

---

**CANCER INCIDENCE AND MORTALITY  
IN MASSACHUSETTS  
1998-2002:  
STATEWIDE REPORT**

---

---

Center for Health Information, Statistics,  
Research, and Evaluation

Massachusetts Department of Public Health

May 2005

---

**CANCER INCIDENCE AND MORTALITY**  
**IN MASSACHUSETTS**  
**1998-2002:**  
**STATEWIDE REPORT**

---

Mitt Romney, Governor  
Kerry Healey, Lieutenant Governor  
Ronald Preston, Secretary of Health and Human Services  
Paul J. Cote, Jr., Commissioner of Public Health

Alda Rego Weathers, Deputy Commissioner of Public Health  
Gerald F. O'Keefe, Director, Health Information Systems  
Susan T. Gershman, Director, Massachusetts Cancer Registry

Center for Health Information, Statistics, Research, and Evaluation

Massachusetts Department of Public Health

May 2005

## ACKNOWLEDGMENTS

This report was prepared by Susan T. Gershman, Director, Massachusetts Cancer Registry, and Massachusetts Cancer Registry staff and consultants. Special thanks to Helen A. Hawk, Bertina Backus, and Melissa J. Liu for their diligent work in the preparation of this report. Thanks are also given to Laurie MacDougall, M.S. Consultant, Annie MacMillan and the staff of the Massachusetts Cancer Registry for their editing and data processing efforts. Thanks are given to Malena Hood in the Division of Research and Epidemiology and staff in the Registry of Vital Records and Statistics for providing the mortality data.

### Massachusetts Cancer Registry Staff

Susan T. Gershman, M.S., M.P.H., Ph.D., C.T.R., *Director*

Troy C. Arthur, C.T.R., <i>Cancer Registrar</i>	Melissa J. Liu, M.S., <i>Epidemiologist</i>
Bertina Backus, M.P.H., <i>Epidemiologist</i>	Ann MacMillan, M.P.H., <i>Epidemiologist</i>
Donna Barlow, L.P.N., C.T.R., <i>Cancer Registrar</i>	Ruth Maranda, L.P.N., C.T.R., <i>Cancer Registrar</i>
Bruce Caldwell, <i>Research Analyst/Geocoder</i>	Mary Mroszczyk, C.T.R., <i>Geocoding/Special Projects Coordinator</i>
Nancy Donovan, M.A., O.T.R., C.T.R., <i>Cancer Registrar</i>	Sadie Phillips-Scott, <i>Administrative Assistant</i>
Patricia J. Drew, C.T.R., <i>Cancer Registrar</i>	Judith Raymond, C.T.R., <i>Cancer Registrar</i>
Helen A. Hawk, Ph.D., <i>Epidemiologist</i>	David Rousseau, <i>Quality Assurance Supervisor</i>
Loi Huynh, <i>Software Developer</i>	Pamela Shuttle, C.T.R., R.H.I.T., <i>Cancer Registrar</i>
Ben Jackson, <i>Systems Analyst</i>	Hung Tran, <i>Software Developer</i>
Regina Kenney, <i>Data Acquisition Coordinator</i>	Donna J. Vincent, R.H.I.A., <i>Geocoder</i>
Mary Jane King, M.P.H., C.T.R., <i>Data Acquisition Supervisor</i>	

### Massachusetts Cancer Registry Advisory Committee

Nancy Mueller, Sc.D., *Chair*

Suzanne Condon, M.S.	Robert Osteen, M.D.
Frederick Li, M.D.	David Ozonoff, M.D., M.P.H.
Regina Mead	Carol Rowan-West, M.P.H.
J. David Naparstek, Sc.M., C.H.O.	Lawrence Shulman, M.D.
Philip Nasca, Ph.D.	Carol Venuti, C.T.R.
Susan O'Hara, C.T.R.	

The data in this report are intended for public use and may be reproduced without permission. Proper acknowledgment of the source is requested.

For further information, please contact the following:

Massachusetts Cancer Registry .....	(617) 624-5642
Research and Epidemiology .....	(617) 624-5635
Occupational Health Surveillance .....	(617) 624-5626
Center for Environmental Health .....	(617) 624-5757
Cancer Prevention and Control Initiative .....	(617) 624-5070
Massachusetts Department of Public Health website .....	www.mass.gov/dph

We acknowledge the Centers for Disease Control and Prevention for its support of the staff and the printing and distribution of this report under cooperative agreement U55/CCU521937-01 awarded to the Massachusetts Department of Public Health. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the Centers for Disease Control and Prevention.

## TABLE OF CONTENTS

	<u>Page</u>
Executive Summary .....	1
Introduction.....	4
Content .....	5
New in This Report .....	5
Methods .....	7
Data Sources.....	8
Definitions .....	9
Interpreting the Data.....	11
Table A. North American Association of Central Cancer Registries (NAACCR) Certification Results for the Massachusetts Cancer Registry (MCR).....	13
Overview.....	14
Leading Types of Cancer .....	15
Cancer Trends.....	16
Cancer Patterns by Race/Ethnicity .....	17
Massachusetts Compared to the U.S. ....	19
Figures & Tables.....	20
Figure 1. Cancer incidence cases by cancer type and sex, Massachusetts, 1998-2002 .....	21
Figure 2. Cancer mortality cases by cancer type and sex, Massachusetts, 1998-2002.....	21
Figure 3. Incidence rates for ten leading cancer types by sex, Massachusetts, 1998- 2002 .....	22
Figure 4. Mortality rates for ten leading cancer types by sex, Massachusetts, 1998- 2002 .....	23
Table 1. Age-specific incidence rates and median ages for selected cancer sites, Massachusetts, 1998-2002, males.....	24
Table 2. Age-specific incidence rates and median ages for selected cancer sites, Massachusetts, 1998-2002, females.....	25
Table 3. Age-specific incidence rates and median ages for selected cancer sites, Massachusetts, 1998-2002, total .....	26
Figure 5. Estimated annual percent change (EAPC) in age-adjusted cancer rates among males, Massachusetts, 1998-2002 .....	27

Figure 6. Estimated annual percent change (EAPC) in age-adjusted cancer rates among females, Massachusetts, 1998-2002.....	28
Table 4. Annual age-adjusted incidence rates for selected cancer sites, Massachusetts, 1998-2002, males.....	29
Table 5. Annual age-adjusted incidence rates for selected cancer sites, Massachusetts, 1998-2002, females.....	30
Table 6. Annual age-adjusted incidence rates for selected cancer sites, Massachusetts, 1998-2002, total.....	31
Table 7. Annual age-adjusted mortality rates for selected cancer sites, Massachusetts, 1998-2002, males.....	32
Table 8. Annual age-adjusted mortality rates for selected cancer sites, Massachusetts, 1998-2002, females.....	33
Table 9. Annual age-adjusted mortality rates for selected cancer sites, Massachusetts, 1998-2002, total.....	34
Table 10. Five leading cancer incidence rates by race/ethnicity and sex, Massachusetts, 1998-2002.....	35
Table 11. Five leading cancer mortality rates by race/ethnicity and sex, Massachusetts, 1998-2002.....	36
Table 12. Incidence cases and percentage of cases for selected cancer sites by race/ethnicity, Massachusetts, 1998-2002, males.....	37
Table 13. Incidence cases and percentage of cases for selected cancer sites by race/ethnicity, Massachusetts, 1998-2002, females.....	38
Table 14. Incidence cases and percentage of cases for selected cancer sites by race/ethnicity, Massachusetts, 1998-2002, total.....	39
Table 15. Age-adjusted incidence rates and 95% confidence limits (95% CL) for selected cancer sites by race/ethnicity, Massachusetts, 1998-2002, males.....	40
Table 16. Age-adjusted incidence rates and 95% confidence limits (95% CL) for selected cancer sites by race/ethnicity, Massachusetts, 1998-2002, females.....	41
Table 17. Age-adjusted incidence rates and 95% confidence limits (95% CL) for selected cancer sites by race/ethnicity, Massachusetts, 1998-2002, total.....	42
Table 18. Mortality cases and percentage of cases for selected cancer sites by race/ethnicity, Massachusetts, 1998-2002, males.....	43
Table 19. Mortality cases and percentage of cases for selected cancer sites by race/ethnicity, Massachusetts, 1998-2002, females.....	44
Table 20. Mortality cases and percentage of cases for selected cancer sites by race/ethnicity, Massachusetts, 1998-2002, total.....	45
Table 21. Age-adjusted mortality rates and 95% confidence limits (95% CL) for selected cancer sites by race/ethnicity, Massachusetts, 1998-2002, males.....	46

Table 22. Age-adjusted mortality rates and 95% confidence limits (95% CL) for selected cancer sites by race/ethnicity, Massachusetts, 1998-2002, females.....	47
Table 23. Age-adjusted mortality rates and 95% confidence limits (95% CL) for selected cancer sites by race/ethnicity, Massachusetts, 1998-2002, total .....	48
Table 24. Incidence and mortality rates for selected cancer sites by sex, Massachusetts residents, 1998-2002, and NAACCR registries, 1997-2001.....	49
Special Section: Lung Cancer .....	50
Introduction .....	51
Long Term Incidence and Mortality Trends .....	51
Figure 7. Age-adjusted lung cancer incidence and mortality rates for males and females, Massachusetts, 1982-2002.....	51
Age-Specific Incidence Rates by Sex.....	52
Figure 8. Age-specific lung cancer incidence rates for males and females, Massachusetts, 1998-2002 .....	52
Incidence Rates by Race/Ethnicity and Sex .....	53
Figure 9. Average annual age-adjusted lung cancer incidence rates for males and females, Massachusetts, 1998-2002.....	53
Lung Cancer by Histology Groups and Sex.....	54
Lung Cancer by Stage and Sex.....	54
Figure 10. Invasive lung cancer cases distribution by stage and sex, Massachusetts, 1998-2002 .....	55
Probability of Developing or Dying from Lung Cancer.....	55
Table 25. Probability of developing lung cancer by a specific age for males and females, Massachusetts, 1998-2002.....	56
Table 26. Probability of dying of lung cancer by a specific age for males and females, Massachusetts, 1998-2002.....	57
Summary .....	57
Appendices.....	59
Appendix I ICD codes used for this report .....	60
Appendix II Population estimates by age, race/ethnicity and sex, Massachusetts, 1998-2002 .....	63
References .....	64

# **EXECUTIVE SUMMARY**

## EXECUTIVE SUMMARY

*Cancer Incidence and Mortality in Massachusetts, 1998-2002: Statewide Report* presents cancer incidence and mortality data for the Commonwealth from 1998 through 2002. The data include numbers and rates for twenty-three types of cancer, detailed information about the most commonly occurring types of cancer, a discussion of cancer trends, an examination of patterns by race/ethnicity, and a comparison of Massachusetts and national cancer rates. The report provides data only on invasive cancer, except for urinary bladder (which includes *in situ* and invasive cancers combined) and *in situ* breast cancer. This year, the report also includes some new statistics such as median age at diagnosis and confidence intervals for age-adjusted rates. The special section entitled "Lung Cancer" contains more detailed data for cancer of the bronchus and lung, including a twenty-one year trend of incidence and mortality and age conditional probability of developing and dying from lung cancer.

### Highlights from the report

- From 1998 to 2002 there were 171,729 newly diagnosed cases of cancer and 69,298 deaths from cancer among Massachusetts residents. The average annual age-adjusted incidence rate was 522.0 per 100,000 persons, and the average annual age-adjusted mortality rate was 205.6 per 100,000 persons. Overall, cancer incidence and mortality rates in Massachusetts stabilized over the years 1998-2002.
- Prostate cancer was the most common type of newly diagnosed cancer among Massachusetts males. Prostate cancer accounted for 30% of new cancers among males in the state from 1998 to 2002. The average annual age-adjusted incidence rate of prostate cancer was 186.2 per 100,000 males. The annual incidence rate of prostate cancer fluctuated over the years without any statistically significant trend from 1998 to 2002.
- From 1998 to 2002, invasive breast cancer was the most common type of newly diagnosed cancer among Massachusetts females, accounting for approximately 31% of new cancers among females in the state. The average annual age-adjusted incidence rate of breast cancer was 144.8 per 100,000 females. The incidence rate of female invasive breast cancer decreased significantly over the years 1998-2002, by 2.5% annually. Breast cancer *in situ* was included in this report as a separate category. The age-adjusted incidence rate of *in situ* for Massachusetts females was 47.5 per 100,000. The mortality from breast cancer also decreased during this period by 1.5% annually, though not significantly.
- Cancer of the bronchus and lung was the most common cause of cancer deaths among both Massachusetts males and females between 1998 and 2002, accounting for 29% of all deaths among males and about 25% of all deaths among females. During this time period, the mortality rate of cancer of the bronchus and lung in Massachusetts decreased by 1.6% annually for males and increased by 1.5% annually for females. These changes were not statistically significant.
- For all types of cancer combined for 1998-2002, black, non-Hispanics had the highest age-adjusted incidence and mortality rate among Massachusetts males.
- Between 1998 and 2002, cancers of the prostate, bronchus and lung, and colon/rectum were the top three most commonly diagnosed cancers, and cancer of the bronchus and lung was the most common cause of cancer death for all Massachusetts male race/ethnicity groups.
- For all types of cancer combined for 1998-2002, white, non-Hispanics had the highest age-adjusted incidence rate and black, non-Hispanics had the highest age-adjusted mortality rate among Massachusetts females. Cancers of the breast, bronchus and lung, and colon/rectum were the top three most



commonly diagnosed cancers for all Massachusetts female race/ethnicity categories during this time period. Cancer of the bronchus and lung was the most common cause of cancer death among all female race/ethnicities in Massachusetts.

