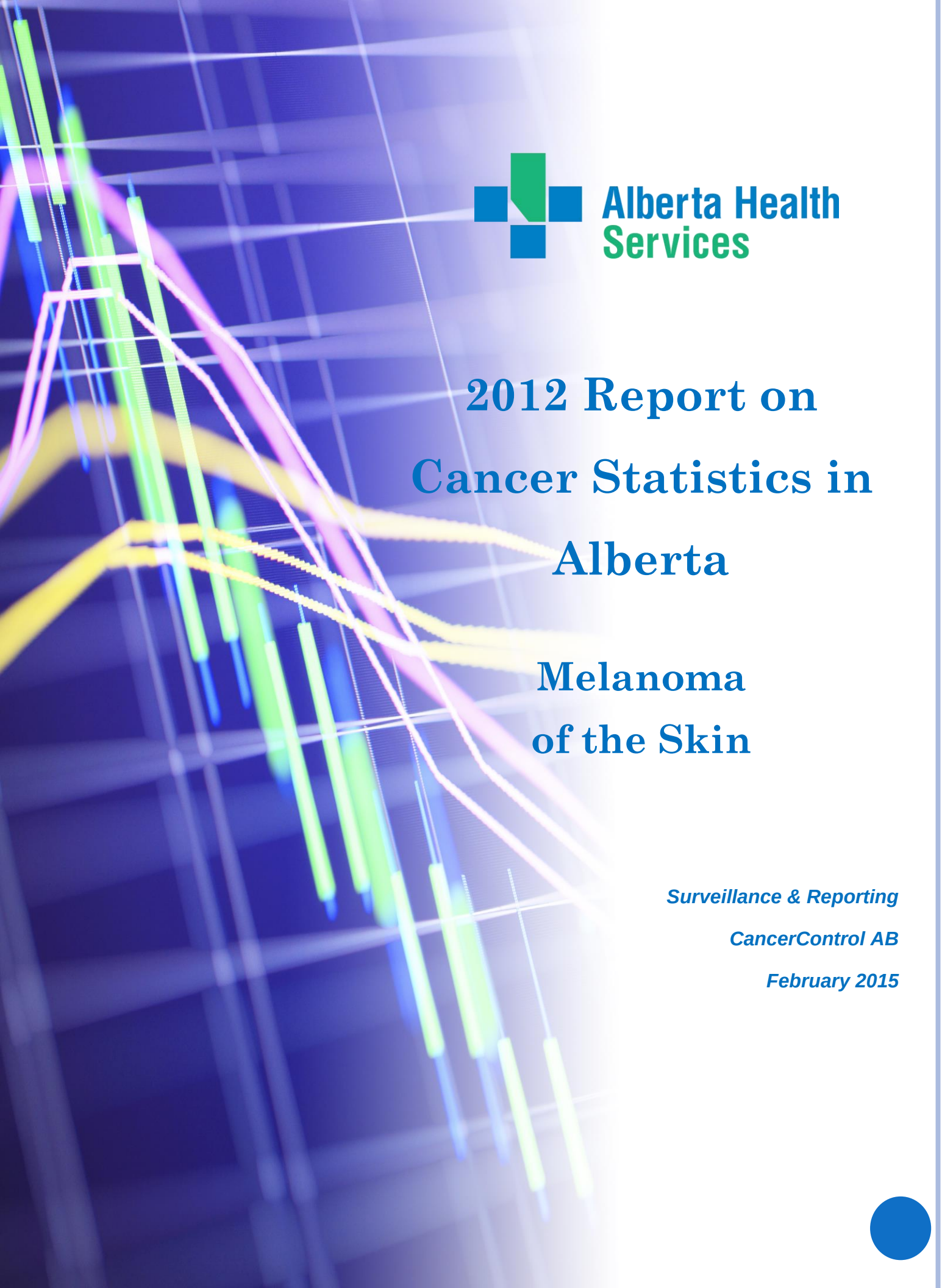

Alberta Health Services

# 2012 Report on Cancer Statistics in Alberta

## Melanoma of the Skin

*Surveillance & Reporting*

*CancerControl AB*

*February 2015*

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- *Report Editor:*
  **Dr. Lorraine Shack**, *Director, Surveillance & Reporting*
- *Project Coordinator:*
  **Bethany Kaposhi**, *Epidemiologist*
- *Analysis and Review:*
  **Dr. Zhenguo Qiu**, *Biostatistician*
  **Li Huang**, *Senior Surveillance Analyst*
  **Jingyu Bu**, *Senior Surveillance Analyst*
  **Anthony Karosas**, *Surveillance Analyst*
  **Andrew Min**, *Assistant Programmer Analyst*
  **Lee-Anne Weeks**, *Analyst*
  **Michael Taylor**, *Senior Analyst*
  **Shuang Lu**, *Senior Surveillance Analyst*
  **Ting Liu**, *Programmer*
- *Design Assistance:*
  **Kira Kulicki**, *Communications Coordinator, Alberta Cancer Clinical Trials*

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## Purpose of the Report

Surveillance & Reporting, a specialized team within Cancer Measurement Outcomes Research and Evaluation (C-MORE), Alberta Health Services, actively contributes to Changing our Future: Alberta's Cancer Plan to 2030. As well, Surveillance & Reporting keenly contributes to the goal of making Alberta a place where most cancers are prevented, more cancers are cured, and suffering is reduced. This is accomplished in part by conducting cancer ***surveillance*** through the collection, integration, analysis, and dissemination of cancer-related data and information.

The report is designed to provide comprehensive and detailed information regarding cancer in Alberta. It will help support health professionals, researchers and policy makers in the planning, monitoring, and evaluation of cancer-related health programs and initiatives. It will also be a useful education tool for the general public and media.

## Navigating the Report

This document provides information on melanoma of the skin (see **Appendix** for cancer site definitions) statistics in Alberta. Details about other individual cancer types are available within separate documents. The words highlighted in ***dark blue*** are terms described in detail in the Glossary within the **Appendix** document.

## Data Notes

In this document, the term "cancer" refers to ***invasive cancers*** unless otherwise specified. It is important to note that this document contains both actual and estimated data; distinctions are made where applicable. The numbers published in this report should be considered provisional, as a few cases and deaths may be registered in subsequent years. The data in this report reflect the state of the Alberta Cancer Registry as of July 14, 2014.

Incidence ***rates*** presented in this document exclude basal and squamous skin cancer cases. Although approximately 30% of the ***malignant*** cancers diagnosed among Albertans each year are basal and squamous skin cancers, these ***tumours*** are generally not life-threatening and are inconsistently reported and coded across registries; therefore, basal and squamous skin cancers are rarely included in cancer registry reports.

For detailed descriptions about data sources and how they affect data presented in this report, please see the **Appendix** document.

## Summary

- The chance of being diagnosed with melanoma of the skin in a lifetime is approximately **1 in 55** men and **1 in 69** women. As of December 31, 2012, approximately **7,800** Albertans were alive who had previously been diagnosed with melanoma of the skin.

- In 2012, there were **599** new cases of melanoma of the skin in Alberta and **72** deaths due to the disease. The trends in incidence rates are different between males and females. From 1992 to 2012*, **male** melanoma **incidence rates increased** while **female** melanoma **incidence rates remained stable**. Mortality rates for both **males and females remained stable during this period**. Both male and female rates of melanoma increase after about age 35 with higher rates in males after age 40.
- In the future it is estimated that approximately **700** cases of melanoma of the skin will be diagnosed in 2017.

- The relative survival ratio for individuals diagnosed with melanoma of the skin is extremely high. The five-year relative survival ratio for melanoma of the skin in Alberta is approximately **91%** for those diagnosed between 2010 and 2012. This means that those diagnosed in 2010 to 2012 are about 91% as likely to be alive 5 years after their diagnoses as someone of the same age who has not been diagnosed with cancer.

