The Alberta GPI Accounts: Human Health and Wellness

Report #9

by

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Pembina Institute
for Appropriate Development

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About this Report

This is one of 28 reports that provide the background for the Genuine Progress Indicators (GPI) System of Sustainable Well-being Accounts. It explains how we derived the indices that were earlier published in *"Sustainability Trends 2000: The Genuine Progress Statement for Alberta, 1961 to 1999."* The research for this report was completed near the end of 2000. The appendices provide further background and explanation of our methodology; additional details can be obtained by contacting the authors. Appendix A includes a list of all GPI background reports.

This report examines a broad range of issues dealing with human health and wellness. Perhaps the most important desired outcome of individuals in society is a healthy, long life. Measuring health and wellness outcomes is complex, with many possible indicators and determinants of health. These Alberta GPI Accounts are a preliminary first step towards the eventual construction of more comprehensive and integrated human health, social capital and natural capital accounts. The strength of GPI well-being accounts is their flexible, transparent and integrated nature allowing for customization and continuous expansion limited only by data and knowledge. The GPI Alberta system of well-being accounts provides a well-being accounting framework that can manage a comprehensive inventory of health data and indicators to be examined independently or in relationship with trends in the condition of other economic, social, and environmental indicators of well-being.

In this report we limit the indicators to a few significant measures that are commonly used to assess human health and wellness. The Health and Wellness accounts consider the following key indicators (* denotes indicators which are not included in the GPI Account indices and

Sustainability Circle. Future GPI accounts could begin to add a fuller list of health and wellness indicators):

a) life expectancy
b) premature mortality
c) disease and chronic illness*
d) self-rated health*
e) injuries (auto crashes are considered in a separate report)
f) suicide
g) infant mortality
h) obesity
i) substance abuse (alcohol, drugs, tobacco)
j) gambling

At this stage the Alberta GPI Accounts for health and wellness do not incorporate the monetary costs associated with health and wellness, with some exceptions (auto crashes, suicide, and gambling). It is vital to consider the full costs to human health associated with changes in economic, social and environmental conditions. Also important in GPI accounting is the need to distinguish private and public health care spending that contributes to the genuine improved well-being of individuals and communities and those which are defensive and perhaps regrettable expenditures that mitigate against regrettable social, human and natural capital degradation costs. GPI accounts should also attempt to distinguish between preventative health care expenditures from those that deal with a failed health condition after the fact.

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About the Author

Mark Anielski is Director of the Green Economics team and has considerable experience in public policy analysis including natural resource, energy, royalty and fiscal policy issues in both the public (Alberta Government) and private (GPC- Government Policy Consultants) sector. He also serves as Senior Fellow to the U.S. economic policy think-tank Redefining Progress in Oakland, California and authored the 1999 U.S. GPI report with journalist Jonathan Rowe. He currently advises the National Round Table on Economy and the Environment's Sustainable Development Indicator Steering Committee on the development of indicators for measuring sustainability in Canada. Mark teaches business and the environment in the University of Alberta's School of Business. His expertise is varied and broad including accounting for sustainable development, natural resource accounting, public policy analysis, business planning and performance measurement. Mark pioneered the development of natural capital accounts for Alberta's timber, oil, gas, coal and other natural capital as well as having experience in the development of performance measurement systems, land use planning and non-market resource valuation, royalty policy analysis (forestry, oil and gas), and analysis of subsidies for both government and private forestry, energy and financial service industries. He holds a Masters degree in forest economics, plus bachelor degrees in economics and forestry.

Acknowledgements and Disclaimer

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The high quality of the data compiled by Statistics Canada and the opportunity to use this data enabled us to undertake a much more thorough analysis than would otherwise have been possible. We also thank Kim Sanderson for her editing assistance. Finally, the Pembina Institute appreciates the vision of Western Economic Diversification in supporting this project—the first of its kind for Alberta, if not internationally.

The contents of this report are the responsibility of the Pembina Institute and do not necessarily reflect the views and opinions of those who are acknowledged above or the opinions or positions of Western Economic Diversification who helped fund the research.

We have made every effort to ensure the accuracy of the information contained in this document at the time of writing. However, the authors advise that they cannot guarantee that the information provided is complete or accurate and that any person relying on this publication does so at their own risk. Given the broad scope of the project and time constraints, it has not been possible to submit the entire report for peer review. The material should thus be viewed as preliminary and we welcome suggestions for improvements that can be incorporated in any later edition of the work.

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Figures and Tables

1 Executive Summary

Personal health and wellness comprise a separate section of the Alberta GPI accounts included under the broad heading of Societal Well-being Accounts. There are countless ways of measuring an individual's health and wellness, and we have examined only a subset of many potential indicators that would ultimately make up a robust health and wellness GPI account. The GPI accounting framework provides for the expansion of our preliminary account. We examined four key health indicators: life expectancy, premature mortality (including trends in disease), infant mortality and obesity. We also provide a brief discussion of the economic costs of illness and disease, including estimated costs of obesity-related illness.

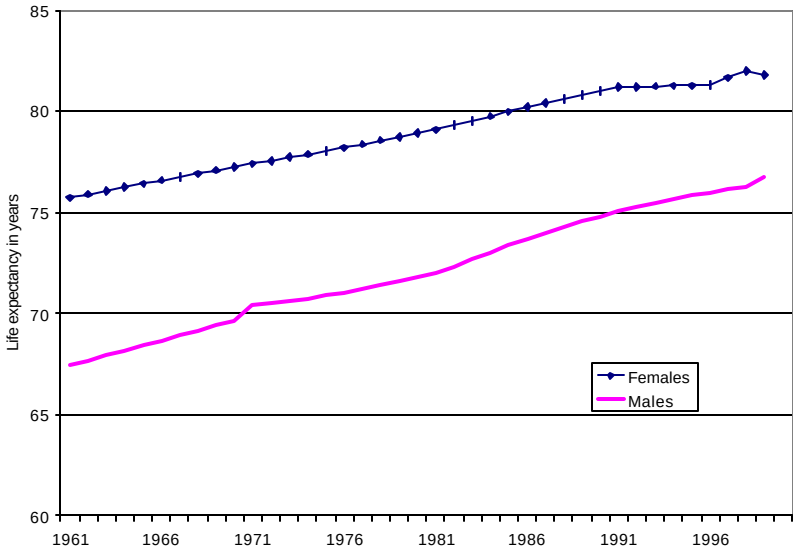
Noteworthy

- The life expectancy of Alberta men in 1999 was 76.8 years while women were living to 81.8 years, on average.
- Compared with the rest of the world, the life expectancy for Alberta men ranks third after Iceland and Japan, while life expectancy for Alberta women is second, behind Japan.
- In 1999, most Albertans (64%) rated their own health as excellent or very good, with only 3.4% reporting poor health.
- Healthy lifestyles lead to longer life—in 1996, 72% of Albertans reported they didn't smoke, 65% said they got physical exercise and roughly 82% wore seatbelts while driving.

1.1 Life Expectancy in Alberta: How Much?

Life expectancy is one of the key indicators of human health and wellness. Most people wish to live long and fulfilling lives. Life expectancy data for Alberta suggest that both men and women in Alberta are living longer than ever before. Based on 1999 Statistics Canada data, Alberta men were living to 76.8 years on average while women were living an average of 81.8 years. This is a significant increase from 1961—6.06 years for women and 9.37 years for men. The increase in life expectancy between 1961 and 1999 was greater for men (23 percent) than for women (16 percent). This may be due, in part, to more women being in the workforce where they experience more stress and may be more likely to smoke, both of which can contribute to a range of diseases and illnesses. Compared with other parts of the world, life expectancy in 1998 for Alberta males (76.3 years) ranked third, after Iceland and Japan (both at 76.8 years), and Alberta females ranked second at 82.0 years behind Japan (82.9 years).

Life Expectancy for Men and Women, Alberta 1961 to 1999



Source: Statistics Canada, Cat. No.82-001, 82-003, 91-209 and 84-210

Living longer, healthier and more fulfilling lives is the ultimate measure of well-being at the individual and household level. Many factors contribute to longer lives, including better diet, good medical facilities and treatment, and improved socio-economic conditions. Although premature mortality and infant mortality are declining, stress is rising, smoking is high among working women, and obesity has increased dramatically. At the same time, Albertans feel good about their health as revealed in citizen surveys and reflected in the table below.

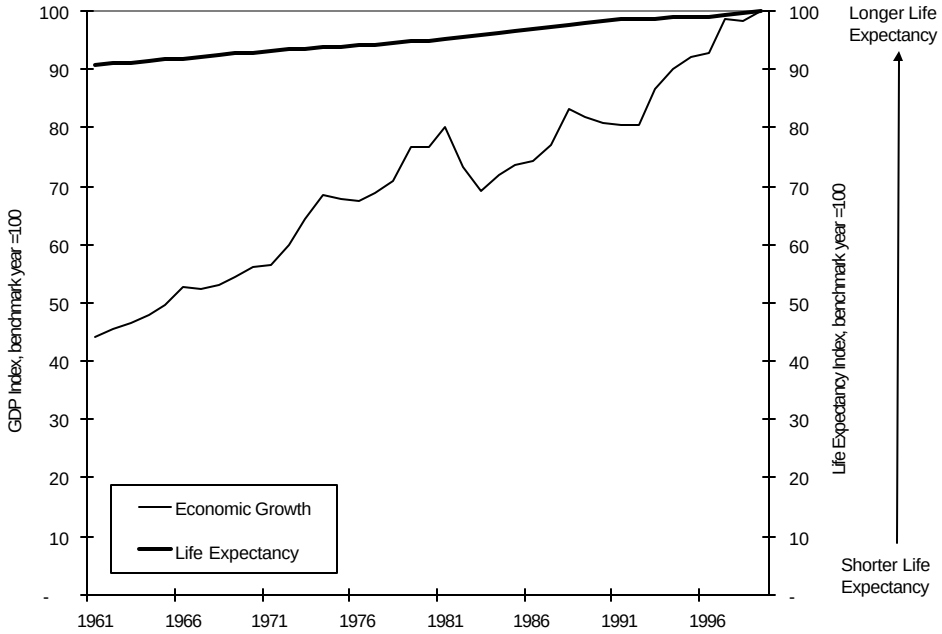
Self-Rated Health by Albertans 1996 to 1999

	Excellent	Very Good	Good	Fair	Poor
1996	25.3	38.8	24.3	8.7	3.0
1997	24.9	37.5	25.7	8.2	3.6
1998	24.0	38.9	25.2	8.5	3.5
1999	23.7	39.9	24.7	8.3	3.4

Source: Annual Alberta Health Survey, as it appears in *Measuring Up, 1999-2000*

The GPI Accounts include measures of health and wellness, such as life expectancy and premature mortality, as proxies for health and well-being. Increasing life expectancy contributes to a rising GPI Index. The figure below shows life expectancy expressed as an index, relative to GDP expressed as an index. Life expectancy has continued to rise and was the highest ever in 1999, at 100 points out of a possible 100.

Life Expectancy Index: Where are we today?



Can this increasing trend in life expectancy be sustained? Some analysts suggest that we might see a saturation point, or threshold, for life expectancy in both men and women. One of the more important trends to watch is congenital anomalies that can be correlated to environmental

influences. Other factors known to influence health and longevity are income and education. Further research into GPI accounting might include examining the complex array of socio-economic and environmental determinants of human health to identify what gives Alberta a comparative advantage over other jurisdictions. Because no price can be placed on human health and wellness, there is no price tag or cost attached to life expectancy.

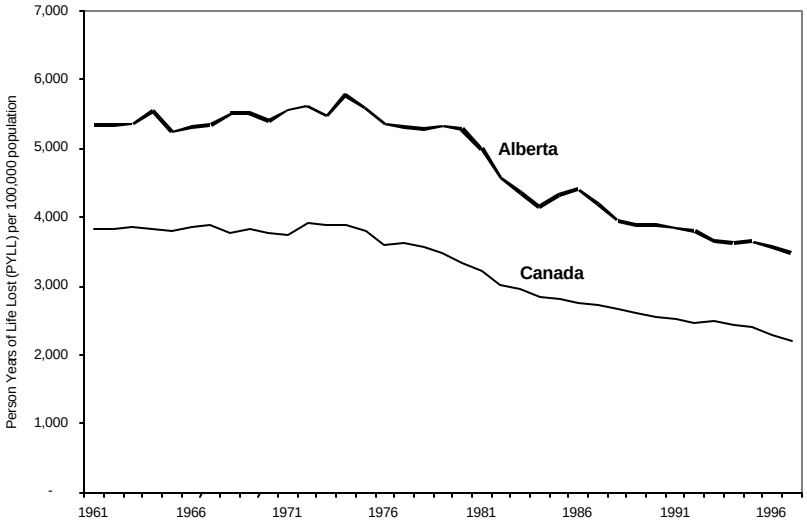
1.2 Premature Mortality in Alberta: How Much?

The incidence of premature mortality (death before age 75) and disease is an important indicator of human health and well-being. Between 1961 and 1999, premature mortality in Alberta fell by 36.7 percent. Premature mortality is measured in terms of person years of life lost (PYLL) due to mortality from all causes. While remaining fairly constant through the 1960s, Alberta's PYLL declined from a high of 5,781 PYLL per 100,000 population in 1974 to 3,477 PYLL per 100,000 in 1997. The most important cause of premature mortality in 1997 was accidental deaths (auto crashes, injuries), followed by cancer, all other causes, heart disease, suicide, respiratory disease, cerebrovascular disease, and congenital anomalies. In 1961, the top three causes of premature mortality were accidental deaths, cancer, and all other causes. Virtually every cause of premature mortality, except suicide, decreased from 1961 to 1997. While this is a positive trend in genuine well-being, Alberta's rate of premature mortality in 1997 was 1.58 times higher than the Canadian average.

Noteworthy

- Premature mortality rates by cause showed the following percentage changes from 1961 to 1997:
  - respiratory disease (decreased by 67.7%)
  - congenital anomalies (decreased by 62.2%)
  - cerebrovascular diseases (decreased by 58.1%)
  - heart disease (decreased by 54.9%)
  - accidental deaths (decreased by 43.0%)
  - all other causes (decreased by 33.1%)
  - cancers (decreased by 11.5%)
  - suicide (increased by 80.8%)
- The rate of mortality from heart disease among both men and women has fallen since 1987, but still represented the major cause of death in Alberta in 1998—201 deaths per 100,000 males and 176 per 100,000 females.
- Cancer mortality remains stubbornly high, largely unchanged from 1987 to 1998, with 187 deaths per 100,000 males and 166 deaths per 100,000 females in 1998.
- While mortality from cancer may be holding, the incidence of cancer among Canadian men and women shows a steady increase since the early 1970s; 33% more men (per 100,000 population) contracting cancer in 2000 and 25% more women (per 100,000 population).