- The age-adjusted incidence rates in Massachusetts were higher than their national counterparts. The Massachusetts male and female incidence rates from 1998-2002 were 620.0 per 100,000 and 459.0 per 100,000, while the rates for the North American Association of Central Cancer Registries (NAACCR) were 566.1 per 100,000 and 420.0 per 100,000, respectively.
- Similarly, the age-adjusted mortality rates in Massachusetts males and females were slightly higher than the age-adjusted mortality rates in the United States. For all cancers sites combined, 258.7 per 100,000 versus 258.3 per 100,000 for males and 174.1 per 100,000 versus 173.9 per 100,000 for females.
- The lung cancer incidence and mortality rates have decreased in males over the past decade, but are still increasing in females. However the annual incidence and mortality rates among females have continued to grow but at a slower rate since the middle of the 90s.

# **INTRODUCTION**

## INTRODUCTION

The Massachusetts Cancer Registry (MCR) collects reports of newly diagnosed cases of cancer and routinely compiles summaries of cancer incidence and mortality data. This report, *Cancer Incidence and Mortality in Massachusetts, 1998-2002: Statewide Report*, is produced annually with statewide data. An electronic version of this report may be found on the Internet at

<http://www.mass.gov/dph/bhsre/mcr/canreg.htm#statewide>. Another report, *Cancer Incidence in Massachusetts: City and Town Supplement*, is also produced annually and contains information for the 351 cities and towns in Massachusetts. The most recent *City and Town Supplement* may be found on the Internet at <http://www.mass.gov/dph/bhsre/mcr/canreg.htm#supplement>.

### Content

This report:

- provides statewide information on cancer incidence and mortality in Massachusetts for twenty-three types of cancer and for all cancers combined for 1998 through 2002, including data by race/ethnicity\*;
- provides detailed information about the most commonly occurring types of cancer for 1998 through 2002, including leading cancers by race/ethnicity;
- reviews Massachusetts cancer incidence and mortality trends for 1998 through 2002;
- compares Massachusetts incidence and mortality data with national incidence and mortality data; and
- provides detailed information about bronchus and lung cancer in Massachusetts;

The report is organized into the following four sections:

- **METHODS** provides a detailed explanation of the data collection, data processing and statistical techniques employed in this report and the limitations to consider when reviewing the data.
- **OVERVIEW** provides an overview of the leading types of cancer incidence and mortality in Massachusetts from 1998 through 2002 and trends in the state during that time period.
- **FIGURES & TABLES** presents cancer incidence and mortality data for twenty-three types of cancer, by sex, for 1998-2002. There are six figures and twenty-four tables in this section with breakdowns such as sex, race/ethnicity, year, age group, state data versus national data, and cancer type.
- **SPECIAL SECTION: LUNG CANCER** provides detailed information about incidence and mortality from lung cancer.
- **APPENDICES** provide information supplemental to this report, including a listing of codes used to prepare the report and population estimates.

*\* The Massachusetts incidence data include only invasive cancers, with the exception of cancer of the urinary bladder, where both in situ and invasive cases are included. Cancer of the breast in situ is presented as a separate category, but is not included in the "all sites combined" data.*

### New in This Report

- A special section with more detailed data for cancer of the bronchus and lung has been added. The section includes long-term incidence and mortality trend analysis, stage and morphology distribution, and lifetime and

age interval risks of being diagnosed and dying from lung cancer.

- The MCR has been collecting information on *in situ* breast cancer cases since 1992. However, this is the first time that the MCR has presented these data in the statewide report. Following the rules of the Surveillance, Epidemiology, and End Results (SEER) program, *in situ* breast cancer data are not included in the totals for all sites combined.
- The North American Association of Central Cancer Registries (NAACCR) algorithm for defining race/ethnicity has been implemented in this report.
- Additional statistics are provided in this report. These include median age at the time of diagnosis for males and females, confidence intervals (limits) for incidence and mortality rates by sex and race/ethnicity, and age-specific rates by types of cancer, sex and five-years age groups.
- The Massachusetts cancer incidence and mortality data are compared with NAACCR data as a national standard. NAACCR registries cover about 55% of the U.S. population including Massachusetts. In the previous years, Massachusetts data were compared to SEER data. The SEER participating registries cover a smaller percentage of the U.S. population (about 14%).

# **METHODS**

## METHODS

### Data Sources

#### *Cancer Incidence*

The MCR collects reports of newly diagnosed cancer cases from all Massachusetts acute care hospitals and one medical practice association (76 reporting facilities in 2002). In the year 2001, the MCR started to collect reports from dermatologists' offices (about 230 offices) and dermatopathology laboratories (2 laboratories), particularly on cases of melanoma. In the year 2002, the MCR started to collect reports from urologists' offices and a general laboratory. Currently, the MCR collects information on *in situ* and invasive cancers and benign tumors of the brain and associated tissues. The MCR does not collect information on basal and squamous cell carcinomas of the skin.

The MCR also collects information from reporting hospitals on cases diagnosed and treated in staff physician offices when this information is available. Not all hospitals report this type of case, however, and some hospitals report such cases as if the patients had been diagnosed and treated by the hospital directly. Collecting this type of data makes the MCR's overall case ascertainment more complete. The cancer types most often reported to the MCR in this manner are prostate cancer and melanoma.

In addition, the MCR identifies previously unreported cancer cases through death certificate clearance to further improve case completeness. This process identifies cancers mentioned on death certificates that were not previously reported to the MCR. In some instances, the MCR obtains additional information on these cases through follow-up activities with hospitals, nursing homes and physicians' offices. In other instances, a cancer-related cause of death recorded on a Massachusetts death certificate is the only source of information for a cancer case. These "death certificate only" cancer diagnoses are, therefore, poorly documented, and have not been confirmed by review of complete clinical information. Such cases are included in this

report, but they comprise less than 3% of all cancer cases.

Case reports from 1998 to 2000 were coded following the International Classification of Diseases for Oncology, Second Edition (ICD-O-2) system (1). The International Classification of Diseases for Oncology, Third Edition (ICD-O-3) was implemented in North America with cases diagnosed as of January 1, 2001 (2). For comparability of the data, all cancer cases diagnosed prior to January 1, 2001, coded in ICD-O-2, were converted to ICD-O-3 following the SEER rules of conversion (3).

Each year, the North American Association of Central Cancer Registries (NAACCR) reviews cancer registry data for quality, completeness, and timeliness. The NAACCR certification results for the MCR for diagnosis years 1998-2001 are presented in Table A. For 1998-2001, the MCR's annual case count was estimated by NAACCR to be more than 95% complete each year. The MCR achieved the gold standard for this certification element as well as in six other certification elements for each year from 1998-2001. Certification results for the year 2002 have not yet been released.

The Massachusetts cancer cases presented in this report are primary cases of cancer diagnosed among Massachusetts residents during 1998-2002 and reported to the MCR as of October 27, 2004. These data include late reported cases that were not included in the previous report. Cancer site/types were grouped according to coding definitions adapted from the National Cancer Institute (NCI)'s Surveillance, Epidemiology, and End Results (SEER) program (Appendix I). Most of the Massachusetts data presented are invasive cancers, with the exception of urinary bladder and breast cancer. Both *in situ* and invasive cancers are presented for these sites. Invasive cancers have spread beyond the layer of cells where they started and have the potential to spread to other parts of the body. *In situ* cancers are neoplasms diagnosed at the earliest stage, before they have spread, when they are limited to a small number of cells and have not invaded the organ itself. Typically, published incidence rates do not combine invasive and *in situ* cancers due to

differences in the biologic significance, survival prognosis and types of treatment of the tumors. The breast *in situ* data are presented separately from the breast invasive data and are not added into the totals for all cancer sites combined. Due to the specific nature of the diagnostic technique and treatment patterns, *in situ* and invasive cancer of the urinary bladder are combined and *in situ* urinary bladder is added into the totals for all cancer sites combined.

The national incidence data are from NAACCR. The NAACCR incidence rates include data from 28 states and 5 metropolitan areas and cover 55% of the United States population including Massachusetts (4). At the time of publication, 2001 was the latest diagnosis year from NAACCR available for public use. As a result, the NAACCR incidence rates cover the time period 1997-2001.

### ***Cancer Mortality***

The Massachusetts death data were obtained from the Massachusetts Registry of Vital Records and Statistics, which has legal responsibility for collecting reports of deaths in this state. Death reports from 1998 were coded using the International Classification of Diseases, Ninth Revision (ICD-9) (5). Death reports from 1999 to 2002 were coded using the International Classification of Diseases, Tenth Revision (ICD-10) (6). The cancer site/type groups for deaths in this report were based on cancer site/type grouping from the SEER program (Appendix I).

The U.S. mortality data presented here are from NAACCR, and use data from the National Center for Health Statistics (4). At the time of publication, 2001 was the latest year for which mortality data were available. As a result, the U.S. mortality rates cover the time period 1997-2001.

The cancer mortality data published in this report may differ slightly from the cancer mortality data published in *Massachusetts Deaths*, the annual Massachusetts Department of Public Health mortality surveillance publication. To help make comparisons between deaths coded with ICD-9 and ICD-10, the National Center for Health Statistics (NCHS) has developed preliminary comparability ratios for leading causes of death.

These comparability ratios are multipliers that adjust for changes in coding between the two revisions of ICD (7). *Massachusetts Deaths* uses comparability-modified rates consistent with the NCHS. Massachusetts mortality data in this publication were *not* adjusted with the comparability ratios, following the SEER/NAACCR rules for cancer mortality site/type codification.

### **Definitions**

#### ***Population Estimates***

All of the population data were obtained from the Massachusetts Department of Public Health (MDPH) using the Massachusetts Community Health Information Profile (MassCHIP) demographic/census files. The 1998 data are based on estimates from the Massachusetts Institute for Social and Economic Research (MISER). The 1999 data are based on a linear interpolation between the 1998 MISER population estimates and MDPH 2000 population estimates. The 2000-2002 data are based on the Massachusetts Census file abstracted from the *Census 2000 SF1* file. Census data were reallocated to create mutually exclusive race categories consistent with the race categories used to collect cancer incidence and cancer mortality data. The population data used in this report are presented in Appendix II.

#### ***Race/Ethnicity***

The MCR uses an algorithm developed by NAACCR called the NAACCR Hispanic Identification Algorithm (NHIA) to help classify Hispanic ethnicity. The algorithm is only applied to cases with an unknown Spanish/Hispanic origin or cases that have been classified as Hispanic based on a Spanish surname only. The algorithm uses last name, maiden name, birthplace, race, and sex to determine the ethnicity of these cases.

The race/ethnicity categories presented in this report are mutually exclusive. Cases and deaths are only included in one race/ethnicity category. The race/ethnicity tables include the categories white, non-Hispanic; black, non-Hispanic; Asian, non-Hispanic; and Hispanic. The total population

in Massachusetts also includes unknown races/ethnicities and American Indians. As a result, the number of cases for the total population is not the sum of cases by race/ethnicity.

### ***Statistical Terms***

- *Age-Specific Rates* – age-specific rates were calculated by dividing the number of people in an age group who were diagnosed with cancer or died of cancer in a given time frame by the number of people in that same age group overall in a given time frame. They are presented as rates per 100,000 residents and are site- and sex- specific.
- *Age-Adjusted Rates* – an age-adjusted incidence or mortality rate is a weighted average of the age-specific rates, where the weights are the proportions of persons in the corresponding age groups of a standard 100,000 population. The potential confounding effect of age is reduced when comparing age-adjusted rates for different age-structured populations. The 2000 U.S. Bureau of the Census population distribution was used as a standard. Rates were age-adjusted using 18 five-year age groups. Age-adjusted rates can only be compared if they are adjusted to the same standard population. It is also important to note that differences in methodologies used in calculating rates, such as number of age groups used, may cause slight variations in results.
- *Confidence Intervals or Confidence Limits (CL)* - the confidence interval is a range of values determined by the degree of variability of the data within which the true value should lie. The 95% confidence interval presented in this report means that 95 times out of 100, this range of values will contain the true one. The confidence interval indicates the precision of the rate calculation; the wider the interval the less certain the rate. Statistically, the width of the interval reflects the size of the population and the number of events; smaller populations and smaller number of cases yield less precise estimates that have wider confidence intervals. Confidence intervals were used in

the report as a *conservative* statistical test to estimate the difference between the age - adjusted incidence or mortality rates with the probability of error 5% or less (**p<=0.05**). Rates and confidence intervals were not calculated when there were fewer than twenty cases. As shown at the New York State Department of Health information about age adjusted rates, 95% confidence intervals and unstable rates (8), when the number of cases is below twenty, the statistical error of the rate calculation increases dramatically and becomes comparable to the rate value.