- Potential years of life lost (PYLL) is the number of years of life lost when a person dies prematurely from any cause, based on their life expectancy. In 2012, **1,462** potential years of life were lost due to melanoma of the skin.

* Year range represents the period over which the most recent significant trend was observed.

## Probability of Developing or Dying from Melanoma of the Skin

The ***probability of developing or dying of cancer*** measures the risk of an individual in a given age range developing or dying of cancer, and is conditional upon the person being melanoma of the skin free prior to the beginning of that age range.

It is important to note that the probabilities of developing or dying of cancer represent all of Alberta's population on average and should be interpreted with caution at the individual level as the probabilities will be affected by the risk behaviours and exposures of the individual. In addition, someone diagnosed with cancer has a higher probability of developing another cancer in the future.[1]

**Table 9-1: Probability of Developing Melanoma of the Skin by Age and Sex, Alberta, 2008-2012**

| Age Group | Males | Females |
|---|---|---|
| Lifetime Risk (all ages) | 1 in 55 | 1 in 69 |
| 0 - 20 | Less than 1 in 10,000 | Less than 1 in 10,000 |
| 20 - 30 | 1 in 3,992 | 1 in 2,065 |
| 30 - 40 | 1 in 1,513 | 1 in 1,001 |
| 40 - 50 | 1 in 720 | 1 in 555 |
| 50 - 60 | 1 in 372 | 1 in 439 |
| 60 - 70 | 1 in 227 | 1 in 324 |
| 70 - 80 | 1 in 165 | 1 in 315 |
| 80+ | 1 in 122 | 1 in 204 |

**Data Source**: Alberta Cancer Registry, Alberta Health Services

The probability of developing melanoma varies by age and sex (**Table 9-1**). Approximately 1 in 55 males and 1 in 69 females will develop invasive melanoma of the skin in their lifetime.

On a population basis, the probability of developing melanoma of the skin by the end of the age range for a melanoma-free individual at the beginning of the age range are shown in **Table 9-1**. For instance, a melanoma-free female at age 40 has a 1 in 555 chance of developing melanoma by the time she is 50.

**Table 9-2: Probability of Dying from Melanoma of the Skin by Age and Sex, Alberta, 2008-2012**

| Age Group | Males | Females |
|---|---|---|
| Lifetime Risk (all ages) | 1 in 302 | 1 in 566 |
| 0 - 20 | Less than 1 in 10,000 | Less than 1 in 10,000 |
| 20 - 30 | Less than 1 in 10,000 | Less than 1 in 10,000 |
| 30 - 40 | Less than 1 in 10,000 | Less than 1 in 10,000 |
| 40 - 50 | 1 in 5,270 | 1 in 9,859 |
| 50 - 60 | 1 in 2,284 | 1 in 5,877 |
| 60 - 70 | 1 in 1,660 | 1 in 2,414 |
| 70 - 80 | 1 in 877 | 1 in 3,099 |
| 80+ | 1 in 491 | 1 in 881 |

**Data Source**: Alberta Cancer Registry, Alberta Health Services

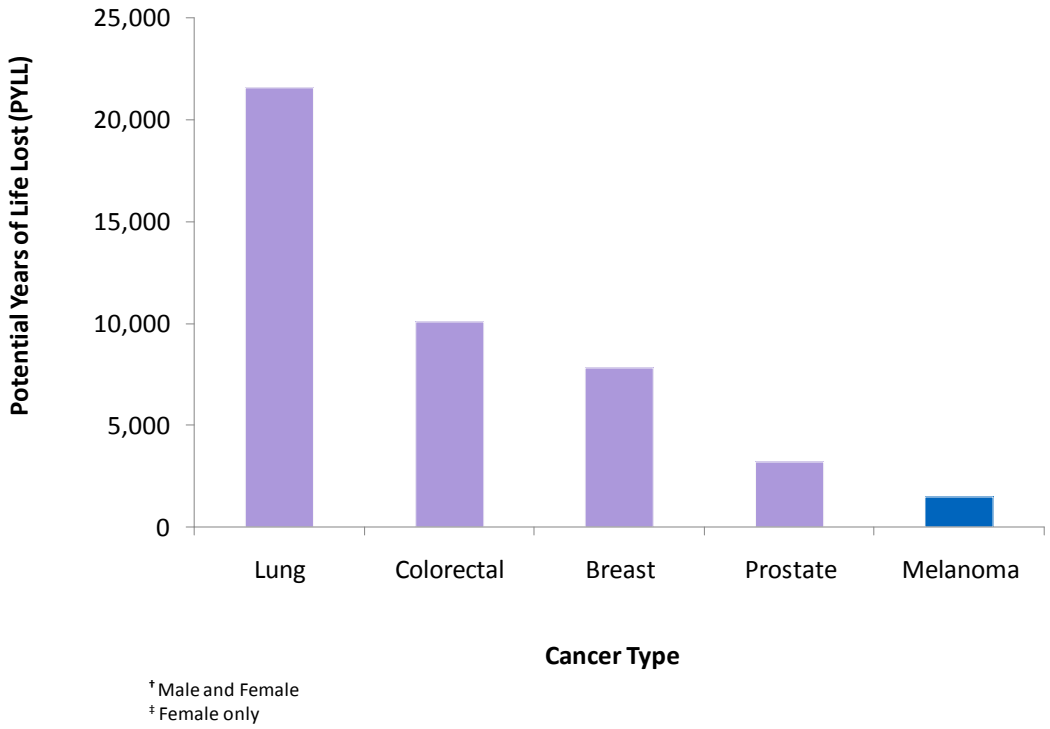
The probability of dying from melanoma of the skin varies by age and sex (**Table 9-2**). Approximately 1 in 302 males and 1 in 566 females will die of invasive melanoma.

Males have a higher chance of dying from melanoma of the skin than females. On a population basis, the probability of a cancer-free individual at the beginning of the age range dying from melanoma of the skin by the end of the age range are shown in **Table 9-2**. For example, a cancer-free female at age 40 has a 1 in 9,859 chance of dying from melanoma by the time she is 50.

## Potential Years of Life Lost

One frequently used measure of premature death is ***potential years of life lost (PYLL)***. PYLL due to cancer is an estimate of the number of years that people would have lived had they not died from cancer. PYLL due to cancer has been calculated by multiplying the number of deaths in each age group and the absolute difference between the mid-point age of an age group and the age-specific life expectancy. The age-specific life expectancy is calculated by determining the age to which an individual would have been expected to live had they not died from cancer. PYLL is one way to measure the impact, or burden, of a disease on a population.

**Figure 9-1: Potential Years of Life Lost (PYLL) from Melanoma of the Skin† Compared with Lung†, Colorectal†, Breast‡ and Prostate Cancers, Alberta, 2012**




† Male and Female
‡ Female only

**Data Source**: Alberta Cancer Registry, Alberta Health Services

In 2012, **1,462** potential years of life were lost due to melanoma of the skin, which constitutes 1.6% of PYLL for all cancers (**Figure 9-1**).

## Prevalence

The ***prevalence*** of a disease is defined as the number of people alive who had been previously diagnosed with that disease.

Limited-duration melanoma of the skin prevalence represents the number of people alive on a certain day who had previously been diagnosed with melanoma within a specified number of years (e.g. 2, 5, 10 or 20 years) while complete melanoma prevalence represents the proportion of people alive on a certain day who had previously been diagnosed with melanoma, regardless of how long ago the diagnosis was.[2]

In this section of the report, both limited-duration and complete melanoma prevalence are presented; the latter describing the number of people alive as of December 31, 2012 who had ever been diagnosed with melanoma.

Prevalence is a useful indicator of the impact of cancer on individuals, the healthcare system, and the community as a whole. Although many cancer survivors lead healthy and productive lives, the experience can have a strong impact on the physical and emotional well-being of individuals and their families. The cancer experience can also result in the continued use of the healthcare system through rehabilitation or support services, as well as loss of work productivity, which can affect the whole community.