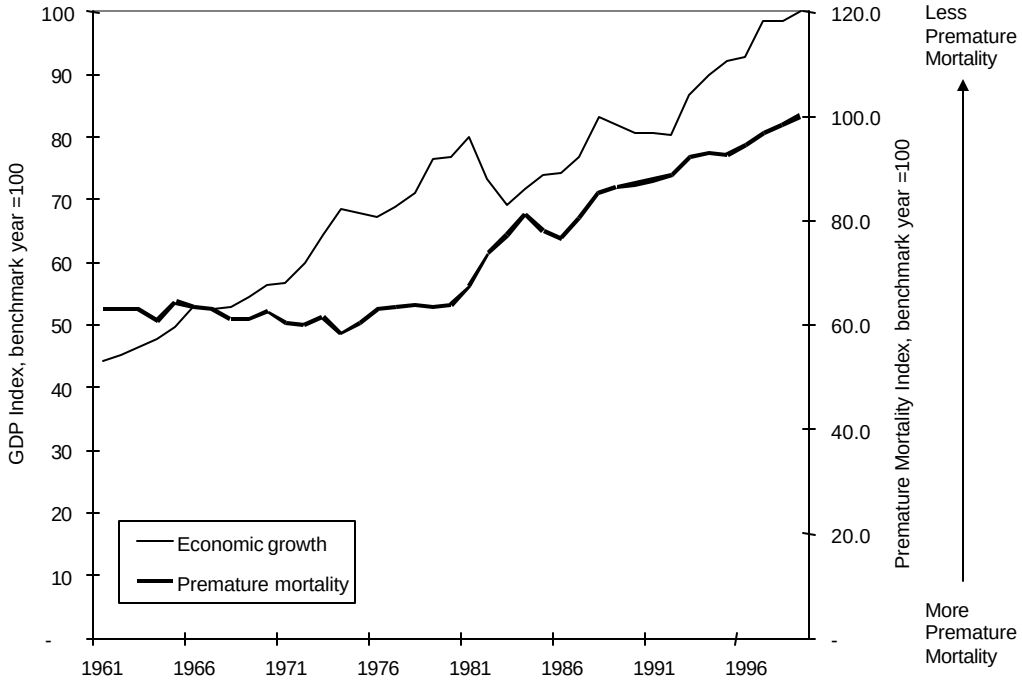
Premature Mortality: Alberta vs. Canada, 1961 to 1997



Source: Statistics Canada. *Health Statistics at a Glance*, Catalogue No. 82F007XCB

Tracking human health indicators, such as premature mortality, is fundamental to assessing the condition of human capital within the GPI accounting framework. As with the life expectancy index, the premature mortality index showed a progressive improvement (reduced premature mortality) over the past 40 years (see figure below). Here we set 100 equal to the lowest rate of premature deaths per 100,000 population over the study period 1961 to 1999. The optimum benchmark year is 1999, which had the lowest rate of premature mortality over the study period; thus our GPI premature mortality index improves over time following a path similar to economic growth (GDP) since 1961. While a dollar value cannot be placed on human life, indicators such as premature mortality, life expectancy and other indicators of human health provide meaningful evidence of the changing condition of human health and wellness. Many factors such as the incidence of disease (e.g., cancer, cardiovascular diseases, asthma, and diabetes), socio-economic profiles of at-risk segments of society, diet, stress (workplace, financial, personal), and environmental stressors (e.g., air quality, water quality) determine health and wellness. These key determinants should be part of a more complete GPI System of Well-Being Accounts in future. Comprehensive and longitudinal data sets of these human health determinants could be developed, providing robust information to measure well-being more completely. The open and transparent GPI accounting architecture allows for such an expansion and would be ideal for examining the complex set of relationships between key determinants of health and wellness.

Premature Mortality Index: Where are we today?



Major Causes of Death in Alberta 1987 to 1999

Major Causes of Death in Alberta (standardized Mortality Rates per 100,000 population)								
	Heart Disease		Cancer		Respiratory Disease		Injuries	
	Males	Females	Males	Females	Males	Females	Males	Females
1987	**240**	**193**	**188**	**164**	**73**	**49**	**89**	**38**
1988	236	185	189	167	76	52	86	38
1989	**231**	**176**	**190**	**170**	**78**	**54**	**82**	**38**
1990	220	177	195	165	76	52	81	36
1991	**208**	**178**	**199**	**160**	**74**	**50**	**80**	**34**
1992	208	179	196	168	72	55	78	33
1993	**207**	**180**	**192**	**175**	**70**	**59**	**75**	**31**
1994	204	182	196	171	70	61	76	32
1995	**200**	**183**	**200**	**167**	**70**	**63**	**77**	**32**
1996	197	184	192	168	70	61	74	32
1997	**194**	**184**	**184**	**169**	**70**	**58**	**70**	**31**
1998	**201**	**176**	**187**	**166**	**77**	**66**	**75**	**29**
1999	**195**	**173**	**182**	**177**	**76**	**71**	**67**	**29**

Source: Alberta Health and Wellness, derived from Alberta Vital Statistics death files and as report in "Measuring Up," The 2000-2001 Annual Report, Government of Alberta
http://www.treas.gov.ab.ca/publications/measuring/measup01/people.html#2

Note: Bold figures are actual; all other figures are estimates.

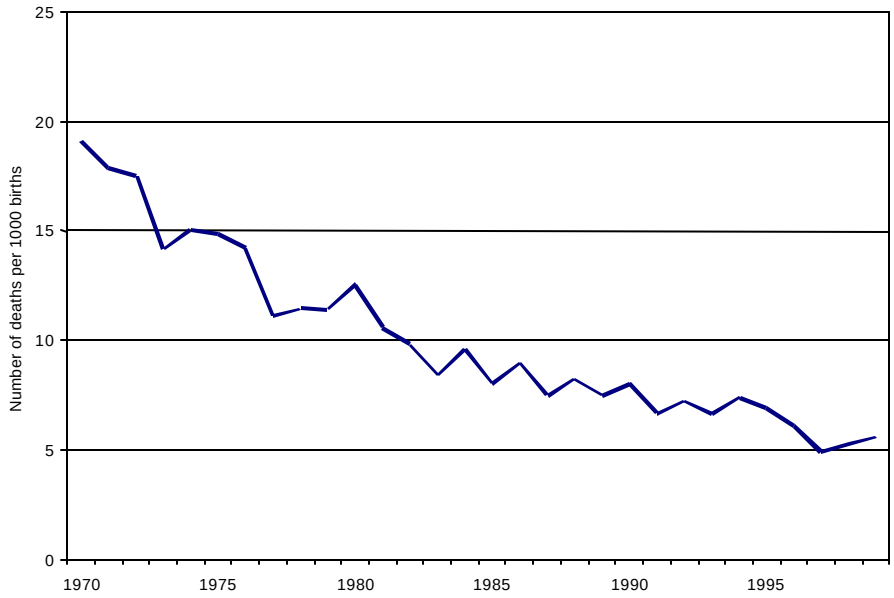
1.3 Infant Mortality in Alberta: How Much?

Measuring the health and wellness of children is a complex task. The Alberta GPI Accounts briefly evaluate children's health, examining trends in infant mortality and low birth-weight babies. A big success story in Alberta and Canada is the dramatic reduction in infant mortality. From 1970 to 1999, the rate of infant mortality declined 70 percent. The most common causes of infant mortality are birth trauma, jaundice, infection (prenatal conditions), birth defects and sudden infant death syndrome (SIDS). This significant improvement is due to improved medical services, as well as healthier mothers with healthier pregnancies and an improved quality of life for all. Although Alberta's infant mortality rate has dropped, it still tends to be higher than the Canadian average.

Noteworthy

- The lowest rate of infant mortality was recorded in 1997, at 4.9 deaths per thousand live births.
- The highest rate of infant mortality was in 1970, with 19.0 deaths per thousand live births.
- In 1997, 174 babies died in their first year: 100 boys and 74 girls.
- The most common causes of death were birth trauma, jaundice, infections, birth defects and sudden infant death syndrome (SIDS).
- The highest rate of low birth-weight babies is in Calgary; the lowest is in the northwestern region of the province.
- Alberta's rate of low birth-weight babies continues to be higher than the Canadian average.
- The most common causes of low birth weight are prematurity, fetal defects (caused by inherited and environmental factors), multiple births, acute or chronic diseases in the mother, and domestic violence or abuse.

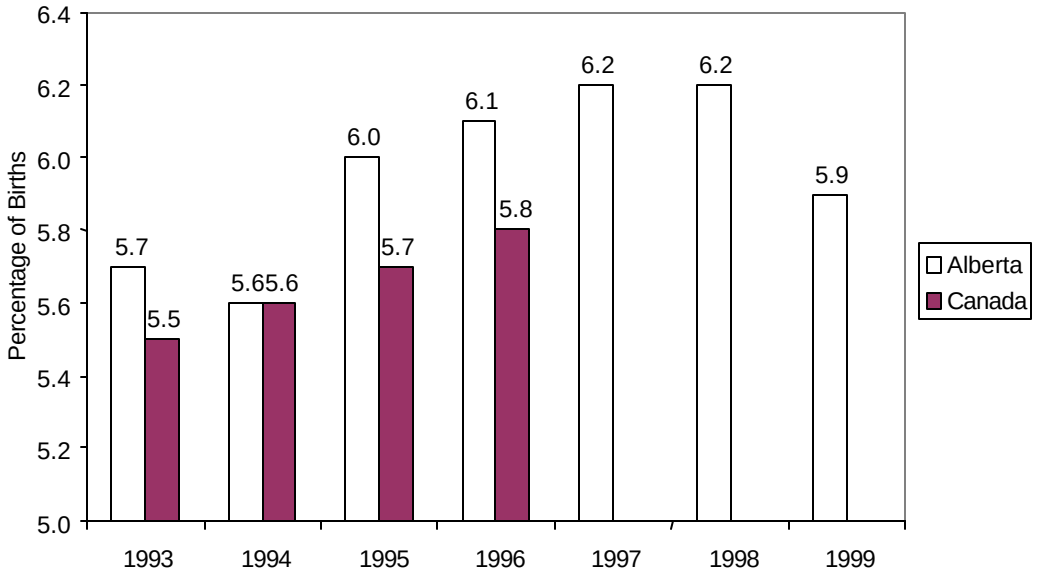
Infant Mortality, Alberta, 1970 to 1999



Source: Alberta Vital Statistics, *Measuring Up*, Human Resources Canada (Index for Social Health)

Over the past ten years, Alberta's rate of low birth-weight babies has gone up and down. However, according to Alberta Health, in 1997 the rate climbed to 6.2 percent, the highest level in the 1990s. Alberta's rate is higher than the Canadian average.

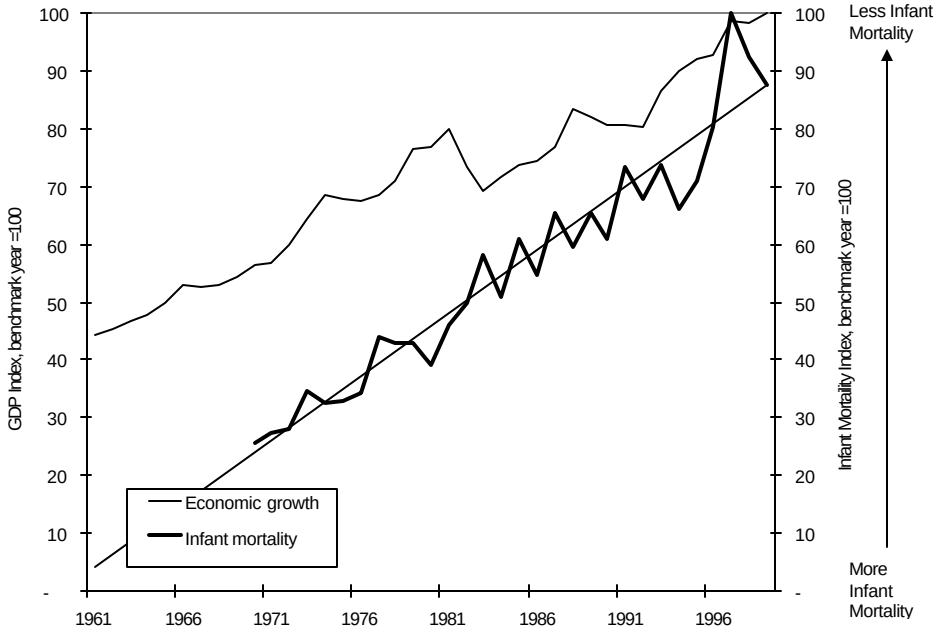
Low Birth-Weight Babies (percentage of newborns), Alberta vs. Canada, 1993 to 1999



Source: Alberta Vital Statistics data reported by Alberta Health and Wellness; 1997-1999 data for Canada were not available.

Fewer babies are dying in Alberta before their first birthday, which is something to celebrate in terms of improved conditions of human well-being. When expressed as an index, infant mortality has increased at a rate not unlike the rate of growth of the economy. Here we set 100 equal to the lowest rate of infant mortality per 1,000 live births. The year 1997 is our benchmark year, with the lowest level of infant mortality between 1961 and 1999. The GPI infant mortality index improves over time following a path similar to GDP since 1961 (see figure below).

Infant Mortality Index: Where are We Today?



The likely societal and human benefits associated with reduced infant mortality and low birth-weight babies have not been calculated. Mitigating against infant mortality and investing time and resources in improving conditions that would avoid the problems associated with low birth-weight babies would provide a net benefit to society. Direct and indirect costs associated with the effects of these conditions on human health and the community would be reduced or mitigated with investments that reduce the risks of such occurrences. Society and individuals are better off in both the short and long term when healthy individuals are contributing to the well-being of households and community. In the absence of any benchmark studies of the total societal costs of these issues, the Alberta GPI account is silent on the full and long-term societal and personal costs associated with infant mortality and low birth-weight babies. This remains an important piece of future GPI analysis along with estimating the full costs of auto crashes and suicide.

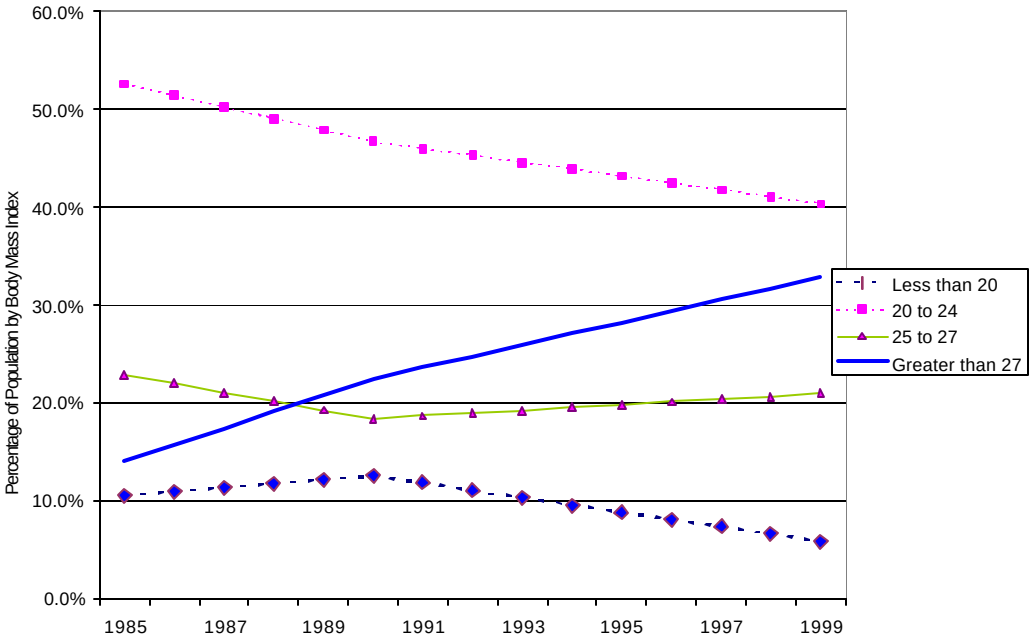
1.4 Obesity in Alberta: How Much?

Obesity is an increasingly important dimension of human health as more Canadians, and Albertans, are overweight. The GDP makes no distinction between healthy eating and unhealthy eating; GDP rises with each expenditure—whether good food or "junk" food. Advertising expenditures to entice consumption of processed junk food also contribute to GDP even if intuitively we know that such expenditures do not enhance genuine well-being and good health. The Alberta GPI accounts reveal that Albertans are getting fatter by the year due to poor eating habits and lack of exercise. Based on Statistics Canada (1999) data from 1996, an estimated 465,153 Albertans (or 29.4 percent of the population) were overweight—that is, they had a Body Mass Index of 27 or more. We estimate that by 1999, roughly 32.9 percent of Albertans were overweight. This represents a two-fold increase since 1985 when roughly 14 percent of the population was overweight. This means that obesity has increased by almost 135 percent in 14 years, a condition that some might call an epidemic. The most recent national study of obesity among young Canadians found a dramatic increase in overweight teens and youth.

Noteworthy

- In 1999, 32.9 percent of Albertans were considered to be overweight.
- In 1996, Statistics Canada reported that just over 50% of Albertans were considered to be in a healthy weight class, compared with 63.1% of the population in 1985.
- According to the 1996 National Health Surveys, 72% of Albertans reported not smoking, 65% reported getting physical exercise, and 82% (in 1994) reported wearing a seatbelt, but only 42% reported having a healthy body weight.
- The most recent national study of obesity among young Canadians found a dramatic increase in overweight teens and youth; in 1999, roughly 29% of boys and 24% of girls were overweight.

Healthy Body Weights in Alberta (Body Mass Indices), 1985 to 1999



Source: Statistics Canada, Health Statistics Division

As economic prosperity has grown, so have our waistlines, as shown in the figure below. The more we consume the greater our ecological footprint, including our food footprint. Rising levels of consumption of food and other goods and services contribute to rising GDP. Although the two are not correlated, the GPI index for obesity shows a declining condition as the GDP index rises. Precise estimates of the cost of obesity and unhealthy living are unavailable for Alberta. Studies of the economic costs of obesity in the U.S. in 1995 estimated a cost of US$99.2-billion or $377.53 per American, including direct medical expenditures on disease associated with obesity, and indirect costs such as loss of productivity.

