Health Effects of Exposure to Environmental Tobacco Smoke: the report of the California Environmental Protection Agency,* cited in ACOEM (2000), op. cit., and available at http://rex.nci.nih.gov/nic_monographs/index.htm.
[255] Ontario Tobacco Control Unit, University of Toronto, *Protection from Second-Hand Tobacco Smoke in Ontario: A review of the evidence regarding best practices,* Toronto, May, 2001, pages 12-13.
[256] Glantz and Parmley, op. cit., page 4.

heart disease have made it more challenging to identify the causal links with smoking and to control for the wide range of other possible risk factors.

By 1983, the U.S. Surgeon-General was able to establish that cigarette smoking is the largest preventable cause of heart disease in the United States.[257] Once the link was confirmed, smoking was found to kill more people due to heart disease than due to lung cancer.

As recently as 1986, there was insufficient evidence to link heart disease unequivocally with ETS.[258] That situation dramatically shifted in the 1990s with leading researchers definitively concluding that "passive smoking causes heart disease," and that about ten times as many passive smokers die of heart disease as die of lung cancer. A review of ten studies found that both male and female non-smokers exposed to ETS in the home have an overall 30% higher risk of death from heart disease than those married to non-smokers. [259]

These mortality estimates are confirmed in studies on heart disease *incidence* attributable to second-hand smoke. Statistically significant dose-response relationships have been found between increasing amounts of smoking by the spouse and the risk of heart disease in the non-smoking spouse.[260] Dr. Malcolm Law of the Wolfson Institute of Preventive Medicine in London analyzed 19 published studies involving 6,600 people, and found that people who have never smoked also have a 30% greater chance of developing heart disease if they live with a smoker:

> *"Our result confirms the high risk of heart attack arising from breathing other people's smoke and shows that it is likely to be due to the blood clotting system being very sensitive to small amounts of tobacco smoke."*[261]

[257] US Public Health Service (1983), *The Health Consequences of Smoking: Cardiovascular Disease: A Report of the Surgeon-General,* US Department of Health and Human Services 84-50202.
[258] US Public Health Service, (1986), *The Health Consequences of Involuntary Smoking: A Report of the Surgeon-General,* Centers for Disease Control #87-8398; National Research Council, (1986), *Environmental Tobacco Smoke: Measuring Exposure and Assessing Health Effects,* National Academy Press, Washington D.C.
[259] Steenland, Kyle, (1992), "Passive Smoking and the Risk of Heart Disease," *Journal of the American Medical Association,* 267 (1): 94-99, January 1, 1992; Glantz, Stanton and Parmley, William, (1995), "Passive Smoking and Heart Disease: Mechanisms and Risk," *Journal of the American Medical Association,* 273 (13), April 5, 1995; Glantz, Stanton, and Parmley, William, (1991), "Passive Smoking and Heart Disease: Epidemiology, Physiology, and Biochemistry," *Circulation* 83 (1), January, 1991, Clinical Progress Series, pages 1-12; Kawachi, I. et al., (1997), "A Prospective Study Of Passive Smoking And Coronary Heart Disease," *Circulation* 95: 2374-2379; Law, M.R. et al., (1997), "Environmental tobacco smoke exposure and ischaemic heart disease: an evaluation of the evidence," *British Medical Journal* 315: 973-980; Humble, C. et al., (1990), "Passive Smoking and 20-year cardiovascular mortality among non-smoking wives, Evans County, Georgia, *American Journal of Public Health,* 80: 599-601; Howard, G., et al., (1998), "Cigarette Smoking and Progression of Atherosclerosis: The Artherosclerosis in Communities (ARIC) Study," *Journal of the American Medical Association* 279: 119-124; Wells, A. J., (1994), "Passive Smoking as a Cause of Heart Disease," *Journal of the American College of Cardiology* 24: 546-554; Wells, A. J., (1998), "Heart Disease from Passive Smoking in the Workplace," *Journal of the American College of Cardiology* 31: 1-9; National Clearinghouse on Tobacco and Health (1995), The Health Effects of Tobacco Use," cited in Nova Scotia Department of Health, *Towards Healthier Communities in Nova Scotia: A Discussion Paper,* available at http://www.gov.ns.ca/health/smoke_free/default.htm.
[260] Glantz and Parmley (1991), op. cit, pages 2-3; Steenland, op. cit., page 95; Humble C., (1990), op. cit., Hole, D., et al., (1989), "passive smoking and cardiorespiratory health in a general population in the west of Scotland," *British Medical Journal* 299: 423-427; Helsing, K., et al., (1988), "Heart disease mortality in nonsmokers living with smokers," *American Journal of Epidemiology,* 127: 915-922.
[261] Law, et al., (1997), op. cit., and study report in *Times of London,* 17 October, 1997.