- *Estimated Annual Percent Change (EAPC)* – the EAPC is a statistical method for trend analysis. It shows how fast or slow a cancer rate has increased or decreased over the observed period of time. This estimation assumes that the change in incidence or mortality rates is constant during the observed time period. The EAPC for a short time period (1998-2002 for this report) was calculated using the SEER methods. The  $EAPC = 100 * (e^m - 1)$ , where  $m$  is a slope of the linear regression line which is an approximation of the function of the natural logarithm of the rates by the year of diagnosis (9). A positive EAPC corresponds to an increasing trend, while a negative EAPC corresponds to a decreasing trend. All of the EAPCs calculated in this report were statistically tested (**p<=0.05**) against the hypothesis that they are equal to zero (the rate is neither increasing nor decreasing).
- *Joinpoint Regression Analysis of Cancer Trends* - the EAPC is a linear approximation; therefore it may not give an accurate picture of long-term trend. SEER provides software to calculate the number and location (in time) of points where trends change direction (joinpoints). At each joinpoint, the trend may change in different ways. The joinpoint regression model describes the trend as a sequence of linear segments between corresponding joinpoints, so that each segment has an associated EAPC positive trend, negative trend or no trend (10).



- *Probability of Being Diagnosed With or Dying From Cancer* – these probabilities were calculated using the DevCan Software developed by SEER (11). The results are presented as tables showing the probability (in percentage) of a person at a specified 5-year age group and sex being diagnosed with cancer within the next 10, 20, 30 years or within their remaining lifetime. The lifetime was restricted to the age 85 in this analysis.
- *Median Age at Diagnosis* – represents the point (in age) where half of cancer cases occurred below this age and half of cases occurred after this age.

### **Interpreting the Data**

In interpreting cancer incidence and mortality data in this report, it is important to consider the following:

#### ***Border Areas and Neighboring States***

Some areas of Massachusetts appear to have low cancer incidence, but this may be due to loss of cases in Massachusetts residents who were diagnosed in neighboring states and not reported to the MCR. Presently the MCR has reciprocal reporting agreements with the following fifteen states: Alaska, Arkansas, Connecticut, Florida, Maine, Mississippi, New Hampshire, New York, North Carolina, Rhode Island, South Carolina, Texas, Vermont, Wisconsin and Wyoming.

#### ***Cases Diagnosed in Non-Hospital Settings***

During the time period covered by this report, the MCR's information sources for most newly diagnosed cases of cancer were hospitals. In addition, the MCR collected information from reporting hospitals on cases diagnosed and treated in staff physician offices, when this information was available. In 2001, dermatologists and dermatopathology laboratories were added as reporting sources. The addition of new reporting sources may elevate the incidence of melanoma

diagnosed in the year 2001 and 2002. In 2002, urologist offices and a general laboratory were added as reporting sources. Some types of cancer in this report may be under-reported because they are diagnosed primarily by private physicians, private laboratories, health maintenance organizations or radiotherapy centers that escape the case identification systems used by hospitals. The extent of this under-reporting has not been determined exactly, but cases included in this report represent the great majority of cases statewide and provide an essential basis for evaluating statewide cancer incidence patterns.

#### ***Definition of Cancer Sites***

*Note: including in situ cases in urinary bladder cancer incidence has elevated both the number of cases and rates for this site and for all sites combined compared to reports prior to 1997-2001.*

The implementation of ICD-O-3 coding in 2001, and corresponding cancer site recodes, has changed the incidence of some types of tumors, especially ovarian cancer, leukemias, and lymphomas. These changes may affect annual site-specific incidence, causing a drop or spike in 2001-2002 rates, as well as the incidence of all sites combined and average annual incidence rates. Therefore, caution should be exercised when comparing rates in 2001-2002 with those for previous years, as well as when comparing this report with previous ones.

#### ***Trends***

Trend data should be interpreted with caution. Apparent increases or decreases in cancer incidence over time may reflect changes in diagnostic methods or case reporting rather than true changes in cancer occurrence. Also, cancer incidence trends may appear more favorable than they actually are because they have not been adjusted for reporting error or delay (12). Typically, statewide Massachusetts cancer incidence data are released about two years after a diagnosis year; for example, data for 2001 diagnoses are released for the first time in 2004.

The MCR continues to receive case reports on an ongoing basis even after the data are released. The delayed case reports, as well as corrections to cases based on subsequent details from the reporting facilities, result in reporting delay and error; the more recent diagnosis years may be less complete than the earlier diagnosis years. Finally, the following should be considered when interpreting trend data:

- The source of the population estimates differs between 1998 and 1999-2002.
- The EAPC assumes that the change in rate is the same over the entire time period examined, which may or may not be true for the trends examined in this report.
- If the percent difference in rates between year 2002 and year 1998 is small, the statistical significance of the EAPC may have no practical importance.

### ***Race/Ethnicity***

Race/ethnicity data for cancer cases are based on information in the medical record. Race/ethnicity data for cancer deaths are based on information from death certificates as reported by next-of-kin and funeral directors. Errors in these source documents may lead to incorrect classification of race/ethnicity. Also, completeness of the race/ethnicity data may be different for cancer cases and cancer deaths. Some race/ethnicity categories may be under-reported if race/ethnicity is not available for all cases. Counts and rates may under-represent the true incidence of cancer in some racial/ethnic populations. The NAACCR Hispanic Identification Algorithm (NHIA) has been implemented in this report to help classify Hispanic ethnicity.

**Table A.**  
**North American Association of Central Cancer Registries (NAACCR) Certification Results**  
**for the Massachusetts Cancer Registry (MCR)**

Registry Element	Gold Standard	Silver Standard	MCR Results By Year				Standard Achieved
			1998	1999	2000	2001	
Completeness of case ascertainment*	95%	90%	>95%	>95%	>95%	>95%	Gold
Unknown "age at diagnosis"	≤2%	≤3%	0.0%	0.0%	0.0%	0.0%	Gold
Unknown "sex"	≤2%	≤3%	0.0%	0.0%	0.0%	0.0%	Gold
Unknown "race"	≤3%	≤5%	1.5%	2.0%	2.7%	1.9%	Gold
Death certificate only cases†	≤3%	≤5%	2.2%	2.5%	1.9%	1.7%	Gold
Duplicate primary cases	≤0.1%	≤0.2%	0.08%	0.08%	0.03%	0.04%	Gold
Timeliness	Data submitted within 24 months of close of calendar year.						Gold

\* Completeness of case ascertainment was estimated by methods from the NAACCR.

† Death certificate only cases are cases that are identified through the death certificate clearance process and only have information from a death certificate.

# **OVERVIEW**

## OVERVIEW

In Massachusetts, from 1998 through 2002, there were 171,729<sup>1</sup> newly diagnosed cases of cancer – 86,597 in males and 85,117 in females. For all types of cancer combined for 1998-2002, the average annual age-adjusted incidence rate among males was 620.0 cases per 100,000. For all types of cancer combined for 1998-2002, the average annual age-adjusted incidence rate among females was 459.0 cases per 100,000.

### Leading Types of Cancer

#### *New Cancer Cases and Deaths by Sex*

The most commonly diagnosed type of cancer in Massachusetts males from 1998-2002 was prostate cancer, followed by cancers of the bronchus and lung, colon/rectum and urinary bladder. These four cancer types comprise about 64% of newly diagnosed cases.

Among Massachusetts females, the most commonly diagnosed cancer types were cancers of the breast, bronchus and lung, colon/rectum, and corpus uteri (uterus), representing about 62% of new cancer cases.

Cancers of prostate and breast remained the leading cancer types for males and females, comprising 30.2% and 30.5% of all incident cases, respectively (Figure 1).

Although prostate cancer and breast cancer were the most commonly diagnosed cancers in Massachusetts males and females respectively, these cancers ranked second in mortality for each sex. Cancer of the bronchus and lung was the leading cause of cancer death for both males and females between 1998 and 2002. During this time period, cancer of the bronchus and lung accounted

for 28.9% of all cancer deaths in males and 24.5% of all cancer deaths in females.

The third and fourth most common causes of cancer death in Massachusetts males and females for 1998-2002 were cancers of the colon/rectum and pancreas. In both sexes, the four leading types of cancer comprised approximately 56% of all cancer deaths for this time period (Figure 2).

#### *Incidence and Mortality Age-adjusted Rates by Sex*

The age-adjusted incidence rates were the highest for prostate (186.2 per 100,000 males) and breast (144.8 per 100,000 females) cancer. Lung and colon/rectum cancer incidence rates ranked second and third for males and females. Urinary bladder and non-Hodgkin lymphoma ranked fourth and fifth, respectively, for males, and corpus uteri and melanoma ranked fourth and fifth for females (Figure 3).

From 1998 to 2002, lung cancer was the leading cause of cancer deaths. The age-adjusted mortality rate was 73.1 per 100,000 for males and 44.1 per 100,000 for females. Mortality rates for prostate and breast cancers were 31.1 per 100,000 and 27.4 per 100,000 for males and females, respectively. Cancer of the colon/rectum was the third leading cause of cancer deaths for both men and women, and pancreatic cancer was fourth. The fifth leading cause of cancer deaths in men was non-Hodgkin lymphoma, and ovarian cancer ranked fifth among women (Figure 4).

#### *Cancer Incidence by Age and Sex*

The likelihood of being diagnosed with cancer increased steadily with age. Thus, the age-specific incidence rate for all sites combined for males rose from 21 per 100,000 in the age group 0-4 to 3,449 per 100,000 in the age group 80-84 (Table 1). For females, the age-specific rate for all sites combined increased from 22.3 for ages 0-4 to 2,151 for ages 80-84 (Table 2). The cancer incidence rate for people aged 85 and above declined for both males and females (Tables 1, 2 and 3).

---

<sup>1</sup> The male and female case counts will not add up to the total case count because the MCR added two additional gender classifications (transsexuals and persons with sex chromosome abnormalities/hermaphrodites) for cases diagnosed as of January 1, 1995. Cases diagnosed before this date were limited to male or female only.

The median age of diagnosis with any type of cancer in the period 1998-2002 is 68 years for both males and females. For most of the cancer types presented in this report, the median age at diagnosis was over age 60 for males, females and both sexes combined (Tables 1, 2 and 3). The following cancers were diagnosed at a younger median age: female breast *in situ* (median age - 57), Hodgkin lymphoma for both sexes (median age - 38), testis (median age - 34) and thyroid for both sexes (median age - 45).

## Cancer Trends

### *Incidence*

From 1998 to 2002, overall cancer incidence in Massachusetts remained almost unchanged. Though cancer rates fluctuated by year, the average annual percentage change in incidence rates did not exceed 0.6% for both males and females. Incidence trends in the leading cancers affecting Massachusetts males and females are discussed below. See Figures 5 and 6 for incidence trends and Tables 4, 5 and 6 for annual age-adjusted incidence rates over the years 1998-2002.

All the data describing percent increases and decreases per year are based upon the estimated annual percent change (EAPC). Additional new sources of data collection, such as dermatologists' offices and dermatopathology laboratories, the inclusion of *in situ* cases in incidence of urinary bladder, and the implementation of the ICD-O-3 coding system in 2001 may affect the EAPC for melanoma, urinary bladder, leukemias, lymphomas, ovarian cancer and all sites combined and may not reflect true change in incidence.

### Males

Among Massachusetts males between 1998 and 2002, the incidence rate of prostate cancer increased by 0.5% per year (Figure 5). The 1998 incidence rate of prostate cancer was 180.8 cases per 100,000 males, and increased to 182.3 cases per 100,000 males in 2002 (Table 4). However, there was an overall decrease in prostate cancer from its peak incidence of 217.4 per 100,000 in 1992. The national increase in prostate cancer

incidence during the late 1980s and early 1990s is attributed to changes in diagnostic methodology and increased prostate-specific antigen (PSA) screening (14).

The age-adjusted incidence rate declined by 1.9% per year (Figure 5) for cancer of the bronchus and lung, the second most commonly diagnosed cancer in males, though the decrease was not statistically significant. The incidence rate for cancer of the bronchus and lung fell from 98.1 cases per 100,000 males in 1998 to 90.1 cases per 100,000 in 2002 (Table 4). The decline is consistent with national data (13). A more detailed analysis of lung cancer incidence is presented in this report in the section entitled "Lung Cancer".

The incidence rate of colorectal cancer decreased from 76.7 cases per 100,000 males in 1998 to 72.5 cases per 100,000 in 2002. The estimated annual percent decrease was slight (0.7%) and not statistically significant (Figure 5). The national data show that colorectal incidence rates stabilized beginning in 1996 for both sexes (15).

The incidence data for cancer of the urinary bladder include both *in situ* and invasive tumors. Incidence rates fluctuated over the years 1998-2002 with an average annual increase of 0.8%. In 1998, 48.2 males per 100,000 were diagnosed with cancer of the urinary bladder; by 2002, the incidence rate was 49.6 per 100,000 (Table 4).

Incidence rates of melanoma and multiple myeloma increased significantly from 1998 to 2002 (Table 4). However, the increase in melanoma may be due to the addition of the new sources of cases, namely dermatologists' offices, while the implementation of the new ICD-O-3 coding system may affect the incidence of multiple myeloma.