As of December 31, 2012, approximately **7,800** Albertans were alive who had previously been diagnosed with melanoma of the skin (**Table 9-3**). In addition, there were **1,150** Albertans alive who had been diagnosed with melanoma of the skin within the previous two years. The two year time period is significant because most definitive cancer treatments will occur within two years of diagnosis.

**Table 9-3: Limited-Duration and Complete Prevalence for Melanoma of the Skin, Both Sexes, Alberta, 2012**

| Duration | Prevalence (#) |
|---|---|
| 2-Year | 1,150 |
| 5-Year | 2,450 |
| 10-Year | 4,050 |
| 20-Year | 6,300 |
| Complete (Ever Diagnosed) | 7,800 |

**Data Source**: Alberta Cancer Registry, Alberta Health Services

# Melanoma of the Skin Incidence and Mortality

## Introduction

***Incidence counts*** are the number of new cancer cases diagnosed during a specific time period in a specific population. In this section of the report, incidence counts refer to the number of new melanoma of the skin diagnoses in Alberta residents in a calendar year. Incidence rates are the number of new cancer cases diagnosed per 100,000 in the population, in a specific time period.

***Mortality counts*** describe the number of deaths attributed to cancer during a specific period of time in a specific population. In this section of the report, mortality refers to the number of deaths due to melanoma of the skin in Alberta residents in a calendar year, regardless of date of diagnosis. Mortality rates are the number of deaths per 100,000 in the population, in a specific time period.

In order to compare cancer incidence or cancer mortality over time, or between populations, ***age-standardized incidence rates (ASIRs)*** or ***age-standardized mortality rates (ASMRs)*** are presented. These are weighted averages of ***age-specific rates*** using a standard population. These rates are useful because they are adjusted for differences in age distributions in a population over time, which permit comparisons of cancer incidence or mortality among populations that differ in size, structure, and/or time period. ASIRs and ASMRs give the overall incidence and mortality rates that would have occurred if the population of Alberta had been the same as the standard population. In this report the Canadian 1991 standard population is used.

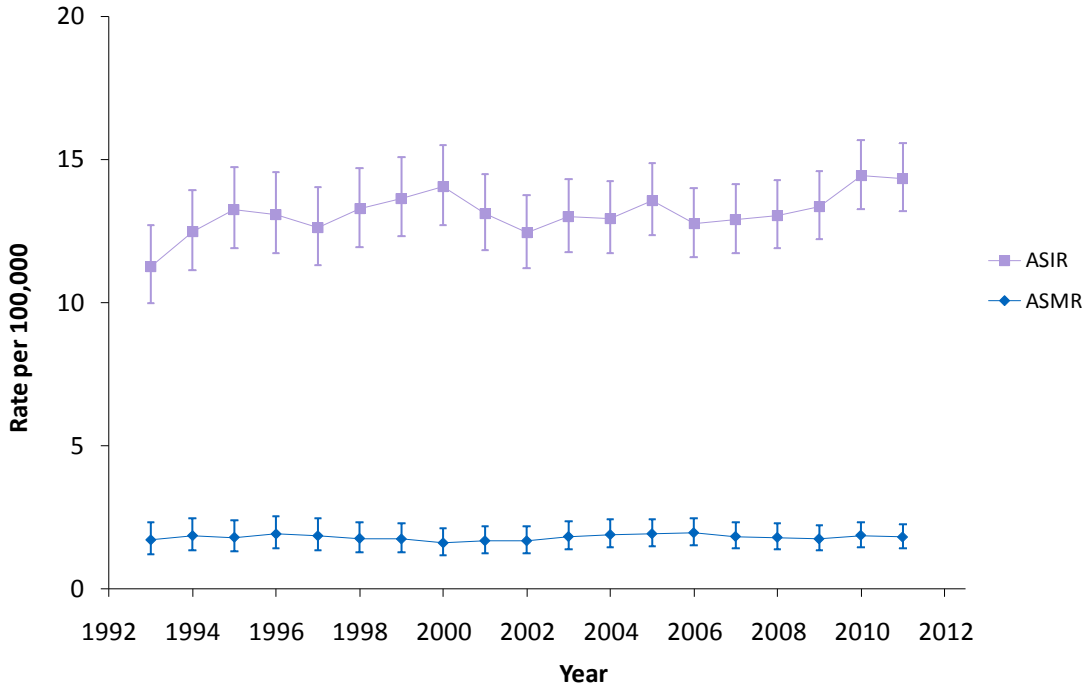
***Three-year moving averages*** are used to smooth out year-to-year fluctuations so that the underlying trend may be more easily observed. They are calculated based on aggregating three years of data. Age-standardized incidence rates (ASIRs) and age-standardized mortality rates (ASMRs) are presented as three-year moving averages; therefore, information can only be presented for 1993-2011. This smoothing of trends is especially important when the number of cancer cases per year is relatively small and where year-to-year variability can be quite large.

Incidence and mortality can be affected by the implementation of public health prevention or screening strategies that either prevent disease or find cancer in its early ***stages*** when treatment is generally more successful. Incidence and mortality are also affected by the development of cancer treatment programs, which may impact chances of survival and research innovations.

The following figures show incidence and mortality trends in Alberta. Separate analyses for both incidence and mortality are shown in subsequent sections. The statistical significance* of the trends was determined by using Joinpoint[3] and is described in the text accompanying each graph. Joinpoint models are based on yearly rates; hence there may be slight differences in the rates presented in the text (from Joinpoint model) and the graphs (where ASIRs and ASMRs are shown as three-year moving averages).

* Throughout this report, the use of the word significant refers to statistical significance at an alpha level of 0.05 (i.e. 95%CI).

**Figure 9-2: Age-Standardized Incidence Rates (ASIRs)[*†] and Mortality Rates (ASMRs)[*†] with 95% Confidence Intervals (CI) for Melanoma of the Skin, Both Sexes, Alberta, 1992-2012[‡]**



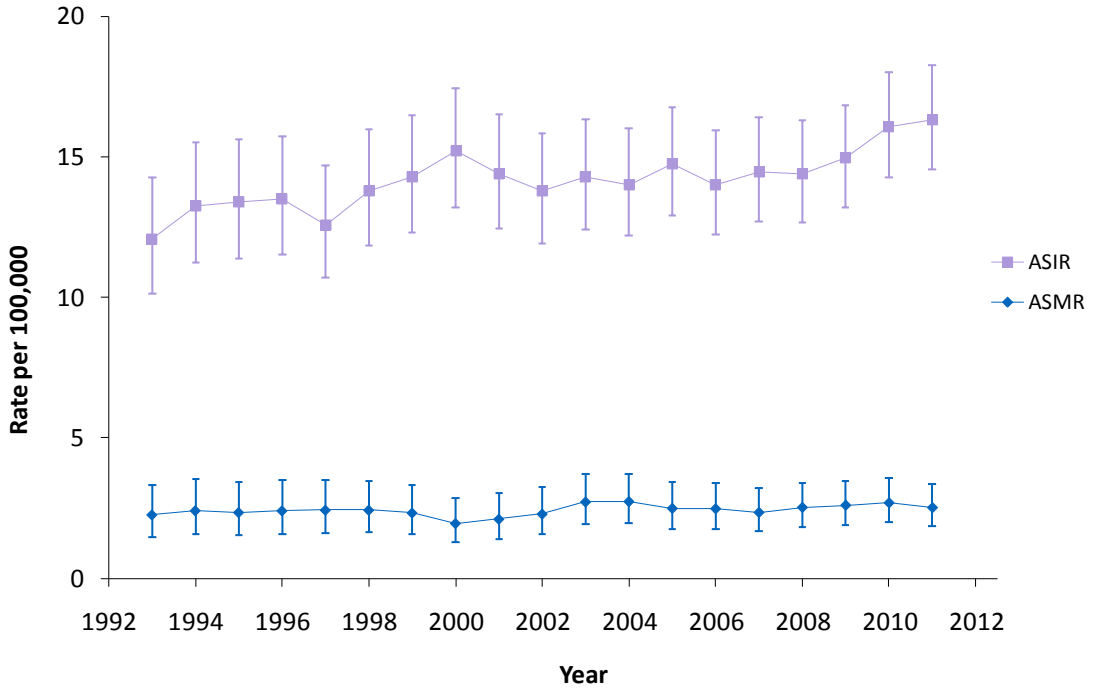

[*] Three-year moving average.
[†] Standardized to 1991 Canadian population.
[‡] Excludes basal and squamous skin cancers.