Far fewer workplace studies have been conducted, but most studies show similar levels of ETS exposure where no workplace smoking bans are in effect as in the homes of smokers, with significantly higher levels of exposure in restaurants, bars and casinos. Specific workplace studies have now found that workers exposed to second-hand smoke at work experience excess heart disease, with a statistically significant linear trend with measures of increasing exposures.[262]

The American Heart Association has determined that passive smoking is an important risk factor for heart disease, and the U.S. Occupational Safety and Health Administration (OSHA) has included the effects of ETS on the heart in its risk assessments of passive smoking.[263] The California Environmental Protection Agency has concluded that both heart disease mortality, and acute and chronic heart disease morbidity are causally associated with ETS exposure.[264]

Pooling the available statistical evidence from 12 different epidemiological studies, and accounting for confidence levels, researchers have concluded that one can be *"more than 97.5% confident that passive smoking increases the risk of death from heart disease."*[265] Observation of eleven more studies of non-fatal cardiac events, including three demonstrating dose-response relationships, with higher exposures of second-hand smoke associated with larger increases in risk, led the researchers to conclude:

> *"The fact that passive smoking increases the risk of nonfatal coronary events is consistent with what we know about the physiology and biochemistry of how passive smoking affects the heart…. In addition, the fact that the observed risks are of comparable magnitude across studies done in many countries and controlling for a variety of the other risk factors for heart disease strengthens the confidence once can have in reaching the conclusion that passive smoking causes heart disease."*[266]

As this statement implies, the epidemiological evidence has been immeasurably strengthened in recent years by research into the physiological and biochemical mechanisms by which ETS causes heart disease and other illnesses. Non-smokers who inhale the toxic gases, particles and chemicals from both the lighted end of a cigarette and from the smoker's own exhalation, take nicotine, carbon monoxide and other substances into their own bloodstreams.

After half an hour, the blood pressure and heartbeat of these non-smokers has been found to rise measurably, indicating extra stress placed on the heart.[267] It is now known that second-hand

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[262] ACOEM, op. cit., page 3; He Y., et al., (1994), "Passive smoking at work as a risk factor for coronary heart disease in Chinese women how have never smoked," *British Medical Journal* 308: 380-384; Wells, A.J., (1998), "Heart disease from passive smoking in the workplace," *Journal of the American College of Cardiology* 31: 1-9.
[263] Taylor, A.E., et al., (1992), "Environmental tobacco smoke and cardiovascular disease: a position paper from the Council on Cardiopulmonary and Critical Care, American Heart Association, *Circulation* 86: 1-4; Glantz and Parmley (1995), op. cit., page 1047.
[264] Ontario Tobacco Research Unit, University of Toronto (2001), *Protection from Second-Hand Smoke in Ontario: A review of evidence regarding best practices,* May, 2001, page 4.
[265] Glantz and Parmley, (1995), op. cit., pages 1050, 1051.
[266] Idem.
[267] Nova Scotia Department of Health, (1997), *Smoke-Free Places: Towards Healthier Communities in Nova Scotia, A Discussion Paper,* page 2.

smoke has both short-term toxic effects and long-term permanent effects on heart health, and that it contributes to the development of atherosclerosis .

Passive smoking reduces the blood's ability to deliver oxygen to the heart, because the carbon monoxide in ETS displaces and competes with oxygen for binding sites on red blood cells. Passive smoking also reduces the ability of the heart muscle to convert oxygen into the energy molecule adenosine triphosphate. These effects reduce exercise capability in people breathing second-hand smoke.[268]

Second-hand smoke also increases platelet activity, accelerates atherosclerotic lesions, and increases tissue damage following ischemia or myocardial infarction. Increased platelet activity increases the likelihood of acute thrombus (blood clot) formation, can damage the lining of the coronary arteries, and is an independent risk factor for recurrent or more serious myocardial infarction.[269]

Passive smokers have significantly thicker carotid artery walls, in a dose-response relationship, than people who are not exposed to ETS. As well, free radicals induced by passive smoking are also extremely destructive to the heart muscle cell membrane. Other studies have demonstrated that exposure to ETS may lower levels of high-density lipoprotein cholesterol (HDL-C) and increase fibrinogen, which in turn can lead to increased thrombogenesis.[270]

Indeed, it has been suggested that exposure to sidestream smoke may be proportionately more toxic to the heart than exposure to mainstream smoke. Sidestream smoke is emitted from the burning end of a cigarette and enters directly into the environment. Mainstream smoke is first drawn through the cigarette into the smoker's lungs, and then exhaled.

Among other factors, there are more carbon monoxide and nicotine breakdown products in dilute sidestream smoke than in mainstream smoke. Sidestream smoke also contains higher concentrations of several known carcinogens than the smoke inhaled by the smoker, including carcinogens like 2-naphthylamine, N-nitrosodimethylamine, and 4-aminobipheyl.[271] Overall, laboratory experiments have shown that condensate of sidestream smoke is more carcinogenic than that of mainstream smoke.[272] There are also consistently higher levels of other known toxic agents in sidestream smoke than in mainstream smoke.[273]

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[268] Idem., page 1047.
[269] Idem., page 1048; Gold, Mark MD, (1995), *Tobacco,* Volume 4 in *Drugs of Abuse: A Comprehensive Series for Clinicians,* Plenum Medical Book Company, New York, page 69.
[270] Idem., page 1049 and Steenland, op. cit., page 96.
[271] National Research Council, (1986), *Environmental Tobacco Smoke: Measuring Exposures and Assessing Health Effects,* National Academy Press, Washington, DC; U.S. Department of Health and Human Services, (1986), *The Health Consequences of Involuntary Smoking: A Report of the Surgeon-General,* Rockville, Maryland; Collishaw, Neil, et al., (1984), "Tobacco Smoke in the Workplace: An Occupational Health Hazard," *Canadian Medical Association Journal* 131 (10): 1199-1204.
[272] International Program on Chemical Safety, World Health Organization, *Environmental Health Criteria 211: Health Effects of Interactions between Tobacco Use and Exposure to other Agents*, World Health Organization, Geneva, 1999, page 5.
[273] Ontario Tobacco Research Unit, University of Toronto, (2001), *Protection from Second-Hand Tobacco Smoke in Ontario: A review of the evidence regarding best practices,* Toronto, May, 2001, page 38.