### Females

Invasive breast cancer incidence decreased significantly by 2.5% per year over the last five years (Figure 6). The incidence rate decreased from 154.5 cases per 100,000 females in 1998 to 138.4 cases per 100,000 in 2002 (Table 5). Nationally, breast cancer incidence increased 0.4% per year from 1987-2001, which was a

slower rate of increase than before 1987. Rising breast cancer incidence during the 1990s have been attributed to increasing mammography screening (13).

The incidence of cancer of the bronchus and lung increased by 0.8% per year; the increase was small but statistically significant. The rate changed from 60.1 cases per 100,000 females in 1998 to 61.9 cases per 100,000 in 2001 (Table 5). A more detailed analysis of the lung cancer incidence trend is presented in the section entitled “Lung Cancer”.

The rate of colorectal cancer, which is the third most common cancer among Massachusetts females, stabilized over the years 1998 through 2002, which is consistent with the national data between 1996 and 2000 (15). The Massachusetts incidence rate was 51.4 per 100,000 in 1998 and 50.2 per 100,000 in 2002.

The annual rate for uterine cancer, the fourth most common cancer among Massachusetts females, changed little over the years 1998 to 2002, with a non-statistically significant increase (Figure 6).

In addition to the changes mentioned above, there were statistically significant trends from 1998 to 2002 for Hodgkin lymphoma (a decrease of 7.4% per year), and melanoma of the skin (an increase of 12.5% per year). The trend in both types of cancer may be affected by adding new sources of information (melanoma) and implementing the new ICD-O-3 coding system (Hodgkin lymphoma).

### ***Mortality***

Cancer mortality for all sites combined from 1998 to 2002 varied little, decreasing annually by 1% for males and 0.1% for females (Figures 5 and 6). The most recent national data show a decline in mortality rates since 1990 (13). The introduction of ICD-10 revision beginning with 1999 mortality data may affect recent mortality trends (6, 7).

### **Males**

Mortality from bronchus and lung, prostate, and colon/rectum cancers decreased for males over the

years 1998-2002 but the decreases were not statistically significant. Mortality rates increased significantly (6% annually) for multiple myeloma in males (Figure 5).

### **Females**

For females, the bronchus and lung cancer mortality rate increased by 1.5% annually, while breast cancer mortality decreased by 1.5%. Neither of these changes were statistically significant, however. The colon/rectum cancer mortality rate declined for females by 1.6% per year. There was an increase in cancers of the reproductive organs. From 1998-2002, corpus uteri & uterus cancer death rates increased significantly by 3.9% per year, and ovarian cancer deaths rates increased significantly by 5.1% per year. Urinary bladder cancer death rates also increased significantly, by 7.4% per year (Figure 6).

*It is important to note that, the mortality rates for most cancers with significant increases or decreases are low (Tables 7 and 8). A trend based on a small number of deaths may not be stable over a longer period. As a result, the statistical significance of EAPC for these sites may have no practical importance.*

## **Cancer Patterns by Race/Ethnicity**

### ***Leading Types of Cancer***

Among males, the top three most commonly diagnosed cancers were the same for all races combined and for each male race/ethnicity category. These top three cancers were prostate cancer, followed by cancers of the bronchus and lung and colon/rectum. The cancer that ranked fourth for Massachusetts males varied by race/ethnicity. The fourth most commonly diagnosed cancer was cancer of the urinary bladder for white, non-Hispanic males, stomach cancer for black, non-Hispanic males, cancer of the liver and intrahepatic bile ducts for Asian, non-Hispanic males, and cancer of the urinary bladder for Hispanic males (Table 10).

Among females, breast cancer was the most commonly diagnosed cancer for all races combined and for each female race/ethnicity category. Cancer of the bronchus and lung was the second leading cancer for white, non-Hispanic and black, non-Hispanic females, but the third leading cancer for Asian, non-Hispanic and Hispanic females. Cancer of the colon/rectum was the third leading cancer for white, non-Hispanic and black, non-Hispanic females, but the second leading cancer for Asian, non-Hispanic and Hispanic females. Corpus uteri cancer was the fourth leading cancer site for all race/ethnicity groups, except Asian, non-Hispanic females. Thyroid cancer was the fourth most common cancer for Asian, non-Hispanic females. Non-Hodgkin lymphoma was the fifth most frequent cancer in white, non-Hispanic and black, non-Hispanic females. Corpus uteri and cervix uteri were the fifth most commonly diagnosed cancers for Asian, non-Hispanic and Hispanic females (Table 10), respectively.

For Massachusetts males, cancer of the bronchus and lung was the most common cause of cancer death among all race/ethnicities (Table 11). Cancer of the prostate was the second leading cause of cancer death among white, non-Hispanic, black, non-Hispanic, and Hispanic males. Cancer of the liver and intrahepatic bile ducts was the second leading cause of cancer death for Asian, non-Hispanic males. Cancer of the colon/rectum was the third most common cause of cancer death among all race/ethnicity groups.

Cancer of the bronchus and lung, followed by breast cancer and colon/rectum cancer, were the three most common causes of cancer death among all female race/ethnicities. These three leading causes of cancer death were the same for all races combined and for each race/ethnicity group (Table 11).

### ***Cancer Incidence by Race/Ethnicity and Sex***

Tables 12, 13 and 14 present the distribution of cases by cancer type for all races combined, and by race/ethnicity groups for males, females and for all sexes for the period 1998-2002.

Overall, of the total 171,729 newly diagnosed cancer cases, 156,968 new cancer cases occurred among white, non-Hispanics, 5,754 cases occurred in black, non-Hispanics, 1,998 in Asian, non-Hispanics and 3,785 new cases occurred in Hispanics. The remaining 3,224 cases occurred in American Indians or those whose race/ethnicity was unknown.

Age-adjusted rates for all races combined and by race/ethnicity, cancer type and sex are presented in the Tables 15, 16 and 17. The tables include age-adjusted rates surrounded by the 95% confidence intervals or limits (95% CL). See the Introduction of this report for more information about confidence intervals.

From 1998 to 2002, black, non-Hispanic males had the highest incidence rate of all cancer types combined (723.6 per 100,000). This rate was significantly higher than the rates for other race/ethnicity groups ( $p \leq 0.05$ ). Asian, non-Hispanic males had the lowest incidence rate of all sites combined (345.1 per 100,000) ( $p \leq 0.05$ ). Black, non-Hispanic males had the highest rate of prostate cancer (312.7 per 100,000), which was significantly higher than the prostate cancer rates for other race/ethnicity groups and for all races. Nationally, prostate cancer incidence was 62 percent higher in black men than in white men (13). Asian, non-Hispanic men had the highest rate of liver cancer. This cancer ranked fourth for Asian males. The rate was 26.4 per 100,000 versus 8.4 per 100,000 for all races combined (Table 15).

White, non-Hispanic females had the highest incidence rate of all cancer types combined (460.1 per 100,000) among all race/ethnicity groups. Asian, non-Hispanic females had the lowest incidence rate of all sites combined (277.0 per 100,000). The invasive breast and lung cancer incidence rates were the highest for white, non-Hispanic females, 146.7 and 62.2 per 100,000, respectively. The breast cancer *in situ* incidence rate was the highest among white, non-Hispanic females (Table 16).



### ***Cancer Mortality by Race/Ethnicity and Sex***

The number of cancer related deaths, age-adjusted mortality rates, and 95% confidence intervals by cancer type, race/ethnicity and sex are presented in Tables 18 through 23.

Of the 69,298 deaths from cancer between 1998 and 2002, 65,008 occurred among white, non-Hispanics, 2,551 among black, non-Hispanics, 704 among Asian, non-Hispanics and 967 among Hispanics. Overall death rates were the highest in the black, non-Hispanic population, which is consistent with national data. This suggests that black men and women may not have experienced the same benefits from screening and/or treatment as white men and women (13).

For all types of cancer combined for 1998-2002, black, non-Hispanics had the highest age-adjusted mortality rate among males, with 345.3 deaths per 100,000 males. Black, non-Hispanics had a statistically significant higher rate of lung cancer deaths (94.4 per 100,000 males) than all other race/ethnicity groups. Prostate cancer was the second leading cause of death among white, non-Hispanic, black, non-Hispanic, and Hispanic males. Cancer of the liver and intrahepatic bile ducts was the second leading cause of cancer deaths for Asian, non-Hispanic males with a mortality rate of 19.9 per 100,000 (Table 21).

For all types of cancer combined for 1998-2002, black, non-Hispanic females had the highest age-adjusted mortality rate among females with 197.4 deaths per 100,000 females. White, non-Hispanic females had the highest mortality rate of lung cancer, while black, non-Hispanic females had the highest mortality rate of breast cancer among all race/ethnicity groups. The death rate from colon/rectum cancer was the highest in black, non-Hispanic females, 24.4 per 100,000 versus 18.6 per 100,000 for all races combined ( $p \leq 0.05$ ) (Table 22).

### **Massachusetts Incidence and Mortality Compared to the U.S.**

Age-adjusted incidence and mortality rates in Massachusetts are compared to national rates in

Table 24. The national incidence and mortality data are from the North American Association of Central Cancer Registries (NAACCR). It is important to interpret these data cautiously. NAACCR represents about 55% of the U.S. population, including 54.5% of whites, 51.3% of blacks and 67.6% of other race/ethnicity categories. Cancer rates may be affected by differences in the racial/ethnic composition of the population, the difference in population estimates, the prevalence of cancer risk factors, and cancer screening rates. Cancer rates in Massachusetts and NAACCR areas may differ because of these variations. Also, the Massachusetts incidence and mortality data presented in these tables represent cancer cases and deaths from 1998-2002. The NAACCR incidence and the United States mortality data represent cancer cases and deaths from 1997-2001 (the latest available data from NAACCR).

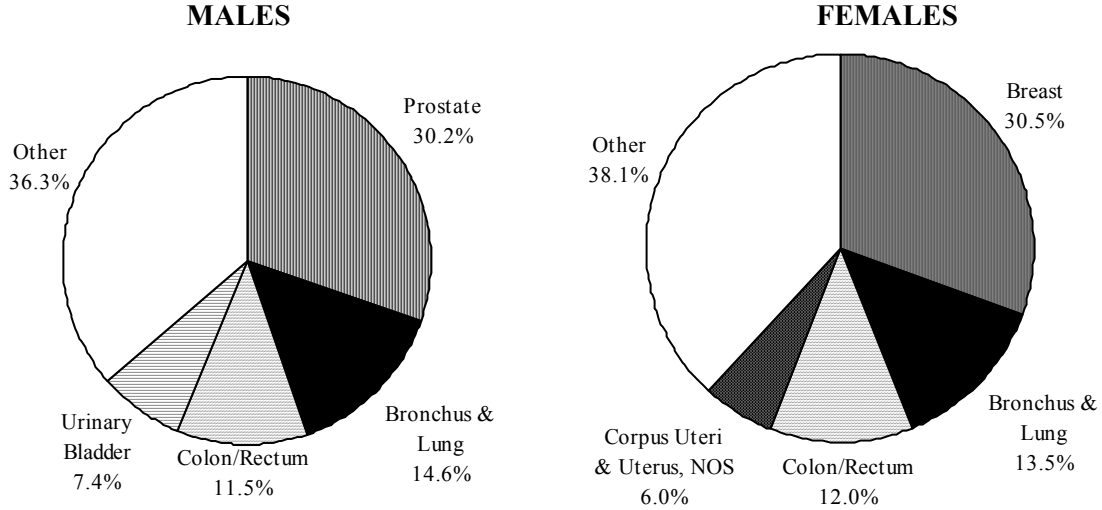
For all cancer sites combined and for both sexes, the age-adjusted incidence rates were higher in Massachusetts than the NAACCR areas. The incidence rates in Massachusetts were slightly higher than the incidence rates in the NAACCR areas for leading cancers: female bronchus and lung, colon/rectum, female breast, prostate and uterine cancer. Female breast *in situ* cancer incidence was higher in Massachusetts than in NAACCR registries (47.5 versus 27.9 per 100,000 females). The incidence rate of cervical cancer in Massachusetts was lower than the incidence rate in the NAACCR registries (7.1 per 100,000 versus 9.7 per 100,000) (Table 24).

Similarly, the age-adjusted mortality rate in Massachusetts was slightly higher than the age-adjusted mortality rate in the United States for all cancer sites combined, 258.7 per 100,000 versus 251.1 per 100,000 for males, and 174.1 per 100,000 versus 173.9 per 100,000 for females. Massachusetts had a higher mortality rate than the United States for cancer of bronchus and lung among females. Massachusetts mortality rates were lower than the U.S. for some other cancers such as bronchus and lung among males and cervix uteri among females (Table 24).