**Data Source**: Alberta Cancer Registry, Alberta Health Services; Alberta Health

Melanoma of the skin ASIRs increased significantly between 1992 and 2012 by 0.8% annually (**Figure 9-2**). In 2012, the ASIR for melanoma of the skin was 13.9 per 100,000 in the population.

Melanoma mortality rates are much lower than incidence rates (**Figure 9-2**). However, these rates did not change significantly between 1992 and 2012. In 2012, the ASMR for melanoma of the skin was 1.7 per 100,000 in the population.

**Figure 9-3: Age-Standardized Incidence Rates (ASIRs)[*†] and Mortality Rates (ASMRs)[*†] with 95% Confidence Intervals (CI) for Melanoma of the Skin, Males, Alberta, 1992-2012[‡]**



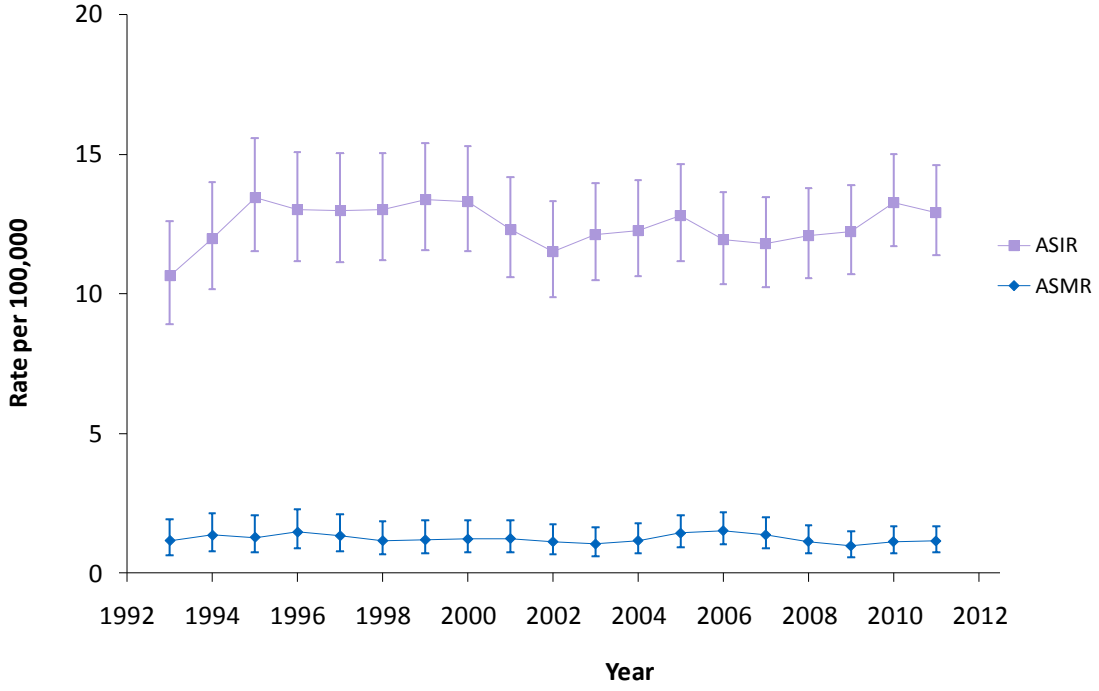

[*] Three-year moving average.
[†] Standardized to 1991 Canadian population.
[‡] Excludes basal and squamous skin cancers.

**Data Source**: Alberta Cancer Registry, Alberta Health Services; Alberta Health

Male melanoma of the skin ASIRs increased significantly between 1992 and 2012 by 1.3% annually (**Figure 9-3**). In 2012, the ASIR for melanoma of the skin in males was 16.1 per 100,000 males in the population.

Male melanoma of the skin ASMRs have not changed significantly since 1992 (**Figure 9-3**). In 2012, the ASMR for melanoma of the skin in males was 2.2 per 100,000 males in the population.

**Figure 9-4: Age-Standardized Incidence Rates (ASIRs)[*†] and Mortality Rates (ASMRs)[*†] with 95% Confidence Intervals (CI) for Melanoma of the Skin, Females, Alberta, 1992-2012[‡]**




[*] Three-year moving average.
[†] Standardized to 1991 Canadian population.
[‡] Excludes basal and squamous skin cancers.

**Data Source**: Alberta Cancer Registry, Alberta Health Services; Alberta Health

Female melanoma of the skin ASIRs has not changed significantly between 1992 and 2012 (**Figure 9-4**). In 2012, the ASIR for melanoma of the skin in females was 12.4 per 100,000 females in the population.

Female melanoma ASMRs have not changed significantly since 1992 (**Figure 9-4**). In 2012, the ASMR for melanoma of the skin in females was 1.1 per 100,000 females in the population.

## Melanoma of the Skin Incidence

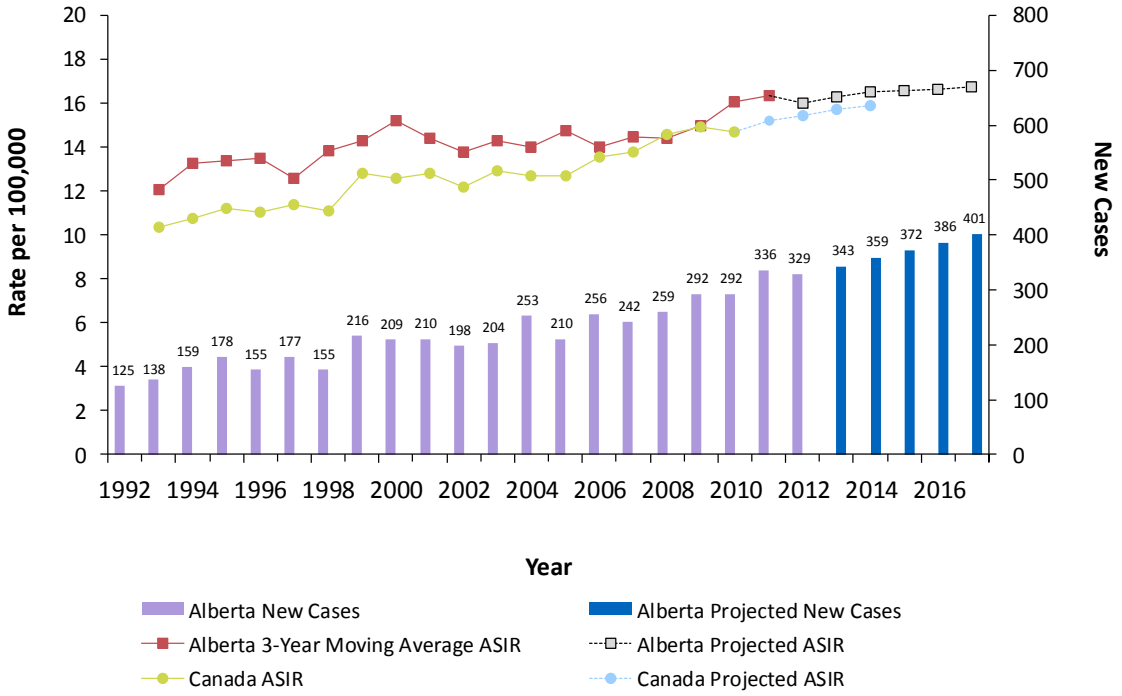
The following three figures (**Figures 9-5** to **9-7**) provide information on melanoma of the skin incidence in Alberta. The number of new cancer cases in Alberta is affected not only by changes in the underlying risk of developing melanoma, but also by the changes in the age structure and growth of the population. In order to compare trends over time, age-standardized incidence rates (ASIRs) are provided.

