Community Health Profile

Southwestern Ontario

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EXECUTIVE SUMMARY
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This document was completed by Dr. Marya Haq and her colleagues (Lebené Numekevor, Priyanka Singh and Annabritt Chisholm) at the request of the SouthWestern Academic Health Network (SWAHN) to provide an overview of population health in Southwestern Ontario, which includes the catchment areas of the Erie St. Clair Local Health Integration Network (LHIN 1) and the South West LHIN (LHIN 2).

SWAHN’s vision of "transforming health in Southwestern Ontario through integrated excellence in research, education, and clinical practice" can be better achieved by a clear understanding of the health of our population. The Community Health Profile can be utilized by SWAHN’s committees and working groups to develop strategic education and research programs which encourage excellence in clinical practice while impacting health outcomes in the region.

Demographics

The population of Southwestern Ontario is approximately 1.6 million people which makes up 4.8% of the total Canadian population and is distributed across rural regions, small and midsize cities. However, between 1991 and 2011 the increase in the population was less than the population increase in Ontario and Canada. Aboriginal populations make up about 2.4% of the population of Southwestern Ontario. Bruce (4.0%), Haldimand-Norfolk (4.1%) and Lambton (3.6%) had substantially greater Aboriginal populations than the regional (2.4%) and provincial averages (2.4%).

The group with the largest population in Southwestern Ontario ranges between the ages of 45 and 65 years, and the region has a growing population of seniors. The total dependency ratio (which includes both dependents under 18 years and elderly dependents over 64 years) was almost 10% higher than the provincial and national dependency ratios. This means that there is a greater burden on the working age population to provide care, which may be associated with an increase in physical and mental health problems in these informal caregivers.

The majority of the population speaks English as their first language. Southwestern Ontario has a smaller population of native French speakers (1.7%) than the rest of the province (4.0%) and country (21.7%). The most commonly spoken languages in Southwestern Ontario are English, German, Arabic and Spanish. About 1 in 5 residents of Southwestern Ontario are first generation immigrants. Therefore, SWAHN has an opportunity to address unique health issues for the elderly, the middle-aged caregivers and our multicultural communities.
Social Determinants of Health

Health concerns in Southwestern Ontario can be addressed by focusing on making improvements related to the social determinants of health that align to SWAHN’s mission and scope. For example, the proportion of individuals in Southwestern Ontario (particularly in the rural areas), who reportedly have either no formal schooling or who have a high school certificate was about 53% – a higher rate than in the rest of Canada. 57% of the Aboriginal populations in Southwestern Ontario have had either no formal schooling or a high school certificate.

Southwestern Ontario also had a lower median income than the rest of Ontario although it is higher than the overall country. In 2011, Aboriginal populations in Southwestern Ontario were substantially more likely to report a low-income status (27.5%) compared to the overall population of Southwestern Ontario (13.9%), and Aboriginal populations in the rest of the province (23.5%) and country (25.3%). Given this data, SWAHN has the potential to influence communities to address the social determinants of health related to education and employment (e.g., looking at strategies to increase education for the population and potentially create jobs in healthcare or research), and particularly Aboriginal communities. SWAHN may also play a supportive role in creating an environment that is conducive to job creation – particularly through health research and innovation.

Health Outcomes

In terms of certain illnesses, there are variable rates across Southwestern Ontario. The data shows that several illnesses have higher incidence rates in this area than Ontario and Canada. (See Table 1 below.) For example, the death rates due to all cancers, circulatory diseases, and premature mortality rates, are highest for LHIN1 followed by LHIN2, Ontario and Canada.

Lung cancer incidence rates were higher in Southwestern Ontario than the province but lower than the national rates. Breast cancer incidence and mortality rates in females were higher in LHIN2 than those in LHIN1, Ontario and Canada. Prostate cancer incidence rates were higher in LHIN1. Colon cancer incidence rates in LHIN1 were higher than LHIN2 and Ontario, and slightly lower than the national rates.

Mortality rates due to respiratory diseases are highest in LHIN2 and Canada followed by LHIN1 and Ontario. LHIN2 had higher Chronic Obstructive Pulmonary Disease (COPD) prevalence rates than LHIN1, Ontario and Canada. LHIN1 reported a prevalence rate slightly lower than provincial and national rates. (See Table 2 below.)

SWAHN may want to target specific cancers and respiratory diseases as high priority areas given that our mortality rates and incidence rates for certain cancers are higher than provincial and national levels.
Table 1: Age-standardized mortality rates by cause (deaths per 100,000 population)

<table>
<thead>
<tr>
<th>Cause</th>
<th>Erie St. Clair LHIN (LHIN1)</th>
<th>South West LHIN (LHIN2)</th>
<th>Ontario</th>
<th>Canada</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Cancers</td>
<td>171.7</td>
<td>167.3</td>
<td>159.1</td>
<td>166.4</td>
</tr>
<tr>
<td>Circulatory Disease</td>
<td>201.8</td>
<td>170.3</td>
<td>155.6</td>
<td>157.3</td>
</tr>
<tr>
<td>Respiratory Disease</td>
<td>42.0</td>
<td>45.4</td>
<td>41.3</td>
<td>45.0</td>
</tr>
<tr>
<td>Breast Cancer</td>
<td>12.4</td>
<td>13.2</td>
<td>12</td>
<td>11.9</td>
</tr>
<tr>
<td>Prostate Cancer</td>
<td>8.4</td>
<td>8.3</td>
<td>8</td>
<td>8.3</td>
</tr>
<tr>
<td>Suicide and Self-inflicted injuries</td>
<td>7.5</td>
<td>9.6</td>
<td>7.7</td>
<td>10.2</td>
</tr>
</tbody>
</table>

Other chronic diseases that SWAHN may want to focus on include obesity, diabetes and cardiac disease. (See Table 2 below.) Southwestern Ontario had higher rates of overweight and obese persons with LHIN1 having higher rates than LHIN2. Similarly, although the LHIN2 diabetes prevalence rate was lower than in LHIN1 and Ontario, LHIN1 had substantially higher prevalence rates than both provincial and national rates.

Southwestern Ontario reported higher prevalence rates of hypertension than provincial and national rates in 2013. LHIN1 reported substantially higher rates of myocardial infarctions than LHIN2 and the provincial and national rates.

Table 2: Prevalence rates (% of population) of chronic conditions

<table>
<thead>
<tr>
<th>Condition</th>
<th>Erie St. Clair LHIN (LHIN1)</th>
<th>South West LHIN (LHIN2)</th>
<th>Ontario</th>
<th>Canada</th>
</tr>
</thead>
<tbody>
<tr>
<td>COPD</td>
<td>3.9</td>
<td>5.2</td>
<td>4.2</td>
<td>4.3</td>
</tr>
<tr>
<td>Diabetes Mellitus</td>
<td>7.7</td>
<td>6.2</td>
<td>6.8</td>
<td>6.2</td>
</tr>
<tr>
<td>Overweight or Obese</td>
<td>61.4</td>
<td>55.5</td>
<td>52.0</td>
<td>52.0</td>
</tr>
<tr>
<td>Hypertension</td>
<td>19.7</td>
<td>18.7</td>
<td>17.4</td>
<td>17.0</td>
</tr>
<tr>
<td>Myocardial Infarction*</td>
<td>250</td>
<td>210</td>
<td>207</td>
<td>209</td>
</tr>
</tbody>
</table>

*Incidence rate per 100,000 population
Therefore, not only can SWAHN focus on education about these chronic diseases but also the preventive aspects of these chronic diseases such as improving nutrition and physical activity. In addition, the study of the assessment and management of these chronic diseases and then translation of the research across the SWAHN region, could improve the health outcomes of the Southwestern Ontario population. SWAHN and its stakeholders could help to identify the education and research that is currently being done in these high priority areas in the region and assist in both the dissemination of this information and guide the evaluation of its impact on the population.

Although not a primary area of focus, SWAHN may also use the Community Health Profile to answer questions that other networks may have about other differences across the regions of Southwestern Ontario. For example, air quality, which is often associated with the overall health of the population, is an important indicator of the condition of the physical environment. Air quality rates range across Southwestern Ontario. In our region, there has been considerable improvement in air quality over the last five years. However, more improvement is required – particularly as it relates to health conditions like respiratory illnesses and allergies.

The Community Health Profile should be updated on a regular basis to determine any positive changes that have occurred in the region due to SWAHN’s efforts in initiatives that target education, research and knowledge translation. The monitoring of the Community Health Profile will provide SWAHN an opportunity to reevaluate its priorities to address the evolving health needs of our population.
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CHAPTER 1

Preface
Chapter 1 – Preface

1.1 Purpose

The SouthWestern Academic Health Network commissioned this document. The aim is to provide healthcare institutions and educational facilities a better understanding of the population that they serve, using evidence to inform strategic planning and resource allocation.

1.2 SouthWestern Academic Health Network

Academic health networks can be found across Canada and internationally. They are usually established in order to improve collaboration between healthcare delivery, researchers, and academic institutes. The ultimate goal of these networks is to stimulate innovation and improvement of patient outcomes in the population they serve [1]–[3].

The SouthWestern Academic Health Network [SWAHN] was established in order to foster greater collaboration between Southwestern Ontario’s health care delivery, education and research organizations. The organization intends to eliminate silos between the government, hospitals, educational institutes, research organizations, and community-based service providers, thereby improving the health status of the population of Southwestern Ontario[4].

SWAHN’s vision is ‘transforming health in Southwestern Ontario through integrated excellence in research, education and clinical practice’[5].

1.3 Data

The data included in this report has been collected from a variety of sources, including Statistics Canada, Air Quality Ontario, the London Police Department, the Ontario Road Safety Annual Report, the Ontario Student Drug Use and Health Survey, Canadian Vital Statistics, the Canadian Institute for Health Information [CIHI], Born Ontario, and the Canadian Congenital Anomalies Surveillance System.

The data used is as up-to-date as possible; it is presented at the county level where available and at progressively larger geographic areas depending on the availability. Physical and community environments are included in this report to provide an understanding of the social determinants of health of the target population. Each chapter includes a detailed report of the data sources used, and specifies where data is missing or incomplete.

1.4 Structure of Ontario’s Health Care System

In 2006, the health care system in Ontario was divided into fourteen Local Health Integration Networks [LHINs]. The rationale was that the local population could better identify and address health problems within their own communities [6]. Each LHIN integrates hospitals and community-based care, such as mental health and long-term care services, in order to deliver high quality health care.

This community health profile will focus on the Erie-St Clair and South West LHINs, i.e. LHINs 1 and 2. The purpose of this community health profile is to help with the identification of key issues within the population, inform the priority setting process, and assist in the allocation of scarce health care resources. This will be accomplished by providing an overview of the social determinants of health of the people of Southwestern
Ontario, as well as providing a current state analysis of their health care outcomes and needs [7]. In addition, comparisons to provincial and national data will be provided where appropriate.

1.5 Regional Geography

The province of Ontario is located in east-central Canada and has been divided into fourteen separate LHINs, as seen in Figure 1-1. The Erie St Clair LHIN is also referred to as LHIN 1, and the South West LHIN is referred to as LHIN 2.

The Erie St Clair LHIN is the southernmost LHIN in Ontario, and is surrounded on three sides by water bodies. The eastern border is shared with the southwestern border of the South West LHIN, as seen in Figure 1-2. It includes the counties of Chatham-Kent, Lambton/Sarnia and Essex/Windsor [8].

The South West LHIN is located in the south-west region of Ontario, and is bordered in the north-west by Lake Huron and the northeast by the Georgian Bay as seen in Figure 1-3. To the east, it is bordered by a number of LHINs, including the Waterloo-Wellington LHIN [LHIN 3], with which it shares a portion of Grey County and the Hamilton-Niagara LHIN [LHIN 4], with which it shares a portion of Norfolk County [9]. To the southwest is the Erie-St Clair LHIN; Lake Erie forms the southern boundary. The South West LHIN includes the counties of Bruce, Middlesex, Elgin, Norfolk¹, Grey², Oxford, Huron, and Perth [9].

---

Figure 1-1 Ontario Local Health Integration Network Boundaries - 2006 [10]

¹ 79% of this county is in the Hamilton Niagara Haldimand Brant LHIN
² 5% of this county is included in the Waterloo Wellington LHIN
Figure 1-2 Erie St Clair Local Health Integration Network Boundaries - 2005 [8]
Figure 1-3 South West Local Health Integration Network Boundaries - 2006 [9]
CHAPTER 2

Demographic Profile
Chapter 2 - Demographic profile

This chapter provides a description of the characteristics of the population of Southwestern Ontario, as well as the importance to the health of the population.

2.1 Data

Statistics Canada publishes census data in a hierarchical fashion, with municipalities and census subdivision data feeding into census agglomerations or census metropolitan areas depending on the size of the population. This means that for regions such as Chatham-Kent, there is data available at both the municipality level and census metropolitan area level. This report utilizes data from the smallest relevant unit to prevent overlapping boundaries from confounding the data. Therefore census data used will be presented at the census subdivision or municipality level, unless otherwise stated.

Norfolk was established as a municipality in 2001 [10]. Accordingly, the population data for the Norfolk region prior to 2001 is reported at the census agglomeration level, and thereafter at the census subdivision level. The region was previously considered part of the Haldimand-Norfolk Municipality and has been included in this profile because of its inclusion within the geographical boundaries of the South West LHIN [21% in Southwest LHIN and 79% in the Hamilton Niagara Haldimand Brant LHIN]. In the interest of completeness, this profile will include data for all of Norfolk County rather than just that portion that is part of the South West LHIN.

Although London is considered part of Middlesex, it is an important enough region in Southwestern Ontario that results for it have been provided separately.

2.2 Population Distribution

The population of Southwestern Ontario makes up 4.8% of the total Canadian population. Figure 2-1 and Table 2-1 describe the population changes seen within Southwestern Ontario from 1991 to 2011. The most substantial increases in population were seen in London [20.8%], Elgin [16.0%], Essex [18.8%], Middlesex [18.0%] and Oxford [13.8%]. Regions that had little to no change in population were Bruce [1.3% increase], Huron [0.1% change], and Lambton [2.1% decrease].

As seen in Figure 2-2, Southwestern Ontario experienced a 16.0% increase in overall population from 1991 to 2011. This was less than the population increase in Ontario [31.5%] and Canada [22.7%].

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>London</td>
<td>303,165</td>
<td>325,669</td>
<td>336,539</td>
<td>352,395</td>
<td>366,151</td>
<td>20.8%</td>
</tr>
<tr>
<td>-------------------</td>
<td>-----------------</td>
<td>-----------------</td>
<td>-----------------</td>
<td>-----------------</td>
<td>-----------------</td>
<td>--------</td>
</tr>
<tr>
<td>Bruce</td>
<td>65,270</td>
<td>65,680</td>
<td>63,892</td>
<td>65,349</td>
<td>66,102</td>
<td>1.3%</td>
</tr>
<tr>
<td>Elgin</td>
<td>75,425</td>
<td>79,159</td>
<td>81,553</td>
<td>85,351</td>
<td>87,461</td>
<td>16.0%</td>
</tr>
<tr>
<td>Essex</td>
<td>327,365</td>
<td>350,329</td>
<td>374,975</td>
<td>393,402</td>
<td>388,782</td>
<td>18.8%</td>
</tr>
<tr>
<td>Grey</td>
<td>84,070</td>
<td>87,621</td>
<td>89,073</td>
<td>92,411</td>
<td>92,568</td>
<td>10.1%</td>
</tr>
<tr>
<td>Huron</td>
<td>59,065</td>
<td>60,220</td>
<td>59,701</td>
<td>59,325</td>
<td>59,100</td>
<td>0.1%</td>
</tr>
<tr>
<td>Chatham-Kent</td>
<td>109,945</td>
<td>109,650</td>
<td>107,709</td>
<td>108,177</td>
<td>103,671</td>
<td>-5.7%</td>
</tr>
<tr>
<td>Lambton</td>
<td>128,940</td>
<td>128,975</td>
<td>126,971</td>
<td>128,204</td>
<td>126,199</td>
<td>-2.1%</td>
</tr>
<tr>
<td>Middlesex</td>
<td>372,275</td>
<td>389,616</td>
<td>403,185</td>
<td>422,333</td>
<td>439,151</td>
<td>18.0%</td>
</tr>
<tr>
<td>Norfolk</td>
<td>-</td>
<td>60,534</td>
<td>60,847</td>
<td>62,563</td>
<td>63,175</td>
<td>-</td>
</tr>
<tr>
<td>Oxford</td>
<td>92,885</td>
<td>97,142</td>
<td>99,270</td>
<td>102,756</td>
<td>105,719</td>
<td>13.8%</td>
</tr>
<tr>
<td>Perth</td>
<td>69,975</td>
<td>72,106</td>
<td>73,675</td>
<td>74,344</td>
<td>75,112</td>
<td>7.3%</td>
</tr>
<tr>
<td>Southwestern Ontario</td>
<td>1,385,215</td>
<td>1,501,032</td>
<td>1,433,142</td>
<td>1,594,215</td>
<td>1,607,040</td>
<td>16.0%</td>
</tr>
<tr>
<td>Ontario</td>
<td>10,084,885</td>
<td>10,753,573</td>
<td>11,410,046</td>
<td>12,160,282</td>
<td>13,263,500</td>
<td>31.5%</td>
</tr>
<tr>
<td>Canada</td>
<td>28,000,000</td>
<td>28,846,761</td>
<td>30,007,094</td>
<td>31,612,897</td>
<td>34,342,800</td>
<td>22.7%</td>
</tr>
</tbody>
</table>

Table 2-1: Trends in population distribution in Southwestern Ontario, Ontario, and Canada [Adapted from Table 1.1, Community Health and Well-Being-1996] [5], [11]-[14]

3 Referred to as Kent before 1998.
4 Presented as municipality [i.e. census subdivision] data, with exception of data from 2001 that is unavailable through Statistics Canada. Therefore the census agglomeration figure of 107,709 is used. Census municipality data from 2006 reports the 2001 population count at 107,341 value.
Figure 2-1 Trends in Population Distribution across Southwestern Ontario from 1991-2011 [5], [11]–[14]

Figure 2-2 Comparison of trends in population growth between Southwestern Ontario, Ontario, and Canada [5], [11]–[14]
2.3 Population Pyramids

As Figures 2-3 to 2-5 demonstrate, the population make-up is similar across Southwestern Ontario, Ontario and Canada, with respect to both age groups and gender distribution. In all three regions, the population pyramid is shaped like a box or dome, rather than a traditional pyramid. This type of distribution is characteristic of developed countries with low fertility rates and high life expectancies.