Alberta Obesity Index, 1985 to 1999

As we indulge in unhealthy meals and lifestyles then counter this with dieting, the GDP keeps rising—indifferent to healthy or unhealthy lifestyle choices. In fact, a healthy, locally-grown diet would show up as a reduction in GDP. The GDP also makes no distinction between the full costs and benefits of money spent on nutritious food baskets, grown at home or bought in farmers' markets and food that is grown, processed, preserved, and shipped thousands of kilometres to distant markets. Neither do our national and provincial accounts track the full health costs due to poor nutrition. In general, Albertans self-report that they are participating in healthier lifestyles (see table below), which is a positive trend. Sustainable living is intuitively about a healthy lifestyle, including diet.

Percentage of Albertans Who Participate in Healthy Lifestyles

	Do not smoke	Get physical activity	Always wear seatbelt	Healthy body weight
1985	67	64	25	48
1990	70	54	75	50
1994	72	60	82	45
1995	72	65	x	42

Source: Health Promotion Survey (1985, 1990); National Health Survey (1994-95, 1996-97)
x = not available

2 Introduction to Health and Wellness

One of the most comprehensive assessments of the health of Albertans comes from Alberta Health.[1] This report notes that addressing the complex issue of health and wellness requires a "look through a wider lens" including considering a variety of health and wellness indicators—both quantitative (such as disease rates) and qualitative (such as self-rated health and quality of life). Genuine progress of individual, household and societal well-being might be measured by examining the life expectancy of people and asking them about their quality of life. Health and wellness is, however, more complex than this, including not only the state of the body but the condition of the mind and the health of the soul (spiritual health). These latter issues are more difficult to quantify. Focusing simply on outcome measures such as life expectancy and premature mortality might mask more distressing trends and longitudinal impacts of stress, mental illness, unhealthy lifestyles and declining environmental quality. These impacts may take years to show up in measures of health.

According to the Alberta Health report, the current condition of the health of Albertans can be summarized as:

- Albertans are living longer than ever and enjoying healthier lifestyles due to the combined positive impacts of declining infant mortality and prevention of premature mortality from disease.
- Albertans are happier with their quality of life as reflected in positive self-ratings of their health.
- While people may be living longer, more years may be offset by chronic diseases such as respiratory disease, arthritis and dementia.
- The leading causes of death are heart disease, cancer, respiratory disease, stroke and injuries, and cancer rates remain stubbornly high.
- Suicides and motor vehicle crashes are leading causes of premature mortality with Alberta's suicide rate one of the highest in Canada, a disturbing condition.
- Aboriginal health, while still poorer than the general population, is improving as measured by increasing life expectancy. Aboriginal Albertans still experience high rates of suicide, substance abuse and injuries, which require attention and stewardship.
- Poverty persists even in a prosperous economy, with an explosion of food banks across the province since the 1980s and increasing numbers of children (one in eight) living in low-income situations. These conditions have longitudinal health and wellness impacts and eventually cost all of society in the form of higher health and social costs.
- Resource development places increasing pressures on air, water and soil quality, and may present an undetermined future risk to human and ecological health.

Overall, the report by Alberta Health suggests that Albertans are blessed with good health, based on both concrete evidence and self-reporting. More detailed analysis at the regional and household level, sensitive to socio-economic conditions, might reveal important discoveries into which Alberta households are at greatest risk in terms of long-term human health. Identifying these risk profiles and understanding the determinants of human health outcomes will be critical to more effective management of public and private health care investments to achieve optimum health outcomes for all Albertans.

3 Data and Methodologies

There is a remarkable amount of health data from various sources including Statistics Canada, Health Canada and Alberta Health and Wellness. According to Alberta Health biostatistician Don Schopflocher,[2] the best source for Alberta health statistics will be the forthcoming "Information Roadmap" being developed by the Canadian Institute for Health Information in cooperation with Health Canada and Statistics Canada. The Roadmap will provide a comprehensive framework and data set for assessing population health and should be considered in future Alberta GPI Account updates. In 1997, Alberta Health published *Health Trends in Alberta*, which is based in part on the indicators being developed by the Roadmap initiative. *Health Trends* is being updated. The report identifies the key indicators that should eventually form the basis of the health and wellness component of a GPI accounting framework.

Historical data on key indicators used in the GPI accounts, including premature mortality rates and life expectancy, exist as far back as 1961. However, Schopflocher cautions that the use of historical longitudinal data back to the 1960s has certain shortcomings and these data are not necessarily comparable with figures from the 1990s. This is due to differences in methodologies and to incompatibilities and problems with data gathering. Overall there is a problem in taking a retrospective view of health and wellness using historical data. Many health indicator experts tend to ignore the constraints of the data set and problems with comparability. We too exercise caution in asserting causality about health outcomes and trends. We need to take extra care with statistics and what story they tell. In particular, the issue of covariance in the statistics is rarely discussed, nor is the interrelationship between variables explored in a meaningful way.

An important area of future research is examining the relationships among all variables of health and wellness and the key drivers or determinants. These include a complex array of diet, genetics, lifestyle, socio-economic profile, and environmental factors. In discerning the suitability of an indicator we can do one of two things; we can either 1) pose a hypothesis or theory (e.g., economic theory) that if a variable can be valued or measured in monetary terms we would use it as a suitable indicator, or 2) in psychology, if a variable moves in tandem or together with other variables then we can potentially use it as an indicator since a relationship between variables has been identified.

The GPI accounts present evidence of current and historical conditions of human health and wellness using the following key indicators: 1) life expectancy; 2) premature mortality; 3) self-rated health; 4) infant mortality; 5) obesity; and 6) suicide. Other indicators of health include substance abuse (youth drug use), auto crashes (and injuries) and problem gambling, which are covered in separate GPI reports. Many other indicators could be presented in the GPI accounts and should be incorporated in future accounts as more complete data sets emerge.

Perhaps the key determinant of human health and wellness is life expectancy. This indicator is used in many international measurement frameworks including the influential UN Human Development Index. However, Schopflocher cautions that, although commonly used as a measure of overall health, life expectancy may not be the best measure. Inconsistency and flaws in the calculations over time make comparisons over time problematic.[a] Schopflocher suggests adopting a new measure called "age-sex standardized mortality rate," which measures life expectancy adjusted for differences in age and sex compared to the national average. Although such a measure is technically more valid it is not commonly used or currently recognized by health indicator analysts. In addition, statistics only date back to 1986 for Alberta. This new measure

[a] Alberta and Canadian figures date back to the 1920s.

might be an appropriate long-term replacement of life expectancy except that it is difficult for citizens to understand. Since age-sex standardized mortality rates are highly correlated with traditional life-expectancy data it may be possible to use the standardized mortality statistics and project them back in time.

Another cautionary note from Schopflocher is that, demographically, Alberta has a younger population than the rest of the country so that comparing Alberta's health and wellness indicators with Canadian averages requires discretion. For example, premature mortality rates per 100,000 population are generally higher for Alberta than Canada (1.58 times higher in 1997), which may be due to higher rates of accidents. Indeed, accidental deaths are 1.90 times higher in Alberta and suicide is 1.51 times higher (expressed in person years of life lost per 100,000 population).[3] However a turning point may occur in the year 2024 when the number of elderly Albertans (aged 65 years and older) will exceed the number of young Albertans (15 years and younger). This will also be a critical time for economic and social policy decision makers.

4 Life Expectancy and Self-rated Health

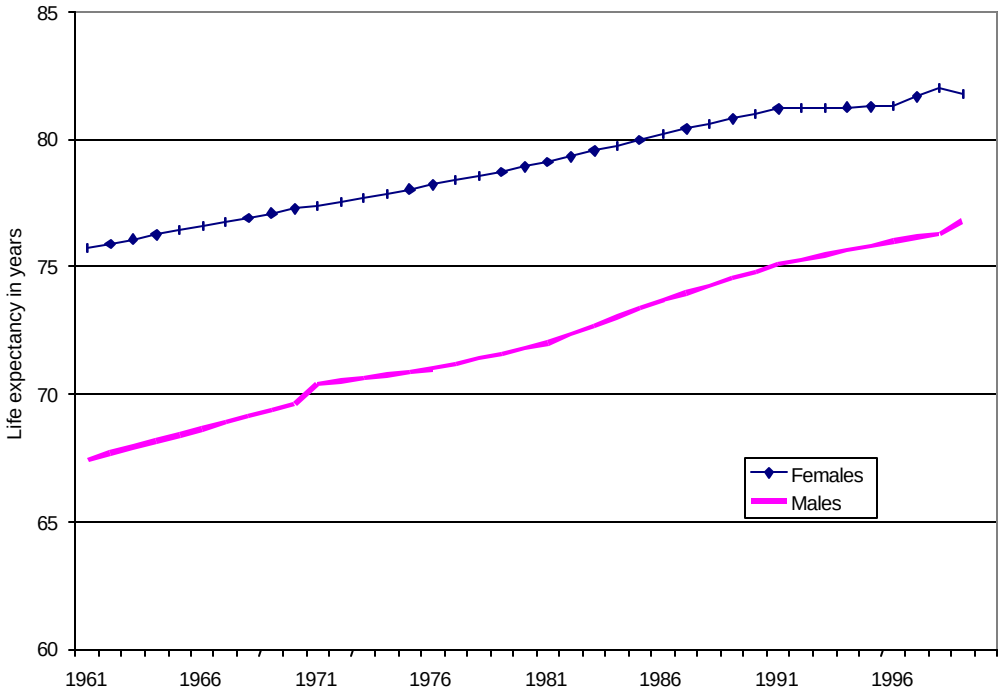
Life expectancy is often used as a key indicator of current health and mortality conditions of a population. Life expectancy is defined as the average number of years an individual of a given age is expected to live if current mortality rates continue to apply.[4] An increase in life expectancy is usually interpreted as an indicator that a population is healthy.

Life expectancy continues to rise for both men and women in Alberta (see Figure 1). Life expectancy has risen steadily since the early 1920s, the earliest source of data. In the 1920-22 period, the life expectancy for men was 59 years and 61 years for women; by 1990-1992, the average life expectancy had risen to 78 years (75 years for men and 81 years for women).[5] Alberta's average life expectancy in 1990-92 (based on Statistics Canada data) equaled the national average of 78 years, the same as New Brunswick, Ontario, Manitoba, Saskatchewan and British Columbia. In 1998, life expectancy for Alberta males ranked third in the world after Iceland and Japan (both at 76.8 years), and second for females at 82.0 years after Japan (82.9 years).[6] In 1996, Canada's life expectancy at birth was 78.6 years, third behind Switzerland and Japan among OECD countries.[7]

In 1999, Alberta men were living on average to 76.8 years while women were living to 81.8 years on average.[8] Compared with 1961, this is a significant increase of 6.06 years for women and 9.37 years for men. The increase in life expectancy between 1961 and 1999 was greater for men (23 percent) than for women (16 percent).

An Alberta study of trends in life expectancies for both Alberta males and females across all 17 Alberta Regional Health Authorities for each of the years from 1986 to 1996 showed a steady increase over these 11 years, though it was more marked for males than for females.[9] Since the 1970s, it appears that increases in female life expectancy have been smaller than those for males. The relative slowdown for females may be due in part to more women in the workforce, leading to higher incidence of heart disease and increasing rates of smoking among women. According to Don Schopflocher of Alberta Health we might expect to see a saturation point, or threshold, for life expectancy in both men and women.[10] On another issue related to life expectancy, Schopflocher noted that one of the more important trends to watch for as a potential threat to sustained life expectancy rates is congenital anomalies that may be correlated with environmental influences.

Figure 1: Life Expectancy (Years) of Alberta Men and Women, 1961 to 1999



Source: Statistics Canada, Cat. No.82-001, 82-003, 91-209 and 84-210

Statistics Canada's 1996 life expectancy data, sorted by Canadian health regions, ranked the top regions in Alberta as follows: Headwaters Health Authority (79.3 years average for both sexes), Calgary Regional Health Authority (79.2 years) and the Capital (Edmonton) Health Authority (79.1 years).[11] The lowest life expectancy in Alberta in 1996 was recorded in the Peace Regional Health Authority at 73.6 years. For Canada, the highest life expectancy in 1996 was recorded in Richmond, B.C. (81.4 years average for both males and females) and the lowest in Région du Nunavik, Quebec (64.4 years).

Life expectancy at birth is generally lower in remote northern health regions in Canada, which include larger Aboriginal populations where major chronic diseases are common, particularly among women; circulatory disease, respiratory disease and cancer (especially lung cancer due to smoking) are prevalent.[12] Suicide is also high among men and women in northern communities particularly in Région du Nunavik (Quebec) and Nunavut. Socio-economic determinants of low life expectancy include high rates of unemployment and lower levels of education.

Another way of measuring health and wellness is to ask people how they feel, relative to others, about their health. Since 1996, the University of Alberta's Population Research Laboratory has surveyed Albertans for Alberta Health on self-rated health. The results suggest that Albertans feel very healthy, with less than four percent of the sample population complaining of poor health (see Table 1). In 1999, 23.7 percent of respondents rated their health as excellent, down slightly from 1996 when 25.3 percent reported excellent health. Most (nearly 64 percent in 1999) report their health as excellent or very good. This is a remarkably high rate of feeling good.

Table 1: Self-Rated Health by Albertans 1996 to 1999

	Excellent	Very Good	Good	Fair	Poor
1996	25.3	38.8	24.3	8.7	3.0
1997	24.9	37.5	25.7	8.2	3.6
1998	24.0	38.9	25.2	8.5	3.5
1999	23.7	39.9	24.7	8.3	3.4

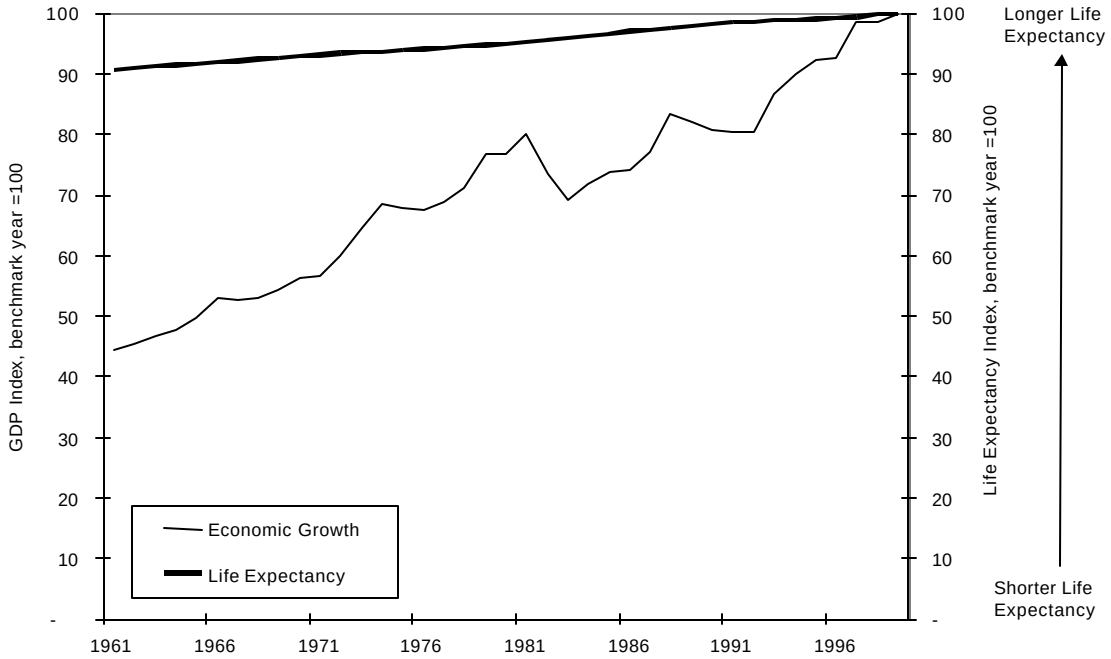
Source: Annual Alberta Health Survey, as it appears in *Measuring Up, 1999-2000*

Unfortunately data are not available prior to 1996 so that a longitudinal data set for creation of a self-rated health indicator in the GPI accounts was not possible and had to be excluded from the GPI indicator set. Future GPI accounts that are not concerned with historical, longitudinal comparisons, might include more indicators of health and wellness such as self-rated health.

4.1 Life Expectancy as an Index

Converting the rate of life expectancy for both men and women to an index in the GPI accounts and comparing these trends with GDP growth presents the portrait shown in Figure 2. The graph shows that life expectancy has steadily increased along with GDP, a positive concurrent trend.

