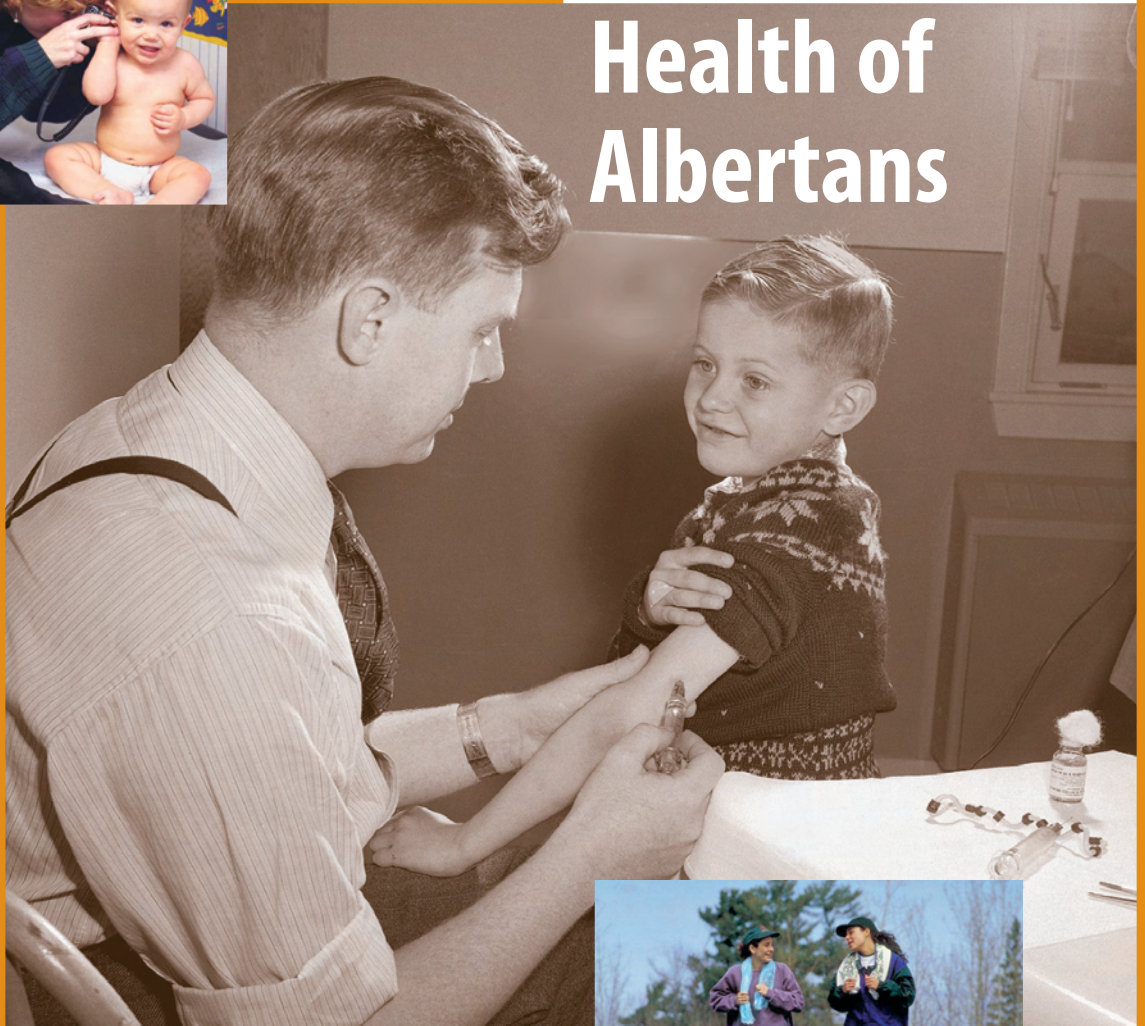


Report on the Health of Albertans



Alberta

Alberta Health and Wellness (2006) *Report on the Health of Albertans*.
Edmonton: Alberta Health and Wellness.

For more information contact:

Public Health Surveillance and Environmental Health

Public Health Division
Alberta Health and Wellness
24th Floor, Telus Plaza North Tower
10025 Jasper Avenue
P O Box 1360 STN MAIN
Edmonton, Alberta T5J 2N3
CANADA

Telephone: 1-780-427-4518
Toll-free: 310-0000 (in Alberta only)
Fax: 1-780-427-1470
Website: www.health.gov.ab.ca

ISBN: 0-7785-3476-6 (print)
ISBN: 0-7785-3477-4 (internet)
NCN 1227 (2006/02)

Table of Contents

Introduction	9
Demographics	13
Population Distribution	14
Immigration	17
Life Expectancy	19
Mortality	20
Fertility	22
Population Growth	24
Determinants of Health	25
Self-Perceived Health Status	29
Tobacco Use	31
Cancer Screening	33
Birth Weight	36
Body Weight	39
Nutrition	42
Disability and Functional Limitations	45
Alcohol and Drug Use	47
Physical Activity	49
Mental Health	51
Anxiety/Depression	54
Substance Abuse Disorders	58
Non-Communicable Disease	61
Historical Context	61
Cancer	63
Cervical Cancer	63
Lung Cancer	65
Prostate Cancer	67
Cardiovascular Disease	69
Ischaemic Heart Disease	70
Cerebrovascular Disease	74
Hypertension	78
Chronic Respiratory Disease	81
Asthma	81
Chronic Bronchitis	84
Chronic Obstructive Pulmonary Disease (COPD)	87
Diabetes	91
Chronic Renal Failure	95
Arthritis	99

Injury	103
Unintentional Injury	106
Intentional Injury	107
Suicide and Parasuicidal Behaviour	108
Homicide	111
Communicable Disease	113
Historical Context	113
Communicable Disease Mortality	116
Sexually Transmitted Infections	116
Chlamydia	116
Gonorrhoea	118
Syphilis	121
Hepatitis C	123
HIV/AIDS	124
Food and Waterborne Communicable Diseases	126
Campylobacteriosis	126
Giardiasis	128
Haemorrhagic Colitis (<i>e-coli O157:H7</i>)	129
Salmonellosis	131
Typhoid/Paratyphoid	132
Vaccine-Preventable Communicable Disease	135
Diphtheria	135
Hepatitis A	137
Hepatitis B	139
<i>Haemophilus Influenzae</i> Type b	140
Influenza	143
Rubella	145
Measles	147
Invasive Meningococcal Disease	149
Mumps	150
Pertussis	152
Poliomyelitis	153
Smallpox	157
Tetanus	159
Varicella	160
Tuberculosis	163
Conclusions	165

List of Figures

Demographics

- Figure 1 Alberta population 1901 to 2001
- Figure 2 Population Distribution, 1901
- Figure 3 Population Distribution, 1921
- Figure 4 Population Distribution, 1941
- Figure 5 Population Distribution, 1961
- Figure 6 Population Distribution, 1981
- Figure 7 Population Distribution, 2001
- Figure 8 Net international migration to Alberta, 1970 to 2000
- Figure 9 Net inter-provincial migration to Alberta, 1972 to 2001
- Figure 10 Alberta Immigrants by Year and Origin
- Figure 11 Life expectancy at birth in Alberta, 1931 to 2001
- Figure 12 Age adjusted mortality rates per 1,000 population for all causes of death, Alberta, 1986 to 2003
- Figure 13 Infant mortality rate per 1,000 live births, Alberta, 1983 to 2004
- Figure 14 Total fertility rate for Alberta, 1936 to 2003
- Figure 15 Age-specific fertility rates, Alberta 1986, 2004, and 2003
- Figure 16 Mean age of fertility in Alberta, 1986 to 2003
- Figure 17 Population Distribution, 2004 and projected to 2033

Determinants of Health

- Figure 18 Per cent of the population rated their health as very good or excellent by age of respondent, Alberta 2003
- Figure 19 Per cent of the population reporting their health to be very good or excellent, by year and sex, Alberta
- Figure 20 Per cent of the population reporting their health to be very good or excellent, regional health authority, Alberta 2003
- Figure 21 Self reported percentage of smokers by age, Alberta 2003
- Figure 22 Per cent of the population reporting smoking either occasionally or daily, Alberta 2003
- Figure 23 Per cent of the population reporting smoking either occasionally or daily by regional health authority, Alberta 2003
- Figure 24 Per cent of women aged 50 to 69 years reporting they received a mammogram within the previous two years, Alberta 1996 to 2003
- Figure 25 Per cent of women aged 50 to 69 years reporting they received a mammogram within the previous two years by regional health authority, Alberta 2003
- Figure 26 Per cent of women reporting having had a pap smear within the past three years, Alberta 1994 to 2003
- Figure 27 Per cent of women reporting having had a pap smear within the past three years by age, Alberta 2003
- Figure 28 Per cent of women reporting having had a pap smear within the past three years by regional health authority, Alberta 2003
- Figure 29 Proportion of live births weighing less than 2,500 grams, Alberta 1983 to 2004

-
- Figure 30 Proportion of live births weighing less than 1,500 grams, Alberta 1983 to 2004
- Figure 31 Body mass index for males and females, Alberta 1994 to 2003
- Figure 32 Percentage of the population with and body mass index in the overweight and obese categories by age, Alberta 2003
- Figure 33 Percentage of the population with and body mass index in the overweight and obese categories by regional health authority, Alberta 2003
- Figure 34 Percentage of Albertans reporting consuming five or more servings of fruits and vegetables per day, Alberta 2003
- Figure 35 Percentage of Albertans reporting consuming five or more servings of fruits and vegetables per day by sex, Alberta 2003
- Figure 36 Percentage of Albertans reporting consuming five or more servings of fruits and vegetables per day by regional health authority, Alberta 2003
- Figure 37 Percentage of the population reporting activity limitation by age, Alberta 2003
- Figure 38 Percentage of the population reporting activity limitation by sex, Alberta 1994 to 2003
- Figure 39 Percentage of the population reporting activity limitation by regional health authority, Alberta 2003
- Figure 40 Percentage of individuals reporting consuming five or more drinks on one occasion 12 or more times per year, by age, Alberta 2003
- Figure 41 Percentage of individuals reporting consuming five or more drinks on one occasion 12 or more times per year, by sex, Alberta 1994 to 2003
- Figure 42 Percentage of individuals reporting consuming five or more drinks on one occasion 12 or more times per year, by regional health authority, Alberta 2003
- Figure 43 Per cent reporting being active or moderately active during leisure time, Alberta 1994 to 2003
- Figure 44 Per cent reporting being active or moderately active during leisure time by regional health authority, Alberta 2003

Mental Health

- Figure 45 Age standardized treated prevalence per 100 population for mental health problems, Alberta 1983 to 2003
- Figure 46 Treated prevalence per 100 population for mental health disorders by age and sex, Alberta 1986 and 2003
- Figure 47 Regional differences in the treated prevalence for mental health disorders, Alberta 2003
- Figure 48 Age standardized treated prevalence per 100 for anxiety disorders/depression, Alberta 1983 to 2003
- Figure 49 Age standardized treated prevalence per 100 population for anxiety disorders/depression problems by age and sex, Alberta 1986 and 2003
- Figure 50 Regional differences in the treated prevalence for anxiety disorders/depression, Alberta 2003
- Figure 51 Age standardized hospital separation rates per 100,000 for anxiety disorders/depression, Alberta 1979/1980 to 2002/2003
- Figure 52 Age-standardized treated prevalence per 100 population for substance abuse disorders, Alberta 1983 to 2003

- Figure 53 Age-standardized treated prevalence per 100 population for substance abuse disorders by age and sex, Alberta 1986 and 2003
- Figure 54 Regional differences in the treated prevalence of substance abuse disorders, Alberta 2003
- Figure 55 Age standardized hospital separation rates per 100,000 population for substance abuse disorders, Alberta 1979/1980 to 2002/2003

Non-Communicable Disease

- Figure 56 Age-standardized hospital separation rates for cervical cancer, Alberta 1979/1980 to 2002/2003
- Figure 57 Age standardized mortality rate for cervical cancer, Alberta 1960 to 2003
- Figure 58 Age standardized hospital separation rates per 100,000 for lung cancer, Alberta 1979/1980 to 2002/2003
- Figure 59 Age-standardized lung cancer mortality rates, Alberta 1961 to 2003
- Figure 60 Age-standardized hospital separation rates for prostate cancer, Alberta 1979/1980 to 2002/2003
- Figure 61 Age-standardized mortality rates attributed to prostate cancer, Alberta 1961 to 2003
- Figure 62 Age-standardized treated prevalence per 100 population for cardiovascular disease, Alberta 1983 to 2003
- Figure 63 Age-specific treated prevalence per 100 population for cardiovascular disease, Alberta 1986 and 2003
- Figure 64 Age-standardized treated prevalence per 100 population for ischaemic heart disease, Alberta 1983 to 2003
- Figure 65 Age-specific treated prevalence per 100 population for ischaemic heart disease, Alberta 1983 to 2003
- Figure 66 Regional differences in the treated prevalence of ischaemic heart disease, Alberta 2003
- Figure 67 Age-standardized hospital separation rates per 100,000 population for ischaemic heart disease, Alberta 1979/1980 to 2002/2003
- Figure 68 Age-standardized mortality rate per 100,000 population for ischaemic heart disease, Alberta 1961 to 2003
- Figure 69 Age-standardized treated prevalence per 100 population for cerebrovascular disease, Alberta 1983 to 2003
- Figure 70 Age-specific treated prevalence per 100 for cerebrovascular disease, Alberta 1986 and 2003
- Figure 71 Regional differences in the treated prevalence of cerebrovascular disease, Alberta 2003
- Figure 72 Age-standardized hospital separation rate per 100,000 population for cerebrovascular disease, Alberta 1979/1980 to 2002/2003
- Figure 73 Age-standardized mortality rates per 100,000 for cerebrovascular disease, Alberta 1961 to 2003
- Figure 74 Age-standardized treated prevalence per 100 population for hypertension, Alberta 1983 to 2003

Figure 75	Age-specific treated prevalence per 100 for hypertension, Alberta 1986 and 2003
Figure 76	Regional differences in the treated prevalence of hypertension, Alberta 2003
Figure 77	Age-standardized asthma treated prevalence per 100, Alberta 1983 to 2003
Figure 78	Age-specific treated prevalence of asthma per 100 population, Alberta 1986 and 2003
Figure 79	Regional differences in the treated prevalence of asthma, Alberta 2003
Figure 80	Age-standardized hospital separation rates per 100,000 population attributed to asthma, Alberta 1979/1980 to 2002/2003
Figure 81	Age-standardized treated prevalence for chronic bronchitis per 100 population, Alberta 1983 to 2003
Figure 82	Age-specific treated prevalence for chronic bronchitis, Alberta 1986 and 2003
Figure 83	Regional differences in the treated prevalence of chronic bronchitis, Alberta 2003
Figure 84	Age-standardized hospital separation rates per 100,000 population for chronic bronchitis, 1979/1980 to 2002/2003
Figure 85	Age-standardized treated prevalence of COPD per 100, Alberta 1983 to 2003
Figure 86	Age-specific treated prevalence per 100 for COPD, Alberta 1986 and 2003
Figure 87	Regional differences in the treated prevalence of COPD, Alberta 2003
Figure 88	Age-standardized treated prevalence per 100 for diabetes, Alberta 1986 to 2003
Figure 89	Age-specific treated prevalence per 100 population for diabetes, Alberta 1986 and 2003
Figure 90	Regional differences in the treated prevalence of diabetes, Alberta 2003
Figure 91	Age-standardized hospital separation rates per 100,000 population for diabetes, Alberta 1979/1980 to 2002/2003
Figure 92	Age-standardized mortality rate per 100,000 population for diabetes, Alberta 1960 to 2003
Figure 93	Age-standardized treated prevalence per 100 population for chronic renal failure, Alberta 1983 to 2003
Figure 94	Age-specific treated prevalence per 100 population for chronic renal failure, Alberta 1986 and 2003
Figure 95	Regional differences in the treated prevalence of chronic renal failure, Alberta 2003
Figure 96	Age-standardized hospital separation rates per 100,000 population for chronic renal failure, Alberta 1979/1980 and 2002/2003
Figure 97	Age standardized treated prevalence per 100 for arthritis in Alberta, 1983 to 2003
Figure 98	Age-specific treated prevalence per 100 population for arthritis, Alberta 1986 and 2003
Figure 99	Regional differences in the treated prevalence of arthritis, Alberta 2003
Figure 100	Age standardized hospital separation rates per 100,000 population for arthritis, Alberta 1979/1980 to 2002/2003

Injury

- Figure 101 Age-standardized treated prevalence per 100 population for injuries, Alberta 1983 to 2003
- Figure 102 Age-specific treated prevalence per 100 population for injuries, Alberta 1986 and 2003
- Figure 103 Regional differences in the treated prevalence of injury, Alberta 2003
- Figure 104 Age standardized hospital separation rates for unintentional injury, Alberta 1979/1980 to 2002/2003
- Figure 105 Age-standardized mortality per 100,000 population attributed to unintentional injury in Alberta, 1960 to 2003
- Figure 106 Age standardized hospital separation rates for intentional injury, Alberta 1979/1980 to 2002/2003
- Figure 107 Age-standardized hospital separation rate per 100,000 for suicide, Alberta 1979/1980 to 2002/2003
- Figure 108 Age-standardized mortality rate per 100,000 due to suicide, Alberta 1960 to 2003
- Figure 109 Age-specific mortality rate per 100,000 due to suicide, Alberta 1986 and 2003
- Figure 110 Regional differences in the age-standardized suicide mortality rate per 100,000 population, Alberta 2001-2003 combined
- Figure 111 Age standardized homicide mortality rate per 100,000 population, Alberta 1960 to 2003
- Figure 112 Age-specific mortality rate per 100,000 due to homicide, Alberta 1986 and 2003
- Figure 113 Regional differences in the age-standardized homicide mortality rate per 100,000 population, Alberta 2001-2003 combined

Communicable Disease

- Figure 114 Communicable disease mortality rates per 100,000 population, Alberta 1961 to 2003
- Figure 115 Chlamydia incidence per 100,000, Alberta 1989 to 2002
- Figure 116 Gonorrhoea incidence per 100,000, Alberta 1941 to 2003
- Figure 117 Infectious Syphilis incidence per 100,000 population, Alberta 1944 to 2003
- Figure 118 Age-standardized hepatitis C incidence, Alberta 1984 to 2003
- Figure 119 HIV incidence per 100,000 population, Alberta 1998 to 2003
- Figure 120 Campylobacteriosis incidence per 100,000 population, Alberta 1983 to 2003
- Figure 121 Giardiasis incidence per 100,000 population, Alberta 1983 to 2002
- Figure 122 Haemorrhagic colitis incidence per 100,000 population, Alberta 1983 to 2003
- Figure 123 Salmonella incidence per 100,000 population, Alberta 1960 to 2003
- Figure 124 Typhoid incidence per 100,000 population, Alberta 1919 to 2003
- Figure 125 Diphtheria incidence per 100,000 population, Alberta, 1920 to 2003
- Figure 126 Hepatitis A incidence per 100,000 population, Alberta 1945 to 2003
- Figure 127 Hepatitis B incidence per 100,000 population, Alberta 1969 to 2003
- Figure 128 *Haemophilus influenzae* type B incidence per 100,000 population, Alberta, 1978 to 2003

-
- Figure 129 Age Standardized influenza incidence per 100, Alberta 1986 to 2003
 - Figure 130 Age standardized mortality attributable to influenza per 100 population, Alberta 1986 to 2003
 - Figure 131 Incidence of reported rubella cases, Alberta 1928 to 2003
 - Figure 132 Measles incidence per 100,000 population, Alberta 1919 to 2003
 - Figure 133 Invasive meningococcal disease incidence per 100,000 population, Alberta, 1924 to 2003
 - Figure 134 Mumps incidence per 100,000 population, Alberta 1979 to 2003
 - Figure 135 Pertussis incidence per 100,000 population, Alberta, 1919 to 2003
 - Figure 136 Poliomyelitis incidence per 100,000 population, Alberta, 1919 to 2003
 - Figure 137 Smallpox incidence per 100,000 population, Alberta, 1919 to 2003
 - Figure 138 Varicella (chickenpox) incidence rate per 100,000 population under age five, Alberta, 1986 to 2004
 - Figure 139 Varicella (chickenpox) incidence rate per 100,000 population age ten years and younger, Alberta 1986 and 2003
 - Figure 140 Tuberculosis incidence per 100,000 population, Alberta 1919 to 2003

The year 2005 marked the 100th anniversary of the province of Alberta. Today, Alberta boasts a vibrant economy and one of the best health care systems in Canada and the world. Albertans can expect to receive high quality care and services designed to prevent disease, manage disease, and promote and protect their health. At the turn of the century, Albertans were living shorter lives often reduced by infectious diseases that knew no boundaries. Today, with advances in medical science and public health measures, significant gains have been achieved in both duration and quality of life. The roots of today's system began modestly more than 100 years ago before Alberta became a province.

Health services at the end of the 19th century were primarily delivered by charitable organizations. The first public health practitioners in Alberta were three Catholic nuns, Sisters Emery, Lamy, and Alphonse, who belonged to the Order of Charity. They were commonly known as the Grey Nuns. In 1859, the three Sisters were sent to Lac St. Anne to settle and provide a service to “suffering humanity”. The Grey Nuns worked closely with First Nations, who were at the time relying on traditional healers for their health needs.

In 1865, Alberta's first doctor arrived. Dr. William McKay was hired by the Hudson's Bay Company to act as the resident physician for Fort Edmonton and tend to the health needs of the company's employees. While hired by the company, Dr. McKay was similar to other physicians of the day; he did not refuse anyone his medical services should they be needed. Dr. McKay traveled extensively throughout northern Alberta and the Northwest Territories providing needed medical assistance.

While the Order of Charity brought the first public health practitioners to Alberta, and the Hudson's Bay Company brought the first doctor, it was the police that established Alberta's first hospital. The Northwest Mounted Police, now the Royal Canadian Mounted Police, were created to stop the whiskey trade and prevent abuse of First Nations by traders. The hospital was located in Fort McLeod and was established in 1874 where Dr. George Kittson provided care to the constables and civilians. Seven years later in 1881, the Grey Nuns established a hospital in Edmonton.



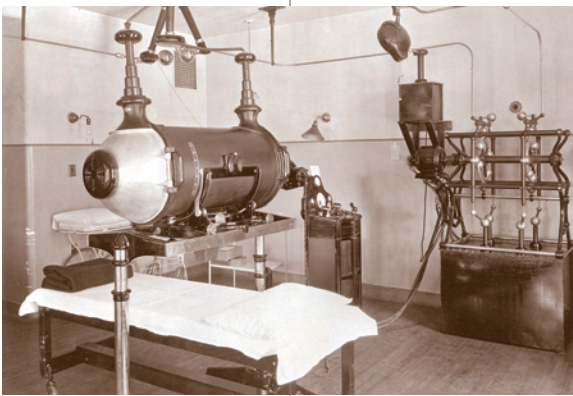
Provincial Archives of Alberta, A2994
*Public Hospital – in operation between
1900 - 1911*

Completion of the railway to Alberta brought with it many new settlers and consequently, more disease. While still haphazard, the beginnings of Alberta's health care system were emerging. Multiple players including government, charitable organizations, religious groups, business, and a police force, provided health services of varying types.

Between 1905 and 1945, there were a number of developments that would influence the direction of health care delivery. While communicable disease and injury were still the major causes of premature mortality, public health measures were beginning to have an impact. Urbanization began to have an influence as people started moving more towards cities. This combined with two world wars caused significant social disruption and increased the need for a more organized approach to health services. Families, small communities, churches and charitable organizations found it increasingly difficult to meet the needs and demands of the less fortunate.

During the prosperity of the "roaring twenties", the federal government developed the Old Age Pension in 1927. The move was highly criticized as people believed it would discourage self-reliance.¹

The prosperity of the 1920s ended with the depression of the 1930s. A realization that misfortune could strike people through no fault of their own began to change the thinking around access to health services. It became clear that charitable organizations and private insurance schemes of the time were simply not meeting the needs of the disadvantaged. New drugs, like penicillin, began improving health outcomes, but also increased the cost of providing service. Improved care and increasing cost began to increase people's interest in health care.



Provincial Archives of Alberta, A8320
Royal Alexandra X-Rays and High frequency apparatus - 1926

Following the Second World War, there were significant advances in diagnostic and therapeutic abilities. The public health system was able to significantly reduce the burden of communicable disease and non-communicable (chronic) conditions became more common. Health insurance programs still varied and were inconsistent in their coverage. None could guarantee services for anyone suffering significant financial setbacks. In 1947, Saskatchewan established Canada's first universal insurance program ensuring hospital care would be provided to all residents of the province regardless of means. Alberta followed Saskatchewan's lead, creating a similar provincial plan. The provincial plan required the collection of premiums to help offset the costs of offering a universal program.



Provincial Archives of Alberta, A8365
Red Cross exhibit at Edmonton
Exhibition

In 1957, the federal government passed the *Hospital Insurance and Diagnostic Services Act*. The *Act* stated that provinces willing to provide hospital services to their residents in a consistent manner with uniform terms and conditions would be eligible for federal grants. Alberta was among the first five provinces to join, with all ten participating by 1962. While the *Act* made hospital services available, it did not address access to physician services.

In 1964, a Royal Commission led by Justice Emmett Hall made recommendations for a stronger federal role in the provision of health services. Justice Hall also recommended that it would be desirable to have a universal health care system for all Canadians. As a result, the federal government passed the 1966 *Medical Care Act* allowing the federal government to provide grants to provinces that provided comprehensive and universal coverage of hospital and medical services to its residents. Initially, Alberta and Quebec were opposed to the *Act*, stating that it interfered with provincial priorities and responsibilities. In 1969, Alberta passed its *Alberta Health Care Insurance Act* providing comprehensive health services to all residents of the province.

From these humble beginnings, Alberta has created a diverse health care system that provides a continuum of care to all Albertans. Even with the successes in improving health, many challenges are faced by today's health care system. Chronic diseases impart a significant burden on the health care system and society, an aging population requires changes in service delivery, health disparities remain difficult to alleviate, emerging pathogens and a global economy increase the risk of pandemics. These factors, among others, create challenges for sustaining the health care system in Alberta.

To lower rates of chronic disease, Alberta Health and Wellness has a number of initiatives in place that aim at reducing disease onset. These include programs aimed at improving lifestyle, activity and nutrition in an effort to promote the health of the population and reduce the risk of disease. Examples of such initiatives include the Alberta Diabetes Prevention Initiative, the Influenza Self-Care Initiative, the Alberta Tobacco Reduction Strategy, Healthy U campaign and others.

HISTORICAL EVENTS

- 1874 First hospital in Alberta is built by the North West Mounted Police in Fort McLeod.
- 1877 The North West Mounted Police and local miners cooperatively build a hospital in Lethbridge.

HISTORICAL EVENTS

- 1889 Government financial involvement begins with the provision of one hundred dollars to the St. Albert hospital and five hundred dollars to the Medicine Hat General Hospital.

Prevalence of disease, health behaviors, and demand for health services are all pivoted upon the demography of a population. Demography is defined as “the study of populations, especially with reference to size and density, fertility, mortality, growth, age distribution, migration, and vital statistics and the integration of all of these with social and economic conditions.”² This section contains a review of the demographic trends in Alberta over the past 100 years.

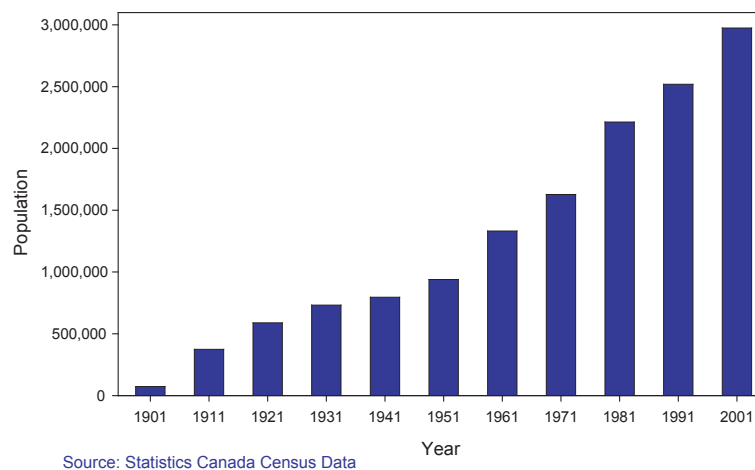
Figure 1 shows Alberta’s population size from 1901 to 2001. In 1901, Alberta’s population was 73,022. One hundred years later, its population has almost reached three million.



Provincial Archives of Alberta, A9436
John Neil Hospital, Cold Lake - 1959



Figure 1 Alberta population 1901 to 2001



Population Distribution

A population pyramid provides a graphic representation of the percentage of males and females in each age group in a total population.³ The series of population pyramids, **Figures 2 to 7**, show a dramatic shift in the structure of Alberta's population over the past 100 years. The population structures in 1901 and 1921 were heavily weighted with young people age nine years or less. In 1901, over 28 per cent of Alberta's population was less than 10 years of age. This dropped slightly in 1921 to about 26 per cent.

Figure 2 Population Distribution, 1901

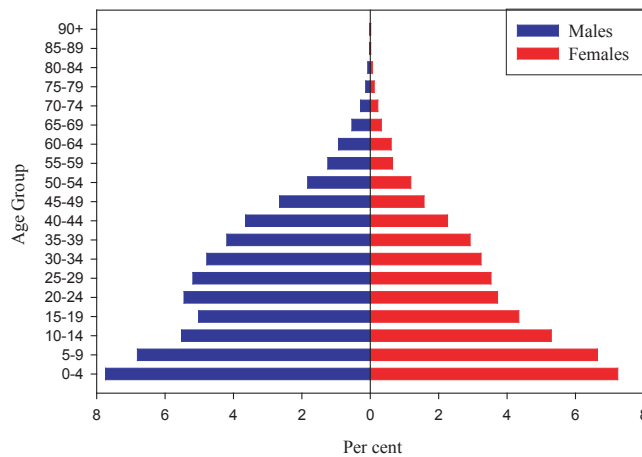
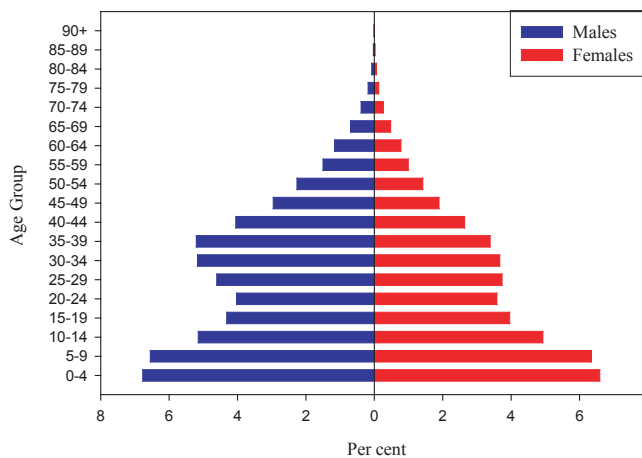


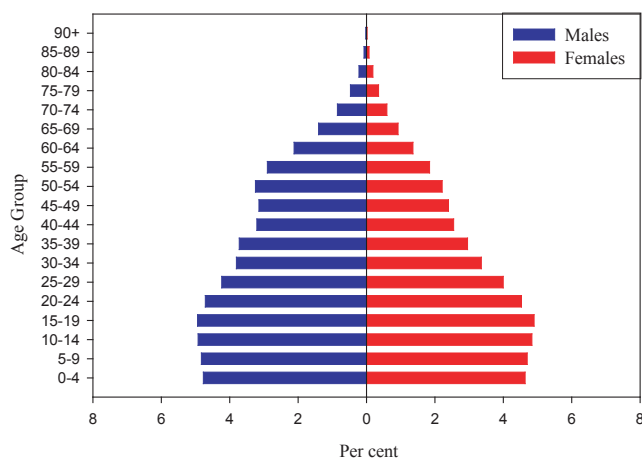
Figure 3 Population Distribution, 1921



Source: Statistics Canada, 1921

The population distribution in 1941 shows a shift towards a higher distribution of people in the teen years and early twenties. The proportion of people under 10 years decreased to 19 per cent in 1941.

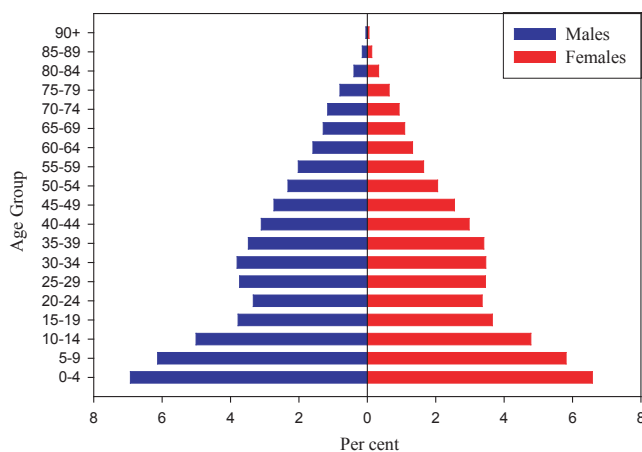
Figure 4 Population Distribution, 1941



Source: Statistics Canada, 1941

The effect of the baby boomer generation (those born between 1941 and 1967) is evident in the pyramid for 1961. The peak of the baby boomer generation occurred in 1960. The 1961 pyramid shows a significant increase in children age nine years or younger compared to 1941.

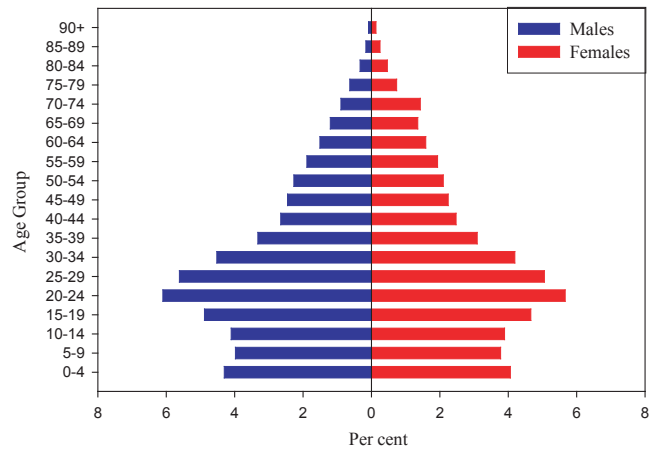
Figure 5 Population Distribution, 1961



Source: Statistics Canada, 1961

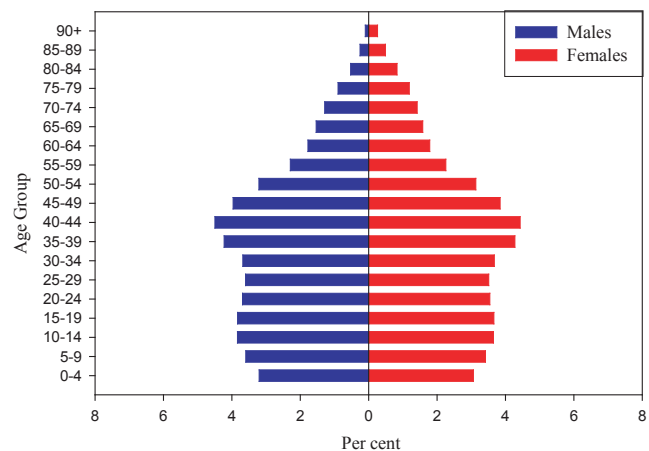
The pyramids in 1981 and 2001 reflect the aging of the baby boomers, in their 20s in 1981 and 40s in 2001. A low proportion of people less than 10 years of age is reflected in the pyramid for 1981; the so-called baby bust cohort of children born between 1967 and 1979, coinciding with a decline in fertility.

Figure 6 Population Distribution, 1981



Source: Statistics Canada, 1981

Figure 7 Population Distribution, 2001

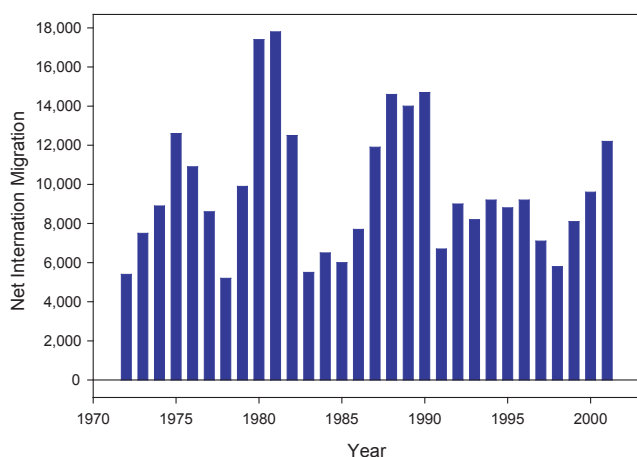


Source: Statistics Canada, 2001

Immigration

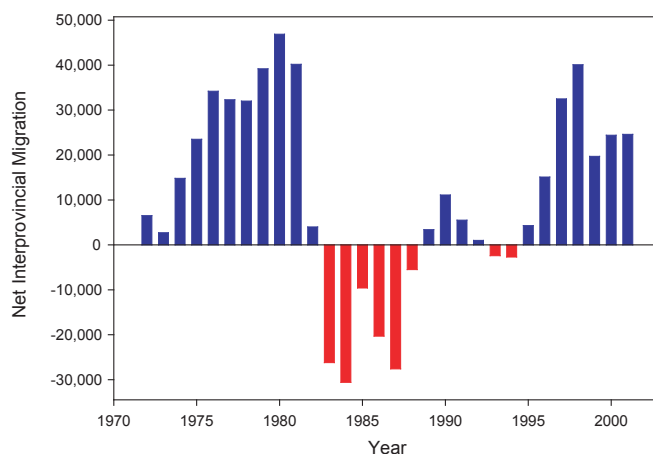
Figure 8 shows the net international migration for Alberta from 1970 to 2000. **Figure 9** shows the net inter-provincial migration between 1970 and 2004. Peak immigration times for international immigration occurred in 1980 and 1990, whereas inter-provincial migration peaked in 1980 and 1998. It should be noted that international immigration continually remains positive, suggesting that more individuals are entering Alberta from outside of Canada than are leaving to other countries. Although more Albertans left for other provinces than came to Alberta between 1981 and 1995, recent trends in provincial migrations show that more individuals from other provinces are now migrating to Alberta.

Figure 8 Net international migration to Alberta, 1970 to 2000



Source: Statistics Canada

Figure 9 Net inter-provincial migration to Alberta, 1972 to 2001

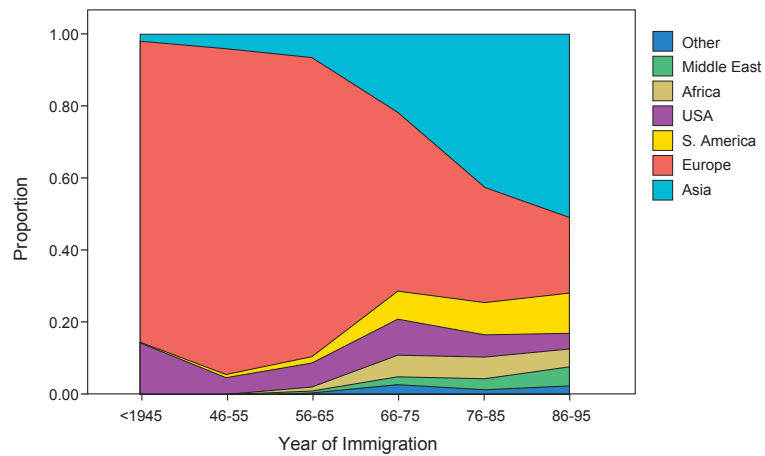


Source: Statistics Canada

Alberta Immigrants

Figure 10 shows Alberta immigrants by time and origin. Alberta has seen a significant shift in immigration over the past century. In the early 1900s, immigrants to Alberta primarily originated in Europe. In 2001, the majority of immigrants in the five years prior came from Asia. This is indicative of an older less mobile population in Europe compared to a younger more mobile population in Asia.

Figure 10 Alberta Immigrants by Year and Origin



HISTORICAL EVENTS

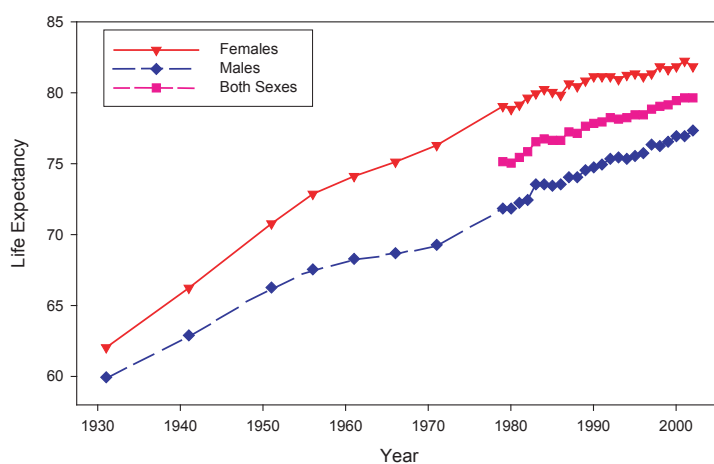
- 1890** Medicine Hat hospital is built and incorporated. The Dominion and Territorial governments, public donations, and companies financed the construction and equipment costs with interests in the west.
- 1891** The Grey Nuns arrive in Calgary taking possession of their new hospital, an unfinished two storey building.
- 1895** The Grey Nuns establish the General Hospital in Edmonton.

Life Expectancy

Life expectancy is an important health status indicator based on the average number of years a person at a given age may be expected to live given current mortality rates.⁴ **Figure 11** shows the life expectancy for males and females in Alberta from 1931 to 2001. Life expectancy in both sexes increased dramatically in the first half of the century reflecting the reduction in infectious diseases and the improvements in maternal and child health. In the second half of the century, life expectancy continued to increase, although at a slower rate.

Over the years, the life expectancy for females continues to be higher than that for males.

Figure 11 Life expectancy at birth in Alberta, 1931 to 2001

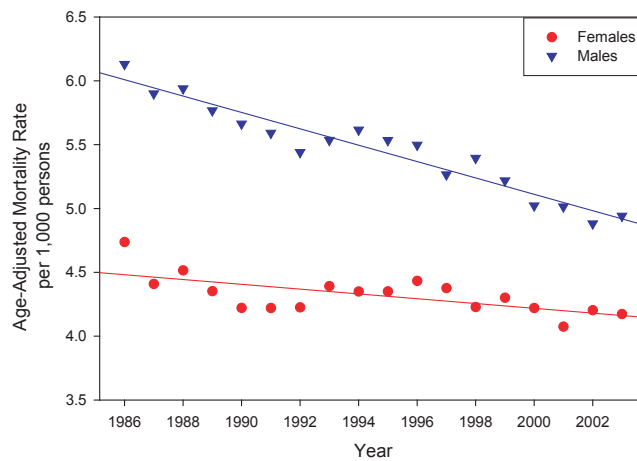


Source: Statistics Canada

Mortality

Mortality rates give an indication of the overall health of a population. **Figure 12** shows the age-adjusted mortality rates from all causes for Alberta from 1986 to 2003. The age-adjusted mortality rates in Alberta have steadily declined from 1986 to 2003 although the decline has been more prominent in males.

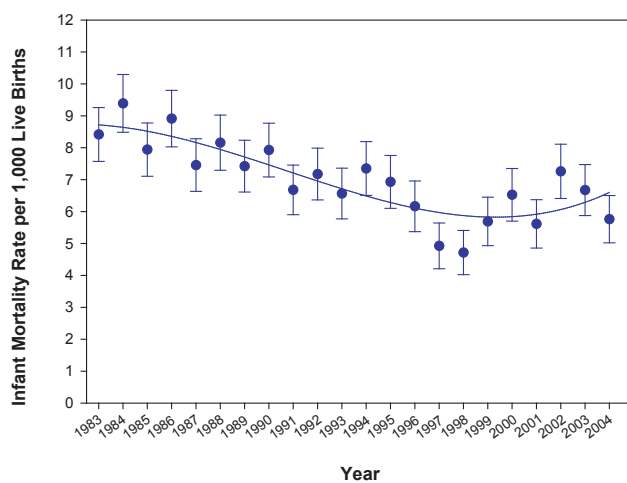
Figure 12 Age adjusted mortality rates per 1,000 population for all causes of death, Alberta, 1986 to 2003



Source: Alberta Vital Statistics Death Files, 1986 - 2003

Infant Mortality

Infant mortality refers to the death of a newborn prior to their first birthday. The infant mortality rate is an internationally accepted measure of population health status. Prematurity and low birth weight are the two strongest predictors of infant mortality. **Figure 13** displays the infant mortality rate for Alberta from 1983 to 2004. Between 1983 and 1998 there was a significant decline in the rate of infant deaths. Since 1998 the rate appears to have leveled at a rate between six and seven deaths for every 1,000 live births.

Figure 13 Infant mortality rate per 1,000 live births, Alberta, 1983 to 2004**HISTORICAL EVENTS**

- 1905** The province of Alberta is born on September 1. Physicians in southern Alberta claim regular outbreaks of typhoid are due to polluted water
- 1906** The first Provincial Medical Officer of Health, Dr. A.E. Clendennan, is appointed. He reports outbreaks of smallpox, diphtheria, scarlet fever, and typhoid fever. In Germany, Dr. Alois Alzheimer first describes a disorder with progressive loss of memory and intellectual functioning.
- 1907** The *Public Health Act* is passed as Alberta's first piece of health legislation, creating a Provincial Board of Health. The Alberta Provincial Laboratory was established with Dr. G.V. Revell appointed Provincial Bacteriologist.
- 1907** The Holy Cross Hospital, operated by the Grey Nuns, opens its school of nursing. Five graduates receive their diplomas in 1910.

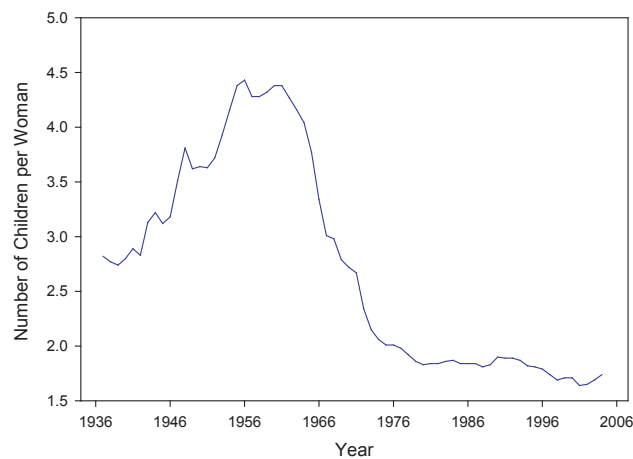
Fertility

Fertility is the bearing of living children. A complex issue, fertility is more than biological potential and is influenced by cultural, social, economic, religious and other factors.

Total Fertility Rate

The Total Fertility Rate (TFR) is defined as the average number of babies born to women during their reproductive years. A TFR of 2.1 births per woman is considered the replacement rate; and would imply a stable population assuming no immigration or emigration takes place. The total fertility rate in Alberta decreased from 1.81 births per woman in 1986 to 1.69 births per woman in 2003. The years 1945 thru 1960 show a spike in fertility that is indicative of the baby boom; at its peak, women were having over four children on average.

Figure 14 Total fertility rate for Alberta, 1936 to 2003

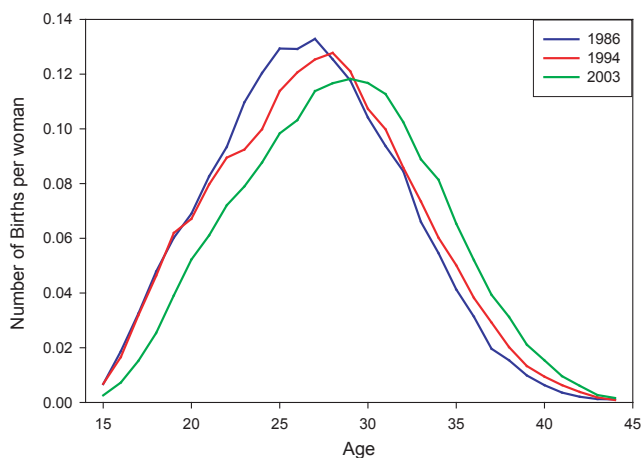


Source: Statistics Canada

Age Specific Fertility

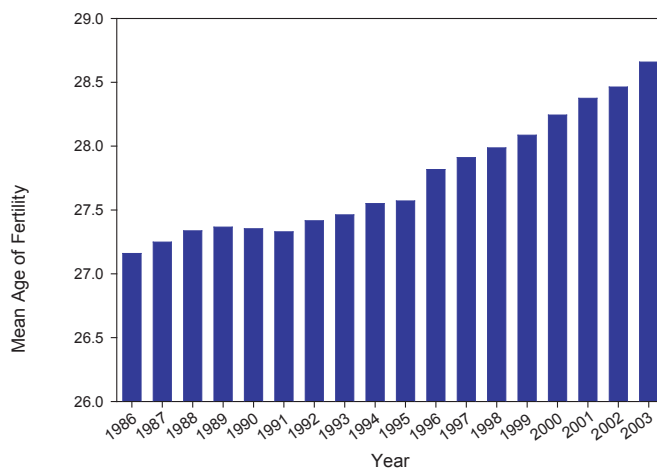
Figures 15 and 16 show the age specific fertility rates in Alberta for 1986, 1994 and 2003 and the mean age of fertility in Alberta from 1986 to 2003. The downward shift in the fertility curve indicates decreased fertility. The shift to the right indicates an increase in the mean age of fertility. Adjusting for the changing age structure of female population aged 15 to 44, the mean age of fertility increased from 27.2 in 1986 to 28.5 in 2002. This indicates that childbearing is starting later and women are having fewer children.