In **Figures 9-5** and **9-6** observed age standardized incidence rates are shown for 1992 to 2011 (three-year moving averages), ***projected*** rates for 2012 to 2017, and observed numbers of new melanoma of the skin cases are shown for the years 1992 to 2012 and projected numbers for 2013 to 2017.

The projected cancer numbers were calculated by applying the estimated age-specific cancer incidence rates to the projected age-specific population figures provided by Alberta Health.[4] These were observed up to 2011 (due to the use of three-year moving averages) and estimated for 2012 to 2017. Caution should be exercised when comparing Canada[5] and Alberta rates as Canadian rates are yearly rates while Alberta rates are three-year moving averages.

The estimated melanoma of the skin incidence rates were calculated by extrapolating the historical trends in age-specific rate based on data from 1987 to 2011.

**Figure 9-5: Actual and Projected Number of New Cases and Age-Standardized Incidence Rates (ASIRs)[*†] for Melanoma of the Skin[‡], Males, Alberta, 1992-2017**



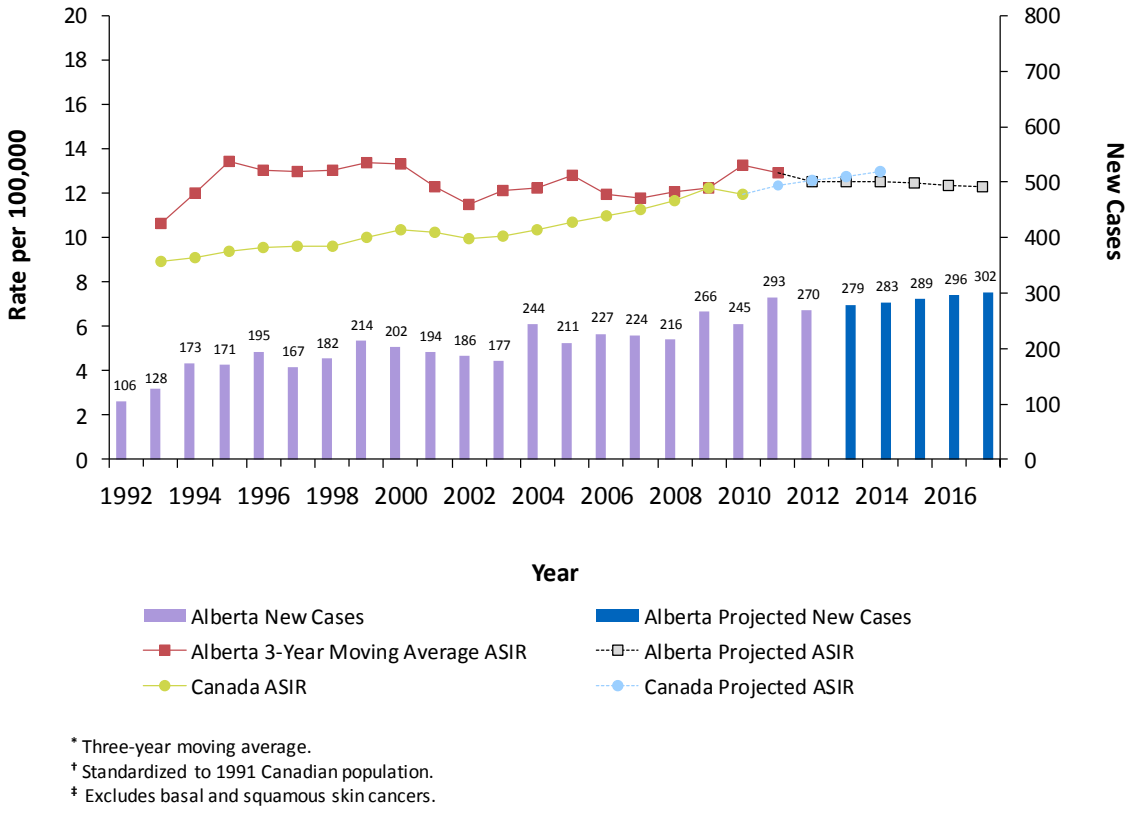

[*] Three-year moving average.
[†] Standardized to 1991 Canadian population.
[‡] Excludes basal and squamous skin cancers.

**Data Source**: Alberta Cancer Registry, Alberta Health Services; Alberta Health; Canadian Cancer Society

In 2012, 329 cases of male melanoma of the skin were diagnosed in Alberta (**Figure 9-5**). ASIRs for male melanoma of the skin in Alberta were generally higher than ASIRs in Canada.

It is estimated that 400 cases of melanoma will be diagnosed in males in Alberta in 2017.

**Figure 9-6: Actual and Projected Number of New Cases and Age-Standardized Incidence Rates (ASIRs)[*†] for Melanoma of the Skin[‡], Females, Alberta, 1992-2017**



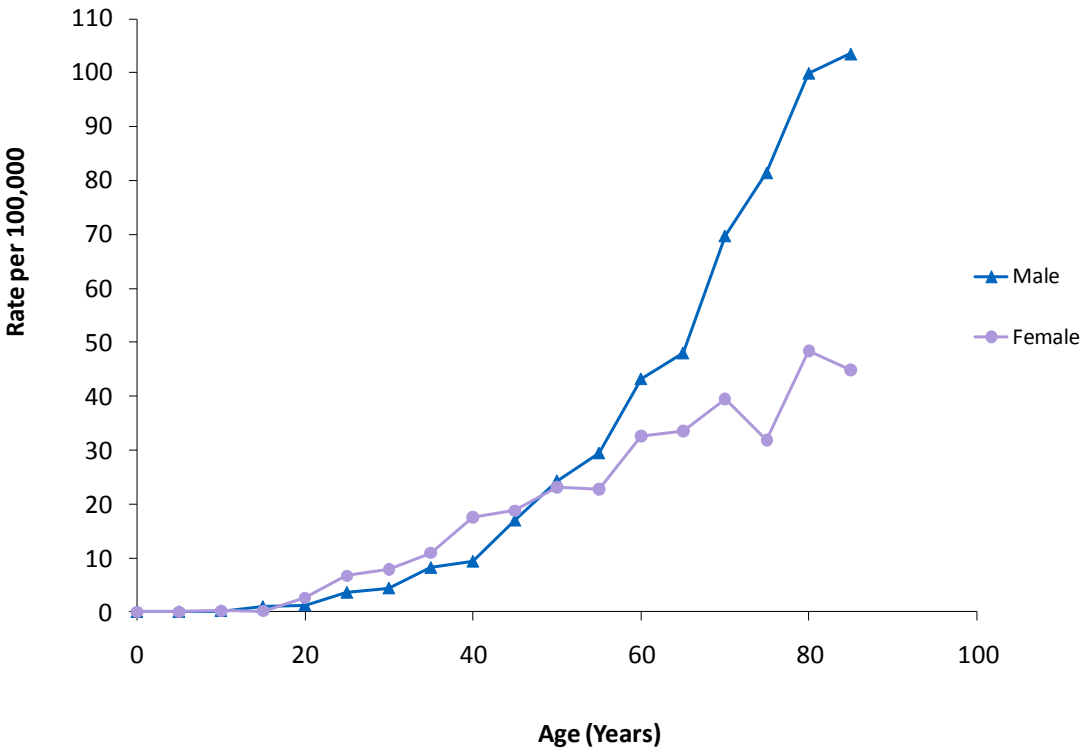

[*] Three-year moving average.
[†] Standardized to 1991 Canadian population.
[‡] Excludes basal and squamous skin cancers.