Figure 2: Premature Mortality Index vs. GDP, Alberta, 1961 to 1999



The GPI accounting system takes raw data and converts it to an index for comparison with other indicators and for aggregation with other indicators to create composite indices such as the Societal GPI Index (containing 22 social and human health indicators) and the aggregate GPI (containing all 51 indicators in the GPI accounts).

The life expectancy index is developed using time series data (see Appendix B). Raw data are converted to an index system on a 100-point scale. To index the data series we assume that higher rates of life expectancy are more desirable than lower rates. Thus the higher the value in the index, the better the condition of life expectancy. In the case of life expectancy the benchmark year (optimum condition over 40 years) is 1999 with the highest rate in 40 years. We then set this rate as our benchmark year for the period 1961 to 1999. This figure is converted to 100 basis points by dividing through by itself. Then the entire data time series is divided through by this benchmark year figure multiplied by 100 to yield an index.

5 Premature Mortality and Disease

Premature mortality[b] and disease are important indicators of human health that would be monitored in a GPI accounting system. Data on the incidence of disease are more difficult to gather, thus we have opted for a time series of data on premature mortality.

Comparing the causes of death in Canada in 1926 with 1996 shows that in 1996, the major cause of death was cardiovascular disease, followed by cancer and all other causes (see Table 2). In 1926, the leading causes of death were all other causes, followed by cardiovascular diseases, and respiratory disease. Perhaps the greatest improvement in the past 70 years has been in infectious diseases and perinatal causes of death, while heart disease and cancer became the most common causes of death in the 1990s.

Table 2: Major Causes of Death (by percentage of deaths) 1926 and 1996, Canada

Major Causes of Death, 1926 and 1996, Canada (percentage of deaths)		
	1926	**1996**
Cardiovascular diseases	19	37
Cancer	7	28
Respiratory diseases	15	9
Accidents/violence	5	6
Infectious diseases	12	1.5
Perinatal causes	9	0.5
All other causes	32	18

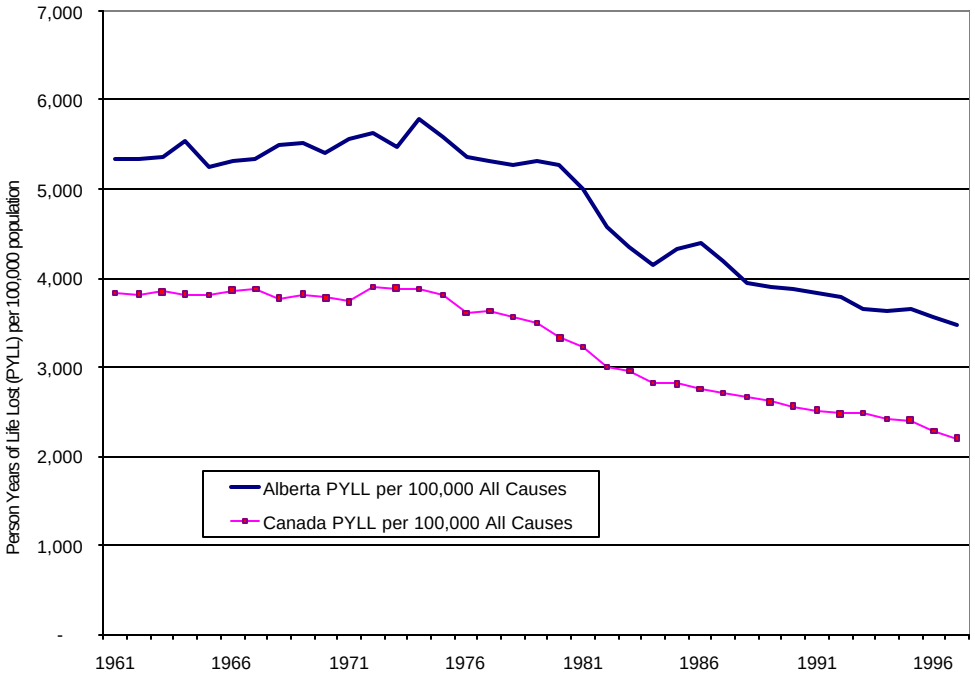
Sources: Human Activity and the Environment 2000, Stat. Can. Cat. No.11-509-XPE, Table 6.6.1. Brancker, A. D.A. Enarson, S. Grzybowski, E.S. Hershfield and C.W.L Jeanes, 1992
"A Statistical Chronicle of Tuberculosis in Canada: Part 1. From the Era of Sanatorium Treatment to the Present," Health Reports, Catalogue No. 82-003-XPB, Vol. 4, No. 2, pp. 102-112, Ottawa. Statistics Canada, Health Division.

Premature mortality rates along with life expectancy provide a robust set of indicators of the health and wellness of a population. Premature mortality is measured in terms of the number of person years lost due to mortality from all causes: cancer, heart disease, respiratory ailments, accidents, suicide, congenital anomalies, perinatal mortality, and cerebrovascular disease.[13] Premature mortality data are available from Statistics Canada (1999) for the period 1961 to 1997. The missing years of 1998 and 1999 were extrapolated using simple regression analysis of the data set, which covered the period 1961 to 1997.

[b] Premature mortality is the number of years of life that an individual did not live due to premature death before the age of 75.

The good news is that premature mortality has declined over the past 40 years in both Alberta and Canada (see Figure 3). Person years of life lost (PYLL) fell from a high of 5,781 PYLL per 100,000 population in 1974 to 3,477 PYLL per 100,000 in 1997, a decline of 34.8 percent from 1961 to 1997. Alberta's rate of PYLL is actually higher than the Canadian average. In 1997, Alberta's PYLL was 1.58 times higher than the Canadian average.

Figure 3: Alberta versus Canada PYLL per 100,000 population, 1961 to 1997



The most important cause of premature mortality in 1997 was accidental deaths (auto crashes, injuries), cancer, all other causes, heart disease, suicide, respiratory disease, cerebrovascular disease, and congenital anomalies (Table 3). In 1961, the top three causes of premature mortality were accidental deaths, cancer, and all other causes. Virtually every cause of premature mortality except suicide (which is higher in 1997) decreased between 1961 and 1997 (Figure 4).

Table 3: Premature Mortality by Cause, Alberta, 1961 versus 1997

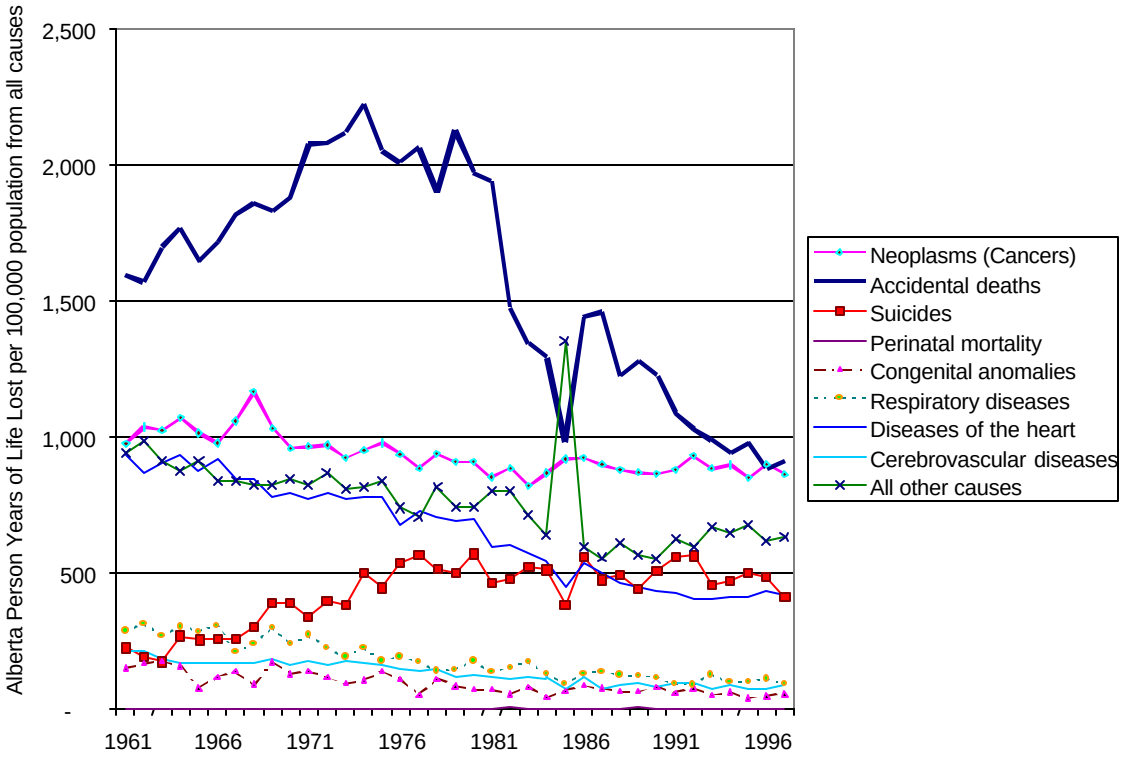
Cause of Premature Mortality (person years life lost per 100,000 population)		
	1961	**1997**
Accidental deaths (auto crashes, injuries)	1,595	909
Cancers	976	864
All other causes	943	631
Heart disease	933	421
Suicide	227	411
Respiratory disease	287	93
Cerebrovascular disease	216	91
Congenital anomalies	153	58
All causes	5,330	3,477

Source: Statistics Canada. Health Statistics at a Glance, Catalogue No. 82F007XCB

Premature mortality rates by cause showed the following percent changes comparing 1961 to 1997 (Figure 4):

- respiratory disease (decreased by 67.7 percent)
- congenital anomalies (decreased by 62.2 percent)
- cerebrovascular diseases (decreased by 58.1 percent)
- heart disease (decreased by 54.9 percent)
- accidental deaths (decreased by 43.0 percent)
- all other causes (decreased by 33.1 percent)
- cancers (decreased by 11.5 percent)
- suicide (increased by 80.8 percent)

Figure 4: Person Years of Life Lost per 100,000 Population, Alberta 1961 to 1997

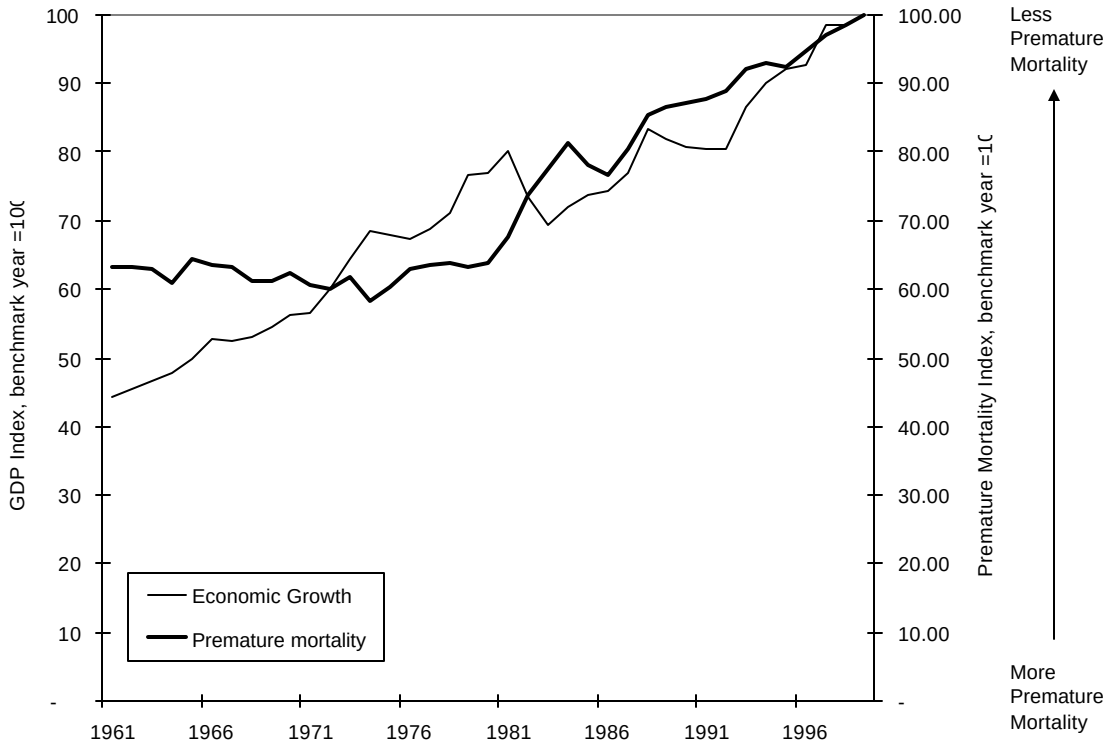


Source: Statistics Canada. *Health Statistics at a Glance*, Catalogue No. 82F007XCB

5.1 Premature Mortality as an Index

Figure 5 presents the results of converting the rate of premature mortality to an index in the GPI accounts and comparing these trends with GDP growth. The graph shows positive trends in both the rate of premature mortality and GDP, or economic growth.

Figure 5: Premature Mortality Index vs. GDP, Alberta, 1961 to 1999



The GPI accounting system takes raw data and converts it to an index for comparison with other indicators and for aggregation with other indicators to create composite indices such as the Societal GPI Index (containing 22 social and human health indicators) and the aggregate GPI (containing all 51 indicators in the GPI accounts).

The premature mortality index is developed using time series data (see Appendix B). Raw data are converted to an index system on a 100-point scale. To index the data series we assume that lower rates of premature mortality are better than higher rates. Thus the higher the value of the premature mortality index, the better the condition of premature mortality. In the case of premature mortality, the benchmark year (optimum condition over 40 years) is 1999 with the lowest rate in 40 years. We then set this rate as our benchmark year for the period 1961 to 1999. This figure is converted to 100 basis points by dividing through by itself. Then the entire data time series is divided through by this benchmark year figure multiplied by 100 to yield an index.

6 Disease and Causes of Death

Data on the incidence of disease are more difficult to find than data on causes of death. Ideally, we would want to track trends in the incidence of disease as well as premature mortality, life expectancy and causes of death.

The four major causes of death in Alberta are heart disease, cancer, respiratory disease and injuries[14] (see Table 4). Over the past 12 years, the rate of deaths from heart disease and injuries has declined. At the same time the rate of respiratory disease has increased considerably for women, and deaths from cancer were relatively unchanged from 1987 to 1999. This trend is consistent with Canadian trends overall, showing a decline in death rates by major causes since 1970 in the case of heart disease generally and coronary heart disease in particular.[15] Cardiovascular diseases remain the highest cause of premature mortality followed by cancer. Cancer rates have increased in Canada and Alberta since the 1970s but have declined in recent years.

Table 4: Major Causes of Death in Alberta

Major Causes of Death in Alberta (standardized Mortality Rates per 100,000 population)								
	Heart Disease		**Cancer**		**Respiratory Disease**		**Injuries**	
	Males	Females	Males	Females	Males	Females	Males	Females
1987	**240**	**193**	**188**	**164**	**73**	**49**	**89**	**38**
1988	236	185	189	167	76	52	86	38
1989	**231**	**176**	**190**	**170**	**78**	**54**	**82**	**38**
1990	220	177	195	165	76	52	81	36
1991	**208**	**178**	**199**	**160**	**74**	**50**	**80**	**34**
1992	208	179	196	168	72	55	78	33
1993	**207**	**180**	**192**	**175**	**70**	**59**	**75**	**31**
1994	204	182	196	171	70	61	76	32
1995	**200**	**183**	**200**	**167**	**70**	**63**	**77**	**32**
1996	197	184	192	168	70	61	74	32
1997	**194**	**184**	**184**	**169**	**70**	**58**	**70**	**31**
1998	**201**	**176**	**187**	**166**	**77**	**66**	**75**	**29**
1999	**195**	**173**	**182**	**177**	**76**	**71**	**67**	**29**

Source: Alberta Health and Wellness, derived from Alberta Vital Statistics death files and as report in "Measuring Up," The 2000-2001 Annual Report, Government of Alberta
http://www.treas.gov.ab.ca/publications/measuring/measup01/people.html#2
Note: Bold figures are actual; all other figures are estimates.

Canada has one of the lowest age-standardized mortality rates in the world at 680 deaths per 100,000 population, behind South Korea (550 deaths), Japan (570 deaths), Iceland (630 deaths) and Switzerland (640 deaths), based on 1994 data.[16] In 1996, Canada's mortality rate was even lower at 653 deaths per 100,000 population.