The largest 'bulge' in the pyramid in all three regions – Southwestern Ontario, Ontario and Canada - is between the ages of 45 and 65 years, indicating that this age group makes up the largest proportion of the population. Life expectancy for females after 25 years of age was higher than males in 2011 in all three regions. Approximately twice as many females in comparison to males lived beyond 80 years of age in all three regions.

![Population Pyramid - Southwestern Ontario - 2011](image)

Figure 2-3 Population Pyramid - Southwestern Ontario - 2011 [14]
Figure 2-4 Population Pyramid – Ontario - 2011 [11]

Figure 2-5 Population Pyramid – Canada – 2011 [15]
2.4 Dependency Ratio

The **Total Dependency Ratio** is defined as the ratio of the proportion of the population within the labor force [generally between the age of twenty to sixty four] to the population not in the labor force [i.e. those nineteen years of age or younger, and those greater than sixty four years of age] [16], [17]. This indicator is indicative of the portion of the population that can socially and economically support the portion of the population under the age of 19 years and older than 64 years of age [17].

$$Total\ Dependency\ Ratio = \frac{Population\ not\ in\ workforce\ [younger\ than\ 19\ years\ or\ older\ than\ 64\ years]}{Population\ in\ workforce\ [ages\ 20\ –\ 64\ years]}$$

The **Elderly Dependency Ratio** is defined as the ratio of the population aged sixty five and above to those between twenty to sixty four years of age [16]. This indicator measures the number of individuals over the age of 65 years of age who may be dependent, economically and otherwise, on working age individuals and require greater support from the healthcare system [17].

$$Elderly\ Dependency\ Ratio = \frac{Population\ over\ 65\ years\ of\ age}{Population\ in\ workforce\ [ages\ 20\ –\ 64\ years]}$$

### 2.4.1 Southwestern Ontario

The total dependency ratio in Southwestern Ontario ranges from 60 dependents per 100 working-age persons in the city of London to almost 80 dependents in Huron County. Elderly dependency ratios range from a low of 24 seniors per 100 working-age persons in London to a high of 37 seniors per 100 working-age persons in Grey County [Figure 2-6].

![Figure 2-6 Dependency Ratios - Southwestern Ontario - 2011](image-url)
Significance

Both the elderly and youth require social and financial support, and the burden of this support falls on the portion of the population of working-age. The term ‘sandwich generation’ has been coined to describe the phenomenon of adults who simultaneously care for both young children and elderly parents.

The positive effects on self-esteem provided by caregiving may buffer a substantial portion of this stress, and ‘sandwiched’ individuals report being equally satisfied with their as those with less duties [18]. However, there is evidence that caregivers who report mental or emotional strain are at a greater risk of detrimental health effects, and in these individuals, caregiving is an independent risk factor for mortality [19]. In addition, high-intensity caregivers\(^5\) were reported to have substantially higher stress levels and more difficulty with balancing their elder’s care needs and work demands [18]. Health system planning must take into account the burden on informal caregivers and the downstream resource needs of these individuals. The detrimental effects on their physical and mental wellbeing represent an additional burden on the healthcare system. These should be addressed early through the provision of appropriate support.

As the population of seniors increases steadily, these caregivers will need increasing amounts of support from the system, including greater flexibility in the workplace. Home-care can be utilized to support caregivers and enable seniors to remain independently at home. This is less expensive than institutional care, and therefore beneficial for the healthcare system overall. Home-care also facilitates the continuation of the positive effects of caregiving relationships [18], [20].

2.4.2 Comparison of Dependency Ratios

Southwestern Ontario has 30 elderly dependents per 100 working persons, compared to approximately 24 per 100 working persons in Ontario and Canada. The total dependency ratio in Southwestern Ontario is almost 10 percentage points greater than the total dependency ratio in both Ontario and Canada as a whole [Figure 2-7]. This is reflective of a greater burden on Southwestern Ontario’s working-age population in comparison to the rest of the province and country.

\(^5\) High intensity caregivers spend more than eight hours per month on elder care
2.5 Cultural Mix

This report defines culture as the set of perspectives, aspirations, practices of everyday living, and typical beliefs and values shared by a racial, ethnic, religious, or social group [21]. A group's approach to life is influenced by their perspectives, beliefs and values; their aspirations and practices of everyday living are a tangible expression of this. Culture has a multi-faceted influence on the health of individual, and the following description attempts to shed some light on the cultural mix in Southwestern Ontario.

2.5.1 Spoken Languages

In 2011, Southwestern Ontario had a greater proportion of native English speakers [83.0%] than either Ontario [69.8%] or Canada [58.1%] as seen in Table 2-2 and Figures 2-8 to 2-10. It had a much smaller proportion of native French speakers [1.7%] in comparison to Ontario [4.0%], and Canada [21.7%]. Speakers of Aboriginal languages in Southwestern Ontario [0.02%] were lower than in Ontario [0.13%] and Canada as a whole [0.54%].
<table>
<thead>
<tr>
<th>Region</th>
<th>% of Population</th>
<th>% of Mother Tongue</th>
<th>% of Total Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elgin</td>
<td>85.9 [73,440]</td>
<td>1.0 [880]</td>
<td>13.1 [11,190]</td>
</tr>
<tr>
<td>Essex</td>
<td>74.8 [281,975]</td>
<td>3.1 [11,710]</td>
<td>22.1 [83,280]</td>
</tr>
<tr>
<td>Grey</td>
<td>92.5 [83,810]</td>
<td>0.9 [800]</td>
<td>6.6 [5,955]</td>
</tr>
<tr>
<td>Huron</td>
<td>91.3 [53,075]</td>
<td>0.8 [460]</td>
<td>7.9 [4,575]</td>
</tr>
<tr>
<td>Chatham-Kent</td>
<td>88.5 [89,795]</td>
<td>2.9 [2,915]</td>
<td>8.6 [8,735]</td>
</tr>
<tr>
<td>Lambton</td>
<td>91.0 [112,840]</td>
<td>2.1 [2,580]</td>
<td>6.9 [8,530]</td>
</tr>
<tr>
<td>Middlesex</td>
<td>81.0 [346,600]</td>
<td>1.3 [5,370]</td>
<td>17.7 [75,755]</td>
</tr>
<tr>
<td>Norfolk</td>
<td>86.8 [53,770]</td>
<td>1.2 [725]</td>
<td>12.1 [7,485]</td>
</tr>
<tr>
<td>Oxford</td>
<td>90.2 [93,805]</td>
<td>1.0 [1,070]</td>
<td>8.8 [9,155]</td>
</tr>
<tr>
<td>Perth</td>
<td>89.8 [66,230]</td>
<td>0.6 [465]</td>
<td>9.6 [7,085]</td>
</tr>
<tr>
<td>Southwestern Ontario</td>
<td>83.0 [1,597,350]</td>
<td>1.7 [32,385]</td>
<td>15.4 [295,655]</td>
</tr>
<tr>
<td>Ontario</td>
<td>69.8 [8,677,040]</td>
<td>4.0 [493,300]</td>
<td>26.3 [3,264,435]</td>
</tr>
<tr>
<td>Canada</td>
<td>58.1 [18,858,980]</td>
<td>21.7 [7,054,975]</td>
<td>20.2 [6,567,680]</td>
</tr>
</tbody>
</table>

Table 2-2 Mother Tongue - Southwestern Ontario - 2011 [14]

2.5.2 Detailed Overview of Languages

Official Languages

83.0% of the population of Southwestern Ontario identified English as their mother tongue in 2011 [Figure 2-8]. This is a greater proportion than the provincial and national percentages, at 69.8% and 58.1% respectively [Figure 2-9 and 2-10].

Approximately 1.7% of the population of Southwestern Ontario identified French as their mother tongue in 2011 [Figure 2-8]. In comparison, approximately 4.0% of the population of Ontario and 21.7% of the population of Canada as a whole reported French as their mother tongue in 2011 [Figure 2-9 and 2-10].

Selected Aboriginal Languages

Only about 0.02% of the population of Southwestern Ontario identified one of the selected aboriginal languages in the census questionnaire as their mother tongue [Figure 2-8]. In comparison, 0.13% of Ontario’s population and 0.54% of Canada’s population identified an aboriginal language as their mother tongue.

Non-Official Language

The smaller pie charts in Figures 2-8 to 2-10 display a detailed breakdown of each region’s top ten languages other than English, French and Aboriginal languages. The list of top-ten languages varies across the

\[\text{Atikamekw, Cree; n.o.s., Dene, Innu/Montagnais, Inuktitut, Mi'kmaq, Ojibway, Oji-Cree, Stoney}\]
three regions under examination, although all three share the following commonly spoken languages (1) Chinese [n.o.s.]; (2) Italian; (3) Spanish; (4) Arabic; and (5) German.

The most commonly reported first languages [i.e. mother tongues] in Southwestern Ontario were English [82.3%], German [2.2%], Arabic [1.4%] and Spanish [1.3%]. In comparison, Ontario’s most commonly reported first languages were English, Italian, Chinese [n.o.s], Cantonese and Spanish. Canada’s most commonly reported first languages were English, Panjabi, Chinese [n.o.s], Spanish and German and Italian.

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Figure 2-8 Detailed overview of languages spoken in Southwestern Ontario – 2011 [14]

---

7 N.o.s: not otherwise specified
### Mother Tongue in Ontario - 2011

<table>
<thead>
<tr>
<th>Language</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>69.78%</td>
</tr>
<tr>
<td>French</td>
<td>3.97%</td>
</tr>
<tr>
<td>Arabic</td>
<td>1.07%</td>
</tr>
<tr>
<td>Urdu</td>
<td>1.04%</td>
</tr>
<tr>
<td>Other Languages</td>
<td>12.64%</td>
</tr>
<tr>
<td>Tagalog (Filipino)</td>
<td>1.13%</td>
</tr>
<tr>
<td>Panjabi (Punjabi)</td>
<td>1.40%</td>
</tr>
<tr>
<td>Other</td>
<td>12.64%</td>
</tr>
<tr>
<td>Italian</td>
<td>2.02%</td>
</tr>
<tr>
<td>Chinese; n.o.s.</td>
<td>1.57%</td>
</tr>
<tr>
<td>Cantonese</td>
<td>1.50%</td>
</tr>
<tr>
<td>Spanish</td>
<td>1.43%</td>
</tr>
<tr>
<td>Panjabi (Punjabi)</td>
<td>1.32%</td>
</tr>
<tr>
<td>Other</td>
<td>9.18%</td>
</tr>
<tr>
<td>French</td>
<td>21.60%</td>
</tr>
<tr>
<td>Other Languages</td>
<td>20.11%</td>
</tr>
<tr>
<td>Italian</td>
<td>1.25%</td>
</tr>
<tr>
<td>Spanish</td>
<td>1.26%</td>
</tr>
<tr>
<td>German</td>
<td>1.25%</td>
</tr>
<tr>
<td>Mandarin</td>
<td>0.76%</td>
</tr>
<tr>
<td>Other</td>
<td>9.18%</td>
</tr>
<tr>
<td>Other</td>
<td>1.30%</td>
</tr>
</tbody>
</table>

### Mother Tongue in Canada - 2011

<table>
<thead>
<tr>
<th>Language</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>57.75%</td>
</tr>
<tr>
<td>French</td>
<td>21.60%</td>
</tr>
<tr>
<td>Other</td>
<td>20.11%</td>
</tr>
<tr>
<td>Arabic</td>
<td>1.00%</td>
</tr>
<tr>
<td>Urdu</td>
<td>1.04%</td>
</tr>
<tr>
<td>Other Languages</td>
<td>9.18%</td>
</tr>
<tr>
<td>Tagalog (Filipino)</td>
<td>1.00%</td>
</tr>
<tr>
<td>Panjabi (Punjabi)</td>
<td>1.32%</td>
</tr>
<tr>
<td>Spanish</td>
<td>1.26%</td>
</tr>
<tr>
<td>French</td>
<td>21.60%</td>
</tr>
<tr>
<td>Other</td>
<td>20.11%</td>
</tr>
<tr>
<td>Italian</td>
<td>1.25%</td>
</tr>
<tr>
<td>Mandarin</td>
<td>0.76%</td>
</tr>
<tr>
<td>Other</td>
<td>9.18%</td>
</tr>
<tr>
<td>Other</td>
<td>1.30%</td>
</tr>
</tbody>
</table>

Figure 2-9 Detailed overview of languages spoken in Ontario – 2011 [14]

Figure 2-10 Detailed overview of languages spoken in Canada –2011 [14]
2.5.3 Immigrant Status

The term "foreign-born citizen" is used to represent first generation immigrants\(^8\) to Canada, and differentiate them from second and third generation immigrants. Second and third generation immigrants make up more than 61% of the Canadian population and are categorized as Canadian-born to differentiate them from more recent immigrants [22]. First generation immigrants have stronger ties to their own culture than later generations, and their health status is reflective of their original culture for up to the first two decades after immigration.

The "Healthy Immigrant Effect"

The "Healthy Immigrant Effect" describes the observation that immigrants to Canada have a higher overall health status at the time of immigration, with lower age-standardized mortality rates\(^9\) and disability rates compared to the Canadian-born population. Over a period of twenty years, the health status of these immigrants declines to approximately the Canadian average [24], [25].

![Chart of First Generation Immigrants in Southwest Ontario, Ontario and Canada 2006](chart.png)

**Figure 2-11 First generation immigrants as a percentage of total population – 2006 [13]**

First generation immigrants represent a subset of the population with a vastly different culture; second and third generation immigrants have generally integrated sufficiently that they share cultural characteristics with the native population [26].

---

\(^8\)First generation immigrants: "refers to people who were born outside Canada" [22]

\(^9\)The age-standardized mortality rate is a weighted average of the age-specific mortality rates per 100,000 persons, where the weights represent the proportions of persons in the corresponding age groups of the WHO standard population [23]
**Figure 2-11** displays the proportion of the total population made up by first generation immigrants in Southwestern Ontario, Ontario and Canada. In 2006, Southwestern Ontario had a lower proportion of first generation immigrants [17.1%] than Ontario [27.8%] and Canada [19.6%]. The proportion of first generation immigrants to the native-born population was highest in Essex [22.2%], London [21.6%] and Middlesex [19.9%]. The lowest proportion was in Huron [7.9%], Bruce [8.0%] and Grey [8.8%].

### 2.6 Socioeconomic Status

Socioeconomic status is defined as “a composite measure that typically incorporates economic status, measured by income; social status, measured by education; and work status, measured by occupation” [27].

Socioeconomic status affects the decisions individuals make regarding their health, the environment they are located in, and the health care they access [28]. Health risk and health enhancing behaviors are thus affected by socioeconomic status, through opportunity, culture and necessity.

For instance, lower socioeconomic states are associated with higher rates of smoking and alcohol abuse. They are also associated with decreased intake of fresh fruits and vegetables, as well as lower rates of regular physical activity [29]. Workers in ‘blue collar’ jobs are generally of lower socioeconomic classes, and are exposed to greater physical and environmental dangers than those in office jobs [28].

Socioeconomic status has been linked to a number of chronic diseases including obesity, cardiovascular disease, diabetes, hypertension, and cancer. The effects of socioeconomic status may begin before birth of the individual, and low maternal socioeconomic status has been associated with low birth weight in their offspring [28].

The following factors are used to describe the socioeconomic environment of Southwestern Ontario: (1) education and literacy; (2) income; and (3) family structure.

#### 2.6.1 Education and Literacy

**Health Effects**

Education is a component of socioeconomic status and affects health status independent of other factors such as income, health insurance, family background, and social support systems [30]. Higher levels of educational attainment are associated with longer life expectancies in both sexes, lower morbidity rates and better health outcomes [31], [32]. Infant mortality rates of babies born to mothers with 16 years of education are almost half of that of mothers with less than a high school degree or equivalent [33].

**Education Levels in Southwestern Ontario**

There is a wide variation in the level of maximal educational attainment across Southwestern Ontario. A considerably greater proportion of Essex and Middlesex-London reported attainment of university-level education compared to other regions of Southwestern Ontario. **Figure 2-12** and **2-13** describe the variation in maximal educational attainment across the three regions under examination.

schooling or [2] high school or equivalent certificate. This was slightly higher than the provincial statistic of 49.0%, and national statistic of 49.3% [Figure 2-13].

Southwestern Ontario reported a lower proportion of the population with university degrees at the Baccalaureate level and higher [14.9%] when compared to Ontario [20.5%] and Canada [18.1%]. There was a slightly higher percentage of population with ‘Trades Certificates’ [8.9%] in Southwestern Ontario than in Ontario [8.0%] as a whole; this was less than the national statistic [10.9%]. Southwestern Ontario had a considerably higher percentage of ‘College’ level educated individuals [20.1%] than Ontario [18.4%] and Canada [17.3%] in 2006.

![COMPARISON OF MAXIMAL EDUCATIONAL ATTAINMENT SOUTHWESTERN ONTARIO 2006](chart.png)

Figure 2-12 Comparison of levels of maximal educational attainment across Southwestern Ontario - 2006 [13]
2.6.2 Income

2.6.2.1 Health Effects
Low household income is associated with poor health status, which is exacerbated when low income is combined with residence in a location with high levels of income inequality [34],[35]. Lower levels of national income inequality, rather than high total national wealth, have been associated with better population health outcomes [36].

2.6.2.2 Income in Southwestern Ontario

2.6.2.2.1 Median Income
As seen in Figure 2-14, Southwestern Ontario had a lower median income [$26,243] than the rest of Ontario [$27,258] and higher than Canada [$25,615] in 2006. Bruce, Chatham-Kent, Grey, Huron, and Norfolk all had median incomes lower than the regional statistic.

Figure 2-13 Comparison of levels of maximal educational attainment in Southwestern Ontario, Ontario, and Canada -2006 [14]
Figure 2-14 Median income of population [aged 15+ years] of Southwestern Ontario – 2006 [13]

2.6.2.2.2 Low-Income Population

Low-income\textsuperscript{10} is a term used to describe those families for whom greater than seventy percent [70\%] of their total income is used for food, shelter and clothing [37]. The average Canadian family spends up to 50\% of their total income on these necessities, and thus families spending 70\% are financially strained.

These low income families have little resources available for other spending needs such as insurance, recreation, or travel [37]. As well, pharmaceutical, dental, and vision care in Ontario are not universally covered by government insurance plans, so low-income families are at greater risk of poor health outcomes due to a lack of comprehensive insurance coverage.

An examination of Figures 2-14 and 2-15 reveals that although the median incomes in London, Middlesex, and Essex are higher than the regional statistic, there were much larger proportions of low-income families in these areas in 2006. This may be indicative of higher level of income inequality in these regions.