# **FIGURES & TABLES**

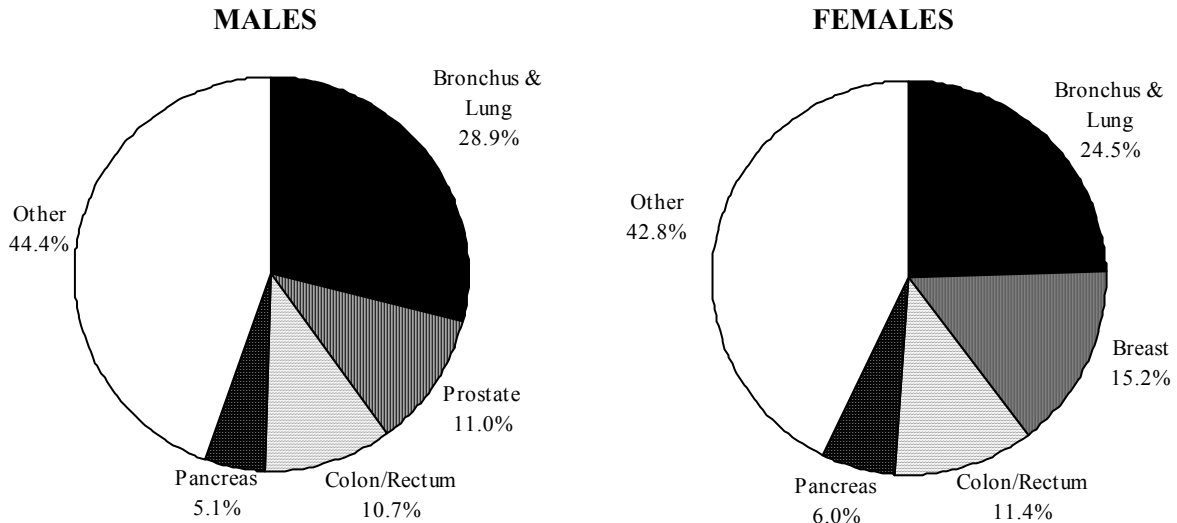
**Figure 1.**  
**CANCER INCIDENCE CASES BY CANCER TYPE AND SEX**

**Massachusetts, 1998-2002**

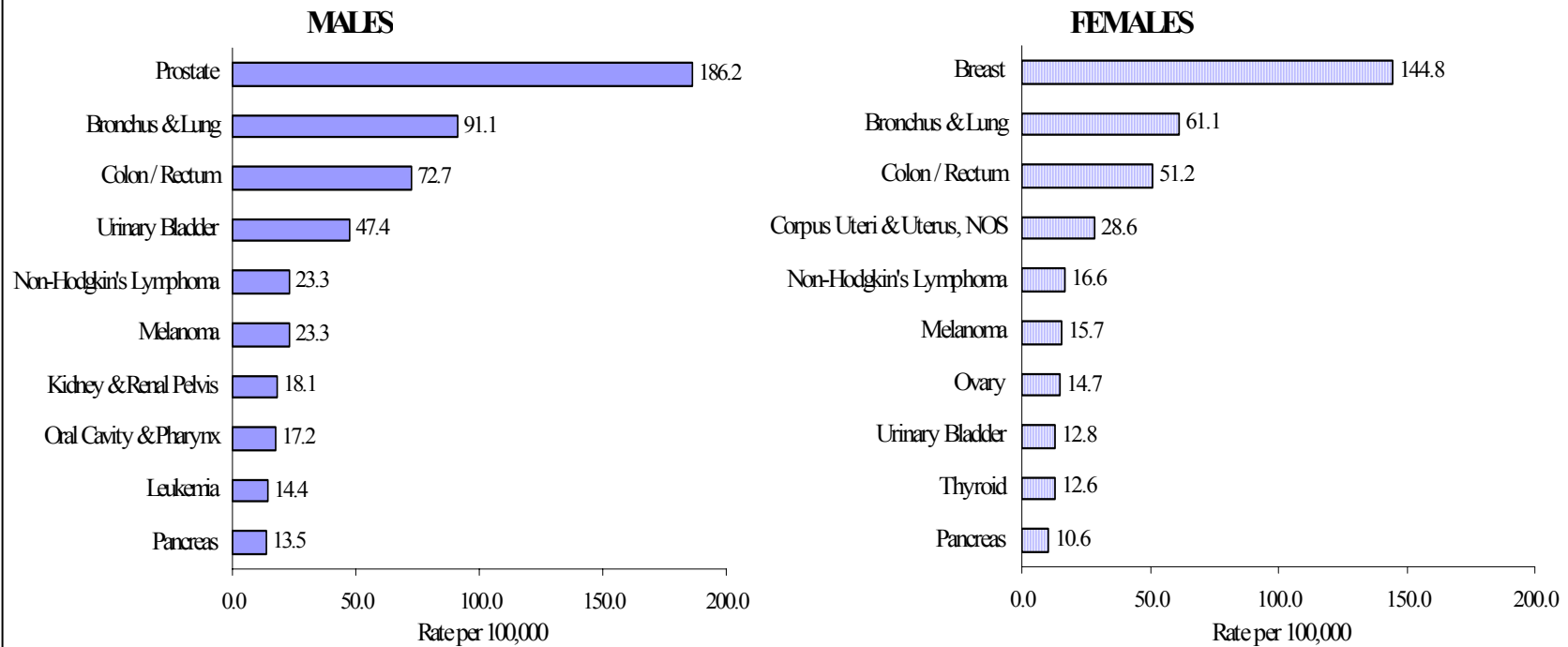


**Figure 2.**  
**CANCER MORTALITY CASES BY CANCER TYPE AND SEX**

**Massachusetts, 1998-2002**



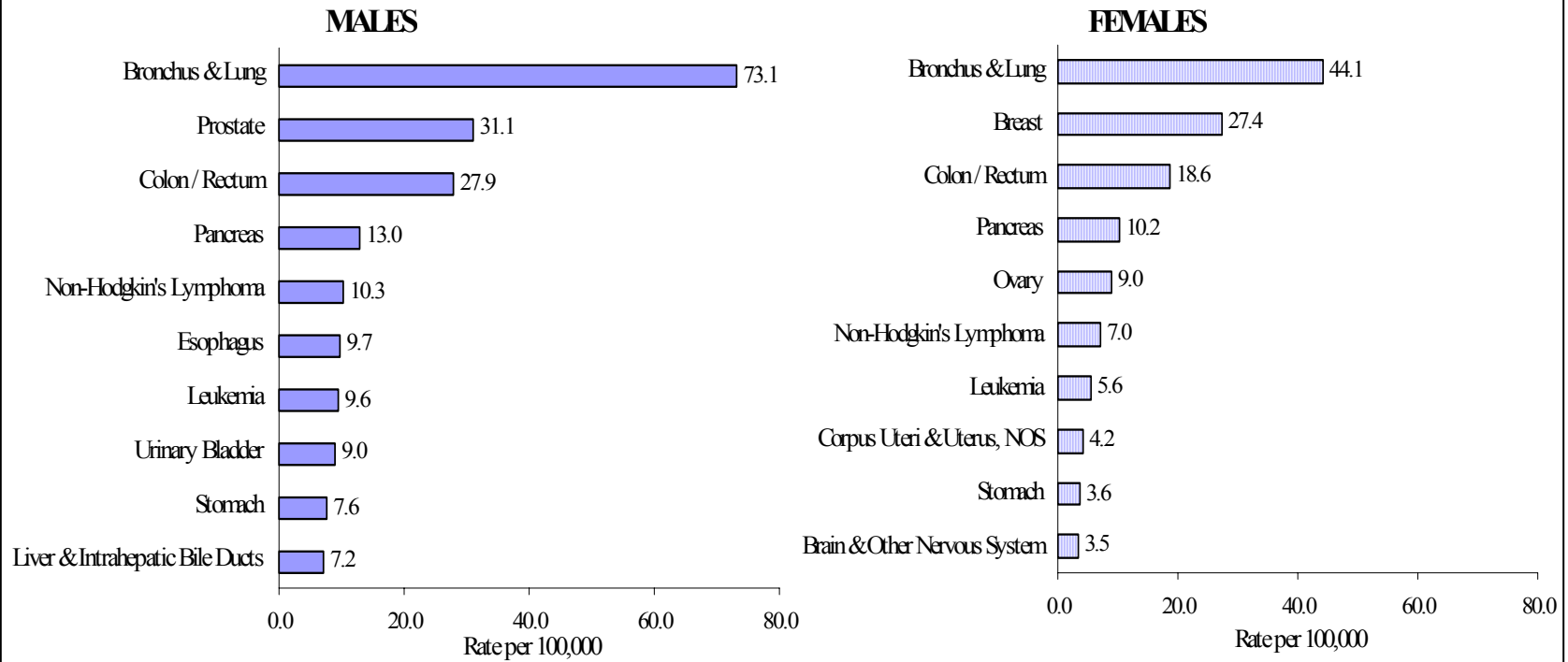
**Figure 3.**  
**INCIDENCE RATES<sup>1</sup> FOR TEN LEADING CANCER TYPES BY SEX**  
**Massachusetts, 1998-2002**



<sup>1</sup> Rates are age-adjusted to the 2000 U.S. Standard Population

**Figure 4.**  
**MORTALITY RATES<sup>1</sup> FOR TEN LEADING CANCER TYPES BY SEX**

**Massachusetts, 1998-2002**



<sup>1</sup> Rates are age- adjusted to the 2000 U.S. Standard Population

**Table 1.**  
**AGE-SPECIFIC INCIDENCE RATES<sup>1</sup> AND MEDIAN AGES FOR SELECTED CANCER SITES**  
**Massachusetts, 1998-2002**  
**MALES**

Cancer Site/Type	Age Groups																		Median
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+	Age
All Sites	21.1	11.6	13.5	21.8	35.9	51.8	72.6	96.3	161.4	303.6	612.2	1159.9	1849.6	2564.3	3170.6	3465.5	3448.8	3310.3	68
Brain & Other Nervous System	3.6	3.8	3.6	2.7	2.5	3.5	3.8	5.0	6.0	7.4	9.8	16.9	20.1	25.6	26.5	32.5	29.2	23.8	58
Breast	- <sup>3</sup>	-	-	-	-	0.1	0.2	0.3	0.7	1.1	1.6	2.5	2.7	7.0	5.2	8.3	9.7	5.1	62
Breast <i>In Situ</i> <sup>2</sup>	-	-	-	0.1	-	-	-	0.2	0.2	0.4	0.1	0.3	0.4	1.0	0.4	0.3	1.8	-	57
Bronchus & Lung	-	-	-	0.2	0.5	1.8	1.6	5.1	16.6	33.4	73.7	151.5	255.3	395.2	545.2	597.1	597.5	458.5	71
Colon / Rectum	0.1	-	0.2	0.2	0.9	1.9	4.7	7.2	16.2	30.8	62.0	116.2	178.9	270.5	376.8	451.5	528.4	560.0	73
Esophagus	-	-	-	-	-	0.1	0.4	0.9	2.4	6.2	13.7	25.1	35.6	48.9	55.8	57.0	61.1	57.2	69
Hodgkin Lymphoma	0.1	0.5	1.3	2.8	6.2	6.0	4.9	4.2	4.3	4.9	3.1	3.7	4.2	5.4	6.5	4.7	5.3	5.8	38
Kidney & Renal Pelvis	2.1	0.4	0.1	0.3	0.4	0.4	2.4	3.9	8.6	13.4	27.6	41.1	55.2	67.7	80.8	91.1	88.6	61.6	67
Larynx	-	-	-	-	-	-	0.3	1.1	2.0	5.3	10.1	22.4	29.8	33.4	39.8	41.0	39.9	30.2	66
Leukemia	6.4	3.8	3.1	2.7	2.3	2.5	3.7	3.8	6.6	8.8	12.2	22.1	29.8	38.2	58.9	80.7	85.5	82.8	68
Liver & Intrahepatic Bile Ducts	0.8	0.1	0.1	0.1	0.2	0.2	0.7	1.5	3.5	10.5	13.2	15.8	24.3	29.0	38.5	42.4	39.9	33.4	68
Melanoma of Skin	0.1	-	0.2	1.4	2.5	5.6	7.5	12.3	14.4	21.1	36.1	41.1	58.1	68.5	90.8	106.8	118.7	108.5	60
Multiple Myeloma	-	-	-	-	-	0.2	0.2	0.6	1.8	4.2	6.3	11.0	17.0	25.6	29.6	38.8	48.3	45.0	71
Non-Hodgkin Lymphoma	0.3	1.0	1.5	3.1	3.9	4.3	7.5	8.6	13.1	18.8	26.1	40.6	51.0	72.1	93.0	121.9	127.6	133.6	68
Oral Cavity & Pharynx	0.2	0.2	0.2	0.5	0.6	0.7	2.0	2.9	9.0	21.9	29.3	51.8	55.2	63.7	60.6	63.6	63.3	60.4	63
Pancreas	-	-	-	0.2	0.1	-	0.5	1.1	3.6	5.8	13.3	24.6	35.6	48.1	66.7	81.5	94.3	101.5	73
Prostate	-	-	-	0.1	-	-	0.2	0.9	9.4	51.4	182.5	427.2	743.6	1019.7	1107.5	1004.8	723.8	675.5	68
Stomach	-	-	-	-	0.3	0.4	1.0	1.6	3.3	5.8	11.7	17.1	31.8	44.8	52.8	68.8	104.5	118.2	73
Testis	0.4	-	-	3.9	8.6	14.9	18.0	15.5	10.1	7.2	4.4	1.9	1.5	1.8	1.7	1.9	0.9	1.3	34
Thyroid	-	0.3	0.3	0.6	2.0	2.9	4.3	5.3	5.2	5.8	6.7	8.6	9.5	12.0	10.6	7.2	5.3	3.2	45
Urinary Bladder	0.1	-	-	0.1	0.5	0.5	2.0	3.5	8.3	17.2	31.9	67.2	115.3	172.4	254.0	317.7	372.1	391.7	72
Other Sites	7.0	1.6	3.0	3.0	4.4	6.0	6.9	11.1	16.2	22.8	36.9	51.2	94.9	114.7	169.3	246.4	304.7	353.2	72

<sup>1</sup> per 100,000 <sup>2</sup> Breast *in situ* is excluded from all sites <sup>3</sup> Dashed out age groups had no incident cases.