Comparing provincial mortality rates, Alberta ranked second lowest after British Columbia in 1996.[17] Alberta recorded 639 deaths per 100,000 (both males and females) including cancer, cardiovascular disease, coronary heart disease, stroke, respiratory disease, pneumonia/influenza, accidents and suicide. British Columbia had a mortality rate of 623 deaths per 100,000 and the Canadian average was 653 deaths. Comparing mortality rates by cause of death for both males and females among eleven provinces and territories, Alberta ranked as follows:

- Cancer, all (9th,)
- Lung cancer (11th)
- Breast cancer (3rd)
- Cardiovascular disease (6th)
- Coronary heart disease (7th)
- Stroke (4th)
- Respiratory, all (6th)
- Pneumonia/influenza (7th)
- Accidents (3rd)
- Suicide (4th)

6.1 Heart Disease

Heart disease is the leading cause of death for Canadians and Albertans, although these numbers have declined steadily since the mid-1960s; in 1997, the death rates were almost half those of 1969.[18] However, while mortality rates have dropped for cardiovascular diseases, the actual number of cases has increased in Canada. This apparent contradiction reflects increased survivorship and an increasing size of population over age 65. The decline can be explained in part by a reduction in the prevalence of smoking and by lifestyle changes and improved medical and surgical care for those with cardiovascular disease.

In Alberta, the rate of death from heart disease among males and females ranks ahead of cancer and respiratory disease at 201 deaths per 100,000 men and 187 deaths per 100,000 women in 1998 (see Table 4). Cardiovascular heart disease is by far the most important cause of death in Canada. The average Canadian cardiovascular heart disease rate in 1996 was 226 deaths per 100,000 (both sexes) while Alberta's was slightly higher at 233 deaths.

6.2 Cancer

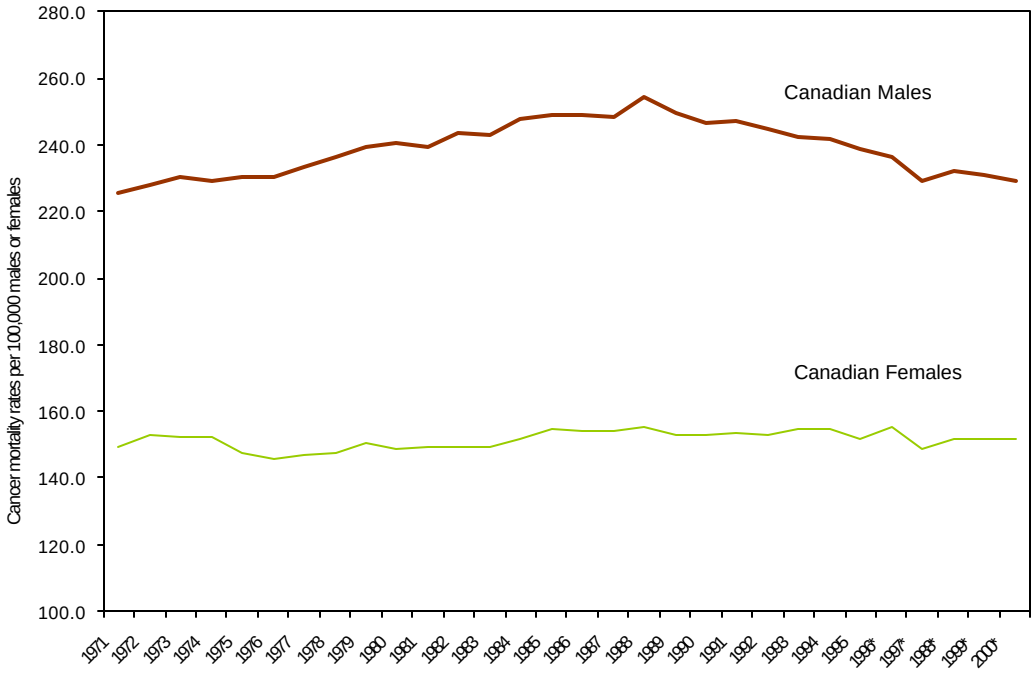
Cancer of all types has remained the second greatest cause of premature mortality in Canada and in Alberta. In 1996, the average Canadian mortality rate for cancer was 185 deaths per 100,000 population while Alberta's rate was 174 deaths, the ninth lowest among all provinces and territories.[19] An estimated 132,000 new cases of cancer and 65,000 deaths were expected to occur in Canada in 2000, with lung cancer the most frequently diagnosed cause of cancer death for both men and women. For Alberta, Health Canada projected 10,100 new cancer cases for both sexes for 2000 and an estimated 4,900 deaths.[20] For women, breast cancer is the most frequently diagnosed cancer while for men it is prostate cancer. Among children, an average of 1,279 Canadians were diagnosed with cancer and 249 died from cancer in recent years, with leukemia the most common cause of mortality (32 percent of deaths).[21]

Overall the age-standardized mortality rates for most cancers in Canada (per 100,000 population) have increased only marginally since the early 1970s. The increase is a mere 1.4 percent for Canadian males and 1.6 percent for Canadian females (see Figure 6). For males, the mortality rate declined steadily in the 1990s after peaking in 1988 at 254.7 deaths per 100,000 males; the decline is due to decreases in mortality rates for lung, colorectal and other cancers.[22]

Mortality rates from all cancers have remained stubbornly high for Canadian women, although generally lower than male mortality rates. Cancer mortality rates for females also peaked in 1988 at 155.3 per 100,000 population. There has been a steady and significant decline in mortality rates

for all cancers other than lung cancer. Since 1985, breast cancer mortality rates have declined by about 25 percent among women aged 50-65. Among Canadian children, cancer mortality rates have declined by more than 50 percent since the 1950s.

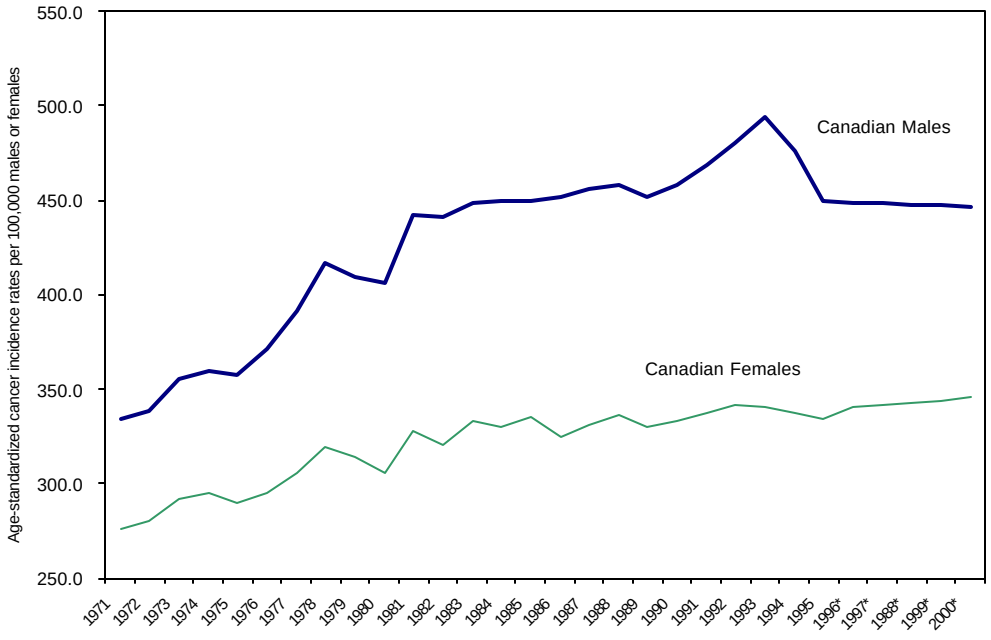
Figure 6: Age-standardized Mortality Rates for All Cancers, 1971-2000, Canada, Males and Females



Source: National Cancer Institute of Canada, Canadian Cancer Statistics 2000. Tables 7,1, 7,2, 8.1 and 8.2; pp. 34-37. * Estimated

The bad news is that the incidence of all cancers has been increasing for at least 30 years. Figure 7 shows a clear upward trend from 1971 to 2000 in the incidence of cancer among Canadian males and females with the rates increasing 33.4 percent and 25.1 percent respectively. By 2000, the estimated incidence rate for Canadian males was 446.4 per 100,000 males compared with an estimated 345.4 for females. The peak in incidence rates for Canadian males occurred in 1993, and for females it is estimated to have peaked in 2000.[23] Estimates of Alberta's incidence rates for 2000 were 402 per 100,000 males and 338 per 100,000 females, thus lower than the national average.

Figure 7: Incidence Rates for All Cancers, Canadian Males and Females, 1971 to 2000



Source: National Cancer Institute of Canada, Canadian Cancer Statistics 2000. Tables 7,1, 7,2, 8.1 and 8.2; pp. 34-37. * Estimated

The 1993 peak in male cancer rates and the sharp rise leading up to it were due primarily to prostate cancer, which declined in 1994. The same longitudinal incidence and mortality trend data were not available for Alberta, thus we are uncertain whether the same trends are occurring for Alberta males and females.[24] However, the incidence rate of prostate cancer in 2000 was projected at 112 per 100,000, ranking Alberta sixth lowest in Canada. The lung cancer rate for men is declining but is still almost double the rate for women. Among women, Health Canada projects the incidence of breast cancer at 105 per 100,000 Alberta females, the fourth lowest in Canada. Lung cancer incidence and mortality rates continue to increase rapidly and are now more than four times as high as rates in 1971. Incidence of lung cancer among Alberta men is projected to be 66 per 100,000 in 2000 compared with a rate of 43 per 100,000 for women. Alberta's male lung cancer rate is fourth lowest in Canada while Alberta's female lung cancer rate is third lowest in Canada. Colorectal cancer, the third most common cancer for both men and women, has declined steadily in both incidence and mortality rates over the past 15 years. These trends suggest that the war against cancer is far from being won as the incidence has risen even though prevention approaches such as reduced smoking, early detection and screening and cancer treatments are having beneficial impacts on reducing age-standardized mortality rates.

According to statistics from the National Cancer Institute of Canada, the probability of developing and dying from cancer varies. Among men, 1 in 9 (11.1 percent) will develop prostate cancer during their lifetime, mostly after the age of 70; 1 in 11 (9.1 percent) will develop lung cancer; and 1 in 16 (6.2 percent) will develop colorectal cancer. Among women, 2 in 19 (10.5 percent) will develop breast cancer; 1 in 18 (5.6 percent) will develop colorectal cancer; and 1 in 20 (5.0 percent) will develop lung cancer.

Comparing the provinces, the Canadian Advocacy Coalition (an advocate for cancer care) shows that Alberta has the second lowest cancer mortality rates in Canada while Nova Scotia and

Quebec have the highest.[25] The North American Association of Central Cancer Registries ranks most Canadian provinces behind U.S. states in overall cancer deaths. B.C. has the best record in Canada (6th on the list that ranks every province and state) followed by Alberta (11th), Saskatchewan (16th), Ontario (24th), Manitoba (27th), Newfoundland (33rd), P.E.I. (34th), New Brunswick (36th), Quebec (54th), and Nova Scotia (57th).[26] People in Utah had the lowest cancer mortality rate in North America.

The North American Association of Central Cancer Registries compared cancer mortality rates for males, using incidence rates[c] for all U.S. states and Canadian provinces between 1993 and 1997. They called their ratio the "mortality/incidence ratio"; the higher the ratio the higher the proportion of individuals with cancer who die from cancer. Their study found that Utah had the lowest mortality/incidence ratio at 34.56 percent: Utah's mortality rate was 106.1 deaths per 100,000 males compared to an incidence rate of 307 cases per 100,000 male population. Alberta's mortality/incidence ratio ranked 34th (in the middle of the 62 states and provinces) at 43.80 percent based on a mortality rate of 137 per 100,000 males and an incidence rate of 312.8 per 100,000 males. Canada's overall ratio of deaths to new cases (incidence) is estimated at 49 percent overall. In terms of the lowest cancer incidence rates (per 100,000 males), the Yukon (263.9), Northwest Territories (266.9), and Nevada (278.4) were ranked lowest, respectively.[27]

6.3 The Economic Cost of Illness

As the rates of illness and disease rise, so too does the Gross Domestic Product, as more money is spent on doctors, hospitals and drugs. Assessing the full costs of illness in Canada is critical for allocating scarce public financial resources for health care services. Translating morbidity and premature mortality statistics into a financial cost estimate is a challenging yet critical part of GPI accounting. This first GPI account for Alberta provides only a preliminary treatment of a full-cost accounting of illness and disease applied in the GPI accounting framework. Future research is recommended that would apply other national estimates of the cost of illness to the provinces. Part of the illness cost accounting has been captured in the estimates of the cost of auto crashes in Alberta.

A 1993 study of the economic burden of illness in Canada estimated the total direct and indirect costs at $156.9-billion, equivalent to 22 percent of Canada's GDP, or $5,450 per capita, using a six percent discount rate.[28] If the Canadian average per capita figure were applied to Alberta's population (all other things being equal), the estimated economic burden of illness to Alberta would have been roughly $15.8-billion in 1993. Direct costs accounted for $71.7-billion (45.7 percent of total costs) of which hospital care was the largest direct cost component ($26.1-billion), followed by cost of services by physicians ($10.4-billion), drugs ($9.9-billion) and other miscellaneous health expenditures ($9.3-billion). Research expenditure was the smallest component at $752-million. Indirect costs (54.3 percent of total costs) amounted to an estimated $85.1-billion, of which almost half ($38.3-billion) was attributed to loss of productivity from long-term disability.

In terms of costs by illness, cardiovascular diseases were the largest category at 15.3 percent of cost of the total estimated direct and indirect costs of illness ($7.4-billion in direct costs and $12.4-billion in indirect costs). Musculoskeletal disorders and injuries (which would include auto crash injuries) ranked second and third with total costs of $17.8-billion and $14.3-billion, respectively. Cancer was next, totaling $13.1-billion. All four categories accounted for 50.2 percent of the cost of illness estimates.

[c] Incidence rate is the ratio of deaths to new cases.

7 Children's Health

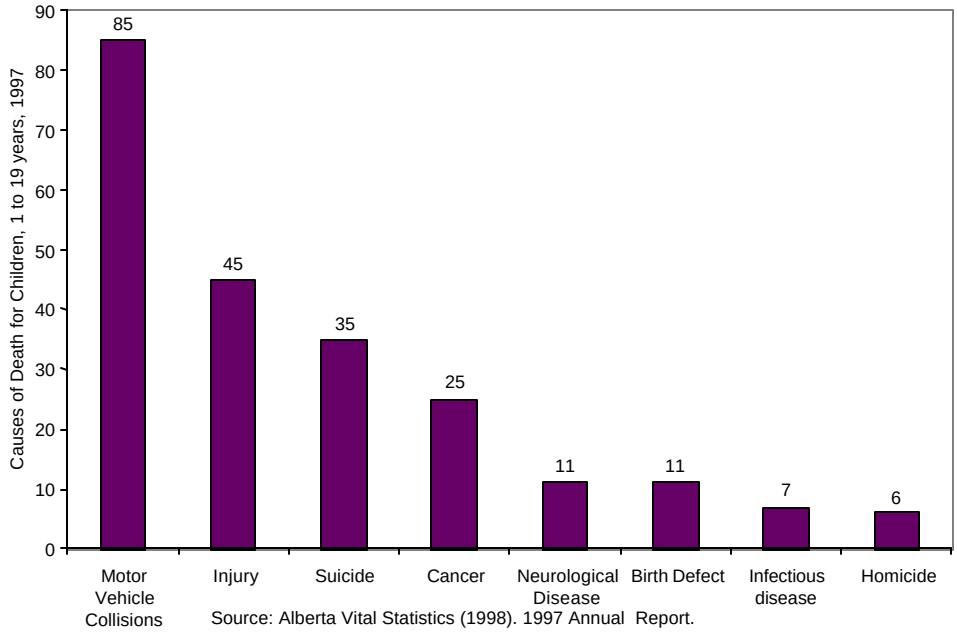
Measuring the health and wellness of children is as complex as measuring that of adults. There are many proxies or indicators of health and wellness of children, including child abuse, substance abuse, genetics, suicide, environmental carcinogens, air quality, low birth weight, diet, family breakdown, poverty, and other socio-economic variables. This complex array of factors contributes to the outcomes of children's health and wellness. The GPI accounts explore only a few of these factors, but future accounts should examine a more comprehensive set of indicators that are important drivers of children's health and well-being.