Figure 15 Age-specific fertility rates, Alberta 1986, 2004, and 2003



Source: Alberta Vital Statistics Birth Files, 1986 - 2003

Figure 16 Mean age of fertility in Alberta, 1986 to 2003

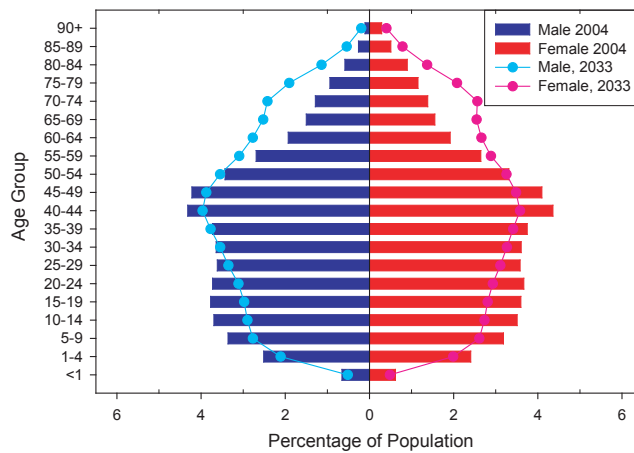


Source: Alberta Vital Statistics Birth Files, 1986 - 2003

Population Growth

Alberta’s population is projected to surpass five million by the year 2033, growing at about 1.6 per cent annually. Not only will the population be growing, but it will continue to get older. The median age of Alberta’s population in 2004 was just over 35 years, and is expected to be over 40 years by 2033. **Figure 17** compares Alberta’s age structure in 2004 with what was projected by 2033. The proportion of the Alberta population aged 65 and over is projected to be 18.6 per cent by 2033, compared to 10.5 per cent in 2004.

Figure 17 Population Distribution, 2004 and projected to 2033



Source: AHCIP Stakeholder Registry, 2004
Population Projections for Alberta and its Health Regions, 2004 to 2033

Many factors play a role in making a person healthy. These factors, referred to as the determinants of health, include those things that directly or indirectly impact health status. The health of a person or of a population is seen to be influenced by the interactions between one's genetic make-up, lifestyle, and environment and modified somewhat by health interventions.

Determinants can have positive or negative impacts on health status. For example, smoking has been linked to increased risks of lung cancer, emphysema, and heart disease, among others. Smoking would be considered a 'risk factor' working to move an individual towards ill-health. Other factors, such as eating fruits and vegetables, tend to work to improve health status. These are referred to as 'protective factors'. Evidence has been established that demonstrates that most determinants of health are related to factors outside of the traditional health care system. These determinants can be broadly grouped into 12 categories.

Income and Social Status

A person's income and social status have a significant impact on their health status. As people improve their income and move up the social hierarchy, there are improvements in overall health status. Income has an influence on living conditions, the ability to afford and acquire safe housing as well as the ability to purchase the necessities of life, such as food and clothing. Countries with the greatest differences between the richest and the poorest tend to have poorer overall health status than societies which are both prosperous and have an equitable distribution of wealth.

Social Support Networks

Social support networks include family, friends, and communities. Needed support received from the social support network is associated with better health status. These networks assist with problem solving, improve perception of control and offer a sense of mastery over problems. Caring and respect are derived from strong social networks with improve one's sense of well-being and appear to act as a buffer protecting against health problems.



Education

Education is strongly associated with socio-economic status. It also contributes to health by providing people with knowledge and skills that can be used for problem solving. This helps to create a sense of control and mastery over life events better equips people to deal with the prevention and management of health issues. Higher education improves one's ability to acquire employment and improve income providing a sense of security and satisfaction.

Employment and Working Conditions

Unemployment, underemployment, and stressful or unsafe work all have a negative impact on health status. Employment provides a sense of security and can provide opportunities to improve social well-being. Having more control over one's work situation and fewer stressful demands from their job tends to lead to healthier and longer lives.



Social Environment

The social environment goes beyond friends and family and extends to the broader community in which a person lives and works. It includes a sense of cohesiveness within society from its values to institutions to informal giving. The values within society have varying influences on the well-being of the population as a whole. Issues such as social stability, feelings of safety, good working relationships and the perceptions of a supportive community help to reduce the risks to good health.

Physical Environment

One's exposure to contaminants in our air, water, food and soil, in unsafe quantities, can lead to a variety of adverse outcomes, such as certain cancers, birth defects, respiratory illness and gastrointestinal problems. In addition to these factors, the built environment in which we live has an influence on health status. One's physical and psychological well-being is influenced by housing, indoor air quality, and the design of communities and transport systems.

Biology and Genetic Endowment

One's genetic endowment has a direct influence on health status as it determines a person's predisposition to the range of individual responses that impact health status. Genetics and biology work to determine the body's response to internal and external influences that can either protect against certain diseases or act as a risk factor for their development. While social and environmental factors have a strong influence on health, genetic endowment appears to predispose certain individuals to particular health problems.

Personal Health Practices and Coping Skills

Personal health practices and coping skills refer to those activities that can prevent diseases, cope with challenges, develop self-reliance, solve problems, and make choices that enhance health. There is increasing understanding that personal decisions are greatly influenced by the socio-economic environments in which people live, learn, work, and play. There is evidence showing that there are biochemical changes that occur within individuals based on how they cope with problems and these changes can modify one's health status.



Healthy Child Development

Healthy child development is a powerful determinant of health. How a child develops is greatly influenced by their physical and social environments. Housing, family income, parental education, access to nutritious foods, physical activity, and genetic endowment are all examples of influences that impact the child's health throughout their lifespan.

Health Services

The availability and accessibility of health services has a direct impact on the health of the population. These include those services designed specifically to prevent disease, detect disease early in its course, and to provide services to restore health and functional abilities. Health services can be viewed as a continuum of activities aimed at prevention and treatment.

Culture

Cultural values play a role influencing health status, particularly for those who are part of a cultural group that is not the dominant one in the area in which they live and work. Misunderstanding of language, values, and day to day processes can make it difficult to gain employment or may lead to marginalization and stigmatism. The loss or devaluation of language and cultural practices can lead to poor self-esteem and other problems. A lack of access to culturally appropriate or sensitive health services can be a barrier to prevention and treatment of health problems.

Gender

Gender refers to the societal roles placed on the sexes that influence behaviours, personality, attitudes, and power and influence on society that may be on a differential basis. The delivery of services, health and other, can be influenced by the gender of the person or persons delivering and receiving the services. The risk of disease and injury is different for males and females as are their needs for health services.

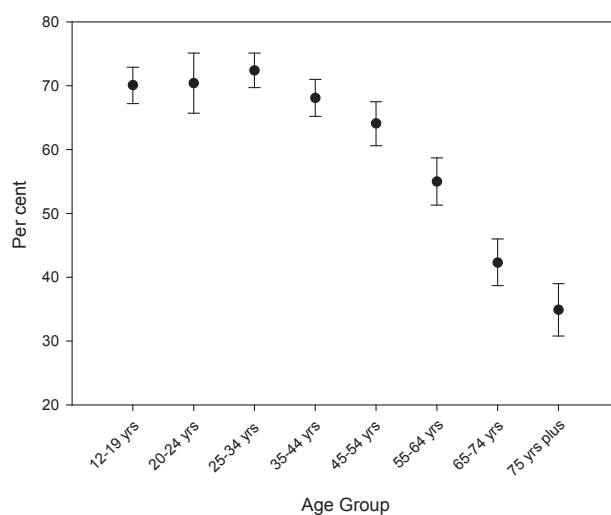
HISTORICAL EVENTS

- 1911 “Swatting the fly” campaign launched in the city of Edmonton to reduce the potential risk of disease spread from flies. Alberta’s population is 374,295. The Ponoka Asylum for the care of the mentally ill is opened.
- 1914 Canada enters the First World War.
- 1915 Prohibition legislation is passed.
- 1916 Smallpox vaccine introduced in Canada. Women in Alberta gain the right to vote.
- 1918-1919 Pandemic influenza (“Spanish Flu”) kills over 25 million people worldwide. Over 4,000 Albertans die.
- 1918 Alberta’s *Venereal Disease Prevention Act* is passed.
- 1918 The *Municipal Hospitals Act* is proclaimed.
- 1919 The Honourable A.G. MacKay is appointed as Alberta’s first Minister of Health.
- 1919 The first Alberta Vital Statistics Report is released.

Self-Perceived Health Status

Health is much more than just the absence of disease or disability. The World Health Organization has defined health as a state of physical, emotional, and social well-being. Self-reported health status, the subjective experience of how healthy a person feels, is an important indicator. **Figure 18** displays the per cent of the population that rates its health as very good or excellent by age of respondent. Approximately 70 per cent of respondents between the ages of 19 and 44 years rate their health in positive terms. As individuals age, the rating begins to steadily decline.

Figure 18 Per cent of the population rated their health as very good or excellent by age of respondent, Alberta 2003



There are sex differences in reporting one's health as very good or excellent. Males consistently are more likely to report their health as very good or excellent than are females (**Figure 19**). In addition to sex differences, there are regional differences within Alberta. Residents of the Capital and Calgary health regions tend to report being healthier while residents of the northern most regions (Aspen, Peace Country, Northern Lights) were least likely to report their health as very good or excellent.

Figure 19 Per cent of the population reporting their health to be very good or excellent, by year and sex, Alberta

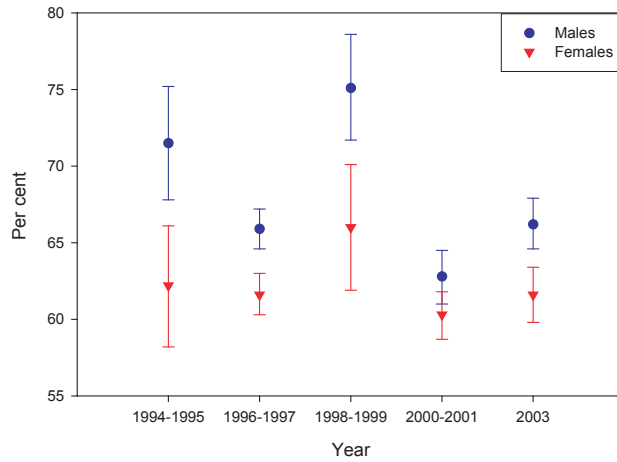
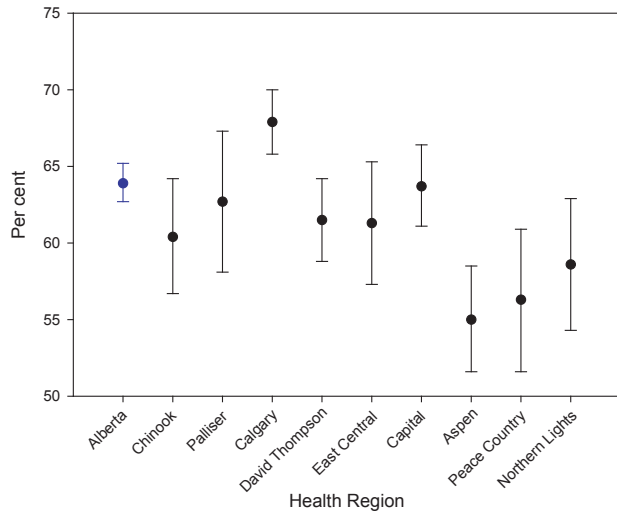


Figure 20 Per cent of the population reporting their health to be very good or excellent, regional health authority, Alberta 2003



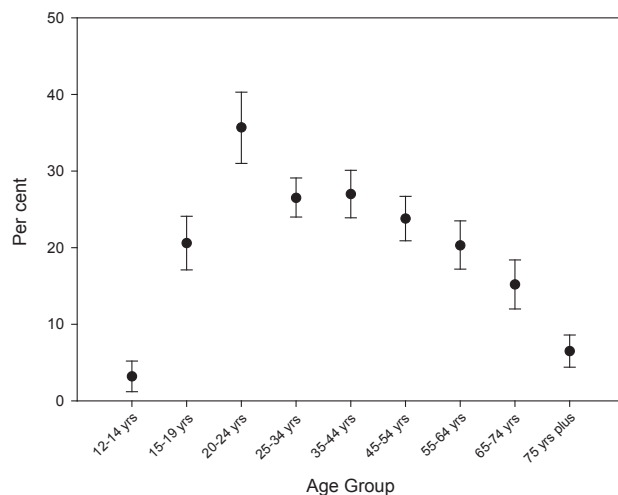
Tobacco Use

Tobacco use and smoking are addictive behaviours. Nicotine in tobacco causes chemical and biological changes in the brain. While the change is less dramatic than with drugs such as heroin or cocaine, the strength of the addiction can be just as powerful.⁵ Additionally, nicotine is a reinforcing drug, which means that users desire the drug regardless of its damaging effects.⁶

Smoking puts smokers at an increased risk of coronary heart disease, peripheral vascular disease, aortic aneurysm, high blood pressure, high cholesterol, lung cancer, cancer of the mouth, throat and voice box, cancers throughout the body, chronic obstructive pulmonary disease, and a variety of other diseases. Female smokers are at increased risk of cancer of the cervix, menstrual problems, fertility problems, and spontaneous abortion (miscarriage). Male smokers are at increased risk of erectile dysfunction (impotence) and fertility problems. Smoking also leads to premature aging.⁷

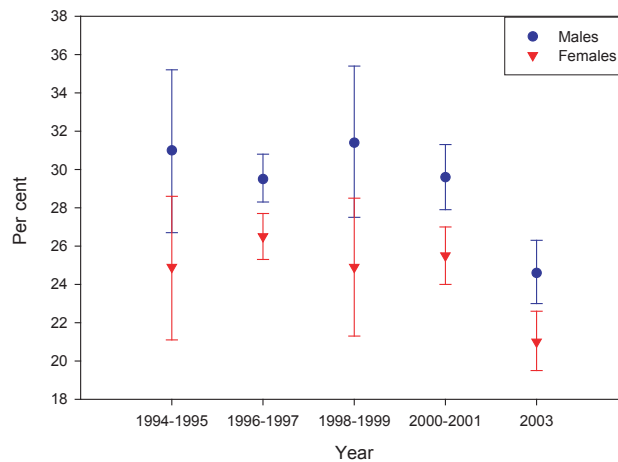
Smoking cessation has immediate health benefits. Within two days of quitting the chance of heart attack goes down, three months later circulation improves and lung function increases up to 30 per cent; within one year the chance of smoking-related heart attack is cut in half. Ten years after quitting smoking, the chance of dying of lung cancer is cut in half; within 15 years, the chance of dying of a heart attack is as low as those of individuals who had never smoked.⁸ However, the benefits of quitting are realized only if diseases due to smoking have not already taken root.

Figure 21 Self reported percentage of smokers by age, Alberta 2003



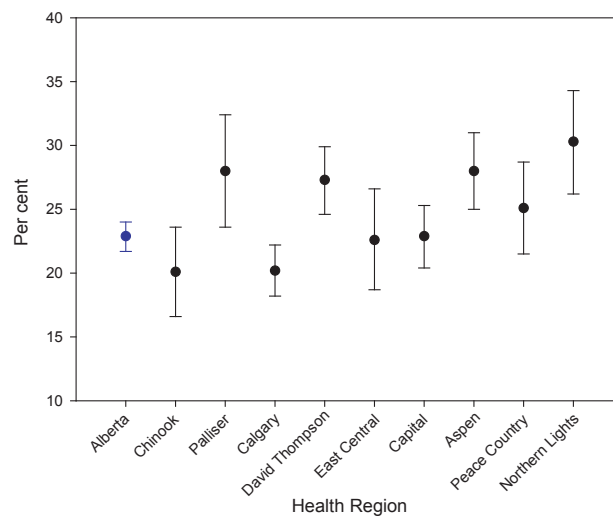
Smoking rates are highest among individuals aged 20 to 24 years and lowest in the 12 to 14 year age group. There is a steady decline in smoking rates associated with age. Overall, 23 per cent of Albertans report being either occasional or daily smokers. The overall smoking rate appears to have declined in 2003 (**Figure 22**) compared to previous years. Males are more likely to report smoking than females.

Figure 22 Per cent of the population reporting smoking either occasionally or daily, Alberta 2003



Smoking rates varied by regional health authority (**Figure 23**). The Calgary health region had the lowest smoking rates while Northern Lights had the highest.

Figure 23 Per cent of the population reporting smoking either occasionally or daily by regional health authority, Alberta 2003



Cancer Screening

Screening programs test otherwise healthy people to identify the presence of disease before symptoms begin.⁹ Screening for cancer means that diagnosis can occur at an earlier stage in the disease when treatment is often more successful. Two cancers, cervical and breast, have been shown to most greatly benefit from regular screening.

Alberta Health and Wellness is currently in the implementation stage of an Alberta Breast Cancer Screening Program.¹⁰ This program is targeting women 50 to 69 years of age. However, women in the 40 to 49 and 65 and over age groups will also be screened.¹¹ This program will provide a coordinated province-wide approach to the delivery of mammography screening services.^{12,13} An additional Breast Cancer screening program, Screen Test, is currently in place and is run by the Alberta Cancer Board. This program provides outreach services at two onsite locations, in Edmonton and Calgary, and to residents in 100 rural communities in the province of Alberta.¹⁴

Between 1996 and 2003 there was not significant difference in the number of women age 50 to 69 years who reported having had a screening mammogram (**Figure 24**). There was, however, an increase in the number reporting having had a mammogram for other reasons. Regionally, none of the regional health authorities differed significantly from the provincial average.

Figure 24 Per cent of women aged 50 to 69 years reporting they received a mammogram within the previous two years, Alberta 1996 to 2003

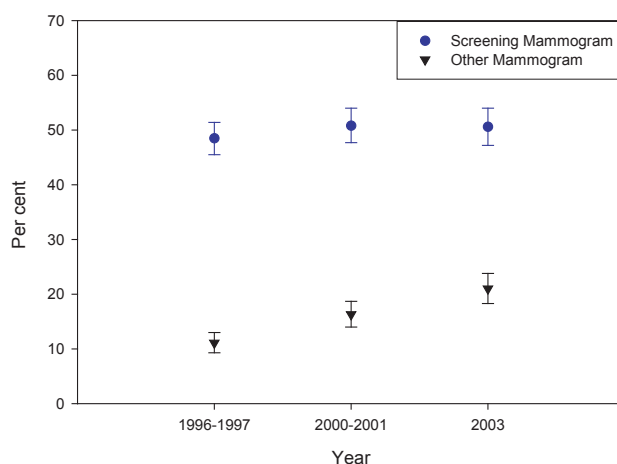
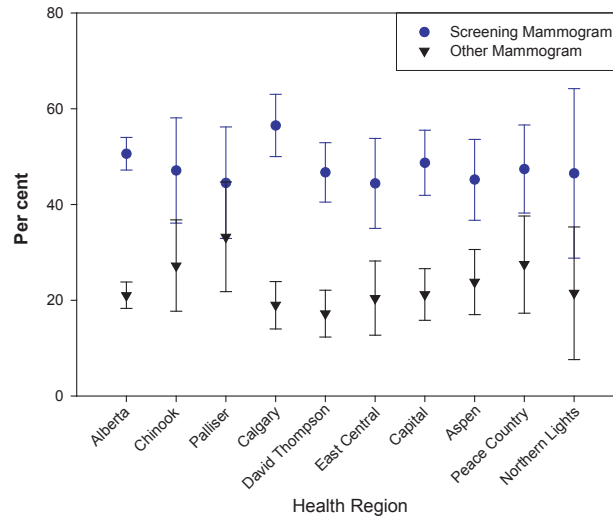


Figure 25 Per cent of women aged 50 to 69 years reporting they received a mammogram within the previous two years by regional health authority, Alberta 2003



Alberta Health and Wellness announced the Alberta Cervical Cancer Screening Program (ACCSP) in February 2000.¹⁵ This program targets women between the ages of 18 and 69 for pap-smears. Having regular Pap tests can prevent almost all cervical cancers by finding cell changes early enough to be treated and cured.¹⁶

The benefits of implementing active screening of cancers such as prostate and colorectal cancer are currently debated.¹⁷ However, as evidence is collected that proves the efficacy of specific tests for other cancers, screening programs and/or clinical practice guidelines will be developed to aid in the early detection and treatment of these cancers.¹⁸

Approximately 80 per cent of Alberta women reported having had a pap smear within the past three years. The distribution of pap smear varies by age with the lowest rates among the youngest and oldest age groups. Calgary health region had the highest per cent of women having had a pap smear while East Central had the lowest.

Figure 26 Per cent of women reporting having had a pap smear within the past three years, Alberta 1994 to 2003

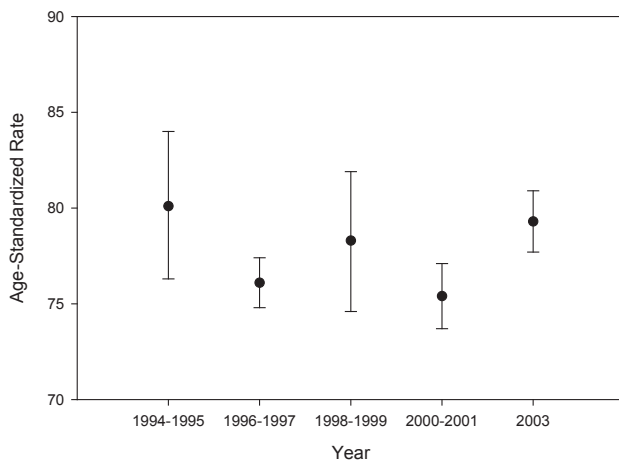


Figure 27 Per cent of women reporting having had a pap smear within the past three years by age, Alberta 2003

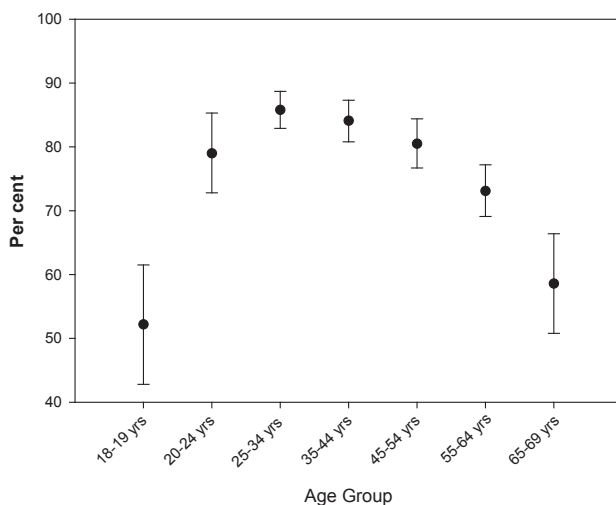
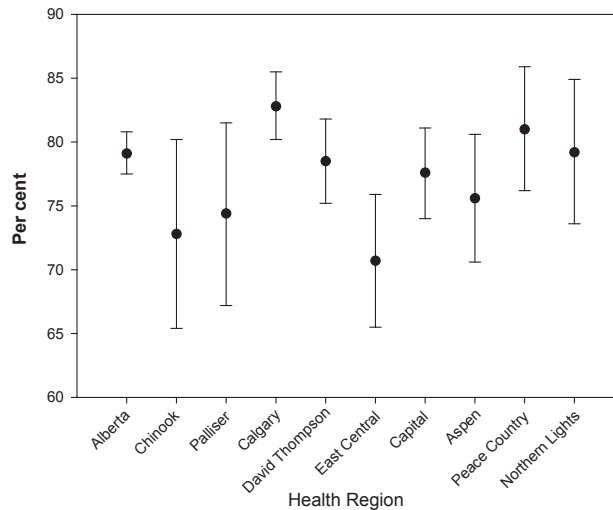


Figure 28 Per cent of women reporting having had a pap smear within the past three years by regional health authority, Alberta 2003



Birth Weight

Low birth weight, the proportion of newborns weighing less than 2,500 grams, is an internationally accepted measure of population health status.¹⁹ Low birth weight has been acknowledged as the single most important determinant of neonatal mortality.²⁰ Furthermore, low weight babies are at a much greater risk of death, disease, and disability. This can include cerebral palsy, learning disabilities, visual problems, and respiratory problems.²¹

Very low birth weight (VLBW) babies, those under 1,500 grams, are especially likely to have long-term health problems and to require higher levels of health care throughout their lives.²²

Low birth weight typically occurs in three categories of infants: those born prematurely (before 37 weeks of gestation), infants termed “small-for-dates” exhibiting intrauterine growth that was slowed but were delivered at term or later than term, and infants born prematurely who also had delayed intrauterine growth and were considered small-for-dates.

Although low birth weight may not always be prevented, a number of risk factors have been identified as increasing the probability that a baby will be born with low birth weight. Factors include both broad determinants of health and maternal factors. Broad determinants of health include maternal age, in vitro fertilization and assisted reproduction, multiple births, socio economic status, social support and the beliefs and values of society.²³ Maternal factors include smoking, alcohol and drug use.²⁴ Furthermore, younger mothers (below age 17) and older mothers (above age 35) are also at increased risk.^{25,26}

The newborns weighing less than 2,500 grams and less than 1,500 grams are displayed in **Figures 29** and **30** respectively. There has been an increasing trend to having a higher proportion of low birth weight over time. In 2004, the low birth weight rate was 6.4 per 100 live births. Over the same period there was also an increase in the number of newborns weighing under 1,500 grams. The increase in low birth weight may be attributed to a number of factors that include, delayed childbearing, in-vitro fertilization, use of alcohol, drugs and tobacco during pregnancy, and maternal age.

Figure 29 Proportion of live births weighing less than 2,500 grams, Alberta 1983 to 2004

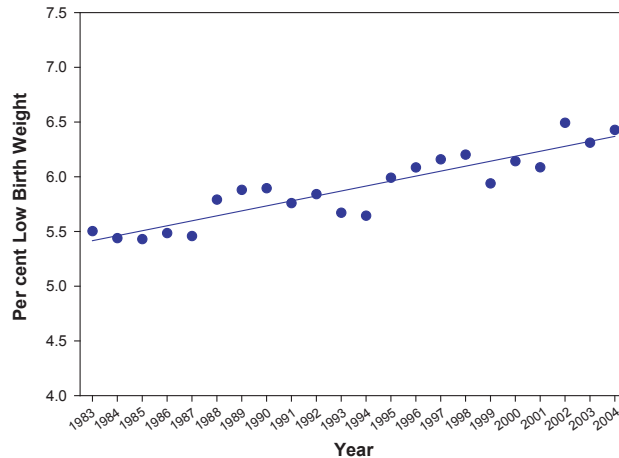
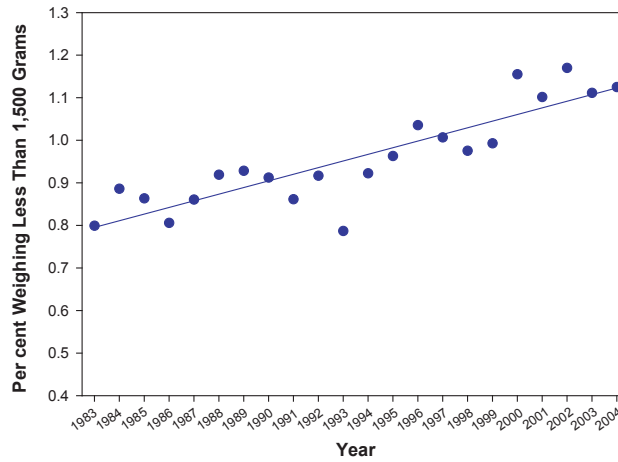


Figure 30 Proportion of live births weighing less than 1,500 grams, Alberta 1983 to 2004



HISTORICAL EVENTS

- 1921 Alberta's population grows to 588,454. One quarter of all cows in Southern Alberta tested positive for tuberculosis
- 1922 Drs. F.G. Banting, C.H. Best, J.J.R. Macleod, and J.B. Collip discover insulin. The government provides free distribution of insulin via mail to all persons with diabetes.
- 1924 Alberta's *Liquor Act* is repealed, ending eight years of prohibition.
- 1928 The *Sexual Sterilization Act* is passed. The Act was repealed in 1972.
- 1928 Alberta becomes the first province to provide special facilities for the treatment of poliomyelitis.
- 1929 Women become persons under the law.

Body Weight

Body weight depends on a number of factors including: genetics, nutrition, and the level of physical activity.²⁷ People who are overweight or obese are at increased risk for conditions and diseases such as: premature death, cardiovascular disease, high blood pressure, osteoarthritis, some cancers, and diabetes. In order to determine if an individual is overweight the Body Mass Index (BMI) calculation is often used.²⁸

BMI calculates the weight of an individual as a ratio to the individual's height.²⁹ The measure is intended for everyone except those under 18 years of age, and pregnant and/or lactating women.³⁰ BMI is calculated with the following formula: $BMI = \text{weight (kg)} / \text{height (m)}^2$. The measure achieved by this formula is then placed into one of the categories found in **Table 1** that shows the classification of the individual's weight, in addition to their risk of developing health problems, is assessed.³¹

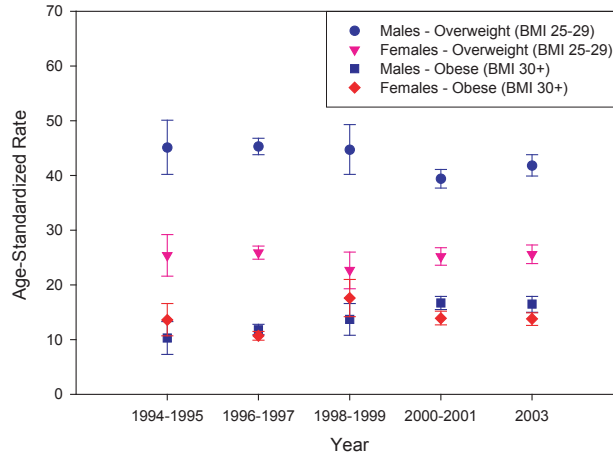
Table 1 Health risk classification according to body mass index (BMI)

Classification	BMI Category (kg/m ²)	Risk of developing health problems
Underweight	< 18.5	Increased
Normal Weight	18.5 – 24.9	Least
Overweight	25.0 – 29.9	Increased
Obese class I	30.0 – 34.9	High
Obese class II	35.0 – 39.9	Very high
Obese class III	>= 40.0	Extremely high

As indicated above, a person at normal weight is usually at an index of 18.5 to 24.9. However, this is not always the case. Because BMI relies on only an individual's weight and height, it cannot calculate body fat. Subsequently an individual with a high percentage of muscle may have the same weight and height as an individual with proportionately more fat. Both individuals will have the same BMI.³² BMI is not diagnostic,³³ and is instead one of the many tools used to assess an individual's health and risk of disease and death.³⁴

Figure 31 shows the percentage of the population with a BMI in the overweight and obese categories. The proportion of males with a BMI in the obese category has increased over the past decade, from 10.3 per cent to 16.5 per cent, while females have stayed stable at just under 14 per cent.

Figure 31 Body mass index for males and females, Alberta 1994 to 2003



The proportion of the population with a BMI in the overweight and obese categories increases with age until age 65. After age 65, the proportion overweight remains stable and the proportion obese begins to fall. One in five adults between the ages of 55 and 64 years is obese and close to 40 per cent of Albertans over the age of 45 years are overweight.

Figure 32 Percentage of the population with and body mass index in the overweight and obese categories by age, Alberta 2003

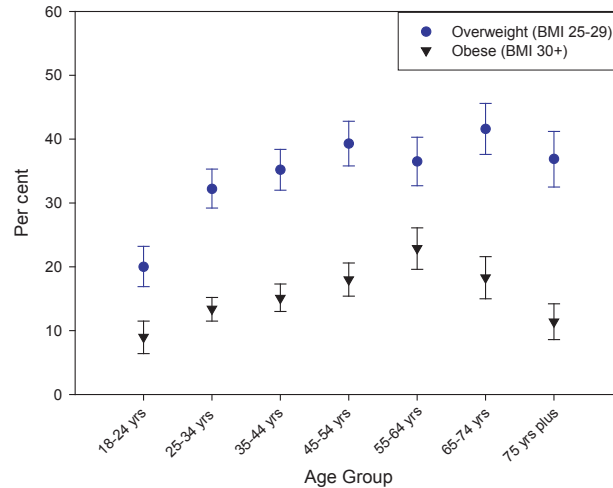
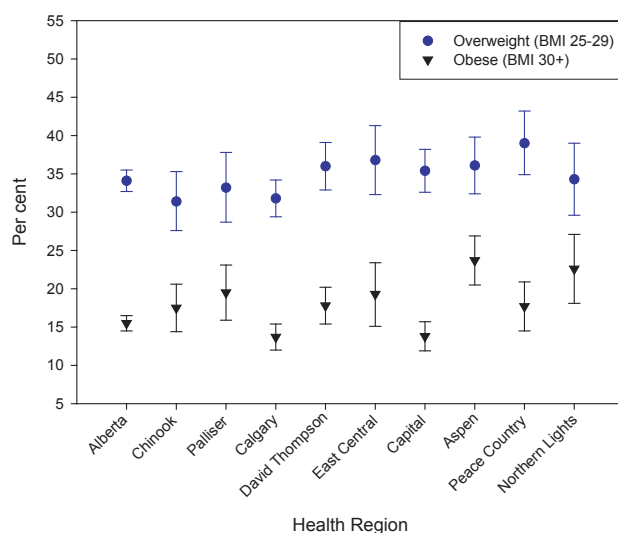


Figure 33 displays the regional differences in BMI for the overweight and obese categories. The Calgary and Capital health regions have the lowest proportions of their populations that are obese compared to other health regions. Aspen and Northern Lights reported the highest proportion of their populations in the obese category.

Figure 33 Percentage of the population with and body mass index in the overweight and obese categories by regional health authority, Alberta 2003



HISTORICAL EVENTS

- 1930** Mental health clinics are opened across Alberta.
- 1931** Alberta's population is 731,605. Life expectancy is 62.1 years for females and 60 years for males.
- 1936** The provincial government begins providing hospital care.
- 1936** The *Tuberculosis Act* comes into force providing free diagnosis and treatment.
- 1938** *Poliomyelitis Sufferers Act* provides for free medical, surgical, and hospital care for persons with the disease.
- 1939** Alberta Tuberculosis Association is formed. A twelve-day stay on a maternity ward is available for \$25.

Nutrition

Nutrition relates to the intake of food by an individual and the manner in which the food is assimilated by the human body in order to create body tissue.³⁵ Poor nutrition is a contributing factor to various diseases and conditions including being overweight and/or obese, diabetes, cardiovascular disease, high blood pressure, osteoarthritis, some cancers, and premature death.

The *Canadian Food Guide to Healthy Eating* outlines the foods that Health Canada has stipulated to be part of a good nutritional regiment. These are broken down into: Grain Products, Vegetables and Fruit, Milk Products, and Meats and Alternatives, and provides a comprehensive nutritional recommendation for Canadians.³⁶ The guide is currently in the final stages of a full review which assessed the food guide's: scientific background, changes in the food supply and food use patterns, use and understanding by intermediaries, and use and understanding by consumers.³⁷

In addition to the food guide, Health Canada recommends that individuals enjoy a variety of foods, emphasize cereals, breads, vegetables and fruit, choose low-fat dairy products, leaner meats, and food prepared with little or no fat, and limit the intake of salt, alcohol and caffeine.³⁸ The Canadian Food Guide recommends five to twelve servings of grains, five to ten servings of fruits and vegetables, two to four servings of dairy products, and two to three servings of meats and alternatives.

Less than half of all Albertans meet the recommended consumption of five or more servings of fruits and vegetables per day. Young adults (20 to 24 years) are the least likely to consume five or more servings, at only 30 per cent. Females are significantly more likely to consume the recommended amount than males. Between 2000/2001 and 2003 cycles of the Canadian Community Health Survey, the proportion of females who consumed five or more servings of fruits and vegetables daily increased while the proportion of males remained the same.

Figure 34 Percentage of Albertans reporting consuming five or more servings of fruits and vegetables per day, Alberta 2003

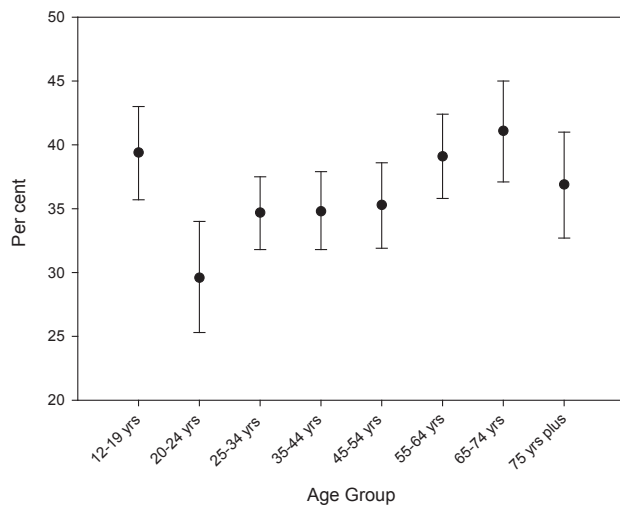
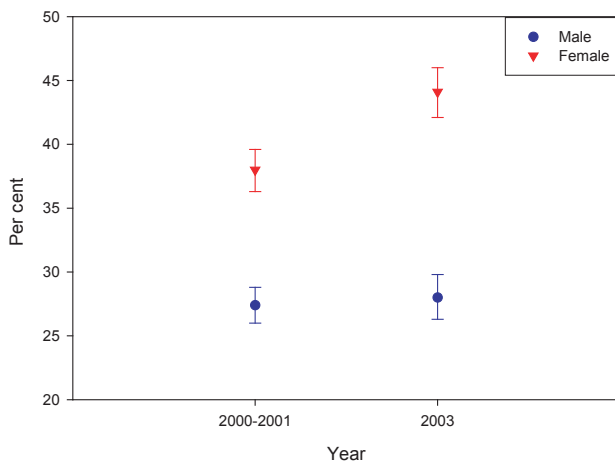
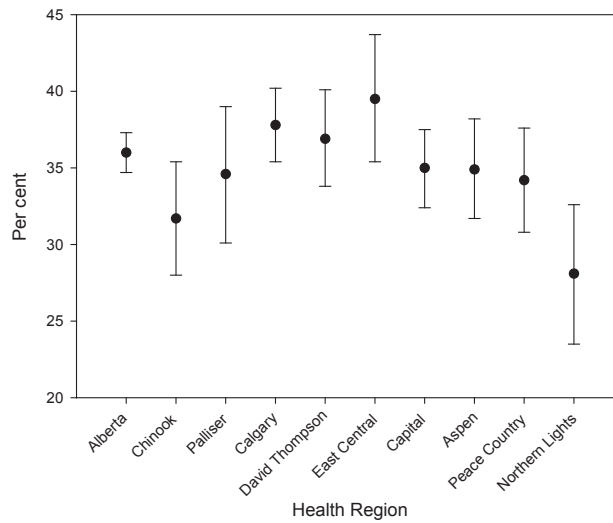


Figure 35 Percentage of Albertans reporting consuming five or more servings of fruits and vegetables per day by sex, Alberta 2003



Variations on fruit and vegetable consumption exist across health regions. Northern Lights had the lowest proportion of individuals indicating that they consumed five or more servings of fruits and vegetables; East Central reported the highest proportion.

Figure 36 Percentage of Albertans reporting consuming five or more servings of fruits and vegetables per day by regional health authority, Alberta 2003

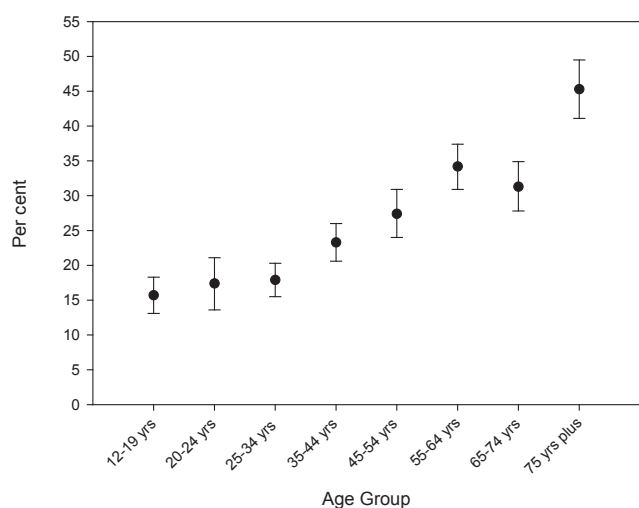


Disability and Functional Limitations

The measure for disability and functional limitations looks at the number of Albertans who report their activities are limited as a result of a long-term physical or mental condition or other health problem. These limitations may affect activities in the home, school, or workplace. They can affect access to transportation, employment and leisure activities.³⁹

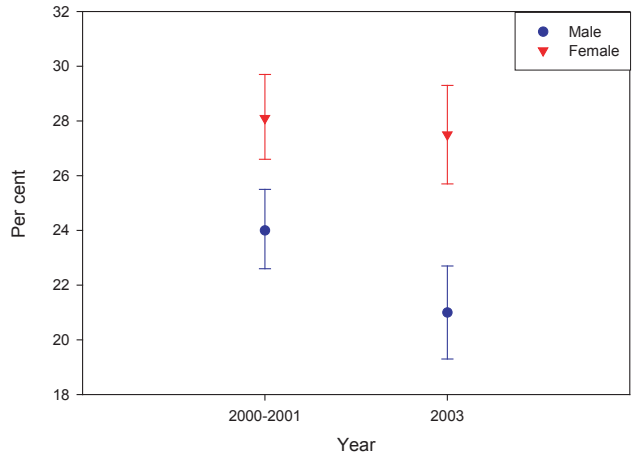
Activity limitation increases with increasing age (**Figure 37**). Males are much more likely to report having limitations than are females (**Figure 38**). Between 1994 and 2003, the proportion of the population reporting activity limitations has increased for both males and females. Across Alberta there is variation on reported activity limitation by regional health authority. The two northern most regions (Peace Country and Northern Lights) had the lowest proportion of their populations reporting activity limitation.

Figure 37 Percentage of the population reporting activity limitation by age, Alberta 2003



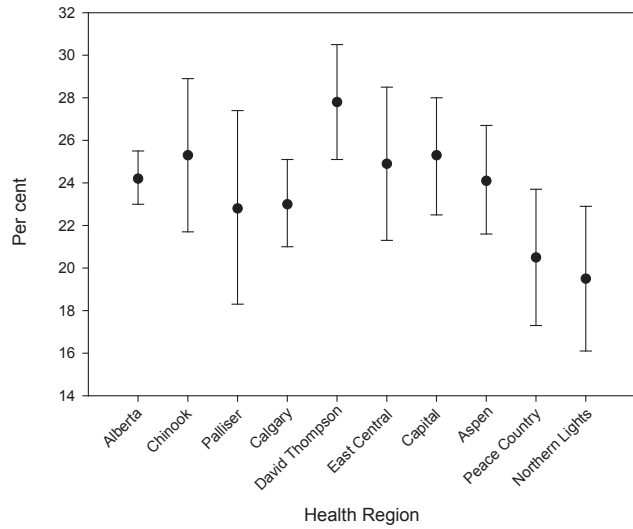
* Population aged 12 and over who report being limited in selected activities (home, school, work and other activities) because of a physical condition, mental condition or health problem which has lasted or is expected to last 6 months or longer.

Figure 38 Percentage of the population reporting activity limitation by sex, Alberta 1994 to 2003



* Population aged 12 and over who report being limited in selected activities (home, school, work and other activities) because of a physical condition, mental condition or health problem which has lasted or is expected to last 6 months or longer.

Figure 39 Percentage of the population reporting activity limitation by regional health authority, Alberta 2003



* Population aged 12 and over who report being limited in selected activities (home, school, work and other activities) because of a physical condition, mental condition or health problem which has lasted or is expected to last 6 months or longer.

Alcohol and Drug Use

Alcohol and drug use may pose serious health problems to individuals and society at large. The effects of alcohol use can be acute, chronic or relate to the dependence itself. Alcohol use is a compounding risk factor for a variety of diseases including hypertension, stroke, coronary artery disease and cancer and increases the risk of injury. It also increases reproductive disorders and results in poor pregnancy outcomes with low birth weight or fetal alcohol spectrum disorders in newborns.⁴⁰

Drug use and abuse is becoming more widespread. Drug addiction is a compulsion to use a substance and obtain it by any means with a need to increase the dosage or amount to obtain the desired effect. Physiological and/or psychological dependence on the effects of the substance may occur. Drug addiction has a detrimental effect on individuals, families and communities through increased stress, violence and crime.⁴¹

The proportion of individuals who consume five or more drinks per occasion 12 or more times per year are more likely to be younger (**Figure 40**) and male. The pattern of heavy drinking appears to be increasing over time for both males and females (**Figure 40**). While not significantly different than the provincial average, rates of heavy drinking appear highest in the Northern Lights health region and lowest in the Aspen health region (**Figure 41**).

Figure 40 Percentage of individuals reporting consuming five or more drinks on one occasion 12 or more times per year, by age, Alberta 2003

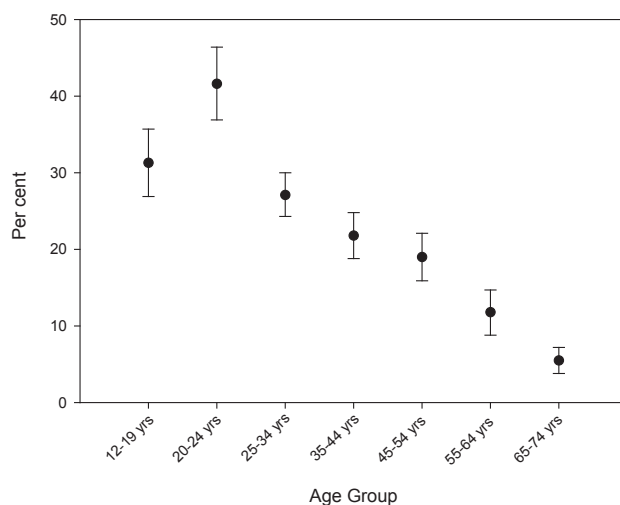


Figure 41 Percentage of individuals reporting consuming five or more drinks on one occasion 12 or more times per year, by sex, Alberta 1994 to 2003

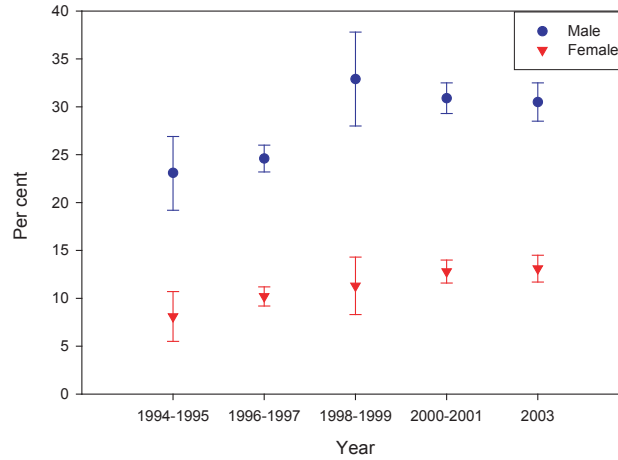
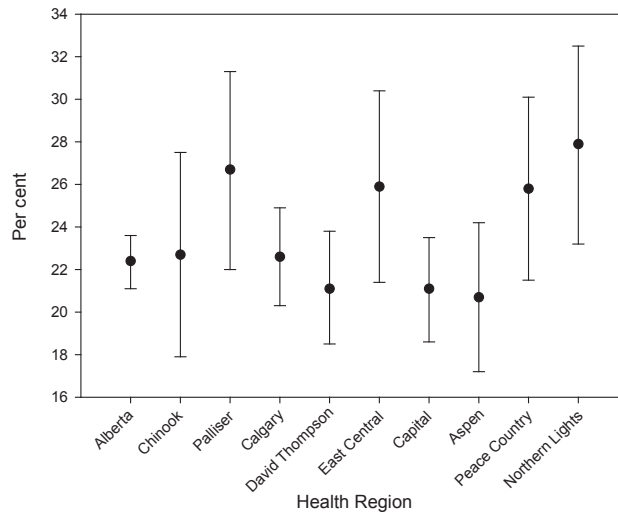


Figure 42 Percentage of individuals reporting consuming five or more drinks on one occasion 12 or more times per year, by regional health authority, Alberta 2003



Physical Activity

Physically active lifestyles have been linked to a decreased risk of many health problems including: cancer, type 2 diabetes, mental health problems, arthritis, hormonal problems, cardiovascular disease, lung disease, obesity and osteoporosis.⁴² One study has shown that middle aged people with desk jobs who do not exercise are twice as likely to have heart attacks as those who exercise regularly.⁴³ The benefits of physical activity go beyond individual health to impact the whole of the health care system.

The preventive benefits of exercise are promoted in Healthy U, an Alberta Health and Wellness initiative that provides Albertans with information on how they can stay healthy.⁴⁴ Although the benefits attained by exercising are great, the amount of exercise required for these benefits is minimal. Alberta Health and Wellness recommends an activity regimen of moderate to vigorous exercise for 20 to 30 minutes three or more times each week.⁴⁵ Furthermore the half-hour of exercise does not have to be done at once, and can be spread intermittently over the day.⁴⁶ To increase student physical activity levels, Alberta Education is introducing 30 minutes of mandatory daily physical activity in Alberta schools starting in fall 2005.⁴⁷

Figure 43 shows the percentage of Albertans who report being active or moderately active during their leisure time. The per cent has increased for both sexes since 1994 and the gap between males and females has decreased. Residents of the Calgary health region reported being the most active during leisure time, while residents of East Central reported the lowest.