**Table 2.**  
**AGE-SPECIFIC INCIDENCE RATES<sup>1</sup> AND MEDIAN AGES FOR SELECTED CANCER SITES**  
**Massachusetts, 1998-2002**  
**FEMALES**

Cancer Site/Type	Age Groups																		Median Age
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+	
<b>All Sites</b>	22.3	10.3	12.9	19.2	33.6	61.8	110.9	177.7	294.6	459.4	682.1	956.2	1265.5	1493.7	1753.8	2037.6	2151.0	1945.6	68
<b>Brain &amp; Other Nervous System</b>	4.0	3.8	2.7	1.3	2.0	2.4	3.0	3.3	5.6	5.6	8.5	10.8	12.6	14.9	17.0	22.6	20.3	18.4	58
<b>Breast</b>	- <sup>3</sup>	-	-	-	1.6	7.2	29.7	68.6	136.9	222.9	282.2	363.2	418.9	437.3	465.2	503.1	463.5	392.9	62
<b>Breast <i>In Situ</i><sup>2</sup></b>	-	-	-	-	-	1.0	4.4	19.1	63.3	100.9	128.5	129.5	135.3	126.4	129.5	112.7	81.2	40.3	57
<b>Bronchus &amp; Lung</b>	-	0.1	-	0.2	0.5	1.3	2.2	5.8	14.6	32.4	66.7	130.7	204.7	270.7	334.2	353.3	328.0	197.0	71
<b>Cervix Uteri</b>	0.1	-	-	0.2	1.0	4.4	8.9	10.0	13.4	11.3	12.0	10.4	13.6	12.6	13.5	13.4	12.1	9.4	49
<b>Colon / Rectum</b>	-	-	0.1	0.1	0.9	1.1	2.7	7.6	14.6	24.7	46.8	74.2	123.2	173.2	225.5	333.0	409.1	425.4	73
<b>Corpus Uteri &amp; Uterus, NOS</b>	-	-	-	0.1	0.4	1.7	3.3	6.6	12.4	28.0	63.9	94.2	108.0	105.7	103.3	89.9	89.4	59.5	63
<b>Esophagus</b>	-	-	-	-	0.1	0.1	-	0.3	0.4	1.0	3.5	3.6	5.9	9.9	10.2	16.8	18.6	20.3	69
<b>Hodgkin Lymphoma</b>	0.1	0.1	1.9	4.0	5.0	4.9	5.0	3.5	3.0	1.9	2.4	1.7	1.8	4.7	4.6	4.9	4.1	2.8	38
<b>Kidney &amp; Renal Pelvis</b>	1.4	0.5	0.3	0.4	0.6	0.4	1.2	2.4	5.3	8.8	12.8	18.7	28.1	39.3	43.2	44.4	44.9	32.7	67
<b>Larynx</b>	-	-	0.1	-	-	-	0.1	0.2	0.5	1.0	2.3	5.0	8.7	6.9	10.2	5.1	7.0	3.5	66
<b>Leukemia</b>	9.2	2.6	2.0	2.4	1.4	1.7	2.9	3.4	4.0	7.5	8.6	11.2	21.9	22.5	35.0	38.6	52.4	57.4	68
<b>Liver &amp; Intrahepatic Bile Ducts</b>	0.3	0.2	-	-	0.2	0.3	0.2	0.1	0.7	1.3	2.8	3.7	6.9	9.2	9.6	14.5	17.6	18.4	68
<b>Melanoma of Skin</b>	-	-	0.6	1.6	5.2	9.9	14.3	15.9	16.6	20.0	27.5	30.3	33.5	32.9	41.6	45.7	36.2	41.0	60
<b>Multiple Myeloma</b>	-	-	-	-	-	0.2	0.2	0.2	1.1	2.1	4.2	6.5	11.5	13.9	24.3	22.1	28.5	22.8	71
<b>Non-Hodgkin Lymphoma</b>	0.9	0.6	0.8	1.5	1.9	4.0	5.1	6.3	9.2	12.0	17.4	30.2	39.4	54.2	71.4	86.4	97.8	72.8	68
<b>Oral Cavity &amp; Pharynx</b>	0.1	0.2	0.1	0.5	0.7	1.0	2.0	2.7	3.3	6.2	11.9	14.9	21.9	24.2	26.6	26.5	26.3	28.6	63
<b>Ovary</b>	0.2	0.6	0.5	1.2	1.2	2.2	4.1	6.1	10.7	18.7	27.0	34.4	41.6	42.6	49.3	52.5	58.7	50.2	64
<b>Pancreas</b>	-	-	0.1	-	-	0.1	0.4	1.3	1.8	3.8	8.8	14.4	25.7	40.6	53.1	69.6	80.2	90.3	73
<b>Stomach</b>	-	-	-	-	0.1	0.2	1.1	1.0	2.0	2.8	3.6	6.8	10.3	16.1	23.8	29.7	44.0	59.7	73
<b>Thyroid</b>	-	0.1	0.7	3.1	7.6	13.7	18.6	22.1	22.0	20.9	21.6	18.1	16.7	15.9	13.0	14.5	10.6	6.5	45
<b>Urinary Bladder</b>	-	-	-	0.2	0.2	0.3	0.6	1.7	3.4	5.1	12.3	24.0	36.5	50.2	62.7	79.5	79.5	86.2	72
<b>Other Sites</b>	6.0	1.6	3.1	2.6	3.2	4.5	5.3	8.6	13.3	21.3	35.4	49.2	74.0	96.0	116.5	171.6	222.2	249.8	72

<sup>1</sup>per 100,000 <sup>2</sup>Breast *in situ* is excluded from all sites <sup>3</sup>Dashed out age groups had no incident cases.

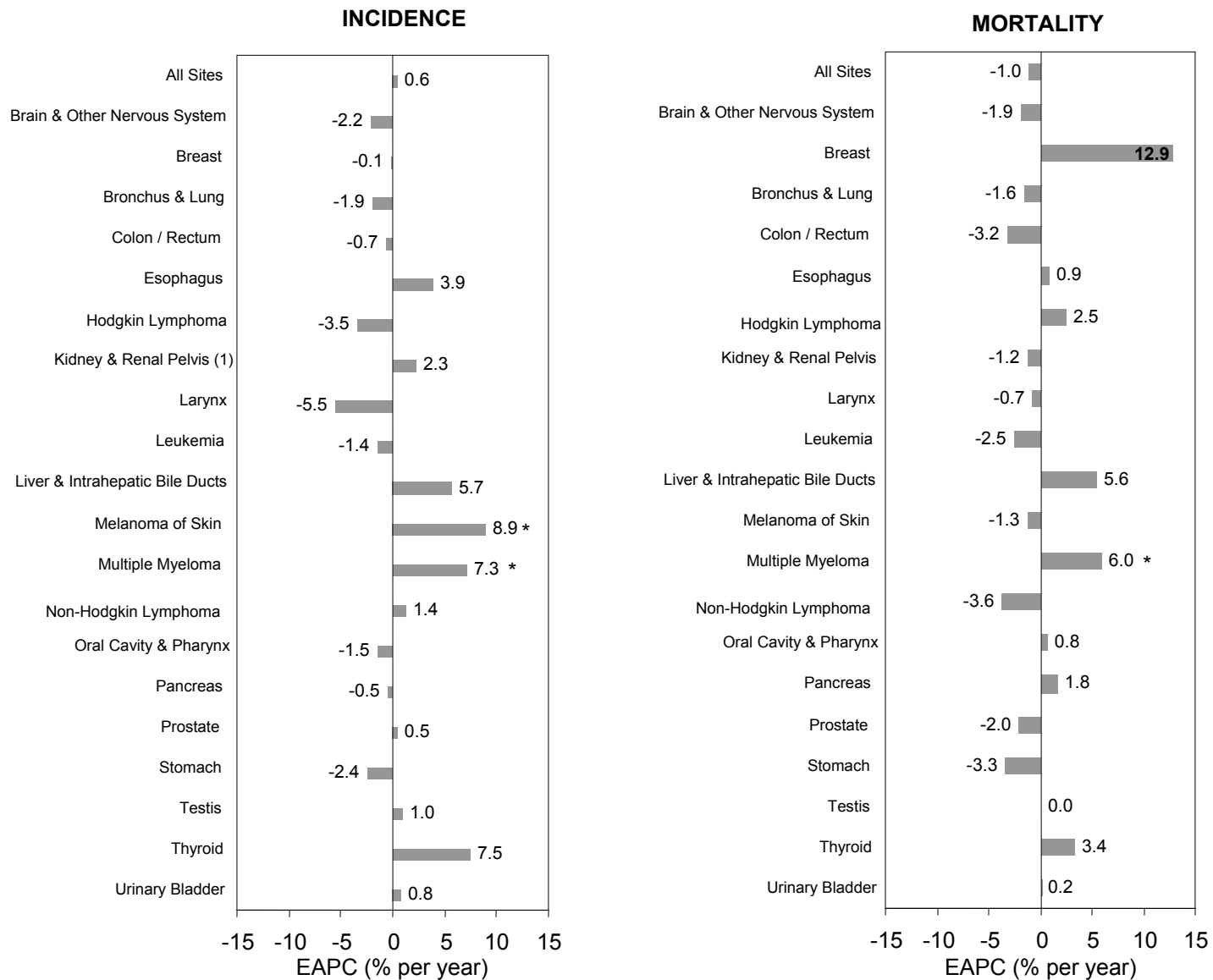
**Table 3.**  
**AGE-SPECIFIC INCIDENCE RATES<sup>1</sup> AND MEDIAN AGES FOR SELECTED CANCER SITES**  
**Massachusetts, 1998-2002**  
**TOTAL**

Cancer Site/Type	Age Groups																		Median Age
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+	
<b>All Sites</b>	21.7	11.0	13.2	20.5	34.7	56.9	92.0	137.5	229.4	383.5	648.3	1054.0	1541.7	1982.0	2365.3	2604.5	2609.0	2306.2	68
<b>Brain &amp; Other Nervous System</b>	3.8	3.8	3.2	2.0	2.2	2.9	3.4	4.1	5.8	6.4	9.1	13.7	16.1	19.8	21.1	26.6	23.4	19.8	58
<b>Breast</b>	- <sup>3</sup>	-	-	-	0.8	3.7	15.1	34.9	70.2	114.8	146.2	189.9	222.4	241.0	266.7	306.7	303.4	290.7	62
<b>Breast <i>In Situ</i><sup>2</sup></b>	-	-	-	*	-	0.5	2.2	9.7	32.4	51.9	66.3	67.4	71.6	69.2	73.9	68.1	53.1	29.7	57
<b>Bronchus &amp; Lung</b>	-	*	-	0.2	0.5	1.5	1.9	5.4	15.6	32.9	70.1	140.7	228.6	327.5	425.3	450.0	423.1	266.1	71
<b>Cervix Uteri</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Colon / Rectum</b>	0.1	-	0.1	0.1	0.9	1.5	3.7	7.4	15.3	27.7	54.2	94.4	149.5	217.6	290.8	380.1	451.2	460.9	73
<b>Corpus Uteri &amp; Uterus, NOS</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Esophagus</b>	-	-	-	-	*	0.1	0.2	0.6	1.4	3.6	8.4	13.9	19.9	27.7	29.9	32.8	33.6	30.0	69
<b>Hodgkin Lymphoma</b>	0.1	0.3	1.6	3.4	5.6	5.5	5.0	3.9	3.6	3.3	2.7	2.7	2.9	5.0	5.4	4.8	4.5	3.6	38
<b>Kidney &amp; Renal Pelvis</b>	1.8	0.4	0.2	0.3	0.5	0.4	1.8	3.1	6.9	11.0	19.9	29.5	40.9	52.2	59.5	62.9	60.3	40.4	67
<b>Larynx</b>	-	-	*	-	-	-	0.2	0.6	1.2	3.1	6.1	13.3	18.6	19.0	23.0	19.3	18.6	10.5	66
<b>Leukemia</b>	7.7	3.2	2.5	2.5	1.8	2.1	3.3	3.6	5.2	8.2	10.4	16.4	25.6	29.7	45.3	55.3	64.1	64.1	68
<b>Liver &amp; Intrahepatic Bile Ducts</b>	0.6	0.1	*	*	0.2	0.3	0.4	0.8	2.1	5.8	7.8	9.5	15.1	18.3	22.0	25.6	25.5	22.4	68
<b>Melanoma of Skin</b>	0.1	-	0.4	1.5	3.9	7.8	10.9	14.1	15.6	20.6	31.7	35.5	45.2	49.1	62.8	69.9	65.3	58.8	60
<b>Multiple Myeloma</b>	-	-	-	-	-	0.2	0.2	0.4	1.5	3.1	5.2	8.7	14.1	19.3	26.5	28.7	35.5	28.7	71
<b>Non-Hodgkin Lymphoma</b>	0.6	0.8	1.1	2.3	2.9	4.2	6.3	7.5	11.1	15.3	21.6	35.2	44.9	62.4	80.7	100.5	108.3	88.9	68
<b>Oral Cavity &amp; Pharynx</b>	0.2	0.2	0.1	0.5	0.6	0.9	2.0	2.8	6.1	13.9	20.3	32.6	37.6	42.2	41.3	41.2	39.4	37.0	63
<b>Ovary</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Pancreas</b>	-	-	*	0.1	*	*	0.4	1.2	2.7	4.8	11.0	19.3	30.4	44.0	59.0	74.3	85.2	93.3	73
<b>Prostate</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	68
<b>Stomach</b>	-	-	-	-	0.2	0.3	1.0	1.3	2.6	4.3	7.5	11.7	20.5	29.2	36.3	45.2	65.3	75.1	73
<b>Testis</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Thyroid</b>	-	0.2	0.5	1.8	4.8	8.4	11.5	13.8	13.8	13.5	14.4	13.5	13.3	14.2	12.0	11.6	8.8	5.6	45
<b>Urinary Bladder</b>	0.1	-	-	0.1	0.3	0.4	1.3	2.6	5.8	11.0	21.8	44.8	73.8	105.9	145.3	174.1	182.7	166.9	72
<b>Other Sites</b>	6.5	1.6	3.1	2.8	3.8	5.2	6.1	9.8	14.7	22.0	36.2	50.2	83.9	104.5	139.3	201.3	251.3	277.1	72