According to Alberta Health and Wellness, in 1998 over 840,000 children and youth aged 19 years or younger lived in Alberta—30 percent of the total population. There are slightly more boys (51 percent) than girls (49 percent). According to the National Longitudinal Survey of Children and Youth (NLSCY) in 1994/95, roughly 80 percent of children and youth lived with their birth parents, 12.5 percent with a single parent (mostly mothers) and 6 percent with a stepparent. According to Alberta Family and Social Services, 21,810 children received child protection services during the fiscal year 1998-1999, an increase of 49.0 percent from 1993-1994 when 14,642 children received such protection.[29] According to Alberta's Children's Services, 47,000 cases of child abuse[d] were reported in 1998-1999.[30]

7.1 Causes of Death Among Children

The leading cause of death among Alberta children aged 1 to 19 in 1997 was motor vehicle accidents, followed by injuries, suicide and cancer (see Figure 8). We did not analyze the trend data in causes of death among children, though future GPI Accounts should assess emerging trends in mortality and incidence of disease, particularly cancer, asthma, diabetes and other diseases.

Figure 8: Cause of Death of Children, Ages 1 to 19, 1997

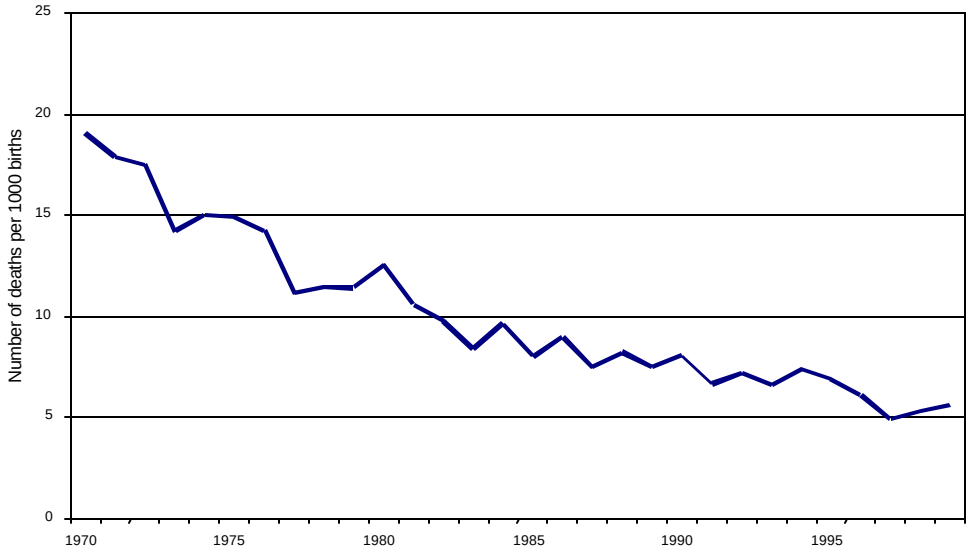


[d] It is considered child abuse when anyone mistreats or neglects a child, resulting in significant emotional or psychological harm, or serious risk of harm, to the child.

7.2 Infant Mortality

One of the big success stories in children's health is the dramatic fall in infant mortality in Alberta and Canada (see Figure 9). For the past 40 years the rate of infant mortality has been declining steadily. In 1921, an estimated 86 out of every thousand infants died before their first birthday.[31] By 1998, the estimated infant morality rate had dropped to less than five per 1,000. The most common causes of infant mortality have been birth trauma, jaundice, infection (prenatal conditions), birth defects and sudden infant death syndrome (SIDS). We can be thankful for improved medical services, healthier mothers and pregnancies and generally improved quality of life. Although Alberta's infant mortality rate has declined, it still tends to be higher than the Canadian average.

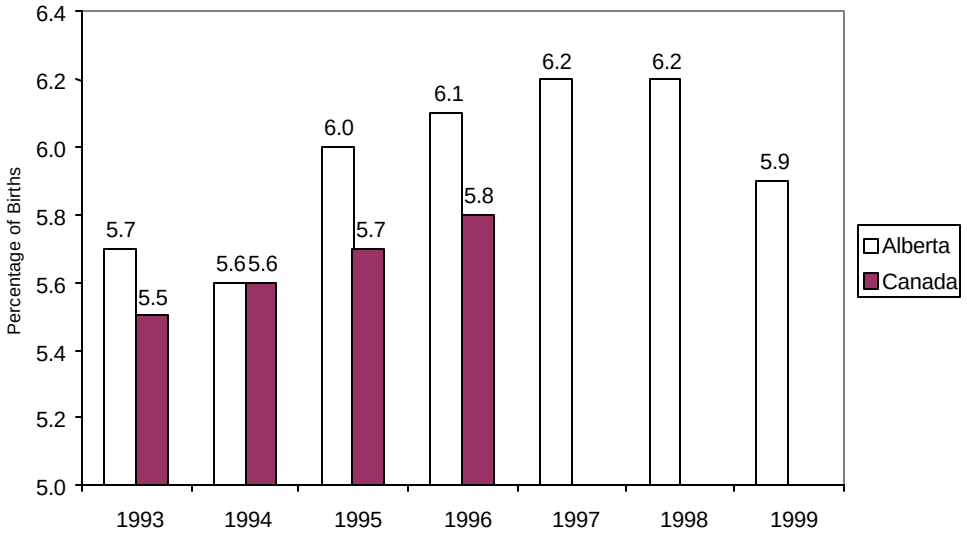
Figure 9: Infant Mortality, Alberta, 1960 to 1999



Source: Alberta Vital Statistics, *Measuring Up*, Human Resources Canada (Index for Social Health)

Another success story is the reduction in the number of low birth-weight babies (see Figure 10). Babies who weigh less than 2,500 grams (5.5 pounds) are more likely to suffer birth-related complications and health problems. These children often grow up with long-term health problems, developmental delays and behavioural problems[32] that may impose a cost on all society. Over the past ten years, Alberta's rate of low birth-weight babies has gone up and down. Unfortunately in 1997 the rate climbed to 6.2 percent, the highest recorded in 10 years. Alberta's rates continue to be higher than the Canadian average. The provincial government has set a low birth-weight baby target for 2002 of 5.5 percent.

Figure 10: Low Birth-Weight Babies (Percentage of Newborns), 1993 to 1999, Alberta vs. Canada



Source: Alberta Vital Statistics data reported by Alberta Health and Wellness; 1997-1999 data for Canada were not available.

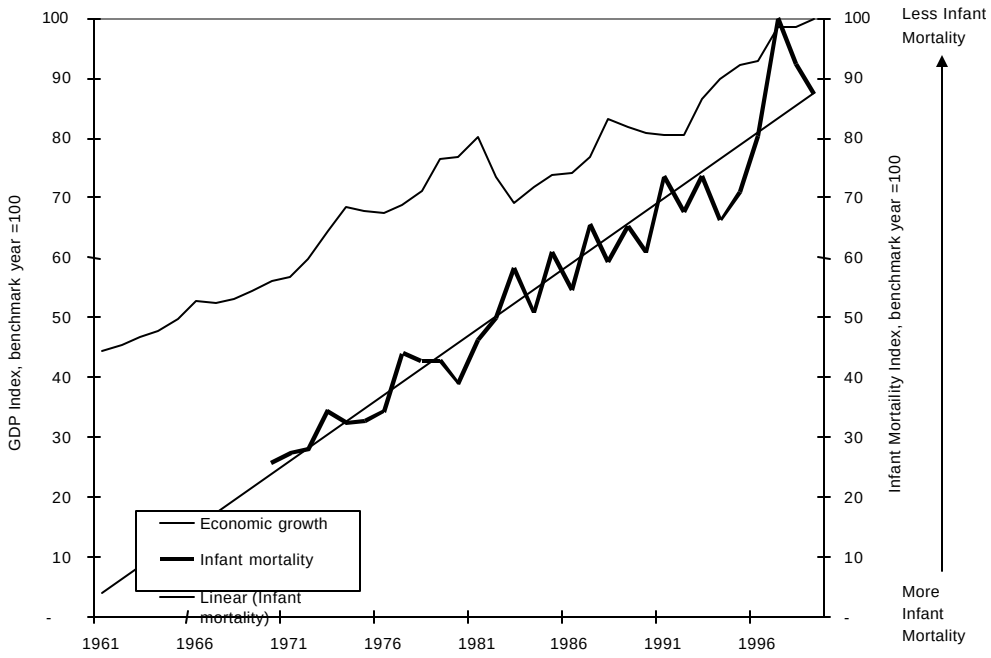
The causes of low birth weight are numerous and complex, including fetal defects either inherited or caused by environmental factors, multiple births, acute or chronic disease in mothers, inadequate nutrition, smoking or alcohol during pregnancy, poor living conditions and lack of education. Women in these situations tend to be at higher risk. Teenage mothers or mothers older than 35 years are also more likely to have low birth-weight babies.

Among children and youth, motor vehicle injuries, unintentional injuries (excluding motor vehicle deaths), suicide and cancer are the leading causes of death.[33] Many of the historical diseases like diphtheria, smallpox, polio, tetanus, measles, mumps and rubella have been drastically reduced, thanks in part to immunization programs.

7.3 Infant Mortality as an Index

Figure 11 presents the rate of infant mortality as an index and compares infant mortality rates with GDP growth. It shows that as GDP has grown, the rate of infant mortality has improved (declined).

Figure 11: Infant Mortality vs. GDP Growth Index (1961-1985), Alberta



The GPI accounting system takes raw data and converts it to an index for comparison with other indicators and for aggregation with other indicators to create composite indices such as the Societal GPI Index (containing 22 social and human health indicators) and the aggregate GPI (containing all 51 indicators in the GPI accounts).

The infant mortality index was developed using time series data (see Appendix B). Raw data are converted to an index system on a 100-point scale. To index the data series we assume that lower rates of infant mortality are better than higher rates. Thus the higher the infant mortality index, the better the condition of well-being. In the case of infant mortality, the lowest rate recorded over 40 years occurred in 1997 and thus is established as the benchmark year (optimum condition). Using this benchmark rate the figure is converted to 100 basis points by dividing through by itself. Then the entire data time series is divided through by this benchmark year figure multiplied by 100 to yield an index.

7.4 Asthma

Asthma can be debilitating and even life-threatening. It is a complex and multifaceted disease whose causes are difficult to discern. A number of international studies have noted rising rates of asthma, particularly among children, and have suggested that changes in the environment may be contributing to the increases. National health surveys in Canada also show a sharp increase in reported prevalence of childhood asthma and in hospitalization rates.[34] According to these studies, childhood asthma rates have increased from an estimated 2.5 percent of children younger than 15 in 1978/79, to 11.2 percent or 672,000 children by 1994/95.[35]

The estimated direct and indirect costs of asthma in Canada in 1990 have been estimated to be between $504- and $648-million.[36]

Asthma rates vary by region and socio-economic conditions. Studies conducted in 1994/95 found asthma prevalence was highest in Atlantic Canada and lowest in the Prairies.[37] The authors speculate that the regional differences may be due to variations in exposure to environmental pollution. Studies have also found that the prevalence of asthma did not differ between urban and rural residents although children with asthma who had had a recent attack were more likely to be from rural areas. There is no discernible difference in the prevalence of asthma among socio-economic groups. Studies have in fact shown that children from lower-income households and higher-income households had more asthma than those in middle-income households, while lower-income household children were more likely to have had a recent attack.[38]

Research studies for Alberta showed that in 1995/96, about seven percent of children aged 5 to 19 were diagnosed with asthma.[39] The national Student Lung Health Survey found that in 1995/96, 21 percent of the same age group had had asthma-like conditions in the previous 12 months.

Of the Alberta children who reported asthma, more than half said that tobacco smoke brought on their asthma or made it worse, with 48 percent reporting being exposed to second-hand smoke most often in their homes.[40] The impact on asthma from industrial emissions from oil and gas refineries and facilities has been studied. While Alberta Health and Wellness (1999) reports "a recent study of the correlation between flaring activities and physician claims for asthma cases showed no relationship," they nevertheless caution that "this does not exclude the possibility of effects on human health." According to the *Report on the Health of Albertans* (1999) the volume of total contaminants from solution gas flaring increased between 1989 and 1993 and declined every year since then. However, with reduced efficiency of flaring (Alberta Research Council 1996) there are heightened concerns about the impact of these factors on the health of both children and adults.

7.5 Cancer in Children

Is cancer on the rise in children? According to the National Cancer Institute of Canada, cancer mortality rates among Canadian children have declined by more than 50 percent since the 1950s.[41] Health Canada says we are seeing a stable rate of incidence of childhood cancer and a declining mortality rate.

> *Although rare, childhood cancer is the most common potentially fatal illness in Canadian children. Of 1,097 deaths reported in 1996 in Canadian children 1-14 years of age, 179 or 16.3 percent of all deaths in this age group were attributed to cancer, second only to injuries as the leading cause of death in this population. The three indicators selected, childhood cancer incidence, mortality and survival, provide three*

important perspectives on the impact of cancer on the health of Canadian children. Despite a relatively stable childhood cancer incidence over the past 15 years, there has been a significant decrease in the childhood cancer mortality rate. The third indicator, childhood cancer survival, is an additional indicator that provides valuable information on the effectiveness of cancer treatment for children. As described, the prognosis for children affected by cancer has steadily improved, and now more than two-thirds of children diagnosed with cancer will survive at least 10 years. The childhood cancer data presented in this report are limited to children aged 14 years and younger. This age category is consistent with how childhood cancer surveillance data are reported internationally, and reflects data availability within Canada.
Source: http://www.hc-sc.gc.ca/hpb/lcdc/brch/measuring/mu_g_e.html

The most important forms of childhood cancer in Canada from 1991 to 1997 were:

- leukemia (25 percent of new cases; 32 percent of deaths);
- brain and spinal cord (17 percent of new cases; 24 percent of deaths); and
- lymphomas (17 percent of new cases and 8 percent of deaths).

In Alberta cancer was the fourth most important cause of death of children (25 deaths) but the most important cause of disease-related deaths. In terms of cause of death, cancer ranked after motor vehicle accidents (85), injuries (45) and suicide (25) (see Figure 8). We did not have access to trend information on childhood cancer rates for Alberta.

7.6 The Costs of Infant Mortality and Low Birth Weight Babies

Both societal costs and benefits are associated with infant mortality and low birth-weight babies. Mitigating against infant mortality and investing time and resources in improving conditions that would avoid the problems associated with low birth-weight babies would provide a net benefit by having healthier individuals in society. Direct and indirect costs associated with the effects of these conditions on human health and the community would be reduced or mitigated with investments that reduce the risks of such occurrences. Society and individuals are better off in both the short and long term with healthy individuals contributing to the well-being of households and community.

In the absence of any benchmark studies of the total societal costs of these issues, the Alberta GPI account is silent on the full and long-term societal and personal costs associated with low birth-weight babies and infant mortality. We believe it remains an important piece of future analysis alongside estimates of the full costs of auto crashes and suicide. We were unaware of any studies that have examined the full costs and benefits of preventing this undesirable situation, and thus recommend this as an area of future research by economists and health practitioners.

8 Obesity and Unhealthy Lifestyles

In this section of the GPI we look at indicators and trends in lifestyle, with a focus on obesity, nutrition and food. We examine trends in obesity as another indicator of unhealthy living. There is a natural relationship between food consumption and the Ecological Footprint accounts (see also the *Alberta GPI: Ecological Footprint* report). Food consumption is a major part of the ecological footprint analysis, although it does not provide the level of detail necessary to assess the nature of food consumption—whether healthy or unhealthy diets are maintained. Indeed, the national and provincial economic accounts and the family expenditure surveys do not provide enough detail to discern the quality of food being consumed or the full costs of the food (including the origin, cost of transport, and other production costs).

Obesity is an increasingly important dimension of human health, as the incidence of being overweight in Alberta, Canada and the U.S. increases. The more we eat, the more we diet, and the more food we consume (of any type), the more GDP rises even if such consumption is detrimental to our health and to our health system—costing us more money today and in future health care expenditures on dietary related illness. The Alberta GPI accounts assess the trends in obesity and attempt to examine some of the full costs associated with obesity and unhealthy eating habits.

A more detailed analysis of eating habits and lifestyle would require more information on consumption, such as physical quantities of food or expenditures as a proxy for physical consumption. Unfortunately such detailed expenditure information on food consumption (e.g., whether purchased in food stores or restaurants) was not available for this exercise. Also longitudinal studies of nutritional intake were unavailable for our GPI accounting exercise. Ideally, future GPI accounts to track healthy eating and for ecological footprint analysis would benefit from details of expenditures on food by type, as a second best substitute for actual food intake.