\textsuperscript{10} Statistics Canada publishes data on both before-tax and after-tax low-income populations. Since the after-tax low-income indicator is more representative of actual income available, Statistics Canada recommends use of this indicator [37].
2.6.2.3 Income Inequality

Income inequality is associated with detrimental effects, including higher levels of mental illness, cardiovascular illness, and juvenile delinquency [36], [38]. Suicide rates in lower income areas are almost double that of the high income neighborhoods [36]. Children of lower socioeconomic classes are more likely to experience cardiovascular disease and diabetes as adults [36].

Ontario’s strategic plan includes a promise for ‘the right care, at the right time, at the right place’. Income inequality makes this goal much more difficult, as individuals from lower socioeconomic classes are less likely to utilize the health care system at the primary care level. This has detrimental effects on other social determinants of health such as housing and education, by affecting their ability to work or improve their social capital through education. Reduced access to primary care leads to avoidable hospitalizations, which are associated with higher costs to the health care system, and worse health care outcomes for the individual [36]. The Canadian Institute for Health Information [CIHI] reported that in 2010, $160 million was spent by the healthcare system on conditions where timely ambulatory care could have prevented hospitalization [39].
### 2.6.2.3.1 Source of Income

As seen in Figure 2-16 and 2-17, for the population of Southwestern Ontario in 2006, a greater proportion of their income came from ‘Other Money’\(^{11}\) [14.4\%] and ‘Government Transfers’\(^{12}\) [12.4\%] than Ontario [12.9\%, 9.8\%] and Canada [12.7\%, 11.1\%] as a whole. ‘Earnings’ made up a smaller percentage of the total income in Southwestern Ontario [73.2\%] compared to provincial [77.4\%] and national [76.2\%] statistics.

![COMPARISON OF SOURCES OF INCOME SOUTHWESTERN ONTARIO 2006](image_url)

Figure 2-16 Comparison of sources of income as percentages of total income - Southwestern Ontario – 2006 [13]

\(^{11}\) Other Money Income “refers to regular cash income received during calendar year 2005 and not reported in any of the other ten sources listed on the questionnaire. For example, severance pay and retirement allowances, alimony, child support, periodic support from other persons not in the household, income from abroad [excluding dividends and interest], non-refundable scholarships, bursaries, fellowships and study grants, and artists’ project grants are included” [40].

\(^{12}\) Government transfers are all monetary benefits provided by federal, provincial, territorial or municipal governments per annum, and includes pensions, employment insurance benefits and child benefits [41].
2.6.3 Family Structure

The percentage of married-couple families was highest in Huron [79.5%], Bruce [79.4%] and Perth [77.4%] in 2006. The lowest percentage of married-couple families was found in London [69.7%], Middlesex [71.6%] and Chatham-Kent [73.0%]. Southwestern Ontario [73.5%] reported lower percentages of married-couple families than Ontario [73.9%] and higher than Canada [68.6%] in 2006 [Figure 2-18].

The number of common-law couple families was relatively uniform across the region at around 11%, with the exception of Essex [9.1%]. Southwestern Ontario [11.1%] and Ontario [10.3%] reported smaller proportions of common-law couple families than the national average [15.5%].

Lone-parent families were highest in London [17.9%], followed by Middlesex [16.5%] and Essex [16.4%]. Southwestern Ontario [15.3%] reported slightly lower rates of lone-parent families compared to Ontario [15.8%] and Canada [15.9%].
Figure 2-18 Comparison of Family Structures - Southwestern Ontario, Ontario and Canada - 2006 [13]
London had the greatest percentage of female lone-parent families [14.7%], followed by Middlesex [13.6%], Essex [13.3%], and Chatham-Kent [12.0%] in 2006. Lower than the provincial average of 12.9% were Bruce [7.5%], Huron [7.6%], Norfolk [8.9%], Grey [9.5%], Perth [9.7%] and Oxford [10.7%], seen in Figure 2-19.

The percentage of male lone-parent families [Southwestern Ontario 2.9%, Ontario 2.9%, and Canada 3.2%] did not vary substantially across the three regions being examined. It was substantially lower than the percentage of female lone-parent families reported in 2006 [Southwestern Ontario 12.4%, Ontario 12.9%, and Canada 12.7%].
2.7 Summary

- **Population Distribution**
  - Southwestern Ontario made up 4.8% of the national population in 2011. Age and sex distributions in Southwestern Ontario were similar to that of the province and nationally.
  - Dependency ratios in Southwestern Ontario were higher than the rest of the province. The elderly dependency ratio in Southwestern Ontario was 6.2% greater than the rest of the province and country in 2011.
  - The total dependency ratio in Southwestern Ontario was almost 10% greater than the provincial and national ratios in 2011.

- **Cultural Mix**
  - Language
    - Languages spoken in Southwestern Ontario varied from those spoken in the rest of the province and country.
    - Francophones made up a much smaller proportion of the population of Southwestern Ontario at 1.7%, versus 4.0% in Ontario overall and 21.7% in the country as a whole in 2011.
    - The most commonly reported mother tongues spoken in Southwestern Ontario, other than English and French, were German, Arabic, and Spanish.
    - In comparison, Ontario's top languages were Italian, Chinese dialects (n.o.s)\(^{13}\) and Cantonese and Spanish. Canada's top languages in 2011 were Punjabi, Chinese (n.o.s), Spanish, German and Italian.
  - Immigrant Status
    - Southwestern Ontario reported lower percentages of first generation immigrants [17.1%] than Ontario [27.8%] and Canada [19.6%].

- **Socioeconomic Status**
  - Education
    - Residents of Southwestern Ontario were substantially less likely to have a university degree [14.9%] than residents of Ontario [20.5%] and Canada [18.1%] in 2006.
  - Income
    - On average, residents of Southwestern Ontario reported lower median incomes [$26,243] than the rest of Ontario [$27,258]; Southwestern Ontario's residents reported higher median incomes than the national median income [$25,615] in 2006.
    - The proportion of the population living below the low-income cut-off in Southwestern Ontario [6.7%] was substantially less than that of the province [11.1%] and Canada overall [11.4%] in 2006.
    - For the population of Southwestern Ontario, a greater proportion of their income came from 'Other Money' [14.4%] and 'Government Transfers' [12.4%] than Ontario [12.9%, 9.8%] and Canada [12.7%, 11.1%] in 2006.
  - Family Structures
    - Southwestern Ontario [73.5%] reported a higher percentage of married-couple families than the national average [68.6%]. This was on par with the statistics reported for Ontario [73.9%] in 2006.

---

\(^{13}\) N.o.s: not otherwise specified
- Southwestern Ontario [11.1%] and Ontario [10.3%] had smaller percentages of common-law-couple families than Canada [15.5%]
- Southwestern Ontario [15.3%] reported slightly lower percentages of lone-parent families compared to Ontario [15.8%] and Canada [15.9%]
CHAPTER 3

Community Environment
Chapter 3 – Community Environment

This chapter will highlight crime rates, motor vehicle collisions, and student drug use to provide a better understanding of the community environments found in the region of Southwestern Ontario and the effect of these environments on the health of the population.

Health has been defined by the World Health Organization as “the state of complete physical, mental, and social wellness; not merely the absence of disease or infirmity” [42]. For substantive improvements in population health, efforts must focus on enhancing the social determinants of health, which are those contributors to the health of an individual influenced by their external environment [43]. For substantive improvement in the social determinants of health, collaboration is required across a multitude of sectors such as infrastructure, justice, education and health care [44].

The social determinants of health are:

1. Income and social status
2. Social support networks
3. Education and literacy
4. Employment and working conditions
5. Social environments
6. Physical environments
7. Personal health practices and coping skills
8. Healthy child development
9. Biology and genetic endowment
10. Health services
11. Gender
12. Other [45]

An individual’s community environment influences multiple social determinants of health. For instance, income and socioeconomic status affect the occupational hazards an individual is exposed to. It also affects the location of an individual’s residence and the accompanying risks associated with higher crime areas. Coping mechanisms differ based on socioeconomic status. For instance, smoking rates are higher in lower income families [46]. Overall, lower socioeconomic states have been associated with poor current and future health outcomes, both physical and mental [28], [47], [48].
3.1 Crime and Health

3.1.1 Introduction

Crime can be categorized into violent and non-violent crimes. Statistics Canada states that "violent crimes include homicide, attempted murder, assault, sexual assault, other sexual offences, abduction, forcible confinement or kidnapping, threat, harassment, extortion and robbery [unlike theft, robbery involves direct confrontation and a threat of physical harm]" [49].

The incidence rates of violent crimes can be used as a proxy for the overall level of violence in a community. However, caution should be used since some data elements [such as sexual assault] included in crime rates are contingent on self-reported data, and will not capture the entirety of the relevant population.

Violence has been found to affect the health status of an individual in a multitude of ways. A model used to explain the complexity of violence is found in Figure 3-1. Violent crimes can be classified based on the nature of the crime [physical, sexual, psychological, and deprivation/neglect], as well as by the subject of the violence [self-directed violence, interpersonal violence, and violence on a collective level, such as war].

There are both short and long-term, as well as direct and indirect, detrimental effects of violence on an individual’s health status. For instance, victims of sexual and/or domestic violence clearly suffer from the immediate, direct effects of their abuse. However, in addition there are numerous long-term health effects such as worse overall health and more frequent visits to emergency departments [50].

Figure 3-1 A Model for Understanding the Effects of Violence [50]

To prevent violence and associated health costs effectively, an understanding of the causes of violence is necessary. *The World Report on Violence and Health* by the World Health Organization uses an ecological model to demonstrate the complex interactions that lead to violence [Figure 3-2].

**Individual**

Individual factors are those elements specific to the individual that makes them more likely to be a victim or perpetrator of violence. These include both biological and environmental factors, such as low impulse control, lack of higher education, substance abuse and history of violent behaviors [50].
Relationship

An individual’s propensity for violence is affected by their relationships. An individual who lives in close proximity with their abuser is more likely to suffer from their violent behaviors, such as the dynamic between victims of domestic violence and child abuse and their abusers. Peer pressure amongst youth is also associated with violent behaviors [50].

Community

There are characteristics of a community associated with high levels of violence, such as low social capital\(^\text{14}\), densely populated areas, unemployment, low income levels, and the presence of a flourishing drug trade [50]. This combination of factors illuminates the reasons behind higher crime rates in areas with low-income housing complexes [52].

Societal

Societal attitudes towards violence influence the ability to address some forms of violence such as domestic violence and suicide. For instance, considering domestic violence a ‘family matter’ that outsiders do not involve themselves with prevents victims from accessing timely help. Another example is a societal perspective that suicide is an individual’s choice, rather than a violent action that is preventable through the provision of mental health resources and improvement of social capital.

Any solutions proposed to reduce violence must necessarily address some, if not all of these factors, to be successful in the long-term.

---

\(14\) Social capital: “Those tangible assets [that] count for most in the daily lives of people: namely goodwill, fellowship, sympathy, and social intercourse among the individuals and families that make up a social unit” [51]
3.1.2 Crime Rates

![Graph showing crime statistics trends in London-Middlesex region over ten years]

**Figure 3-3 Crime Statistics – Trends in London-Middlesex region over ten years [53]**

<table>
<thead>
<tr>
<th>Offence Category</th>
<th>2002</th>
<th>2012</th>
<th>Percentage Change</th>
<th>Overall Trend from '02 to '12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homicide</td>
<td>3</td>
<td>7</td>
<td>133.3%</td>
<td>Increased</td>
</tr>
<tr>
<td>Attempt Murder</td>
<td>9</td>
<td>9</td>
<td>0.0%</td>
<td>Remained same</td>
</tr>
<tr>
<td>Abduction</td>
<td>8</td>
<td>48</td>
<td>500.0%</td>
<td>Increased</td>
</tr>
<tr>
<td>Assault</td>
<td>2,105</td>
<td>2,068</td>
<td>-1.8%</td>
<td>Decreased</td>
</tr>
<tr>
<td>Sexual Assault</td>
<td>267</td>
<td>235</td>
<td>-12.0%</td>
<td>Decreased</td>
</tr>
<tr>
<td>Robbery</td>
<td>266</td>
<td>255</td>
<td>-4.1%</td>
<td>Decreased</td>
</tr>
<tr>
<td>Crime Type</td>
<td>2002</td>
<td>2012</td>
<td>Decrease</td>
<td>Status</td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>------</td>
<td>------</td>
<td>----------</td>
<td>----------</td>
</tr>
<tr>
<td>Break and Enter</td>
<td>3,270</td>
<td>2,524</td>
<td>-22.8%</td>
<td>Decreased</td>
</tr>
<tr>
<td>Theft: Motor Vehicle</td>
<td>2,695</td>
<td>859</td>
<td>-68.1%</td>
<td>Decreased</td>
</tr>
<tr>
<td>Theft</td>
<td>9,391</td>
<td>8,409</td>
<td>-10.5%</td>
<td>Decreased</td>
</tr>
<tr>
<td>Possession Stolen Property</td>
<td>160</td>
<td>182</td>
<td>13.8%</td>
<td>Increased</td>
</tr>
<tr>
<td>Frauds</td>
<td>1,123</td>
<td>1,000</td>
<td>-11.0%</td>
<td>Decreased</td>
</tr>
<tr>
<td>Counterfeit</td>
<td>1,129</td>
<td>83</td>
<td>-92.6%</td>
<td>Decreased</td>
</tr>
<tr>
<td>Prostitution</td>
<td>42</td>
<td>79</td>
<td>88.1%</td>
<td>Increased</td>
</tr>
<tr>
<td>Gaming and Betting</td>
<td>1</td>
<td>0</td>
<td>-100.0%</td>
<td>Decreased</td>
</tr>
<tr>
<td>Offensive Weapon</td>
<td>137</td>
<td>264</td>
<td>92.7%</td>
<td>Increased</td>
</tr>
<tr>
<td>Other Criminal Code</td>
<td>8,727</td>
<td>9,438</td>
<td>8.1%</td>
<td>Increased</td>
</tr>
<tr>
<td>Total Criminal Offences</td>
<td>29,333</td>
<td>25,460</td>
<td>-13.2%</td>
<td>Decreased</td>
</tr>
</tbody>
</table>

Table 3-1 Trends in Crime Statistics in London-Middlesex region [53]

3.1.2.1 Data

London-Middlesex crime data was retrieved from the London Police Department archives; detailed crime statistics were not readily available for regions other than London-Middlesex. However, the Crime Severity Index described in Section 3.1.2 and Figure 3-4 provides detail about crime levels in other regions of Southwestern Ontario.

3.1.2.2 Trends in London-Middlesex Crime Rates

From 2002 to 2012, there has been a 13.2% decrease in the total number of crimes recorded annually in the London-Middlesex region [Figure 3-3].


### 3.1.3 Crime Severity Index

The Crime Severity Index\(^\text{15}\) is a tool that has a number of advantages over the traditional reporting of crime rates. The Index reflects both the seriousness of the crime and the number of occurrences, enabling easier comparison of crime trends across the provinces and territories [55].

\(^{15}\) The Index is calculated in the following manner: "the number of police-reported incidents for each offence is multiplied by the weight for that offence. All weighted offences are then added together and divided by the corresponding population total.” This is then standardized to a scale of 0-100, using 2006 as the base year [54]. The data used in the above figure has been retrieved from Statistics Canada’s Police reported and then made more concise by including only the larger counties of the region and excluding data [other than London] from cities and towns.
The Crime Severity Index increased in West Grey, Grey County [Georgian Bluffs], South Bruce [Kincardine] and Huron [Goderich] from 2003 to 2011 [shown with markers in Figure 3-4]. All other regions in Southwestern Ontario recorded reductions in CSI in the same period.

3.2 Motor Vehicle Accidents

3.2.1 Introduction
Motor vehicle accidents are the leading cause of unintentional injuries leading to death in the London-Middlesex region, and one of the leading causes of death nationally [56], [57]. From a public health perspective, most motor vehicle accidents are preventable and efforts should be focused on prevention.


3.2.2 Data
Data for this section was retrieved from the most recent publication of the Ontario Road Safety Annual Report, released in 2010. Data on national statistics was retrieved from the Transportation Canada and Statistics Canada websites.

![COMPARISON OF TOTAL COLLISION RATE FROM MOTOR VEHICLE ACCIDENTS PER 100,000 SOUTHWESTERN ONTARIO, ONTARIO AND CANADA 2010](image)

**Figure 3-5 Comparison of Total Collision Rates from Motor Vehicle Accidents - Southwestern Ontario, Ontario and Canada - 2010 [59] [60]**

In 2010, most regions in Southwestern Ontario had lower collision rates than the provincial average, with the exception of Bruce, Grey, Norfolk and Middlesex [Figure 3-5]. The overall total collision rate for Canada was unavailable.
With the exception of Essex, most regions in Southwestern Ontario had a higher fatality rate from motor vehicle accidents than the provincial rate in 2010. Chatham-Kent, Elgin, Grey, Norfolk, Huron, Oxford, and Perth also had higher fatality rates in comparison to the national rate in 2010 [Figure 3-6].

Figure 3-6 Comparison of Fatalities from Motor Vehicle Accidents – Southwestern Ontario, Ontario and Canada - 2010 [59] [60]

Figure 3-7 Comparison of Injuries from Motor Vehicle Accidents – Southwestern Ontario, Ontario and Canada - 2010 [61] [62]
In 2010, injury rates from motor vehicle collisions were lower than the provincial rate for most regions in Southwestern Ontario, with the exception of Norfolk and Middlesex [Figure 3-7]. In comparison to the national rate, all regions in Southwestern Ontario with the exception of Lambton had higher overall injury rates from motor vehicle accidents in 2010.

3.2.3 Summary
While most regions in Southwestern Ontario had lower collision rates than the rest of the province, the fatality rates from such collisions were higher. Improvements in road safety are therefore vital to the health and safety of the population, particularly in the regions of Grey, Norfolk and Middlesex.

3.3 Youth Violence
Juvenile delinquency has been strongly correlated with rates of drug and alcohol abuse. This section will discuss the overall prevalence of alcohol and drug use, using that as an indirect indicator of current or future juvenile delinquency [61]-[63].