**Data Source**: Alberta Cancer Registry, Alberta Health Services; Alberta Health; Canadian Cancer Society

In 2012, 270 cases of female melanoma were diagnosed in Alberta (**Figure 9-6**). ASIRs for female melanoma of the skin in Alberta were generally higher than ASIRs in Canada.

It is estimated that 300 cases of melanoma will be diagnosed in females in Alberta in 2017.

**Figure 9-7: Age-Specific Incidence Rates for Melanoma of the Skin* by Sex, Alberta, 2008-2012**




* Excludes basal and squamous skin cancers.

**Data Source**: Alberta Cancer Registry, Alberta Health Services; Alberta Health

Melanoma incidence rates remain low in both males and females until age 20 when rates start to increase (**Figure 9-7**). Female rates are higher than males between the ages of about 25 to 50. At older ages above 50, male rates are higher than female rates.

## Melanoma of the Skin Mortality

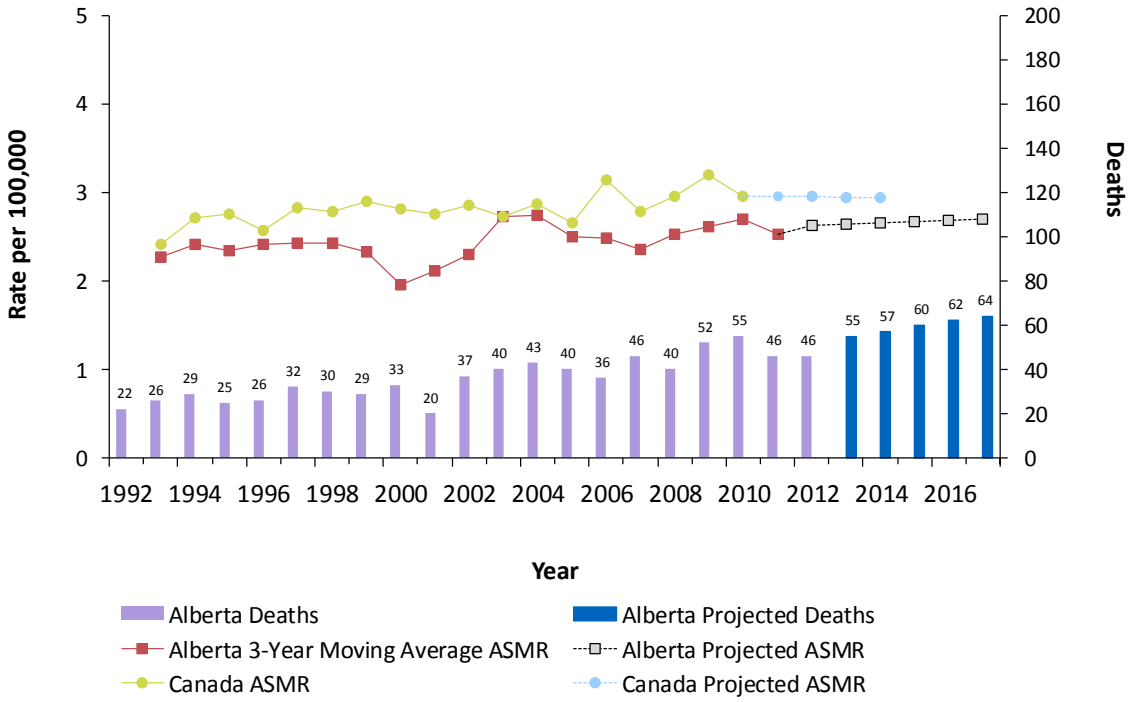
The following three figures (**Figures 9-8** to **9-10**) provide information on melanoma of the skin mortality in Alberta. The number of deaths in Alberta is affected not only by changes in the underlying risk of dying from melanoma, but also by the changes in the age structure and growth of the population. In order to compare trends over time, age-standardized mortality rates (ASMRs) are also provided.

In **Figures 9-8** and **9-9** observed age standardized mortality rates are shown for 1992 to 2011 (three-year moving averages), ***projected*** rates for 2012 to 2017. Similarly, observed numbers of melanoma of the skin deaths are shown for the years 1992 to 2012 and projected numbers for 2013 to 2017.

The projected numbers of cancer deaths were calculated by applying the estimated age-specific cancer mortality rates to the age-specific population figures provided by Alberta Health.[4] These were observed up to 2011 (due to the use of three-year moving averages) and estimated for 2012 to 2017. Caution should be exercised when comparing Canada[5] and Alberta rates as Canadian rates are yearly rates while Alberta rates are three-year moving averages.

The estimated melanoma of the skin mortality rates were calculated by extrapolating the historical trends in age-specific rate based on data from 1987 to 2011.

**Figure 9-8: Actual and Projected Number of Deaths and Age-Standardized Mortality Rates (ASMRs)[*†] for Melanoma of the Skin[‡], Males, Alberta, 1992-2017**



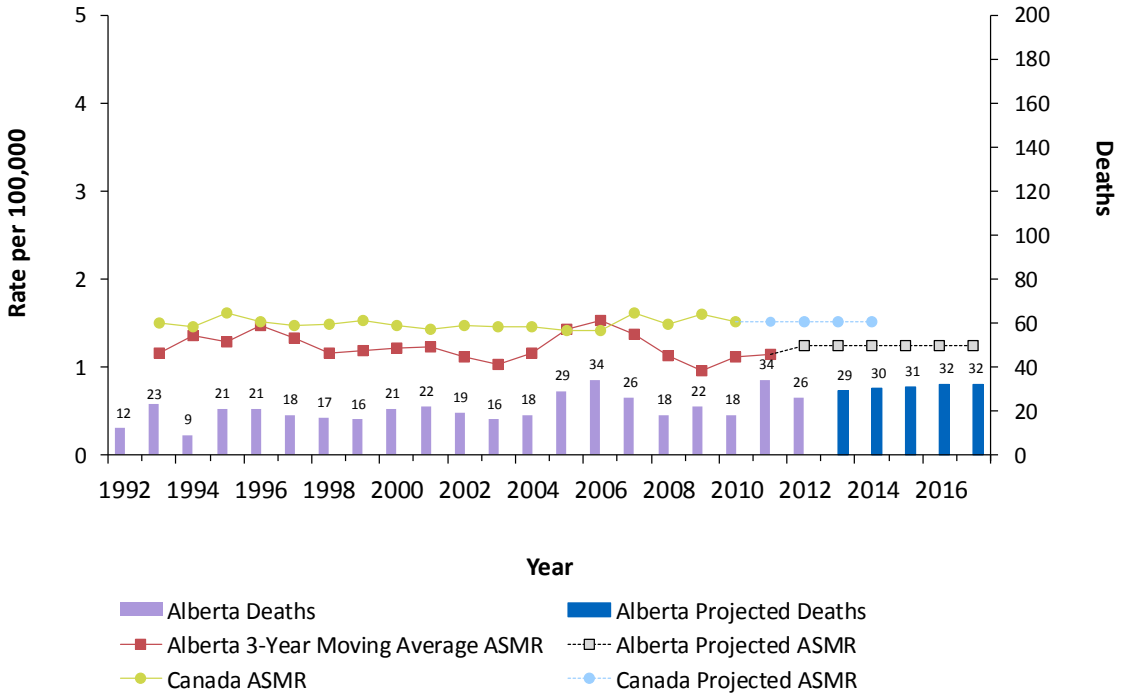

[*] Three-year moving average.
[‡] Standardized to 1991 Canadian population.