Rather than a single component of the smoke being responsible, however, the accumulated evidence indicates that many different components of second-hand smoke, including carbon monoxide, nicotine, and polycyclic aromatic hydrocarbons, may damage the cardiovascular system in a variety of ways.[274]

The most recent evidence has confirmed, for the first time, direct biological links between second-hand smoke and artery damage, and demonstrates that second-hand smoke leads to an accumulation of fat in the arteries. The evidence is particularly troubling because that damage is extremely difficult to reverse, and because clogging and hardening of the arteries leads to heart attacks and strokes and is the single leading cause of death in North America. The policy implications of the latest findings are profound. According to Richard Daynard at Northeastern University:

> *"Now you have hard biological evidence that (exposure to ETS) irreversibly damages arteries. The study likely spells the end of smoking in shared public places in the United States."*[275]

The recent accumulation of strong evidence demonstrating the links between ETS and heart disease illustrates the need to apply the precautionary principle to preventive action as soon as strong circumstantial evidence becomes available. As early as 1988, it was first estimated that 32,000 heart disease deaths among non-smokers in the U.S. were attributable to ETS, somewhat fewer than later estimates (using completely different data and assumptions) of 35,000 to 62,000 annual excess heart disease deaths due to passive smoking.[276]

Had protections against ETS exposure been put in place when the evidence first came to light, it is likely that tens of thousands of lives could have been saved, and hundreds of thousands of cases of chronic illness avoided in North America. Indeed it is almost inconceivable that in 2003, thousands of Canadian restaurant, bar and casino workers are still involuntarily exposed to such high doses of a toxic, dangerous and potentially fatal substance for prolonged periods on a daily basis. Indeed, researchers have pointed to a double standard in the regulatory process:

> *"Individual lifetime excess risks of heart disease death due to ETS of one to three per 100 can be compared with much lower excess risks of one death per 100,000, which are often used in determining environmental limits for other toxins."*[277]
>
> *"In fact, there is no other consumer product to which large numbers of Ontarians are exposed on a daily basis with few or no restrictions that generates by-products as carcinogenic or toxic as second-hand smoke."*[278]

The mechanisms that underlie the development of both heart disease and cerebrovascular disease (stroke) have much in common. Atherosclerosis, platelet aggregation, and the formation of thrombi and thromboses can lead to both heart disease and strokes. Not surprisingly, therefore,

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274 Steenland, op. cit., page 95; Glantz and Parmley (1995), op. cit., page 1047.
275 Robert Langreth (1998), "New Smoking Study Likely to Have Broad Impact," *Wall Street Journal,* New York, January 15, 1998; Gold, op. cit., page 69.
276 Steenland, op. cit., page 99; Glantz and Parmley (1995), op. cit., pages 1050, 1051.
277 Steenland, op. cit., page 94.
278 A Report to the Minister of Health from her Expert Panel on the Renewal of the Ontario Tobacco Strategy (February 1999), op. cit., page 22.

given the evidence discussed above, recent studies have found that the risk of stroke is twice as high for those living with smokers than for those living with non-smokers, after adjustment for active smoking, education, heart disease, hypertension and diabetes.[279]

It must be noted that many of the more recent discoveries about the health hazards of environmental tobacco smoke, such as its link to stroke and breast cancer, have not yet been incorporated into the mortality statistics assessing deaths due to ETS. It can therefore be expected that as research progresses, current estimates of mortality due to second-hand smoke exposure will be seen to be conservative.

*ETS and Respiratory Illness*

The link between second-hand smoke and childhood respiratory ailments, including bronchitis, pneumonia and asthma, has been well established. Much less research has been done on ETS and adult respiratory problems. Recent studies found that ETS elevates the risk of pneumococcal pneumonia, adult asthma, chronic bronchitis and emphysema, and increases the incidence of cough, phlegm, and days lost from work in workers exposed to second-hand smoke.[280] The California Environmental Protection Agency has also reported that sensory eye and nasal irritation can result from ETS-related noxious stimulation of upper respiratory tract and corneal mucous membranes. And the study found suggestive evidence of a causal association between ETS exposure and both cystic fibrosis and decreased pulmonary function.[281]

Similarly, the United States Environmental Protection Agency found that:

> *"Environmental tobacco smoke has subtle but significant effects on the respiratory health of non-smokers, including reduced lung function, increased coughing, phlegm production, and chest discomfort."*[282]