<sup>1</sup> per 100,000 <sup>2</sup> Breast *in situ* is excluded from all sites <sup>3</sup> Dashed out age groups had no incident cases \* age-specific incidence rates are less than 0.1.

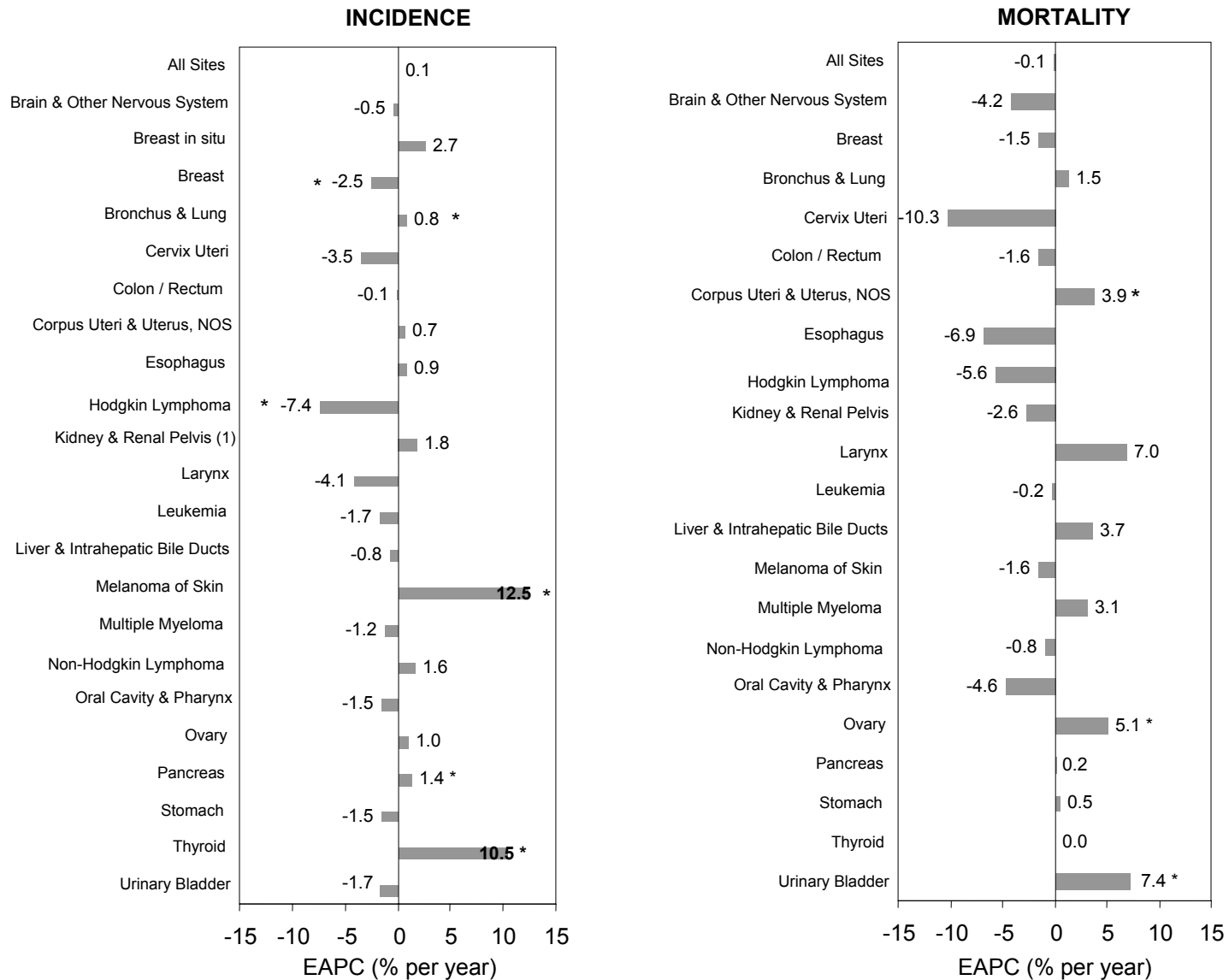


**Figure 5.**  
**Estimated Annual Percent Change (EAPC) in Age-Adjusted Cancer Rates Among Males, Massachusetts, 1998-2002**



<sup>1</sup>Massachusetts rates for this site include codes 64.9 & 65.9 (ICD-O-3) only for comparability. Massachusetts hospital coding conventions may have assigned some cases to a "not otherwise specified" category. EAPC is statistically significant (p<0.05).

**Figure 6.**  
**Estimated Annual Percent Change (EAPC) in Age-Adjusted Cancer Rates Among Females, Massachusetts, 1998-2002**



<sup>1</sup>Massachusetts rates for this site include codes 64.9 & 65.9 (ICD-O-3) only for comparability. Massachusetts hospital coding conventions may have assigned some cases to a "not otherwise specified" category. EAPC is statistically significant (p<0.05).

**Table 4.**  
**ANNUAL AGE-ADJUSTED<sup>1</sup> INCIDENCE RATES<sup>2</sup> FOR SELECTED CANCER SITES**  
**Massachusetts, 1998-2002**  
**MALES**

Cancer Site/Type	1998	1999	2000	2001	2002
All Sites	622.9	607.2	613.2	625.2	631.4
Brain and Other Nervous System	9.2	8.4	9.6	8.5	8.2
Breast <sup>3</sup>	1.4	1.5	1.4	0.9	1.8
Bronchus & Lung	98.1	90.9	87.6	88.7	90.1
Colon / Rectum	76.7	71.0	69.1	74.0	72.5
Esophagus	10.1	11.2	11.3	10.6	12.6
Hodgkin Lymphoma	4.3	3.9	3.3	3.7	3.7
Kidney & Renal Pelvis	17.2	18.3	17.4	18.7	19.1
Larynx	9.0	8.8	8.7	7.0	7.6
Leukemia	14.7	14.9	14.1	14.0	14.1
Liver & Intrahepatic Bile Ducts	7.9	7.2	8.6	9.2	9.2
Melanoma of Skin	20.4	20.5	21.2	27.3	27.1
Multiple Myeloma	5.9	5.7	6.3	7.5	7.3
Non-Hodgkin Lymphoma	22.8	23.3	22.3	23.9	24.1
Oral Cavity & Pharynx	18.5	16.7	17.6	15.8	17.6
Pancreas	13.9	13.8	12.6	13.1	13.9
Prostate	180.8	185.2	191.2	191.1	182.3
Stomach	12.7	12.4	13.7	12.5	11.2
Testis	6.4	6.3	6.2	6.0	6.9
Thyroid	3.9	3.8	4.1	4.1	5.4
Urinary Bladder	48.2	45.2	48.3	46.0	49.6

<sup>1</sup> age-adjusted to the 2000 U.S. Standard Population

<sup>2</sup> per 100,000 males

<sup>3</sup> Incidence rates for breast *in situ* is not presented due to being less than 20 cases.

**Table 5.**  
**ANNUAL AGE-ADJUSTED<sup>1</sup> INCIDENCE RATES<sup>2</sup> FOR SELECTED CANCER SITES**  
**Massachusetts, 1998-2002**  
**FEMALES**

Cancer Site/Type	1998	1999	2000	2001	2002
All Sites	464.4	455.8	451.8	458.6	464.4
Brain and Other Nervous System	6.0	6.6	6.8	6.1	6.1
Breast	154.5	145.9	144.5	140.5	138.4
Bronchus & Lung	60.1	60.6	61.0	62.0	61.9
Cervix Uteri	8.0	6.9	7.1	6.5	6.9
Colon / Rectum	51.4	51.5	49.6	53.6	50.2
Corpus Uteri & Uterus, NOS	29.3	28.9	26.1	27.0	31.4
Esophagus	2.8	2.2	2.3	2.6	2.7
Hodgkin Lymphoma	3.3	3.2	3.2	2.8	2.4
Kidney & Renal Pelvis	9.6	9.7	8.6	9.7	10.5
Larynx	1.8	1.8	1.9	1.7	1.5
Leukemia	9.3	9.9	9.8	8.7	9.1
Liver & Intrahepatic Bile Ducts	2.4	2.6	2.6	2.4	2.4
Melanoma of Skin	12.3	14.0	14.6	17.7	19.7
Multiple Myeloma	4.2	4.0	4.0	3.9	4.0
Non-Hodgkin Lymphoma	16.3	17.2	14.8	16.6	18.0
Oral Cavity & Pharynx	6.7	7.7	6.5	6.8	6.6
Ovary	14.7	13.6	15.0	15.5	14.5
Pancreas	10.3	10.4	10.6	10.9	10.8
Stomach	5.9	4.8	5.4	5.3	5.2
Thyroid	10.4	10.6	13.3	13.3	15.3
Urinary Bladder	14.1	12.4	12.2	12.7	12.8
Breast <i>in situ</i> <sup>3</sup>	43.4	46.9	50.2	47.6	49.3

<sup>1</sup> age-adjusted to the 2000 U.S. Standard Population

<sup>2</sup> per 100,000 females

<sup>3</sup> Breast *in situ* is excluded from all sites

**Table 6.**  
**ANNUAL AGE-ADJUSTED<sup>1</sup> INCIDENCE RATES<sup>2</sup> FOR SELECTED CANCER SITES**  
**Massachusetts, 1998-2002**  
**TOTAL**

Cancer Site/Type	1998	1999	2000	2001	2002
All Sites	525.5	514.9	515.5	524.5	529.6
Brain and Other Nervous System	7.5	7.4	8.1	7.2	7.0
Breast	85.6	81.1	79.9	77.4	76.8
Bronchus & Lung	75.1	73.0	71.5	72.7	72.8
Cervix Uteri	- <sup>4</sup>	-	-	-	-
Colon / Rectum	62.0	59.6	57.7	62.1	59.7
Corpus Uteri & Uterus, NOS	-	-	-	-	-
Esophagus	6.1	6.0	6.2	6.0	7.0
Hodgkin Lymphoma	3.7	3.5	3.3	3.2	3.0
Kidney & Renal Pelvis	12.8	13.5	12.3	13.8	14.3
Larynx	4.9	4.9	4.9	3.9	4.1
Leukemia	11.5	12.0	11.7	10.9	11.3
Liver & Intrahepatic Bile Ducts	4.8	4.7	5.3	5.4	5.4
Melanoma of Skin	15.6	16.7	17.2	21.5	22.3
Multiple Myeloma	4.9	4.7	4.9	5.3	5.4
Non-Hodgkin Lymphoma	18.9	19.8	18.0	19.8	20.5
Oral Cavity & Pharynx	12.0	11.7	11.4	10.8	11.6
Ovary	-	-	-	-	-
Pancreas	11.9	11.8	11.6	11.8	12.1
Prostate	-	-	-	-	-
Stomach	8.6	7.8	8.8	8.4	7.7
Testis	-	-	-	-	-
Thyroid	7.3	7.3	8.8	8.9	10.5
Urinary Bladder	27.8	25.6	27.0	26.2	27.5
Breast <i>in situ</i> <sup>3</sup>	23.3	25.1	27.0	25.6	26.5