![Comparison of Drug Use Statistics across Ontario - 2009](image)

Southwestern Ontario has student smoking rates on par with the Ontario average, although considerably higher than some other regions such as the Central West LHIN. Alcohol usage rates were the highest in the province, as was the rate of binge drinking, with more than 80% of students reporting use of alcohol in the past year, and almost half reporting binge drinking in the last year [Figure 3-8 to 3-9].
SECONDARY STUDENT DRUG USE
COMPARISON OF SOUTHWESTERN ONTARIO AND ONTARIO
2009

Figure 3-9 Comparison of relative percentages of specific drug use by secondary students in the Southwestern Ontario and Ontario - 2009\textsuperscript{16} 17 18 [64]

Figures for the following were not available: Salvia Dinosaurum use in Ontario, Methamphetamine/Crystal Meth, Tranquilizers [NM], Oxycontin, Potential Cannabis Dependence, Glue/Solvents, OTC\textsuperscript{19} Cough/Cold Medication [NM] use in Southwestern Ontario.

\textsuperscript{16} The “NM” in Stimulants [NM] and NM Prescription drug refers to non-medical use; use without a doctor’s prescription
\textsuperscript{17} LSD [Lysergic acid] and PCP [Phencyclidine] are both hallucinogens.
\textsuperscript{18} Passenger/drugs, Passenger/alcohol refers to the question on the survey where students were asked how frequently they were a passenger in the vehicle of someone who had been drinking alcohol or using drugs in the last twelve months.
\textsuperscript{19} OTC refers to “over the counter” medications, i.e. those medications that are available without a doctor’s prescription
Compared to the Ontario average, Southwestern Ontario’s secondary students reported greater usage of most drugs in the Ontario Student Drug Use and Health Survey. The following drugs/type of drug use were reported considerably more often by students in Southwestern Ontario than the Ontario average:

- Binge drinking [13.6% more in Southwestern Ontario]
- Alcohol [12.9% more in Southwestern Ontario]
- Hazardous drinking [7.5% more in Southwestern Ontario]
- Cannabis use [5.9% more in Southwestern Ontario]
- Any Illicit Drug, including non-medical use of prescription drug [5.8% more in Southwestern Ontario]
- Passenger/Drugs [5.2% more in Southwestern Ontario]
- Cannabis-Driving - Drivers Grades 10-12 [5.1% more in Southwestern Ontario]
- Any non-medical use of prescription drugs [3.4% more in Southwestern Ontario]
- Passenger/alcohol [3.3% more in Southwestern Ontario]
- Hallucinogens other than Lysergic Acid, Phencyclidine [2.5% more in Southwestern Ontario]
- Jimson Weed [2.3% more in Southwestern Ontario]
- Opioid Pain Relievers – non-medical use [1.9% more in Southwestern Ontario]
- Stimulants – non-medical use [1.2% more in Southwestern Ontario]
3.4 Summary

- **Crime and Health**
  - There are individual, relationship, community, and societal factors that relate to crime and violence and health.
  - London-Middlesex region has seen decreases in crime rates in the region specifically for assault, sexual assault, robbery, breaking and entering, motor vehicle theft, frauds, counterfeiting and gaming and betting.
  - London-Middlesex region has seen increases specifically in the incidence of homicide, abduction, possession of stolen property, prostitution and offensive weapons.

- **Motor Vehicle Accidents**
  - In 2010, most regions in Southwestern Ontario had lower collision rates than the provincial average, with the exception of Bruce, Grey, Norfolk and Middlesex.
  - With the exception of Essex, most regions in Southwestern Ontario had a higher fatality rate from motor vehicle accidents than the provincial rate in 2010. Chatham-Kent, Grey, Norfolk, Huron, Oxford, and Perth had substantially higher fatality rates in comparison to the national rate in 2010.
  - In 2010, injury rates from motor vehicle collisions were lower than the provincial rate for most regions in Southwestern Ontario, with the exception of Norfolk and Middlesex. In comparison to the national rate, all regions in Southwestern Ontario with the exception of Lambton had higher injury rates from motor vehicle accidents in 2010.

- **Youth Violence**
  - Youth alcohol and drug use is correlated with current and future violence.
  - Alcohol usage rates in Southwestern Ontario were highest in the province, as were self-reported rates of binge drinking in past year.
  - Drug use in Southwestern Ontario was higher than provincial average for use of the following drugs:
    - **Alcohol**
      - Binge drinking [13.6% more in Southwestern Ontario]
      - Alcohol [12.9% more in Southwestern Ontario]
      - Hazardous drinking [7.5% more in Southwestern Ontario]
    - **Cannabis**
      - Cannabis use [5.9% more in Southwestern Ontario]
      - Cannabis-Driving - Drivers Grades 10-12 [5.1% more in Southwestern Ontario]
    - **Driving under the influence**
      - Passenger/Drugs [5.2% more in Southwestern Ontario]
      - Passenger/alcohol [3.3% more in Southwestern Ontario]
    - **Prescription Drug Misuse**
      - Any non-medical use of prescription drugs [3.4% more in Southwestern Ontario]
      - Opioid Pain Relievers – non-medical use [1.9% more in Southwestern Ontario]
      - Stimulants – non-medical use [1.2% more in Southwestern Ontario]
    - Any Illicit Drug, including non-medical use of prescription drug [5.8% more in Southwestern Ontario]
- Hallucinogens other than Lysergic Acid, Phencyclidine [2.5% more in Southwestern Ontario]
- Jimson Weed [2.3% more in Southwestern Ontario]
CHAPTER 4

Physical Environment
Chapter 4 - Physical Environment

4.1 Introduction

The physical environment an individual is exposed to has a considerable effect on their health. Air quality in particular has consistently been associated with the overall health of the population and is an important indicator of the condition of the physical environment [65], [66].

The Air Quality Index [AQI] is a reading from 0-100 that combines the concentrations of a number of pollutants into one value to indicate the overall quality of the air, as shown in Table 4-1 [65]. Pollutants included in the AQI are ozone, fine particulate matter, sulphates, nitrogen dioxide, carbon monoxide, and sulphur dioxide.

4.2 Data


<table>
<thead>
<tr>
<th>AIR QUALITY INDEX</th>
<th>HEALTH EFFECTS OF OVERALL AIR QUALITY INDEX LEVELS</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-15</td>
<td>Very Good</td>
</tr>
<tr>
<td>16-31</td>
<td>Good</td>
</tr>
<tr>
<td>32-49</td>
<td>Moderate</td>
</tr>
<tr>
<td>50-99</td>
<td>Poor</td>
</tr>
<tr>
<td>100+</td>
<td>Very Poor</td>
</tr>
</tbody>
</table>

Table 4-1 Air Quality Index Categories [68]
4.3 Trends in the Air Quality Index in Southwestern Ontario

There has been considerable improvement in the air quality of Southwestern Ontario over the last five years, although air quality at the two Windsor stations remained in the ‘Moderate’ range [AQI of 32-49], as seen in Figure 4-1 and Table 4-2.


The two Windsor stations also recorded improvements in AQI from 2007 to 2012. However, the improvements were from Poor air quality to ‘Moderate’ quality in 2012. Thus, while the Windsor West and Windsor Downtown stations recorded substantial improvements in AQI [54.1% and 40.0%, respectively], air quality was still worse than that recorded at other stations in Southwestern Ontario. ‘Moderate’ air quality is associated with adverse health effects for sensitive individuals who are already of poor respiratory and overall health status [Table 4-1] [65].

![Trends in Air Quality Index](image)

Figure 4-1 Air Quality Index – Trends from 2007 to 2012 [68]
<table>
<thead>
<tr>
<th>Date</th>
<th>London</th>
<th>Port Stanley</th>
<th>Windsor West</th>
<th>Windsor Downtown</th>
<th>Sarnia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aug-01-07</td>
<td>46</td>
<td>47</td>
<td>85</td>
<td>65</td>
<td>35</td>
</tr>
<tr>
<td>Aug-01-08</td>
<td>23</td>
<td>31</td>
<td>40</td>
<td>43</td>
<td>27</td>
</tr>
<tr>
<td>Aug-01-09</td>
<td>25</td>
<td>33</td>
<td>31</td>
<td>30</td>
<td>28</td>
</tr>
<tr>
<td>Aug-01-10</td>
<td>32</td>
<td>34</td>
<td>33</td>
<td>35</td>
<td>37</td>
</tr>
<tr>
<td>Aug-01-11</td>
<td>25</td>
<td>27</td>
<td>32</td>
<td>33</td>
<td>26</td>
</tr>
<tr>
<td>Aug-01-12</td>
<td>27</td>
<td>26</td>
<td>39</td>
<td>39</td>
<td>28</td>
</tr>
<tr>
<td>Trend from 2007 to 2012</td>
<td>-41.3%</td>
<td>-44.7%</td>
<td>-54.1%</td>
<td>-40.0%</td>
<td>-20.0%</td>
</tr>
</tbody>
</table>

Table 4-2 Air Quality Index - Trends over time in Southwestern Ontario [68]
4.4 Air Quality Index Range

4.4.1 Background
Air Quality Index Range is an indicator used to demonstrate the percentage of time spent in each AQI range. It provides a better understanding of the overall air quality recorded in 2012 than the snapshot seen in Figure 4-1. In 2012, the air quality index remained mostly within the ‘Good’ range for all stations in Southwestern Ontario. However, the percentage of time with AQI of ‘Moderate’ and ‘Poor’ range is higher in the Windsor and Port Stanley, which is indicative of worse air quality in these areas [Figure 4-2].

![Figure 4-2 Percentage of Time in Air Quality Index Range – 2012](image-url)
Figure 4-3 Number of Days with Air Quality Index greater than 31 [68]

4.4.2 Trends in Southwestern Ontario

Figure 4-3 describes the number of days with an AQI >31 [i.e. falling in the 'Moderate', 'Poor', or 'Very Poor' ranges] recorded at each station from 2007 to 2012. This indicator is used to understand the changes in air quality recorded in a particular region over a period of one year. For instance, in comparison to Figure 4-1 where Port Stanley’s overall air quality was recorded in the ‘Good’ range, Figure 4-3 demonstrates that the air quality in Port Stanley was within the ‘Moderate’ range for 80 days in 2012, equivalent to 20% of the year.
4.5 Fine Particulate Matter

4.5.1 Background

Fine Particulate Matter [FPM] is a term used to encompass those particles, both solid and liquid, that are 2.5 microns or less in diameter. According to the Ministry of the Environment, these particles include “aerosols, smoke, fume, dust, ash and pollen” and in Ontario are “made up largely of sulphates and nitrate particles, elemental and organic carbon and soil” [69]. Sources of FPM include fuel combustion and atmospheric chemical reactions. A large proportion of FPM [up to fifty percent] detected in Ontario are originally located in the U.S and carried over by the air [69].

High levels of FPM adversely affect population health and are associated with increased numbers of hospital admissions and premature death. Asthmatics, individuals with chronic lung or cardiac disease, as well as children and the elderly are sensitive to the concentration of FPM in the environment. These adverse effects have been found with both short-term exposure [days] and long-term exposure [years], as seen in Table 4-3.

<p>| HEALTH EFFECTS OF AIR QUALITY INDEX [AQI] LEVEL CHANGES CAUSED BY FINE PARTICULATE MATTER |
|---------------------------------|----------------------------------|---------------------------------|---------------------------------|</p>
<table>
<thead>
<tr>
<th>AQI</th>
<th>Category</th>
<th>Pollutant Concentration Breakpoints [µg/m³]</th>
<th>Fine Particulate Matter [PM2.5]</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 15</td>
<td>Very Good</td>
<td>0 - 11</td>
<td>Sensitive populations may want to exercise caution.</td>
</tr>
<tr>
<td>16 - 31</td>
<td>Good</td>
<td>12 - 22</td>
<td>Sensitive populations may want to exercise caution.</td>
</tr>
<tr>
<td>32 - 49</td>
<td>Moderate</td>
<td>23 - 45</td>
<td>People with respiratory disease at some risk.</td>
</tr>
<tr>
<td>50 - 99</td>
<td>Poor</td>
<td>46 - 90</td>
<td>People with respiratory disease should limit prolonged exertion; general population at some risk.</td>
</tr>
<tr>
<td>100 or over</td>
<td>Very Poor</td>
<td>91 or over</td>
<td>Serious respiratory effects even during light physical activity; people with heart disease, the elderly and children at high risk; increased risk for general population.</td>
</tr>
</tbody>
</table>

Table 4-3 Adapted from Air Quality Ontario’s Table “Health effects of different Air Quality Index [AQI] levels caused by fine particulate matter” [69]
4.5.2 Trends in Southwestern Ontario

All four Southwestern sites displayed an overall downward trend in the concentration of FPM, and levels remained in the ‘Very Good’ range over the last ten years [Figure 4-4]. However, there has been a trend similar to the AQI trend, with levels increasing from 2009 onwards at all four sites.
4.6 Acid Aerosols

4.6.1 Background
Sulphur dioxide \([\text{SO}_2]\) is a colorless gas that can be oxidized to form acid aerosols\(^{20}\) and sulphate particles, with intermediates such as \(\text{H}_2\text{SO}_3\) and \(\text{SO}_3\). These particles have been associated with respiratory illnesses such as asthma, and there is a dose dependent relationship between sulphate concentrations and cardiorespiratory admissions in Ontario \([5, 66]\).

Sulphur dioxide \([\text{SO}_2]\) has detrimental health effects at higher concentrations, particularly respiratory and cardiovascular illness [Table 4-4]. It is a component of acid rain, which damages infrastructure and vegetation, and acidifies water sources.

| HEALTH EFFECTS OF AIR QUALITY INDEX [AQI] LEVEL CHANGES CAUSED BY SULPHUR DIOXIDE |
|---|---|---|---|
| **AQI** | **Category** | **Pollutant Concentration Breakpoints [ppb]** | **Sulphur Dioxide [SO\(_2\)]** |
| 0 - 15 | Very Good | 0 - 79 | No health effects are expected in healthy people |
| 16 - 31 | Good | 80 - 169 | Damages some vegetation in combination with ozone |
| 32 - 49 | Moderate | 170 - 250* | Damages some vegetation |
| 50 - 99 | Poor | 251 - 1999 | Odour; increasing vegetation damage |
| 100 or over | Very Poor | 2000 or over | Increasing sensitivity for asthmatics |

Table 4-4 Adapted from Air Quality Ontario’s Table “Health effects of different Air Quality Index [AQI] levels caused by sulphur dioxide” [71]

4.6.2 Trends in Southwestern Ontario

Data for the Tiverton station was unavailable except for the period 2007-2010. Data for the London station was unavailable in 2003, 2011 and 2012. Overall, the concentration of \(\text{SO}_2\) detected in Southwestern Ontario has declined substantially over the last decade. Of the four \(\text{SO}_2\) monitoring stations located in Southwestern Ontario, Sarnia consistently reported higher levels of \(\text{SO}_2\) than the other stations, even as it experienced a downward trend of almost 49% from the year 2000 to 2012 [Figure 4-5].

\(^{20}\) Acid aerosols are solid or liquid acids that form particles
Windsor’s levels were also considerably higher than the other stations, although much lower than that of Sarnia; it is trending downward at an equivalent rate of 49% from the year 2000 to 2010. London has had S0\textsubscript{2} concentrations of approximately half of Windsor’s for the last ten years, and has experienced a 67% decrease in S0\textsubscript{2} levels from 2000 to 2010. Tiverton experienced a 34% decrease in S0\textsubscript{2} levels from 2007 to 2010.

![Figure 4-5 Trends in average hourly sulphur dioxide concentrations in parts per billion across Southwestern Ontario](image)

### 4.7 Summary

- **Air Quality**
  - Air quality within the region has improved considerably over the last five years. The two Windsor stations continue to record AQIs mostly in the ‘Moderate’ range. AQI in the ‘Moderate’ range is associated with adverse health effects for sensitive individuals.

- **Fine particulate matter**
  - All four stations in Southwestern Ontario displayed an overall downward trend in the concentration of FPM, and levels have remained in the ‘Very Good’ range for the last ten years.

- **Acid Aerosols**
  - S0\textsubscript{2} levels in Southwestern Ontario have declined substantially over the last decade.
CHAPTER 5

Mortality Patterns in Southwestern Ontario
Chapter 5 - Mortality Patterns in Southwestern Ontario

5.1 Data

The data presented was obtained from Canadian Vital Statistics through Statistics Canada.

5.2 Infant Mortality

Infant mortality rate is defined as the number of deaths of children under one year of age per 1,000 live births. Total infant mortality rates are slightly higher in South West LHIN [5.4 deaths per 1000 live births] compared to Ontario [5.1] and Canada [5.0]. South West LHIN reported higher male infant mortality rates [6.0] than the provincial [5.5] and national [5.4] rates [Figure 5-1].

Total infant mortality rates in Erie St Clair LHIN [3.7] are substantially lower than South West LHIN, Ontario and Canada. However, the male infant mortality rate was comparable to the other geographical areas [5.1] and was more than twice the female mortality rates.

![Figure 5-1 Infant Mortality Rate in Southwestern Ontario, Ontario, and Canada - 2013](image-url)
5.3 Life Expectancy

Life expectancy represents the number of years an individual is expected to live from a particular start point, and is used as a measure of population health [73]. Life expectancies can be calculated from birth, or from age 65 years. Life expectancy did not vary widely across the four geographical regions under examination in 2013. Female life expectancy was higher than male life expectancy, both at birth [Figure 5-2] and at age 65 [Figure 5-3].

![Comparison of life expectancies at birth in Southwestern Ontario, Ontario and Canada - 2013](image1)

![Comparison of life expectancies at age 65 in Southwestern Ontario, Ontario and Canada - 2013](image2)
5.4 Selected Causes of Death by Sex and Region

5.4.1 Data
The age-standardized mortality rates enable comparison between populations without the confounding effect of age affecting the results. The age-standardized rate of death per 100,000 for select causes are shown in Figures 5-4 to 5-9.

5.4.2 Mortality Rates – All Causes

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>South West</td>
<td>655.8</td>
<td>685.0</td>
<td>473.0</td>
<td>704.0</td>
<td>487.9</td>
<td>521.8</td>
<td>640.8</td>
<td>542.3</td>
<td>443.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Erie St. Clair</td>
<td>582.1</td>
<td>521.8</td>
<td>430.2</td>
<td>670.1</td>
<td>640.8</td>
<td>521.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ontario</td>
<td>487.9</td>
<td>521.8</td>
<td>430.2</td>
<td>670.1</td>
<td>640.8</td>
<td>521.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Canada</td>
<td>640.8</td>
<td>542.3</td>
<td>443.1</td>
<td>670.1</td>
<td>640.8</td>
<td>542.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 5-4 Mortality rates due to all causes of death – 2013 [72], [74]

Total overall mortality rate was higher in Erie St. Clair LHIN than South West LHIN. Southwestern Ontario’s overall mortality rate was higher than both the provincial [522 deaths per 100,000 population] and national rates [542 deaths per 100,000 population].