Preferably we would want to compare the full costs of a healthy diet with an unhealthy one. This would include the full costs of processed, imported and high-fat or high-sugar food with the full benefits and costs of a less processed, locally grown, and healthier food basket. Unfortunately, such analysis is not available in this amount of detail.

Dr. Kim Raines, a University of Alberta nutritionist, recently completed a study of the cost of a nutritious food basket for different household or family types for Edmonton.[42] She found that the cost of healthy eating is not prohibitive, estimating the monthly cost of a healthy diet at $374.44 per month for a single parent with two children and $558.57 per month for a two adult-two child family. Based on the Alberta GPI personal consumption expenditure data[43] for Edmonton, we estimate the average Edmonton household spends $529.83 per month (1996 data) or $196.96 per capita. The Canadian average monthly household food expenditure is estimated at $496.67. It isn't a matter of not being able to afford a nutritious diet, but a matter of choice.

Another indicator of dietary intake is to focus on increasing levels of fat (or sugar) in our diets. Dr. Raines[44] notes that a crude indicator of population dietary intake is food disappearance data—a measure of how much food was purchased. This doesn't really tell us what people ate, but what food was available to the entire population. Raines explains that if the fat content of food available increases with time, you make the assumption that fat consumption increases. Health Canada, Nutrition Surveillance, according to Raines, is beginning to examine new ideas for indicators. The challenge in collecting nutrition data is the lack of data collection historically, which only began in 1972 with the first national nutrition survey. Various indicators are available to assess the cost of healthy eating, with the National Nutritious Food Basket, which has been in

place since the 1970s, being the most widely used. Unfortunately, Health Canada stopped collecting these data in 1996. Alberta Agriculture, Food and Rural Development has apparently been pricing a food basket but this was not examined in our analysis.

8.1 Obesity a Growing Concern

Obesity is one of the best measures of unhealthy lifestyles, as North American diets tend to be particularly high in fat. One of the best measures of healthy bodies is the Body Mass Index (BMI) used by health professionals. The BMI is a measure of body health and is a function of weight and height. A BMI greater than or equal to 27 is the rate of overweight conferring a "probable health risk" (i.e., risk of heart disease, stroke, pulmonary embolism, gallbladder disease, some cancers, type 2 diabetes, hypertension, arthritis and asthma), or in other words an obesity threshold at which these persons are at high health risk.

The incidence of obesity (i.e., being overweight with a BMI $27) among Albertans has more than doubled since 1985 (see Figure 12). Albertans are getting fatter by the year across all age groups due in large part to diet, lack of exercise, stress and other impacts. Using Statistics Canada (1999) data for the periods 1985, 1990, 1994 and 1996, we constructed a time series filling in the data gaps using regression analysis and projected forward to 1999. Based on the Statistics Canada 1996 data, an estimated 465,153 Albertans (or 29.4 percent of the population sample of 1,582,038) were in the obese category (BMI $27). Using 1999 projected figures, we estimate that roughly 33 percent of Albertans (some 974,780 individuals) were obese in 1999. Whether the exact numbers of Albertans who are obese are accurate, the dramatic doubling since 1985 (when roughly 14 percent of the population was obese) is significant. This disturbing trend represents an increase in obesity of 134.6 percent over the period 1985 to 1999. The percentage of Albertans who have a healthy weight (i.e., a BMI of 24 or less) declined from 63.1 percent of the population in 1985 to just over half of the population (50.5 percent) in 1996.

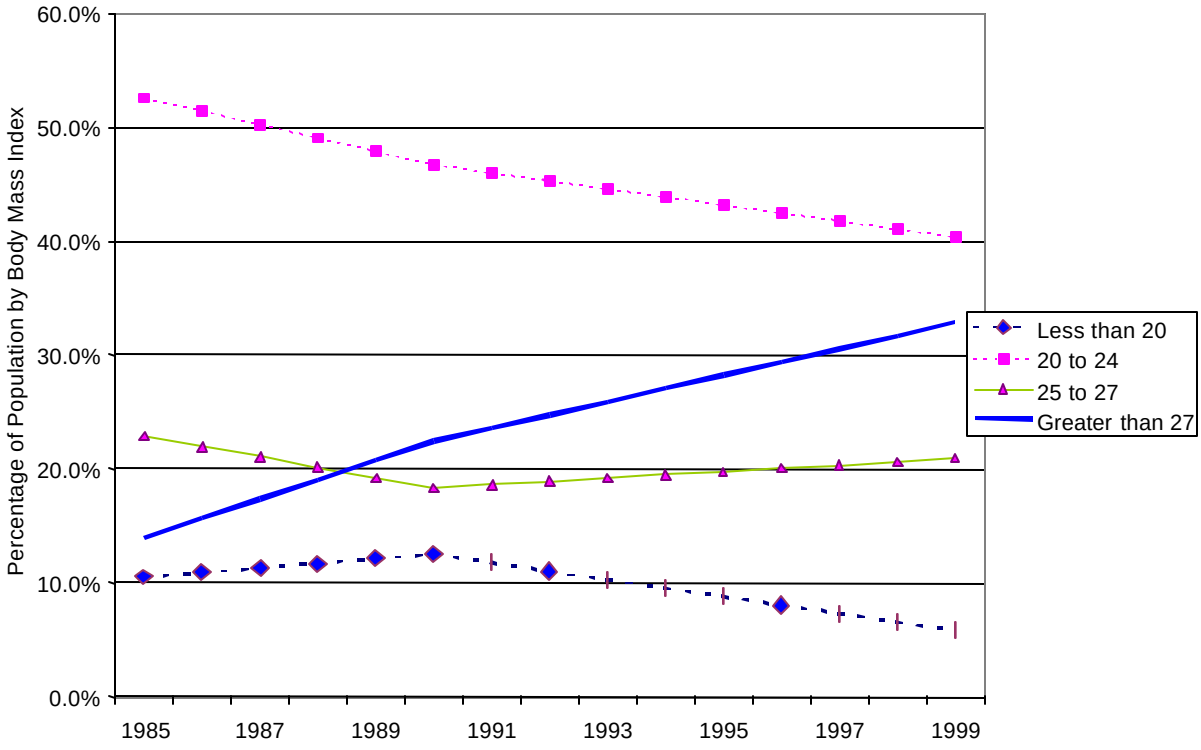
The problem of obesity is even worse in the U.S. In the 1999 GPI study by Clifford Cobb for Redefining Progress (1999), an entire special chapter is dedicated to the cost of obesity and unhealthy diet. The authors found that:

> *According to the Third National Health and Nutrition Examination Survey (NHANES III), over half (55 percent) of American adults are currently overweight or obese (severely overweight) (National Institutes of Health 1998). While the GDP nearly tripled from 1960 to 1994 (in inflation-adjusted dollars), the rates of obese Americans nearly doubled, increasing from 12.8 percent to 22.5 percent of adults (Flegal et al. 1998). Evidence suggests an accelerating upward trend since 1994. According to the journal of the American Medical Association, the prevalence of obesity increased by 6 percent….*
>
> *Similar trends of increasing numbers of overweight and obese Americans are also showing up in children. Two successive Surgeons General have pronounced childhood obesity an "epidemic." Indeed, over the last two decades, the number of overweight children has increased by more than 50 percent, and the number of obese (extremely overweight) children has nearly doubled to roughly 14 percent of children and 12 percent of adolescents. Less than a third of children ages 6 to 17 meet the minimum standards for cardiovascular fitness, flexibility, and strength (CDC 1997)."*

Obesity among Canadian youth is also a growing concern, as youth are increasingly sedentary and less physically active, with poor diets. The most recent national study of obesity among young Canadians found a dramatic increase in overweight and obese teens and youth. In 1999, roughly 29 percent of boys were overweight and 24 percent were obese while 24 percent of girls were overweight and 12 percent were obese.[45] This is due more to lack of exercise and less to diet and eating habits. Many youth would prefer to be watching television or surfing the web than being active.

Figure 12: Healthy Body Weights in Alberta (Body Mass Indices) 1985 to 1999

(Figure shows percentage of population by BMI; a BMI greater than 27 is considered obese.)



Source: Statistics Canada, Health Statistics Division

The number of Canadians with a BMI greater than 27 rose from 12.8 percent of the population in 1985 to an estimated 32.1 percent of the population by 1999. Albertans are slightly more obese than the Canadian average. Work by GPI Atlantic indicates that New Brunswick has the highest rate of obesity in Canada (40 percent of the population).[46]

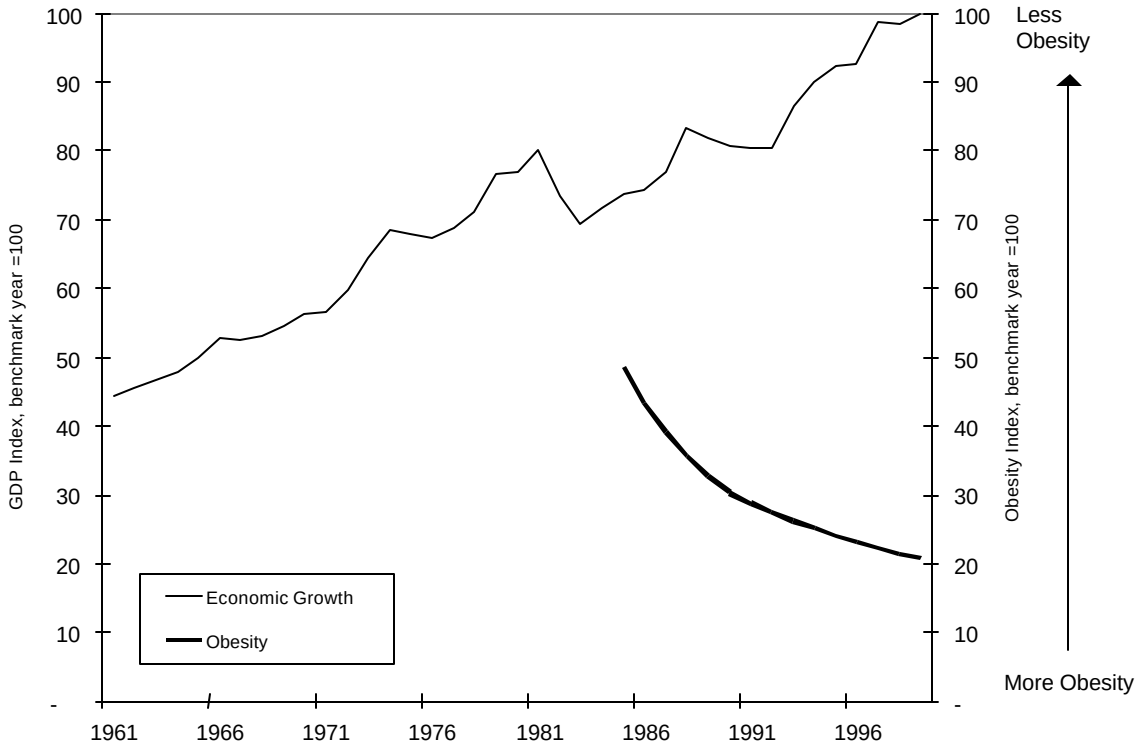
The age group with the highest level of obesity in 1996 (BMI of 27 or greater) was 55 to 64 year olds (38.5 percent of age group), followed in order by 45 to 54 year olds (35.3 percent), 35 to 44 years holds (25.9 percent) and 20 to 24 year olds (15.8 percent).

While data prior to 1985 are lacking, we estimated a time series for obesity back to 1961 using regression analysis of the trends from 1985 to 1996.

8.2 Obesity as an Index

Figure 13 reflects the conversion of the rate of obesity to an index in the GPI Accounts and compares obesity with GDP growth. It shows that GDP has grown along with obesity. Between 1985 and 1999, the incidence of obesity more than doubled. While Alberta's real per capita GDP rose 35.5 percent from 1985 to 1999, the rate of obesity (percentage of population with a body mass index greater than 27) increased 134.6 percent. This suggests that the more the GDP grows, the more we grow in girth, though the relationship between GDP growth and unhealthy eating is speculative at best.

Figure 13: Obesity Index (1985-1999) versus GDP Growth Index (1961-1985), Alberta



The GPI accounting system takes raw data and converts it to an index for comparison with other indicators and for aggregation with other indicators to create composite indices such as the Societal GPI Index (containing 22 social and human health indicators) and the aggregate GPI (containing all 51 indicators in the GPI accounts).

The obesity index was developed using time series data (see Appendix B). Raw data (obesity rates for adult Albertans 15 years and older) was converted to an index system on a 100-point scale. In indexing the data series we assume a lower the rate of obesity is a better condition of well-being than higher rates. Thus the higher the obesity index the better the condition of adult obesity. The benchmark for obesity is set at the lowest obesity rate for all adult age groups over the time period 1985 to 1999. This corresponded with a 6.8 percent obesity rate (+27 BMI) for adult Albertans aged 20 to 24 year olds in the year 1990. Unfortunately, obesity data were not available prior to 1985. We then used the 1990 adult (20-24 years of age) benchmark rate as the

basis of calculating the obesity index by dividing the average obesity rates of all Alberta adults (15 years and older) through by the benchmark rate, multiplied by 100 over the period 1985 to 1999. This yields an obesity index that ranged from 48.5 in 1985 to 20.7 in 1999. The obesity index calculation is unique in that we chose a benchmark from a subset (i.e., specific age-class with the lowest obesity rate) of the entire adult obesity rate data set.

8.3 The Cost of Obesity

GPI Atlantic recently completed a study of obesity (see Appendix C) and estimated that:

> *Obesity-related illnesses cost the Alberta health care system an estimated $320 million dollars annually, or nearly 6 percent of total direct health care costs in the province. When productivity losses due to obesity, including premature death, absenteeism and disability, are added, the total cost of obesity to the Alberta economy is estimated at between $620 million and $700 million a year, or 0.7 percent-0.8 percent of the province's Gross Domestic Product. This compares to the estimated $804 million in direct and indirect costs due to tobacco in Alberta.*

As we indulge in unhealthy food and lifestyles, then attempt to diet our way to health, the GDP keeps rising, indifferent to our healthy or unhealthy choices. In fact, a healthy diet would show up as a reduction in GDP relative to the present economy and eating habits. The GDP also makes no distinction between spending on nutritious food and food that is processed, preserved, salted, sugared or empty of calories. Nor do our national or provincial accounts track the costs of poor nutrition in terms of medical bills, future illness and disease and other health costs. Unfortunately, estimates of the costs of obesity and unhealthy eating are not available for Alberta. Studies into the full costs of unhealthy diets would be a welcome addition to future GPI accounting, as would estimates of the full benefits of healthy eating.

Sustainable well-being would intuitively be achieved when the food we eat and the lifestyles we maintain are oriented toward healthy living. We could argue that food industries, including restaurants, which advertise, produce and serve over-processed and unhealthy food actually impose a health cost (future) on all society. If we ate locally produced and nutritious food, rather than food that has been heavily processed or shipped 2,000 kilometres to our tables, we would actually reduce the GDP.

In the U.S., obesity and poor diet are even more serious problems. Redefining Progress (1999) addressed the issue of obesity in the 1999 update to the U.S. GPI. Surveys of Americans have found that, when asked, 40 percent of Americans admit they eat more calories than they should (USDA 1999).

The Redefining Progress study found that "Americans spend $30 to 50 billion a year on dieting, trying to get rid of the extra growth around their midsections (Berg 1997)... Including agriculture, restaurants, and the like, $700 billion flowed through the U.S. food industry last year (Rowe and Silverstein 1999)." As the authors note, "When it comes to food, the all-too-common cycle of overeating or eating poorly, buying diet products and exercise machines, paying the medical bills for obesity and poor nutrition, and then eating more for consolation hardly adds up to progress. That growth is unwanted by the American people, but every dollar spent advertising food products, gaining weight, and then trying to shed those unwanted pounds contributes to the GDP."

According to U.S. studies, America's food producers produce enough food to supply 3,800 calories every day to every American (Perl 1999). However, the average woman only needs 2,000 calories a day, the average man 2,500, and children even less.