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[279] Ontario Tobacco Research Unit, University of Toronto (2001), *Protection from Second-Hand Smoke in Ontario: A review of evidence regarding best practices,* May, 2001, page 12, citing You, R. Z., et al., (1999), "Ischaemic stroke risk and passive exposure to spouse' cigarette smoking," *American Journal of Public Health* 89: 572-575; Bonita, R., et. al., (1999), "Passive smoking as well as active smoking increases the risk of acute stroke," *Tobacco Control* 8: 156-160.
[280] Nuorti, J.P. et al., (2000), "Cigarette smoking and invasive pneumococcal disease," *New England Journal of Medicine* 342: 681-689; Sheffield, J.V. and Root, R.K., (2000), "Smoking and pneumococcal infection," 342: 732-734; ACOEM (2000), op. cit., page 2, and also page 3 and page 7 (footnotes 23 and 24), citing Jindal, S.K., et al., (1994), "Indices of morbidity in adult patients exposed to environmental tobacco smoke," *Chest.* 106: 746-749 and White, J.R., et al., (1991), "Respiratory illness in non-smokers chronically exposed to tobacco smoke in the workplace," *Chest.* 100: 39-43; Eisner, M. et al., (1998), "Environmental tobacco smoke and adult asthma: The impact of changing exposure status on health outcomes," *American Journal of Respiratory and Critical Care Medicine* 158: 127-133, cited in *A Report to the Minister of Health from her Expert Panel on the renewal of the Ontario Tobacco Strategy* (February 1999), op. cit., pages 22 and 44; Greer, J., et al., (1993), "Asthma related to occupational and ambient air pollutants in nonsmokers, *Journal of Occupational and Environmental Medicine* 35: 909-915; Shephard, R.J., (1992), "Respiratory irritation from environmental tobacco smoke," *Archives of Environmental Health* 47 (2): 123-130; Tyler, Michele, (1998), "Blowing smoke: Do smokers have a right? Limiting the privacy rights of cigarette smokers," *Georgetown Law Journal* 86 (3): 783-811, citing references on respiratory effects of ETS (page 784).
[281] California Environmental Protection Agency, (1997), *Health Effects of Exposure to Environmental Tobacco Smoke,* Office of Environmental Health Hazard Assessment, CEPA, Sacramento.
[282] Ontario Tobacco Research Unit, University of Toronto (2001), *Protection from Second-Hand Smoke in Ontario: A review of evidence regarding best practices,* May, 2001, page 2.

However, the study that is most relevant to new smoke-free legislation being considered throughout Canada is one by Dr. Mark Eisner of the Division of Pulmonary and Critical Care Medicine, Department of Medicine, University of California, San Francisco. Dr. Eisner and his colleagues studied the respiratory health of San Francisco bartenders before and after the legislative prohibition of smoking in all bars and taverns in California from January 1, 1998.

Self-reported ETS exposure among the interviewed bartenders declined from a median of 28 hours per week before the smoking ban (testing in December, 1997) to 2 hours per week afterwards (testing in February, 1998).[283] Previous studies have found dramatic reductions in indoor airborne nicotine concentrations and respiratory suspended particulate concentrations following smoking bans, suggesting that reduced ETS exposure may have an effect on respiratory health.[284]

Before the ban, 74% of the interviewed bartenders reported respiratory symptoms, including wheezing, dyspnea (shortness of breath), morning cough, cough during the rest of the day or night, and phlegm production. Symptoms were assessed using the International Union Against Tuberculosis and Lung Disease Bronchial Symptoms Questionnaire. Within two months of the ban, 59% of these previously symptomatic bartenders no longer reported respiratory symptoms.

Before the ban, 77% of bartenders also reported ETS-related sensory irritation symptoms, including red, teary or irritated eyes; runny nose, sneezing or nose irritation; and sore or scratchy throat. Following the ban, 78% of these previously symptomatic bartenders were free of symptoms.

In addition, spirometry tests were conducted both before and after the smoking ban to assess lung function, using the standard protocols of the American Thoracic Society Guidelines. After the smoking ban, researchers found improvements in bartenders' mean forced vital capacity and mean forced expiratory volume, both of which measure lung function. Based on both the interview and spirometry results, the researchers concluded:

> *"Establishment of smoke-free bars and taverns was associated with a rapid improvement of respiratory health…. Our study demonstrates that reduced ETS exposure, occurring after implementation of smoke-free workplace legislation, as associated with improved adults respiratory health during a short observation period. In addition to potentially reducing the long-term risk of lung cancer and cardiovascular disease, workplace smoking prohibition appears to have immediate beneficial effects on adult respiratory health."*[285]

The University of California study examined the immediate, short-term respiratory effects of the smoking ban rather than chronic long-term respiratory conditions like chronic obstructive pulmonary disease (COPD), which can be fatal. It is well established that active smoking causes

[283] Eisner, Mark, et al. (1998), "Bartenders' Respiratory Health After Establishment of Smoke-Free Bars and taverns," *Journal of the American Medical Association* 280 (22): 1909-1914, December 9, 1998.
[284] Eisner, op. cit., page 1913.
[285] Idem., pages 1909 and 1914.

a decline in lung function that is irreversible, with an average annual decline in lung volume two to three times as great as the normal decline in volume that occurs with age in non-smokers.[286]

Self-reported obstructive lung disease *has* been associated with ETS exposure in several studies.[287] But because of the time span necessary to assess results, long-term clinical data establishing the decline over time in lung volume and lung function due to ETS exposure are not yet available.