Figure 43 Per cent reporting being active or moderately active during leisure time, Alberta 1994 to 2003

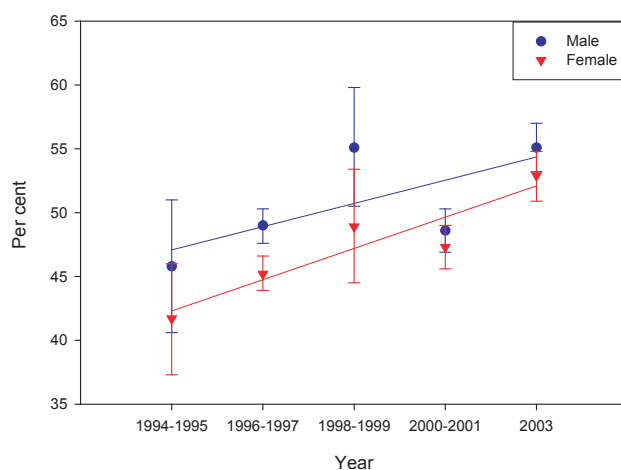
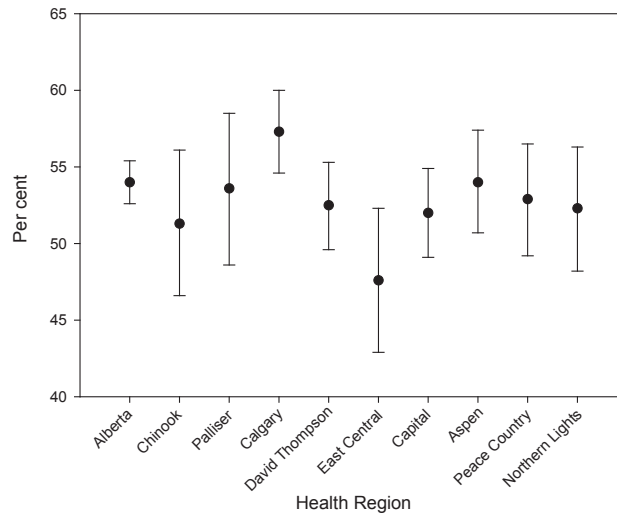


Figure 44 Per cent reporting being active or moderately active during leisure time by regional health authority, Alberta 2003



HISTORICAL EVENTS

- 1940 The *Cancer Treatment and Protection Act* is passed enabling people to receive free care.
- 1941 Alberta's population is 796,169. Life expectancy is 66.3 years for females and 63 years for males.
- 1943 Alberta's last case of smallpox is diagnosed.
- 1944 Hospital services related to childbirth are provided at no cost.
- 1945 An amendment to the *Solemnization of Marriage Act* provides for compulsory blood testing for all persons entering marriage to detect unsuspected syphilis infections as a means of preventing spread.
- 1946 Ninety-six hospitals are operating in Alberta with 5,903 active treatment beds.
- 1947 Calgary physicians claim that a shortage of trained nurses is making it difficult to manage a polio outbreak.
- 1947 The Provincial-Municipal Hospitalization Plan is proclaimed providing free hospitalization and treatment for persons receiving old age and blind pensions or mother's allowance.
- 1948 Diphtheria, Pertussis, and tetanus combined vaccine is introduced.

Mental illness accounts for a large part of the total burden of disease and disability in Alberta. The World Health Organization refers to mental health as "...a complex phenomenon which is determined by multiple social, environmental, biological and psychological factors and depends in part on public health efforts to control neuropsychiatric disorders, including depression, anxiety disorders, schizophrenia, dementia and epilepsy".⁴⁸

Individual mental disorders can take many different forms, and can include a vast array of diseases such as mood disorders, anxiety disorders, eating disorders, attention deficit disorders, schizophrenia, and psychotic disorders. In this section we focus on treated prevalence of all mental illness diagnoses combined, on anxiety and depression, and on substance abuse disorders.

Each year approximately one in five women has been seen by a physician for a mental health problem. For males this proportion is one in ten. The proportion of the Alberta population receiving physician services related to a mental health disorder has been rising. Between 1986 and 2003, mental health problems have increased for all ages for males and females (**Figure 46**). As well, females have consistently had higher rates than males. Of particular note is the increase among young males between five and 20 years of age and among the elderly over the age of 75 years.



Provincial Archives of Alberta, PA2858/1
Oliver Mental Hospital, classroom

Figure 45 Age standardized treated prevalence per 100 population for mental health problems, Alberta 1983 to 2003

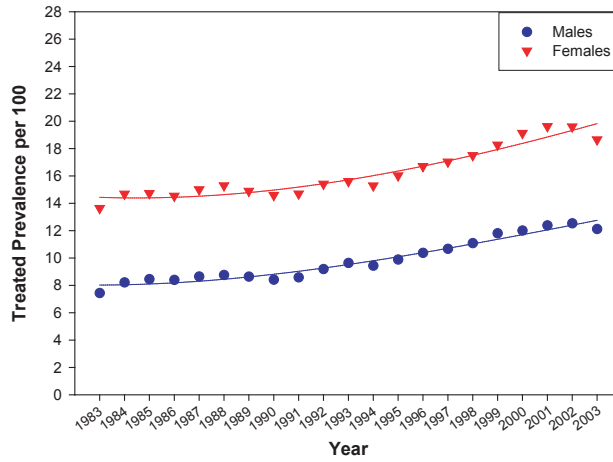
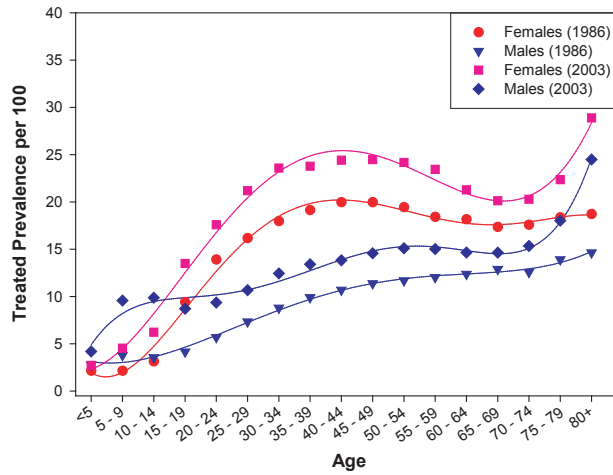
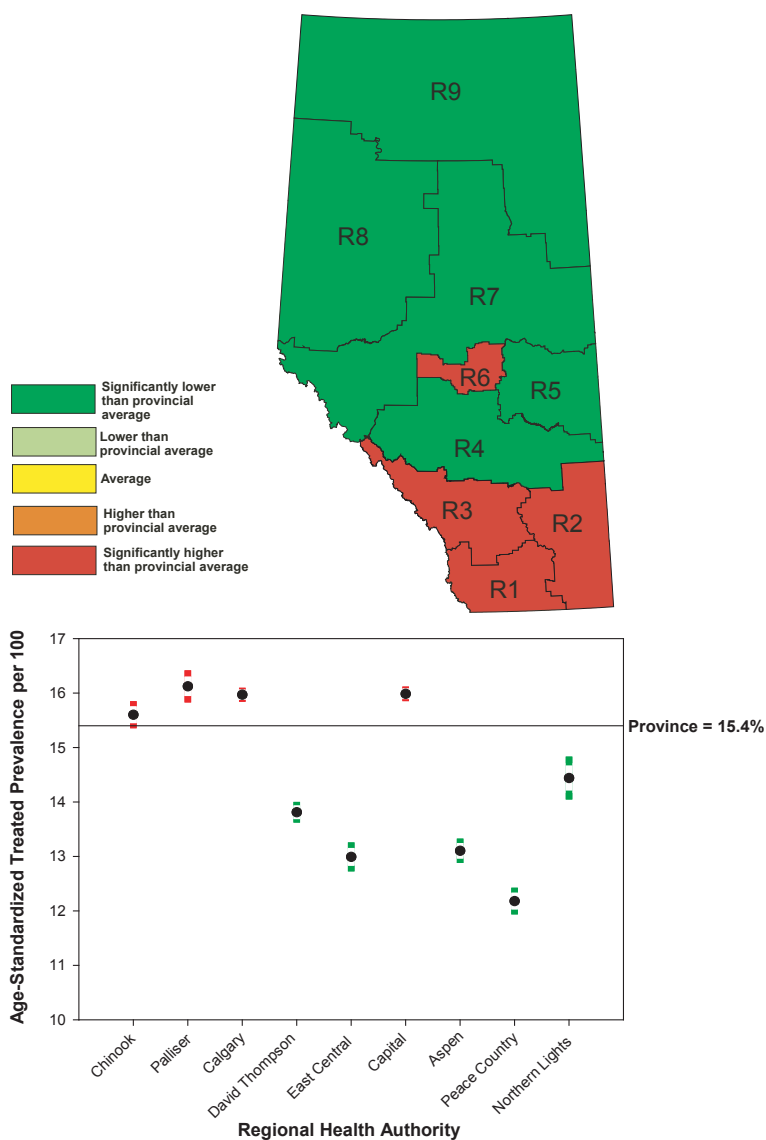


Figure 46 Treated prevalence per 100 population for mental health disorders by age and sex, Alberta 1986 and 2003



Regional variations in the treated prevalence for mental health problems are shown in **Figure 47**. Four health regions (Chinook, Palliser, Calgary, Capital) had prevalence estimates above the provincial average and the remaining five were significantly below the provincial average.

Figure 47 Regional differences in the treated prevalence for mental health disorders, Alberta 2003



Anxiety/Depression

Anxiety disorders and depression are two of Canada's most common illnesses. Due in part to the social stigma surrounding all forms of mental disorders, individuals with anxiety disorders and/or depression may not always seek professional help, and may experience a worsening of symptoms, and poor functioning in even the simplest day-to-day activities. These disorders are also risk factors for disorders such as drug and alcohol dependency, which may occur when individuals with anxiety disorders or depression attempt to medicate themselves.

Of course, some forms of anxiety are normal. Many people feel some level of nervousness before public speaking, or other types of performance such as a sporting activity or an examination. If this prompts an individual to prepare more fully or to abstain from more dangerous activities, then it has served a useful purpose. Excessive anxiety that begins to hinder the abilities to function or takes over an individual's life, however, is a disorder that should be treated. Anxiety disorders affect approximately one in 10 people.⁴⁹ It is most prevalent among women but can affect both sexes and any age group.⁵⁰ Anxiety disorders can be sub-classified into more specific disorders such as panic disorders, phobias, post-traumatic stress disorder, obsessive-compulsive disorder, and generalized anxiety disorder.

Like anxiety, sadness is a part of every life. However, prolonged or severe sadness may signal a depressive illness.⁵¹ Depressive illness can dramatically change the way a person thinks and behaves and how his/her body functions. For example, other symptoms which may be present include feeling helpless or hopeless, a change in sleep patterns, eating more or less than usual, losing interest in normal activities, a decreased sex drive, feeling guilty, losing energy or feeling fatigued, having difficulty concentrating or making decisions, and thinking of suicide. The illness can last a long or short time, and depends not only on individual response to treatment but also upon factors such as the nature of support and coping networks.⁵² Depressive illness is one of an array of mood disorders, which also includes bipolar disorder/ manic depression, and seasonal affective disorder.

Females are more likely to be treated for anxiety disorders/depression than males, and this remains true in Alberta. Middle age, particularly for females, is a time of greater risk (**Figure 49**). Since 1983, the treated prevalence of anxiety disorders/ depression has been increasing (**Figure 48**). The highest treated prevalence was seen in the Capital and Calgary health regions. Six regions (Chinook, David Thompson, East Central, Aspen, Peace Country, and Northern Lights) were significantly below the provincial average (**Figure 50**). Rates of hospitalization for anxiety disorders/ depression have been declining for many years, due in part to the widespread use of many new and effective medications (**Figure 51**).

Figure 48 Age standardized treated prevalence per 100 for anxiety disorders/depression, Alberta 1983 to 2003

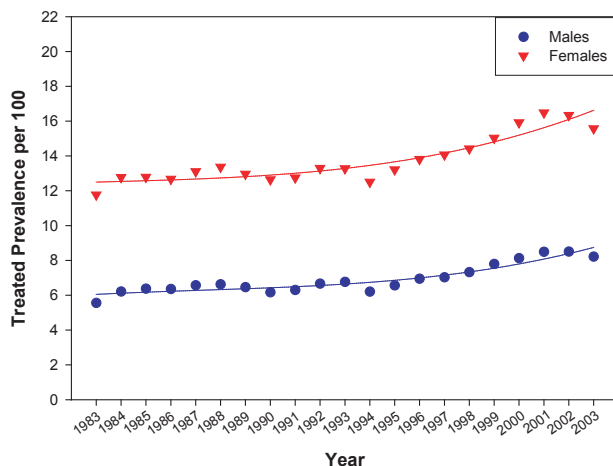


Figure 49 Age standardized treated prevalence per 100 population for anxiety disorders/depression problems by age and sex, Alberta 1986 and 2003

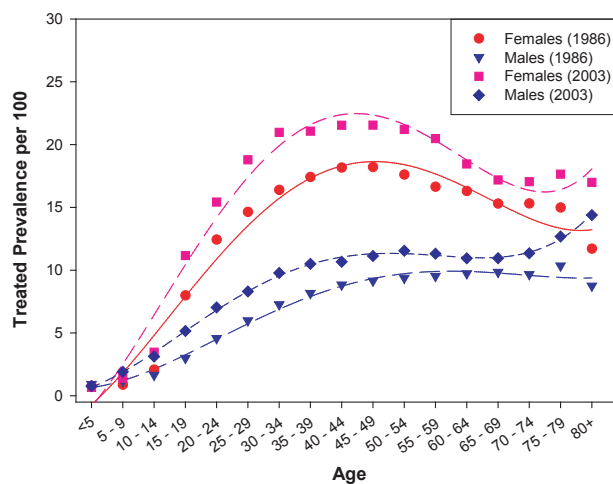


Figure 50 Regional differences in the treated prevalence for anxiety disorders/depression, Alberta 2003

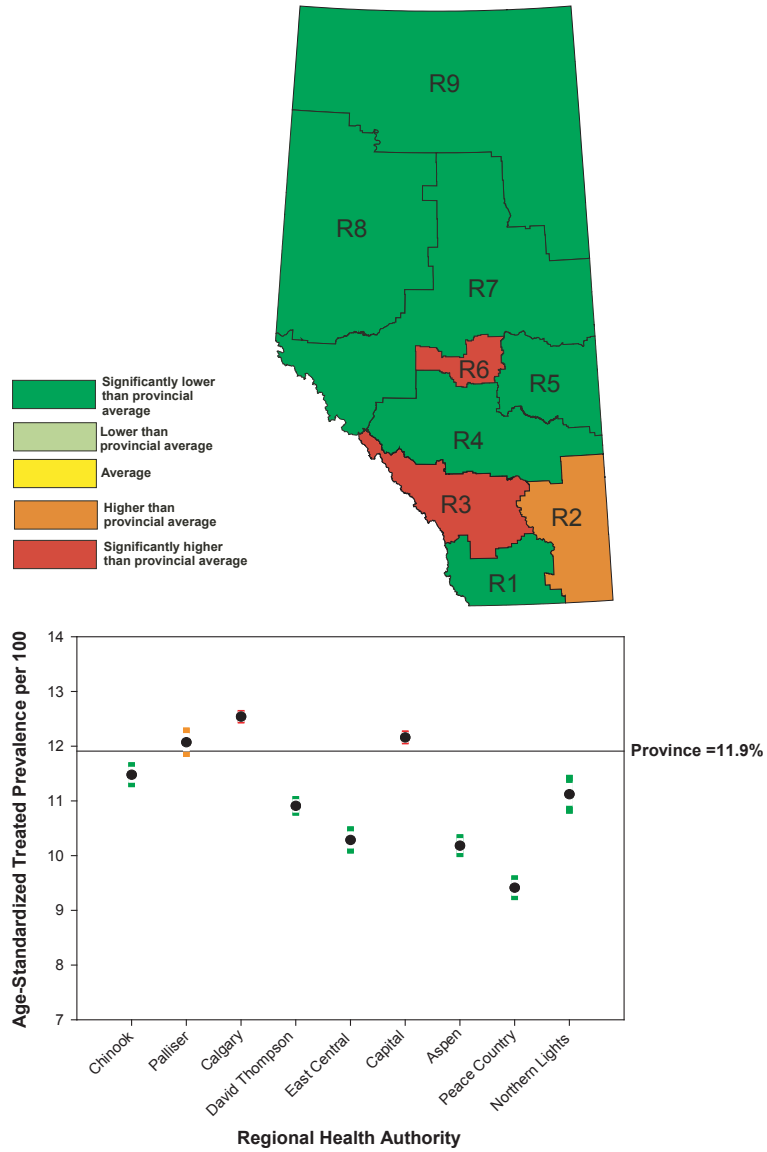
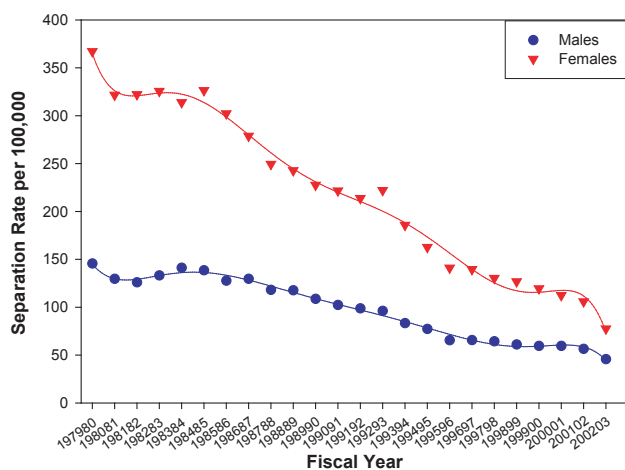


Figure 51 Age standardized hospital separation rates per 100,000 for anxiety disorders/ depression, Alberta 1979/1980 to 2002/2003



HISTORICAL EVENTS

- 1950** The province provides hospital care for a dollar a day.
- 1951** Alberta’s population is 939,501. Life expectancy is 70.8 years for females and 66.3 years for males.
- 1952** The most severe polio epidemic on record occurs with more than 57,800 people stricken. The images of youngsters in wheelchairs, on crutches, or in unwieldy “iron lungs” responsible for their every breath, haunted parents.
- 1955** Dr. Jonas Salk’s polio vaccine is determined to be safe and effective against polio. Following the announcement, Alberta public health officials begin immunizing 40,000 school age children.
- 1956** The first open heart surgery is performed at the University of Alberta Hospital.
- 1957** The federal government passes the *Hospital Insurance and Diagnostic Services Act* establishing necessary hospital care for virtually all Canadians. The cost was shared equally by provinces and the federal government.

Substance Abuse Disorders

Figure 52 displays the treated prevalence per 100 population for physician services related to substance abuse disorders. While males have a significantly higher treated prevalence, the gap between the sexes appears to be decreasing. Both males and females have shown an increase in the treated prevalence over time. **Figure 53** compares the age-specific rates of substance abuse treated prevalence for the years 1986 and 2003. There has been a change in the age distribution to younger ages for both sexes.

Figure 52 Age-standardized treated prevalence per 100 population for substance abuse disorders, Alberta 1983 to 2003

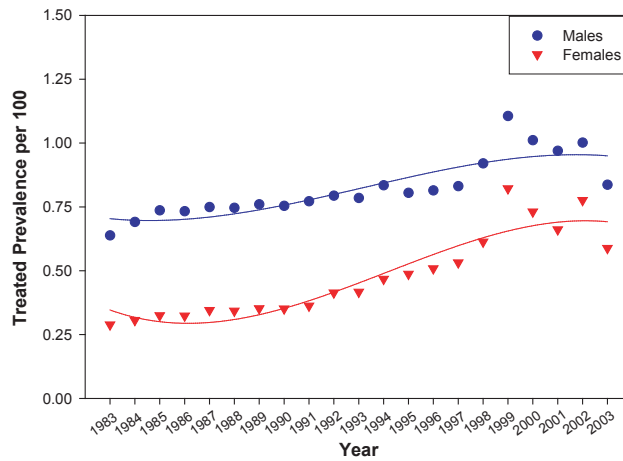
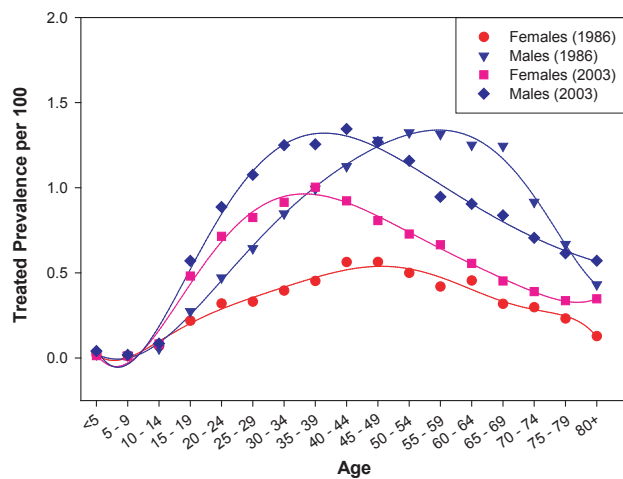
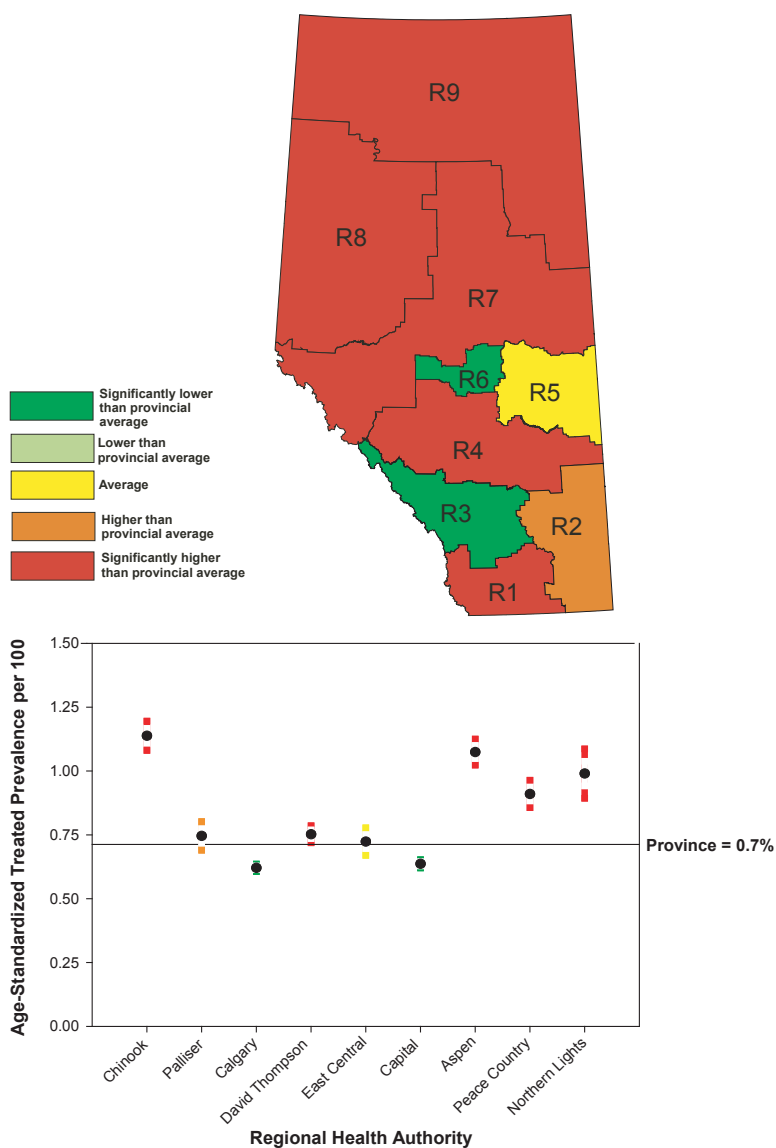


Figure 53 Age-standardized treated prevalence per 100 population for substance abuse disorders by age and sex, Alberta 1986 and 2003



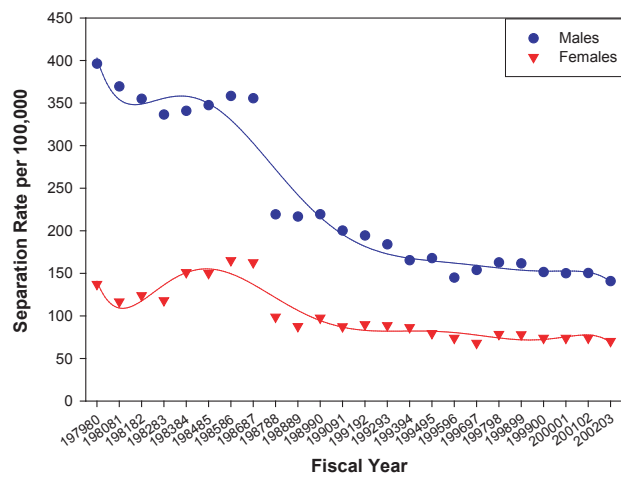
The treated prevalence for substance abuse disorders was lowest in the two largest health regions (Capital and Calgary). Five health regions were significantly above the provincial average for substance abuse disorder treatment (**Figure 54**).

Figure 54 Regional differences in the treated prevalence of substance abuse disorders, Alberta 2003



While the overall proportion of the population consuming alcohol and being treated for substance abuse disorders has increased, hospitalizations have shown a different trend (Figure 55). Hospital separation rates for substance abuse disorders declined from 1979 to the early 1990s where they have been stable. Males are more likely to be hospitalized for substance abuse disorders.

Figure 55 Age standardized hospital separation rates per 100,000 population for substance abuse disorders, Alberta 1979/1980 to 2002/2003



Non-communicable diseases are also commonly known as chronic diseases. These diseases are not the results of pathogens or parasites, but instead, result from a number of risk factors including an individual's age and their lifestyle.⁵³ Non-communicable diseases have become the leading causes of mortality and morbidity in developed countries worldwide and Alberta is no exception. While the incidence of communicable diseases has declined, the prevalence of chronic diseases has been increasing.

This section reviews the history of non-communicable diseases and focuses on the most common: cancer, cardiovascular disease (heart disease), cerebrovascular disease (stroke), hypertension, chronic respiratory disorders, diabetes, chronic renal failure, and arthritis.

Historical Context

The first recorded chronic diseases were those associated primarily with poor nutrition. The lack of essential vitamins and nutrients lead to goitre, scurvy, and rickets. These historically common diseases are virtually non-existent in modern Alberta. Modern chronic diseases, however, are primarily the function of poor nutrition and lifestyle choices. Additionally, these diseases are now the leading causes of death and disease in Alberta.

Major health concerns before World War II were predominantly pneumonia and tuberculosis. Diseases such as goitre, scurvy, and rickets were frequent and Albertans died at a younger age, and in greater numbers. However, antibiotics and vaccines, along with improved living standards, sanitation, nutrition and safe water, brought a reduction in mortality rates from infectious diseases and an increase in life expectancy.

An improved understanding of amines vital to the function of the body brought the discovery of vitamins (vital amines). A number of vitamins were identified within the early 1900s: vitamin D (1911), vitamin A (1916), vitamin B (1916), and vitamin C (1932). The identification of vitamin D (1922) in cod-liver oil resulted in its use as a staple in childcare for decades. Additional substances were also included in the daily lives of Albertans; between 1931 and 1937 the fluoridation of water was implemented to reduce tooth decay, in 1976 the ionization of salt became mandatory in order to prevent goitre. The mineral and vitamin fortification of bread also became mandatory. In the 1950s the fortification of milk with vitamin D served to prevent rickets.



Provincial Archives of Alberta, J1940/4
Cross Cancer Institute - 1975

Due to the improvements in lifestyle, communicable and low-nutrient diseases have nearly vanished, and this has given chronic diseases the opportunity to surface. Although chronic diseases have always existed in human history (diabetes was initially recorded in 1500 BC), the frequencies with which these diseases are occurring have never been higher. These diseases are a product of lifestyle choices such as smoking, a lack of exercise, diets rich in unhealthy fats and sugars, and risk-taking behaviour.⁵⁴

Diabetes – eye exam



Improved living conditions and medical advancements have led to Albertans living longer lives; achieving ages where the propensity for acquiring chronic disease increases.

Some chronic diseases are incurable, and all have an impact on quality of life. However, chronic diseases may be reduced with proper nutrition, exercise and other healthy lifestyle choices.



Lung – emphysema

Cancer

Cervical Cancer

Cervical cancer refers to the cancer of the cervix, the lower, narrow end of the uterus. The cervix leads from the uterus to the vagina (birth canal).⁵⁵ The most common type of cervical cancer starts in the cells that line the surface of the cervix⁵⁶ and is called squamous cell cancer. Adenocarcinoma starts in the mucous secreting glandular tissue of the cervix and is less common.⁵⁷ Cervical cancer has a very good prognosis when detected and treated early.⁵⁸

A number of risk factors have been associated with cervical cancer. Almost all individuals with cervical cancer had been previously infected with HPV (human papilloma virus). However, not all HPV infected women will develop cervical cancer.^{59,60,61,62} Additional risk factors associated with cervical cancer are infection with other sexually transmitted diseases,⁶³ smoking,^{64,65,66} sexual intercourse at a young age,^{67,68} multiple sex partners,^{69,70} suppression of the immune system by drugs after an organ transplant or AIDS,^{71,72} giving birth to many children,⁷³ a diet lacking in vitamins A and C,⁷⁴ and oral contraceptive use.⁷⁵

Cervical cancer is highly preventable. With a combination of a healthy lifestyle and preventive testing, the risk of cervical cancer is reduced and the chance of successfully treating the disease increased. Screening can prevent the incidence of invasive cervical cancer by detecting and treating pre-cancers and treating early stages before they develop into cancer.⁷⁶

Hospital separation rates for cervical cancer have shown a steady decline between the early 1980s and the late 1990s. Current hospital separation rates (**Figure 56**) are one-third of what they were more than 20 years ago. Many factors help to contribute to this decrease and include screening for early detection, a general move to community-based care, and the provision of treatments on an outpatient basis.

Figure 56 Age-standardized hospital separation rates for cervical cancer, Alberta 1979/1980 to 2002/2003

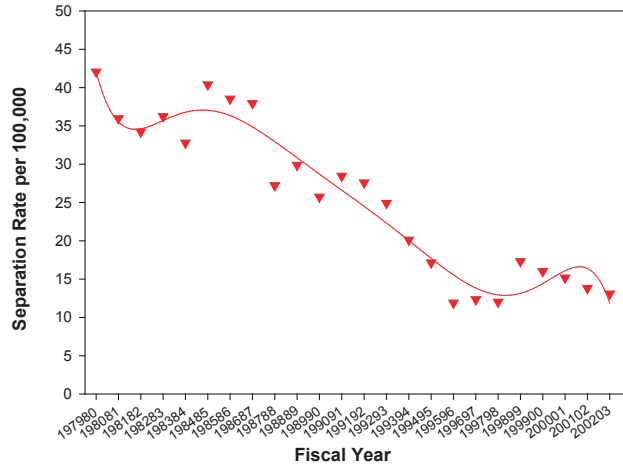
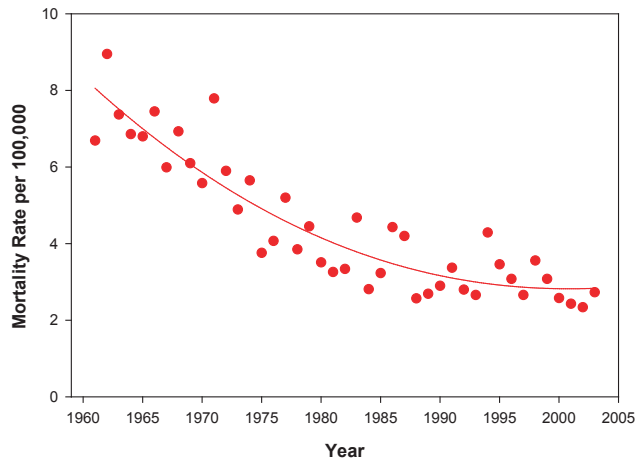


Figure 57 displays the age-standardized mortality rate for cervical cancer. A significant decrease has occurred since the early 1960s with rates falling by nearly 50 per cent. While this pattern has been encouraging, there appears to be a leveling of the mortality rate in the past decade. A total of 41 deaths in 2003 were attributed to cervical cancer.

Figure 57 Age standardized mortality rate for cervical cancer, Alberta 1960 to 2003



Lung Cancer

Lung cancer causes more fatalities and death than any other form of cancer in men and women.⁷⁷ In Alberta, lung cancer accounts for 27 per cent of cancer-related mortalities among men, and 22 per cent among women.⁷⁸ This cancer begins in the lungs, and may spread to other areas of the body. Cancers occurring in the lungs can be divided into four types, small cell lung cancer, squamous cell carcinoma, adenocarcinoma, and large cell carcinoma. Of all of the lung cancers, small cell lung cancer is the least common, but most prone to migrating to other areas of the body.

A number of risk factors have been shown to cause lung cancer. The 1980 U.S. Surgeon General's report states: "smoking is causally associated with cancer of the lung...in women as well as in men".⁷⁹ It has been shown that more than four out of five lung cancers are linked to cigarette smoking and second-hand smoke.^{80,81} Risk factors that also predispose an individual to lung cancer, but to a lesser extent than cigarette smoking, include: cigar and pipe smoking,^{82,83} and environmental factors including carcinogens such as radon gas, asbestos, arsenic, and some forms of silica, nickel and chromium.⁸⁴

Due to the severity of lung cancer, the number of deaths per year is almost as high as the number of new cases. Lung cancer has the highest mortality rate of any other cancer. Still, given the high causality of risk factors such as smoking, lung cancer is almost entirely preventable. By ceasing to smoke, an individual immediately lowers their chance of getting lung cancer. However, those who quit smoking will never have as low of a risk of developing lung cancer as those who have never smoked. Subsequently, the most effective means of preventing lung cancer is to never begin smoking. Lowering the risk of exposure to environmental factors also contributes to lowering the chances of developing lung cancer. Testing the work and home environments for carcinogens and, if found, removing them, will aid in preventing cancer. By removing risk factors, the chance of lung cancer is greatly lowered; however it is never zero, especially for those who are genetically predisposed to lung cancer.

Figure 58 shows the hospital separation rates for lung cancer for males and females for the years 1979/1980 to 2002/2003. During this period male and female separation rates have converged with males showing a marked decline in hospitalizations related to lung cancer. While females have also shown a moderate decrease over the same period, it is not nearly as pronounced as for males.

Figure 58 Age standardized hospital separation rates per 100,000 for lung cancer, Alberta 1979/1980 to 2002/2003

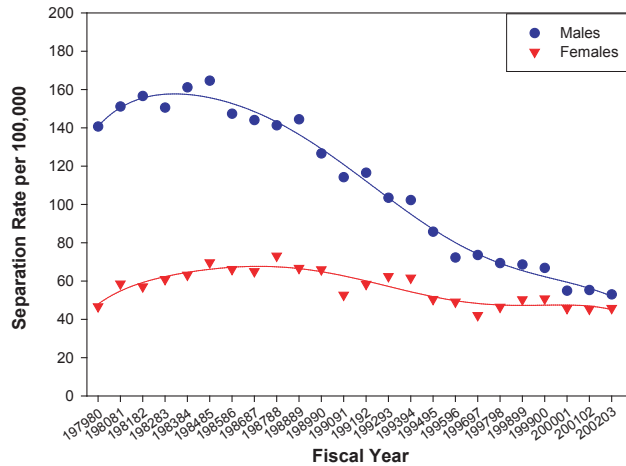
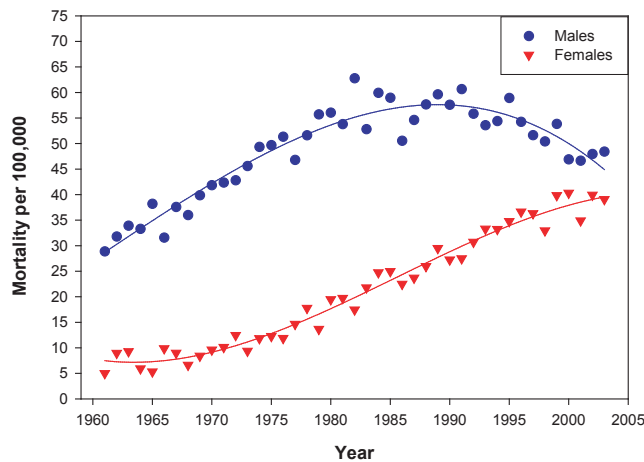


Figure 59 shows the age-standardized mortality rates attributed to lung cancer from 1961 to 2003. Males showed a steady increase in mortality until the mid-1980s when the rate began to fall. During the general decline, there was a fair amount of variability from year to year. Females followed a very different pattern with a general increasing trend over 40 years. The decrease among males and increase among females has nearly closed the gap between the sexes on risk of death due to lung cancer.

Figure 59 Age-standardized lung cancer mortality rates, Alberta 1961 to 2003



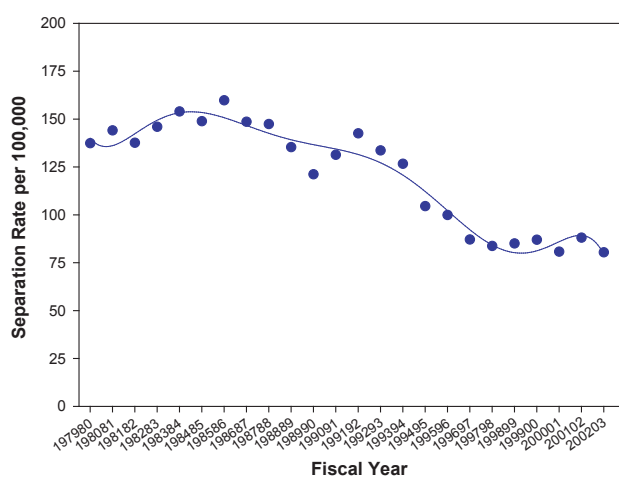
Prostate Cancer

Prostate cancer is the most commonly diagnosed cancer in men, and is one of leading causes of death for men in Canada.^{85,86} Prostate cancer is the cancer of the prostate gland found only in men. Due to the disease's tendency to remain latent, autopsy studies have found that between 60 and 70 per cent of men over the age of 80 have evidence of prostate cancer, although they had no clinical symptoms.⁸⁷

A number of risk factors have been associated with prostate cancer. The most prominent risk factor is being a male over the age of 70. Furthermore, a family history of prostate cancer in a close relative, African-Canadian ancestry, and long term exposure to testosterone, all significantly increase the risk of prostate cancer. Some risk factors with a weaker association with developing prostate cancer include: a diet high in animal fats and low in vegetables and fruit, and occupational exposure to cadmium in the battery or smelting industry.^{88,89}

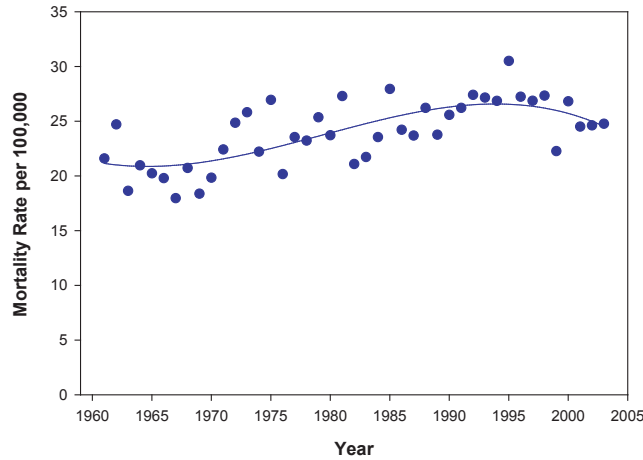
Prostate cancer hospital separation rates per 100,000 population are displayed in **Figure 60**. A general decline in hospitalizations was observed over the period of observation. Recently, hospital separation rates appear to have leveled off with minimal differences recorded over the past seven years. The general decrease may be attributed to a move from inpatient care to outpatient care and management within the community setting.

Figure 60 Age-standardized hospital separation rates for prostate cancer, Alberta 1979/1980 to 2002/2003



Mortality rates for prostate cancer have increased slightly over the past 40 years, stabilizing in the 1990s. In 2003, there were 362 deaths attributed to prostate cancer for an age-standardized mortality rate of 24.8 per 100,000 males.

Figure 61 Age-standardized mortality rates attributed to prostate cancer, Alberta 1961 to 2003



HISTORICAL EVENTS

- 1961** Alberta’s population passes the one million mark at 1,331,944. Life expectancy is 74.2 years for females and 68.4 years for males.
- 1962** Canada’s last case of smallpox is diagnosed in a young boy traveling from Brazil with a falsified smallpox vaccination certificate. No secondary infections were reported. To this point Canada had been smallpox free since the 1940s.
- 1963** The first pace maker operation is performed at the University of Alberta Hospital.
- 1964** The U.S. Surgeon General warns that cigarette smoking may be hazardous to health.
- 1964** The *Nursing Homes Act* is passed.
- 1966** Edmonton adds fluoride to drinking water.
- 1967** The Provincial Cancer Hospitals Board is formed to operate cancer treatment and research programs.
- 1968** The Criminal Code of Canada is amended making therapeutic abortions legal.
- 1969** The *Alberta Health Care Insurance Act* is passed providing comprehensive health services.
- 1969** Measles vaccine made available.
- 1969** The Blair Report on Mental Health Services in Alberta recommends a number of changes to the mental health system that included a movement from institutional care to community care.

Cardiovascular Disease

Cardiovascular disease (CVD) is a general name given to a number of diseases that affect the heart and the network of veins and arteries, which feed blood to all parts of the body. While CVDs affect the heart in a variety of ways; each results in reducing the functioning of the heart. The major CVDs include coronary (or ischaemic) heart disease (including heart attack), cerebrovascular disease (stroke), hypertension (high blood pressure), heart failure, and rheumatic heart disease. Although some of the risk factors associated with the diseases are non-modifiable, many are modifiable, especially in reducing the risk in those less than 65 years of age.⁹⁰

The treated prevalence for cardiovascular disease has been rising in recent years. Approximately, 15 per cent of men and 12 per cent of women visited a physician for services related to cardiovascular disease in 2003 (**Figure 62**). The treated prevalence increases with increasing age (**Figure 63**). Between 1986 and 2003 there was approximately a 50 per cent increase in the treated prevalence for both males and females with approximately 65 per cent of all Albertans over the age of 75 having been treated compare to about 45 per cent in 1986.

Figure 62 Age-standardized treated prevalence per 100 population for cardiovascular disease, Alberta 1983 to 2003

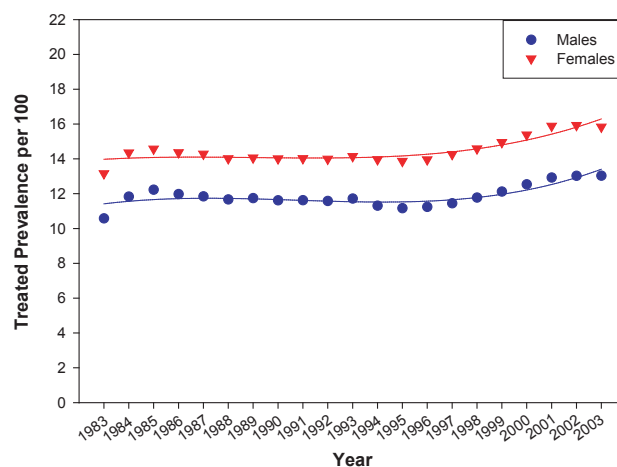
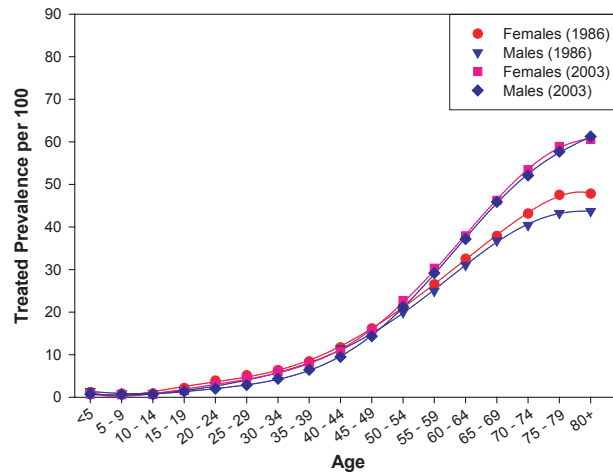


Figure 63 Age-specific treated prevalence per 100 population for cardiovascular disease, Alberta 1986 and 2003



Ischaemic Heart Disease

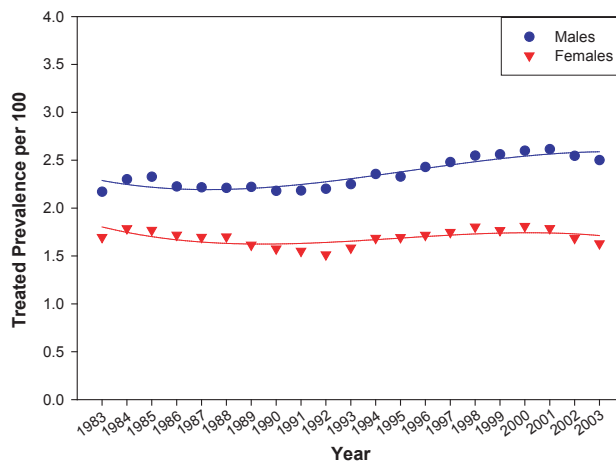
Ischaemic heart disease is also known as coronary heart disease, and often is a precursor to a heart attack. Ischaemic heart disease refers to a condition where there is a lack of blood and oxygen being delivered to the heart muscles.⁹¹ This condition is caused by cholesterol deposits⁹² which block arteries, and is one of the main causes of death in Canada. Clogged arteries cannot deliver enough blood to the muscles of the heart, resulting in the death of heart-muscle cells, and the loss of elasticity of the heart muscle.⁹³ Typically, this causes angina pectoris, or chest pain. Should a blood clot form and the artery become completely blocked, a heart attack, and possibly sudden death, will result.⁹⁴ Although the number of deaths due to coronary heart disease has dropped in the past decade among men and women, it remains a leading cause of death among Albertans.⁹⁵

A number of risk factors have been associated with ischaemic heart disease, and include both modifiable and non-modifiable factors. Non-modifiable factors are those that are not affected by lifestyle changes. In the case of ischaemic heart disease these include increasing age, being male, and a family history of heart disease.^{96,97} However, some major risk factors can be modified or controlled by changes in lifestyle including cigarette smoking, high cholesterol, high blood pressure, physical inactivity, being obese and/or overweight, and having diabetes mellitus.^{98,99}

Figure 64 displays the age-standardized treated prevalence for ischaemic heart disease from 1983 to 2003. Approximately two and half per cent of males and one and a half per cent of females were treated for ischaemic heart disease in 2003.

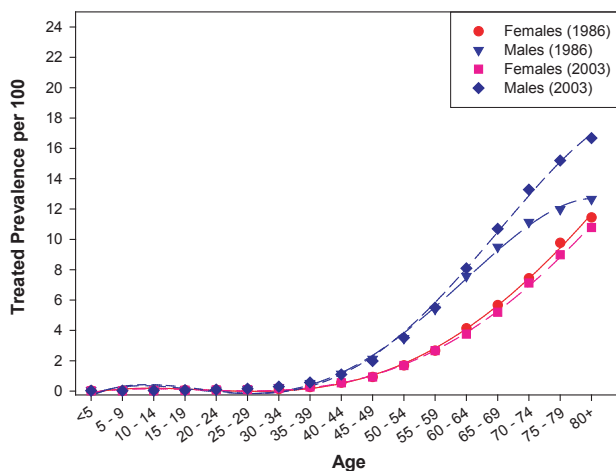
For males, there has been a slight increase in the proportion being treated while female rates were stable. Males had consistently higher treated prevalence rates than females.

Figure 64 Age-standardized treated prevalence per 100 population for ischaemic heart disease, Alberta 1983 to 2003



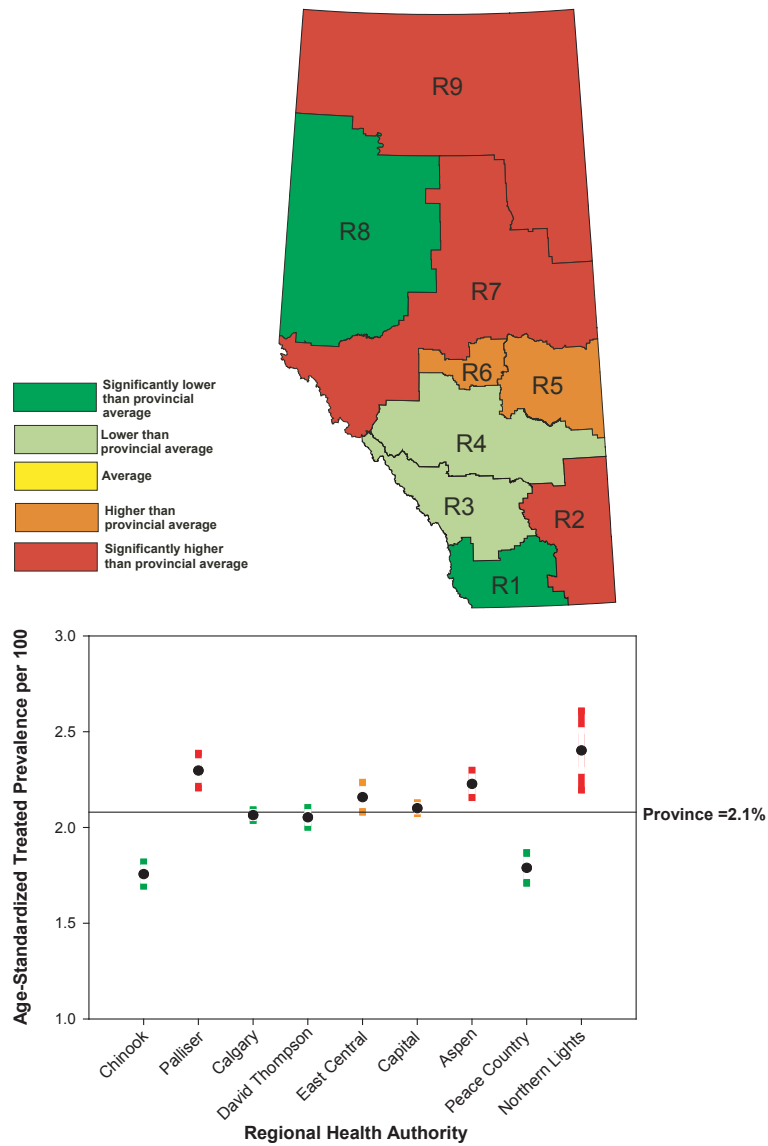
Ischaemic heart disease treated prevalence increases with age beginning in the fourth decade of life. The treated prevalence for males is higher than females throughout all ages older than 45 years. No significant difference was noted for females in their age distribution when comparing 1986 treated prevalence to 2003 (Figure 65). For males, the pattern was also similar with the exception of an increase in treated prevalence at the oldest age groups (age greater than 75 years) in 2003.