Mortality rates for males were higher than females in all four geographical regions. Erie St. Clair LHIN’s male mortality rate of 704 deaths per 100,000 population was higher than the mortality rate in South West LHIN [685], and the provincial [641] and national [670] rates in 2013.

5.4.3 Mortality Rates - Cancer
In general, the death rate due to all cancers is highest for Erie St. Clair LHIN [172 deaths per 100,000 population], followed by South West LHIN [167], Ontario [159], and Canada [166]. However, the pattern for males is different, with the male mortality rate due to all cancers highest in Canada [202], followed by Erie St. Clair LHIN [201], South West LHIN [196], and Ontario [192]. Further, the death rate due to all cancers is higher in males compared to females in all four geographical regions.
5.4.4 Mortality Rates - Circulatory Disease

The total mortality rate due to circulatory diseases was highest for Erie St. Clair LHIN [202], followed by South West LHIN [170], Canada [157] and Ontario [156]. Additionally, the male mortality rate due to circulatory diseases was higher than the female mortality rate in all four geographical regions.
5.4.5 Mortality Rates - Respiratory Disease

In contrast, the rate of death due to respiratory diseases was highest in South West LHIN [45] and Canada [45], followed by Erie St. Clair LHIN [42], and Ontario [41]. The death rate due to respiratory diseases was higher in males compared to females in all four geographical regions.

![Mortality Rates Due to Respiratory Disease](image)

**Figure 5-7** Mortality rates due to respiratory disease - 2013 [72], [74]

5.4.6 Mortality Rates - Suicide and Self-Inflicted Injuries

The total mortality rate due to suicide and self-inflicted injury in 2013 was higher in the South West LHIN, at 9.6 deaths per 100,000 population, than in the Erie St Clair LHIN at 7.5 deaths per 100,000 population [see Figure 5-8].

Compared to the provincial average of 7.7 deaths per 100,000 population, South West LHIN had higher mortality rates due to suicide and Erie St Clair LHIN had lower rates. Compared to Canada’s total mortality rate due to suicide and self-inflicted injuries of 10.2 deaths per 100,000 population, both South West LHIN and Erie St Clair LHIN had lower mortality rates.

Male suicide/self-inflicted injury rates were higher in all regions, and were higher in South West LHIN [14.2] than in the province of Ontario [11.9].
MORTALITY RATES DUE TO SUICIDE AND SELF-INFLICTED INJURIES
SOUTHWESTERN ONTARIO, ONTARIO AND CANADA
2013

Figure 5-8 Mortality rates due to suicide and self-inflicted injuries – 2013 [72], [74]

5.4.7 Premature Mortality Rates
Premature mortality rates are the age-standardized rates of death of individuals younger than 75 years of age [72]. Premature mortality was higher in Erie St. Clair LHIN, at 279 deaths per 100,000 population, than South West LHIN at 264 deaths per 100,000 population. Southwestern Ontario had a higher overall premature mortality rate than the provincial and national rates. Male premature mortality rates in Southwestern Ontario were higher than the rest of the province and country.

PREMATURE MORTALITY RATES
SOUTHWESTERN ONTARIO, ONTARIO AND CANADA
2013

Figure 5-9 Premature mortality rates – 2013 [72], [74]
## MORTALITY RATES PER 100,000 POPULATION BY CAUSE OF DEATH
### SOUTHWESTERN ONTARIO, ONTARIO AND CANADA
#### 2013

<table>
<thead>
<tr>
<th>Cause of Death</th>
<th>South West LHIN</th>
<th>Erie St Clair LHIN</th>
<th>Ontario</th>
<th>Canada</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total M F</td>
<td>Total M F</td>
<td>Total M F</td>
<td>Total M F</td>
</tr>
<tr>
<td><strong>Total Mortality Rate - All Causes Of Death</strong></td>
<td>566 685 473</td>
<td>582 704 488</td>
<td>522 641 430</td>
<td>542 670 443</td>
</tr>
<tr>
<td><strong>All Cancers</strong></td>
<td>167 196 147</td>
<td>172 201 152</td>
<td>159 192 136</td>
<td>166 202 141</td>
</tr>
<tr>
<td><strong>Colorectal Cancer</strong></td>
<td>16 19 13</td>
<td>16 21 12</td>
<td>17 22 13</td>
<td>18 22 14</td>
</tr>
<tr>
<td><strong>Lung Cancer</strong></td>
<td>41 51 34</td>
<td>46 57 39</td>
<td>40 51 32</td>
<td>45 58 36</td>
</tr>
<tr>
<td><strong>Breast Cancer</strong></td>
<td>13 N/A 24</td>
<td>12 N/A 23</td>
<td>12 N/A 22</td>
<td>12 N/A 22</td>
</tr>
<tr>
<td><strong>Prostate Cancer</strong></td>
<td>8 21 N/A</td>
<td>8 21 N/A</td>
<td>8 21 N/A</td>
<td>8 21 N/A</td>
</tr>
<tr>
<td><strong>Circulatory Diseases</strong></td>
<td>167.3 214 136</td>
<td>171.7 250 164</td>
<td>156 197 123</td>
<td>157 200 124</td>
</tr>
<tr>
<td><strong>Ischemic Heart Diseases</strong></td>
<td>96 129 69</td>
<td>114 153 83</td>
<td>87 119 62</td>
<td>85 117 59</td>
</tr>
<tr>
<td><strong>Cerebrovascular Diseases</strong></td>
<td>33 38 30</td>
<td>39 40 38</td>
<td>31 33 29</td>
<td>31 33 29</td>
</tr>
<tr>
<td><strong>All Other Circulatory Diseases</strong></td>
<td>41 48 36</td>
<td>49 56 43</td>
<td>38 45 33</td>
<td>42 50 36</td>
</tr>
<tr>
<td><strong>Respiratory Diseases</strong></td>
<td>45 60 37</td>
<td>42 55 35</td>
<td>41 54 33</td>
<td>45 59 36</td>
</tr>
<tr>
<td><strong>Pneumonia And Influenza</strong></td>
<td>12 14 11</td>
<td>10 13 9</td>
<td>11 14 10</td>
<td>12 15 10</td>
</tr>
<tr>
<td><strong>Bronchitis Asthma And Emphysema</strong></td>
<td>2 4 1</td>
<td>2 3 3</td>
<td>2 3 2</td>
<td>2 3 2</td>
</tr>
<tr>
<td><strong>All Other Respiratory Diseases</strong></td>
<td>31 42 24</td>
<td>30 40 23</td>
<td>28 38 22</td>
<td>31 42 24</td>
</tr>
<tr>
<td><strong>Unintentional Injuries</strong></td>
<td>29 38 21</td>
<td>26 35 17</td>
<td>23 32 16</td>
<td>25 35 16</td>
</tr>
<tr>
<td><strong>Suicides And Self-Inflicted Injuries</strong></td>
<td>10 14 5</td>
<td>8 12 3</td>
<td>8 12 4</td>
<td>10 16 5</td>
</tr>
<tr>
<td><strong>Human Immunodeficiency Virus [HIV] Infection</strong></td>
<td>0 21</td>
<td>- - -</td>
<td>1 2 0</td>
<td>1 2 1</td>
</tr>
<tr>
<td><strong>Premature Mortality</strong></td>
<td>264 324 207</td>
<td>279 339 222</td>
<td>239 297 185</td>
<td>252 312 194</td>
</tr>
</tbody>
</table>

Table 5-1 Mortality Rates in Southwestern Ontario, Ontario and Canada – 2013 [72]

---

21 Data unavailable
5.5 Summary

- **Infant Mortality**
  - Total infant mortality rates were slightly higher in South West LHIN [5.4 deaths per 1000 live births] compared to Ontario [5.1] and Canada [5.0] in 2013.
  - South West LHIN reported higher male infant mortality rates [6.0] than the provincial [5.5] and national [5.4] rates.
  - Total infant mortality rates in Erie St Clair LHIN [3.7] were substantially lower than South West LHIN, Ontario and Canada.
  - Male infant mortality rate was comparable to the other geographical areas [5.1] and was more than twice the female mortality rates.
  - Southwestern Ontario had a higher overall premature mortality rate than the provincial and national rates.
  - Male premature mortality rates in Southwestern Ontario were higher than the rest of the province and country.

- **Life Expectancy**
  - Life expectancy at birth and at 65 years were comparable across Southwestern Ontario and in comparison to provincial and national statistics.
  - Life expectancy at birth and at 65 years was higher for females than males.

- **Selected Causes of Death by Sex and Region**
  - Mortality rates due to ‘All Cancers’ and due to ‘Circulatory Disease’ were highest for Erie St. Clair LHIN, followed by South West LHIN, Ontario, and Canada.
  - Mortality rates due to ‘Respiratory Diseases’ are highest in South West LHIN and Canada, followed by rates for Erie St. Clair LHIN and Ontario.
  - Mortality rates due to suicide and self-inflicted injuries were higher in South West LHIN than both Erie St Clair LHIN and Ontario, and lower than national rates. Rates in Erie St Clair LHIN were slightly lower than provincial rates, and substantially lower than national rates.
CHAPTER 6

Mental Health
Chapter 6 - Mental Health

6.1 Data

The data presented here was obtained from Canadian Community Health Survey through Statistics Canada, as well as from the Distract Abstract Database through CIHI. The data was obtained for the fiscal year 2011-12, i.e. April 2011 to March 2012.

6.2 Perceived Mental Health

Perceived mental health is the percentage of the population aged 12 years and older that self-report perceiving their own mental health status as being ‘Excellent’, ‘Very Good’, ‘Fair’, or ‘Poor’.

As shown in the Figure 6-1, the percentage of the population reporting ‘Excellent’ or ‘Very Good’ mental health was slightly higher in South West LHIN [74.7%] than Erie St Clair LHIN [72.1%], Ontario [72.4%] and Canada [72.2%]. Erie St Clair LHIN had similar rates of positive self-reported mental health as Ontario and Canada in FY 2011-12. Variation between the sexes, while present, was not substantial.

![Figure 6-1 Percentage of population that rated own mental health as very good or excellent - Southwestern Ontario, Ontario and Canada – FY 2011-12](image-url)
6.3 Mood Disorder Diagnosis

Figure 6-2 shows the percentage of the population aged 12 years and older who reported being diagnosed by a health professional as having a mood disorder such as depression, bipolar disorder, mania or dysthymia.

The prevalence of mood disorder diagnoses in Southwestern Ontario was higher than the provincial rate [7.6] but less than half the national rates [17.5] in FY 2011-12. Females were substantially more likely to be diagnosed with a mood disorder in Southwestern Ontario and Ontario than males. Variation between the sexes was not substantial on a national level.

![Percentage of population with mood disorder diagnosis](image)

**Figure 6-2** Percentage of population reporting mood disorder diagnosis – Southwestern Ontario, Ontario and Canada – FY 2011-12 [75]

6.4 Health System and Mental Health

Figure 6-3 below shows the age-standardized rate\(^{22}\) per 100,000 population of departure from general hospitals due to discharge or death following hospitalization for mental illness. The selected mental health illnesses that are included in this measure include substance-related disorders; schizophrenia, delusional and non-organic psychotic disorders; mood/affective disorders; anxiety disorders; and selected disorders of adult personality and behavior.

6.4.1 Mental Illness Hospitalization Rates

Hospitalization rates in Southwestern Ontario in 2011-12 were lower than national rates, as seen in Figure 6-3. Compared to provincial rates [442 hospitalizations per 100,000 population] in 2011-12, South West

\(^{22}\) Age-standardized rates enable comparison between populations without the confounding effect of age affecting the results.
LHIN reported higher rates [458 per 100,000 population], and Erie St Clair LHIN reported lower rates [400 per 100,000 population] of hospitalization for mental illness. Hospitalization rates for males were higher than females across the four geographical regions.

**Figure 6-3 Mental Illness Hospitalization Rate per 100,000 population of South West LHIN, Erie St Clair LHIN, Ontario and Canada – FY 2011-12 [76]**

### 6.4.2 Mental Illness Patient Days

The mental illness patient days indicator represents the age-adjusted rate per 10,000 population of the total number of days in general hospitals for mental illness. The selected mental health illnesses that are included in this indicator include (1) substance-related disorders; (2) schizophrenia; (3) delusional and non-organic psychotic disorders; (4) mood/affective disorders; (5) anxiety disorders; and (6) selected disorders of adult personality and behavior.

Mental illness patient days in Southwestern Ontario [544 days per 10,000 population] were lower than national rates [707] in FY 2011-12 as seen in **Figure 6-4.** South West LHIN had lower rates of mental illness days [544] than Erie St Clair LHIN [668]; this was slightly lower than the provincial rate in FY 2011-12 [547]. Erie St Clair LHIN reported higher rates of mental illness days than both South West LHIN and Ontario in 2011-12. For all four geographical regions, rates were higher for males than females in FY 2011-12.
Figure 6-4 Mental Illness patient days per 10,000 population in South West LHIN, Erie St Clair LHIN and Ontario – FY 2011-12 [76]

6.5 Summary

- Perceived Mental Health
  - The percentage of the population who perceived their own mental health as ‘Very Good’ or ‘Excellent’ was higher in South West LHIN [75%] than Erie St Clair LHIN [72%], Ontario [72%] and Canada [72%] in FY 2011-12.

- Health System and Mental Health
  - Hospitalization Rates for Mental Illness
    - Hospitalization rates for mental illness in Southwestern Ontario were lower than national rates in FY 2011-12.
    - South West LHIN reported higher rates than both Erie St Clair LHIN and Ontario overall.
  - Mental Illness Patient Days
    - Mental illness days per 10,000 population in Southwestern Ontario were lower than national rates in FY 2011-12.
    - South West LHIN had lower rates of mental illness days [544] than Erie St Clair LHIN [668]; this was slightly lower than the provincial rate in FY 2011-12 [547].
    - Erie St Clair reported higher rates than South West LHIN and Ontario, although rates were still lower than national rate.
CHAPTER 7

Aboriginal Health
Chapter 7 – Aboriginal Population

7.1 Introduction

Aboriginal is used to refer to individuals who are indigenous to Canada, and includes First Nations, North American Indians, Métis, Inuit, and self-identified Treaty Indian or registered Indian per the Indian Act of Canada [77].

Compared to the average Canadian growth rate of approximately 5.9% from 2006 to 2011, the growth rate of the Aboriginal population was much higher, recorded at approximately 20.1%. The natural consequence of this is that the median age of the Aboriginal population was 27.7 years in 2011, compared to the general population’s median of 40.6 years [78].

7.2 Data

Data for this chapter was retrieved from Statistics Canada’s 2011 National Household Survey and the associated NHS Aboriginal Population Profile [79]. This data in this chapter is presented at the census subdivision level, rather than census metropolitan area as in the rest of this report. Census subdivisions [and larger geographic areas] include data for Indian reserves, Indian settlements and Inuit communities, which is not necessarily the case for census metropolitan areas. For the majority of regions in Southwestern Ontario, the census subdivisions map neatly onto census metropolitan areas. The sole exception is Norfolk County, for which the geographic region inclusive of reserves is Haldimand-Norfolk census division.

This chapter will cover demographic characteristics, health indicators at the national and provincial levels, and data that make up the components of the Human Development Index to provide a more comprehensive understanding of the population.

7.3 Geographic Distribution

Ontario has the largest Aboriginal population in Canada, recorded at 301,425 in the 2011 National Household Survey. This corresponds to approximately 20% of the total Aboriginal population of Canada [78].

Most regions in Southwestern Ontario reported an Aboriginal population [2.42%] on par with provincial average [2.38% of total population] in 2011. Huron and Oxford reported an Aboriginal population of almost half of the provincial average. Bruce, Haldimand-Norfolk and Lambton reported substantially greater Aboriginal populations than the provincial statistic, and were closer to the national statistic in 2011.

\textsuperscript{23} The Human Development Index is an aggregate measure used to describe the overall development of a nation’s people using (1) Income (2) Education (3) Standard of living as descriptors [86].
Figure 7-1 Geographic Distribution of Aboriginal Peoples in Canada by Province - 2011 [78]

Figure 7-2 Proportion of Population that identifies as Aboriginal - Southwestern Ontario, Ontario and Canada – 2011 [13]
7.3.1 South West LHIN

Reserve Saugeen 29 had the highest percentage of Aboriginals in the region at 87.9% of the population in 2006 [80]. Figure 7-3 illustrates the geographic distribution of the Aboriginal population across the South West LHIN.

7.3.2 Erie St Clair LHIN

Reserves in the Erie St Clair LHIN, particularly the Moravian 47 and Sarnia 45, have the highest percentages of Aboriginal peoples, recorded at 97.3% and 93.5% respectively in 2006. Figure 7-4 illustrates the geographical distribution of Aboriginal populations across the Erie St Clair LHIN.

Figure 7-3 Aboriginal Population Distribution within South West LHIN- 2006 [80]
Figure 7-4 Aboriginal Population Distribution in Erie St Clair LHIN - 2006 [81]
7.4 Demographic features

The Aboriginal population in Southwestern Ontario was markedly younger than that of the population of Southwestern Ontario overall, as seen in the population pyramids below [Figure 7-5 and 7-6]. A much smaller proportion of the Aboriginal population was recorded at the older end of the spectrum, which can be attributed to both the high fertility rates and the general ill-health that Aboriginal populations suffer from [77]. This, in turn, can be explained by examining the status of their social determinants of health.

![ABORIGINAL POPULATION PYRAMID SOUTHWESTERN ONTARIO 2011](image)

Figure 7-5 Population Pyramid of Aboriginals in Southwestern Ontario - 2011 [78]

![TOTAL POPULATION PYRAMID SOUTHWESTERN ONTARIO 2011](image)

Figure 7-6 Population Pyramid for Southwestern Ontario - 2011 [14]
7.5 Social Determinants of Health

7.5.1 Data
Data on Aboriginal populations was obtained from the 2011 National Household Survey [NHS]. It is important to note that the longer, detailed section of the survey was not mandatory for this particular census, whereas it had been in the past. The results may therefore be subject to a non-response bias and therefore should be interpreted cautiously [82].

7.5.2 Health Status and Social Determinants of Health
Aboriginals have distinctly different overall health and socioeconomic status in comparison to the general population. According to the Community Well-Being [CWB] Index for First Nations24, 65 of the 100 unhealthiest communities in Canada were Aboriginal communities. The Human Development Index25 ranked Canada 8th in the world in 2001. However when the Aboriginal communities were evaluated according to the same measures, most ranked from 31st to 72nd on the list in the same year [85], [86].