However, it is logical that the acute short-term symptoms reported by Eisner and his colleagues prior to the California smoking ban also have serious long-term implications for lung volume and function that could potentially increase the risk of COPD in chronically exposed workers. Because these long-term respiratory conditions are life-threatening, application of the precautionary principle requires that the respiratory health of restaurant, bar and casino workers be protected.

Based on the accumulated medical evidence, health authorities have unambiguously called for rigorous smoking restrictions that will eliminate involuntary exposure to environmental tobacco smoke. To take just three examples:

Dr. David Satcher, U.S. Surgeon-General and U.S. Assistant Secretary for Health called for "*clean indoor ordinances requiring 100 percent smoke-free environments in all public areas and workplaces, including all restaurants and bars.*"[288]

The United Kingdom Scientific Committee on Tobacco and Health stated that *"smoking in public places should be restricted on the grounds of public health…. Wherever possible, smoking should not be allowed in the workplace."*[289]

The World Health Organization's International Program on Chemical Safety has recommended: "*In order to avoid interaction with occupational exposures, and to eliminate the risks of exposure to environmental tobacco smoke, smoking in the workplace should be prohibited.*"[290]

And the Ontario Tobacco Research Unit at the University of Toronto stated unequivocally that: *"All involuntary exposure to tobacco smoke is harmful and should be eliminated."*[291]

In light of this evidence, it is remarkable both that Canadians have not, until this time, had strong, comparable evidence on levels of exposure to second-hand smoke, and that nearly one-third of Atlantic Canadians are still exposed to this known health hazard on a regular basis.

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[286] Oster, Gerry, Colditz, Graham, and Kelly, Nancy, (1984), *The Economic Costs of Smoking and Benefits of Quitting,* Lexington Books, D.C. Heath and Company, Lexington, Massachusetts and Toronto, pages 100-103
[287] As cited in Eisner, op. cit., page 1913, and footnotes 15, 16 and 47, page 1914.
[288] Ontario Tobacco Research Unit, University of Toronto (2001), *Protection from Second-Hand Smoke in Ontario: A review of evidence regarding best practices,* May, 2001, page 18.
[289] Ibid., page 17.
[290] World Health Organization, International Program on Chemical Safety, *Environmental Health Criteria 211: Health Effects of Interactions between Tobacco Use and Exposure to other Agents*, Geneva, 1999, page 97.
[291] Ontario Tobacco Research Unit, University of Toronto (2001), *Protection from Second-Hand Smoke in Ontario: A Review of evidence regarding best practices,* May 2001, pages vi and 47.

Prior to the 2000/01 Canadian Community Health Survey, most evidence has been on exposure to second-hand smoke in the home, and on the potential exposure of children to second-hand smoke. This has been variously assessed in Statistics Canada's *General Social Survey, Cycle 10* (1995)*,* on *The Family,* the *Survey of Smoking in Canada, Cycle 2* (1994), the 1996/97 *National Population Health Survey*, and the *Canadian Tobacco Use Monitoring Surveys.* [292] Some of these surveys have assessed the percentage of households that had a total or partial ban on smoking within the home, and thus derived estimates on the number of Canadian children potentially exposed to second-hand smoke.

However, the questions on these surveys have not always been identical, and the evidence therefore not completely comparable. Nor did they provide standardized and comprehensive estimates of regular exposure to second-hand smoke, including exposure in the workplace. Because of these data gaps, CIHI's 1999 National Consensus Conference on Population Health Indicators did not confirm second-hand smoke exposure as a key health indicator at that time, but proposed it for future development.

The 2000/01 Canadian Community Health Survey has now filled a major data gap by providing the first systematic, comprehensive data on second-hand smoke exposure at the health district level. It is hoped that comparable national, provincial, and health district data will now be available on a regular basis to assess trends in this crucial health indicator.

The preceding review of the potential health impacts of that exposure therefore provides a context both for that first detailed release of Canadian data on second-hand smoke exposure, and for current legislative efforts at both provincial and municipal levels to provide needed protection.

**Definition**

The new Statistics Canada standard for measurement in the 2000/01 Canadian Community Health Survey assesses the proportion of the "non-smoking population aged 12 and over who were exposed to second-hand smoke on most days in the month preceding the survey."[293]

**Data Source**

Statistics Canada, Canadian Community Health Survey (CCHS), 2000/01, health file

**Results**

In Canada as a whole and in the Atlantic provinces, more men than women are exposed to second-hand smoke on a regular basis, with 30.2% of Canadian men and 25.3% of Canadian men reporting exposure on most days in the month preceding the survey. Overall, residents of all four