Figure 65 Age-specific treated prevalence per 100 population for ischaemic heart disease, Alberta 1983 to 2003



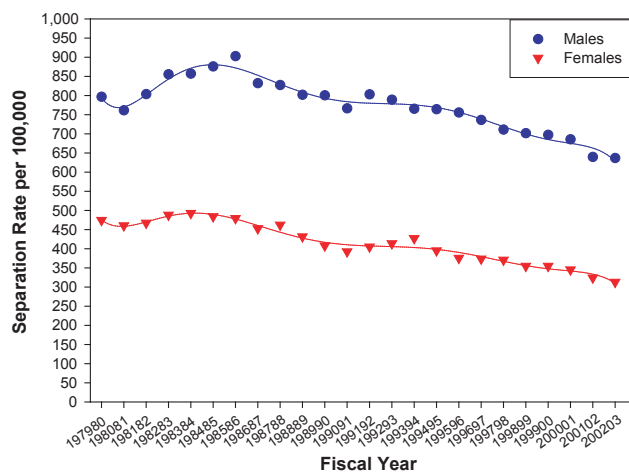
A significant difference exists in the treated prevalence of ischaemic heart disease across Alberta's nine regional health authorities. Palliser, Aspen, and Northern Lights health authorities had treated prevalence estimates significantly higher than the provincial average of 2.1 per cent while both Chinook and Peace Country health authorities had rates significantly below the provincial average.

Figure 66 Regional differences in the treated prevalence of ischaemic heart disease, Alberta 2003



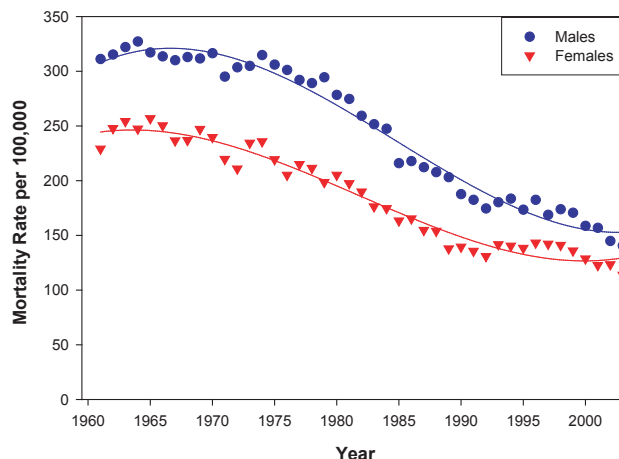
Hospital separation rates per 100,000 population are displayed in **Figure 67**. A general decreasing pattern is seen for both males and females. The higher treated prevalence for ischaemic heart disease in males is also evident in hospital separation rates. Given that the ischaemic heart disease treated prevalence was slightly increasing for males and stable for females, decreasing hospital separation rates would seem to imply that more individuals are being managed more successfully in the community reducing the need for inpatient services for this group.

Figure 67 Age-standardized hospital separation rates per 100,000 population for ischaemic heart disease, Alberta 1979/1980 to 2002/2003



Age-standardized mortality rates per 100,000 population attributed to ischaemic heart disease are displayed in **Figure 68**. A decreasing mortality rate is evident for both males and females. However, the male mortality rate appears to be decreasing more rapidly than the female rate, thus narrowing the gap between the sexes.

Figure 68 Age-standardized mortality rate per 100,000 population for ischaemic heart disease, Alberta 1961 to 2003

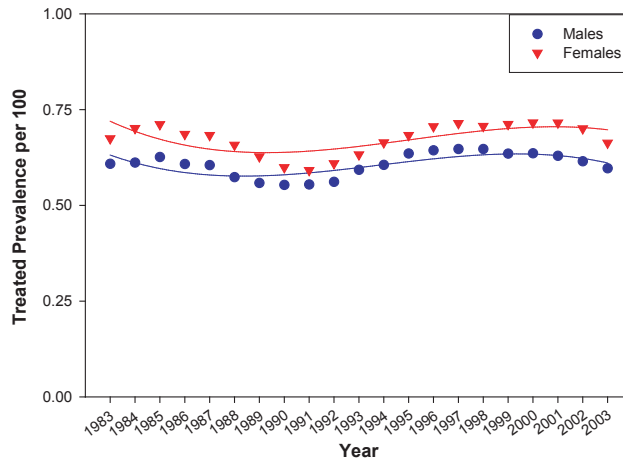


Cerebrovascular Disease

Cerebrovascular disease is also referred to as stroke or brain attack. A stroke occurs when blood flow to the brain is suddenly interrupted. The resulting damage may occur due to bleeding in the brain, or in approximately 70 to 80 per cent of cases¹⁰⁰ because of a clot blocking blood from entering the brain. In both cases massive brain-cell death may occur, and the functions that those brain cells performed may become hindered or paralyzed. Strokes often lead to paralysis, limb weakness, mental problems, pain in the hands and feet, and death.¹⁰¹ Stroke survivors may never recover from the brain damage inflicted by the stroke, and the rehabilitation and lifestyle management associated with having a stroke lasts a lifetime. Furthermore, recurrent strokes are frequent and about 25 per cent of people who recover from the first stroke will have another stroke within five years.¹⁰²

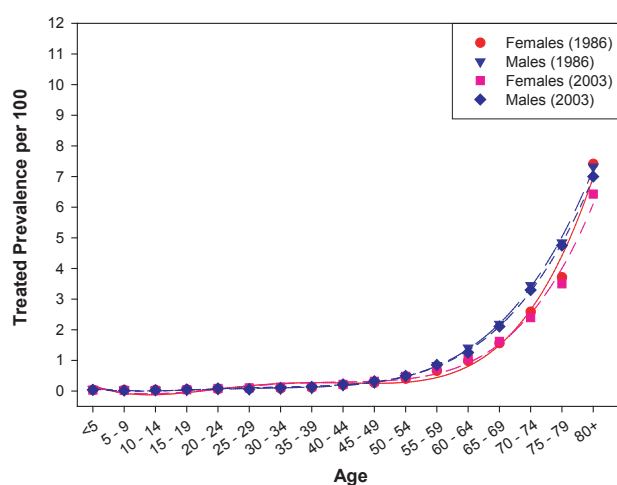
A number of risk factors have been associated with getting a stroke, and include both modifiable and non-modifiable factors. Non-modifiable factors are those that lifestyle modifications cannot change; in the case of a stroke these include being over 55 years of age, being male, having atrial fibrillation,¹⁰³ and having a family history of heart disease.^{104,105} Those factors that can be modified include: high blood pressure, cigarette smoking, heart diseases such as ischaemic heart disease, and diabetes.¹⁰⁶

Figure 69 Age-standardized treated prevalence per 100 population for cerebrovascular disease, Alberta 1983 to 2003



The treated prevalence rate for cerebrovascular disease shows a general decline during the 1980s followed by an increase and then stabilizing in the 1990s; recent rates show a possible decline. Little difference exists between the sexes and no difference between age-specific treatment rates could be seen for the years 1986 and 2003. Cerebrovascular disease appears later in life rising rapidly after age 65 years (Figure 70).

Figure 70 Age-specific treated prevalence per 100 for cerebrovascular disease, Alberta 1986 and 2003



HISTORICAL EVENTS

- 1971 Alberta's population is 1,627,874. Life expectancy is 76.4 years for females and 68.4 years for males.
- 1972 The *Mental Health Act* is passed shifting the focus of care from institutionally based to community based.
- 1973 The provincial government assumes responsibility for Health Unit funding. Dental and nutritional programming are added to health unit services.
- 1977 The United Nurses of Alberta is established.
- 1978 Home care programs introduced in Alberta's health units.
- 1979 Alberta reports its last case of polio.

Cerebrovascular disease treated prevalence varied by regional health authority with Chinook, Palliser, and Aspen having rates significantly higher than the provincial average. Capital, Peace Country, and Northern Lights regional health authorities had treated prevalence rates significantly below the provincial average (Figure 71).

Figure 71 Regional differences in the treated prevalence of cerebrovascular disease, Alberta 2003

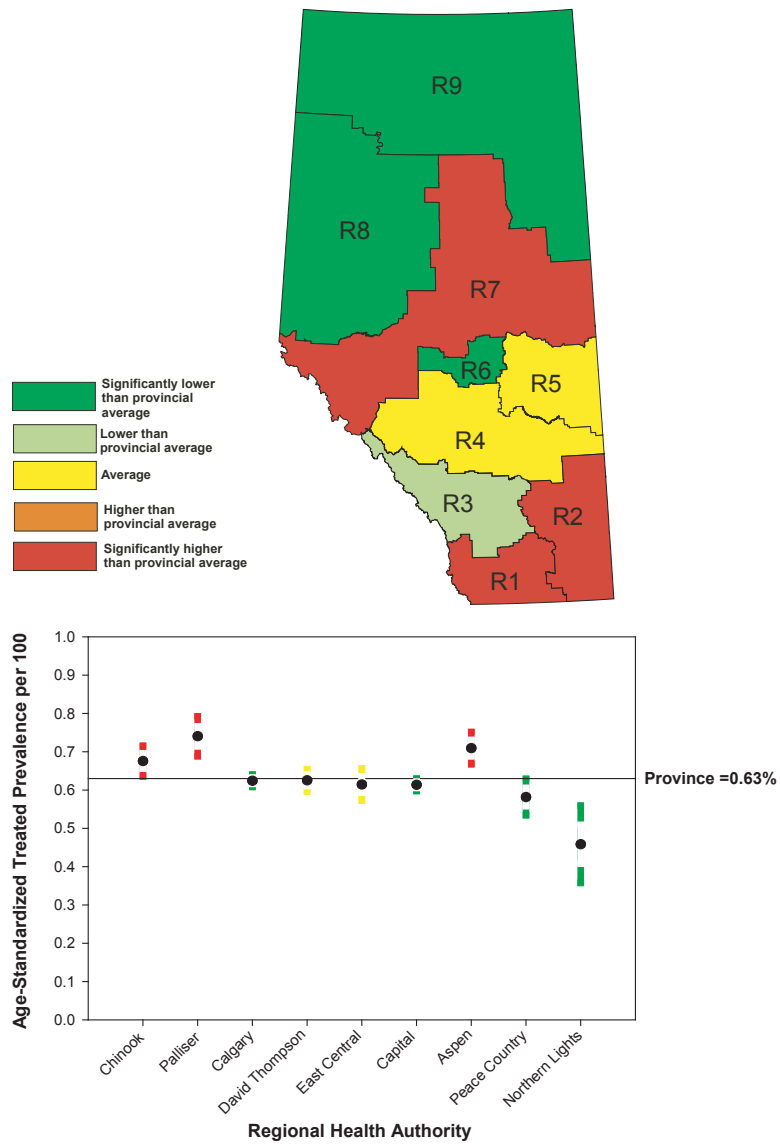
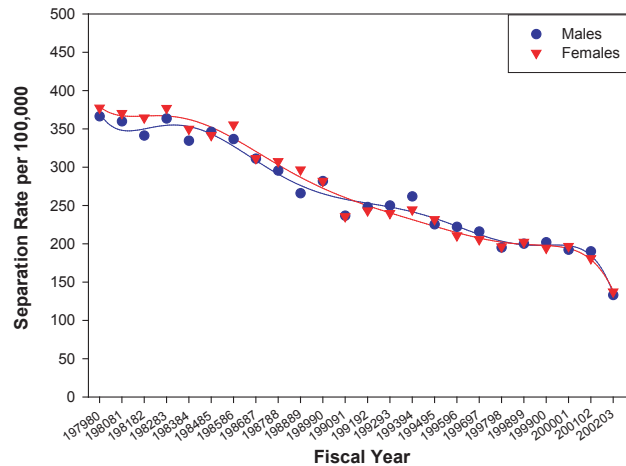


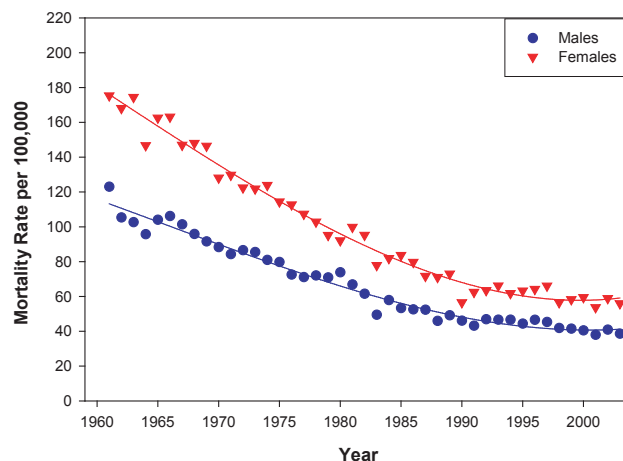
Figure 72 Age-standardized hospital separation rate per 100,000 population for cerebrovascular disease, Alberta 1979/1980 to 2002/2003



Both males and females show a significant decrease in hospital separation rates between the 1979/1980 and 2002/2003 fiscal years. There was no difference between males and females for hospitalizations. This decrease in hospitalizations was not seen in the overall treated prevalence suggesting that the increased treatment options and diagnostic imaging available to assess and treat individuals with cerebrovascular disease is leading to lower hospitalization rates.

Mortality rates for cerebrovascular disease also showed a decreasing trend over time for both sexes. Females were more likely to have cerebrovascular disease listed as a cause of death than males over the past 40 years with the gap decreasing during the 1990s. (Figure 73)

Figure 73 Age-standardized mortality rates per 100,000 for cerebrovascular disease, Alberta 1961 to 2003



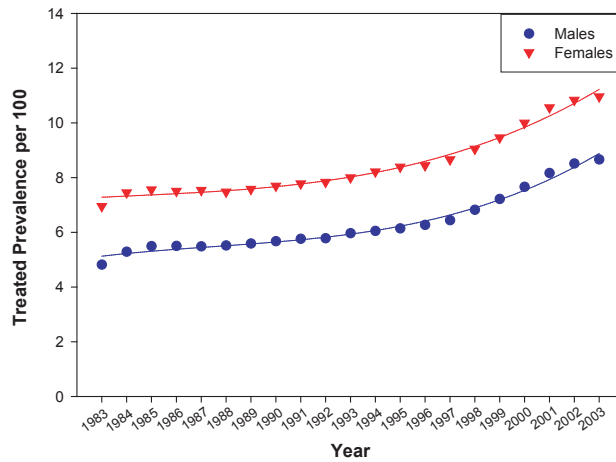
Hypertension

Hypertension is commonly known as high blood pressure. There are differing criteria for classifying an individual as having hypertension. These criteria generally refer to either an elevated systolic or diastolic pressure, or both. The *1999 Canadian Recommendations for the Management of Hypertension* suggest that systolic values consistently above 140 mm Hg or diastolic values above 90 mm Hg, or both can be considered sufficient evidence of hypertension.¹⁰⁷ Hypertension is associated with increased risk of cerebrovascular disease, other cardiovascular disease, and kidney failure. Diabetes can be considered a risk factor for hypertension and as such hypertension is an important health condition to monitor, particularly given its relationship to other diseases associated with diabetes.

A number of risk factors have been associated with hypertension and include both modifiable and non-modifiable factors. Non-modifiable factors are those that modifications to lifestyle cannot change. In the case of hypertension, these include being over 50 years of age and having a family history of high blood pressure.¹⁰⁸ Those factors that can be modified include: being overweight, too much salt in the diet, cigarette smoking, too much alcohol, lack of physical activity, and stress.¹⁰⁹ Furthermore, women who take oral contraceptives and smoke are at increased risk of high blood pressure.¹¹⁰

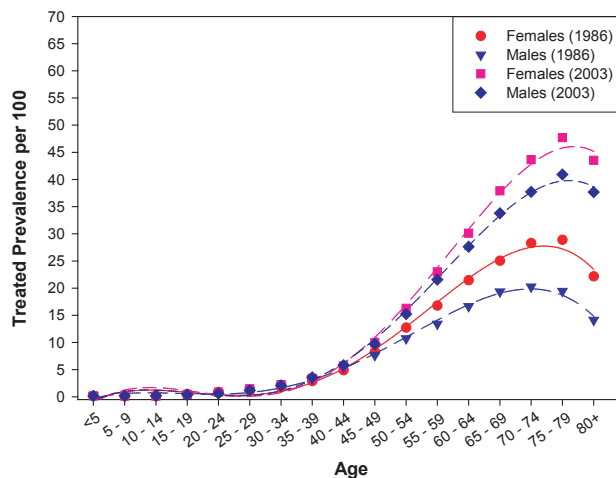
The proportion of the population seeking care for hypertension has been increasing for both males and females. Females have had consistently higher treated prevalence rates than males (**Figure 74**).

Figure 74 Age-standardized treated prevalence per 100 population for hypertension, Alberta 1983 to 2003



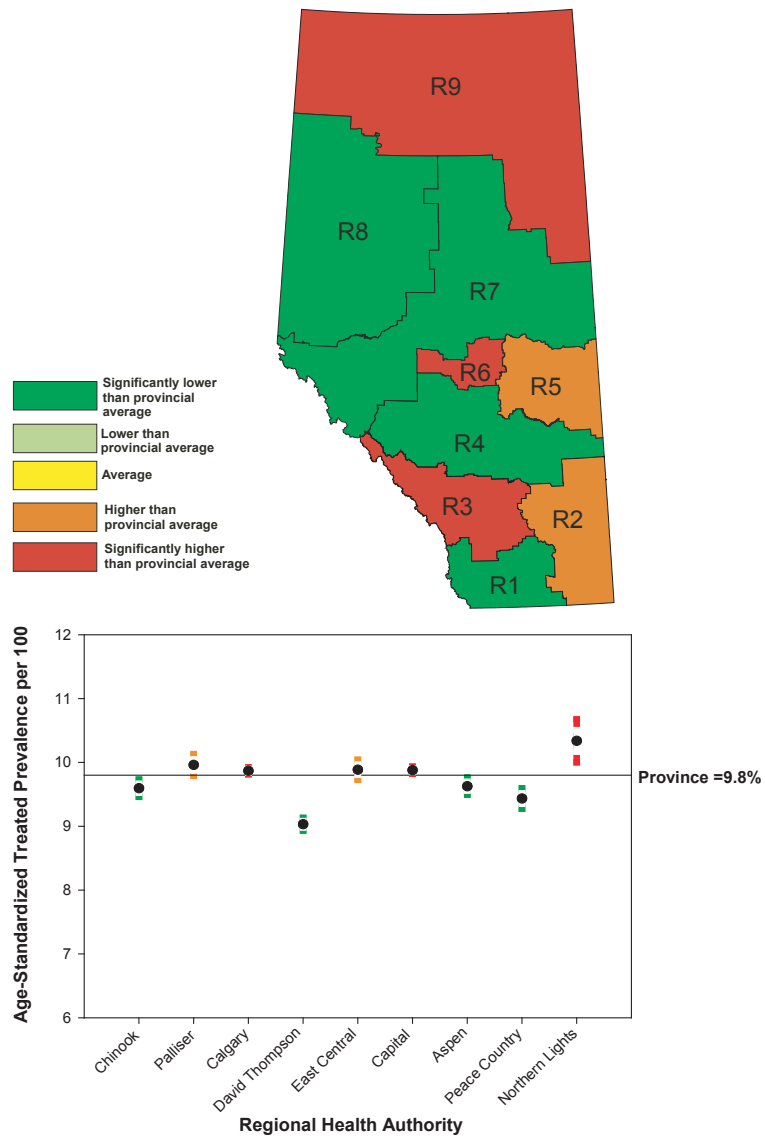
The treated prevalence of hypertension increases with increasing age (Figure 75). It is more commonly treated among females after age 55. Between 1986 and 2003 there was a substantial increase in the proportion of the population being treated for hypertension among those aged 50 and older. For those over age 65, the proportion being treated doubled.

Figure 75 Age-specific treated prevalence per 100 for hypertension, Alberta 1986 and 2003



The treated prevalence of hypertension varied significantly by regional health authority. The Calgary, Capital, and Northern Lights regional health authorities had rates significantly higher than the provincial average. Chinook, David Thompson, Aspen, and Peace Country all had rates significantly below the provincial average (Figure 76).

Figure 76 Regional differences in the treated prevalence of hypertension, Alberta 2003



Chronic Respiratory Disease

Asthma

Asthma is one of the most prevalent chronic conditions in Canadian children and is also a serious problem for adults.¹¹¹ Asthma is a chronic respiratory disorder that causes inflammation and muscle tightening of the airways, restricting airflow into the lungs. Subsequently, not enough air gets into the body, starving cells of air, and in extreme cases, causing cell death.¹¹²

Although the exact cause of asthma is unknown, a number of risk factors interact to either cause or exacerbate asthma. These factors include predisposition factors, causal factors, and contributing factors. Predisposition factors include a tendency to have allergic reactions to foreign substances.^{113,114} Causal factors may sensitize the airways and include aggravators such as: cat dander, dust mites, and workplace contaminants.^{115,116} Finally, contributing factors increase the chance that an individual will get asthma, and include: cigarette smoke experienced during pregnancy and childhood, respiratory infections, and indoor and outdoor air quality.^{117,118}

Asthma cannot be cured but it can almost always be controlled.¹¹⁹ More than 80 per cent of asthma deaths could be prevented with proper asthma education¹²⁰ and treatment. Controlling asthma includes taking a variety of medications to maintain or possibly increase the air capacity of the lung's airways. With a proper and consistent maintenance schedule, asthma has minimal impact on daily life. Asthma is considered under control when daytime symptoms happen less than four times per week, night-time symptoms happen less than once a week, asthma does not limit physical activity, the affected individual does not miss school or work because of asthma, and asthma "attacks" are mild and infrequent.¹²¹

The proportion of the population seeking care for asthma within a year rose steadily from 1983 to 1995 before stabilizing (**Figure 77**). A sex difference was not noted in the treated prevalence. **Figure 78** displays the treated prevalence by age and sex comparing the years 1986 and 2003. Both males and females showed an increase in overall prevalence during this time. The youngest age groups showed the most pronounced changes with children under 10 years of age nearly doubling over this time period. Among the elderly, the increase in treated prevalence was less. However, the general pattern of higher treated prevalence in the young and elderly was consistent between the comparison years.

Figure 77 Age-standardized asthma treated prevalence per 100, Alberta 1983 to 2003

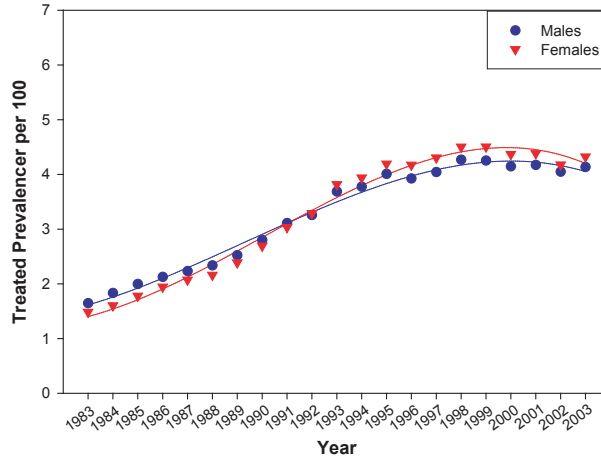


Figure 78 Age-specific treated prevalence of asthma per 100 population, Alberta 1986 and 2003

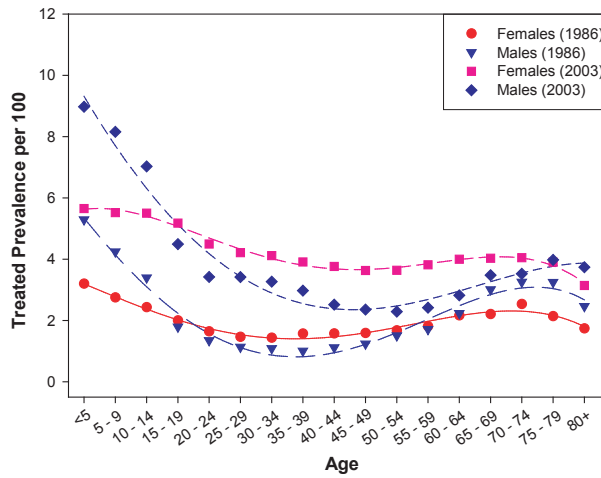


Figure 79 displays the age-standardized treated prevalence per 100 population for asthma by regional health authority of the patient. Treated prevalence was highest in the two largest health regions (Capital and Calgary) which also have the highest proportion of population living in an urban setting. While the Capital Health Authority did not differ from the provincial value, the Calgary Health Region was significantly higher. Six of the health regions had treated prevalence estimates significantly lower than the provincial average.

Figure 79 Regional differences in the treated prevalence of asthma, Alberta 2003

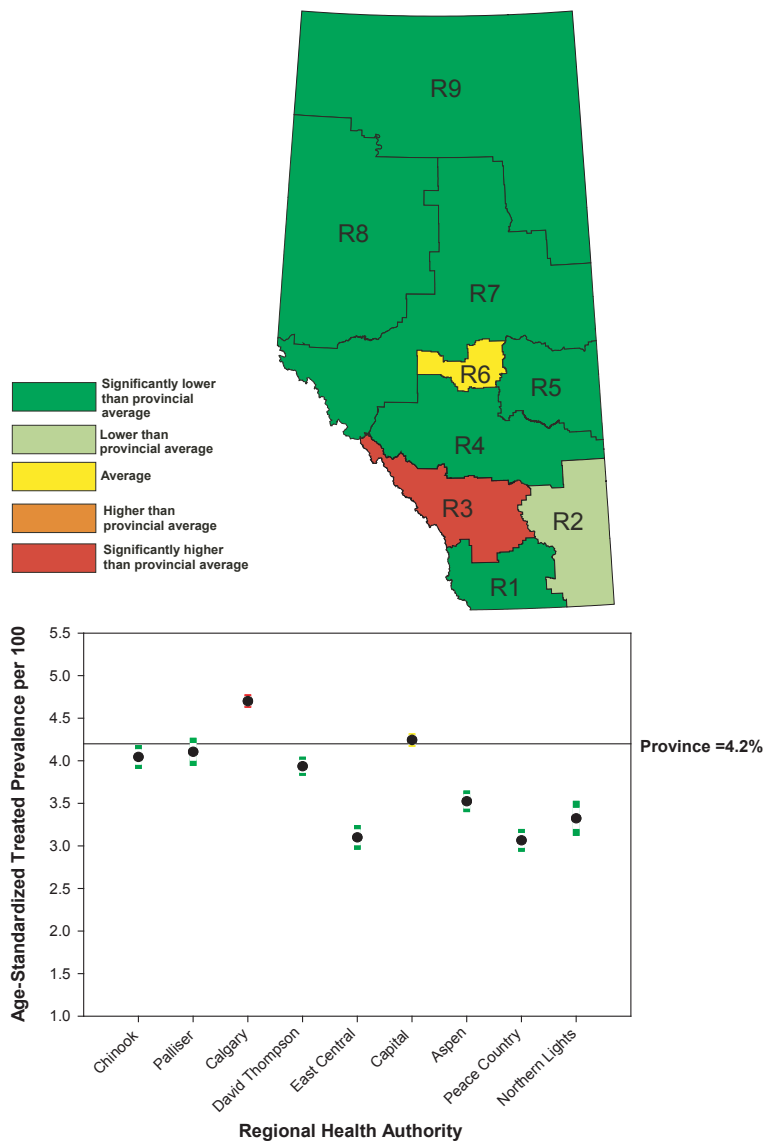
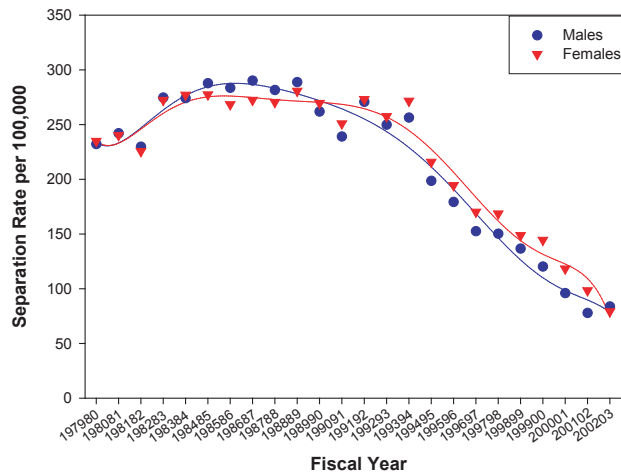


Figure 80 Age-standardized hospital separation rates per 100,000 population attributed to asthma, Alberta 1979/1980 to 2002/2003



Hospitalizations attributed to asthma have shown a steady decline since the 1989/1990 fiscal year for both males and females. The need for inpatient hospitalization for asthma is minimized if asthma is well managed by patients and their family physicians.

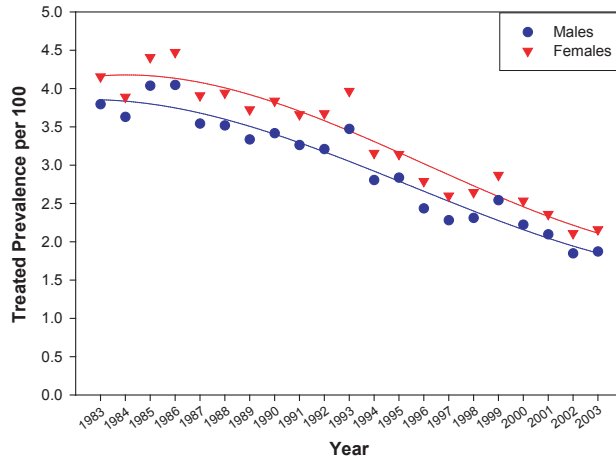
Chronic Bronchitis

Chronic bronchitis results from the production of excess mucus in the lungs and results in problems absorbing oxygen. The excess mucus impairs breathing and is usually associated with constant coughing.¹²² Chronic bronchitis affects people of all ages, but has an increased prevalence among those over 45 years of age. This disease is one of the principal manifestations of chronic obstructive pulmonary disease.¹²³

Cigarette smoking is the most important cause of chronic bronchitis.¹²⁴ The longer and heavier a person smokes, the more likely it becomes that the person will develop chronic bronchitis.¹²⁵ Second-hand smoke may also cause chronic bronchitis,¹²⁶ especially in young children whose mother smokes heavily.¹²⁷ The disease rarely occurs in non-smokers;¹²⁸ however, exposure to irritants such as pollution and chemicals will have an exaggerating effect. Furthermore, females are more than twice as likely to be diagnosed with chronic bronchitis as males.¹²⁹

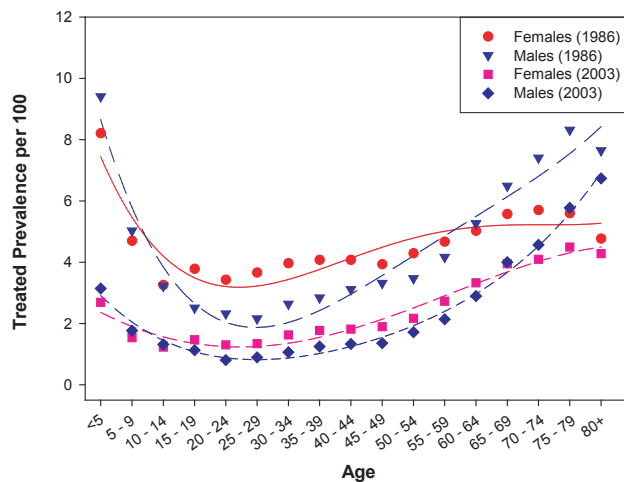
Because the primary cause of chronic bronchitis is smoking, the most effective manner to prevent this disease is to stop smoking. By ceasing to smoke an individual immediately lowers their chance of getting bronchitis. However, those who quit smoking will never have as low of a risk of developing bronchitis as those who have never smoked.

Figure 81 Age-standardized treated prevalence for chronic bronchitis per 100 population, Alberta 1983 to 2003



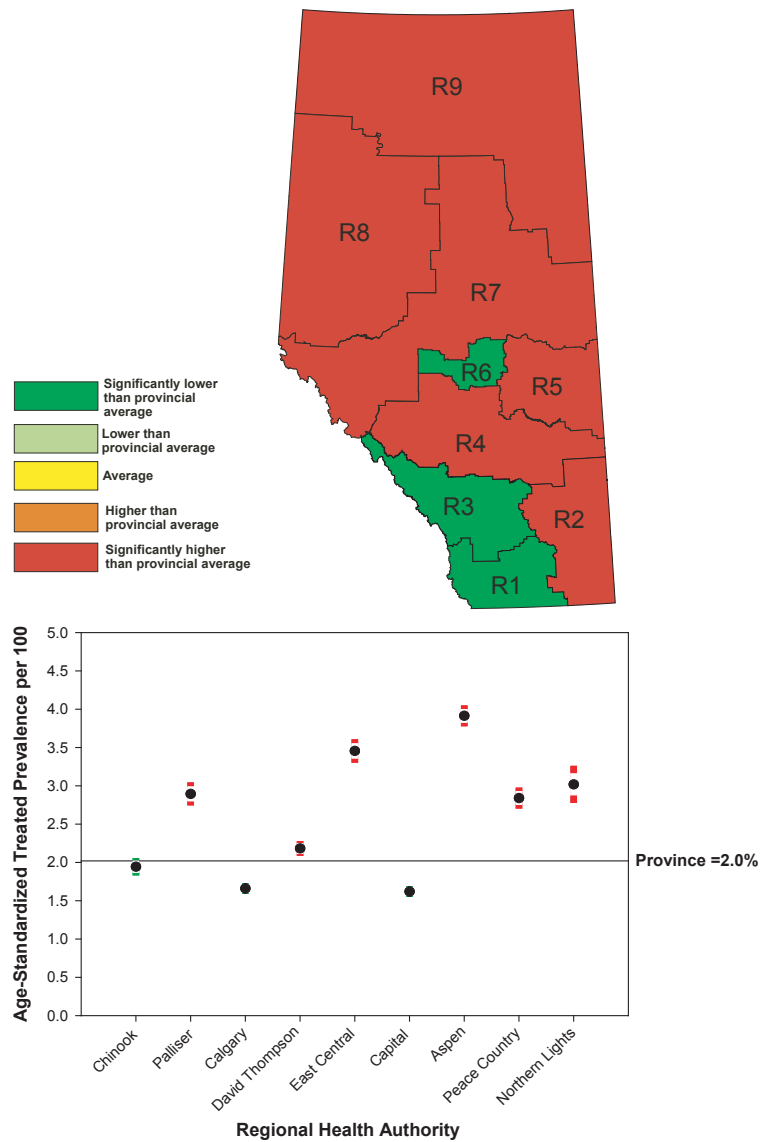
Unlike asthma that saw an increase and leveling in the treated prevalence, chronic bronchitis has shown a general decreasing trend (Figure 81). This trend is consistent between the sexes with females more likely to receive care. Age-specific treated prevalence of chronic bronchitis shows a bimodal distribution with the highest rates among the very young and the elderly (Figure 82). Between 1986 and 2003, there has been an overall decrease in treated prevalence for all ages, but most pronounced for the youngest age groups. By 2003, the bimodal nature of the distribution has become less obvious with most cases among the older age groups.

Figure 82 Age-specific treated prevalence for chronic bronchitis, Alberta 1986 and 2003



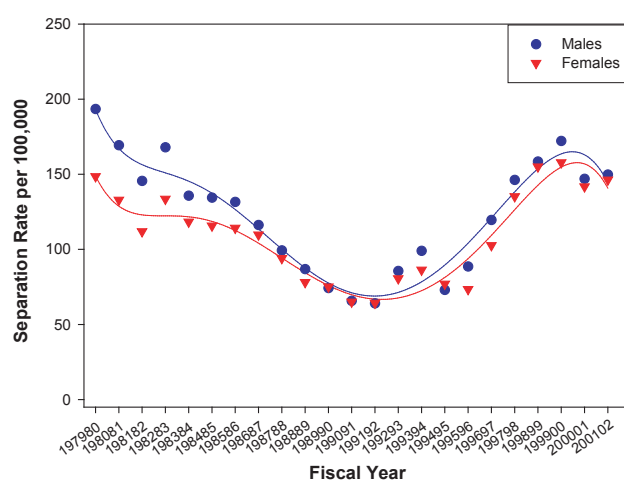
Six of nine health regions had treated prevalence estimates significantly above the provincial average of approximately two per cent of the population (Figure 83). Three health regions (Chinook, Capital and Calgary) had significantly lower treated prevalence rates. A two and a half fold difference in the rate can be seen between the highest (Aspen) and lowest (Capital) health regions.

Figure 83 Regional differences in the treated prevalence of chronic bronchitis, Alberta 2003



Hospitalizations attributed to chronic bronchitis had been declining until the 1992/1993 fiscal year where hospital separation rates began to rise before leveling in 2000/2001. It is not clear why hospitalizations are increasing for chronic bronchitis, but it may be possible that improvements in differentiating between asthma and bronchitis have attributed to the increase. Significant diagnostic uncertainty can exist, particularly in older age groups, between asthma and chronic bronchitis.

Figure 84 Age-standardized hospital separation rates per 100,000 population for chronic bronchitis, 1979/1980 to 2002/2003



Chronic Obstructive Pulmonary Disease (COPD)

Chronic Obstructive Pulmonary Disease (COPD) refers to a group of diseases that cause airflow blockage, non-reversible pulmonary function impairment,¹³⁰ and breathing-related problems.¹³¹ COPD is one of North America's most rapidly growing health problems¹³² and is a common and important health problem among seniors in Canada.¹³³ Often, the damage to the lungs from COPD gets progressively worse until the agents that trigger the attacks are removed, or treatment is started.¹³⁴ Furthermore, unless the progressive degeneration of the lungs is lessened, individuals with COPD experience a lower quality of life.¹³⁵

A number of agents and aggravating substances interact to either cause or exaggerate COPD. The most prominent agent that increases the risk of developing COPD is smoking, which is known to irritate the lungs and interfere with their normal functioning.¹³⁶ Additional aggravating agents include asthma, exposure to air pollutants in the home and workplace, genetic factors, and respiratory infections.¹³⁷

Reductions in the risk of COPD can be achieved through the cessation of smoking, and early detection through pulmonary function testing.¹³⁸ Early testing helps identify COPD before it lowers the infected individual's quality of life, and increases the effectiveness of treatment. Most effective, however, is stopping the disease where it starts which includes avoiding indoor and outdoor pollutants, and most importantly ceasing to smoke and lowering exposure to cigarette smoke. However, those who quit smoking will never have as low of a risk of developing COPD as those who have never smoked.

Treated prevalence rates for COPD have shown a general decreasing trend over time with approximately three per cent of the population seeking care in 2003 (Figure 85). Females had slightly higher treated prevalence estimates; however, both sexes showed the decrease. Similar to chronic bronchitis, COPD appears to have a bimodal distribution (Figure 86) with the youngest and the elderly having the highest prevalence. A decrease in the treated prevalence can be seen for both sexes and across all ages under 70 years. Children currently have a treated prevalence rate similar with other age groups and the rate remains stable until the fifth decade of life, when the treated prevalence for COPD begins to rise.

Figure 85 Age-standardized treated prevalence of COPD per 100, Alberta 1983 to 2003

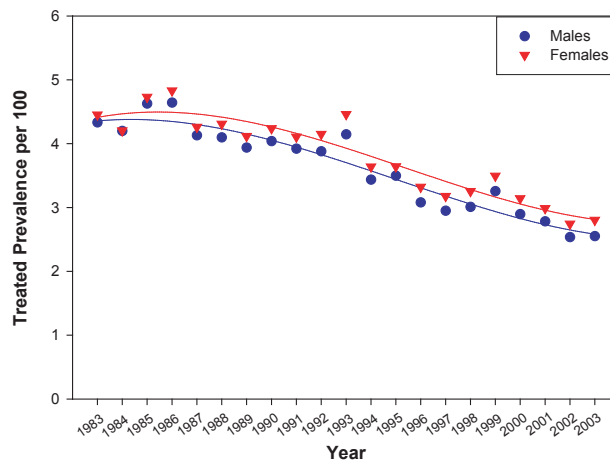
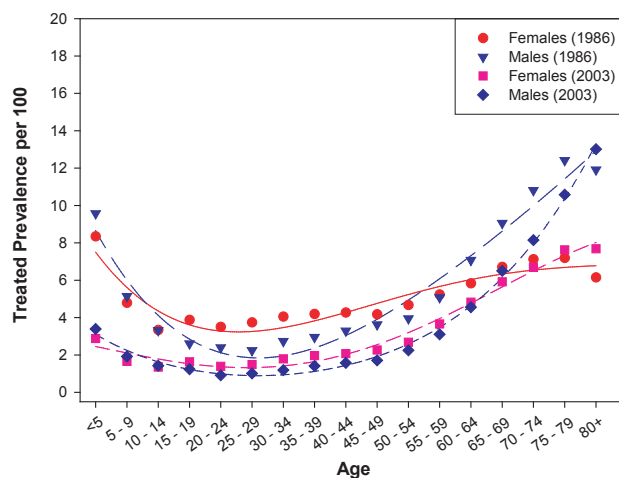


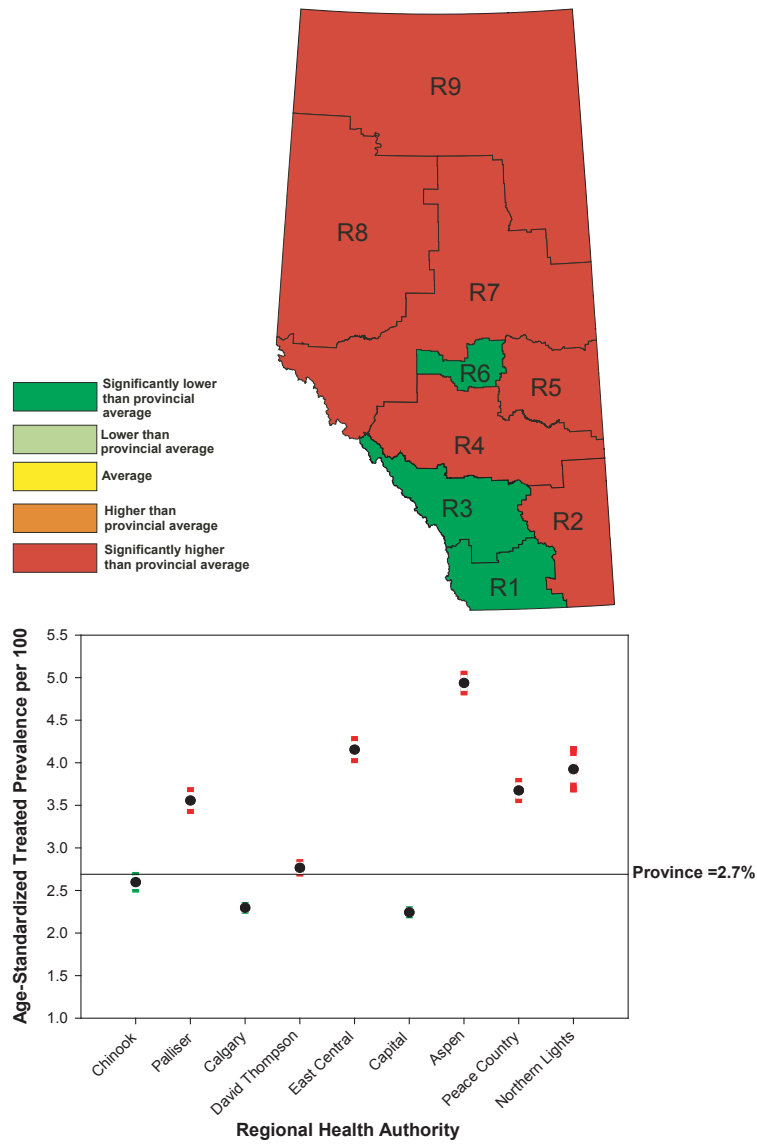
Figure 86 Age-specific treated prevalence per 100 for COPD, Alberta 1986 and 2003

HISTORICAL EVENTS

- 1980** The Alberta Heritage Foundation for Medical Research is established.
- 1981** Alberta's population is 2,213,650. Life expectancy is 79.2 years for females and 72.3 years for males.
- 1982** Explosion at a sour gas well in Lodgepole causes a 67 day sour gas leak. Two people die and the gas plume extends over 400 km.
- 1983** AIDS becomes a reportable condition in Alberta.
- 1984** The *Canada Health Act* is passed.
- 1986** Agreement is reached with the Alberta Medical Association to end extra billing by physicians.
- 1986** An increased incidence of measles throughout the province is noted with 810 cases reported. Predominantly affected those 1-4 yrs (176/810 cases) and high school aged children (212/810).
- 1987** Fifteen cases of measles are identified in the first week in March. These cases are linked to a student at the University of Alberta, resulting in a mass vaccination program at the University of Alberta
- 1987** A tornado strikes Edmonton killing 27 and leaving 400 homeless.

Consistent with chronic bronchitis, six of nine health regions (Figure 87) had COPD treated prevalence estimates significantly above the provincial average (2.7 per cent). Three health regions (Chinook, Capital and Calgary) had significantly lower treated prevalence rates. A two and a half fold difference can be seen between the highest (Aspen) and lowest (Capital) health regions.

Figure 87 Regional differences in the treated prevalence of COPD, Alberta 2003



Diabetes

Diabetes is a serious, chronic health condition and is viewed as a major cause of and contributor to extensive morbidity and mortality among Albertans.¹³⁹ Diabetes is a disease in which the body has difficulty in making insulin or using insulin produced, or both. As a result, blood glucose levels rise above normal. Glucose levels refer to the amount of sugar found in an individual's blood.¹⁴⁰

Three types of diabetes are possible:

- Type 1 diabetes—typically occurs in childhood or adolescence and is characterized by the inability of the pancreas to produce insulin. It accounts for 5-10 per cent of all diagnosed cases of diabetes.¹⁴¹
- Type 2 diabetes—typically begins after age 40, as a result of resistance to insulin's action followed by the pancreas failing to produce insulin. It accounts for 90-95 per cent of all diagnosed diabetes.¹⁴²
- Gestational diabetes—a form of glucose intolerance that appears during pregnancy. Usually this form of diabetes is transient, disappearing by six weeks postpartum. Some evidence indicates that women with gestational diabetes are at increased risk of developing type 2 diabetes.¹⁴³

This section focuses on type 2 diabetes – the form of diabetes where the evidence related to risk reduction is the strongest.

In a healthy individual, the pancreas creates insulin, which is used to help get glucose into cells. However, in people with diabetes, the body does not use the insulin efficiently. Eventually the pancreas cannot keep up with the body's demand for insulin, and sugar does not get moved into cells, and remains instead in the blood. Excessive sugar in the blood damages various organs that require blood to function.¹⁴⁴ Complications associated with diabetes include damage to nerve and blood vessels resulting in heart disease, stroke, blindness, kidney disease, nerve problems, and amputation.¹⁴⁵

Although the complications associated with diabetes are widespread, the effects of diabetes take time to develop. Subsequently many people have no visible signs or symptoms of diabetes. Symptoms can also be so mild that people might not even notice them. However, some visible symptoms include increased thirst, increased hunger, fatigue, increased urination, unexplained weight loss, blurred vision, and sores that do not heal.¹⁴⁶

Figure 88 Age-standardized treated prevalence per 100 for diabetes, Alberta 1986 to 2003

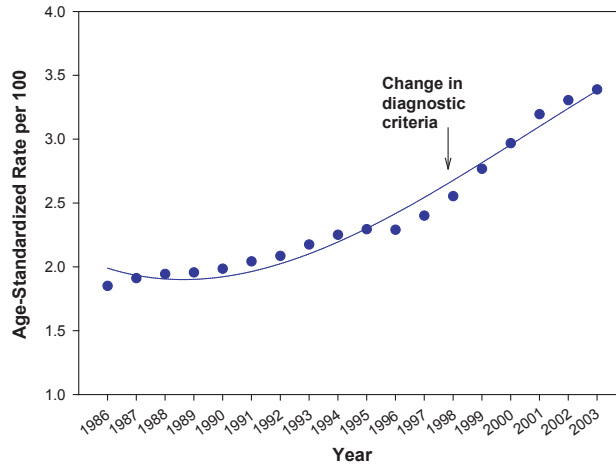
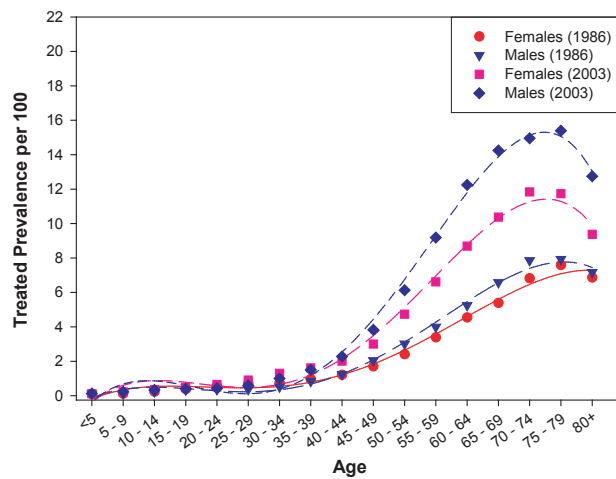


Figure 89 shows the age-specific treated prevalence per 100 population comparing the years 1986 and 2003. With both time periods, diabetes treated prevalence begins to increase after about age 45 and continues to rise until age 80 where there is a drop. Both males and females showed a significant increase from 1986 to 2003 with the male rate remaining higher. Between 1986 and 2003, the difference between males and females has increased creating a greater gap between the sexes than was present in 1986.

Figure 89 Age-specific treated prevalence per 100 population for diabetes, Alberta 1986 and 2003



Significant geographic variation exists in the treated prevalence of diabetes across Alberta's nine regional health authorities (Figure 90). The highest rates appear in the northern most and southern most regions of the province.