**Data Source**: Alberta Cancer Registry, Alberta Health Services; Alberta Health; Canadian Cancer Society

In 2012, 46 males died of melanoma of the skin in Alberta (**Figure 9-8**). ASMRs for male melanoma of the skin in Alberta were generally lower than ASMRs in Canada.

It is estimated that 65 males will die from melanoma in Alberta in 2017.

**Figure 9-9: Actual and Projected Number of Deaths and Age-Standardized Mortality Rates (ASMRs)[*†] for Melanoma of the Skin[‡], Females, Alberta, 1992-2017**



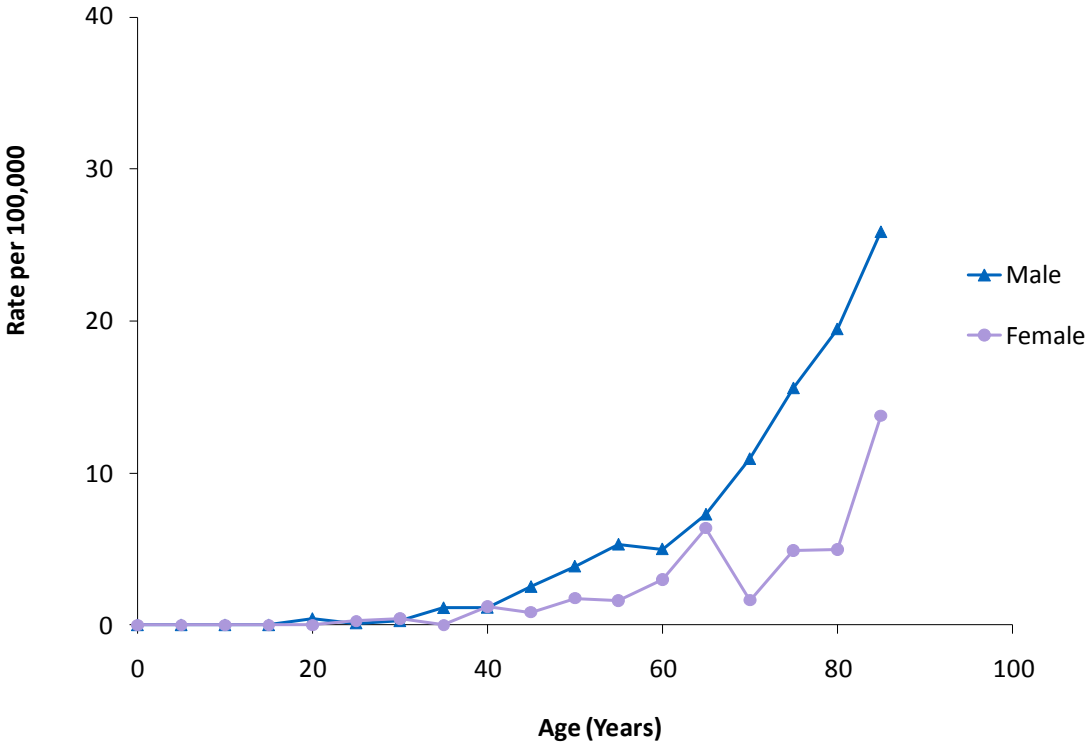

[*] Three-year moving average.
[†] Standardized to 1991 Canadian population.

**Data Source**: Alberta Cancer Registry, Alberta Health Services; Alberta Health; Canadian Cancer Society

In 2012, 26 females died of melanoma of the skin in Alberta (**Figure 9-9**). ASMRs for female melanoma of the skin in Alberta were generally lower than ASMRs in Canada.

It is estimated that 30 females will die from melanoma in Alberta in 2017.

**Figure 9-10: Age-Specific Mortality Rates for Melanoma of the Skin* by Sex, Alberta, 2008-2012**




**Data Source**: Alberta Cancer Registry, Alberta Health Services; Alberta Health

Melanoma mortality rates remain low in both males and females until about age 35, when they begin to increase (**Figure 9-10**). Female rates are lower than male rates after age 40. The highest melanoma mortality rates occur in the older age groups.

## Melanoma of the Skin Survival

Cancer survival ratios indicate the proportion of people who will be alive at a given time after they have been diagnosed with cancer. Survival is an important outcome measure and is used for evaluating the effectiveness of cancer control programs.

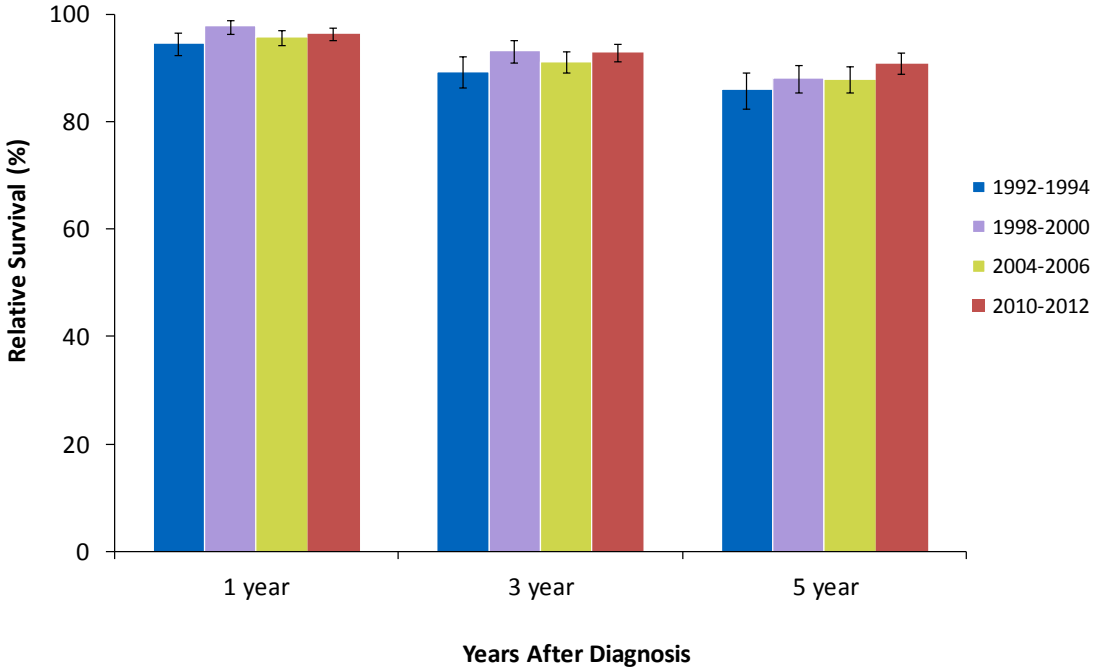
Survival depends on several factors including the cancer type (most importantly site, stage, and morphology at diagnosis), sex, age at diagnosis, health status, and available treatments for that cancer. While ***relative survival ratios*** (RSRs) give a general expectation of survival over the whole province, these ratios may not apply to individual cases. Individual survival outcomes depend on the stage at diagnosis, treatment, and other individual circumstances.

Relative survival ratios are estimated by comparing the survival of cancer patients with that expected in the general population of Albertans of the same age, sex, and in the same calendar year.[6] In this section of the report, RSRs are standardized by the age structure in the standard population (i.e. all persons who were diagnosed with that cancer in Canada between 1992 and 2001) to permit RSRs to be compared over time, independent of differences in age distribution of cancer cases.

RSRs are estimated by the ***cohort method*** [6] when complete follow-up data (e.g., at least five years of follow-up to estimate the five-year rate) after diagnosis are available. For recently diagnosed cases whose complete follow-up data are not available, the up-to-date estimates are computed using the ***period method***.[7] However, comparison between cohort and period RSRs should be interpreted with caution because of the two different methods used to derive the respective ratios.

The relative survival ratio is usually expressed as a percentage (%) and the closer the value is to 100%, the more similar the survival pattern is to the general population.