There are multiple factors that have interacted to produce the current health status of the Aboriginal people. Some of these factors include (1) Poor physical environments; (2) Domestic violence; (3) High-risk health behaviors; (4) Food insecurity and (5) Poor maternal and fetal health.

Poor physical environments

Overcrowding26 and poor ventilation of reserve housing causes mold development that subsequently leads to high rates of atopic illnesses such as asthma and allergies in Aboriginal children. Overcrowding is also associated with poor mental health and increased risk of behavioral problems in youth [86], [87].

Domestic violence

Domestic violence is experienced by up to 75% of First Nations women located on reserves. This has subsequent effects on mental and physical health of both adults and children in abusive households [86].

High-Risk Health Behaviors

Aboriginals have a greater likelihood of alcohol abuse and are twice as likely to be smokers as the general population. In combination with the predominance of physical inactivity and poor diet, Aboriginal communities have higher rates of heart disease, lung cancer, and Type II Diabetes [86].

Food Insecurity

Food insecurity encompasses both the fear of lack of sufficient food due to monetary issues in the 12 months prior to surveying, and a ‘compromised diet’ where either quality or quantity of food suffers due to monetary issues. Aboriginal households located off-reserve are up to three times more likely to experience food insecurity than the general population. Food insecurity has been linked to chronic disease, obesity, and poor mental health [86].

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24 The Community Well-Being Index for First Nations is used to measure the socioeconomic status of First Nations, Inuit and other Aboriginal communities in comparison to other Canadian communities. The index measures four components of socioeconomic status (1) Income (2) Education (3) Labor Statistics (4) Housing [83]
25 The Human Development Index is an aggregate measure used to describe the overall development of a nation’s people using (1) Income (2) Education (3) Standard of living as descriptors [84].
26 Overcrowding “is defined as more than one person per room. Not counted as rooms are bathrooms, halls, vestibules, and rooms used solely for business purposes” [86],[87]
Maternal and Fetal Health

Aboriginal women are less likely to have access to prenatal care, and are twice as likely to smoke in pregnancy compared to the general population [86].

7.6 Health Indicators

7.6.1 Data
Data on health indicators for Aboriginal populations in Canada is provided only at the provincial and national levels. Data at the LHIN or regional level was not readily available. Data represents 2010 projections based on the 2006-07 census population data, which is standard practice by Statistics Canada during inter-census years [88].

7.6.2 Health Outcomes

7.6.2.1 Perceived Health
This indicator reports on an individual's self-reported perception of their own health, where health is defined as complete physical, mental and social wellbeing, not merely the absence of infirmity [89]. Perception of ‘Very Good’ or ‘Excellent’ health was lower in Aboriginal populations compared to general population, in both Ontario and Canada [Figure 7-7].

![Comparison of self-perception of health in Aboriginal and the general population - 2010](image-url)

Figure 7-7 Comparison of self-perception of health in Aboriginal and the general population – 2010 [89]
7.6.2.2 Chronic Conditions

This indicator reports on the prevalence of chronic conditions that include:

1. Respiratory illness – e.g. asthma and chronic obstructive pulmonary disease
2. Musculoskeletal disease – e.g. back problems
3. Head and neck disorders – e.g. migraine
4. Gastrointestinal disorders – e.g. ulcers, inflammatory bowel disease and irritable bowel disease
5. Urinary disorders – e.g. incontinence
6. Cardiovascular disorders – e.g. high blood pressure and strokes
7. Cancer
8. Mental illness including dementia

Aboriginal populations reported higher prevalence of chronic conditions in both Ontario and Canada. Of the population aged 12 years and older, 60.9% of the Aboriginal population reported suffering from one or more chronic conditions, compared to 48.2% in the general population. Similarly in Canada overall, 55.5% of the Aboriginal population reported having one or more chronic conditions, compared to 48.0% of the general population [Figure 7-8].

![Comparison of prevalence of chronic conditions](image)

**Figure 7-8** Comparison of self-reported prevalence of one or more chronic conditions in Aboriginal and the general population – 2010 [89]
7.6.2.3 Arthritis
Arthritis is an umbrella term used to indicate joint inflammation and the associated signs and symptoms. This indicator includes data on rheumatoid and osteoarthritis, but does not include fibromyalgia [89].

As seen in Figure 7-9, Aboriginal persons residing in Ontario were more likely to suffer from arthritis compared to the general population [16.2% compared to 13.2%]. A similar pattern was seen in Canada, with Aboriginal populations reporting higher rates of arthritis than the general population [14.4% compared to 12.1%].

Figure 7-9 Comparison of self-reported diagnosis of arthritis in Aboriginal and the general population – 2010 [89]

7.6.2.4 Asthma
Asthma is a chronic respiratory illness in which airways are hyper-reactive to stimuli, resulting in airway inflammation and narrowing [90]. Aboriginal populations in Ontario reported almost twice the rates of asthma as the general population, [16.4% compared to 8.5%], as seen in Figure 7-10. In Canada, asthma prevalence in Aboriginal populations was 13.7%, compared to 8.6% of the general population.

Figure 7-10 Comparison of self-reported diagnosis of asthma in Aboriginal and the general population – 2010 [89]
7.6.2.5 Diabetes

Diabetes is a chronic disease associated with reduced insulin production and/or reduced insulin sensitivity. Further information on diabetes can be found in Chapter 9 - Complex Chronic Disease, Section 9.4.

In Ontario, prevalence of diabetes was higher in Aboriginal populations [6.7%] compared to the general population [4.8%]. A similar pattern was seen nationally, with higher rates of diabetes in Aboriginal populations [6.1%] compared to the general population [4.5%], as seen in Figure 7-11.

![Comparison of Diabetes Prevalence 2010](image)

**Figure 7-11** Comparison of self-reported diagnosis of diabetes in Aboriginal and the general population – 2010 [89]

7.6.2.6 High Blood Pressure

High blood pressure, or hypertension, is an abnormal increase in the pressure of the blood within the body's vasculature. There are a number of causes of high blood pressure, including kidney disease, atherosclerosis, chronic alcohol abuse and obstructive sleep apnea. Most cases of high blood pressure have no identifiable cause, and this is referred to as essential hypertension. Hypertension can occur without any overt signs and symptoms, and may not be diagnosed until late in the disease process [91].

This indicator provides data on self-reported diagnoses of hypertension by a medical doctor. Since individuals suffering from hypertension may not know they have the disease, particularly in populations with poor access to primary health care, the results from this indicator may not accurately reflect prevalence rates in the population.

The self-reported prevalence of hypertension in Aboriginal populations was approximately 3% lower than that of the general population in both Ontario and Canada, as seen in Figure 7-12.
Figure 7-12 Comparison of self-reported diagnosis of high blood pressure in Aboriginal and the general population – 2010 [89]

7.6.2.7 Body Mass Index ≥ 25 [Overweight or Obese]

Obesity is a condition in which an individual’s body mass index [BMI] is greater than or equal to 30 kg/m², for individuals aged 18 and over. A body mass index greater or equal to 25 kg/m² is classified as ‘overweight’. Further detail about the body mass index and the effects of BMI ≥ 25 kg/m² can be found in Chapter 9.

The prevalence of overweight or obese states in Aboriginal youth aged 12 to 17 years was on par with the equivalent age group in the general population in Ontario. Nationally, the prevalence of overweight or obese youth was substantially higher in Aboriginal youth compared to the general population [Figure 7-13]. Aboriginal adults were much more likely to be overweight or obese as compared to the general population in both Ontario and Canada.

Figure 7-13 Comparison of self-reported body mass index ≥ 25 in Aboriginal and the general population – 2010 [89]
7.6.2.8 Perceived Mental Health

Aboriginal populations in both Ontario and Canada were much less likely than the general population to rate their own mental health as ‘Very Good’ or ‘Excellent’. They were twice as likely to rate their mental health as ‘Fair’ or ‘Poor’ than the general population, as seen in Figure 7-14.

![Figure 7-14 Comparison of self-perception of mental health in Aboriginal and the general population – 2010 [89]]

7.6.2.9 Mood Disorders

This indicator provides self-reported data on an individual’s diagnosis of a mood disorder by a medical doctor or medical professional. Mood disorders include depression, bipolar disorder, mania and dysthymia [89]. Prevalence of mood disorders in Aboriginal populations was twice that of the general population, in both Ontario and Canada. [Figure 7-15].

![Figure 7-15 Comparison of self-reported diagnoses of mental health in Aboriginal and the general population – 2010 [89]]
7.6.3 Health Risk and Health Enhancing Behaviors

An individual’s health status is strongly correlated with their behavior, where behaviors can include both health risk and health enhancing activities [92]. Health risk behaviors include smoking, alcohol and drug abuse, lack of exercise and poor nutrition [93].

7.6.3.1 Access to Primary Health Care

Access to a primary care physician enables both disease prevention and early detection and treatment, and is an essential aspect of primary health care [94]. Aboriginal persons in both Ontario and Canada reported lower rates of contact with the primary care system than the general population for both measures of access [Figure 7-16].

![Comparison of Access to Primary Health Care](image)

*Figure 7-16 Comparison of access to primary health care Aboriginal and the general population – 2010 [89]*

7.6.3.2 Smoking

Smoking is a behavior that is detrimental to an individual’s health due to the association with diseases such as increased risk of lung and other cancers, chronic obstructive pulmonary disease (COPD) and other respiratory illnesses, and cardiovascular illnesses. The term ‘current smoker, daily or occasional’ refers to all individuals ≥ 12 years of age who reported both occasional and daily smoking behaviors. Aboriginal populations in both Ontario and Canada were twice as likely as the general population to identify as smokers [Figure 7-17].
7.6.3.3 Heavy Drinking

Heavy drinking is defined by Statistics Canada as males who reported consumption of ≥ 5 drinks in one sitting, and women who reported consumption of ≥ 4 drinks in one sitting, at least once a month in the year prior to the survey [95]. Further details of the effects of heavy drinking on health status are found in Chapter 12.

As seen in Figure 7-18, Aboriginal populations in both Ontario and Canada reported almost 50% higher rates of heavy drinking compared to the general population.
7.6.3.4 Sense of Belonging in Community

Feeling a sense of belonging in their community has been associated with better health outcomes, both physical and mental [89]. Sense of belonging is used to understand the extent to which an individual has social capital, where social capital is defined as “networks together with shared norms, values and understandings that facilitate cooperation within or among groups” [51]. High social capital has both direct and indirect effects, via social determinants, on the health of an individual [50], [96]. Aboriginal populations were slightly less likely to report that they felt a ‘Very Strong’ or ‘Strong’ sense of belonging in their community as compared to the general population [Figure 7-19].

![Comparison of Sense of Belonging in Community 2010](chart)

**Figure 7-19** Comparison of sense of belonging to community in Aboriginal and the general population – 2010 [89]

7.6.3.5 Physical Activity Rates

Physical activity has an essential role in the maintenance of good health by improving regulation of blood sugar levels, body weight and BMI. There is also evidence of its role in the prevention of numerous chronic diseases such as diabetes, cancer and osteoporosis, and prevention of premature death [97]. The leisure-time physical activity indicator includes both active [such as jogging for 20 minutes per day] and moderately active [such as walking for 20 minutes per day] behaviors. Aboriginal populations in both Ontario and Canada were more likely than the general population to be physically active in their leisure time, as seen in Figure 7-20.
7.6.3.6 Food Insecurity

Food insecurity encompasses both the fear of lack of sufficient food due to monetary issues in the 12 months prior to surveying, and a ‘compromised diet’ where either quality or quantity of food suffers due to monetary issues. It has been linked to chronic disease, obesity, and poor mental health [86].

Aboriginal populations in Ontario were more than twice as likely to suffer from food insecurity, as seen in Figure 7-21. Nationally, Aboriginal populations were three times as likely as the general population to suffer from food insecurity.

Figure 7-20 Comparison of leisure-time physical activity levels in Aboriginal and the general population – 2010 [89]

<table>
<thead>
<tr>
<th>Percentage of Population &gt; 12 years (%)</th>
<th>Aboriginal</th>
<th>General</th>
<th>Aboriginal</th>
<th>General</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ontario</td>
<td>59.7</td>
<td>40.3</td>
<td>52.3</td>
<td>47.7</td>
</tr>
<tr>
<td>Canada</td>
<td>56.5</td>
<td>43.5</td>
<td>53.6</td>
<td>46.4</td>
</tr>
</tbody>
</table>

- Physical activity during leisure-time, moderately active or active
- Physical activity during leisure-time, inactive

Figure 7-21 Comparison of prevalence of food insecurity in Aboriginal and general population – 2010 [89]

<table>
<thead>
<tr>
<th>Percentage of Population (%)</th>
<th>Aboriginal</th>
<th>General</th>
<th>Aboriginal</th>
<th>General</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ontario</td>
<td>19.2</td>
<td>8.0</td>
<td>21.7</td>
<td>7.3</td>
</tr>
<tr>
<td>Canada</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
7.7 Income

The percentage of the Aboriginal population reporting low-income status in 2011 was approximately twice that of the general population across Southwestern Ontario, Ontario and Canada. The single exception to this is Huron County where prevalence of low-income status was lower in Aboriginal populations [10.6%] than the general population [11.8%].

![Comparison of low-income status prevalence](image)

Figure 7-22 Comparison of prevalence of low-income status in Aboriginal populations and overall population – 2011 [22], [98]

7.8 Education

The relevance of educational attainment in understanding a population's health status has been explained in detail in Chapter 2. In summary, higher levels of education are associated with better health outcomes and increased life expectancy, independent of other variables [30].

Aboriginal-identified persons were less likely to have received formal education in comparison to the general population across Southwestern Ontario, Ontario, and Canada. Figures 7-23 to 7-34 compare the maximal educational attainment of Aboriginal-identified persons to the general population in each of the major counties in the region.
7.8.1 No formal education
Aboriginal-identified persons were more likely than the general population to have not received any formal education, and this pattern is seen through the region of Southwestern Ontario.

7.8.2 High school diploma or equivalent
Essex, Grey, and Norfolk counties were unique in the region because the percentage of Aboriginals with a maximal educational attainment level of ‘High School Diploma or the Equivalent’ were similar to that of the general population. A considerably smaller percentage of Aboriginals in the remainder of the region received even a high school education, and this is reflective of the overall situation in Ontario, and across the nation, as seen in Figure 7-34.

7.8.3 Post-Secondary Certificate; diploma or degree
There are lower percentages of Aboriginals with a post-secondary education compared to the general population across the region with some exceptions. These are the regions of Chatham-Kent, Elgin, Essex and Huron Counties, where the percentage of Aboriginals with a maximal educational attainment of a post-secondary education level is almost on par with that of the general population.

7.8.4 Apprenticeship or trades certificates or diploma
Equal or greater percentages of Aboriginal populations have achieved a maximal educational attainment level in the trades compared to the general population. Exceptions to this are found in Bruce, Elgin, Lambton, Norfolk and Oxford counties. This pattern is seen across Southwestern Ontario, Ontario and Canada.

7.8.5 College; CEGEP or other non-university certificate or diploma
Equal or greater percentages of Aboriginals have obtained a maximal educational attainment level of college or the equivalent compared to the general population. This pattern is seen across the region of Southwestern Ontario [with the exception of Grey, Huron and Perth County] and across Ontario. However, considerably smaller percentages of Aboriginals obtain a college equivalent education in Canada, compared to the general population.

7.8.6 University education – certificate or higher
The percentage of Aboriginals that have obtained some university education is considerably less than the general population, and this pattern is seen across the region with the exception of Huron County; a similar pattern is seen across the province and Canada.
Figure 7-23 Comparison of maximal educational attainment of Aboriginal population versus general population in Bruce County - 2011 [22], [98]

Figure 7-24 Comparison of maximal educational attainment of Aboriginal population versus general population in Chatham-Kent - 2011 [22], [98]
Figure 7-25 Comparison of maximal educational attainment of Aboriginal population versus general population in Elgin County - 2011 [22], [98]

Figure 7-26 Comparison of maximal educational attainment of Aboriginal population versus general population in Essex - 2011 [22], [98]
Figure 7-27 Comparison of maximal educational attainment of Aboriginal population versus general population in Grey County - 2011 [22], [98]

Figure 7-28 Comparison of maximal educational attainment of Aboriginal population versus general population in Huron County - 2011 [22], [98]
Figure 7-29 Comparison of maximal educational attainment of Aboriginals versus general population in Lambton County - 2011 [22], [98]

Figure 7-30 Comparison of maximal educational attainment of Aboriginal population versus general population in Middlesex - 2011 [22], [98]
Figure 7-31 Comparison of maximal educational attainment of Aboriginals versus general population in Haldimand-Norfolk – 2011 [22], [98]

Figure 7-32 Comparison of maximal educational attainment of Aboriginal population versus general population in Oxford County - 2011 [22], [98]
Figure 7-33 Comparison of maximal educational attainment of Aboriginal population versus general population in Perth County - 2011 [22], [98]
Figure 7-34 Comparison of maximal educational attainment of Aboriginal population versus general population in Southwestern Ontario, Ontario, and Canada – 2011 [22], [98]
7.9 Housing

7.9.1 Crowding
Crowding is a term used to indicate housing states where there are more than one person per room, where ‘room’ does not include bathrooms, hallways and rooms used for business purposes [99]. In 2011, 1.5% of Aboriginal residences in Southwestern Ontario were classified as ‘crowded’, in comparison to 0.9% of the general population’s dwellings, as seen in Figure 7-35.

![Comparison of Crowding in Aboriginal and general dwellings across Southwestern Ontario, Ontario and Canada - 2011](image)
7.10 Summary

- Aboriginal Population
  - Ontario has the largest aboriginal population in Canada
  - Compared to the average Canadian growth rate of approximately 5.9% from 2006 to 2011, the growth rate of the Aboriginal population was approximately 20.1% in that time-period

- Geographic Distribution
  - Most regions in Southwestern Ontario reported an Aboriginal population on par with provincial average [2.38% of total population] in 2011
  - Huron and Oxford reported an Aboriginal population of almost half of the provincial average
  - Bruce, Haldimand-Norfolk and Lambton reported substantially greater Aboriginal populations than the provincial statistic, and on par with the national statistic in 2011

- Demographic Features
  - The Aboriginal population in Southwestern Ontario is markedly younger than that of the population of Southwestern Ontario overall

- Social Determinants of Health
  - Aboriginal populations have a distinctly different overall health status compared to the general population
  - Multiple factors that have resulted in the current health status
    - Poor physical environments
    - Domestic violence
    - High-risk health behaviours
    - Food insecurity
    - Maternal and fetal health

- Health indicators
  - Approximately 60% of off-reserve Aboriginals live with at least one chronic condition

- Income
  - The percentage of the Aboriginal population reporting low-income status was at least twice as likely as the general population across the region, the province and the country in 2011.
  - They are twice as likely to experience food insecurity compared to the general population.