Figure 90 Regional differences in the treated prevalence of diabetes, Alberta 2003

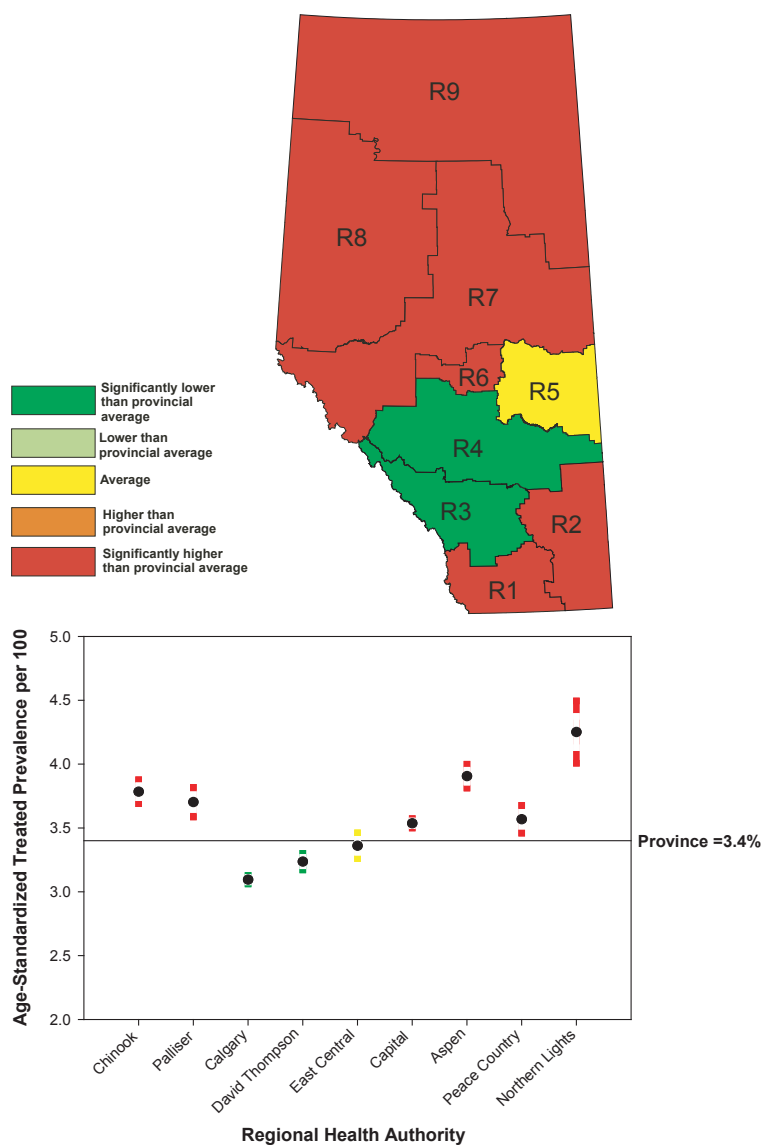
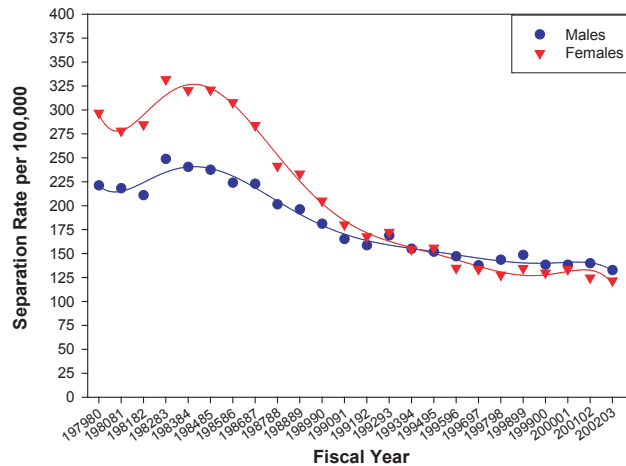


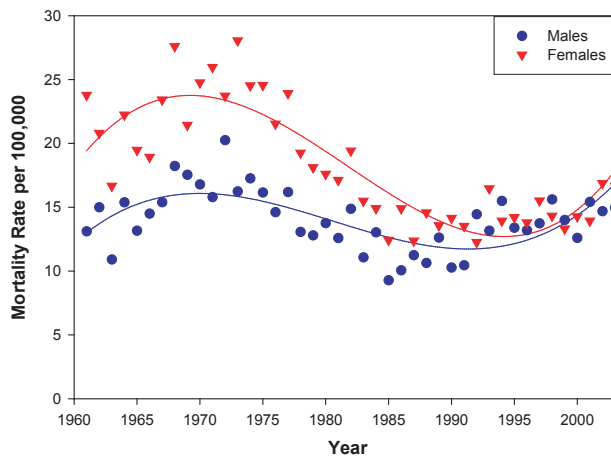
Figure 91 Age-standardized hospital separation rates per 100,000 population for diabetes, Alberta 1979/1980 to 2002/2003



Hospital separation rates for diabetes have decreased substantially from the early 1980s and have stabilized. Also, the sex difference has been reduced and reversed with males now slightly more likely to be hospitalized.

The age-standardized mortality rate per 100,000 population attributed to diabetes is displayed in **Figure 92**. Between 1960 and 1985, there was a general decline in diabetes mortality for both males and females. From 1985 to 2000, the mortality rate remained relatively stable and the sex difference evident in the 1960s and 1970s diminished. Since 2000, it appears that diabetes mortality may be increasing, however, more years of data will be needed to see if this trend continues.

Figure 92 Age-standardized mortality rate per 100,000 population for diabetes, Alberta 1960 to 2003



Chronic Renal Failure

Chronic renal (kidney) failure occurs when disease damages the kidneys so that they can no longer adequately remove fluids and wastes from the body or maintain proper levels of kidney-regulated chemicals in the bloodstream.¹⁴⁷ Because of the wide range of functions that kidneys perform, damaged kidneys affect nearly the whole body, and can lead to hypertension, the weakening of bones, anemia, and a shorter life span. Overall, patients with chronic kidney disease that leads to end-stage renal disease, have a life span that is 18 to 57 per cent that of the general population,¹⁴⁸ those on dialysis have a lifespan that is 16 to 37 per cent that of the general population.¹⁴⁹

A number of causal factors are associated with chronic kidney disease. The four most common causes are diabetes, hypertension, the inflammation of the filtering units of the kidney called glomerulonephritis, and polycystic kidney disease.¹⁵⁰ Additional risk factors include the sustained use of analgesics such as acetaminophen and ibuprofen, the clogging and hardening of arteries leading to the kidneys, obstruction of the flow of urine as caused by stones or an enlarged prostate, HIV infection, sickle cell disease, heroin abuse, amyloidosis, kidney stones, chronic kidney infection and certain cancers.¹⁵¹ Individuals at highest risk of developing chronic renal disease include those with diabetes mellitus type 1 or 2, high blood pressure, or high cholesterol.

Prevention of renal failure can be achieved by lifestyle modification. By maintaining a healthy diet, moderate exercise, and risk management, the various diseases that lead to kidney failure can be prevented. Prevention of these initial chronic diseases, such as hypertension, the hardening of the kidneys, and liver disease, will prevent kidney failure.

The treated prevalence of chronic renal failure has been increasing since 1983 (**Figure 93**). Treated prevalence rates have seen a nearly four fold increase for both males and females. When comparing chronic renal failure treated prevalence in the years 1986 and 2003, the main increase is among individuals over the age of 60 years (**Figure 94**). Also, the gap between males and females has increased over this time period with males having the higher rate.

Figure 93 Age-standardized treated prevalence per 100 population for chronic renal failure, Alberta 1983 to 2003

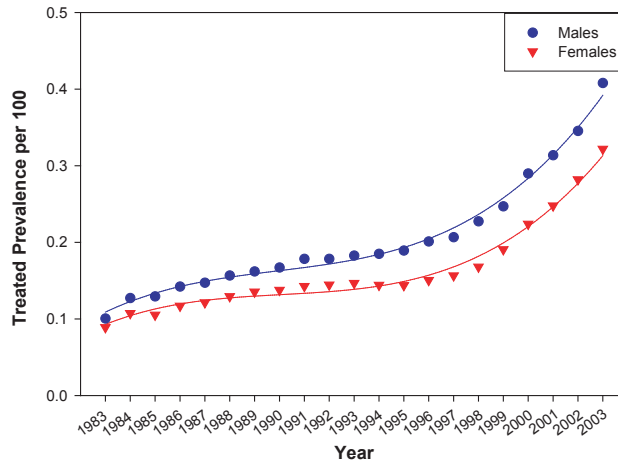
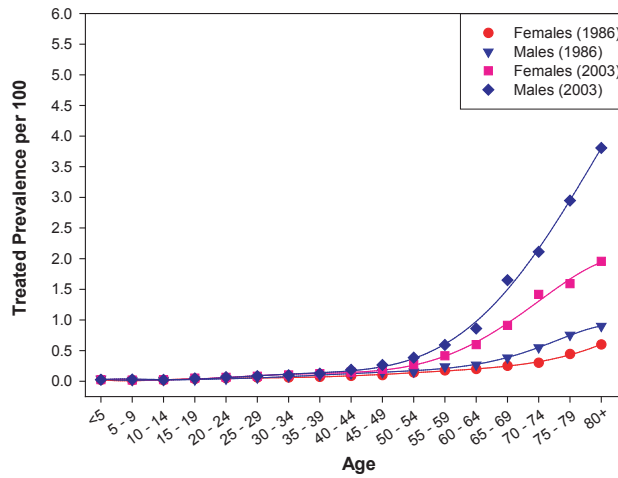
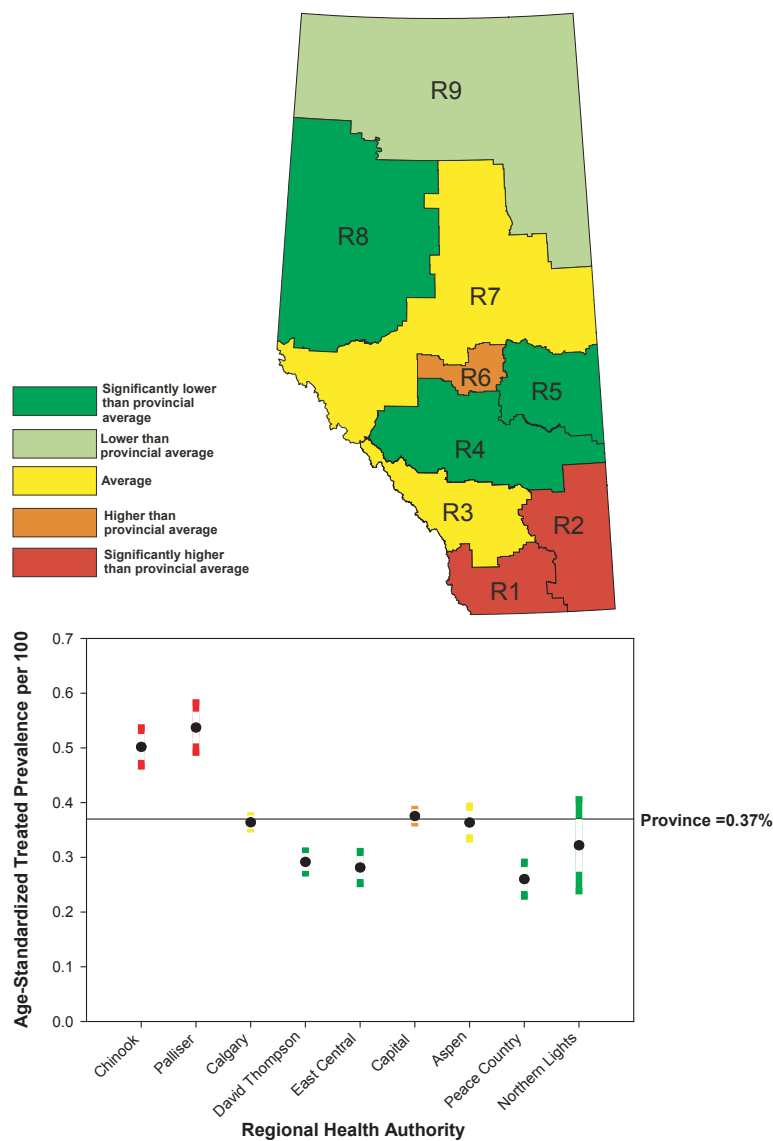


Figure 94 Age-specific treated prevalence per 100 population for chronic renal failure, Alberta 1986 and 2003



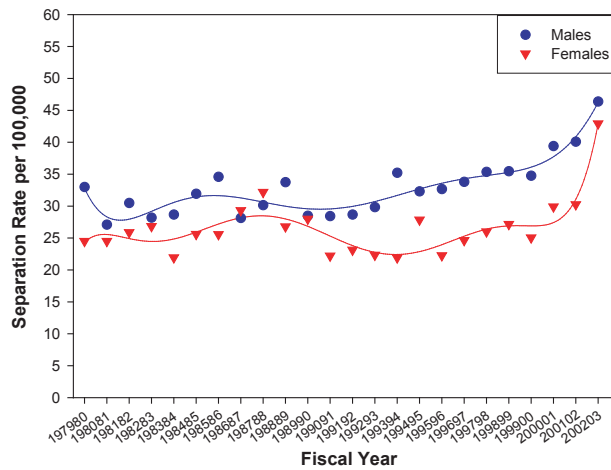
Treated prevalence of chronic renal failure varied across health region with the two southern most regions (Palliser and Chinook) having rates significantly above the provincial average (Figure 95).

Figure 95 Regional differences in the treated prevalence of chronic renal failure, Alberta 2003



Hospital separation rates attributed to chronic renal failure are shown in **Figure 96**. Males have consistently had higher rates than females. In recent years, there appears to be an increasing trend for hospitalization for both sexes. This is consistent with the pattern seen in treated prevalence over time.

Figure 96 Age-standardized hospital separation rates per 100,000 population for chronic renal failure, Alberta 1979/1980 and 2002/2003



Arthritis

The term arthritis does not refer to a single disease but to over a hundred different conditions.¹⁵² These can be anything from relatively mild forms of tendonitis to crippling disorders such as rheumatoid arthritis.¹⁵³ Arthritis includes diseases that affect joints, bones, and supporting tissue such as bursa, tendons, and muscles and ligaments.¹⁵⁴ Arthritis causes pain and loss of movement.¹⁵⁵ Chronic forms of arthritis can last for life and often involve some inflammation of joints. The most common form of arthritis is osteoarthritis. This arthritis is known as the “wear and tear” arthritis and affects 1 in 10 Canadians.¹⁵⁶ This form of arthritis involves the loss of cartilage on bone joints.¹⁵⁷ Without cartilage the bones are neither cushioned nor lubricated, and pain results when the joints stop functioning smoothly and instead grind together.¹⁵⁸

Although there is no known way to prevent arthritis, lifestyle changes may reduce or limit symptoms.¹⁵⁹ Risk reducing methods include: drinking alcohol only in moderation, maintaining a healthy body weight, protecting joints by performing activities in the correct manner, avoiding activities which may injure joints, and avoiding activities that place excessive strain on joints.¹⁶⁰

The treated prevalence of arthritis in Alberta has remained relatively stable (**Figure 97**). Females are more likely to be diagnosed with arthritis. In comparing the treated prevalence for arthritis in 1986 with that of 2003, the general pattern of increasing prevalence with increasing age remained (**Figure 98**).

Figure 97 Age standardized treated prevalence per 100 for arthritis in Alberta, 1983 to 2003

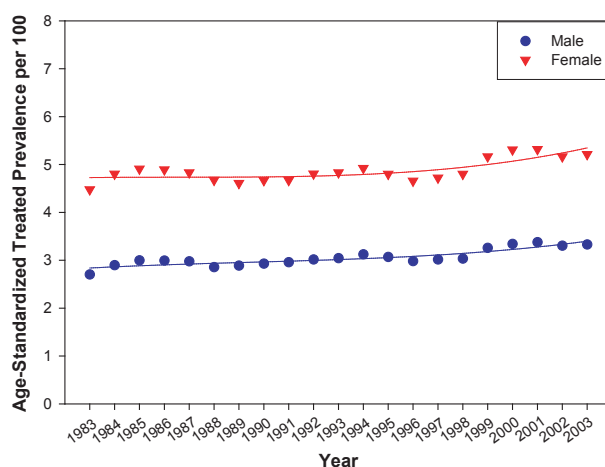
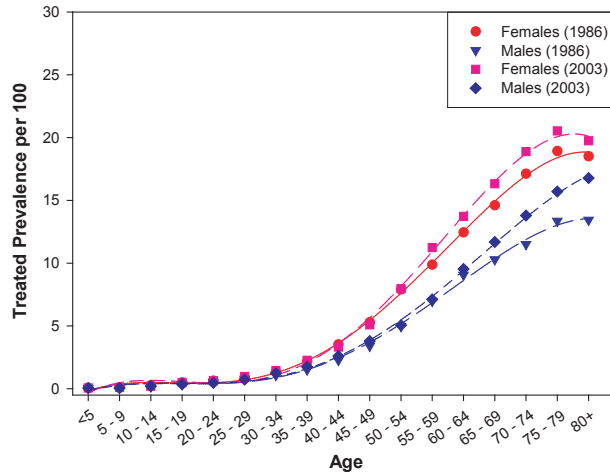


Figure 98 Age-specific treated prevalence per 100 population for arthritis, Alberta 1986 and 2003

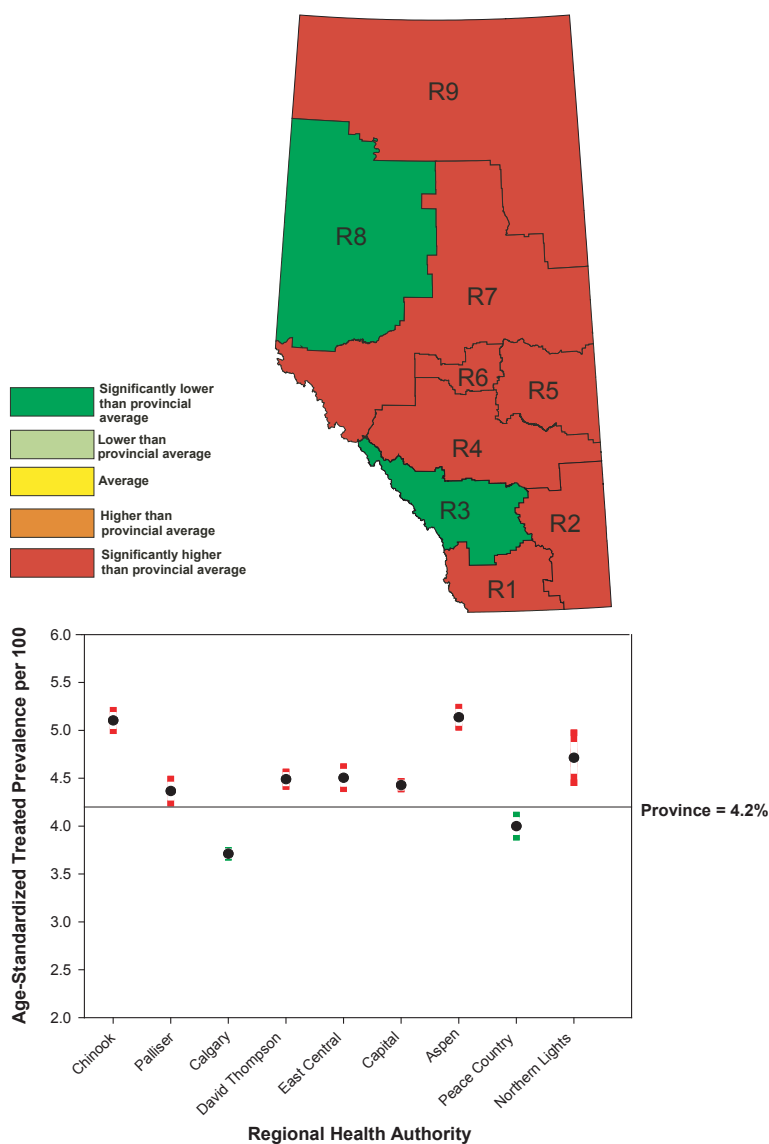


HISTORICAL EVENTS

- 1990** Midwifery is legally recognized. Alberta appoints its first Mental Health Patient Advocate.
- 1990** "The Rainbow Report: Our Vision for Health" report is released by the Premier's Commission on Future Health Care for Albertans.
- 1991** Alberta's population is 2,519,180. Life expectancy is 81.2 years for females and 75 years for males.
- 1994** Alberta establishes 17 regional health authorities, replacing over 200 separate boards and administrations. Hepatitis A vaccine introduced in Alberta.
- 1994** Canada is declared polio free.
- 1995** Alberta launches its Aboriginal Health Strategy. Universal hepatitis B vaccine is introduced.
- 1998** HIV infection becomes reportable. The Alberta Centre for Injury Control and Research is established.

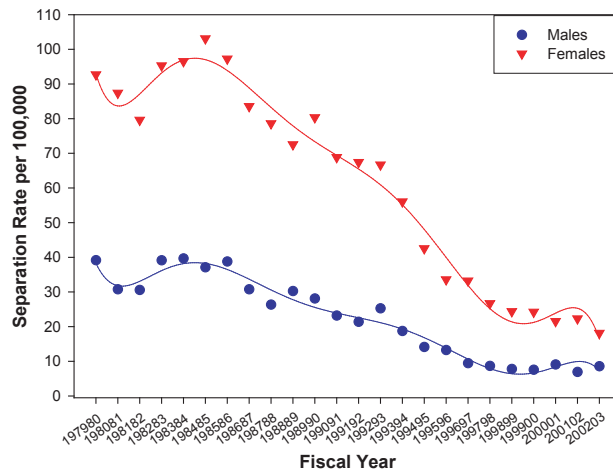
Approximately 4.2 per cent of the population received care related to arthritis in Alberta in 2003. The treated prevalence varied significantly across health regions with seven of the nine having treated prevalence rates above the provincial average and two below. There was nearly a 50 per cent difference in the rates between the highest and lowest regions (Figure 99).

Figure 99 Regional differences in the treated prevalence of arthritis, Alberta 2003



Hospital separation rates for arthritis have declined significantly since 1979/1980. Females have consistently had higher separation rates than males. Arthritis is a condition that can be well managed in the community and the decreasing hospital separation rates demonstrate that there has been a move away from inpatient care.

Figure 100 Age standardized hospital separation rates per 100,000 population for arthritis, Alberta 1979/1980 to 2002/2003



Injuries are significant health events that, for the most part, are preventable. They occur when people have placed themselves or been placed in risky situations.¹⁶¹ Injuries are broadly classified as intentional or unintentional. Intentional injuries are the willed result of human action and include homicide or assault, and suicide, attempted suicide, or self harm. Injury that results from falls, motor vehicle collisions, and fire, are considered unintentional.

Figure 101 shows the age-standardized treated prevalence per 100 persons for all forms of injury. During the 1980s there was little change in the prevalence with approximately 28 per cent of men and 24 per cent of women seeking care related to an injury. Since 1994, however, there has been a consistent decrease in the number of people receiving care for injuries for both males and females. There has also been a narrowing of the gap in the treated prevalence between the sexes.



Figure 101 Age-standardized treated prevalence per 100 population for injuries, Alberta 1983 to 2003

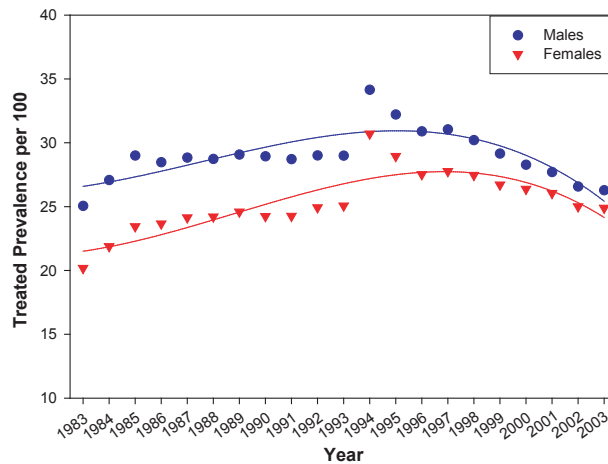
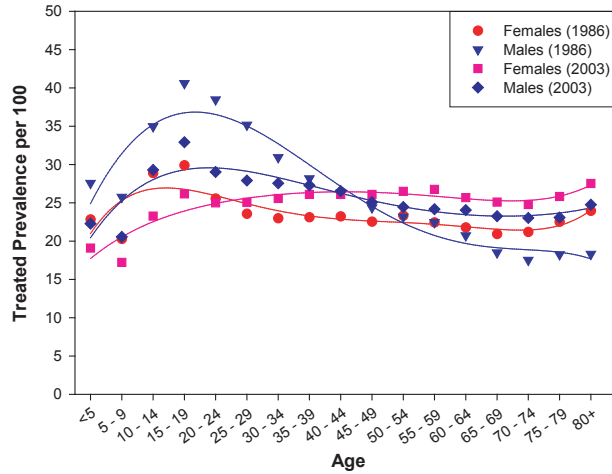


Figure 102 Age-specific treated prevalence per 100 population for injuries, Alberta 1986 and 2003

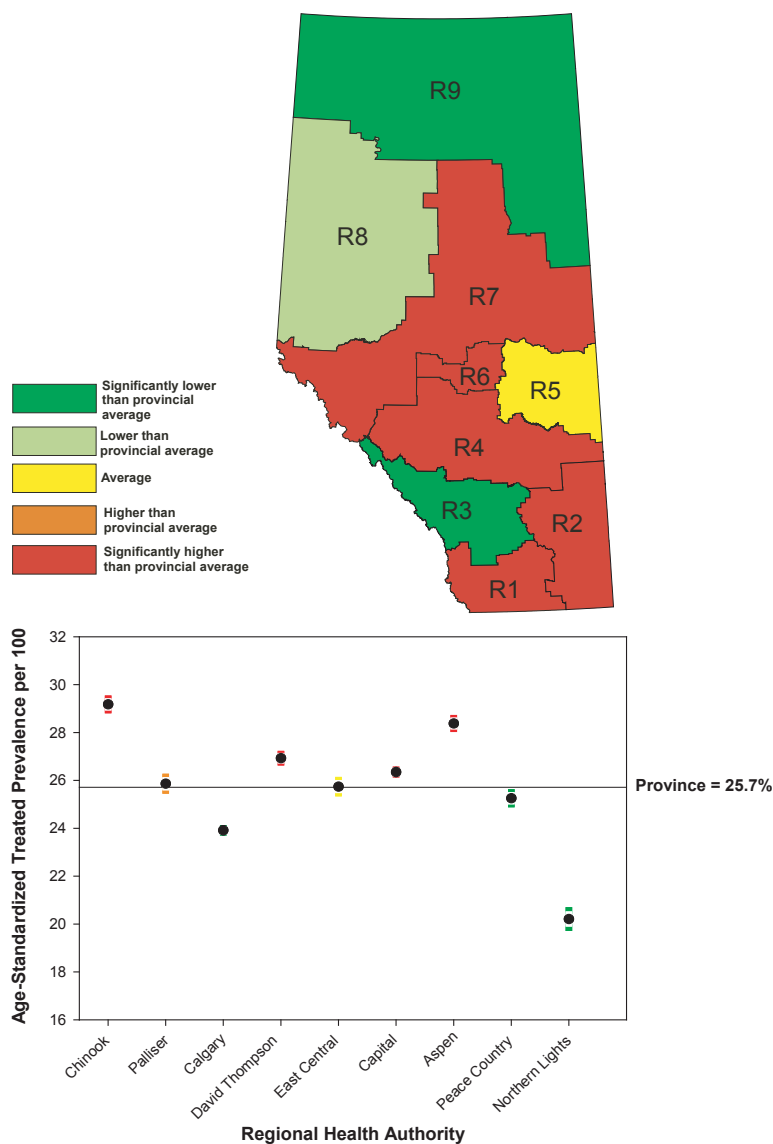


HISTORICAL EVENTS

- 2001** Alberta's population is 2,974,810. Life expectancy is 82.3 years for females and 77 years for males.
- 2003** Alberta reports 275 human cases of West Nile virus. In May 2003, the Canadian Food Inspection Agency quarantines an Alberta farm after a single cow tests positive for Bovine Spongiform Encephalopathy.
- 2005** 50th Anniversary of the introduction of the Salk (polio) vaccine which was declared "safe, effective and potent" ushering in a new era of hope that polio could be conquered.

Regional variations in the treated prevalence of injuries are shown in **Figure 103**. Five regions (Chinook, Palliser, David Thompson, Capital Health, Aspen) all had treated prevalence estimates significantly above the provincial average. The lowest rate was in the Northern Lights health region with a treated prevalence of approximately 20 per cent, or one in every five residents.

Figure 103 Regional differences in the treated prevalence of injury, Alberta 2003



Unintentional Injury

Unintentional injury occurs when neither the injured person, nor the person/thing that caused the injury had meant for the injury to occur. These injuries most often include motor vehicle collisions and falls, and less often injuries due to fire or environmental events such as extreme weather patterns. It is possible to understand the risk factors for unintentional injury and promoting means of reducing risk is a major focus of Public Health practice. Since 1979, there has been a steady decline in hospitalizations related to unintentional injury (**Figure 104**). There has also been a decrease in the gap between males and females. **Figure 105** displays the age-standardized unintentional injury mortality from 1960 to 2003. Females and especially males showed a significant decline over this time period.

Figure 104 Age standardized hospital separation rates for unintentional injury, Alberta 1979/1980 to 2002/2003

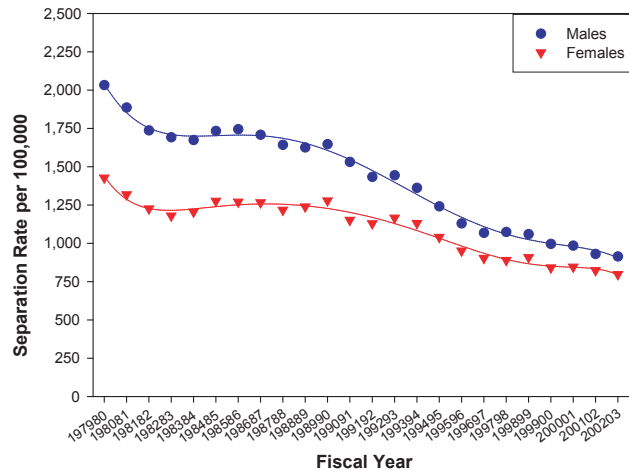
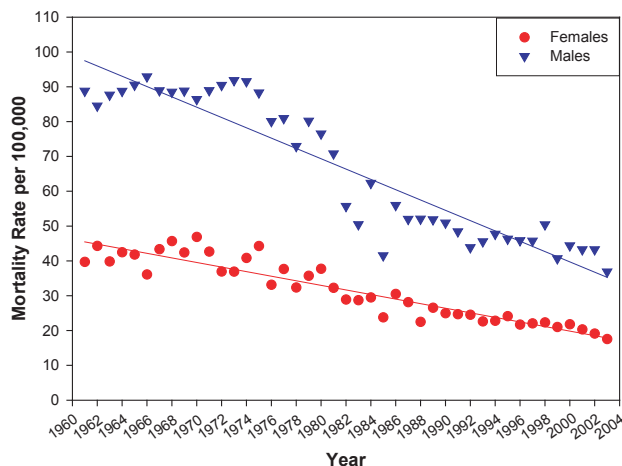


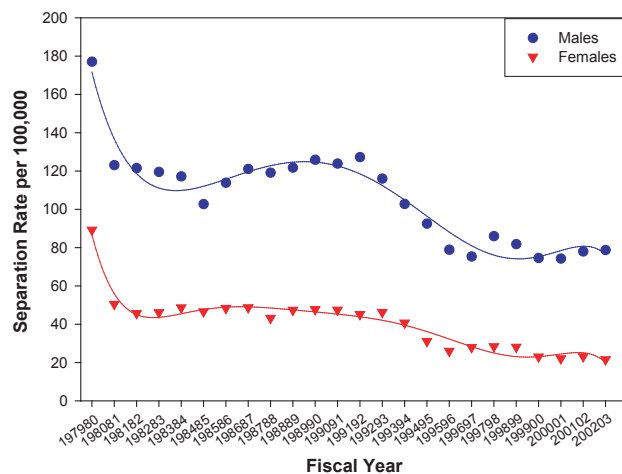
Figure 105 Age-standardized mortality per 100,000 population attributed to unintentional injury in Alberta, 1960 to 2003



Intentional Injury

Intentional injury occurs when either the party that is injured or the party that injures intended to cause injury. These injuries include suicides, homicides, and assaults. Intentional injury is also a focus of Public Health intervention as there are actions that can be taken to reduce the risk of occurrence.

Figure 106 Age standardized hospital separation rates for intentional injury, Alberta 1979/1980 to 2002/2003



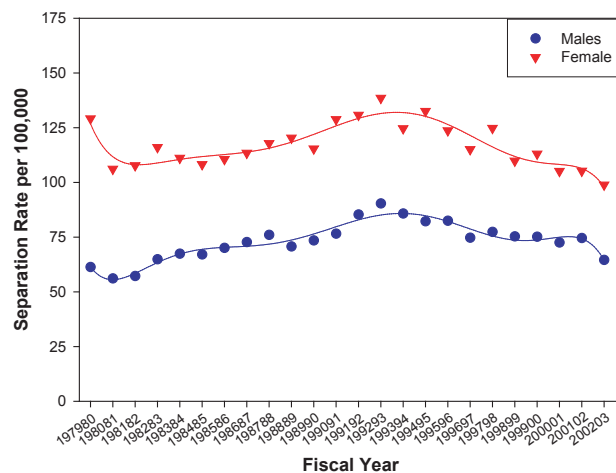
Suicide and Parasuicidal Behaviour

Parasuicide is a self-inflicted form of injury, where the injured individual was attempting to harm or kill him or herself. Suicide is the term used to denote a fatality. Almost all persons who commit suicide have a diagnosable mental or substance abuse disorder or both, and the majority of these have depressive illnesses.¹⁶² Although women are far less likely to die as a result of parasuicidal behaviour than men, up to three times more women will attempt suicide.¹⁶³

In addition to making threats of suicide or self harm, expressing a strong wish to die or making plans about when and how to commit suicide, warning signs of parasuicidal behaviour can include: exhibiting a sudden change in behaviour, appearance, or mood, being overwhelmed by depression, hopelessness, sadness, withdrawal, alcohol or drug abuse, giving away prized possessions, or having experienced a recent suicide attempt by a friend or family member.¹⁶⁴

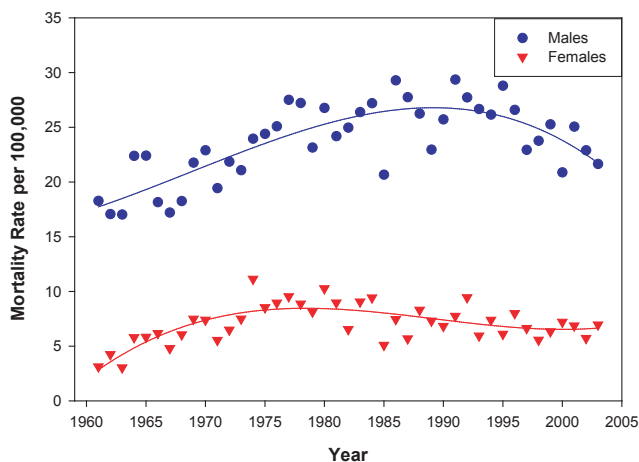
Age standardized hospital separation rates attributed to suicide and parasuicide are displayed in **Figure 107**. Females are more likely to be hospitalized than males. Overall, female hospital separation rates have been stable while male rates appear to have shown a moderate increase between 1979/1980 and 2002/2003 fiscal years.

Figure 107 Age-standardized hospital separation rate per 100,000 for suicide, Alberta 1979/1980 to 2002/2003



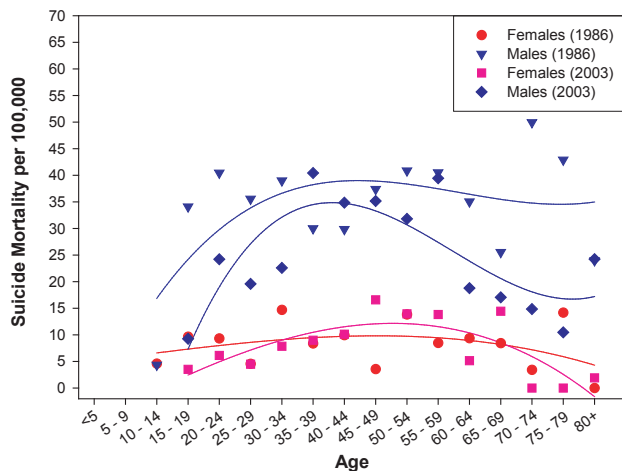
Differences exist between hospitalizations and completed suicide. While females are more likely to be hospitalized, males are more likely to complete a suicide. Males tend to use more lethal means of parasuicidal behaviour, such as shooting or hanging, than do females. As with the hospital data, female suicide mortality rates have been relatively stable. Male suicide mortality appears to be decreasing in recent years (**Figure 108**).

Figure 108 Age-standardized mortality rate per 100,000 due to suicide, Alberta 1960 to 2003



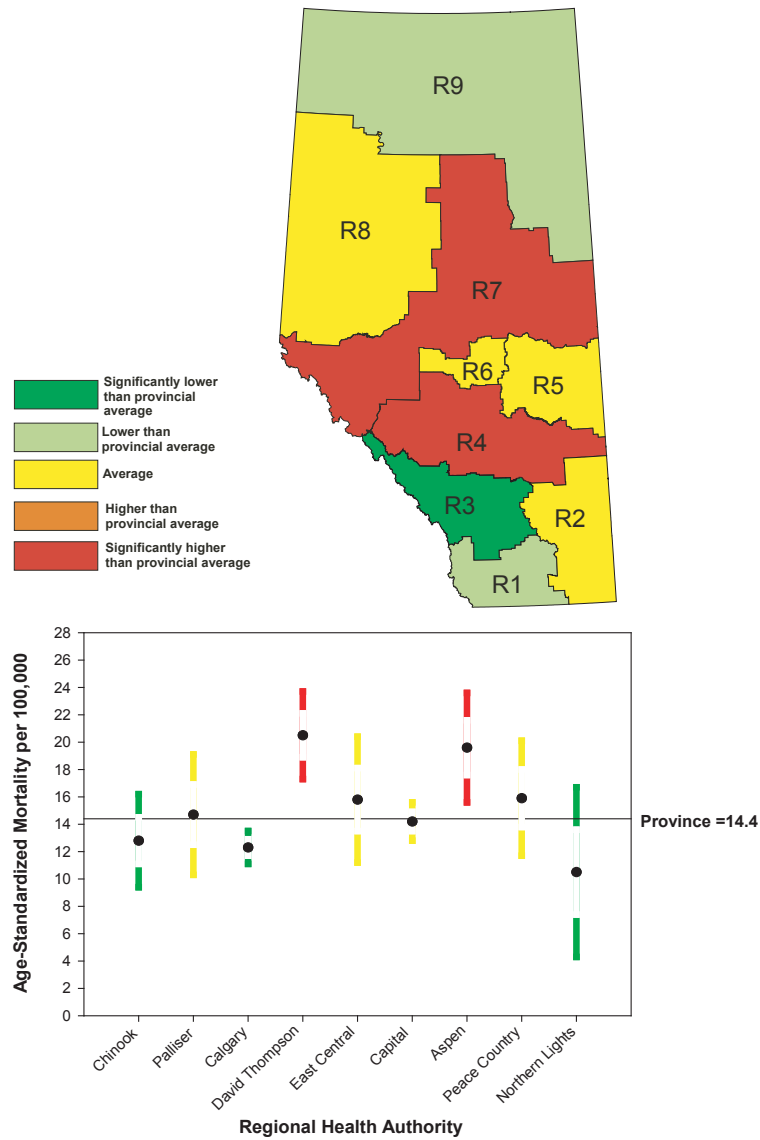
Suicide can occur in any age group beyond the very youngest; however, the age groups at greatest risk of suicide have typically been reported to be young adult males between the ages of 15 and 24.¹⁶⁵ Alberta's pattern differs. While suicides among the youth were at the same level as those among older persons in 1986, the suicides rates among the young and the elderly, especially males, have decreased (Figure 109). By 2003, male suicides showed the highest rates between the ages of 30 and 54 years. The female pattern is generally similar but peaks at a slightly higher age.

Figure 109 Age-specific mortality rate per 100,000 due to suicide, Alberta 1986 and 2003



Regional variations in suicide are shown in **Figure 110**. Two regions (David Thompson and Aspen) had rates significantly above the provincial average. These regions also have large populations of Treaty Status Aboriginal Canadians, a group long known to have had very high rates of suicide.

Figure 110 Regional differences in the age-standardized suicide mortality rate per 100,000 population, Alberta 2001-2003 combined



Homicide

Homicide deaths occur most frequently in young and middle age adults, and victims are almost twice as likely to be male than female. In many cases, victims know their perpetrators; they are often family members.¹⁶⁶

Homicide mortality rates (Figure 111) vary from year to year. Males have consistently had higher homicide rates over the past 40 years. During this time period, males first showed an upward and then a leveling in homicide deaths while females showed a decrease. A change in the age distribution of the homicide rate can be seen between 1986 and 2003 (Figure 112). For females, there was a decrease in the rate of homicide among women aged 20 to 50 years. For males, there was a shift in the age distribution towards younger ages.

Figure 111 Age standardized homicide mortality rate per 100,000 population, Alberta 1960 to 2003

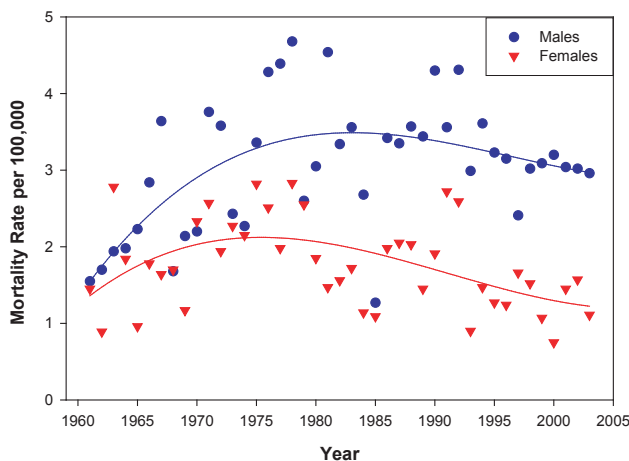
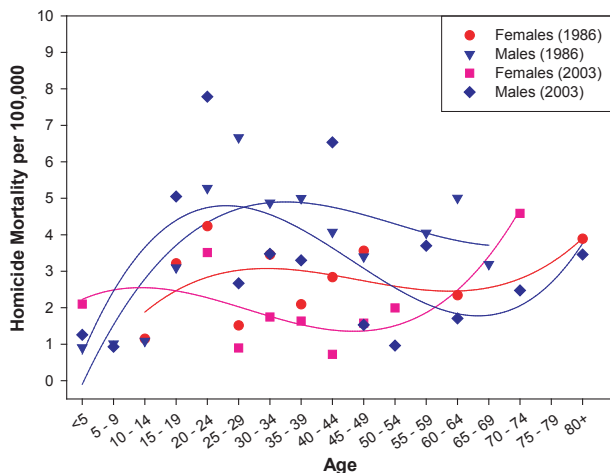
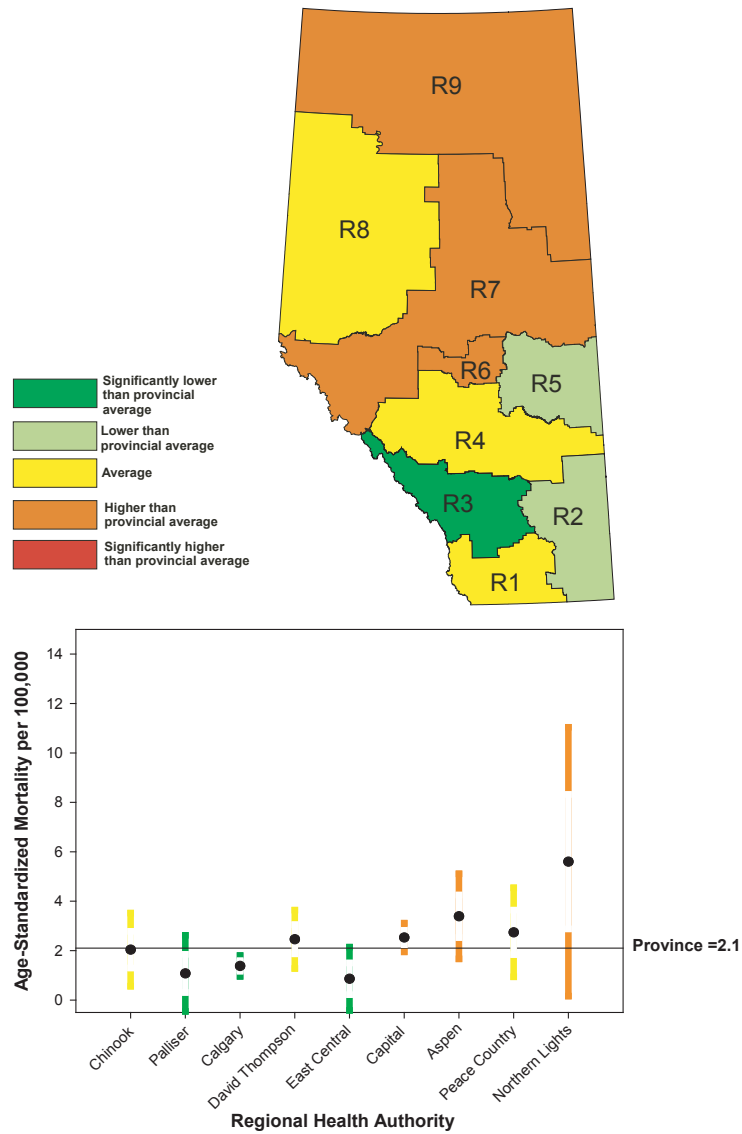


Figure 112 Age-specific mortality rate per 100,000 due to homicide, Alberta 1986 and 2003



Regional variations in homicide are shown in **Figure 113**. While there are no definitive differences in the rates, there appears to be a tendency for the more northern low population density regions to have higher homicide rates in the recent past.

Figure 113 Regional differences in the age-standardized homicide mortality rate per 100,000 population, Alberta 2001 to 2003 combined

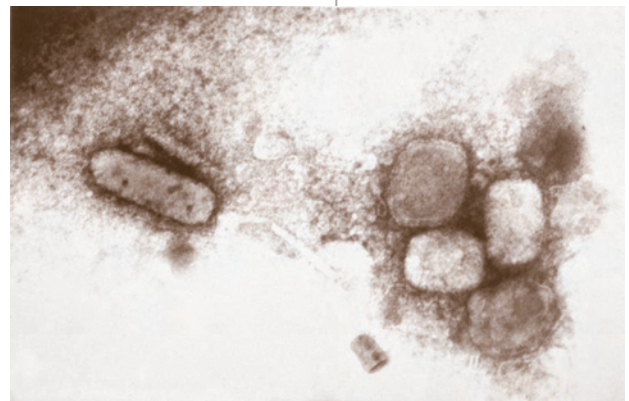


Historical Context

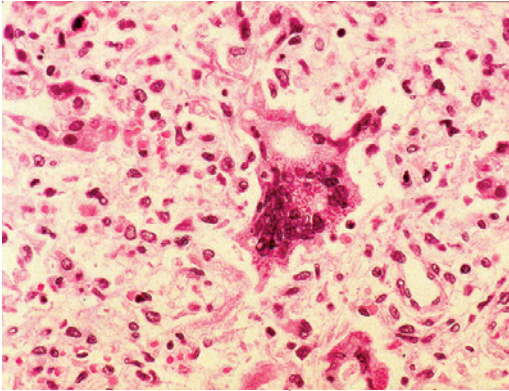
The cause of disease remained highly debated until approximately the mid-part of the nineteenth century. At this time, the two most prominent theories were the new germ theory, which was being debated against the long-standing miasma theory. The miasma theory, based on Greek and Roman medicine, stipulated that disease was caused by noxious vapors emanating from the earth. It was not until the 1840s, that person-person, animal-person, and environment-person transmission was demonstrated. Still, the description and treatment of diseases has a far longer history.^{167,168}

Diseases such as smallpox, gonorrhoea, measles, and the black (bubonic) plague ravaged most of the world long before their agents were known. Mumps was first noted by Hippocrates in 5th century B.C., smallpox was described in Chinese text in the 4th century A.D. and measles in the 7th century. Common remedies were often based on speculation and typically did not provide any benefits to the infected individuals (some even were detrimental); other treatments and preventative techniques were based on empirical studies and proved highly beneficial. An example of effective prevention occurred during the late 1400s when a virulent form of syphilis spread rapidly through Europe. Control measures included: examination and registration of prostitutes, closure of communal bathhouses, isolation in special hospitals, reporting of the disease, and expulsion of sick prostitutes or strangers. The isolation techniques, though they did not cure the disease, aided in stemming the number of individuals exposed to the disease-causing agent.

The miasma theory was a strong proponent of minimizing exposure to disease agents, and subsequently cleaning the filth in towns as a method of preventing infectious diseases. Early cities were often covered in garbage, sewage, animal carcasses, and wastes. Legislation in the 1830s in Britain and Canada improved the ability of municipalities and boards of health to cope with sanitation of community water supplies and sanitation, moving the responsibility for the sanitation of cities away from individual homeowners, and instead placing it on government boards. The resulting sanitation greatly improved health conditions



Smallpox virus



Histopathology of measles pneumonia

Environment-carried diseases that had propagated in the wastes of the city were directly studied in the mid 1800s by such epidemiologists as John Snow. In 1854, Snow investigated deaths due to cholera in a city where two water companies supplied homes with overlapping water mains. One of these companies moved its water intake to a less polluted part of the river, while the other company left its intake in a part of the river heavily polluted with sewage. Most individuals who were infected with cholera had been drinking from the pump supplied by the second company. His research illustrated that it was not miasmas that caused the illness, but the disease agent (cholera)

being transmitted through sewage-contaminated water, thereby supporting environmental transmission of an agent.

In 1846 Peter Ludwig Panum described person-to-person transmission of infectious diseases when he investigated an outbreak of measles in the Faroe Islands, which had been measles-free since 1781. Panum visited all of the island, tracing the chain of transmission of the disease from location to location, and the immunity of those exposed during the 1781 epidemic.

Through the work of such scientists as Panum and Snow, the theory of vector-borne disease transmission became popular. Studies were prompted which looked at intermediate hosts to the disease. Parasitic diseases of animals and people were investigated in many centres during the nineteenth century. In 1883, Jacob Koch established criteria for linking the cause of a disease to a particular parasite or agent. He stated that an organism (agent) must be shown to be present in every case of the disease, that the agent should not be found in cases of any other disease, that once isolated, the agent should be grown in a series of cultures and must be capable of reproducing the disease in experimental animals, and that the agent must then be recovered from the disease produced in the experimental animals.