The Redefining Progress study goes further:

> *Overweight people run a higher risk of premature death, according to a recent American Cancer Society study, the largest ever done on obesity and mortality. 'The evidence is now compelling and irrefutable,' says the lead researcher, Dr. JoAnn Manson of the American Cancer Society. "Obesity is probably the second-leading preventable cause of death in the United States after cigarette smoking" (Associated Press 1999). Obesity leads to such serious diseases as type II diabetes, gallbladder disease, heart disease, breast and colon cancer, and higher risk of stroke. An estimated 300,000 Americans die each year from the combined effects of an unhealthy diet and inactivity (McGinnis 1993).*

According to Wolf and Colditz,[47] the economic costs of obesity in the U.S. in 1995 totaled US$99.2-billion, or $377.53 per American. This estimate comprises an estimated US$51.6-billion (US$196.38 per American) in direct medical expenditures on disease associated with obesity, plus $47.6-billion (US$181.15 per American) in indirect costs (lost productivity). Medical spending alone represents 5.7 percent of U.S. health expenditures.[48] An estimate by Frazao (1996) of the health costs due to obesity-related conditions rang in at $250-billion (roughly US$951.43) each year in medical spending and lost productivity. Add to these costs the estimated $10-billion spent on advertising and $20-billion on coupons and gimmicks by the U.S. food industry (Nestle 1998), and the regrettable costs of unhealthy living pile up.

While many Americans overeat, more than two-thirds of Americans are trying to maintain or lose weight, which also contributes to GDP growth. Diet drinks and low calorie foods are common purchases for those conscious of being overweight. Thus we see a kind of "double-dividend" treadmill for economic growth: the first from unhealthy food consumption and the second from the diets and diet foods that are consumed in attempts to achieve renewed health.

Ironically, in the U.S. an estimated 10 percent of Americans go hungry or lack nutritious food for healthy living (USDA 1999). According to the USDA (1999) roughly 9.7 percent of households were rated "food insecure" in 1996-1998. In contrast to obesity, eating disorders such as anorexia and bulimia are a common affliction among young women. U.S. researchers Mellin et al. have found that roughly half of American elementary students between the first and third grades want to be thinner. The National Institute of Mental Health and studies by Schuster (1999) found that cases of anorexia and bulimia have doubled in the past ten years, with the sharpest increases in teenage girls (Schuster 1999). As Jonathan Rowe and Judith Silverstein (1999) note, "Bulimia may be the trademark affliction of the growth era. It is a disease of literal obedience to the schizoid messages that barrage young girls: indulge yourselves wantonly but also be taut and svelte."

While the U.S. estimates of costs of obesity and unhealthy diets are not directly applicable to Alberta, we can provide some preliminary estimates adopting the U.S. values. Based on the estimated number of Albertans who are considered overweight (974,780 or 32.9 percent of the population) multiplied by the conservative estimate of total costs of US$377.53 per person (Wolf and Colditz 1998), we estimate that obesity in Alberta may amount to as much as $412.8-million (Canadian), and possibly more, in direct and indirect costs.[e] This is less than the $700-million in direct and indirect costs estimated by GPI Atlantic. Our estimate would amount to 0.5 percent of Alberta's GDP in 1995 compared to GPI Altantic's estimate of 0.7-0.8 percent of Alberta's GDP.

[e] The calculation for estimating the $412-million cost is based on U.S. direct and indirect costs per capita ($377.53) multiplied by the estimated number of Albertans who were considered overweight in 1995 (773,816 persons) and converting to Canadian dollars (x 1.413) (Canadian Economic Observer).

9 Lifestyle Choices

According to the National Health Surveys, Albertans typically exhibit other healthy lifestyle habits; for example, 72 percent say they do not smoke, 65 percent say they get physical activity and 82 percent (in 1994) said they always wear a seatbelt (Table 5). The number of Albertans reporting healthy body weight, however, has fallen to 42 percent, which would appear to be consistent with the Statistics Canada data that shows only 50.5 percent of Albertans in the healthy body weight category.

Table 5: Percentage of Albertans Who Participate in Healthy Lifestyles

	Do not smoke	Get physical activity	Always wear seatbelt	Healthy body weight
1985	67	64	25	48
1990	70	54	75	50
1994	72	60	82	45
1995	72	65	x	42

Source: Health Promotion Survey (1985, 1990); National Health Survey (1994-95, 1996-97)
x = not available

10 Stress, Depression and Mental Illness

Mental health is a critical component of well-being, with stress and depression being among the most common mental health ailments. Stress at work and at home can significantly detract from quality of life. In a world that seems to be running faster and faster,[f] the costs of the speed of our economy, commerce, and lifestyles must eventually inflict a cost on individuals, households and society. The signs of stress are everywhere, yet the relationship between stress and health outcomes can be difficult to discern.

In a survey of Canadian families conducted by the National Foundation for Family Research and Education, roughly 92 percent of people surveyed said family stress is greater now than it was in the relatively simple, though hard-scrabble, era of half a century ago. Respondents identified the key drivers of their stress as: lack of money, unstable jobs and lack of respect for parenting. The most important item on the stress list was divorce and family breakdown, followed by: parents working too hard and for too many hours; insecure job conditions; excessive taxation; and lack of respect for the efforts parents put into raising children.[49]

According to Statistics Canada's (1999) National Population Health Survey from 1998-99, about five percent of Albertans may have suffered from depression at some point during the year. According to the national statistics, the probable risk for depression in Alberta was only 3.9 percent (the second lowest rate after Saskatchewan at 3.7 percent) among persons 12 years and older with an additional 1.5 percent in the "possible risk" category.

Albertans report feeling more financially stressed and vulnerable than most Canadians. A 1999 survey conducted by the Canadian Council on Social Development as part of developing a Personal Security Index for Canada found that Albertans feel particularly vulnerable about their financial security. Roughly 23 percent of Alberta respondents noted that they were financially stressed and would not have enough savings to last beyond one month.[50]

[f] What Dr. Juliet Schor calls the "squirrel-cage of capitalism."

A *Maclean's Magazine* article[51] titled "The Alberta Paradox" said that while Alberta's economy (Calgary and Edmonton) is in the midst of an economic boom, indicators of health outcomes exhibit a relatively lacklustre performance compared with other provinces and cities. Theories abound as to why Alberta's health performance indicators lag British Columbia's or even Ontario's. Suggested factors include stress in the workplace and smoking habits; according to the latest Health Canada statistics, 27 percent of Albertans smoke, compared with 20 percent in B.C.

Stress in the workplace or at home is linked with depression. An estimated three million Canadians suffer from depression and just slightly more than six percent of these people are diagnosed and treated.[52] The exact determinants and drivers of depression are complex.

Estimates of both the human and economic cost of stress and depression are difficult to determine. Stress in the workplace can lead to absenteeism and illness and loss of productivity, which can cost a firm or economy thousands if not millions of dollars. According to Bill Wilkerson of the Business and Economic Roundtable on Mental Health, depression and stress in the information economy are so significant that, in the case of three of Canada's best known corporations, more than 30 percent of all disabilities recorded were depression or stress related. According to Wilkerson (2000) "the "downtime cost" of depression in the U.S. is 172 million person-years on conservative six-month prevalence rates of the disease—with impairment ranging from absenteeism to basic performance and interpersonal problems to poor overall functioning and ultimately, incapacity to work at all." This is fundamentally a disease that affects business performance as well as quality of life at the household level.

How stress and depression lead to other illnesses and disease is hard to determine. The full and long-term impacts of a stress-filled, fast-paced, information economy are undoubtedly yet to be felt in the health and well-being of individuals, workplaces, and the households of the nation.

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Appendix A. List of Alberta GPI Background Reports

A series of Alberta GPI background reports accompanies the *Alberta Sustainability Trends 2000* report and this report. These documents are being released in late 2001 and early 2002 and will be available on the Pembina Institute's website at www.pembina.org.

Alberta GPI Background Reports and Sustainability Indicators

GPI Background Reports	GPI Accounts Covered by Report
1. Economy, GDP, and Trade	• Economic growth (GDP) • Economic diversity • Trade
2. Personal Consumption Expenditures, Disposable Income and Savings	• Disposable income • Personal expenditures • Taxes • Savings rate
3. Money, Debt, Assets and Net Worth	• Household debt
4. Income Inequality, Poverty and Living Wages	• Income distribution • Poverty
5. Household and Public Infrastructure	• Public infrastructure • Household infrastructure
6. Employment	• Weekly wage rate • Unemployment • Underemployment
7. Transportation	• Transportation expenditures
8. Time Use	• Paid work time • Household work • Parenting and eldercare • Free time • Volunteerism • Commuting time
9. Human Health and Wellness	• Life expectancy • Premature mortality • Infant mortality • Obesity
10. Suicide	• Suicide
11. Substance Abuse; Alcohol, Drugs and Tobacco	• Drug use (youth)
12. Auto Crashes and Injuries	• Auto crashes
13. Family Breakdown	• Divorce
14. Crime	• Crime
15. Gambling	• Problem gambling
16. Democracy	• Voter participation
17. Intellectual Capital and Educational Attainment	• Educational attainment
18. Energy (Oil, Gas, Coal and Renewable)	• Oil and gas reserve life • Oilsands reserve life
19. Agriculture	• Agricultural sustainability
20. Forests	• Timber sustainability • Forest fragmentation
21. Parks and Wilderness	• Parks and wilderness

GPI Background Reports	**GPI Accounts Covered by Report**
22. Fish and Wildlife	• Fish and wildlife
23. Wetlands and Peatlands	• Wetlands • Peatlands
24. Water Resource and Quality	• Water quality
25. Energy Use Intensity, Greenhouse Gas Emissions and Air Quality	• Energy use intensity • Air quality-related emissions • Greenhouse gas emissions
26. Carbon Budget	• Carbon budget deficit
27. Municipal and Hazardous Waste	• Hazardous waste • Landfill waste
28. Ecological Footprint	• Ecological footprint

Appendix B. Health GPI Data: Life Expectancy, Premature Mortality, Infant Mortality and Obesity

Life expectancy, premature mortality, infant mortality and obesity data and indices

Year	Estimated Blended Life Expectancy (years) for men (50 percent) and females (50 percent)	Life Expectancy Index uses benchmark of maximum life expectancy 79.3 years in 1999	Person Years of Life Lost per 100,000 population from all causes of death	Person Years of Life Lost due to all causes per 100,000 population (lowest rate, 1999=100)
1961	71.97	5.58	5330.26	63.27
1962	72.16	9.81	5344.87	63.10
1963	72.36	14.05	5353.09	63.00
1964	72.55	18.29	5540.25	60.87
1965	72.74	22.53	5239.21	64.37
1966	72.94	26.77	5314.20	63.46
1967	73.13	31.00	5330.54	63.27
1968	73.32	35.24	5503.01	61.29
1969	73.51	39.48	5509.15	61.22
1970	73.71	43.72	5398.75	62.47
1971	73.90	47.96	5566.07	60.59
1972	74.04	50.87	5622.25	59.99
1973	74.18	53.79	5468.64	61.67
1974	74.32	56.71	5781.47	58.33
1975	74.46	59.63	5580.06	60.44
1976	74.60	62.55	5353.71	63.00
1977	74.79	65.46	5317.33	63.43
1978	74.98	68.38	5277.98	63.90
1979	75.17	71.30	5322.45	63.37
1980	75.36	74.22	5279.42	63.88
1981	75.55	77.14	4991.43	67.57
1982	75.83	78.36	4571.86	73.77
1983	76.11	79.59	4358.26	77.38
1984	76.39	80.82	4144.87	81.37
1985	76.67	82.04	4320.81	78.05
1986	76.95	83.27	4399.15	76.66
1987	77.19	84.50	4187.37	80.54
1988	77.43	85.72	3955.94	85.25
1989	77.67	86.95	3896.71	86.55
1990	77.91	88.18	3873.43	87.07
1991	78.15	89.41	3842.93	87.76
1992	78.25	90.59	3796.52	88.83
1993	78.35	91.78	3659.72	92.15
1994	78.45	92.97	3625.45	93.03
1995	78.55	94.16	3645.05	92.53
1996	78.65	95.35	3561.52	94.70
1997	78.90	96.90	3476.61	97.01
1998	79.15	98.45	3425.73	98.45
1999	79.30	100.00	3372.60	100.00

Year	Infant Mortality (death per 1000 live births)	Infant mortality Index where benchmark is the lowest rate (4.9) in 1997	Percentage of adults (15 years or older) with Body Mass Index (BMI) greater than 27	Obesity Index where the benchmark is the lowest obesity rate for 20 to 24 year olds in 1990 in Alberta, 6.8%
1961	Not available	Not available	Not available	Not available
1962	Not available	Not available	Not available	Not available
1963	Not available	Not available	Not available	Not available
1964	Not available	Not available	Not available	Not available
1965	Not available	Not available	Not available	Not available
1966	Not available	Not available	Not available	Not available
1967	Not available	Not available	Not available	Not available
1968	Not available	Not available	Not available	Not available
1969	Not available	Not available	Not available	Not available
1970	19.1	25.65	Not available	Not available
1971	17.9	27.37	Not available	Not available
1972	17.5	28.00	Not available	Not available
1973	14.2	34.51	Not available	Not available
1974	15.06	32.54	Not available	Not available
1975	14.89	32.91	Not available	Not available
1976	14.25	34.39	Not available	Not available
1977	11.13	44.03	Not available	Not available
1978	11.44	42.83	Not available	Not available
1979	11.43	42.87	Not available	Not available
1980	12.58	38.95	Not available	Not available
1981	10.6	46.23	Not available	Not available
1982	9.81	49.95	Not available	Not available
1983	8.41	58.26	Not available	Not available
1984	9.64	50.83	Not available	Not available
1985	8.03	61.02	14.0%	48.51
1986	8.98	54.57	15.7%	43.30
1987	7.48	65.51	17.4%	39.10
1988	8.25	59.39	19.1%	35.65
1989	7.5	65.33	20.8%	32.75
1990	8.05	60.87	22.4%	30.29
1991	6.66	73.57	23.6%	28.81
1992	7.23	67.77	24.8%	27.46
1993	6.65	73.68	25.9%	26.23
1994	7.4	66.22	27.1%	25.11
1995	6.9	71.01	28.2%	24.08
1996	6.1	80.33	29.4%	23.13
1997	4.9	100.00	30.6%	22.25
1998	5.3	92.45	31.7%	21.44
1999	5.6	87.50	32.9%	20.68

Appendix C. GPI Atlantic, Obesity Study of Alberta

According to GPI Atlantic in Halifax rates of Rates of overweight conferring a "probable health risk" (BMI $27) have more than doubled in Alberta, with 29.4 percent of the province's adults now overweight compared to just 14 percent in 1985.[53] The dramatic increase is part of what the World Health Organization has called a "global epidemic." Rates of overweight have also doubled throughout Canada, with twenty-nine per cent of Canadians now overweight compared to just 13 percent in 1985.

Obesity is linked to heart disease, diabetes, hypertension, osteoarthritis, certain types of cancer, and a wide range of other illnesses. A Statistics Canada analysis found that obese Canadians are four times more likely to have diabetes, 3.3 times more likely to have high blood pressure, and 56 percent more likely to have heart disease than those with healthy weights.

Obese individuals are also 50-100 percent more likely to die prematurely from all causes than those with healthy weights. Obesity is now recognized by experts as the second-leading preventable cause of death after cigarette smoking. It is estimated that more than 1,500 Albertans die prematurely each year due to obesity-related illness, losing 6,000 potential years of life annually. The findings are included in a new study on The Cost of Obesity in Alberta, produced by GPI Atlantic, a non-profit research group that is constructing an index of well-being and sustainable development in Canada.

Obesity-related illnesses cost the Alberta health care system an estimated $320-million dollars annually, or nearly 6 percent of total direct health care costs in the province. When productivity losses due to obesity, including premature death, absenteeism and disability, are added, the total cost of obesity to the Alberta economy is estimated at between $620-million and $700-million a year, or 0.7 percent-0.8 percent of the province's Gross Domestic Product. This compares to the estimated $804-million in direct and indirect costs due to tobacco in Alberta. Because smoking is on the decline and overweight is increasing rapidly, it is predicted that obesity-related costs will soon overtake the costs of tobacco-related illness.

Only 60 percent of Albertans exercise regularly (three or more times a week), down by 5 percent from 1985, and 17 percent of Albertans either never exercise or exercise less than once a week. Albertans also watch more television than before – an average of 3.2 hours each day, and they eat out more often. Sedentary lifestyles, longer work hours, rising stress levels, and poor eating habits (including more fast food), may all be contributing to the increase in unhealthy weights.

The GPI Atlantic study suggests that healthy school lunches, nutritional education and physical fitness programs, and brief physician advice to patients can be inexpensive and highly cost-effective ways of controlling the obesity epidemic. In the longer term, the study recommends warning labels and taxes on unhealthy foods akin to current anti-tobacco strategies. Noting the high correlation between stress, long work hours, poor dietary habits and gains in overweight, the study also recommends that the province follow the lead of European countries that have created jobs by reducing work hours.

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