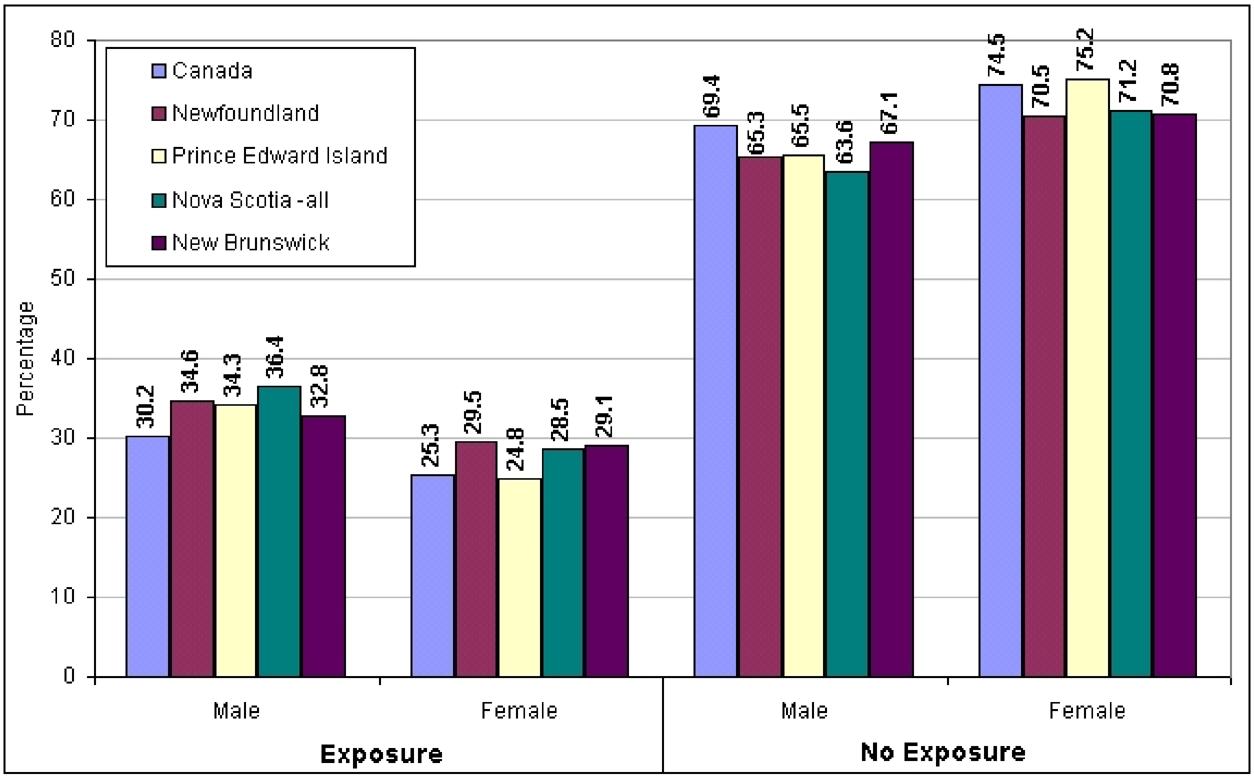
[292] Statistics Canada, Housing, Family and Social Statistics Division, *General Social Survey, Cycle 10: The Family* (1995); Health Canada, *Survey of Smoking in Canada, Cycle 2,* Ottawa, 1994; and Health Canada, *Statistical Report on the Health of Canadians,* Ottawa, 1999, pages 65-68; Statistics Canada, *National Population Health Survey, 1996/97;* and Statistics Canada, *Canadian Tobacco Use Monitoring Surveys* 1999-2002, available at Health Canada, http://www.hc-sc.gc.ca/hecs-sesc/tobacco/research/ctums/#200. ,

[293] Statistics Canada, http://www.statcan.ca/english/freepub/82-221-XIE/00502/defin2.htm#55.

Atlantic provinces are considerably more likely to be exposed to second-hand smoke than most other Canadians, with the highest regional levels of exposure reported in Nova Scotia.

In 2000/01, 36.4% of Nova Scotian men and 28.5% of Nova Scotian women reported being exposed to second-hand smoke on most days. The highest regional rate for women was in Newfoundland, where 29.5% of women were regularly exposed to second-hand smoke. Only PEI had a slightly lower rate of exposure for women (24.8%) than the national level (25.3%), but 34.3% of men in that province reported regular exposure to second-hand smoke, considerably above the 30.2% Canadian average (Figure 108).

**Figure 108. Proportion of the population, aged 12 and over, reporting exposure to second-hand smoke on most days in the last month, Canada and Atlantic provinces, 2000/01, (%)**




Source: Statistics Canada, Canadian Community Health Survey, 2000/01, health file

In the next CCHS cycle, it will be most interesting to assess the provincial and local impacts of smoke-free legislation that has come into effect since the 2000/01 CCHS, including total or partial smoke bans in mainland Nova Scotia, Cape Breton, Fredericton, Kings County (NS) and other jurisdictions. In fact, the 2000/01 data that follow will provide an important benchmark to assess the effectiveness of this legislation at both the provincial and health districts levels, and to examine its utility in reducing second-hand smoke exposure by comparison with jurisdictions that have not adopted such legislation.

There are marked disparities among health districts in the Atlantic region in levels of exposure to second-hand smoke. The highest level of exposure to second-hand smoke in the four Atlantic provinces is in Cape Breton (NS5), where 46.6% of men and 40.9% of women are exposed to second-hand smoke on a regular basis. This contrasts sharply with Central (NS6) where 32.6% of men and 24.8% of women are exposed to second-hand smoke, and with the Annapolis Valley (NS2) where 28.7% of men and 27.7% of women are exposed.

In Nova Scotia, South-Southwest (NS1), Pictou-GASHA (NS4), and Colchester-Cumberland-East Hants (NS3) also have high levels of regular exposure to second-hand smoke, particular for men – 39.2%, 39%, and 37.2% respectively. In Pictou-GASHA (NS4), nearly one-third of women are exposed to second-hand smoke on a regular basis, the second highest level in the province for women (Figure 109).