With individual agents being identified as the cause of a number of diseases, immunization to these agents was therefore identified as a method to prevent incidence and spread of disease. The history of immunization precedes the theories of agent causality. The first efforts to prevent smallpox occurred in China and India in the eighth century and involved intentional inoculation of a susceptible person with scab material from a person with smallpox. However, this method was extremely dangerous and could result in smallpox infection from the vaccine. In 1798 Edward Jenner developed a smallpox vaccine that was derived from cowpox. His vaccine was widely accepted through the world, and became compulsory in many countries. By the late 20th century, the vaccine had aided in the eradication of small pox worldwide.

The success of the smallpox vaccine has resulted in goals to eradicate other vaccine-preventable diseases. Among these are such childhood ailments as poliomyelitis (polio), which has been essentially eradicated from the Americas and most of Europe. This vaccine is given in Alberta as part of the as part of the DTaP-IPV-Hib vaccine cocktail, which encompasses vaccines for: diphtheria, tetanus (1924), pertussis (1930), poliomyelitis (1955), and *Haemophilus influenzae* type b (Hib). Further childhood immunizations in Alberta include Mumps (1948), Measles (1963), Rubella (1965), Varicella/Chickenpox (2001), and Meningococcal Disease (2001).

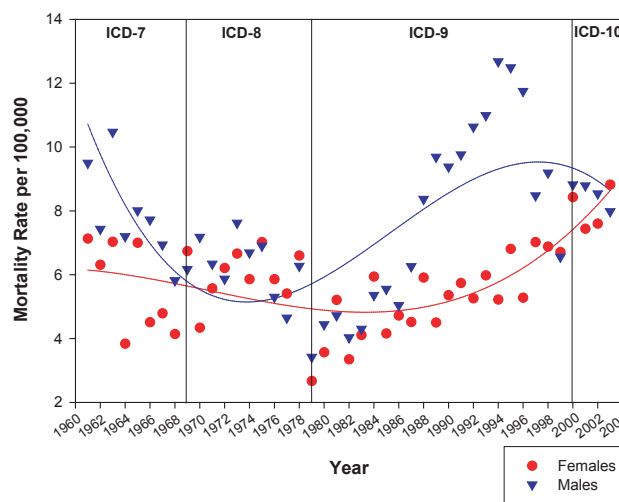


Provincial Archives of Alberta, PA2887/1
Polio vaccination - 1959

Communicable Disease Mortality

Figure 114 displays the mortality rates attributed to communicable disease in Alberta from 1961 to 2003. Communicable disease mortality declined between 1961 and 1980 for both sexes. Beginning in the 1980s, the mortality rate began to raise, particularly for males. More time is needed to see if this trend will continue.

Figure 114 Communicable disease mortality rates per 100,000 population, Alberta 1961 to 2003



Sexually Transmitted Infections (STIs)

Chlamydia

Description

Identification: The primary manifestation of chlamydia in men is urethritis and in women mucopurulent cervicitis. Asymptomatic genital chlamydial infections also occur. It has been estimated that 50 per cent of cases in males and approximately 70 per cent in females are asymptomatic.

Infectious Agent: Chlamydia is caused by the bacterium *Chlamydia trachomatis*

Occurrence: Worldwide. Chlamydia is one of the most frequently reported sexually transmitted infections (STI).

Reservoir: Humans

Mode of transmission: Chlamydia is primarily transmitted from person to person by sexual contact. This infection can also be transmitted vertically from infected mothers to their newborns during delivery. The transmission is more efficient from male to female than from female to male.

Prevention Measures: Correct and consistent use of condoms is an effective way of preventing STIs, including Chlamydia. Other effective methods of prevention include abstinence, limiting the number of sexual partners, being knowledgeable about a partner's past sexual history, avoiding having sex with an infected person, and partner notification and treatment in case of an infection.

Chlamydia Disease Trends

Figure 115 Chlamydia incidence per 100,000, Alberta 1989 to 2004



Chlamydial infections are the most common reportable STI in Canada accounting for more than three quarters of all STIs. In Canada, chlamydia infections have shown a general decreasing trend over time. However, the incidence since 1998 has increased.

Genital chlamydia became reportable in Alberta in 1989. It is the most common reportable STI in Alberta. The rate of chlamydial infection in Alberta has remained above the national average since 1990. The number of cases in the province declined from 7,727 cases (305.8 per 100,000) in 1989 to 7,356 cases (263.5 per 100,000) in 1997. In 1998 the number of cases began increasing. In 2004, 8,339 (262.3 per 100,000) cases were reported and the number of cases continues to increase.

Women are more likely to be diagnosed with chlamydia than men. In 2003, the female to male ratio was approximately 2:1, down from the ratio of 3:1 reported in 1989. This difference may be related to more screening in women accessing health services for other reasons. Since 1998, women aged 20 to 24 years have had the highest rate of infection followed by women 15 to 19 years of age.

Gonorrhea

Description

Identification: The primary manifestation of gonorrhea in men is urethral discharge and painful urination. In women the predominant symptom is mucopurulent cervicitis and occasionally urethritis with symptoms including vaginal discharge, dysuria and bleeding. Many gonorrheal infections are asymptomatic, or have minor symptoms.

Infectious Agent: Gonorrhea is caused by the bacterium *Neisseria gonorrhoeae*

Occurrence: Worldwide. Gonorrhea is the second most common reportable sexually transmitted infection in Canada.

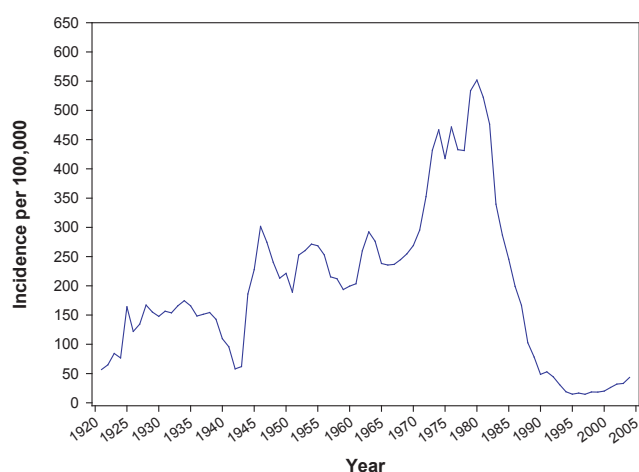
Reservoir: Humans

Mode of transmission: Gonorrhea is primarily transmitted person to person via sexual contact. The bacteria may also spread from the primary site of the infection to other sites causing infection.

Prevention Measures: Prevention of gonorrhea is essential as resistance to the antibiotics traditionally used to treat the infection is increasing. Correct and consistent use of condoms is an effective way of preventing both gonorrhea and HIV transmission. Other effective methods of prevention include those noted under Chlamydia.

Gonorrhea Disease Trends

Figure 116 Gonorrhea incidence per 100,000, Alberta 1921 to 2004



The first case of gonorrhea was reported in Canada in 1924. The Canadian infection rate declined steadily from 1981 to 1997. Part of this change might have been changing sexual practices due to increased awareness of the threat of HIV/AIDS. After reaching a low in 1997, gonorrhea rates have begun to climb in Canada.

In Alberta, the incidence of gonorrhea declined steadily from 1980 to 1995. The number of reported cases has slowly increased from 401 in 1995 to 1,376 cases in 2004. Some of the increase in cases from 2001 to 2004 is attributable to regional outbreaks of this infection.

In Alberta, more cases of gonorrhea are reported in males compared to females. Between 2000 and 2004, men were 1.5 times more likely to be diagnosed with gonorrhea than women. Approximately 50 per cent of gonorrhea cases are under 24 years of age.

HISTORICAL VIGNETTE

Syphilis in Alberta

In 1918, the first *Venereal Disease (VD) Prevention Act* in Canada was passed by the Alberta Legislature. Two years later, the first free VD clinic in Canada was started by Dr. Harrold Orr, in Alberta¹. Clinics were opened in Edmonton, Calgary, Lethbridge, and Medicine Hat for the diagnosis and treatment of venereal disease. "It is particularly encouraging to note the readiness with which syphilitics are applying for treatment" (1920 Annual Report of the Division of Social Hygiene). Other Alberta programs include consultation to physicians with free drugs for treatment and venereal disease examination for all persons admitted to jails.

The 1939 Annual Report of the Division of Social Hygiene noted that the city of Lethbridge had the highest syphilis rate in the province, and the suggestion was made that the existence of several recognized "houses of prostitution" in the centre of that city was the direct cause of the excessive syphilis rate there. With large numbers of soldiers being trained in Lethbridge, the matter of suppressing open prostitution was considered urgent. As stated in the 1940 Annual Report "Every venereally infected soldier is always a temporary and sometimes a permanent war casualty, just as surely as if struck by an enemy bullet". By 1942, Alberta had the lowest incidence of syphilis of any Canadian province. The late 1940s saw the introduction of penicillin for the treatment of both gonorrhoea and syphilis. Compulsory premarital blood tests to control the incidence of syphilis

were instituted in Alberta in 1947 and not repealed until 1986. In 1949, a mobile clinic to enable contact tracing of sexual partners throughout the province first hit the road.

Between 1983 and 1987, Alberta experienced an outbreak of infectious syphilis with rates more than double the high incidence experienced during the 1950s and 1960s. In 2004, the Capital Health region (Edmonton and area) experienced a significant rise in syphilis cases. This was of particular concern considering the expected number of cases during this period should be zero. Most of the cases stemmed from people involved in casual or anonymous sex. The majority of cases were among heterosexual men. Approximately half of the heterosexual men concerned reported sex with a sex trade worker².



Syphilis – long term damaged internal organs



Serology of Syphilis class

Sources:

Elaine Benjamin, Disease Control and Prevention Branch, AHW

¹ [http://www.albertadoctors.org/bcm/ama/ama-website.nsf/0/00707B190EE25FC487256F9D0072CB58/\\$File/FACT_SHEET.PDF?OpenElement](http://www.albertadoctors.org/bcm/ama/ama-website.nsf/0/00707B190EE25FC487256F9D0072CB58/$File/FACT_SHEET.PDF?OpenElement)

² Public Health Agency of Canada, (http://www.phac-aspc.gc.ca/bid-bmi/dsd-dsm/nb-ab/2004/nb4104_e.html)

Syphilis

Description

Identification: Undiagnosed or untreated syphilis progresses through several stages: primary, secondary, latent and tertiary. These stages are grouped into three categories: Infectious syphilis (primary, secondary, early latent); non-infectious syphilis (late latent, tertiary); and congenital syphilis (transmission from an infected mother to her infant). The infection may persist for life. Syphilis is sometimes referred to as the ‘great imitator’ or the ‘great imposter’ due to the extensive variability of symptoms.

Infectious Agent: Syphilis is caused by the bacterium *Treponema pallidum*

Occurrence: Worldwide.

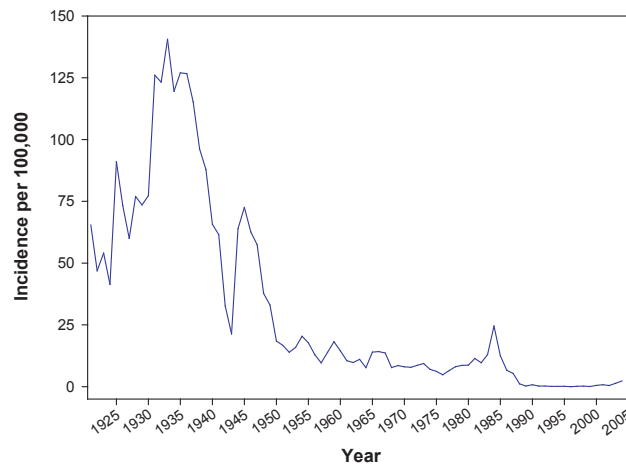
Reservoir: Humans

Mode of transmission: Syphilis is transmitted through direct sexual contact with an infected individual, or contact with their blood. This disease can also be transmitted vertically from infected mothers to their newborns. Groups at highest risk of contracting syphilis are individuals with more than one sexual partner, injection drug users and their partner(s), people whose sexual partner has syphilis and people who have been diagnosed with another STI.

Prevention Measures: Correct and consistent use of condoms is an effective way of preventing syphilis infection. Other effective methods of prevention include those noted under other sexually transmitted infections (chlamydia). Furthermore, infection in infants can be prevented through prenatal screening, testing, and treatment for syphilis. The prenatal program currently in place in Alberta screens pregnant mothers for a number of blood borne pathogens and works towards preventing vertical transmission of the disease.

Syphilis Disease Trends

Figure 117 Infectious Syphilis incidence per 100,000 population, Alberta 1921 to 2004



Syphilis has been a notifiable disease in Canada since 1940 when rates were very high. Infectious syphilis rates have declined since 1984, following a peak of 24.5 cases per 100,000. Rates reached their lowest point in 1996 when only 36 cases (1.3 cases per 100,000) of infectious syphilis were reported. This improvement was credited to aggressive public health interventions such as screening, education, diagnosis, contact tracing and partner notification. The syphilis rate in Canada has subsequently shown a significant increase to 3.0 cases per 100,000 in 2003.

In Alberta a significant syphilis outbreak occurred in 1984 when 574 cases were reported. Subsequent years showed a decline in the number of cases. Since 1990, fewer than 100 cases have been reported annually in the province, although the rate of syphilis in Alberta is increasing. In 2004, 74 cases of infectious syphilis (2.3 cases per 100,000) were reported.

More than 90 per cent of infectious syphilis cases in Alberta are reported from the Calgary and Capital (Edmonton) Health Regions. Calgary Health Region experienced isolated outbreaks of syphilis in 2000 and 2001 as did Capital Health in 2003. Currently, men are three times more likely to be diagnosed with syphilis than women with men age 20 to 24 years mostly likely to be diagnosed.

Hepatitis C

Description

Identification: Hepatitis C causes an inflammation of the liver. Symptoms include anorexia, abdominal pain, nausea and vomiting with progression to jaundice. A high proportion of cases are asymptomatic (90 per cent) although most HCV infections will become chronic. Diagnosis is primarily by detection of HCV antibody.

Infectious Agent: Hepatitis is caused by the hepatitis C virus (HCV), an RNA virus.

Occurrence: Worldwide. The Middle East has the highest prevalence of disease. Certain risk groups such as injection drug users are more likely to be infected.

Reservoir: Humans

Mode of Transmission: Hepatitis C (HCV) is primarily transmitted through exposure to infected blood. Transmission occurs more often in people with large or repeated direct exposure to blood or blood products. The most frequent method of transmission is injection drug use (IDU). Since 1990, the risk of transmission from screened, donated blood, manufactured blood products and transplanted organs has been minimal.

Prevention Measures: Avoidance and education about high risk behaviours is the best way to prevent hepatitis C. Health care workers should use universal precautions and report needle stick injuries immediately. There is no vaccine or post exposure prophylaxis for hepatitis C.

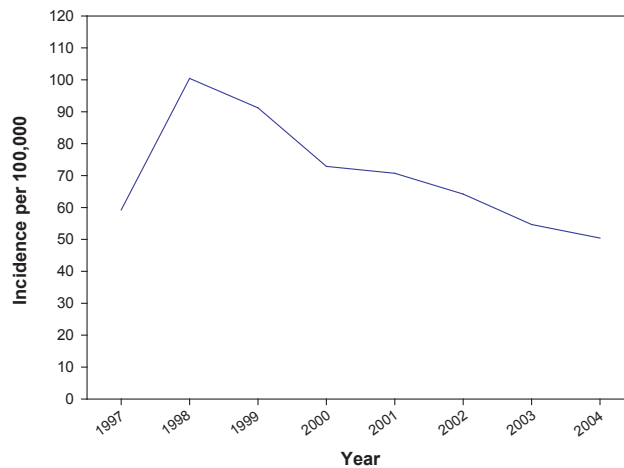
Hepatitis C Disease History and Trends

Hepatitis C is a major public health concern worldwide. It is estimated that approximately three per cent of the world's population, or 170 million persons worldwide, are infected. In Canada in 2000, it was estimated that approximately 0.8 per cent of the population, or more than 240,000 people were infected by hepatitis C.

When hepatitis C was first identified in 1989, it was originally known as “non-A, non-B” hepatitis. In 1997, Alberta designated hepatitis C as a notifiable disease. After the initial spike in reported cases, due to new and old cases being reported, the rate of newly diagnosed hepatitis C has been decreasing. In 2004, there were 1,603 cases of hepatitis C (50.4 cases per 100,000) reported in Alberta.

In Alberta, almost twice as many males as females are diagnosed with hepatitis C; the rate of infection is greater in males in every age category. The peak rate of HCV infection occurs among men 40 to 59 years of age, which may reflect infection acquired several years prior to diagnosis.

Figure 118 Age-standardized hepatitis C incidence, Alberta 1997 to 2004



HIV/AIDS

Description

Identification: Initial infection with HIV usually presents as an acute infection (known as seroconversion illness) with symptoms including: fatigue, headache, rash and weight loss. The infection then becomes asymptomatic for an undetermined period of time.¹⁷⁷ Late stage infection is known as AIDS (Acquired Immunodeficiency Syndrome) and characterized by opportunistic infections and cancers.

Infectious Agent: HIV is caused by human immunodeficiency virus, a retrovirus.

Occurrence: Worldwide. HIV is endemic in sub-Saharan Africa, South East Asia, Latin America, parts of the Caribbean, and in many developing nations.

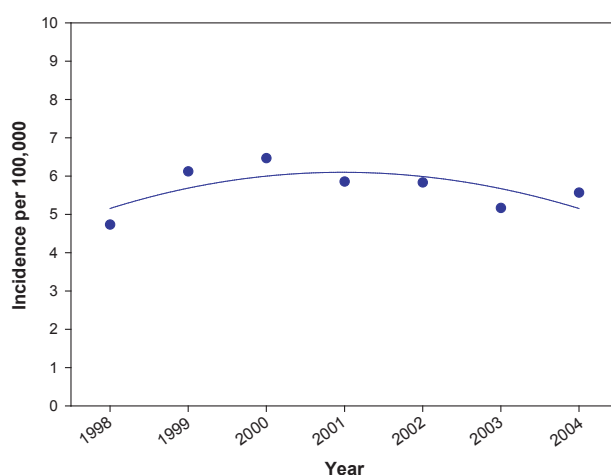
Reservoir: Humans

Mode of Transmission: HIV is transmitted through direct sexual contact with an infected individual, or contact with their blood. This disease can also be transmitted vertically from infected mothers to their newborns.

Prevention Measures: Correct and consistent use of condoms is an effective way of preventing HIV transmission.¹⁷⁸ Other effective methods of prevention include those noted under sexually transmitted infections (chlamydia).

HIV Disease Trends

Figure 118 HIV incidence per 100,000 population, Alberta 1998 to 2003



AIDS was first recognized in 1981 though isolated cases occurred in the 1970s. AIDS has been documented in virtually all countries of the world, among all races, ages and social classes. The World Health Organization (WHO) estimated that at the end of 2001, over 40 million people worldwide were living with HIV/AIDS.¹⁷⁹

AIDS in Canada was first recognized in the early 1980s and testing programs became available in 1985. Initially, the disease was most prevalent among the male homosexual population. As the infection in North America became more prevalent, new at risk populations emerged, with an increasing proportion of people becoming infected through unprotected heterosexual intercourse and intravenous drug use.

The first HIV positive person was identified in Alberta in 1979.¹⁸⁰ AIDS became reportable in 1983 and HIV became a notifiable disease in 1998. Since 1998, an average of 176 new HIV positive individuals are identified each year. The three most common risk categories for HIV infection in Alberta are injection drug use, men who have sex with men, and heterosexual relations with a partner who is at risk.

Men are more than twice as likely as women to be diagnosed with HIV. In 2003, the highest rate of HIV infection was among men 30 to 39 years of age with 50 cases (21.1 cases per 100,000) reported.

Food and Waterborne Communicable Diseases

In addition to diseases transmitted directly from person to person, a number of diseases are transmitted through food and water. Although a comprehensive list contains hundreds of enteric disease, this section will focus on the five enteric diseases most common in Alberta: campylobacteriosis, giardiasis, *E.coli* O157:H7, salmonellosis, and typhoid/paratyphoid.

Campylobacteriosis

Description

Identification: Campylobacteriosis has variable severity of symptoms. Common symptoms include diarrhea, malaise, fever and abdominal pain. It may cause a bacteremia – which most often occurs in persons with underlying medical conditions. In general, campylobacteriosis is self-limiting and symptoms cease within two to five days. One in every 1,000 cases also reports cases: Guillain-Barré syndrome.¹⁸² This syndrome occurs when a person's immune system is triggered to attack the body's nerves, thereby resulting in paralysis.¹⁸³

Infectious Agent: Campylobacteriosis is caused by *Campylobacter* species most commonly *Campylobacter jejuni* or *Campylobacter coli*. There are over 90 biotypes and serotypes.

Occurrence: Worldwide. *Campylobacter* causes 5 to 14 per cent of diarrheal illness worldwide and is an important cause of traveler's diarrhea.

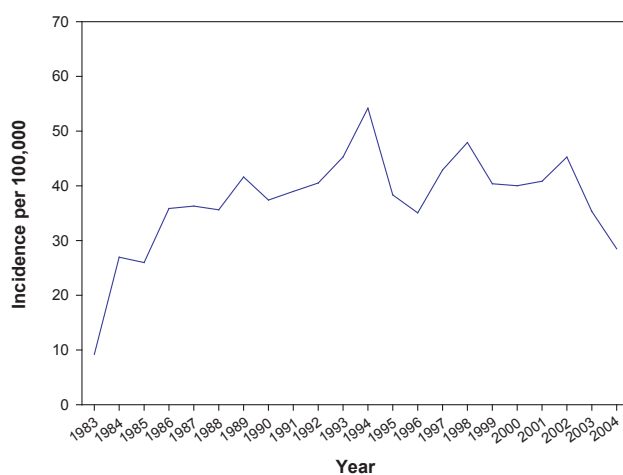
Reservoir: *Campylobacter* bacterium is found in domestic and wild animals, especially poultry, dogs, cats, and pigs.¹⁸⁴

Mode of transmission: The most common source of transmission of campylobacteriosis is the ingestion of contaminated food - in particular raw or undercooked poultry or meat, unpasteurized milk, or contaminated water. Direct contact with animals and pets that are infected is a significant mode of transmission. Person to person transmission (fecal-oral) occurs as well.

Prevention Measures: Practicing preventative techniques is the best way to stop the spread of campylobacter bacterium. Methods of prevention include ensuring that food is thoroughly cooked, milk is pasteurized and hands are washed after contact with pets and animals.¹⁸⁵

Campylobacteriosis Disease Trends

Figure 120 Campylobacteriosis incidence per 100,000 population, Alberta 1983 to 2003



Campylobacteriosis is more common in the warmer summer months in Alberta and Canada.¹⁸⁶ The rate of campylobacteriosis in Canada has been decreasing slightly over the past 10 years. The national rate in 2003 was 29.3 cases per 100,000 population.

Campylobacteriosis is the most common enteric disease in Alberta. Between 1987 and 1999, Alberta's rate remained below the national average. Since 1993, Alberta has reported between 900 and 1,400 cases of campylobacteriosis each year. The rate in 2004 was 28.5 cases per 100,000 (906 cases) – higher than the national rate. Infants and young children are infected with *Campylobacter* more frequently than any other age group.

Southern Alberta is disproportionately affected by campylobacteriosis compared to the central and northern parts of the province.

Giardiasis

Description

Identification: Giardiasis is often asymptomatic. Symptomatic individuals may suffer a variety of symptoms including: acute watery diarrhea, abdominal cramps, distention, and anorexia. Periods of diarrhea may alternate with constipation until treated or symptoms resolve spontaneously. Vomiting and fever occur less commonly.

Infectious Agent: Giardiasis is caused by the parasite *Giardia lamblia*

Occurrence: Worldwide. *Giardia* is one of the most common causes of endemic and epidemic diarrhea throughout the world. International travelers and those who spend time in the wilderness may be at a high risk for infection.

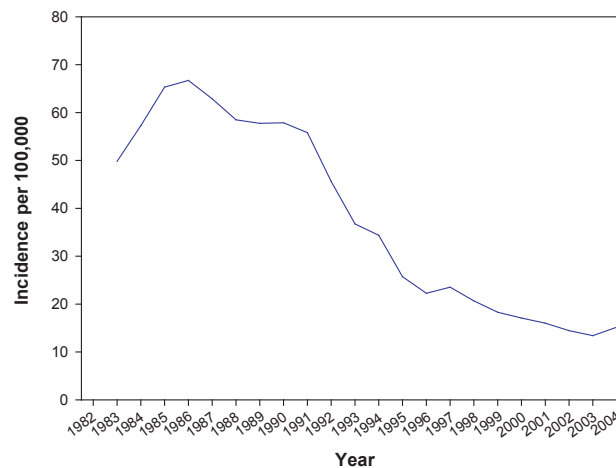
Reservoir: Humans are the principle reservoir of *Giardia lamblia*. Domestic and wild animals, including beavers and bears, have also been identified as potential reservoirs.

Mode of transmission: The primary mode of transmission is through consumption of contaminated water and occasionally from swimming in contaminated water. Person to person transmission (fecal–oral) is the second most common mode of spread. Foodborne transmission has also been documented.

Prevention Measures: Practicing preventative techniques is the best way to stop the spread of Giardiasis. Methods of prevention include exercising personal hygiene, thoroughly treating any drinking water, and properly cooking food.

Giardiasis Disease Trends

Figure 121 Giardiasis incidence per 100,000 population, Alberta 1983 to 2002



The most common enteric parasite in Canada is *Giardia lamblia* - the most frequent cause of non-bacterial diarrhea. Giardiasis is more common in the warmer summer months in Alberta and Canada.¹⁸⁷

In Alberta, the rate of giardiasis has decreased from 66.7 cases per 100,000 in 1986 to 15.1 cases per 100,000 in 2004. The number of cases reported decreased from 1,635 in 1986 to 482 in 2004. Young children are infected with *Giardia lamblia* more frequently than any other age group. Generally, the highest rates of infection are in southern Alberta and along the western border of the province.

Haemorrhagic Colitis (E. coli O157:H7)

Description

Identification: *E. coli* O157:H7 is one of many strains of the *Escherichia coli* bacteria.¹⁸⁸ These bacteria produce a toxin that attacks the lining of the intestine.¹⁸⁹ Diarrhea, which may be bloody, is the most common symptom. Approximately two to seven per cent of cases develop a serious complication called Haemolytic Uraemic Syndrome (HUS).¹⁹⁰ HUS results in the destruction of red blood cells and the failure of the kidneys.¹⁹¹

Infectious Agent: Haemorrhagic colitis is caused by the *E. coli* O157:H7 bacteria.

Occurrence: *E. coli* O157:H7 is a significant issue in North and South America, Europe, South Africa, Japan and Australia.

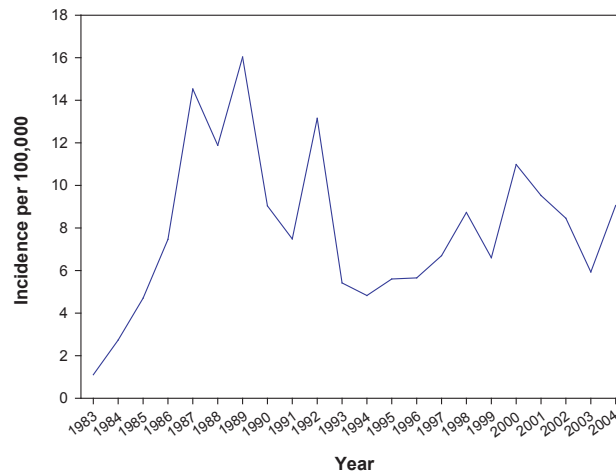
Reservoir: Cattle are the principle reservoir of *E. coli* O157:H7. Humans may also serve as a reservoir.

Mode of transmission: The predominant mode of transmission is through the ingestion of contaminated food, often related to inadequate cooking, or through cross-contamination during food preparation. Infection can also occur through ingesting contaminated drinking water. Person to person transmission (fecal-oral) occurs as well.

Prevention Measures: Practicing preventative techniques is the best way to stop the spread of Haemorrhagic Colitis. Methods of prevention include exercising personal hygiene, thoroughly cooking any suspect food (especially beef), and avoiding contaminated water.

Haemorrhagic Colitis Disease Trends

Figure 122 Haemorrhagic colitis incidence per 100,000 population, Alberta 1983 to 2003



Sporadic cases and outbreaks of *E. coli* O157:H7 have occurred in Canada since the first reported outbreak in the United States in 1982. In Canada, the incidence of *E. coli* has remained stable with 4.1 to 7.1 cases per 100,000 reported between 1990 and 1999 with an average of 1,407 cases reported annually. In 2000, there was a significant increase in national cases due to an outbreak in the town of Walkerton, ON. More than 2,000 cases of *E. coli* O157:H7 were reported, bringing the national rate up to 9.8 cases per 100,000 in 2000.

Alberta typically has a higher incidence of *E. coli* O157:H7 than the national rate. Since 1991, Alberta has reported approximately 300 cases of *E. coli* annually. The rate in 2004 was 9.1 cases per 100,000 (288 cases). *E. coli* O157:H7 is most common among children one to 14 years of age, particularly among children one to four years of age. Typically, the highest rate of infection is in southern Alberta.

Salmonellosis

Description

Identification: Salmonella bacteria attack the digestive system.¹⁹² Salmonellosis symptoms include: diarrhea, cramps and headache. A small number of persons will go on to develop pains in their joints, irritation of the eyes, and painful urination.¹⁹³ These sequels may last for months or years and can lead to chronic arthritis.¹⁹⁴

Infectious Agent: Salmonella is caused by bacteria from the *Salmonella* group

Occurrence: Worldwide. Salmonellosis is endemic in many parts of the world.

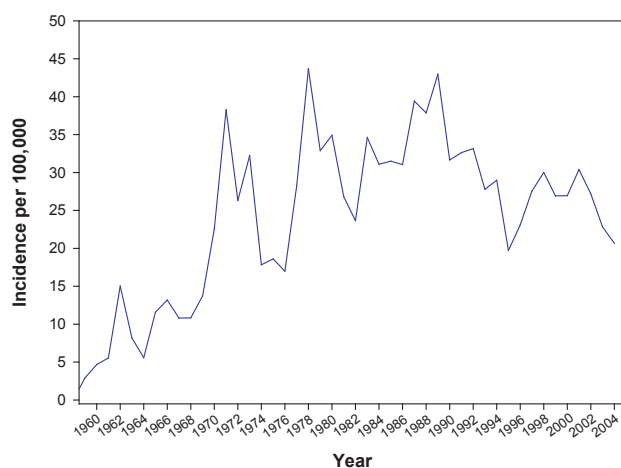
Reservoir: Many wild and domestic animals, including reptiles, birds, dogs, cats, horses and farm animals.¹⁹⁵ Humans may also serve as a reservoir.

Mode of transmission: The predominant mode of transmission is through the ingestion of contaminated food, often related to inadequate cooking or through cross-contamination of foods during preparation. Foods of animal origin are the predominant source of transmission. This includes poultry, red meat, eggs, unpasteurized milk and other dairy products. Pet reptiles are another potential source of these bacteria. Person to person transmission (fecal–oral) also occurs.

Prevention Measures: Preventative techniques are the only way to stop the spread of salmonellosis. Methods of prevention include exercising personal hygiene, thoroughly cooking any suspect food, and avoiding contaminated water. Due to the high enteric outbreak potential of salmonellosis, the prompt reporting of a salmonellosis case for outbreak investigations also aids in prevention.

Salmonella Disease Trends

Figure 123 Salmonella incidence per 100,000 population, Alberta 1960 to 2003



Salmonellosis is not endemic in Canada; Approximately 5,500 cases are reported each year. In 2003, the national rate was 14.5 cases per 100,000.

Alberta typically has a higher incidence of salmonellosis than the national rate. Recently, rates of salmonellosis in Alberta have ranged from 22.9 to 30.6 cases per 100,000 population; this represents approximately 900 cases per year. The highest rate of salmonellosis are among those four years of age or less. The occurrence of approximately 10 to 15 small outbreaks annually can impact the age and geographical distribution of cases.

Typhoid/paratyphoid

Description

Identification: Both typhoid and paratyphoid cause similar symptoms with paratyphoid producing a less severe infection. Common symptoms include: fever, headache, malaise and constipation. Complications associated with these diseases include confusion, delirium, intestinal perforation, and death (15 to 20 per cent of untreated cases).¹⁹⁶ In most cases, typhoid is not a chronic disease, however, a few people remain infected for life.

Infectious Agent: Typhoid and paratyphoid are caused by *Salmonella typhi* and *Salmonella paratyphi* bacteria, respectively.

Occurrence: Worldwide. Typhoid and paratyphoid are endemic of many developing countries, particularly the Indian subcontinent, South and Central America, and Africa.

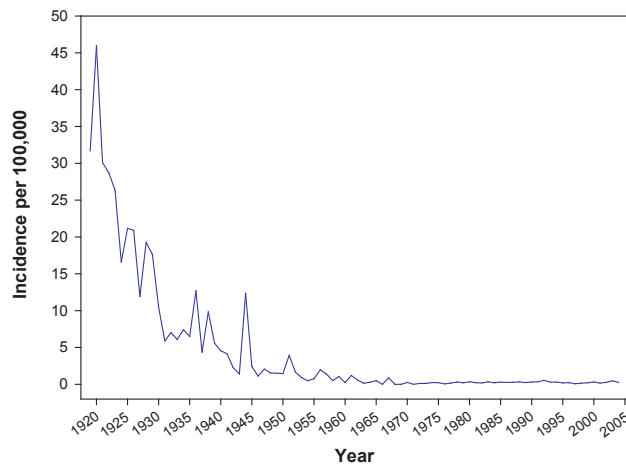
Reservoir: Humans

Mode of transmission: The predominant mode of transmission is through the ingestion of contaminated food or drinking water. Person to person transmission (fecal-oral) also occurs.

Prevention Measures: Immunization is recommended for travellers at risk for acquiring typhoid. Prevention also reduces the risk of typhoid and paratyphoid. Methods of prevention include exercising personal hygiene, thoroughly cooking any suspect food, and avoiding contaminated water. Due to the high enteric outbreak potential of typhoid and paratyphoid, the prompt reporting of a suspected case for outbreak investigations also aids in prevention.

Typhoid Disease Trends

Figure 124 Typhoid incidence per 100,000 population, Alberta 1919 to 2003



The annual incidence of typhoid fever is estimated at about 12 to 33 million cases worldwide with approximately 600,000 deaths.

The incidence of typhoid in Canada is very low with the number of cases reported annually remaining fairly constant. Between 1993 and 2002, 806 cases were reported in Canada, with an average of 73 cases per year. The greatest risk of typhoid infection for Canadians occurs while they are traveling in countries where sanitation is poor.

In Alberta, all typhoid and paratyphoid cases are the result of foreign travel, especially to areas where typhoid is endemic. A case of typhoid is uncommon in Alberta. Eighty eight cases were reported between 1993 and 2004 with an average of six cases per year.

HISTORICAL VIGNETTE

Typhoid in Alberta

Mary Mallon seemed a healthy woman when a health inspector knocked on her door in 1907, yet she was the cause of several typhoid outbreaks. Since Mary was the first “healthy carrier” of typhoid fever in the United States, she did not understand how someone not sick could spread disease.¹ Typhoid fever is a life-threatening illness caused by the bacterium *Salmonella Typhi* which lives only in humans. Persons with typhoid fever carry the bacteria in their bloodstream and intestinal tract. In addition, a small number of persons, called carriers, recover from typhoid fever but continue to carry the bacteria. Both ill persons and carriers shed *S. Typhi* in their feces.²

In Alberta in 1908, the Provincial Health Officer (PHO) stated that “Owing to the rapid growth of the municipalities and villages in many cases sanitation has failed to keep abreast of the increase in population, and the inevitable penalty – typhoid fever – has appeared, with its heavy toll in lives and money”. This has also been the case in many mining and railway camps. Immunization for typhoid fever became available after 1911; still 638 cases of the disease were reported in Alberta in 1913. The larger cities reported over three-quarters of the cases but the PHO was quick to indicate that “This does not mean these cities are insanitary, but being hospital centres, many cases originating in nearby towns are brought in to them for treatment.” Deaths from typhoid during the year were 160; this is a high percentage, the explanation of which is two-fold. Firstly, many mild cases are not reported and secondly, very many of the cases which occur in construction camps only get to the hospital after a

long and exhausting journey (Report of the PHO, 1913).

Better sanitation and a more general recognition of the protection afforded by the typhoid vaccine accounted for a significant drop in typhoid cases in Alberta in the years that followed. The University of Alberta was now producing typhoid vaccine at very low cost and the use of the vaccine had met with a great deal of success, especially among the employees of the Canadian Pacific Railway (Report of the PHO, 1913, 1914). By 1917, the number of typhoid cases in Alberta had dropped to 127.

Typhoid fever is still common in the developing world, where it affects about 21.5 million persons each year. Typhoid fever can be contracted by consumption of food or beverages handled by a person who is shedding *S. Typhi* or if sewage contaminated with *S. Typhi* bacteria gets into the water used for drinking or washing food. Watching what you eat and drink when traveling is as important as being vaccinated.



Typhoid - histopathology of lymph node

Sources:

¹ <http://history1900s.about.com/library/weekly/aa062900a.htm>

² http://www.cdc.gov/ncidod/dbmd/diseaseinfo/typhoidfever_g.htm

Report of the Provincial Health Officer, Department of Agriculture, Alberta, 1908, 1913, 1914, 1917

Vaccine-Preventable Communicable Diseases

Diphtheria

Description

Identification: Diphtheria bacteria target the respiratory track, specifically the tonsils, pharynx and larynx. A less dangerous form of the infection occurs in cutaneous diphtheria, where the skin is affected. Myocarditis, polyneuritis, and airway obstruction are common complications of respiratory diphtheria; death occurs in five to 10 per cent of respiratory cases.¹⁹⁷ Some cases of diphtheria are asymptomatic.

Infectious Agent: Diphtheria is caused by the toxin-producing strain of *Corynebacterium diphtheriae*.

Occurrence: More common in temperate weather zones. Diphtheria is a rare disease in countries where immunization rates are high.

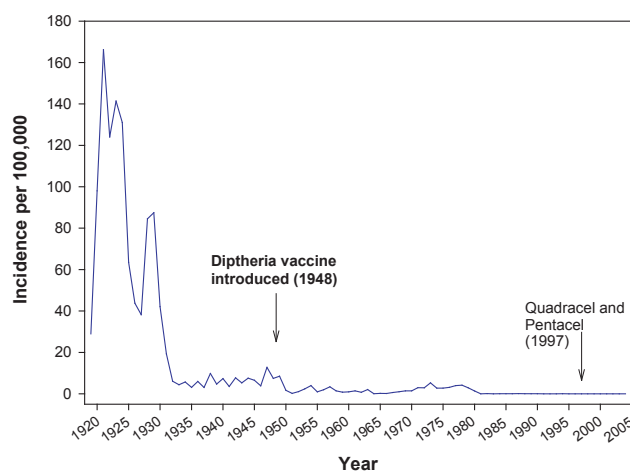
Reservoir: Humans

Mode of transmission: Transmission is via respiratory droplets from close intimate contact with a case or carrier. Sporadic cases most often result from exposure to carriers who are asymptomatic.

Prevention Measures: Mass diphtheria prevention can only be achieved through vaccination, and in cases of active disease, the isolation of the index case and the treatment of contacts with antibiotics.

Diphtheria Disease Trends

Figure 125 Diphtheria incidence per 100,000 population, Alberta, 1920 to 2003



HISTORICAL VIGNETTE

Diphtheria in Alberta

Diphtheria is caused by bacteria infecting the nose and throat so a person may have trouble breathing or they may have skin or ear infections. The bacteria also produce a poison that can cause paralysis or heart damage.¹ Before 1900, diphtheria was one of the most common causes of death in children under five years of age, especially babies. Diphtheria is a severe disease; even with treatment, about 10% of people infected with diphtheria die.

In Alberta in 1908, diphtheria was prevalent, particularly in Calgary, Edmonton, Lethbridge and Pincher Creek. The Report of the Provincial Health Officer also notes that, "Great difficulty was experienced in controlling and stamping out an outbreak of diphtheria amongst the Galicians and Ruthenians in the vicinity of Mundare."

Approximately 12,000 cases and 1,000 deaths due to diphtheria occurred every year in Canada until 1920. Diphtheria toxoid, the vaccine against diphtheria, was developed in France and Canada in the 1920's. In 1929, Dr. Harold A. Hamman made five dogsled trips in 25 days and covered 300 miles to diagnose, treat and vaccinate the inhabitants of Fort Vermillion and Little Red River in an effort to protect two towns from diphtheria.

By the 1930's, routine immunization became widespread. Still, from 1937–1938, Alberta suffered from serious smallpox, influenza and diphtheria epidemics.² Infectious diseases were the leading cause of death worldwide during the early 1900's. Now, as the result of immunization programs, vaccine-preventable diseases cause less than 5 per cent of all deaths in Canada. By 1983, fewer than five cases of diphtheria were reported in Canada; there were no deaths.³

Despite these successes, vaccine-preventable diseases are still with us. There is a grave potential for the disease to resurface due to low levels of immunity among Canadian adults. When immunization coverage rates fall, epidemics of disease occur. Falling immunization rates in Russia have resulted in tens of thousands of cases of diphtheria.



Diphtheria

Sources:

¹ http://www.health.gov.ab.ca/public/immunizations/pdf/CD88_dTap_ivp.pdf
Report of the Provincial Health Officer, Department of Agriculture, Alberta, 1908.

² [http://www.albertadoctors.org/bcm/ama/ama-website.nsf/0/00707B190EE25FC487256F9D0072CB58/\\$File/FACT_SHEET.PDF?OpenElement](http://www.albertadoctors.org/bcm/ama/ama-website.nsf/0/00707B190EE25FC487256F9D0072CB58/$File/FACT_SHEET.PDF?OpenElement)

³ <http://www.immunize.cpha.ca/english/consumer/con-idv/diphther.htm>

Diphtheria is typically a disease of colder months in temperate climates usually involving children who are not immunized, or groups of adults whose immunization has been neglected.¹⁹⁸ In Canada the number of diphtheria cases has decreased significantly as the result of vaccination.

The highest ever recorded number of diphtheria cases in Canada was in 1924 when approximately 9,000 cases were reported. In 1926, diphtheria toxoid was licensed for use in Canada and introduced into routine immunization in 1930.¹⁹⁹ This led to a substantial decline in diphtheria morbidity and mortality. Since 1983, there have been fewer than five cases reported in Canada each year with no deaths. The majority of cases have occurred in adults with inadequate protection.

From 1981 to 1994, five cases and four carriers were reported in Alberta. Only two of the cases were among infants less than two years of age. No cases have been reported since 1995.

Hepatitis A

Description

Identification: Hepatitis A illness often has an abrupt onset of symptoms that include: fever, malaise, anorexia and abdominal discomfort. However, with Hepatitis A, many adults and most children may be infected (and infectious), but have no or very mild symptoms.

Infectious Agent: Hepatitis A is caused by the hepatitis A virus (HAV).

Occurrence: Worldwide. The risk groups for hepatitis A varies between developed and developing countries.

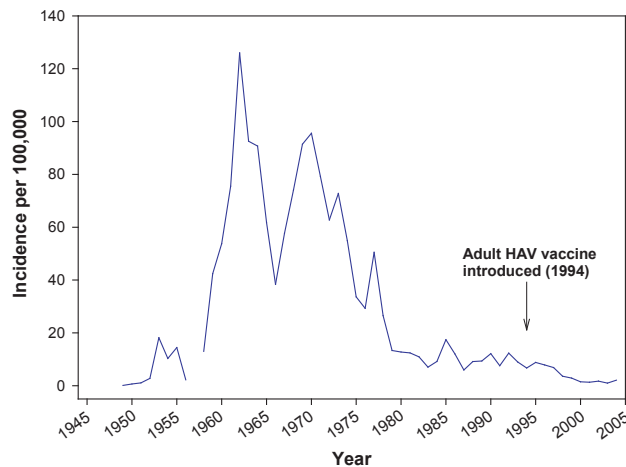
Reservoir: Humans

Mode of transmission: The predominant mode of transmission is through the ingestion of contaminated food, or drinking water in countries where hepatitis A is endemic. Person to person transmission (fecal–oral) also occurs. In Canada and other industrialized nations, individuals at increased risk include foreign travellers, children and staff of day-care facilities, injection drug users, and individuals with multiple male sex partners.

Prevention Measures: The best way to prevent the spread of hepatitis A is to practice preventative techniques. Methods of prevention include exercising personal hygiene, thoroughly cooking food, and avoiding contaminated water. It is also possible to be vaccinated against hepatitis A. Immunization is recommended for foreign travelers and other high risk groups. The prompt reporting of a hepatitis A case for outbreak investigations also aids in prevention.

Hepatitis A Disease Trends

Figure 126 Hepatitis A incidence per 100,000 population, Alberta 1945 to 2003



Canada has a relatively low incidence of hepatitis A. Approximately 1,000 to 3,000 cases are reported each year. The rate has varied from over 10 cases per 100,000 population in 1991 to 3.6 cases per 100,000 in 1998.

Hepatitis A became reportable in Alberta in 1969. The incidence of the disease has been decreasing steadily since the 1970s. Hepatitis A vaccine was introduced in 1994 and is primarily used for travelers and those at high risk. The average incidence over the last ten years is 7.7 cases per 100,000. The rate of hepatitis A is highest among those five to nine years of age with 16.9 cases per 100,000. In the past five years, 235 cases of Hepatitis A were reported (2000 to 2004). The possible source of infection was not known for approximately half (46 per cent) of the cases.

Hepatitis B

Description

Identification: Hepatitis B is an inflammation of the liver. Symptoms include anorexia, abdominal pains, nausea and vomiting, with progression to jaundice. About 10 per cent of adults develop a chronic disease, which can lead to cirrhosis and cancer of the liver later in life. Approximately 10 per cent of adults and 90 per cent of infants who get infected with the hepatitis B become carriers of the hepatitis B virus.

Infectious Agent: Hepatitis B is caused by the hepatitis B virus, a DNA virus

Occurrence: Worldwide. Hepatitis B is endemic in parts of Africa and Asia.

Reservoir: Humans

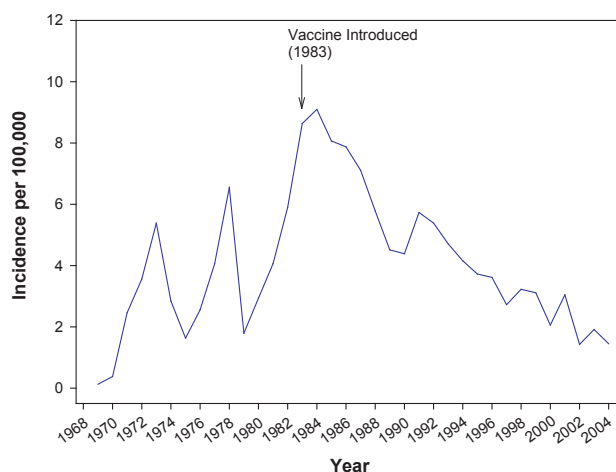
Mode of transmission: The most common mode of transmission is via exposure to blood and body fluids, sexual contact or vertical transmission from mother to infant.

Prevention Measures: Hepatitis B transmission can be prevented by active immunization with a hepatitis B vaccine; adopting safe sex practices; and administering hepatitis B immune globulin to people who have had recent contact (seven days or less) with infected body fluids.²⁰⁰

Infection in infants can be prevented through prenatal screening and testing for hepatitis B. The prenatal program currently in place in Alberta screens pregnant mothers for a number of blood borne pathogens and works towards preventing vertical transmission of the disease.

Hepatitis B Disease Trends

Figure 127 Hepatitis B incidence per 100,000 population, Alberta 1969 to 2003



In Canada, acute hepatitis B has been reportable since 1969. The disease rate has been decreasing since 1994, when the rate was 10.6 cases per 100,000. In 2003 the national rate of hepatitis B was 2.7 cases per 100,000. This decrease is partially the result of the universal hepatitis B immunization programs for children and adolescents across Canada. Hepatitis B is more common in certain risk groups such as injection drug users, individuals with multiple sex partners and health care workers that handle blood products.

The rate of acute hepatitis B disease in Alberta has been decreasing since 1983. The average disease rate between 2000 and 2003 is 2.1 cases per 100,000. In the fall of 1995, Alberta Health and Wellness began immunization of grade five students with the hepatitis B vaccine. The rates of acute infections, especially among those under 20 years of age have continued to drop significantly since then. In 2004, no cases of acute hepatitis B occurred among those under 20 years of age. Chronic carriers exist, but as they are not currently reportable, it is very difficult to judge how many there are in Alberta.

Haemophilus Influenzae type b (Hib)

Description

Identification: Invasive *Haemophilus Influenzae* type (Hib) bacteria target the lower respiratory tract and are a cause of meningitis, pneumonia, and epiglottitis in children. An infection with Hib bacteria is fatal in three to six per cent of cases, and up to 20 per cent of surviving patients have permanent hearing loss or other long-term sequelae.²⁰¹

Infectious Agent: *Haemophilus Influenzae* type b is a bacterium.

Occurrence: Worldwide. In developed countries, Hib is not common. Hib continues to be a major cause of infection in infants and children in developing countries.

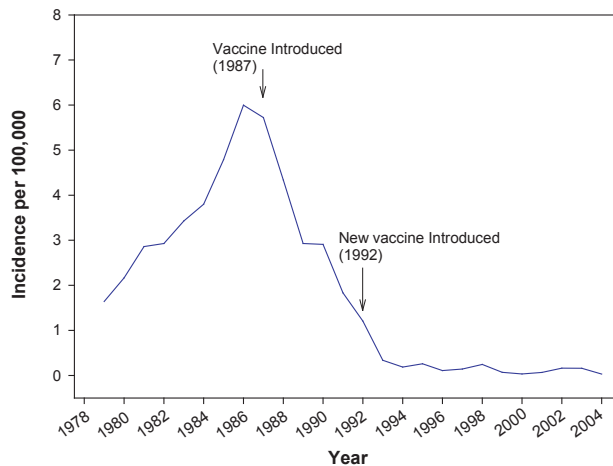
Reservoir: Humans

Mode of transmission: Transmission is via respiratory droplets from close intimate contact with a case or carrier.²⁰²

Prevention Measures: Immunization is the best way to prevent invasive Hib disease.²⁰³

Haemophilus influenzae Type B Disease Trends

Figure 128 *Haemophilus influenzae* type B incidence per 100,000 population, Alberta, 1978 to 2003



Hib was once the most common cause of meningitis, causing a serious infection in approximately one in 300 Canadian children.²⁰⁴ The first Hib vaccine was licensed in 1985 for children over two years of age. A conjugate vaccine was licensed in 1988 for infants two months of age and older. Prior to the introduction of Hib conjugate vaccine, there were approximately 2,000 cases of Hib reported each year. The number of cases has declined since 1988.