- Education
  - Aboriginal populations are less likely to have received formal education in comparison to the general population across the region of Southwestern Ontario, the province of Ontario, and Canada. 57% of the Aboriginal populations in Southwestern Ontario are have had no formal schooling or a high school certificate.
  - The percentage of Aboriginals that have obtained some university education is considerably less than the general population

- Housing
  - Aboriginals were more likely to reside in crowded dwellings than the general population in 2011
CHAPTER 8

Cancer Incidence in Southwestern Ontario
Chapter 8 - Cancer Incidence in Southwestern Ontario

8.1 Introduction

Cancer is the leading cause of death in Canada. It is estimated that 2 of every 5 Canadians will develop cancer, with 1 in 4 dying from the disease. The four most common types of cancer diagnosed in Canada are lung, breast, colorectal and prostate cancer. The overall death rate from cancer has been decreasing over the last three decades. However, it is expected that with the aging of the population, this rate may begin rising again.

The overall incidence rate\(^{27}\) has been increasing with improved diagnostic and screening tools. It is expected to continue to increase with the aging population and the projected increase in Canada’s census population over the next two decades [101].

8.2 Data

Data for this section was collected from the Statistics Canada Community Health Profiles for 2013 [72]. All rates are age-standardized to remove the confounding effect of age on results.

8.3 Overall Cancer Incidence

Overall cancer incidence rates in Southwestern Ontario were higher than provincial and national rates in 2013, as seen in Figure 8-1. South West LHIN reported higher overall incidence rates [421.1 per 100,000] than Erie St. Clair LHIN [412.1 per 100,000]. Male cancer incidence rates were higher than female incidence rates in all four geographical regions.

\(^{27}\) Incidence rates represent the number of new cases of disease recorded in a particular period. Cancer incidence rates represent the number of new cancer cases recorded in a particular period, where new case indicates new primary locations of malignant growths.
8.4 Colon Cancer

Colon cancer includes all cancerous growths located along the cecum, colon, rectosigmoid junction and rectum [102].

Colon cancer incidence rates in Southwestern Ontario were lower than the national rate of 49.9 cases per 100,000 population in 2013, as seen in Figure 8-2. South West LHIN reported lower total incidence rates [46.0 per 100,000] than both Erie St Clair LHIN [49.2 per 100,000] and Ontario [47.8 per 100,000]. Erie St Clair LHIN reported higher colon cancer incidence than Ontario in 2013. Colon cancer incidence rates were higher for males than females in all four geographical regions.

\[\begin{array}{cccc}
\text{Incidence Rate per 100,000 population} \\
\text{Total} & \text{Male} & \text{Female} & \text{Total} & \text{Male} & \text{Female} & \text{Total} & \text{Male} & \text{Female} & \text{Total} & \text{Male} & \text{Female} \\
\text{South West LHIN} & 46.0 & 52.9 & 39.8 & 49.2 & 59.9 & 40.3 & 47.8 & 57.9 & 49.9 & 40.8 \\
\text{Erie St. Clair LHIN} & 39.2 & 40.3 & 22.5 & 49.2 & 59.9 & 40.8 & 47.8 & 57.9 & 49.9 & 47.8 \\
\text{Ontario} & 39.2 & 40.3 & 22.5 & 49.2 & 59.9 & 40.8 & 47.8 & 57.9 & 49.9 & 40.8 \\
\text{Canada} & 39.2 & 40.3 & 22.5 & 49.2 & 59.9 & 40.8 & 47.8 & 57.9 & 49.9 & 40.8 \\
\end{array}\]

Figure 8-2 Comparison of colon cancer incidence in Southwestern Ontario, Ontario, and Canada – 2013 [72]
8.5 Lung Cancer

Lung cancer is the leading cause of cancer deaths in Canadians, with a higher mortality rate than all three of the next most common cancers [breast, colorectal and prostate]. Lung cancer mortality rates have been decreasing over the last two decades. Lung cancer occurs more commonly in males, although the incidence rates in males have been decreasing over the last three decades. Incidence rates in females increased steadily until 2006, and have been stable since that time [103].

Lung cancer incidence rates in Southwestern Ontario were higher than provincial rates and lower than national rates in 2013, as seen in Figure 8-3. South West LHIN [51.0 cases per 100,000 population] had lower incidence rates than Erie St Clair LHIN [53.7 cases per 100,000 population]. Males were more likely than females to be diagnosed with lung cancer in all four geographical regions in 2013.

8.6 Breast Cancer

Breast cancer incidence rates are reported only for females by Statistics Canada, although breast cancer occurs in both men and women. Rates were higher in South West LHIN [104.0 cases per 100,000 population] than those reported by Erie St Clair LHIN, Ontario and Canada in 2013. Erie St Clair LHIN reported lower incidence rates [93.0 cases per 100,000 population] than the provincial and national rates in 2013 [Figure 8-4].
8.7 Prostate Cancer

Prostate cancer incidence rates are reported only for males by Statistics Canada. Incidence rates in Southwestern Ontario were higher than national rates and on par with provincial rates in 2013 [Figure 8-5].
8.8 Summary

- **Overall Cancer Incidence**
  - Overall cancer incidence rates in Southwestern Ontario were higher than provincial and national rates in 2013.
  - South West LHIN reported higher overall incidence rates [421.1 per 100,000] than Erie St. Clair LHIN [412.1 per 100,000].
  - Male cancer incidence rates were higher than female incidence rates in all four geographical regions.

- **Colon Cancer**
  - Colon cancer incidence rates in Southwestern Ontario were lower than national rate in 2013.
  - South West LHIN reported lower incidence rates [46.0 per 100,000] than both Erie St Clair LHIN [49.2 per 100,000] and Ontario [47.8 per 100,000].
  - Erie St Clair LHIN reported higher colon cancer incidence than Ontario in 2013.
  - Colon cancer incidence rates were higher for males than females in all four geographical regions.

- **Lung Cancer**
  - The incidence rate for lung cancer in the South West LHIN was 51.0 per 100,000, and 53.7 per 100,000 in the Erie St. Clair LHIN in 2013.
  - This was greater than the provincial rate but less than the national rate in 2013.

- **Breast Cancer**
  - Breast cancer incidence rates were higher in South West LHIN [104.0 cases per 100,000 population] than those reported by Erie St Clair LHIN, Ontario and Canada in 2013.
  - Erie St Clair LHIN reported lower incidence rates [93.0 cases per 100,000 population] than the provincial and national rates in 2013.

- **Prostate Cancer**
  - Incidence rates in Southwestern Ontario were higher than national rates and on par with provincial rates in 2013.
CHAPTER 9

Complex Chronic Disease
Chapter 9 - Complex Chronic Disease

9.1 Introduction

Chronic diseases are a leading cause of death and disability in Ontario. There has been a shift in health care needs from acute infectious diseases to chronic diseases over the past three decades. The increasing incidence and prevalence of chronic diseases is associated with a staggering economic burden on society, accounting for an estimated 55% of total direct and indirect health care costs [104]. Thus, complex chronic diseases are a major area of interest when exploring community health.

There are numerous prominent chronic diseases in Canada. This health profile will focus specifically on diabetes mellitus, obesity, chronic obstructive pulmonary disease [COPD], and congestive heart failure.

9.2 Data

Data in this section was obtained from Statistics Canada's 2013 Community Health Profiles. These chronic diseases are reported as prevalence rates, which are defined as the "proportion of people in a population who have a particular disease at a specified point in time, or over a specified period of time". These indicators capture all those individuals with the disease at a specific point or period in time, both old cases and newly diagnosed cases. This is in contrast to incidence rates, which capture new occurrences of the disease at a specific point in time [105].

9.3 Chronic Obstructive Pulmonary Disease

Background

Chronic obstructive pulmonary disease [COPD] is a chronic disease that affects the lungs, usually caused by tobacco smoking. COPD is associated with progressive damage to the airways of the lungs, swelling of airways, and mucus obstruction of airways. There is also damage to air sacs of the airways, making it difficult to move air in and out of the lungs. The disease is characterized by a chronic cough, coughing up of mucus, shortness of breath, wheezing and increased frequency and duration of infections [106].

Prevalence in Southwestern Ontario

South West LHIN had higher COPD [5.2%] prevalence rates than Erie St Clair LHIN [3.9%] in 2013. The rates for South West LHIN were also higher than both provincial and national rates [Figure 9-1]. Erie St Clair LHIN's COPD prevalence rate [3.9%] was slightly lower than provincial [4.2%] and national [4.3%] rates. COPD prevalence rates were higher in females than males in all four geographical regions in 2013.
9.4 Diabetes Mellitus

Background
Diabetes Mellitus is a chronic disease caused by an inability to either produce sufficient amounts or adequately utilize insulin [107]. There are three main types of diabetes (1) Type 1 Diabetes Mellitus; (2) Type 2 Diabetes Mellitus; and (3) Gestational Diabetes.

Type 1 diabetes, also known as juvenile diabetes, is insulin-dependent and occurs primarily in young children and adolescents. It is an autoimmune disease where the body attacks and destroys its own insulin producing cells. Type 2 diabetes is a metabolic disorder that occurs when the body is unable to produce sufficient amounts of insulin and/or is unable to utilize it efficiently. This typically occurs in older adults but more recently is being seen in obese young children and youth [107].

Gestational diabetes is a hyperglycemia [high blood sugar] that may develop in pregnant women that usually returns to normal after delivery. Gestational diabetes increases the risk of developing Type 2 Diabetes, and has detrimental effects on the growing fetus. This data in this profile includes only Type 1 and 2 Diabetes Mellitus.

Prevalence in Southwestern Ontario
South West LHIN’s diabetes prevalence rate [6.2%] in 2013 was lower than both Erie St Clair LHIN [7.7%] and Ontario [6.8%]. It is on par with the national prevalence rate of 6.2%. Erie St Clair LHIN reported substantially higher prevalence rates than both the provincial and national rates. In all regions, the prevalence rate of diabetes was higher in males than females [Figure 9-2].
9.5 Obesity

Background

Obesity is a condition in which an individual’s body mass index (BMI) is greater than or equal to 30 kg/m², for individuals aged 18 and over. A BMI ≥ 25 kg/m² indicates that the individual is over the healthy weight range for their height. BMI is the most common measurement of body fat and higher than recommended BMI has been associated with health risks in population-level studies. While there is some controversy about the use of BMI and the inability of the measure to differentiate between muscle and fat, it is the best measure currently widely available.

The pathophysiology of obesity is complex and includes individual susceptibility, lifestyle choices and environmental and social determinants. Obesity has been associated with Type 2 Diabetes, asthma, several types of cancer, cardiovascular disease, osteoarthritis and chronic back pain. It is generally reported that obesity rates are on the rise in Canada [108].

Prevalence in Southwestern Ontario

Southwestern Ontario reported higher rates of overweight and obese persons [i.e. those with BMI ≥ 25 kg/m²] than provincial and national rates in 2013. Erie St Clair LHIN reported that 61.4% of the population had a BMI in the overweight or obese categories, compared to 55.5% in South West LHIN and 52.0% in both Ontario and Canada.

Males were more likely to be overweight or obese in all four geographic regions. Variation in rates across the four regions can be attributed to differences in prevalence of overweight persons, and prevalence rates for obesity [i.e. BMI ≥ 30 kg/m²] were similar at approximately 21%.
9.6 Congestive Heart Failure

Background
Congestive heart failure [CHF] is a condition that develops when the heart is damaged or weakened by disease, resulting in the inability to pump blood effectively throughout the body. This abnormality in heart function can cause fluid back-up in the lungs and other parts of the body. The most common causes of congestive heart failure are myocardial infarction [heart attacks] and hypertension [high blood pressure]; other causes include diabetes and a BMI greater than 30 kg/m²[109].

Prevalence of Hypertension in Southwestern Ontario
Southwestern Ontario reported higher prevalence rates of hypertension than provincial [17.4] and national [17.0] rates in 2013. South West LHIN reported similar prevalence rates for males and females. Erie St Clair LHIN reported higher prevalence rates for females than males [Figure 9-4].

Incidence of Myocardial Infarction in Southwestern Ontario
South West LHIN reported myocardial infarction incidence rates [210 per 100,000 population] on par with provincial and national rates [Figure 9-5]. Erie St Clair LHIN reported substantially higher rates [250 per 100,000 population] of myocardial infarction than South West LHIN and the provincial [207 per 100,000 population] and national [209 per 100,000 population] rates. Myocardial infarction incidence rates were higher in males than females in all four geographical regions in 2013.
Figure 9.4 Comparison of prevalence of hypertension in Southwestern Ontario, Ontario and Canada - 2013 [74]

Figure 9.5 Comparison of myocardial infarction incidence rates per 100,000 population in Southwestern Ontario, Ontario, and Canada - 2013 [74]
9.7 Summary

- COPD
  - South West LHIN had higher COPD prevalence rates than Erie St Clair LHIN, Ontario and Canada.
  - Erie St Clair LHIN's COPD prevalence rate [3.9%] was slightly lower than provincial [4.2%] and national [4.3%] rates.
  - COPD prevalence rates were higher in females than males in all four geographical regions in 2013.

- Diabetes
  - South West LHIN's diabetes prevalence rate [6.2%] was lower than both Erie St Clair LHIN [7.7%] and Ontario [6.8%] in 2013. It was on par with Canada's prevalence rate of 6.2%.
  - Erie St Clair LHIN reported substantially higher prevalence rates than both the provincial and national rates.
  - In all regions, the prevalence rate of diabetes was higher in males than females.

- Obesity
  - Southwestern Ontario reported higher rates of overweight and obese persons [i.e. those with BMI ≥ 25 kg/m²] than provincial and national rates in 2013.
  - Erie St Clair LHIN reported that 61.4% of the population had a BMI in the overweight or obese categories, compared to 55.5% in South West LHIN and 52.0% in both Ontario and Canada.
  - Males were more likely to be overweight or obese in all four geographic regions.

- Congestive Heart Failure
  - Hypertension
    - Southwestern Ontario reported higher prevalence rates of hypertension than provincial and national rates in 2013.
    - South West LHIN reported similar prevalence rates for males and females. Erie St Clair LHIN reported higher prevalence rates for females than males.

- Myocardial Infarction Incidence
  - South West LHIN reported myocardial infarction incidence rates [210 per 100,000 population] on par with provincial and national rates.
  - Erie St Clair LHIN reported substantially higher rates [250 per 100,000 population] of myocardial infarction than South West LHIN and the provincial [207] and national [209] rates.
  - Myocardial infarction incidence rates were higher in males than females in all four geographical regions in 2013.
CHAPTER 10

Reproductive Health Outcomes
Chapter 10 - Reproductive Health Outcomes

10.1 Introduction

In FY 2011-12, 11.5% of all births in Ontario occurred in Southwestern Ontario [110]. A report from the Ontario Ministry of Health Promotion suggests that the reproductive health of a population has a direct impact on the outcomes of pregnancy, and may contribute to the overall health of children and families [111]. For the purposes of this report, reproductive health outcomes have been categorized into those related to newborn health outcomes and maternal health outcomes.

10.2 Data

Data was collected from Born Ontario, the provincial birth and pregnancy registry, and Statistics Canada. Where data was unavailable at the LHIN level, it is presented at the regional level.

10.3 Newborn Health

10.3.1 Birth Weight

Birth weight is an important determinant of perinatal, neonatal, and post-natal outcomes. Low birth weight may be associated with diseases such as hypertension, diabetes, osteoarthritis, and dementia in later life [112]. Low birth weight is calculated as “the rate of singleton live births weighing 500-2499 grams immediately upon birth, based on the mother’s usual place of residence per the total for singleton live births weighing at least 500 grams per 1,000 births” [113].

Although comparable as seen in Figure 10-1, incidence of low birth weight newborns in 2013 was less prevalent in the Erie St. Clair [6.0%) and South West [5.8%] LHINs than in the province of Ontario as a whole [6.2%]. In Southwestern Ontario, Ontario and Canada, low birth weight is more commonly experienced in female newborns than males [114], [115].

10.3.2 Infant Mortality

Infant mortality is considered an indicator of overall population health, as well as a marker of the effectiveness of healthcare and public health initiatives in a given region [116]. Infant mortality is calculated as the number of deaths of children less than one year of age per 1,000 live births in the same year.

As seen in Figure 10-2, infant mortality rates were noticeably lower in Erie St. Clair LHIN [3.7 per 1000 live births] than South West LHIN [5.4 per 1000 live births] in 2013. They were also lower than both provincial and national rates in 2013. The difference between the two LHINs may be explained by the female infant mortality rate in Erie St. Clair LHIN [2.2 per 1000 live births], which was lower than the infant mortality rate of 4.7 per 1000 live births for females in South West LHIN.

In 2013, South West LHIN [5.4] reported infant mortality rates that were slightly higher than provincial [5.1] and national [5.0] rates. In all four geographical regions, the female infant mortality rate was lower than the male infant mortality rate [114], [115].
Figure 10-1 Comparison of Low Birth Weight across Southwestern Ontario, Ontario, and Canada – 2013 [103], [104]

Figure 10-2 Comparison of Infant Mortality Rates across Southwestern Ontario, Ontario and Canada - 2013 [116], [117]
10.4 Maternal Health Outcomes

Data for this section was compiled from a report by bornOntario that used both the BORN Information System and the Canadian Institute for Health Information-Discharge Abstract Database [CIHI-DAD] [110]. It was available only by fiscal year [i.e. April to March of the next year] rather than calendar year.

10.4.1 Maternal Age at Delivery

10.4.1.1 Young Mothers

Women who are less than twenty years of age at delivery are at an increased risk of experiencing adverse outcomes in pregnancy, such as preterm birth and low birth weight babies [117]. 5.3% of women in the Erie St. Clair LHIN, and 4.3% of women in the South West LHIN were less than twenty years at the time of delivery [Figure 10-3]. In both LHINs, the proportion of women less than twenty years of age at delivery was higher than the corresponding provincial percentage of 3.2% in FY 2011-12 [110].

10.4.1.2 Older Mothers

When compared with women of younger age groups, studies suggest that women who give birth after thirty-five years of age are consistently at an increased risk of developing complications and experiencing adverse outcomes, including gestational diabetes, breech presentation, or preterm delivery (before thirty-two weeks gestation) [118], [119].

15.4% of women in the Erie St. Clair LHIN and 15.0% of women in the South West LHIN were thirty-five years of age or older at delivery in FY 2011-12. These numbers were lower than the equivalent statistic for the province of Ontario of 22.0% [110].