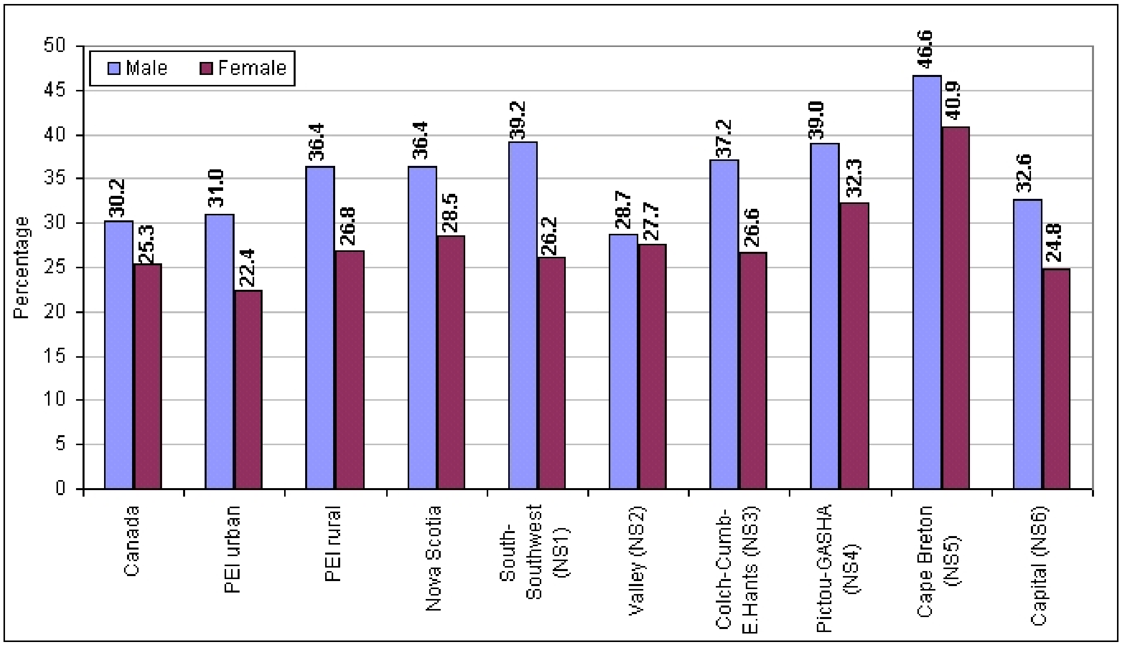
There are also sharp rural-urban disparities in the Atlantic provinces. In Prince Edward Island, more rural Islanders are exposed to second-hand smoke than urban Islanders, with 36.4% of rural males regularly exposed to second-hand smoke compared to 31.9% of men in Charlottetown and Summerside (Figure 109).

In New Brunswick, all three health districts with major urban centres – Moncton (NB1), Sussex/Saint John (NB2), and Fredericton (NB3) – have markedly lower rates of exposure to second-hand smoke for both men and women than all four rural health districts.

Bathurst (NB6) has the highest levels of exposure to second-hand smoke in New Brunswick, particularly for women (40.8%), and more than one in three women in Edmundston (NB4) and Campbellton (NB5) are also regularly exposed to second-hand smoke. In all four rural health districts, about four in ten men are regularly exposed to second-hand smoke. These levels of male exposure about one-third higher than in the three health districts with major urban centres, where fewer than one in three men are exposed to second-hand smoke on most days (Figure 110).

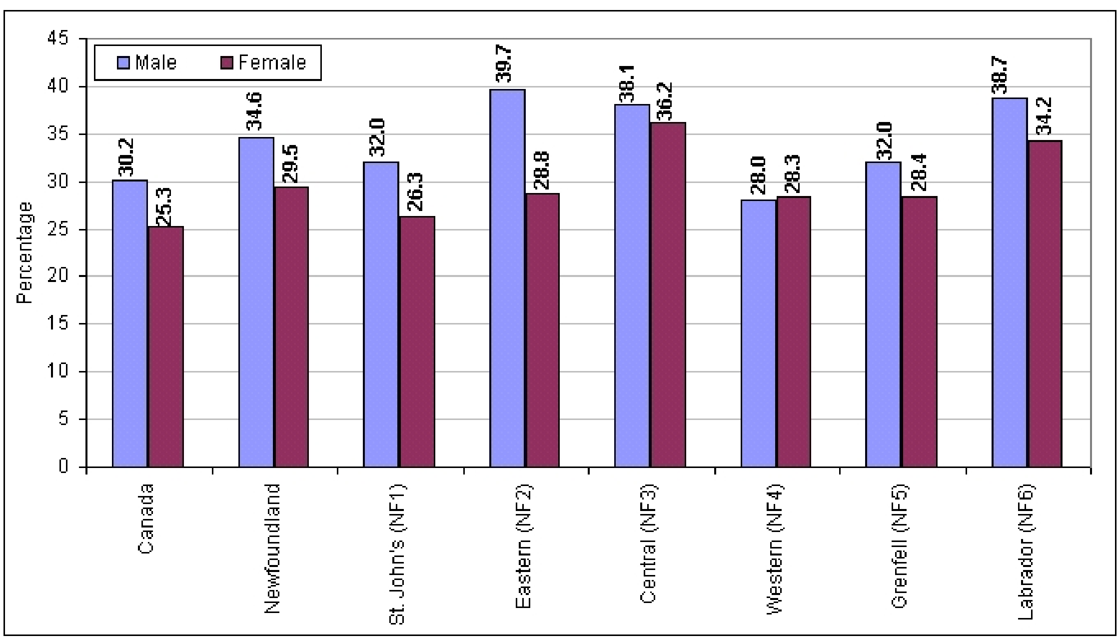
In Newfoundland and Labrador, a similar urban-rural disparity exists, particularly for women, with the St. John's district (NF1) having the lowest levels of female exposure to second-hand smoke in the province. The Western health district (NF4) in Newfoundland also has comparatively lower exposure rates than other parts of the province. The highest rates of regular exposure to second-hand smoke, particularly for men, are in the Eastern (NF2), Central (NF3), and Labrador (NF6) health districts, where close to four in ten men are exposed to second-hand smoke on most days of the month. The highest level of female exposure to second-hand smoke in that province is in the Central district (NF3), where 36.2% of women are exposed to second-hand smoke on a regular basis (Figure 111).