Alberta reported 147 cases of Hib in 1986. Rates were highest in children less than one year of age followed by children aged one to four years. In 1989, after the introduction of the conjugate vaccine, 76 cases of Hib were reported. In 1992, a new Hib vaccine was introduced in Alberta. By 1993, rates in children less than one year of age had drastically declined; there were no cases of Hib among infants less than one year of age. Since 1999, only three cases of Hib have occurred in infants less than one year of age. Only 51 cases of Hib were reported in Alberta between 1993 and 2004.

HISTORICAL VIGNETTE

Influenza in Alberta

Influenza is an infection of the lungs and airways caused by a virus. As with many other viral illnesses, there is no cure. While influenza can be mild in some people, in others it can be very serious - contributing to the development of illnesses such as pneumonia and can even result in death.¹ While influenza is a yearly affliction, rarely does it reach epidemic proportions.

When an epidemic occurs over a wide geographic area and affects a large proportion of the population, it is referred to as a pandemic.² The Spanish Influenza pandemic of 1918-19 is the catastrophe against which all modern pandemics are measured. It is estimated that approximately 20 to 40 per cent of the worldwide population became ill and that over 20 million people died – more than during World War I. Many people died very quickly; some people who felt well in the morning became sick by noon, and were dead by nightfall.³ One of the most unusual aspects of the Spanish influenza was its ability to kill young adults; the attack rate and mortality was highest among adults 20 to 40 years old.

Returning soldiers brought the worldwide flu epidemic to Alberta in October 1918. It quickly made its way to even the remotest communities. When it was over, 38,000 people in the province had been infected and 4,000 had died.⁴ A variety

of home remedies and many cures were marketed to “beat the ‘flu’”. Some sprinkled sulphur in their shoes, others wore face masks, while salt herring tied around the neck was also touted as a remedy.⁵ Influenza not only brought death but social and economic disruptions as well. Schools throughout all of Canada were closed; all celebrations and get-togethers were discouraged as well as mass gatherings at sporting events.⁶

In recent times, influenza pandemics have occurred a few times, but the severity of the Spanish Influenza virus has not been seen again. With about one quarter of Canadians contracting the virus during the winter months, annual influenza vaccinations are given to persons considered to be at risk. Medical experts predict that an influenza pandemic could occur again at any time. In response, the Government of Alberta began work in 1999 to prepare the health system and the province for an influenza pandemic.⁷



Provincial Archives of Alberta, UV6

Sources:

- ¹ <http://www.health.gov.ab.ca/influenza/Index.html>
- ² <http://www.answers.com/topic/pandemic>
- ³ <http://www.health.gov.ab.ca/influenza/PandemicHistory.html>
- ⁴ Alberta History publication / Spring 2005
- ⁵ Lung Association of Canada (<http://www.Lung.ca/ca/articles/19991201killers.html>)
- ⁶ <http://www.elkpointhistory.ab.ca/Steve/Events/flu.htm>
- ⁷ <http://www.health.gov.ab.ca/influenza/PandemicPlan.html>

Influenza

Description

Identification: Influenza causes a variety of symptoms including fever, malaise, sore throat and cough. This virus can cause mild to severe illness including: secondary bacterial pneumonia, dehydration, worsening of chronic medical conditions, sinus problems, ear infections, and at times death.²⁰⁵

Infectious Agent: Influenza is caused by the influenza virus.

Occurrence: Worldwide

Reservoir: Humans

Mode of transmission: Transmission of influenza is airborne from an infected person into the air. Direct contact with respiratory secretions will also transmit disease.

Prevention Measures: Immunization is the best way to prevent influenza. The influenza vaccine causes less severe infection in the vaccinated individual. The virus changes its coat every season, making each year's version of the flu unrecognizable to the immune system.²⁰⁶ Subsequently, immunity to the flu must be re-established with a new flu shot every fall.²⁰⁷ In addition to immunization, hand washing can reduce the transmission of influenza.

Influenza Disease Trends

Figure 129 Age Standardized influenza incidence per 100, Alberta 1986 to 2003

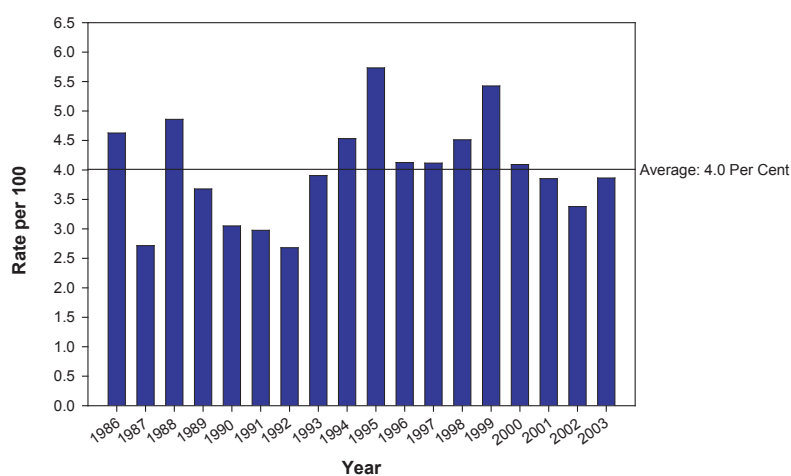


Figure 130 Age standardized mortality attributable to influenza per 100 population, Alberta 1986 to 2003



The influenza virus can rapidly produce epidemics and pandemics. The Spanish flu of 1919 resulted in 20 to 50 million deaths worldwide. Since then, pandemics have occurred in 1957 and 1968. Another pandemic is expected to occur sometime in the near future

Throughout Canada and Alberta, outbreaks of influenza are common in the winter. Long-term care facilities and schools are most frequently affected by outbreaks. In Alberta, the rate of clinically diagnosed influenza has remained fairly constant over the past 15 years with approximately 4.0 cases per 100. In 1999, Alberta experienced a particularly virulent strain of influenza that caused increased mortality. Influenza infection resulted in 109 deaths that year compared to an average of 33.4 deaths for the previous five years.

Rubella

Description

Identification: Rubella is also known as ‘German Measles’. The virus replicates in the nose, throat and the lymph nodes. While rubella is a minor disease in children causing mainly a rash, in adults it can cause sharp and severe pain in the joints, arthritis, inflammation of the brain, and excessive bleeding.

Congenital Rubella Syndrome (CRS) occurs in infants whose mother contracted rubella during pregnancy.²⁰⁸ These infants are often born with complications such as deafness, cataracts, heart defects, abnormal smallness of the head, mental retardation, bone alterations and liver and spleen damage.²⁰⁹

Infectious Agent: Rubella is caused by the rubella virus

Occurrence: Worldwide, especially in unimmunized populations

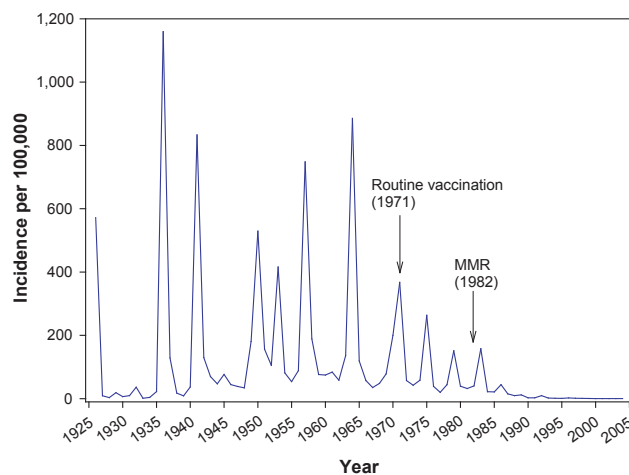
Reservoir: Humans

Mode of transmission: Transmission is via respiratory droplets from close intimate contact with a case or carrier.

Prevention Measures: Immunization is the best way to prevent rubella. The vaccine can be administered to anyone at risk of contracting rubella, but it is routinely offered to infants 12 to 15 months of age – in the MMR vaccine – which also contains measles and mumps vaccine. Once vaccinated, the individual is protected from rubella for life.

Rubella Disease Trends

Figure 131 Incidence of reported rubella cases, Alberta 1928 to 2003



Rubella, or “little red” was believed to be a variant of measles until 1814, when it was described as a separate disease.²¹⁰ The first laboratory confirmed cases of rubella in Canada were reported in 1924. In 1942, an epidemic of cases of congenital cataracts in newborns was associated with mothers infected with rubella. Subsequent investigation demonstrated the complications now associated with congenial rubella syndrome²¹¹. A rubella containing vaccine was introduced in 1969. In Canada, the rate of rubella remains quite low with approximately 0.1 cases per 100,000 reported annually, primarily among not immunized groups. Outbreaks are most common in winter and spring.

Although historically a common disease, in the last 10 years, Alberta has had less than 300 cases of rubella reported altogether. Between 1996 and 2004, rates have ranged from 2.4 cases per 100,000 population (65 cases) in 1996 to no cases in 2004. Only two congenital rubella syndrome cases have been reported in the last 20 years.

Two significant outbreaks occurred in Manitoba in the 1990s, which affected rubella rates in Alberta. The first in 1992/1993 contributed to 258 cases reported in 1992. The second outbreak occurred between October 1996 and June of 1997 when almost 4,000 cases (13.4 cases per 100,000) were reported in Canada. In Alberta in 1996, 34 of the 68 cases reported were related to the outbreak occurring in Manitoba. Both the Alberta and Manitoba outbreaks had a similar age distribution, with most cases occurring among those 15 to 19 years of age, with no history of rubella immunization.

Measles

Description

Identification: Measles is also known as rubeola or red measles. Measles virus replicates in the nose, throat and the lymph nodes. Symptoms of measles include fever, conjunctivitis and a distinctive measles rash. Although the measles virus can infect any age group, severe complications are most common among children. Complications associated with measles infection include pneumonia,²¹² inflammation of the brain,²¹³ and death.²¹⁴ This acute infection has an incubation period of 10 to 12 days before showing symptoms.²¹⁵

Infectious Agent: Measles is caused by the measles virus.

Occurrence: Worldwide, though less common in developed nations.

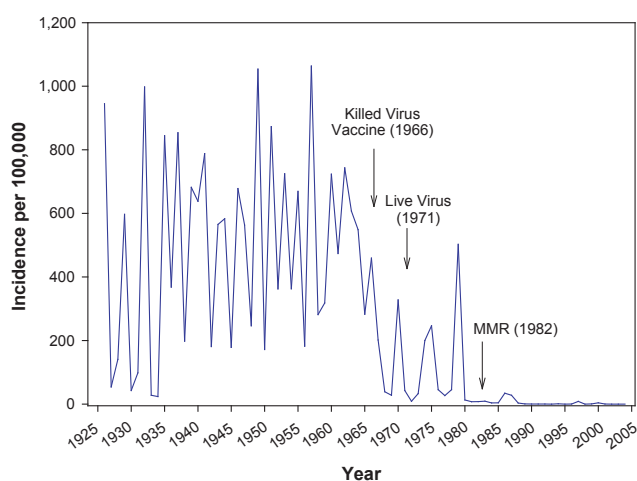
Reservoir: Humans

Mode of transmission: Transmission is via respiratory droplets from close intimate contact with an infected individual.

Prevention Measures: Immunization is the best way to prevent measles. The vaccine can be administered to anyone at risk of contracting measles, but it is routinely offered to children 12 to 15 months of age – in the MMR vaccine – which also contains mumps and rubella vaccine. Once vaccinated, an individual is protected from measles for life.

Measles Disease Trends

Figure 132 Measles incidence per 100,000 population, Alberta 1919 to 2003



Due to its highly infectious nature, measles infection was so common historically that 90 per cent of people were immune by age 15,²¹⁶ and epidemics occurred about every two to three years. The introduction of a vaccine to protect against measles was introduced in 1963 and decreased the incidence of measles by 98 per cent.²¹⁷ The World Health Assembly in 1989 set to eradicate the incidence of measles worldwide by 2010.²¹⁸

Following several large outbreaks, the National Consensus Meeting on Measles Control announced in 1992 a plan to eliminate indigenous measles in Canada by the year 2005. Over the past 15 years, national measles rates have been decreasing, except in 1995 when 2,361 cases were reported. Most of these cases were the result of outbreaks in Ontario. The majority of these cases were in the five to 19 year age group. This amount was 10 times the rate in the United States and represented over half of all cases reported in the Western Hemisphere. In 1998, Canada had the lowest level of measles activity ever recorded with only 12 cases reported (0.04 cases per 100,000).

Apart from a number of small outbreaks in the last 20 years, the rate of measles in Alberta has remained extremely low. The first outbreak that significantly affected disease rates was in 1986 when 843 cases were reported. Most of those affected were children between one to four years of age followed by high-school aged children. In 1987, 15 cases of measles were identified in the first week of March. Unlike previous outbreaks, those most affected were students at the University of Alberta and were linked to a student there.

Between 1997 and 2000, two large outbreaks occurred in the province. The first outbreak in 1997 resulted in 242 cases (up from nine reported cases in 1996). The initial cases were imported from British Columbia. A mass measles campaign aimed at school aged children was embarked upon to control this outbreak. The most recent outbreak of measles in Alberta occurred in 2000. All 123 cases were epidemiologically linked to one of two measles clusters. The first smaller cluster included six cases. A traveler to Mexico had returned with clinical measles. The second much larger cluster of 117 cases was linked to a family that returned from Bolivia with clinical measles. A contributing factor to this outbreak was a large family gathering for which relatives from across the province traveled to visit the family while the family was still infectious.

No cases of measles were reported in 2003.

Invasive meningococcal disease

Description

Identification: Invasive meningococcal disease (IMD) is characterized by a sudden onset of fever, intense headache, nausea and often vomiting, stiff neck and frequently a rash.

Infectious Agent: *Neisseria meningitidis* bacteria

Occurrence: Worldwide, endemic in Canada

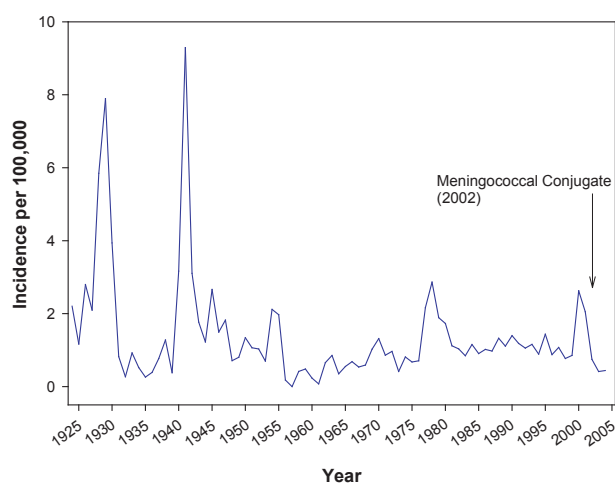
Reservoir: Humans

Mode of transmission: Transmission is via respiratory droplets from close intimate contact with a case or carrier.

Prevention Measures: Immunization of children two months of age and older with meningococcal group C conjugate vaccine.²¹⁹ Educate the public about the risks associated with sharing saliva contaminated items such as food and cigarettes.

Invasive Meningococcal Disease Trends

Figure 133 Invasive meningococcal disease incidence per 100,000 population, Alberta, 1924 to 2003



Invasive meningococcal disease has been nationally reportable in Canada since 1924. Periods of increased disease activity occur about every 10 to 15 years. IMD is more common in winter months, but varies by age, geographical area and serotype.

In Canada, between 1989 and 1992, the incidence of IMD was high with 1.6 cases per 100,000 reported annually. The numbers then declined yearly from 1992 to 1998. In 1999, 214 cases were reported (0.7 cases per 100,000) – the lowest in over 10 years.

In Alberta, invasive meningococcal disease has been responsible for outbreaks as well as sporadic cases. IMD normally occurs at a rate of approximately one case per 100,000 annually in Alberta.

A significant outbreak of IMD began in December in 1999, when the Edmonton area experienced an increase in of cases. In January 2000, an outbreak in Edmonton was declared, as the rate of IMD was 10 cases per 100,000 - 10 times greater than expected. The rate was highest in high school age children, which differed from the historical distribution of cases (normally highest among infants). There were over 100 cases of IMD and nine deaths during the outbreak period (between 1999 and 2000). Of those who survived, some had serious long term complications including deafness and loss of limbs.

As part of a preventative and proactive focus in stopping future outbreaks, a province-wide meningococcal immunization campaign took place over a six-month period between April 1 and September 20, 2001. The campaign was designed to protect the disease's most susceptible group – two to 24 year olds. During the province-wide campaign, an immunization rate of 68 per cent was achieved. In 2002, Alberta introduced routine immunization for meningitis to children six months of age; the number of cases decreased to 14 in 2003.

Mumps

Description

Identification: This virus replicates in the nose, throat, and lymph nodes, before infecting the meningitis and other glands.²²⁰ Complications associated with mumps include central nervous system involvement (50 to 60 per cent of cases), deafness, and possibly death.²²¹

Infectious Agent: Mumps is caused by the mumps virus.

Occurrence: Worldwide, especially in heavily populated areas.

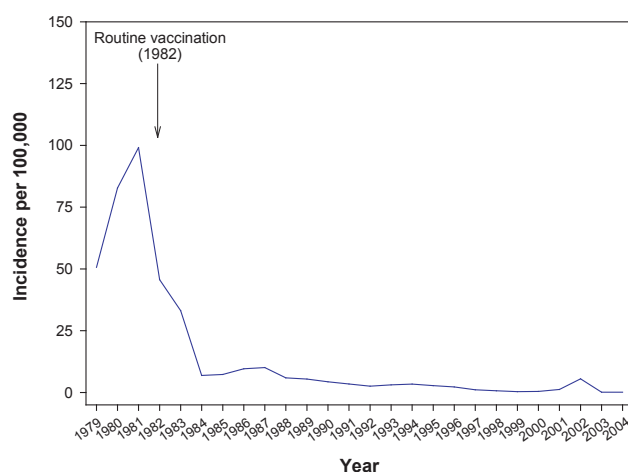
Reservoir: Humans

Mode of transmission: Transmission is via respiratory droplets from close intimate contact with a case or carrier.

Prevention Measures: Immunization is the best way to prevent mumps. The vaccine can be administered to anyone at risk of contracting mumps, but it is routinely offered to children 12 to 15 months of age - in the MMR vaccine - which also contains measles and rubella vaccine. Once vaccinated, an individual is protected from mumps for life.

Mumps Disease Trends

Figure 134 Mumps incidence per 100,000 population, Alberta 1979 to 2003



In Canada, the number of reported cases of mumps has decreased by more than 99 per cent since the introduction of mumps vaccine in 1969.²²² From 1995 to 1999, an average of 237 cases per year were reported (high of 402 cases in 1995; low of 90 cases in 1999). In this five-year period, children five to 14 year olds accounted for 44 per cent of cases.

Currently, mumps outbreaks continue among un-immunized populations in Canada. In 1997, an outbreak occurred among university students in British Columbia (BC), resulting in an increased provincial rate three fold to 3.6 cases per 100,000. In 1998, an outbreak occurred in Quebec among school children (26 cases), many of whom were recent immigrants and were not immunized for mumps.

Mumps vaccine has been part of the routine immunization schedule in Alberta since 1982. In 1981, the number of cases in Alberta peaked with over 2,000 cases reported. Since the introduction of the MMR vaccine, the number of cases of mumps has been low. In 2004, only three cases were reported, all among adults.

There has been only one major mumps outbreak in Alberta in the last 15 years. Between fall 2001 and August 2002, 193 mumps cases were reported in a remote northern community in Alberta among un-immunized individuals. Less than 20 per cent of those infected had a history of immunization. The outbreak was the result of an imported case of mumps into this close community.

Pertussis

Description

Identification: Pertussis is also known as whooping cough. This bacterium targets the respiratory track, causing coughing spells so severe, that infected individuals have a difficult time breathing. Complications related to pertussis include pneumonia, apnea, neurological complications, ear infection, weight loss, and dehydration. The disease results in high morbidity and high mortality,²²³ and is especially dangerous to infants less than one year of age.

Infectious Agent: Pertussis is caused by the *Bordetella pertussis* bacterium

Occurrence: Worldwide. Most common among children.

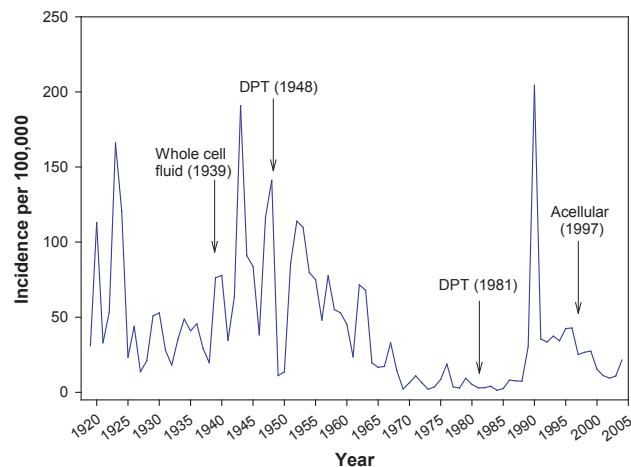
Reservoir: Humans

Mode of transmission: Transmission is via respiratory droplets from close intimate contact with an infected individual.

Prevention Measures: Immunization is the best way to prevent pertussis. An acellular pertussis containing vaccine has been used in Alberta since 1997. This vaccine is known as dTap and protects against diphtheria and tetanus. The dTap vaccine is 85 to 95 per cent effective in preventing pertussis.

Pertussis Disease Trends

Figure 135 Pertussis incidence per 100,000 population, Alberta, 1919 to 2003



In Canada, the rate of pertussis has decreased significantly since the introduction of the first pertussis vaccine in 1943. Pertussis is a cyclical disease, with outbreaks expected approximately every five years or so. The last significant rate increase in pertussis was in 1998 when the national rate was 29.1 cases per 100,000. This appears mostly attributable to the increase in cases experienced by Quebec where 4,880 cases (66.2 cases per 100,000) were reported.

In Alberta, the rate of pertussis has remained quite low in the past 10 years. In 2004, there were 685 cases of pertussis (21.5 cases per 100,000). Most likely to be infected with pertussis are those less than one year of age followed by those 10 to 14 years of age.

The most significant pertussis outbreak in Alberta began in the fall of 1989. Between September 1, 1989 and April 1, 1990, a total of 2,921 cases of pertussis were reported. In total, 5,133 cases of pertussis were reported (209 cases per 100,000 people) in Alberta in 1990. The infection rate was highest among infants less than one year of age, followed by children one to four years of age. There was only one death, in a neonate whose mother was infective at the time of delivery (the mother passed her illness on to the newborn). This outbreak was the largest (in terms of geographic distribution and number of cases) ever on record in Alberta.

Poliomyelitis

Description

Identification: Poliomyelitis is commonly referred to as polio. This virus targets the central nervous system. Symptoms of polio include fever, headache, nausea and muscle weakness. Approximately one in 200 people who are infected with polio become paralyzed and the onset of paralysis can occur in a matter of hours.²²⁴ Of those paralyzed, five to ten per cent die when their breathing becomes immobilized²²⁵.

Infectious Agent: Poliomyelitis is caused by the polio virus

Occurrence: Polio cases still occur in parts of Africa and Asia.

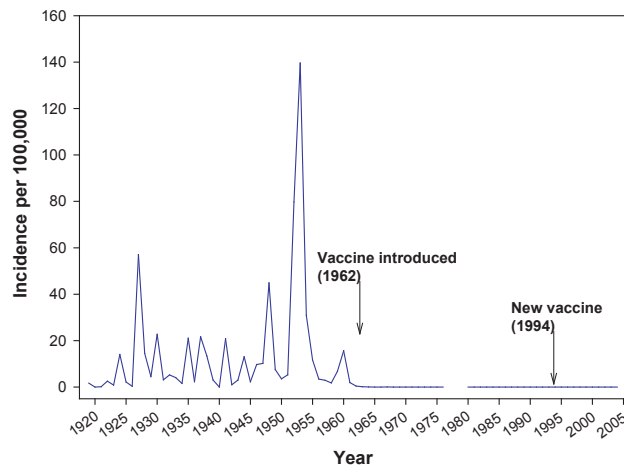
Reservoir: Humans

Mode of transmission: Person to person transmission (fecal–oral).

Prevention Measures: Immunization against polio has almost eradicated this disease.

Poliomyelitis Disease Trends

Figure 136 Poliomyelitis incidence per 100,000 population, Alberta, 1919 to 2003



Poliomyelitis was first described in 1789 by Michael Underwood of England.²²⁶ Prior to the introduction of the vaccine in 1955, outbreaks of polio were common. The vaccine proved to be immensely effective, and caused a drastic fall in the number of poliomyelitis cases. A global initiative to eradicate polio by the end of the year 2000 was initiated. While not eradicated, by the year 2000, cases were down 98 per cent.²²⁷ In 1999, 6,970 cases of polio were reported globally, due to a large wild poliovirus outbreak in Angola.

Polio has historically been a significant source of morbidity and mortality in Canada. The most significant outbreak of polio in Canada was in 1955 when 1,887 cases of polio were reported. The most recent outbreak occurred in 1978/1979 when 11 cases of polio were imported to Ontario, Alberta, and British Columbia. These cases were linked to an outbreak occurring in Holland among un-immunized individuals. The last case of polio in Canada occurred in 1992, and by 1994, Canada was listed as a polio-free region. The last case of vaccine associated polio in Canada was reported in 1995.

There have been three cases of symptomatic polio reported in Alberta since 1968; two were attributed to the vaccine. The third case was reported in 1978 in a child who was not immunized. This case was related to an outbreak in Holland. In 1993, 22 asymptomatic cases of imported wild polio were identified in Alberta. These cases were related to travel to Europe and contact with an infected individual; none of the cases were immunized.

HISTORICAL VIGNETTE

Polio in Alberta

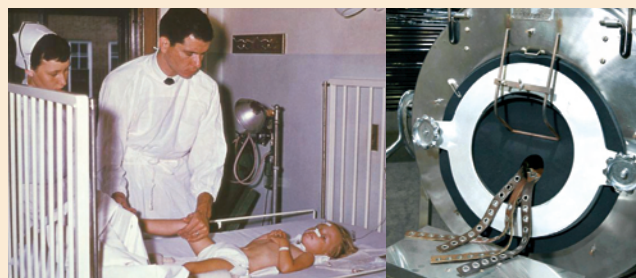
Poliomyelitis (polio) - previously referred to as 'infantile paralysis' - is a highly infectious disease caused by a virus. It invades the nervous system, and can cause total paralysis. It can strike at any age, but affects mainly children under three¹. There is no cure for polio; it can only be prevented through immunization.

Canada recorded its first outbreak of poliomyelitis in 1881. The incidence steadily increased and was followed by waves of epidemics. Polio was one of the most feared diseases in the first half of the 20th century. While rapid advances in science and technology had substantially reduced the impact of several other communicable diseases, early efforts to minimize poliomyelitis infections were less successful.² The worst epidemic in Canada occurred from 1947-1955, with a national case rate in 1953 of 60 per 100,000 – among the highest rates in the world.

Edmonton reeled under the impact of the worst epidemic ever to hit the city. Dr. Russell Taylor commented "it was as if this vibrant, optimistic city had been smitten by a medieval plague; it engendered the same fear and helplessness"². In an attempt to halt the spread of polio, children under 17 years of age were banned from theatres and swimming pools. On a single day in 1953,

(November 12), the *Edmonton Journal* reported 13 new cases of polio in Edmonton and a six day total of 40 cases. Treatment of polio patients was concentrated at the Royal Alex "pest house". At full capacity, the Royal Alex was handling 107 cases on respirators and 33 patients on "iron lungs".

With no remedy for the disease, the development of an effective Salk vaccine at Canada's Connaught Laboratories in the early 1950s had significant international impact. Soon after the introduction of effective vaccines in the late 1950s (IPV) and early 1960s (OPV), polio was brought under control and practically eliminated as a public health problem in industrialized countries. However, in the year 2000, polio was still present in about 30 Asian and African nations. In 2005, polio spread from Nigeria to the Sudan, with 105 confirmed cases. This latest outbreak illustrates "the high risk posed to polio-free areas by the continuing epidemic in west and central Africa"³



Iron lung

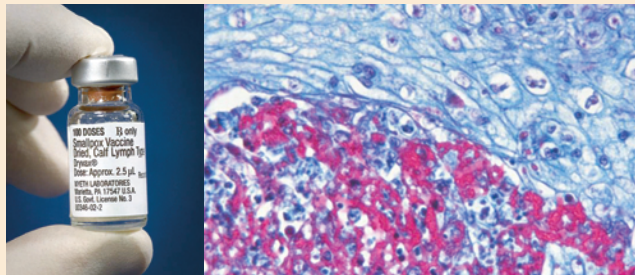
Sources:

- ¹ <http://www.polioeradication.org/disease.asp>
- ² Joy Jaipaul, Capital Health, "In the Shadows: Poliomyelitis and Nursing Care in Edmonton, 1947-1955."
- ³ <http://www.cloudnet.com/~edrbsass/poliotimeline.htm>

HISTORICAL VIGNETTE

Smallpox Vaccine

In 1796, Dr. William Jenner noticed that milkmaids who contracted a mild disease known as cowpox rarely developed the serious condition smallpox. Dr. Jenner wondered if cowpox could somehow prevent smallpox infections. To test his theory, he injected a young boy with cowpox and waited for the disease to present itself and run its course. Once the boy had fully recovered from the mild illness of cowpox, Jenner injected the boy with smallpox. The boy survived the injection and did not develop smallpox – he appeared to be immune. Jenner named the cowpox solution ‘vaccine’, derived from the Latin word *vacca*, meaning cow. The last reported case of smallpox in Alberta and Canada was in 1962 when a young boy traveling from Brazil was diagnosed. The family had falsified the boy’s documents of immunization. In 1977 the last reported case of smallpox occurred in a village in Somalia. The World Health Organization declared the world free of smallpox in 1978.



Smallpox

Smallpox

Description

Identification: Smallpox virus replicates in the lymph nodes, and then in the oral and pharyngeal mucosa and the skin. Complications of smallpox are severe, with 30 per cent²²⁸ of smallpox cases resulting in death; most survivors are marked with scarring resulting in blindness, limb deformities, and arthritis.²²⁹

Infectious Agent: Smallpox is caused by the Variola virus

Occurrence: Eradicated worldwide

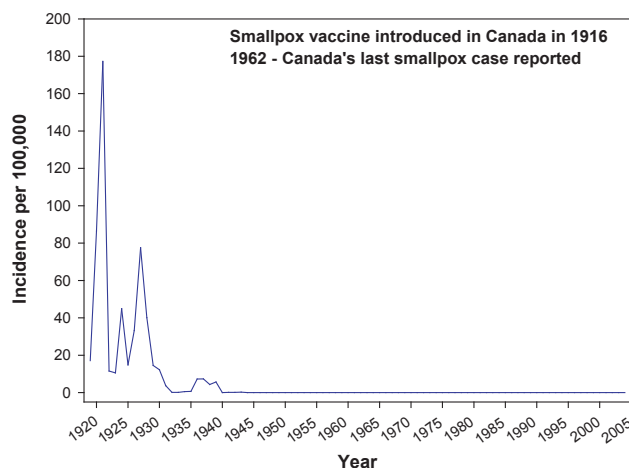
Reservoir: Humans

Mode of transmission: Transmission is via respiratory droplets from close intimate contact with an infected individual.²³⁰ This virus is shed from the rash throughout the course of disease, yet this is not considered as infectious as the aerosolized virus from the respiratory track.²³¹

Prevention Measures: Immunization has eradicated wild smallpox. Routine vaccination for smallpox has been discontinued in Canada.

Smallpox Disease Trends

Figure 137 Smallpox incidence per 100,000 population, Alberta, 1919 to 2003



Smallpox is thought to have originated over 3,000 years ago in India or Egypt.²³² In 1796, the first safe and effective smallpox vaccine was developed by Edward Jenner. The vaccine was 95 per cent effective at preventing smallpox.²³³

In 1967, the World Health Organization launched an intensified plan to eradicate smallpox.²³⁴ At this time the “ancient scourge” threatened 60 per cent of the world’s population. By 1977, the immensely successful campaign resulted in the last case of smallpox being identified in Somalia.²³⁵ In 1980, the World Health assembly endorsed the success of the campaign by acknowledging that wild smallpox had been eliminated.²³⁶

In Alberta, smallpox has not been seen for over 50 years. This is the result of high immunization rates in the population. The last case of smallpox in Alberta was in 1943.

Tetanus

Description

Identification: Tetanus is also known as lock jaw. The toxins produced by the bacteria target the central nervous system, leading to muscle spasms and contractions.²³⁷ Even with modern medicine, 10 to 20 per cent of people who acquire tetanus die.²³⁸

Infectious Agent: Tetanus is caused by *Clostridium tetani* bacteria.

Occurrence: Worldwide

Reservoir: Animals (predominantly horses) and humans. Contaminated soil also harbours bacteria.

Mode of transmission: Deep penetrating wounds with contaminated soil or infected feces. These bacteria only reproduce without oxygen.

Prevention Measures: Immunization is the best way to prevent tetanus. Immunization against *C. tetani* is routinely administered in Alberta using the DTaP vaccine.

Tetanus Disease Trends

Recorded incidence of tetanus date back to the fifth century BC, however, the isolation of the disease did not occur until 1889. Anti tetanus serum (ATS) was discovered in 1880 and contributed to saving the lives of thousands of soldiers during World War I. During World War II the discovery and production of the Tetanus toxoid further reduced the threat of tetanus.

Despite a vaccine, more than 50,000 deaths result from tetanus infections each year. The majority of these cases are in developing countries. The disease is more common in agricultural regions and in underdeveloped areas where immunization may not be adequate and there may be contact with animal feces.²³⁹ Neonatal tetanus accounts for approximately half of all tetanus deaths in developing countries.

Tetanus is rare in Canada and Alberta, resulting from vaccination which began in 1947. In Canada, less than seven cases are reported each year. In Alberta, 10 cases of tetanus have been reported in the last 20 years, the most recent two cases were diagnosed in 2000 and 2001 in adult males living in rural Alberta.

Varicella

Description

Identification: Varicella is also known as chickenpox. The virus replicates in the nose, pharynx and lymph nodes.²⁴⁰ While varicella is considered a mild childhood ailment, it can lead to serious complications. Adults who acquire the disease are at a particular risk for complications which include pneumonia, hospitalization, and death. Approximately 15 per cent of cases report the emergence of zoster (shingles) after infection with VZV.²⁴¹

Congenital Varicella Syndrome (CVS) occurs in infants whose mother contracted varicella during pregnancy. Complications of CVS include birth defects such as skin scars, eye problems, or incompletely formed arms or legs.²⁴²

Infectious Agent: Varicella is caused by the varicella zoster virus (VZV).

Occurrence: Worldwide. Varicella is more common in temperate climates.

Reservoir: Humans

Mode of transmission: Transmission is via respiratory droplets from close intimate contact with an infected individual. Vertical transmission of the virus from mother to infant can also occur.

Prevention Measures: Immunization is the best way to prevent varicella. Currently in Alberta, children are offered the varicella vaccine at 12 months of age or older.

Varicella Disease Trends

Varicella was not differentiated from smallpox until the end of the 19th century.²⁴³ Due to the introduction of routine vaccination in 2001, the rates of varicella disease are decreasing (**Figure 138**). The decrease is evident for all ages under 10 years, but was greatest for those under age five (**Figure 139**).

Figure 138 Varicella (chickenpox) incidence rate per 100,000 population under age five, Alberta, 1986 to 2004

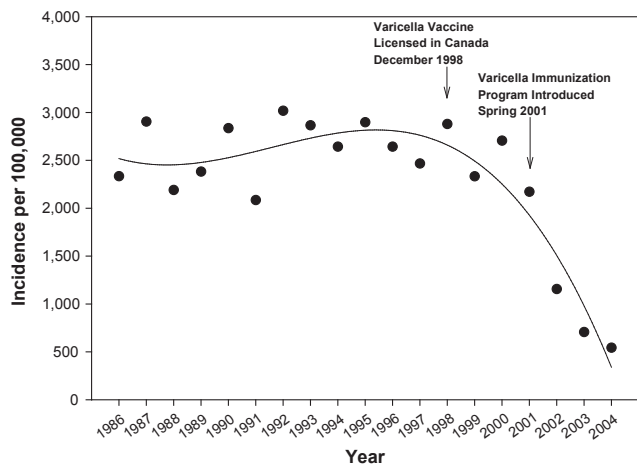
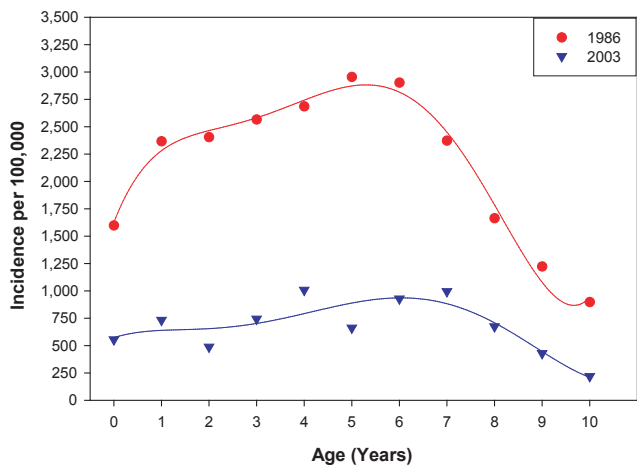


Figure 139 Varicella (chickenpox) incidence rate per 100,000 population age ten years and younger, Alberta 1986 and 2003



HISTORICAL VIGNETTE

Tuberculosis

Tuberculosis, once called 'consumption' is an ancient disease. Hippocrates noted that 'phthisis' (consumption) was the most widespread and fatal disease of his time. In 1882, Robert Koch presented his discovery of *Mycobacterium tuberculosis*, the bacterium that causes tuberculosis (TB). He reminded the audience of terrifying statistics: "If the importance of a disease for mankind is measured by the number of fatalities it causes, then tuberculosis must be considered much more important than those most feared infectious diseases, plague, cholera and the like. One in seven of all human beings die from tuberculosis."¹ The mere mention of the word in the early part of the century struck fear into the hearts of many. Those afflicted by this disease were often given no hope of recovery, and death seemed inevitable and painfully slow.²

One of the first means of treating the disease was to send affected persons to a sanatorium. It was thought that fresh mountain air helped TB patients, so sanatoria were often built near trees. Signs and public service announcements suggesting preventative measures were not uncommon. A public service announcement in the Dallas News preached "do not spit on the floor of your shop, don't drink whiskey, beer or other intoxicating drinks, don't sleep in the same bed with anyone else, and, if possible, not in the same room"²

In Canada, the Prairie Indians were exposed to tuberculosis in the 1850s; high mortality rates decimated communities. While the first Canadian sanatorium opened in 1897, not much was done there for patients and more than 50 per cent of those infected died. In 1910, a group of Calgary women formed a Tuberculosis Society and in 1917, a converted C.P. hotel was designated a sanatorium

and directed by Col. Baker. In 1943, the Alberta Tuberculosis Association donated a mobile X-ray unit to begin mass x-ray screening; in 1962, 189,000 mass X-rays were taken.

An effective drug treatment for TB was well established by 1950 and death from tuberculosis no longer seemed inevitable. Still, Stefan Grzybowski's 1974 review of TB control in Alberta noted that aboriginal tuberculosis rates were 10-20 times higher than the provincial average and that childhood tuberculosis among aboriginals was still high. Today, tuberculosis and other previously common lung diseases are controlled by effective drug treatments, public health interventions, education and better living and working conditions. While the 2000s have shown a gradual decline in TB cases in First Nations communities, 2005 is showing increased overall rate due to the percentage of foreign-born cases.

**Sources:**

Elaine Benjamin, Disease Control and Prevention Branch, AHW

¹ <http://nobelprize.org/medicine/educational/tuberculosis/readmore.html>

² Lung Association of Canada (<http://www.lung.ca/ca/articles/19991201killers.html>)

Tuberculosis

Description

Identification: These bacteria can attack any part of the body though it is usually the lungs.²⁴⁴

Symptoms of tuberculosis include: prolonged coughing, chest pain, night sweats, weight loss and coughing up of blood. A serious tuberculosis infection can result in death. Tuberculosis was once the leading cause of death in America.²⁴⁵

Infectious Agent: Tuberculosis is caused by *Mycobacterium tuberculosis*.

Occurrence: Worldwide

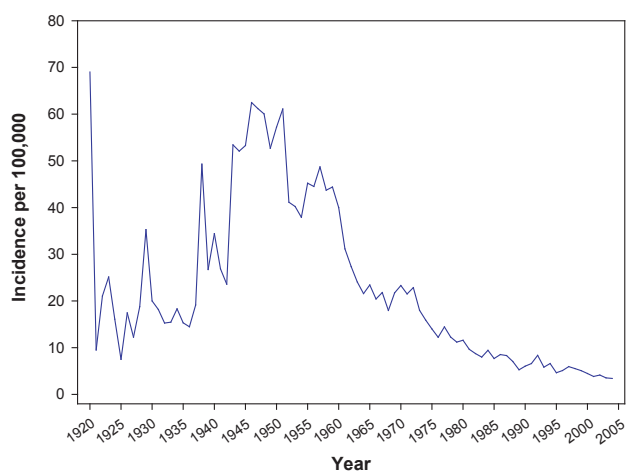
Reservoir: Humans

Mode of transmission: Transmission of tuberculosis is airborne from an infected person into the air. Direct contact with respiratory secretions will also transmit disease.

Prevention Measures: Prevention of tuberculosis includes properly treating active and latent tuberculosis, isolating highly infectious cases, educating the public, and reducing social conditions that help spread tuberculosis.

Tuberculosis Disease Trends

Figure 140 Tuberculosis incidence per 100,000 population, Alberta 1919 to 2003



Historically, Europeans have imported tuberculosis into Canada.²⁴⁶ The efficacy with which the disease spread was alarming, and by 1908, 165 out of every 100,000 Canadians had tuberculosis.²⁴⁷ This is considerably more than the six cases per 100,000 seen today.²⁴⁸

In addition to its contagiousness, the severity of the disease resulted in tuberculosis sanatoriums being opened in Canada - where patients with the disease could be isolated, educated, and helped to recover. By 1909, the first Canadian tuberculosis health nurse began to visit the homes of tuberculosis patients.²⁴⁹ Before the use of antibiotics, a common treatment for tuberculosis was collapse therapy. This therapy included the injection of air into the pleural space, paralysis of the diaphragm, and the removal of ribs.²⁵⁰ Later, surgeries to remove diseased lung tissue were employed.²⁵¹ Treatment for tuberculosis was not a simple matter of taking a prescribed course of antibiotics until 1960.²⁵²

Currently in Alberta, the rate of tuberculosis is quite low; in 2004, 109 cases of tuberculosis (3.4 cases per 100,000) were reported. This compares to a national rate of 5.2 cases per 100,000. Despite these low numbers, certain populations remain over-represented; aboriginals and immigrants are more likely to be infected with tuberculosis than the rest of the population.

This report has provided information on selected health determinants, mental health, non-communicable disease, injury, and communicable disease. It supplies part of the body of evidence needed for effective decision making. Where possible, the information reflects as much history as was possible from available data. Looking at Alberta's current situation within an historical context helps to provide a broad view and perspective on health status. It also allows for a celebration of accomplishment and a look at the challenges to come.

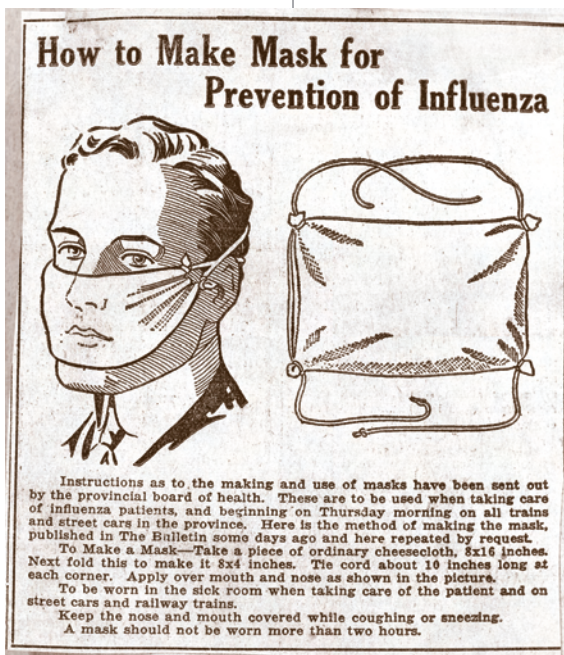
Over the past century, health care in Alberta has evolved from humble beginnings into a complex system that offers a wide range of services for treatment, prevention, protection, and health promotion. When Alberta was established as a province, communicable diseases were a major source of morbidity and mortality. Since that time the incidence of communicable disease has declined substantially. Immunization programs have resulted in significant decreases in disease incidence. Other factors such as improved sanitation and environmental monitoring help to ensure safe food and drinking water. Even with the decline, the risk of communicable disease remains.

Increases in international travel coupled with new emerging pathogens, such as SARS (severe acute respiratory syndrome), means that constant preparation is needed to mitigate risk. Albertans can expect a more international perspective for the control of communicable diseases. It will be increasingly important to enhance linkages and communication networks within Alberta, across Canada, and internationally to prepare for and control disease outbreaks. Infectious agents know no borders and the rapid acquisition and dissemination of information for response and control is needed and will continue to be a priority into the future.



Provincial Archives of Alberta, PA2866/1
Panoka Mental Hospital, therapy lab
- 1952

Over the past century, however, an important shift has occurred. Chronic conditions and injuries have replaced communicable disease as the main driver of ill-health. The shift is partly demographic. In 1930, the life expectancy in Alberta was just over 60 years. Now it is over 80 years for females (82.3 years) and nearly 80 years for males (77.5 years). Population projections indicate that Alberta's population will surpass five million people by the year 2033 with approximately 19 per cent aged 65 and older. The median age of the population will increase from 35 years to over 40 years.



This aging trend highlights the need to develop and implement strategies aimed at reducing the risk of developing chronic conditions like diabetes and heart disease. Early detection and intervention also play important roles in reducing the long term burden on the health care system. A focus on addressing the determinants of health will be needed. Chronic health problems develop as the result of a complex, and not fully understood, interaction between individual biology, lifestyle choices, and social and physical environments. Furthermore, many of the determinants of health are outside of the formal scope of the health system. As a result, to be successful in reducing the risk of developing chronic health problems, multi-disciplinary and multi-sector approaches will continue to be needed and expanded.

Physical activity and nutrition are factors that help to reduce the risk of many chronic conditions, such as cancer, heart disease, and diabetes. Within

Alberta there has been an increase in leisure time physical activity from approximately 40 per cent of the population to about 50 per cent. While encouraging, there is still much room for improvement. The proportion of Albertans eating five or more servings of fruits and vegetables per day is too low. Only 45 per cent of females indicated they eat five or more servings and the proportion is significantly lower among males with less than 30 per cent eating five or more servings.

Another important factor that increases the risk of chronic disease is tobacco use. While the proportion of the population smoking appears to have decreased in recent years, one in four males and one in five females still smoke. Nearly 40 per cent of Albertans aged 20 to 24 years report smoking.

Diabetes, cardiovascular disease, and chronic renal failure have all shown increases in prevalence. The number of Albertans being treated for diabetes has risen significantly over the past 20 years. Diabetes can be considered not only a chronic health condition, but also as a determinant or risk factor for other chronic conditions. People with diabetes are at an increased risk of developing hypertension and other cardiovascular diseases, chronic renal failure, blindness, amputation, and suffer mental health problems.

Increases in the prevalence of hypertension and diabetes appear to be having an impact on the prevalence of chronic renal failure. Chronic renal failure has shown a significant increase in recent years. This increase will place challenges on the health system as there will be an increased need for services such as dialysis.

Presently cardiovascular disease impacts 15 per cent of males and 12 per cent of females. These percentages increase with age. Over half of all Albertans over the age of 65 will access the health system in any given year for a cardiovascular problem. While prevalence appears to be rising, mortality has shown a significant decline over the past four decades being cut in half.

Mental health problems have been increasing over the past two decades. Currently one in five females and one in 10 males seek care within a year related to mental health. Anxiety and depression appear to be among the main drivers of this upward trend. Additional research will be needed to best determine reasons for the increase and to develop strategies for addressing these problems. Currently mental health problems are among the most prevalent of all health conditions being managed by the health system.



Injuries also represent an area that impacts a significant percentage of Albertans. Since 1997, there has been a decline in the proportion of Albertans who have sought care for an injury. Despite the decreasing trend, one in four Albertans still seek care in a year due to an injury. Injuries represent health events that are primarily preventable. There is significant room for improvement in the overall reduction of the burden of injuries on the individual, community, and health system. Successful decreases in injury would help to increase the capacity of the health system to deal with other issues.

While there have been many accomplishments over the past century, there are still many challenges for the health system to address. Smoking rates are still too high and proper nutrition and physical activity are too low. Injuries still represent a significant burden despite the strong evidence that they are highly preventable. Chronic diseases and mental health problems are increasing and will continue to do so in the context of an aging population. The control of communicable disease will continue to be a challenge in a more global economy with more international travel. The importance of immunization and other public health activities will be critical in the control of communicable disease, while a focus on the determinants of health will be important for the control of non-communicable disease.