Figure 10-3 Comparison of maternal age at delivery across Southwestern Ontario and Canada – FY 2011-12 [110]
10.4.2 Maternal Health Conditions and Obstetric Complications

Pre-existing maternal health conditions and the development of obstetric complications can have a significant effect on the risks of pregnancy as well as maternal and child health outcomes.

10.4.2.1 Maternal Health Conditions

Born Ontario reports a number of maternal health conditions, including alcohol dependence syndrome, asthmas, chronic hypertension, diabetes, heart disease, HIV, lupus, psychiatric disorders, thyroid disease, and other pre-existing conditions [110].

As seen in Figure 10-4, 42.6 % of women in Southwestern Ontario were reported to have maternal health conditions in FY 2011-12, which was substantially higher than the rate reported for Ontario [28.0% of women]. Please note, there was some missing data for South West and Erie St. Clair LHINs which may have influenced these results [110].

10.4.2.2 Obstetric Complications

Obstetric complications may include gestational diabetes, hypertension, intrauterine growth restriction, babies who are small for gestational age, or large for gestational age, placental abruption, pre-eclampsia, preterm labour, premature rupture of membranes, preterm premature rupture of membranes and urinary tract infections [110]. The proportion of women who developed obstetric complications in FY 2011-12, was greater in Southwestern Ontario [38.8%] than in Ontario overall [27.6%].

![MATERNAL HEALTH INDICATORS SOUTHWESTERN ONTARIO AND ONTARIO FY 2011-12](Figure 10-4 A comparison of maternal health indicators and obstetric complications across Southwestern Ontario and Ontario – FY 2011-12 [99])
10.5 Summary

- Birth Weight
  - Low birth weight, expressed as a percentage of live births, was slightly less prevalent in the South West [5.8%] LHIN and Erie St. Clair [6.0%] than in the province of Ontario in 2013.
  - Female infants were more likely to be classified as low birth weight than male infants across all four regions.

- Infant Mortality
  - Infant mortality was noticeably lower in Erie St. Clair [3.7 per 1000 live births] than in South West LHIN [5.4 per 1000 live births], Ontario [5.1] and Canada [5.0].
  - In 2013, South West LHIN [5.4] reported infant mortality rates that were slightly higher than provincial [5.1] and national [5.0] rates.
  - In all four geographical regions, the female infant mortality rate was lower than the male infant mortality rate.

- Maternal Health Outcomes
  - 4.3% of women in South West LHIN, and 5.3% of women in Erie St Clair LHIN were younger than 20 years of age at the time of delivery. This was higher than the provincial rate of 3.2% in FY 2011-12.
  - 15.0% of women in the South West LHIN and 15.4% of women in the Erie St Clair LHIN were thirty-five years of age or older at delivery. This was lower than the provincial rate of 22.0% in FY 2011-12.
  - The proportion of women who developed obstetric complications was greater in Southwestern Ontario [38.8%], than in Ontario in FY 2011-12.
CHAPTER 11

Congenital Anomalies
Chapter 11 - Congenital Anomalies

11.1 Introduction

Congenital anomalies, also known as birth defects, may be diagnosed during pregnancy or after birth, and are a result of an error occurring in fetal development. Congenital birth defects are present at the time of birth. Although birth defects are due to mainly unknown causes, some factors associated include genetics and the fetal environment [120].

11.2 Data

Data for this section was provided by the Canadian Congenital Anomalies Surveillance System for 2011. All incidence rates are calculated as the incident number per 10,000 births.

11.3 Stillbirths

Statistics Canada defines stillbirth, or fetal death, as occurring when a fetus is not breathing or showing any evidence of life prior to having been extracted or expelled from the mother. Stillbirths in Canada are registered when the fetal product has a birth weight of 500 grams or more, or the duration of pregnancy is 20 weeks or longer [121].

At 62.1 stillbirths per 10,000 births, the stillbirth incidence rate was higher in the Erie St. Clair LHIN [62.1] than South West LHIN [39.5 per 10,000 births] in 2011. Erie St. Clair LHIN reported higher rates of stillbirths than Ontario [56.3]; South West LHIN reported lower rates than Ontario in 2011 [Figure 11-1].

![Figure 11-1 Stillbirth Incidence Rate for South West LHIN, Erie St. Clair LHIN, and Ontario - 2011](111)
11.4 Congenital Heart Defects

Atrial and ventricular septal defects are two examples of congenital heart defects.

11.4.1 Atrial Septal Defects

An atrial septal defect is a hole between the heart’s left and right atria. They occur in early pregnancy and can vary in size and severity [120].

As shown in Figure 11-2, the incidence rate of atrial septal defects in the South West LHIN was 49.7 per 10,000 births, which was slightly lower than the rate for the province of Ontario [50.9 per 10,000 births] in 2011. The incidence rate in the Erie St. Clair LHIN was markedly lower at 31.8 per 10,000 births.

11.4.2 Ventricular Septal Defects

A ventricular septal defect is a hole between the left and right ventricles of the heart. Like atrial septal defects, ventricular septal defects most commonly occur by chance in early pregnancy. However, ventricular septal defects may also present with chromosomal problems such as Down syndrome [120].

The incidence rate of ventricular septal defects in the South West LHIN was 27.6 per 10,000 births, which was slightly lower than the rate for province of Ontario in 2011 [28.2 per 10,000 births]. The incidence rate in the Erie St. Clair LHIN was almost half the provincial rate at 14.3 per 10,000 births.

In both of the LHINs studied and in Ontario overall, atrial septal defects occurred more often than ventricular septal defects.

![Figure 11-2 Atrial and Ventricular Septal Defect Incidence Rates for South West LHIN, Erie St. Clair LHIN, and Ontario - 2011 [111]](image-url)
11.5 Cleft Lip and/or Palate

Cleft lip and cleft palates are congenital birth defects that can vary in severity and size. A cleft lip means there is a split in the upper lip, whereas a cleft palate means a split in the roof of the mouth. The two defects most commonly occur by chance, but may occasionally be associated with genetic conditions, maternal medications and/or maternal conditions. It is common for babies with cleft lip and/or palate to have difficulty feeding, frequent ear infections, and speech difficulties. Surgical repair is usually considered [111].

The incidence rate of cleft lip and/or palate was only slightly lower in the South West LHIN at 11.0 per 10,000 births than the provincial incidence rate of 12.0 per 10,000 births in 2011. The incidence rate in the Erie St. Clair LHIN is noticeably higher than both South West LHIN and Ontario at 20.7 per 10,000 births [Figure 11-3].

![Cleft Lip and/or Palate Incidence Rate for South West LHIN, Erie St. Clair LHIN, and Ontario – 2011](image)

**Figure 11-3** Cleft Lip and/or Palate Incidence Rate for South West LHIN, Erie St. Clair LHIN, and Ontario – 2011 [111]

11.6 Down Syndrome

A child born with Down syndrome has extra genetic material on the twenty-first chromosome. The extra genetic material is the result of a naturally occurring chromosomal arrangement. Although there are three types of arrangements that may result in Down syndrome, ninety-five percent cases of Down syndrome have trisomy 21, in which there is an extra copy of chromosome 21 [111].

In Southwestern Ontario, the incidence rate of Down syndrome was highest in the South West LHIN at 17.5 per 10,000 births compared with 12.7 per 10,000 births in the Erie St. Clair LHIN [see Figure 11-4].
11.7 Summary

- Stillbirths
  - At 62.1 stillbirths per 10,000 births, the stillbirth incidence rate was higher in the Erie St. Clair LHIN than South West LHIN [39.5 per 10,000 births] in 2011.
  - Erie St. Clair LHIN reported higher rates of stillbirths than Ontario and South West LHIN reported lower rates than Ontario in 2011.

- Congenital Heart Defects
  - In both of the LHINs studied and in Ontario overall, atrial septal defects occurred more often than ventricular septal defects.
  - Atrial Septal Defects
    - The incidence rate of atrial septal defects in the South West LHIN was 49.7 per 10,000 births, which was slightly lower than the rate for Ontario [50.9 per 10,000 births] in 2011.
    - The incidence rate in the Erie St. Clair LHIN was markedly lower at 31.8 per 10,000 births in 2011.
  - Ventricular Septal Defects
    - The incidence rate of ventricular septal defects in the South West LHIN was 27.6 per 10,000 births, which was slightly lower than the rate for Ontario in 2011 [28.2 per 10,000 births].
    - The incidence rate in the Erie St. Clair LHIN was almost half the provincial rate at 14.3 per 10,000 births in 2011.

- Cleft Lip and/or Palate
  - The incidence rate of cleft lip and/or palate was only slightly lower in the South West LHIN at 11.0 per 10,000 births when compared with the provincial incidence rate of 12.0 per 10,000 births.
The incidence rate in the Erie St. Clair LHIN was noticeably higher than both South West LHIN and Ontario in 2011, at 20.7 per 10,000 births.

- Down Syndrome
  - In Southwestern Ontario, the incidence rate of Down syndrome was higher in the South West LHIN at 17.5 per 10,000 births than 12.7 per 10,000 births in the Erie St. Clair LHIN in 2011.
CHAPTER 12

Health Risk and Health Enhancing Behaviors
Chapter 12 - Health risk and health enhancing behaviors

12.1 Introduction

A person's individual characteristics and behaviors are considered a major determinant of health, where behaviors can include both health risk and health enhancing activities [92]. Health risk behaviors include smoking, alcohol and drug abuse, lack of exercise and poor nutrition [93].

12.2 Data

Data for this chapter was retrieved from Statistics Canada's Community Health Profiles for 2013 [72].

12.3 Smoking

Smoking is an important health behaviour due to its associations with diseases such as increased of risk of lung and other cancers, chronic obstructive pulmonary disease [COPD] and other respiratory illnesses, and cardiovascular illnesses.

In South West LHIN, 20.1% of the population reported being a current smoker28 in 2013. Of these, 16.8% reported being a daily smoker. These were lower than the rates reported for Erie St Clair LHIN [22.2, 18.4], but higher than the provincial rates [18.9, 14.5] in 2013. Overall smoking rates [20.1] were slightly lower than the national rate [20.4], although the percentage of daily smokers was higher in South West LHIN [16.8, 15.6]. In Erie St Clair LHIN, 22.2% of the population reported being a current smoker in 2013. Of these, 18.4% reported being a daily smoker. These rates were higher than both provincial and national rates in 2013. Male smoking rates were higher than female rates in all four geographical regions in 2013 [Figure 12-1].

![Figure 12-1 Smoking Prevalence Rates for South West LHIN, Erie St. Clair, Ontario and Canada - 2013 [74]](image)

28 Current smokers include all individuals who smoke either daily or occasionally, where occasional is defined as smoking at least one cigarette in the 30 days leading up to the survey, but not every day. Daily smokers are those individuals who smoked at least one cigarette per day for each of the 30 days before the survey.
12.4 Alcohol Consumption

Alcoholism is the third leading cause of death worldwide, and Canadians consume 50% more alcohol than the global average [122]. Excessive alcohol consumption, on a single occasion or over the long-term, has been associated with numerous detrimental health effects. Diseases associated with heavy drinking include liver cirrhosis and cancer, mouth and oropharyngeal cancers, esophageal cancers, breast cancer, pancreatitis, cardiomyopathies, arrhythmias and cerebrovascular accidents [123] [124].

In 2013, 17.2% of the population of South West LHIN reported being heavy drinkers[^29] in 2013. This was higher than the provincial rate (15.9%) but on par with the national rate (17.3%). 19.8% of the population of Erie St Clair LHIN reported being heavy drinkers, a rate higher than South West LHIN, Ontario and Canada in 2013 [Figure 12-2]. Males reported heavy drinking behavior almost twice as often as females in all four geographical areas in 2013.

<table>
<thead>
<tr>
<th>ALCOHOL CONSUMPTION RATES</th>
<th>SOUTHWESTERN ONTARIO, ONTARIO AND CANADA</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>2013</td>
</tr>
<tr>
<td></td>
<td>South West LHIN</td>
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<tr>
<td></td>
<td>Erie St. Clair LHIN</td>
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<tr>
<td></td>
<td>Ontario</td>
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<tr>
<td></td>
<td>Canada</td>
</tr>
<tr>
<td>Total</td>
<td>17.2%</td>
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<tr>
<td>Male</td>
<td>19.8%</td>
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<tr>
<td>Female</td>
<td>15.9%</td>
</tr>
<tr>
<td>Total</td>
<td>27.0%</td>
</tr>
<tr>
<td>Male</td>
<td>23.4%</td>
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<tr>
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</tr>
<tr>
<td>Total</td>
<td>24.8%</td>
</tr>
<tr>
<td>Male</td>
<td>17.3%</td>
</tr>
<tr>
<td>Female</td>
<td>10.0%</td>
</tr>
</tbody>
</table>

[^29]: Heavy drinking: “Males who reported having 5 or more drinks, or women who reported having 4 or more drinks, on one occasion, at least once a month in the past year” [95].

12.5 Physical Activity

Physical activity plays an important role in the maintenance of good health by improving regulation of blood sugar levels, body weight and BMI. There is also evidence of its role in the prevention of numerous chronic diseases such as diabetes, cancer and osteoporosis, and prevention of premature death [97]. The leisure-time physical activity indicator includes both active behaviors [such as jogging for 20 minutes per day] and moderately active behaviors [such as walking for 20 minutes per day].

Rates of leisure-time physical activity were similar across Southwestern Ontario, Ontario and Canada, although South West LHIN (51.1%) reported slightly higher rates than Erie St Clair LHIN (49.6%) and Ontario (50.5%), and lower rates than Canada (52.3%) in 2013 [Figure 12-3]. Males were more likely than females to be physically active in all four geographic regions.
12.6 Fruit and Vegetable Consumption

Fruit and vegetable consumption is an important indicator of nutrition. Fruits and vegetables provide essential vitamins, minerals and fiber that are imperative to maintain good health; studies have found that regular consumption can reduce the risk of cancer and other chronic diseases [125]. The indicator measures regular fruit and vegetable consumption of five or more servings per day [126].

40.9% of residents of the South West LHIN reported regular fruit and vegetable consumption, whereas only 35.6% of Erie St. Clair residents reported the same in 2013 [Figure 12-4]. Southwestern Ontario’s fruit and vegetable consumption was substantially less than both the provincial [43.2%] and national [44.2%] rates. Males were less likely to consume adequate fruits and vegetables than females in all four geographic regions.
12.7 Access to Primary Health Care

Access to a primary care physician is an important aspect of primary care, both for disease prevention and early detection and treatment [94]. 91.7% of the population of the South West LHIN and 90.9% of the population of Erie St Clair LHIN reported that they had regular access to a physician [Figure 12-5]. This was similar to the provincial rate of 91.1%, and substantially greater than the national rate of 84.8% in 2013.

![Figure 12-5 Comparison of Access to Regular Medical Doctor – Southwestern Ontario, Ontario, and Canada - 2013][74]

12.8 Immunization Rates

Immunization refers to “the process by which a person or animal becomes protected against a disease”; interchangeable terms include inoculation and vaccination [127]. Diseases for which vaccinations are available include Cholera, Hepatitis A and B, Measles, Influenza, Mumps, Rubella, Smallpox and Typhoid. Provinces differ on the vaccination schedules recommended or required for children, but generally include Diphtheria, Tetanus, Whooping Cough, Polio, Chicken Pox, Measles, Mumps, and Rubella [128].

Data on vaccinations at the regional and LHIN level are not readily accessible and therefore this profile will report only on influenza vaccination rates.

The reported rates of influenza vaccinations were slightly lower in South West LHIN [34.2%] than Erie St Clair LHIN [35.8%] in 2013. Southwestern Ontario reported higher immunization rates than both Ontario [31.2%] and Canada [28.8%], as seen in Figure 12-6. Influenza immunization rates for females were higher than males in all four geographic regions.
Figure 12-6 Comparison of influenza immunization rates in Southwestern Ontario, Ontario and Canada – 2013

12.9 Summary

- **Smoking**
  - In South West LHIN, 20.1% of the population reported being a current smoker in 2013. Of these, 16.8% reported being a daily smoker. These were lower than the rates reported for Erie St Clair LHIN [22.2, 18.4], but higher than the provincial [18.9, 14.5] rates in 2013. Overall smoking rates [20.1] were slightly lower than the national rate [20.4], although the percentage of daily smokers was higher in South West LHIN [16.8, 15.6].
  - In Erie St Clair LHIN, 22.2% of the population reported being a current smoker in 2013. Of these, 18.4% reported being a daily smoker. These rates were higher than both provincial and national rates in 2013.
  - Male smoking rates were higher than female rates in all four geographical regions in 2013.

- **Heavy Drinking Behavior**
  - In 2013, 17.2% of the population of South West LHIN reported being heavy drinkers in 2013. This was higher than the provincial rate [15.9%] but on par with the national rate [17.3%].
  - 19.8% of the population of Erie St Clair LHIN reported being heavy drinkers, a rate higher than South West LHIN, Ontario and Canada in 2013.
  - Males reported heavy drinking behavior almost twice as frequently as females in all four geographical areas in 2013.

- **Physical Activity**
  - Rates of leisure-time physical activity were similar across Southwestern Ontario, Ontario and Canada. South West LHIN [51.1%] reported slightly higher rates than Erie St Clair LHIN [49.6%] and Ontario [50.5%], and lower rates than Canada [52.3%] in 2013.
  - Males were more likely than females to be physically active in all four geographic regions.

- **Fruit and Vegetable Consumption**
  - 40.9% of residents of the South West LHIN reported regular fruit and vegetable consumption, whereas only 35.6% of Erie St. Clair residents reported the same in 2013.
Southwestern Ontario’s reported fruit and vegetable consumption was substantially less than both the provincial [43.2%] and national [44.2%] rates.

Males were less likely to consume adequate fruits and vegetables than females in all four geographic regions.

- **Access to Regular Medical Doctor**
  - 91.7% of the population of the South West LHIN and 90.9% of the population of Erie St Clair LHIN reported that they had regular access to a physician in 2013.
  - This is similar to the provincial rate of 91.1% and substantially greater than the national rate of 84.8% in 2013.

- **Influenza Immunization Rates**
  - The reported rates of influenza vaccinations were slightly lower in South West LHIN [34.2%] than Erie St Clair LHIN [35.8%] in 2013.
  - Southwestern Ontario reported higher immunization rates than both Ontario [31.2%] and Canada [28.8%].
  - Influenza immunization rates for females were higher than males in all four geographic regions.
CHAPTER 13

Bibliography
Chapter 13 – Bibliography


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