**Figure 9-11: Age-Standardized One, Three and Five-Year Relative Survival Ratios with 95% Confidence Intervals (CI) for Melanoma of the Skin, Both Sexes, Alberta, 1992-1994^, 1998-2000^ and 2004-2006^, 2010-2012***



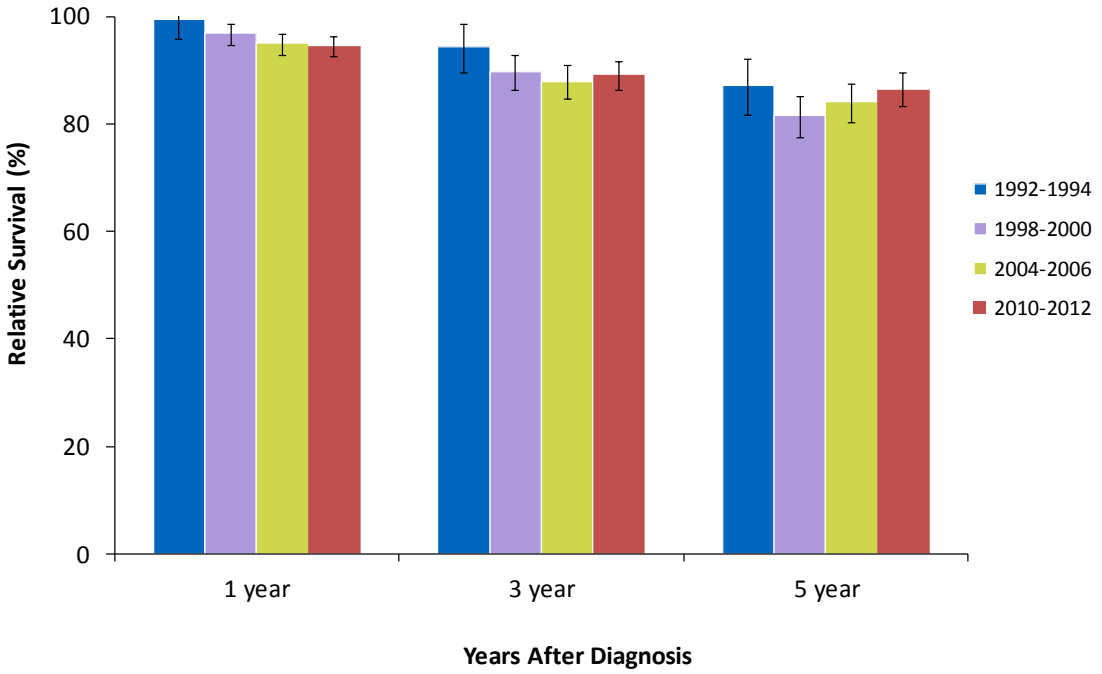

^ Ratios calculated by cohort method, where complete follow-up data are available.
* Ratios calculated by period method, where complete follow-up data are not available.

**Data Source**: Alberta Cancer Registry, Alberta Health Services; Statistics Canada

The five-year relative survival ratio for individuals diagnosed with melanoma of the skin in the period of 2010 to 2012 is estimated to be 91%.

The five-year relative survival ratios for individuals diagnosed with melanoma of the skin is high at over 87% for all time periods. It has been stable between 1992 and 2012 (**Figure 9-11**).

**Figure 9-12: Age-Standardized One, Three and Five-Year Relative Survival Ratios with 95% Confidence Intervals (CI) for Melanoma of the Skin, Males, Alberta, 1992-1994^, 1998-2000^ and 2004-2006^, 2010-2012*†**



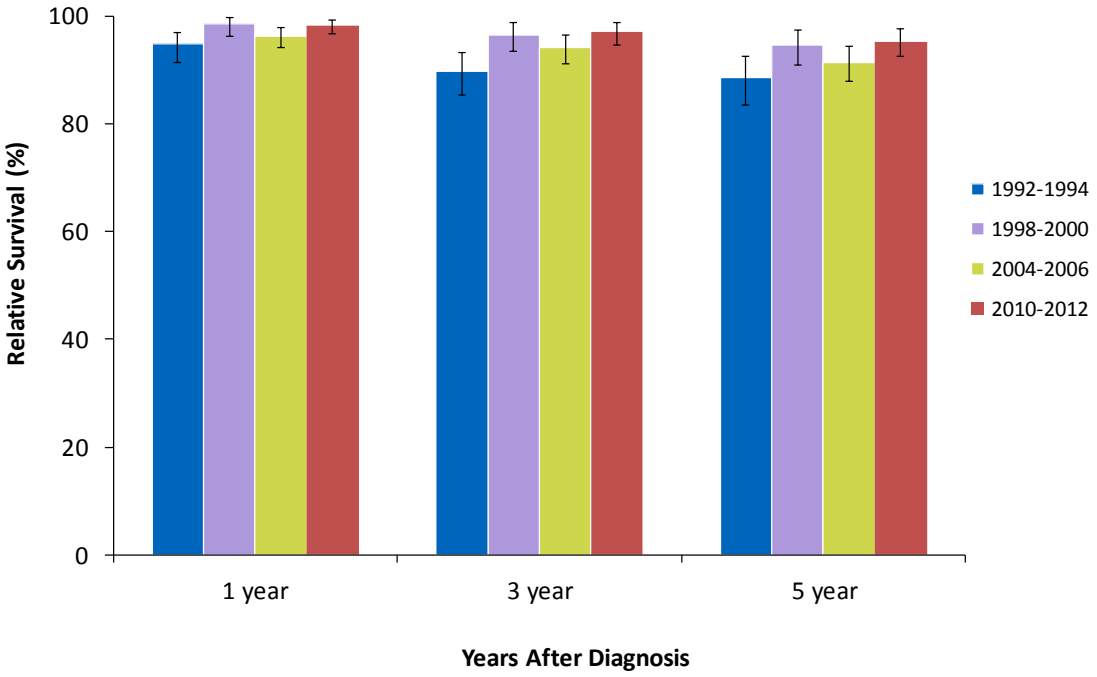

^ Ratios calculated by cohort method, where complete follow-up data are available.
†* Ratios calculated by period method, where complete follow-up data are not available.

**Data Source**: Alberta Cancer Registry, Alberta Health Services; Statistics Canada

The five-year relative survival ratio for males diagnosed with melanoma of the skin in the period of 2010 to 2012 is estimated to be 87%.

The five-year relative survival ratios for individuals diagnosed with melanoma of the skin is high at over 81% for all time periods. It has been stable between 1992 and 2012 (**Figure 9-12**).

**Figure 9-13: Age-Standardized One, Three and Five-Year Relative Survival Ratios with 95% Confidence Intervals (CI) for Melanoma of the Skin, Females, Alberta, 1992-1994^, 1998-2000^ and 2004-2006^, 2010-2012***




^ Ratios calculated by cohort method, where complete follow-up data are available.
* Ratios calculated by period method, where complete follow-up data are not available.

**Data Source**: Alberta Cancer Registry, Alberta Health Services; Statistics Canada

The five-year relative survival ratio for females diagnosed with melanoma of the skin in the period of 2010 to 2012 is estimated to be 95%.

The five-year relative survival ratios for individuals diagnosed with melanoma of the skin is high at over 88% for all time periods. It has been stable between 1992 and 2012 (**Figure 9-13**).

## Further Information

Further information is available on a separate document, the **Appendix**:

**Appendix 1:** Glossary of Terms
**Appendix 2:** Cancer Definitions
**Appendix 3:** Data Notes

## References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## Contact Information

If further information is required, please contact Surveillance & Reporting, C-MORE, Alberta Health Services as follows:


**Mailing Address:**
**Alberta Health Services**
Surveillance & Reporting
C-MORE
1400 - 10123-99 Street
Edmonton, AB, Canada
T5J 3H1

**Phone:** 780-643-4347
**Fax:** 780-643-4380
**Email:** ACB.cancerdata@albertahealthservices.ca