References

- 1 Storch JL, Meilicke CA. Political, social, and economic forces shaping the health care system. In Hibberd JM, Kyle ME (Eds.), *Nursing Management in Canada*. Toronto: W.B. Saunders, 1994.
- 2 Last J.M. (1995). *A Dictionary of Epidemiology*. Third Edition. New York: Oxford University Press.
- 3 Tulchinsky T.H. and Varavikova E.A. 2000. *The New Public Health. An Introduction for the 21st Century*. California: Academic Press.
- 4 Tulchinsky T.H. and Varavikova E.A. 2000. *The New Public Health. An Introduction for the 21st Century*. California: Academic Press.
- 5 Health Canada. First Nations and Inuit Health Branch. Community Programs. Did You Know?. http://www.hc-sc.gc.ca/fnihb/cp/tobacco/did_you_know.htm. Accessed 2005 March 28.
- 6 Health Canada. First Nations and Inuit Health Branch. Community Programs. Did You Know?. http://www.hc-sc.gc.ca/fnihb/cp/tobacco/did_you_know.htm. Accessed 2005 March 28.
- 7 Health Canada. First Nations and Inuit Health Branch. Community Programs. Did You Know?. http://www.hc-sc.gc.ca/fnihb/cp/tobacco/did_you_know.htm. Accessed 2005 March 28.
- 8 Health Canada. Healthy Living. Smoking. Quitting. <http://www.hc-sc.gc.ca/hecs-sesc/tobacco/quitting/index.html>. Accessed 2005 March 28.
- 9 Alberta Health and Wellness. Alberta Cancer Board. Cancer Prevention. Screening Programs. http://www.cancerboard.ab.ca/cancer/cancer_screening.html. Accessed 2005 February 10.
- 10 Alberta Health and Wellness. Alberta Cancer Board. Cancer Prevention. Screening Programs. http://www.cancerboard.ab.ca/cancer/cancer_screening.html. Accessed 2005 February 10.
- 11 Alberta Health and Wellness. Health Information. Alberta Breast Cancer Screening Program Questions and Answers. http://www.health.gov.ab.ca/public/diseases/breast_cancer.html. Accessed 2005 February 10.
- 12 Alberta Health and Wellness. Health Information. Alberta Breast Cancer Screening Program Questions and Answers. http://www.health.gov.ab.ca/public/diseases/breast_cancer.html. Accessed 2005 February 10.
- 13 Alberta Health and Wellness. Alberta Cancer Board. Cancer Prevention. Screening Programs. http://www.cancerboard.ab.ca/cancer/cancer_screening.html. Accessed 2005 February 10.
- 14 Alberta Health and Wellness. Alberta Cancer Board. Cancer Prevention. Screening Programs. http://www.cancerboard.ab.ca/cancer/cancer_screening.html. Accessed 2005 February 10.
- 15 Alberta Health and Wellness. Alberta Cancer Board. Cancer Prevention. Screening Programs. http://www.cancerboard.ab.ca/cancer/cancer_screening.html. Accessed 2005 February 10.
- 16 Alberta Health and Wellness. Alberta Cancer Board. Alberta Cervical Cancer Screening Program. <http://www.cancerboard.ab.ca/accsp/index.html>. Accessed 2005 February 10.
- 17 Alberta Health and Wellness. Alberta Cancer Board. Cancer Prevention. Screening Programs. http://www.cancerboard.ab.ca/cancer/cancer_screening.html. Accessed 2005 February 10.
- 18 Alberta Health and Wellness. Alberta Cancer Board. Cancer Prevention. Screening Programs. http://www.cancerboard.ab.ca/cancer/cancer_screening.html. Accessed 2005 February 10.
- 19 Neonatal Research Unit. Maternal Risk Factors in Relationship to Birth Outcomes. (1999). AB. Calgary. Alberta Health and Wellness. Health Surveillance.
- 20 Neonatal Research Unit. Maternal Risk Factors in Relationship to Birth Outcomes. (1999). AB. Calgary. Alberta Health and Wellness. Health Surveillance.
- 21 Child and Family Canada. Low Birth Weight at a Glance. <http://www.cfc-ecf.ca/docs/00000011.htm>. Accessed 2004 March 10.
- 22 Health Surveillance Branch. Health Trends in Alberta. (1996?). AB. Edmonton. Alberta Health.
- 23 Neonatal Research Unit. Maternal Risk Factors in Relationship to Birth Outcomes. (1999). AB. Calgary. Alberta Health and Wellness. Health Surveillance.
- 24 Neonatal Research Unit. Maternal Risk Factors in Relationship to Birth Outcomes. (1999). AB. Calgary. Alberta Health and Wellness. Health Surveillance.
- 25 Neonatal Research Unit. Maternal Risk Factors in Relationship to Birth Outcomes. (1999). AB. Calgary. Alberta Health and Wellness. Health Surveillance.
- 26 Health Surveillance Branch. Health Trends in Alberta. (1996). AB. Edmonton. Alberta Health.
- 27 Health Surveillance Branch. Health Trends in Alberta. (1996). AB. Edmonton. Alberta Health.
- 28 Department of Health and Human Services. Centers for Disease Control and Prevention. Body Mass Index: BMI for Adults. <http://www.cdc.gov/nccdphp/dnpa/bmi-adult.htm>. Accessed 2005 March 15.
- 29 Health Surveillance Branch. Health Trends in Alberta. (1996?). AB. Edmonton. Alberta Health.
- 30 Government of Canada. Health Canada. Office of Nutrition Policy and Promotion. Body Mass Index (BMI) Nomogram. http://www.hc-sc.gc.ca/hpfb-dgpsa/onpp-bppn/bmi_chart_java_e.html. Accessed 2005 March 15.
- 31 Government of Canada. Health Canada. Office of Nutrition Policy and Promotion. Body Mass Index (BMI) Nomogram. http://www.hc-sc.gc.ca/hpfb-dgpsa/onpp-bppn/bmi_chart_java_e.html. Accessed 2005 March 15.
- 32 Department of Health and Human Services. Centers for Disease Control and Prevention. Body Mass Index: Body Mass Index: What does all this mean?. <http://www.cdc.gov/nccdphp/dnpa/bmi-means.htm>. Accessed 2005 March 15.
- 33 Department of Health and Human Services. Centers for Disease Control and Prevention. Body Mass Index: Body Mass Index: What does all this mean?. <http://www.cdc.gov/nccdphp/dnpa/bmi-means.htm>. Accessed 2005 March 15.
- 34 Department of Health and Human Services. Centers for Disease Control and Prevention. Body Mass Index: Body Mass Index: What does all this mean?. <http://www.cdc.gov/nccdphp/dnpa/bmi-means.htm>. Accessed 2005 March 15.
- 35 University of Newcastle upon Tyne. Department of Medical Oncology. CancerWeb.ncl.ac.uk. Nutrition. <http://cancerweb.ncl.ac.uk/cgi-bin/omd?query=nutrition&action=Search+OMD>. Accessed 2005 March 15.

- 36 Health Canada. Health Products and Food Branch. Office of Nutritional Policy and Promotion. Canada's Food Guide to Healthy Eating. http://www.hc-sc.gc.ca/hpfb-dgpsa/onpp-bppn/food_guide_rainbow_e.html. 2005 March 15.
- 37 Health Canada. Health Products and Food Branch. Office of Nutritional Policy and Promotion. Review of Canada's Food Guide to Healthy Eating. http://www.hc-sc.gc.ca/hpfb-dgpsa/onpp-bppn/review_food_guide_e.html. Accessed 2005 March 15.
- 38 Health Canada. Health Products and Food Branch. Office of Nutritional Policy and Promotion. Canada's Guidelines for Healthy Eating. http://www.hc-sc.gc.ca/hpfb-dgpsa/onpp-bppn/food_guide_guidelines_e.html. Accessed 2005 March 15.
- 39 Alberta Health and Wellness. News/Media/Resources. Health Trends: A Working Document. Health Status and Determinants. http://www.health.gov.ab.ca/resources/publications/Health_Trends/index.html. Accessed 2005 March 28.
- 40 Tulchinsky T.H. and Varavikova E.A. 2000. The New Public Health. An Introduction for the 21st Century. California: Academic Press.
- 41 Tulchinsky T.H. and Varavikova E.A. 2000. The New Public Health. An Introduction for the 21st Century. California: Academic Press
- 42 Canadian Fitness and Lifestyle Research Institute. Tips For Being Active. Fend off Health Problems with Activity. http://www.cflri.ca/cflri/tips/96/LT96_02.html. Accessed 2005 March 17.
- 43 Government of Alberta. Alberta Health and Wellness. Health Link. Health and Wellness. Wellness and Lifestyle. Exercise and Fitness. <http://www.healthlinkalberta.ca>. Accessed 2005 March 17.
- 44 Government of Alberta. Alberta Health and Wellness. Healthy U. Healthy U Goals. <http://www.healthyalberta.com/ProgramObjectives.asp>. Accessed 2005 March 17.
- 45 Government of Alberta. Alberta Health and Wellness. Health Link. Health and Wellness. Wellness and Lifestyle. Exercise and Fitness. <http://www.healthlinkalberta.ca>. Accessed 2005 March 17.
- 46 National Institutes of Health. National Heart, Lung, and Blood Institute. Guide to Physical Activity. http://www.nhlbi.nih.gov/health/public/heart/obesity/lose_wt/phy_act.htm. Accessed 2005 March 17.
- 47 Government of Alberta. Alberta Education. Highlights on Education. <http://www.education.gov.ab.ca/news/Media/Highlights.asp>. Accessed 2005 November 14.
- 48 Tulchinsky T.H. and Varavikova E.A. 2000. The New Public Health. An Introduction for the 21st Century. California: Academic Press
- 49 Canadian Mental Health Association. Anxiety Disorders. http://www.cmha.ca/bins/content_page.asp?cid=3-94&lang=1. Accessed 2005 April 26.
- 50 Canadian Mental Health Association. Anxiety Disorders. http://www.cmha.ca/bins/content_page.asp?cid=3-94&lang=1. Accessed 2005 April 26.
- 51 Canadian Mental Health Association. Mood Disorders. Depression. http://www.cmha.ca/bins/content_page.asp?cid=3-86-87&lang=1. Accessed 2005 April 26.
- 52 Canadian Mental Health Association. Mood Disorders. Depression. http://www.cmha.ca/bins/content_page.asp?cid=3-86-87&lang=1. Accessed 2005 April 26.
- 53 Tulchinsky T.H. and Varavikova E.A. 2000. The New Public Health. An Introduction for the 21st Century. California: Academic Press
- 54 Tulchinsky T.H. and Varavikova E.A. 2000. The New Public Health. An Introduction for the 21st Century. California: Academic Press
- 55 U.S. National Institutes of Health. National Cancer Institute. Cancer Topics. Types of Cancer. Cervix Cancer. Cervix Cancer (PDQ) Treatment: Patient Version. <http://www.cancer.gov/cancertopics/pdq/treatment/cervical/patient>. Accessed 2005 February 8.
- 56 Canadian Cancer Society. Cancer Information. Cervical Cancer. What is Cervical Cancer?. <http://www.cancer.ca> . Accessed 2005 February 8
- 57 Canadian Cancer Society. Cancer Information. Cervical Cancer. What is Cervical Cancer?. <http://www.cancer.ca> . Accessed 2005 February 8
- 58 Alberta Cancer Board. (2004). Cancer in Alberta: A regional Picture 2004, prepared by Population Health and information.
- 59 Canadian Cancer Society. Cancer Information. Cervical Cancer. What Causes Cervical Cancer?. <http://www.cancer.ca> . Accessed 2005 February 8
- 60 U.S. National Institutes of Health. National Cancer Institute. Cancer Topics. Types of Cancer. Cervix Cancer. Cervix Cancer (PDQ) Treatment: Patient Version. <http://www.cancer.gov/cancertopics/pdq/treatment/cervical/patient>. Accessed 2005 February 8.
- 61 Alberta Cancer Board. (2004). Cancer in Alberta: A regional Picture 2004, prepared by Population Health and information.
- 62 Centers for Disease Control and Prevention. National Center for Chronic Disease Prevention and Health Promotion. Cancer Prevention and Control. A-Z Index. Cancer. Cervical Cancer. Cervical Cancer and Pap Test Information. <http://www.cdc.gov/cancer/nbccedp/info-cc.htm>. Accessed 2005 February 1.
- 63 Alberta Cancer Board. (2004). Cancer in Alberta: A regional Picture 2004, prepared by Population Health and information.
- 64 Canadian Cancer Society. Cancer Information. Cervical Cancer. What Causes Cervical Cancer?. <http://www.cancer.ca> . Accessed 2005 February 8
- 65 U.S. National Institutes of Health. National Cancer Institute. Cancer Topics. Types of Cancer. Cervix Cancer. Cervix Cancer (PDQ) Treatment: Patient Version. <http://www.cancer.gov/cancertopics/pdq/treatment/cervical/patient>. Accessed 2005 February 8.
- 66 Alberta Cancer Board. (2004). Cancer in Alberta: A regional Picture 2004, prepared by Population Health and information.
- 67 Canadian Cancer Society. Cancer Information. Cervical Cancer. What Causes Cervical Cancer?. <http://www.cancer.ca> . Accessed 2005 February 8

- 68 U.S. National Institutes of Health. National Cancer Institute. Cancer Topics. Types of Cancer. Cervix Cancer. Cervix Cancer (PDQ) Treatment: Patient Version. <http://www.cancer.gov/cancertopics/pdq/treatment/cervical/patient>. Accessed 2005 February 8.
- 69 Canadian Cancer Society. Cancer Information. Cervical Cancer. What Causes Cervical Cancer?. <http://www.cancer.ca>. Accessed 2005 February 8
- 70 U.S. National Institutes of Health. National Cancer Institute. Cancer Topics. Types of Cancer. Cervix Cancer. Cervix Cancer (PDQ) Treatment: Patient Version. <http://www.cancer.gov/cancertopics/pdq/treatment/cervical/patient>. Accessed 2005 February 8.
- 71 Canadian Cancer Society. Cancer Information. Cervical Cancer. What Causes Cervical Cancer?. <http://www.cancer.ca>. Accessed 2005 February 8
- 72 U.S. National Institutes of Health. National Cancer Institute. Cancer Topics. Types of Cancer. Cervix Cancer. Cervix Cancer (PDQ) Treatment: Patient Version. <http://www.cancer.gov/cancertopics/pdq/treatment/cervical/patient>. Accessed 2005 February 8.
- 73 U.S. National Institutes of Health. National Cancer Institute. Cancer Topics. Types of Cancer. Cervix Cancer. Cervix Cancer (PDQ) Treatment: Patient Version. <http://www.cancer.gov/cancertopics/pdq/treatment/cervical/patient>. Accessed 2005 February 8.
- 74 U.S. National Institutes of Health. National Cancer Institute. Cancer Topics. Types of Cancer. Cervix Cancer. Cervix Cancer (PDQ) Treatment: Patient Version. <http://www.cancer.gov/cancertopics/pdq/treatment/cervical/patient>. Accessed 2005 February 8.
- 75 U.S. National Institutes of Health. National Cancer Institute. Cancer Topics. Types of Cancer. Cervix Cancer. Cervix Cancer (PDQ) Treatment: Patient Version. <http://www.cancer.gov/cancertopics/pdq/treatment/cervical/patient>. Accessed 2005 February 8.
- 76 Alberta Cancer Board. (2004). Cancer in Alberta: A regional Picture 2004, prepared by Population Health and information.
- 77 Public Health Agency of Canada, Canadian Health Network. Disease Prevention. Cancer. Guided Search. Breast Cancer. What should I know about lung Cancer?. <http://www.canadian-health-network.ca/>. Accessed 2005 February 3.
- 78 Alberta Cancer Board. (2004). Cancer in Alberta: A regional Picture 2004, prepared by Population Health and information.
- 79 Centers for Disease Control and Prevention. National Center For Chronic Disease Prevention and Health Promotion. Tobacco Information and Prevention Source (TIPS). The health consequences of smoking, a report of the surgeon general: 2004. Chapter 2. http://www.cdc.gov/tobacco/sgr/sgr_2004/chapters.htm. Accessed 2005 February 3.
- 80 Alberta Cancer Board. (2004). Cancer in Alberta: A regional Picture 2004, prepared by Population Health and information.
- 81 Centers for Disease Control and Prevention. National Center for Chronic Disease Prevention and Health Promotion. Cancer Control. Cancer Prevention and Control Site. Lung Cancer Prevention and Control. Lung Cancer Questions and Answers. www.cdc.gov/cancer/lung/qa.htm. Accessed 2005 February 1.
- 82 U.S. National Institutes of Health. National Cancer Institute. Cancer Topics. Types of Cancer. Common Cancer Types. What you need to know about: Lung Cancer. <http://www.cancer.gov/cancertopics/wyntk/lung>. Accessed 2005 February 1.
- 83 Public Health Agency of Canada, Canadian Health Network. Disease Prevention. Cancer. Guided Search. Lung Cancer. What should I know about lung Cancer?. <http://www.canadian-health-network.ca/>. Accessed 2005 February 3.
- 84 Public Health Agency of Canada, Canadian Health Network. Disease Prevention. Cancer. Guided Search. Lung Cancer. What should I know about lung Cancer?. <http://www.canadian-health-network.ca/>. Accessed 2005 February 3.
- 85 Canadian Cancer Society. Canadian Cancer encyclopedia. Prostate Cancer. Overview-Prostate Cancer. <http://www.cancer.ca>. Accessed 2005 February 10.
- 86 Alberta Health and Wellness. Publications. Health Trends: A Working Paper. http://www.health.gov.ab.ca/resources/publications/Health_Trends/index.html. Accessed 2005 March 28.
- 87 Alberta Cancer Board. (2004). Cancer in Alberta: A regional Picture 2004, prepared by Population Health and information.
- 88 U.S. National Institutes of Health. National Cancer Institute. Cancer Topics. Types of Cancer. Prostate. What you need to know about: Prostate Cancer. <http://www.cancer.gov/cancertopics/wyntk/prostate>. Accessed 2005 February 2.
- 89 Canadian Cancer Society. Canadian Cancer encyclopedia. Prostate Cancer. Signs and Symptoms. <http://www.cancer.ca>. Accessed 2005 February 10.
- 90 Centers for Disease Control and Prevention. National Center for Chronic Disease Prevention and Health Promotion. Chronic Disease Prevention. Preventing Heart Disease and Stroke: Addressing the Nation's leading Killers. http://www.cdc.gov/nccddphp/aag/aag_cvd.htm. Accessed 2005 February 23.
- 91 American Heart Association. Silent Ischemia and Ischaemic Heart Disease. <http://www.americanheart.org/presenter.jhtml?identifier=4720>. Accessed 2005 February 22.
- 92 American College of Cardiology Foundation. Ischaemic Heart Disease. <http://www.acc.org/media/patient/chd/ischaemic.htm>. Accessed 2005 February 22.
- 93 U.S. Department of Health and Human Services. Office on Women's Health. The National Women's Health Information center: 4woman.gov. <http://www.4woman.gov/faq/coronary.htm>. Accessed 2005 February 22.
- 94 U.S. Department of Health and Human Services. Office on Women's Health. The National Women's Health Information center: 4woman.gov. <http://www.4woman.gov/faq/coronary.htm>. Accessed 2005 February 22.
- 95 Health Trends in Alberta Health Surveillance
- 96 American Heart Association. Silent Ischemia and Ischaemic Heart Disease. <http://www.americanheart.org/presenter.jhtml?identifier=4720>. Accessed 2005 February 22.
- 97 World Health Organization. Cardiovascular Disease: The Atlas of Heart Disease and Stroke. http://www.who.int/cardiovascular_diseases/resources/atlas/en/. Accessed 2005 February 23.

- 98 American Heart Association. Silent Ischemia and Ischaemic Heart Disease. <http://www.americanheart.org/presenter.jhtml?identifier=4720>. Accessed 2005 February 22.
- 99 World Health Organization. Cardiovascular Disease: The Atlas of Heart Disease and Stroke. http://www.who.int/cardiovascular_diseases/resources/atlas/en/. Accessed 2005 February 23.
- 100 American Heart Association. American Stroke Association. Stroke. <http://www.strokeassociation.org/presenter.jhtml?identifier=4755>. Accessed 2005 February 23.
- 101 National Institutes of Health. National Institute of Neurological Disorders and Stroke. NINDS Stroke Information Page. <http://www.ninds.nih.gov/disorders/stroke/stroke.htm>. Accessed 2005 February 23.
- 102 National Institutes of Health. National Institute of Neurological Disorders and Stroke. NINDS Stroke Information Page. <http://www.ninds.nih.gov/disorders/stroke/stroke.htm>. Accessed 2005 February 23.
- 103 National Stroke Association. Stroke Prevention. <http://www.stroke.org/HomePage.aspx?P=53489584354312323122>. Accessed 2005 February 23.
- 104 American Heart Association. Silent Ischemia and Ischaemic Heart Disease. <http://www.americanheart.org/presenter.jhtml?identifier=4720>. Accessed 2005 February 22.
- 105 World Health Organization. Cardiovascular Disease: The Atlas of Heart Disease and Stroke. http://www.who.int/cardiovascular_diseases/resources/atlas/en/. Accessed 2005 February 23.
- 106 National Institutes of Health. National Institute of Neurological Disorders and Stroke. Stroke Risk Factors and Symptoms. http://www.ninds.nih.gov/disorders/stroke/stroke_bookmark.htm. Accessed 2005 February 23.
- 107 Feldman, R.D., Campbell, N., Larochelle, P., Bolli, P., Burgess, E.D., Carruthers, G., Floras, J.S., Haynes, R.B., Honos, G., Leenen, F.H.H., Leiter, L.A., Logan, A.G., Myers, M.G., Spence, J.D., Zarnke, K.B. (1999) 1999 Canadian recommendations for the management of hypertension. *Canadian Medical Association Journal*, 161 (Suppl. 12), S1-S17.
- 108 The Kidney Foundation of Canada. High Blood Pressure and Your Kidneys. <http://www.kidney.ca/english/publications/brochures/highbloodpressure/highbloodpressure.htm>. Accessed 2005 February 23.
- 109 The Kidney Foundation of Canada. High Blood Pressure and Your Kidneys. <http://www.kidney.ca/english/publications/brochures/highbloodpressure/highbloodpressure.htm>. Accessed 2005 February 23.
- 110 Department of Health and Human Services. National Institutes of Health. National Heart, Lung, and Blood Institute. Hypertension. Your Guide to Lowering High Blood Pressure. <http://www.nhlbi.nih.gov/hbp/issues/oc.htm>. Accessed 1005 February 23.
- 111 Public Health Agency of Canada, Canadian Health Network. Disease Prevention. Cancer. Guided Search. Breast Cancer. What should I know about lung Cancer?. <http://www.canadian-health-network.ca/>. Accessed 2005 February 3.
- 112 Alberta Children's Hospital Foundation. Knock the breath out of asthma. <http://www.project-a.ca>. accessed 2005 February 10.
- 113 Public Health Agency of Canada. Center for Chronic Disease Prevention and Control. Chronic Diseases. Chronic Respiratory Diseases. Asthma. Description. http://www.phac-aspc.gc.ca/ccdpc-cpcmc/topics/crd-asthma_e.html. Accessed 2005 February 10.
- 114 Centers for Communicable Disease Control and Prevention. National Center for Environmental Health. Health Topics A-Z. Asthma. Asthma Speaker's kit for Health Care Professionals. <http://www.cdc.gov/asthma/speakit/intro.htm>. Accessed 2005 February 10.
- 115 Public Health Agency of Canada. Center for Chronic Disease Prevention and Control. Chronic Diseases. Chronic Respiratory Diseases. Asthma. Description. http://www.phac-aspc.gc.ca/ccdpc-cpcmc/topics/crd-asthma_e.html. Accessed 2005 February 10.
- 116 Centers for Communicable Disease Control and Prevention. National Center for Environmental Health. Health Topics A-Z. Asthma. Asthma Speaker's kit for Health Care Professionals. <http://www.cdc.gov/asthma/speakit/intro.htm>. Accessed 2005 February 10.
- 117 Public Health Agency of Canada. Center for Chronic Disease Prevention and Control. Chronic Diseases. Chronic Respiratory Diseases. Asthma. Description. http://www.phac-aspc.gc.ca/ccdpc-cpcmc/topics/crd-asthma_e.html. Accessed 2005 February 10.
- 118 Centers for Communicable Disease Control and Prevention. National Center for Environmental Health. Health Topics A-Z. Asthma. Asthma Speaker's kit for Health Care Professionals. <http://www.cdc.gov/asthma/speakit/intro.htm>. Accessed 2005 February 10.
- 119 Alberta Health and Wellness. Health Link Alberta. Health. Chronic Diseases. Respiratory System. Asthma. www.healthlinkalberta.ca. Accessed 2005 February 10.
- 120 Alberta Children's Hospital Foundation. Knock the breath out of asthma. <http://www.project-a.ca>. accessed 2005 February 10.
- 121 Alberta Health and Wellness. Calgary Health Region. Child Asthma Network (iCAN). (2004). Control Asthma Now: what you need to know to manage your asthma. Calgary: Author.
- 122 Health Canada. The Facts about Tobacco. Bronchitis and Emphysema. What is Chronic Bronchitis. http://www.hc-sc.gc.ca/hecs-sesc/tobacco/facts/health_facts/bronchitis.html. Accessed on 2005 February 15.
- 123 Health J.M. and Mongia R. (1998). Chronic Bronchitis: Primary Care management. New Jersey, USA: American Family Physician, published by the American academy of family physicians.
- 124 The Lung Association. Chronic bronchitis. What is chronic bronchitis?. http://www.lung.ca/diseases/chronic_bronchitis.html. Accessed 2005 February 15.
- 125 U.S. National Library of Medicine and the National Institute of Health. Medline Plus. Encyclopedia. Chronic Bronchitis: causes, incidence, and risk factors. <http://www.nlm.nih.gov/medlineplus/ency/article/000119.htm> accessed 2005 February 15.

- 126 U.S. National Library of Medicine and the National Institute of Health. Medline Plus. Encyclopedia. Chronic Bronchitis: causes, incidence, and risk factors. <http://www.nlm.nih.gov/medlineplus/ency/article/000119.htm> accessed 2005 February 15.
- 127 Nemer L., Salvi C., Negru L. (2003). Children at risk! Main health effects of exposure to environmental risk factors. Published for the Budapest Conference by the World Health Organization. Europe.
- 128 U.S. National Library of Medicine and the National Institute of Health. Medline Plus. Encyclopedia. Chronic Bronchitis: causes, incidence, and risk factors. <http://www.nlm.nih.gov/medlineplus/ency/article/000119.htm> accessed 2005 February 15.
- 129 American Lung Association. Diseases A to Z. Chronic Bronchitis. How Serious is Chronic Bronchitis?. <http://www.lungusa.org/site/pp.asp?c=dvLUK900E&b=35019>. Accessed 2005 February 15.
- 130 Mannino D.M., Homa D.M., Lakinbami L.J., Ford E.S., Redd S.C. (2005). MMWR: Surveillance Summaries, Chronic Obstructive Pulmonary Disease Surveillance. Atlanta, GA: Center for Disease Control and Prevention, Division of Environmental Hazards and Health Effects National Center for environmental Health and Division of Health and Utilization Analysis, Office of Analysis, Epidemiology, and Health Promotion, National Center for Health Statistics.
- 131 Department of Health and Human Services. (2003). Facts about chronic obstructive pulmonary disease. Atlanta, GA: Centers for Disease Control and Prevention, Division of Environmental Hazards and Health effects.
- 132 Alberta Health and Wellness. Health Link Alberta. Health. Chronic Diseases. Respiratory System. Chronic Obstructive Pulmonary Disease (COPD). <http://www.healthlinkalberta.ca/>. Accessed 2005 February 10.
- 133 Public Health Agency of Canada. Center for Chronic Prevention and Control. Chronic Respiratory Diseases, Chronic Obstructive Pulmonary Disease (COPD). https://www.phac-aspc.gc.ca/ccdpc-cpcmc/crd-mrc/copd_e.html. Accessed 2005 February 10.
- 134 Alberta Health and Wellness. Health Link Alberta. Health. Chronic Diseases. Respiratory System. Chronic Obstructive Pulmonary Disease (COPD). <http://www.healthlinkalberta.ca/>. Accessed 2005 February 10.
- 135 Public Health Agency of Canada. Center for Chronic Prevention and Control. Chronic Respiratory Diseases, Chronic Obstructive Pulmonary Disease (COPD). https://www.phac-aspc.gc.ca/ccdpc-cpcmc/crd-mrc/copd_e.html. Accessed 2005 February 10.
- 136 Alberta Health and Wellness. Health Link Alberta. Health. Chronic Diseases. Respiratory System. Chronic Obstructive Pulmonary Disease (COPD). <http://www.healthlinkalberta.ca/>. Accessed 2005 February 10.
- 137 Department of Health and Human Services. (2003). Facts about chronic obstructive pulmonary disease. Atlanta, GA: Centers for Disease Control and Prevention, Division of Environmental Hazards and Health effects.
- 138 Public Health Agency of Canada. Center for Chronic Prevention and Control. Chronic Respiratory Diseases, Chronic Obstructive Pulmonary Disease (COPD). https://www.phac-aspc.gc.ca/ccdpc-cpcmc/crd-mrc/copd_e.html. Accessed 2005 February 10.
- 139 Alberta Health and Wellness. Alberta Diabetes Strategy. http://www.health.gov.ab.ca/public/diseases/pdf/Diabetes_Strategy.pdf. Accessed 2005 February 10.
- 140 Centers for Disease Control and Prevention. National Center for Chronic Disease Prevention and Health Promotion. Diabetes Public Health Resource. Frequently Asked Questions. <http://www.cdc.gov/diabetes/faq/basics.htm>. Accessed 2005 February 24.
- 141 Alberta Health and Wellness. Alberta Diabetes Strategy. http://www.health.gov.ab.ca/public/diseases/pdf/Diabetes_Strategy.pdf. Accessed 2005 February 10.
- 142 Alberta Health and Wellness. Alberta Diabetes Strategy. http://www.health.gov.ab.ca/public/diseases/pdf/Diabetes_Strategy.pdf. Accessed 2005 February 10.
- 143 Alberta Health and Wellness. Alberta Diabetes Strategy. http://www.health.gov.ab.ca/public/diseases/pdf/Diabetes_Strategy.pdf. Accessed 2005 February 10.
- 144 Centers for Disease Control and Prevention. National Center for Chronic Disease Prevention and Health Promotion. Diabetes Public Health Resource. Frequently Asked Questions. <http://www.cdc.gov/diabetes/faq/basics.htm>. Accessed 2005 February 24.
- 145 National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK). National Diabetes Information Clearinghouse (NDIC). Am I at Risk for Type 2 Diabetes?. <http://www.diabetes.niddk.nih.gov/dm/pubs/type1and2/index.htm>. Accessed 2005 February 24.
- 146 National Institutes of Health. National Institute of Diabetes and Digestive and Kidney Diseases (September 2003). I Can Lower My Risk for Type 2 Diabetes: Taking Steps to Lower the Risk of Getting Diabetes. Atlanta, GA: U.S. Department of Health and Human Services.
- 147 Ford-Martin P.A. Gale Encyclopedia of Medicine. Chronic Kidney Failure. (1999). MI. Farmington Hills. Thomson Gale.
- 148 Ford-Martin P.A. Gale Encyclopedia of Medicine. Chronic Kidney Failure. (1999). MI. Farmington Hills. Thomson Gale.
- 149 Ford-Martin P.A. Gale Encyclopedia of Medicine. Chronic Kidney Failure. (1999). MI. Farmington Hills. Thomson Gale.
- 150 Ford-Martin P.A. Gale Encyclopedia of Medicine. Chronic Kidney Failure. (1999). MI. Farmington Hills. Thomson Gale.
- 151 Emedicine Consumer Health. Kidneys and urinary system. Chronic Kidney Disease. <http://www.emedicinehealth.com/articles/18234-2.asp>. Accessed 2005 February 24.
- 152 The Arthritis Society. Introduction to Arthritis. <http://www.arthritis.ca/types%20of%20arthritis/default.asp?s=1>. Accessed 2005 February 24.
- 153 The Arthritis Society. Introduction to Arthritis. <http://www.arthritis.ca/types%20of%20arthritis/default.asp?s=1>. Accessed 2005 February 24.
- 154 Emedicine. Osteoarthritis. <http://www.emedicinehealth.com/articles/5494-1.asp#>. Accessed 2005 February 24.
- 155 Emedicine. Osteoarthritis. <http://www.emedicinehealth.com/articles/5494-1.asp#>. Accessed 2005 February 24.

- 156 The Arthritis Society. Osteoarthritis. <http://www.arthritis.ca/types%20of%20arthritis/osteoarthritis/default.asp?s=1>. Accessed 2005 February 24.
- 157 The Arthritis Society. Osteoarthritis. <http://www.arthritis.ca/types%20of%20arthritis/osteoarthritis/default.asp?s=1>. Accessed 2005 February 24.
- 158 Emedicine. Osteoarthritis. <http://www.emedicinehealth.com/articles/5494-1.asp#>. Accessed 2005 February 24.
- 159 Emedicine. Osteoarthritis. <http://www.emedicinehealth.com/articles/5494-1.asp#>. Accessed 2005 February 24.
- 160 The Arthritis Society. Q & A. <http://www.arthritis.ca/toolbox/qa%20database/browse/default.asp?s=1>. Accessed 2005 February 24.
- 161 Alberta Center for Injury Control and Research. Action on Injury. (1999). Edmonton. Ab. University of Alberta.
- 162 U.S. Department of Health and Human Services. The Surgeon General's Call to Action To Prevent Suicide: 1999. <http://www.surveoungeneral.gov/library/calltoaction/fact1.html>. Accessed 2005 February 24.
- 163 U.S. Department of Health and Human Services. The Surgeon General's Call to Action To Prevent Suicide: 1999. <http://www.surveoungeneral.gov/library/calltoaction/fact1.html>. Accessed 2005 February 24.
- 164 Alberta Center for Injury Control and Research. Preventing Suicide. (1999). Edmonton. Ab. University of Alberta.
- 165 U.S. Department of Health and Human Services. The Surgeon General's Call to Action To Prevent Suicide: 1999. <http://www.surveoungeneral.gov/library/calltoaction/fact1.html>. Accessed 2005 February 24.
- 166 Health Trends in Alberta: Alberta Health
- 167 Tulchinsky T.H. and Varavikova E.A. 2000. The New Public Health. An Introduction for the 21st Century. California: Academic Press.
- 168 The Centre for Disease Control and Prevention and The National Immunization Program (Centres for Disease Control and Prevention). (January 2004). Epidemiology and Prevention of Vaccine-Preventable Diseases: 8th Edition. Atlanta, GA: Department of Health and Human Services.
- 169 Alberta Health and Wellness. Health Trends: Working Paper. http://www.health.gov.ab.ca/resources/publications/Health_Trends/index.html. Accessed 2005 April 18.
- 170 Public Health Agency of Canada. Notifiable Diseases On-Line. Gonorrhoea. http://dsol-smed.phac-aspc.gc.ca/dsol-smed/ndis/diseases/gono_e.html. Accessed 2005 April 18.
- 171 Health Canada. It's Your Health. Diseases. Gonorrhoea. http://www.phac-aspc.gc.ca/std-mts/gono_e.html. Accessed 2005 April 18.
- 172 Health Canada. It's Your Health. Diseases. Gonorrhoea. http://www.phac-aspc.gc.ca/std-mts/gono_e.html. Accessed 2005 April 18.
- 173 Health Canada. It's Your Health. Diseases. Gonorrhoea. http://www.phac-aspc.gc.ca/std-mts/gono_e.html. Accessed 2005 April 18.
- 174 Cranston L. Building a better blood system for Canadians. Canadian Journal of Public Health. 2000; 91(5):540-1, 543-4.
- 175 Zou S, Tepper M, Giulivi A. Current status of hepatitis C in Canada. Canadian Journal of Public Health. 2000; 91(1):S10-15.
- 176 Patrick DM, Buxton JA, Bigham M et al. Public health and hepatitis C. Canadian Journal of Public Health. 2000;91(1):S18-21.
- 177 Heymann, DL. Control of Communicable Diseases in Man. 2004. American Public Health Association. USA.
- 178 Health Canada. It's Your Health. Diseases. Gonorrhoea. http://www.phac-aspc.gc.ca/std-mts/gono_e.html. Accessed 2005 April 18.
- 179 Health Canada. HIV and AIDS in Canada: AIDS surveillance report to June 30, 2002. Division of HIV/AIDS Epidemiology and Surveillance. November 2002. <http://www.phac-aspc.gc.ca/publicat.aids-sida/index.html>
- 180 Rogan E et al. A case of acquired immune deficiency syndrome before 1980. CMAJ 1987;137:637.
- 181 Health Canada. It's Your Health. Diseases. Syphilis. <http://www.hc-sc.gc.ca/english/iyh/diseases/syphilis.html>. Accessed 2005 April 18.
- 182 Centers for Disease Control and Prevention. Division of Bacterial and Mycotic Diseases. Disease Information. Campylobacter Infections. General Information. http://www.cdc.gov/ncidod/dbmd/diseaseinfo/campylobacter_g.htm. Accessed 2005 March 22.
- 183 Centers for Disease Control and Prevention. Division of Bacterial and Mycotic Diseases. Disease Information. Campylobacter Infections. General Information. http://www.cdc.gov/ncidod/dbmd/diseaseinfo/campylobacter_g.htm. Accessed 2005 March 22.
- 184 Alberta Health and Wellness. Health Information. Common Foodborne Illnesses. Campylobacter Enteritis. <http://www.health.gov.ab.ca/public/diseases/FH1Foodborne.html>. Accessed 2005 March 22.
- 185 Health Trends in Alberta. Working document.
- 186 Alberta Health and Wellness. Health Information. Common Foodborne Illnesses. Campylobacter Enteritis. <http://www.health.gov.ab.ca/public/diseases/FH1Foodborne.html>. Accessed 2005 March 22.
- 187 Public Health Agency of Canada. Notifiable Diseases On-Line. Giardiasis. http://dsol-smed.phac-aspc.gc.ca/dsol-smed/ndis/diseases/giar_e.html. Accessed 2005 March 22.
- 188 Centers for Disease Control and Prevention, Division of Bacterial and Mycotic Diseases. Disease Information. Escherichia coli O157:H7. http://www.cdc.gov/ncidod/dbmd/diseaseinfo/escherichiacoli_g.htm. Accessed 2005 March 22.
- 189 Alberta Health and Wellness. Health Information. Common Foodborne Illnesses. Haemorrhagic Colitis. <http://www.health.gov.ab.ca/public/diseases/FH1Foodborne.html>. Accessed 2005 March 22.
- 190 Centers for Disease Control and Prevention, Division of Bacterial and Mycotic Diseases. Disease Information. Escherichia coli O157:H7. http://www.cdc.gov/ncidod/dbmd/diseaseinfo/escherichiacoli_g.htm. Accessed 2005 March 22.

- 191 Centers for Disease Control and Prevention, Division of Bacterial and Mycotic Diseases. Disease Information. Escherichia coli O157:H7. http://www.cdc.gov/ncidod/dbmd/diseaseinfo/escherichiacoli_g.htm. Accessed 2005 March 22.
- 192 Public Health Agency of Canada. Notifiable Diseases On-Line. Salmonellosis. http://dsol-smed.phac-aspc.gc.ca/dsol-smed/ndis/diseases/salm_e.html. Accessed 2004 March 22.
- 193 Centers for Disease Control and Prevention. Division of Bacterial and Mycotic Diseases. Disease Information. Salmonellosis. http://www.cdc.gov/ncidod/dbmd/diseaseinfo/salmonellosis_g.htm. Accessed 2005 March 22.
- 194 Centers for Disease Control and Prevention. Division of Bacterial and Mycotic Diseases. Disease Information. Salmonellosis. http://www.cdc.gov/ncidod/dbmd/diseaseinfo/salmonellosis_g.htm. Accessed 2005 March 22.
- 195 Centers for Disease Control and Prevention. National Center for Infectious Diseases. Healthy Pets Healthy People. Salmonella Infection (Salmonellosis) and Animals. <http://www.cdc.gov/healthypets/diseases/salmonellosis.htm>. Accessed 2005 March 22.
- 196 Centers for Disease Control and Prevention. Division of Bacterial and Mycotic Disease. Disease Information. Fact Sheet. Typhoid. www.cdc.gov/ncidod/diseaseinfo/typhoidfever_t.html. Accessed 2004 January 12.
- 197 Centers for Disease Control and Prevention. Division of Bacterial and Mycotic Disease. Disease Information. Fact Sheet. Diphtheria. http://www.cdc.gov/ncidod/dbmd/diseaseinfo/diphtheria_t.htm. Accessed 2004 November 30.
- 198 Heymann, DL. Control of Communicable Diseases in Man. 2004. American Public Health Association. USA.
- 199 Health Canada. Canadian Immunization Guide 6th ed. 2002. Minister of Health.
- 200 www.liver.ca/english/liverdisease/hepatitis_b.html
- 201 Centers for Disease Control and Prevention. Division of Bacterial and Mycotic Diseases. Disease Information. Haemophilus Influenzae Serotype b (Hib) Disease. http://www.cdc.gov/ncidod/dbmd/diseaseinfo/haeminfluserob_t.htm. Accessed 2004 December 1.
- 202 World Health Organization. Immunization, Vaccines and Biologicals. Haemophilus influenzae type B vaccine. <http://www.who.int/vaccines/en/haeflub.shtml>. Accessed 2004 December 23.
- 203 World Health Organization. Immunization, Vaccines and Biologicals. Haemophilus influenzae type B vaccine. <http://www.who.int/vaccines/en/haeflub.shtml>. Accessed 2004 December 23.
- 204 Government of Alberta. Alberta Health and Wellness. Health Information. Immunization. DTaP-IPV-Hib (Diphtheria, Tetanus, Pertussis, Polio, Hib): Important information about this vaccine. <http://www.health.gov.ab.ca/public/immunizations/CD5DPT.html>. Accessed 2004 December 23.
- Influenza**
- 205 Center for Communicable Disease Control and Prevention. (November 2004). Fact Sheet on the Flu: How to Prevent the Flu and What To Do If You Get Sick. Atlanta, GA: Department of Health and Human Services.
- 206 National Institutes of Health. National Institute of Allergy and Infectious Disease. Focus on the Flu. Research: Prevention. <http://www2.niaid.nih.gov/Newsroom/FocusOn/Flu04/oneshot.htm>. Accessed 2005 February 2.
- 207 National Institutes of Health. National Institute of Allergy and Infectious Disease. Focus on the Flu. Research: Prevention. <http://www2.niaid.nih.gov/Newsroom/FocusOn/Flu04/oneshot.htm>. Accessed 2005 February 2.
- 208 Center for Disease Control and Prevention. (January 2004). Epidemiology and Prevention of Vaccine-Preventable Diseases: 8th Edition.
- 209 Center for Disease Control and Prevention. (January 2004). Epidemiology and Prevention of Vaccine-Preventable Diseases: 8th Edition.
- 210 Center for Disease Control and Prevention. (January 2004). Epidemiology and Prevention of Vaccine-Preventable Diseases: 8th Edition.
- 211 Tulchinsky T.H. and Varavikova E.A. (2000). The New Public Health: An Introduction for the 21st Century.
- 212 Papania M., Wharton M. and Redd S. (2002). Measles. VPD surveillance Manual: 3rd Edition.
- 213 Papania M., Wharton M. and Redd S. (2002). Measles. VPD surveillance Manual: 3rd Edition.
- 214 Papania M., Wharton M. and Redd S. (2002). Measles. VPD surveillance Manual: 3rd Edition.
- 215 Health Link. Health Information. Health Topics. Infectious Communicable Diseases. Roseola. (March 2004). <http://www.healthlinkalberta.ca/Topic.asp?GUID={E16FBE62-D5CD-46BE-9C7C-931EF3385929}>. Accessed 2004 November 23.
- 216 Center for Disease Control and Prevention. (January 2004). Epidemiology and Prevention of Vaccine-Preventable Diseases: 8th Edition.
- 217 Center for Disease Control and Prevention. (January 2004). Epidemiology and Prevention of Vaccine-Preventable Diseases: 8th Edition.
- 218 Papania M., Wharton M. and Redd S. (2002). Measles. VPD surveillance Manual: 3rd Edition. Atlanta, GA: Department of Health and Human Services.
- 219 Alberta Health and Wellness. Immunizations. Meningococcal Conjugate Vaccine. <http://www.health.gov.ab.ca/public/immunizations/CD65Meningococcal.html>. Accessed 2005 April 7.
- 220 The Center for Disease Control and Prevention and the National Immunization Program (Centers for Disease Control and Prevention). (January 2004). Epidemiology and Prevention of Vaccine-Preventable Diseases: 8th Edition. Atlanta, GA: Department of Health and Human Services.
- 221 The Center for Disease Control and Prevention and the National Immunization Program (Centers for Disease Control and Prevention). (January 2004). Epidemiology and Prevention of Vaccine-Preventable Diseases: 8th Edition. Atlanta, GA: Department of Health and Human Services.
- 222 National Advisory Committee on Immunization. Canadian immunization guide 6th ed. 2002.
- 223 The Center for Disease Control and Prevention and the National Immunization Program (Centers for Disease Control and Prevention). (January 2004). Epidemiology and Prevention of Vaccine-Preventable Diseases: 8th Edition. Atlanta, GA: Department of Health and Human Services.

- 224 World Health Organization. Media Center. Fact Sheet. Polio. <http://www.who.int/mediacentre/factsheets/fs114/en/>. Accessed 2004 November 23.
- 225 World Health Organization. Media Center. Fact Sheet. Polio. <http://www.who.int/mediacentre/factsheets/fs114/en/>. Accessed 2004 November 23.
- 226 The Center for Disease Control and Prevention and the National Immunization Program (Centers for Disease Control and Prevention). (January 2004). *Epidemiology and Prevention of Vaccine-Preventable Diseases: 8th Edition*. Atlanta, GA: Department of Health and Human Services.
- 227 World Health Organization. Media Center. Fact Sheet. Polio. <http://www.who.int/mediacentre/factsheets/fs114/en/>. Accessed 2004 November 23.
- 228 The Center for Disease Control and Prevention and the National Immunization Program (Centers for Disease Control and Prevention). (January 2004). *Epidemiology and Prevention of Vaccine-Preventable Diseases: 8th Edition*. Atlanta, GA: Department of Health and Human Services.
- 229 The Center for Disease Control and Prevention and the National Immunization Program (Centers for Disease Control and Prevention). (January 2004). *Epidemiology and Prevention of Vaccine-Preventable Diseases: 8th Edition*. Atlanta, GA: Department of Health and Human Services.
- 230 The Center for Disease Control and Prevention and the National Immunization Program (Centers for Disease Control and Prevention). (January 2004). *Epidemiology and Prevention of Vaccine-Preventable Diseases: 8th Edition*. Atlanta, GA: Department of Health and Human Services.
- 231 The Center for Disease Control and Prevention and the National Immunization Program (Centers for Disease Control and Prevention). (January 2004). *Epidemiology and Prevention of Vaccine-Preventable Diseases: 8th Edition*. Atlanta, GA: Department of Health and Human Services.
- 232 World Health Organization. Media Center. Fact Sheets. Smallpox. <http://www.who.int/mediacentre/factsheets/smallpox/en/>. Accessed 2004 November 23.
- 233 The Center for Disease Control and Prevention and the National Immunization Program (Centers for Disease Control and Prevention). (January 2004). *Epidemiology and Prevention of Vaccine-Preventable Diseases: 8th Edition*. Atlanta, GA: Department of Health and Human Services.
- 234 World Health Organization. Media Center. Fact Sheets. Smallpox. <http://www.who.int/mediacentre/factsheets/smallpox/en/>. Accessed 2004 November 23.
- 235 World Health Organization. Media Center. Fact Sheets. Smallpox. <http://www.who.int/mediacentre/factsheets/smallpox/en/>. Accessed 2004 November 23.
- 236 World Health Organization. Media Center. Fact Sheets. Smallpox. <http://www.who.int/mediacentre/factsheets/smallpox/en/>. Accessed 2004 November 23.
- 237 The Center for Disease Control and Prevention and the National Immunization Program (Centers for Disease Control and Prevention). (January 2004). *Epidemiology and Prevention of Vaccine-Preventable Diseases: 8th Edition*. Atlanta, GA: Department of Health and Human Services.
- 238 health.gov
- 239 Heymann, DL. *Control of Communicable Diseases in Man*. 2004. American Public Health Association. USA
- 240 Center for Disease Control and Prevention. (January 2004). *Epidemiology and Prevention of Vaccine-Preventable Diseases: 8th Edition*.
- 241 Center for Disease Control and Prevention. (January 2004). *Epidemiology and Prevention of Vaccine-Preventable Diseases: 8th Edition*.
- 242 Alberta Health and Wellness. Health Information. Immunization. <http://www.health.gov.ab.ca/public/immunizations/CD47chickenpox.html>. Accessed 2004 November 23.
- 243 Center for Disease Control and Prevention. (January 2004). *Epidemiology and Prevention of Vaccine-Preventable Diseases: 8th Edition*.
- 244 The Center for Disease Control and Prevention. The National Center for HIV, STD, and TUBERCULOSIS Prevention. Division of Tuberculosis Elimination: http://www.cdc.gov/nchstp/tuberculosis/faqs/qa_introduction.htm. Accessed 2005 January 20.
- 245 The Center for Disease Control and Prevention. The National Center for HIV, STD, and TUBERCULOSIS Prevention. Division of Tuberculosis Elimination. Tuberculosis Introduction. http://www.cdc.gov/nchstp/tuberculosis/faqs/qa_introduction.htm. Accessed 2005 January 20.
- 246 Grzybowski, Stefan, Allen, Edward A. (1999). Tuberculosis: 2. History of the disease in Canada. *Canadian Medical Association Journal*. Vol. 160. Issue 7.
- 247 Grzybowski, Stefan, Allen, Edward A. (1999). Tuberculosis: 2. History of the disease in Canada. *Canadian Medical Association Journal*. Vol. 160. Issue 7.
- 248 Fanning, E. Anne. (March 1998). *Canadian Medical Association Journal*. Vol. 158. Issue 5.
- 249 Grzybowski, Stefan, Allen, Edward A. (1999). Tuberculosis: 2. History of the disease in Canada. *Canadian Medical Association Journal*. Vol. 160. Issue 7.
- 250 Grzybowski, Stefan, Allen, Edward A. (1999). Tuberculosis: 2. History of the disease in Canada. *Canadian Medical Association Journal*. Vol. 160. Issue 7.
- 251 Grzybowski, Stefan, Allen, Edward A. (1999). Tuberculosis: 2. History of the disease in Canada. *Canadian Medical Association Journal*. Vol. 160. Issue 7.
- 252 Grzybowski, Stefan, Allen, Edward A. (1999). Tuberculosis: 2. History of the disease in Canada. *Canadian Medical Association Journal*. Vol. 160. Issue 7.