**Figure 109. Proportion of the population, aged 12 and over, reporting exposure to second-hand smoke on most days in the last month, PEI and Nova Scotia health districts, 2000/01, (%)**




Source: Statistics Canada, Canadian Community Health Survey, 2000/01, health file.

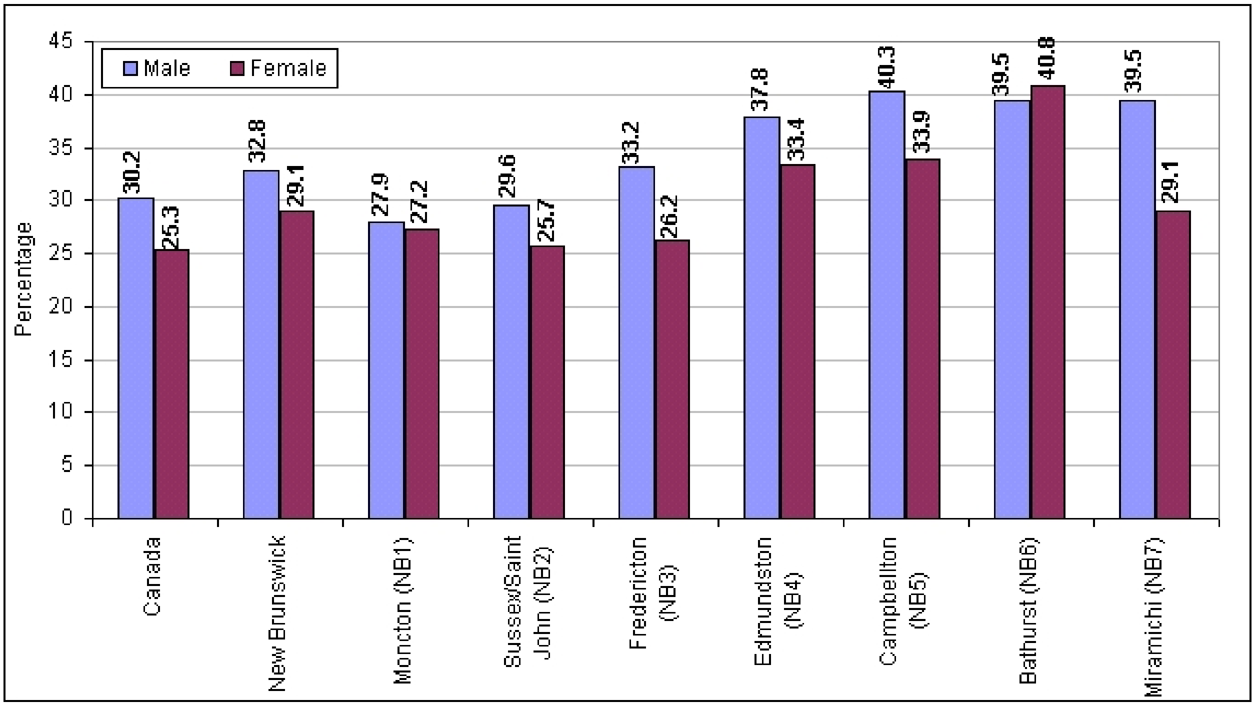
**Figure 110. Proportion of the population, aged 12 and over, reporting exposure to second-hand smoke on most days in the last month, Newfoundland and Labrador health districts, 2000/01, (%)**




Note: Data for men in Grenfell (NF5) have a coefficient of variation (CV) from 16.6% to 33.3% and should be interpreted with caution.

Source: Statistics Canada, Canadian Community Health Survey, 2000/01, health file.

**Figure 111. Proportion of the population, aged 12 and over, reporting exposure to second-hand smoke on most days in the last month, New Brunswick health districts, 2000/01, (%)**




Note: Data for women in Miramichi (NB7) have a coefficient of variation (CV) from 16.6% to 33.3% and should be interpreted with caution.

Source: Statistics Canada, Canadian Community Health Survey, 2000/01, health file.