<sup>1</sup> age-adjusted to the 2000 U.S. Standard Population

<sup>2</sup> per 100,000 total

<sup>3</sup> Breast *in situ* is excluded from all sites

<sup>4</sup> Dashed out cancers found in only one sex

**Table 7.**  
**ANNUAL AGE-ADJUSTED<sup>1</sup> MORTALITY RATES<sup>2</sup> FOR SELECTED CANCER SITES**  
**Massachusetts, 1998-2002**  
**MALES**

<b>Cancer Site / Type</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>
<b>All Sites</b>	264.2	262.6	258.8	252.0	256.2
<b>Brain &amp; Other Nervous System</b>	6.0	5.8	5.9	5.3	5.7
<b>Breast</b>	0.2	0.2	0.2	0.3	0.3
<b>Bronchus &amp; Lung</b>	76.3	73.5	73.6	69.9	72.1
<b>Colon / Rectum</b>	30.5	27.6	28.6	26.7	26.3
<b>Esophagus</b>	9.5	9.9	9.8	9.2	10.3
<b>Hodgkin Lymphoma</b>	0.7	0.9	0.2	0.7	0.9
<b>Kidney &amp; Renal Pelvis</b>	6.1	5.5	6.6	6.0	5.5
<b>Larynx</b>	3.0	3.0	2.7	3.0	2.9
<b>Leukemia</b>	9.5	10.2	10.1	9.9	8.5
<b>Liver &amp; Intrahepatic Bile Ducts</b>	6.8	6.6	6.6	8.4	7.9
<b>Melanoma of Skin</b>	4.7	4.0	4.7	4.4	4.2
<b>Multiple Myeloma</b>	3.9	4.4	4.1	4.6	5.1
<b>Non-Hodgkin Lymphoma</b>	11.9	10.7	8.8	9.7	10.4
<b>Oral Cavity &amp; Pharynx</b>	4.4	4.5	4.0	4.1	4.8
<b>Pancreas</b>	12.8	12.6	12.9	12.4	14.1
<b>Prostate</b>	31.6	32.9	31.1	30.6	29.6
<b>Stomach</b>	8.1	7.1	8.8	7.2	6.8
<b>Testis</b>	0.2	0.4	0.3	0.1	0.4
<b>Thyroid</b>	0.3	0.5	0.4	0.7	0.3
<b>Urinary Bladder</b>	8.6	9.5	8.1	10.2	8.4

<sup>1</sup> age-adjusted to the 2000 U.S. Standard Population  
<sup>2</sup> per 100,000 males

**Table 8.**  
**ANNUAL AGE-ADJUSTED<sup>1</sup> MORTALITY RATES<sup>2</sup> FOR SELECTED CANCER SITES**  
**Massachusetts, 1998-2002**  
**FEMALES**

<b>Cancer Site/Type</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>
<b>All Sites</b>	176.2	171.6	175.0	173.2	174.6
<b>Brain &amp; Other Nervous System</b>	3.8	3.7	3.7	3.0	3.4
<b>Breast</b>	29.0	27.2	26.9	26.9	27.0
<b>Bronchus &amp; Lung</b>	44.5	41.0	44.3	45.4	45.5
<b>Cervix Uteri</b>	2.6	1.8	2.0	1.6	1.6
<b>Colon / Rectum</b>	19.9	18.8	17.8	17.6	19.0
<b>Corpus Uteri &amp; Uterus, NOS</b>	3.9	4.0	4.4	4.2	4.6
<b>Esophagus</b>	2.5	1.9	2.0	1.8	1.8
<b>Hodgkin Lymphoma</b>	0.4	0.6	0.4	0.6	0.3
<b>Kidney &amp; Renal Pelvis</b>	2.5	3.1	2.4	2.8	2.3
<b>Larynx</b>	0.5	0.5	0.6	0.5	0.7
<b>Leukemia</b>	5.1	6.2	5.7	5.6	5.3
<b>Liver &amp; Intrahepatic Bile Ducts</b>	2.3	2.3	2.0	2.8	2.5
<b>Melanoma of Skin</b>	2.0	1.8	2.5	1.9	1.8
<b>Multiple Myeloma</b>	3.1	2.9	2.9	3.1	3.5
<b>Non-Hodgkin Lymphoma</b>	7.1	7.3	6.6	7.1	6.9
<b>Oral Cavity &amp; Pharynx</b>	1.9	1.7	1.9	1.7	1.5
<b>Ovary</b>	7.9	8.7	9.1	9.1	9.9
<b>Pancreas</b>	10.2	9.9	10.6	10.1	10.2
<b>Stomach</b>	3.8	3.5	3.3	3.5	3.9
<b>Thyroid</b>	0.4	0.4	0.5	0.4	0.4
<b>Urinary Bladder</b>	2.4	2.6	2.8	2.8	3.3

<sup>1</sup> age-adjusted to the 2000 U.S. Standard Population  
<sup>2</sup> per 100,000 females

**Table 9.**  
**ANNUAL AGE-ADJUSTED<sup>1</sup> MORTALITY RATES<sup>2</sup> FOR SELECTED CANCER SITES**  
**Massachusetts, 1998-2002**  
**TOTAL**

<b>Cancer Site/Type</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>
<b>All Sites</b>	208.9	206.0	206.6	202.4	204.6
<b>Brain &amp; Other Nervous System</b>	4.8	4.7	4.7	4.0	4.4
<b>Breast</b>	16.8	15.8	15.7	15.6	15.7
<b>Bronchus &amp; Lung</b>	56.9	54.0	56.0	54.9	55.9
<b>Cervix Uteri</b>	- <sup>3</sup>	-	-	-	-
<b>Colon / Rectum</b>	23.9	22.4	22.1	21.3	22.1
<b>Corpus Uteri &amp; Uterus, NOS</b>	-	-	-	-	-
<b>Esophagus</b>	5.5	5.3	5.3	4.9	5.4
<b>Hodgkin Lymphoma</b>	0.5	0.7	0.3	0.6	0.6
<b>Kidney &amp; Renal Pelvis</b>	4.0	4.1	4.1	4.1	3.6
<b>Larynx</b>	1.6	1.5	1.5	1.5	1.6
<b>Leukemia</b>	6.8	7.8	7.5	7.2	6.6
<b>Liver &amp; Intrahepatic Bile Ducts</b>	4.3	4.2	4.1	5.2	4.7
<b>Melanoma of Skin</b>	3.1	2.7	3.4	2.9	2.7
<b>Multiple Myeloma</b>	3.4	3.5	3.3	3.7	4.1
<b>Non-Hodgkin Lymphoma</b>	9.0	8.8	7.5	8.2	8.2
<b>Oral Cavity &amp; Pharynx</b>	3.0	2.9	2.8	2.7	2.9
<b>Ovary</b>	-	-	-	-	-
<b>Pancreas</b>	11.3	11.1	11.7	11.2	11.7
<b>Prostate</b>	-	-	-	-	-
<b>Stomach</b>	5.5	4.9	5.5	5.0	5.1
<b>Testis</b>	-	-	-	-	-
<b>Thyroid</b>	0.4	0.5	0.5	0.5	0.4
<b>Urinary Bladder</b>	4.7	5.0	4.8	5.5	5.2

<sup>1</sup> age-adjusted to the 2000 U.S. Standard Population

<sup>2</sup> per 100,000 total

<sup>3</sup> Dashed out cancers found in only one sex



**Table 10.  
FIVE LEADING CANCER INCIDENCE RATES BY RACE/ETHNICITY AND SEX**

**Massachusetts, 1998-2002**

**MALES**

<b>AGE-ADJUSTED<sup>1</sup> INCIDENCE RATE<sup>2</sup></b>				
<b>RANK</b>	<b>White, non-Hispanic</b>	<b>Black, non-Hispanic</b>	<b>Asian, non-Hispanic</b>	<b>Hispanic</b>
1	Prostate 179.9	Prostate 312.2	Prostate 78.4	Prostate 177.5
2	Bronchus & Lung 91.2	Bronchus & Lung 98.1	Bronchus & Lung 57.1	Bronchus & Lung 60.8
3	Colon / Rectum 72.5	Colon / Rectum 67.1	Colon / Rectum 47.0	Colon / Rectum 51.6
4	Urinary Bladder 48.7	Stomach 22.3	Liver & Intrahepatic Bile Ducts 26.4	Urinary Bladder 28.4
5	Melanoma 24.1	Urinary Bladder 22.1	Non-Hodgkin Lymphoma 18.7	Oral Cavity & Pharynx 23.2

**FEMALES**

<b>AGE-ADJUSTED<sup>1</sup> INCIDENCE RATE<sup>2</sup></b>				
<b>RANK</b>	<b>White, non-Hispanic</b>	<b>Black, non-Hispanic</b>	<b>Asian, non-Hispanic</b>	<b>Hispanic</b>
1	Breast 146.7	Breast 116.3	Breast 69.6	Breast 90.1
2	Bronchus & Lung 62.2	Bronchus & Lung 51.2	Colon / Rectum 39.9	Colon / Rectum 35.2
3	Colon / Rectum 51.1	Colon / Rectum 49.7	Bronchus & Lung 33.0	Bronchus & Lung 26.1
4	Corpus Uteri & Uterus, NOS 28.7	Corpus Uteri & Uterus, NOS 21.2	Thyroid 16.4	Corpus Uteri & Uterus, NOS 24.8
5	Non-Hodgkin Lymphoma 16.4	Non-Hodgkin Lymphoma 13.7	Corpus Uteri & Uterus, NOS 14.3	Cervix Uteri 16.4

<sup>1</sup> Age-adjusted to the 2000 U.S. Standard Population <sup>2</sup> per 100,000

**Table 11.  
FIVE LEADING CANCER MORTALITY RATES BY RACE/ETHNICITY AND SEX**

**Massachusetts, 1998-2002**

**MALES**

<b>AGE-ADJUSTED<sup>1</sup> MORTALITY RATE<sup>2</sup></b>				
<b>RANK</b>	<b>White, non-Hispanic</b>	<b>Black, non-Hispanic</b>	<b>Asian, non-Hispanic</b>	<b>Hispanic</b>
1	Bronchus & Lung 73.8	Bronchus & Lung 94.4	Bronchus & Lung 39.4	Bronchus & Lung 36.8
2	Prostate 30.8	Prostate 60.0	Liver & Intrahepatic Bile Ducts 19.9	Prostate 22.3
3	Colon / Rectum 28.2	Colon / Rectum 37.0	Colon / Rectum 11.2	Colon / Rectum 13.3
4	Pancreas 12.9	Pancreas 20.4	Stomach 8.3	Liver & Intrahepatic Bile Ducts 11.3
5	Non-Hodgkin Lymphoma 10.5	Stomach 15.9	*	Stomach 8.9

**FEMALES**

<b>AGE-ADJUSTED<sup>1</sup> MORTALITY RATE<sup>2</sup></b>				
<b>RANK</b>	<b>White, non-Hispanic</b>	<b>Black, non-Hispanic</b>	<b>Asian, non-Hispanic</b>	<b>Hispanic</b>
1	Bronchus & Lung 45.5	Bronchus & Lung 38.5	Bronchus & Lung 23.8	Bronchus & Lung 14.5
2	Breast 27.7	Breast 31.0	Breast 15.3	Breast 13.8
3	Colon / Rectum 18.7	Colon / Rectum 24.4	Colon / Rectum 13.8	Colon / Rectum 11.5
4	Pancreas 10.3	Pancreas 12.4	Stomach 6.6	Pancreas 7.0
5	Ovary 9.3	Corpus Uteri & Uterus, NOS 8.6	*	Liver & Intrahepatic Bile Ducts 5.2

<sup>1</sup> Age-adjusted to the 2000 U.S. Standard Population <sup>2</sup> per 100,000

\* No other reported cancer with greater than 20 cases for the ranking

**Table 12.**  
**INCIDENCE CASES AND PERCENTAGE OF CASES FOR SELECTED CANCER SITES BY RACE/ETHNICITY<sup>1</sup>**  
**Massachusetts, 1998-2002**  
**MALES**

Cancer Site/Type	All Races <sup>2</sup>		White, non-Hispanic		Black, non-Hispanic		Asian, non-Hispanic		Hispanic	
	Cases	% of Cases	Cases	% of Cases	Cases	% of Cases	Cases	% of Cases	Cases	% of Cases
All Sites	86597	100.0	78776	100.0	3241	100.0	977	100.0	1966	100.0
Brain & Other Nervous System	1279	1.5	1153	1.5	28	0.9	24	2.5	52	2.6
Breast <sup>3</sup>	196	0.2	176	0.2	10	0.3	3	0.3	2	0.1
Bronchus & Lung	12613	14.6	11729	14.9	422	13.0	140	14.3	199	10.1
Colon / Rectum	9942	11.5	9198	11.7	294	9.1	129	13.2	180	9.2
Esophagus	1561	1.8	1425	1.8	69	2.1	11	1.1	39	2.0
Hodgkin Lymphoma	581	0.7	518	0.7	15	0.5	6	0.6	29	1.5
Kidney & Renal Pelvis	2578	3.0	2358	3.0	88	2.7	24	2.5	57	2.9
Larynx	1160	1.3	1035	1.3	60	1.9	10	1.0	40	2.0
Leukemia	2014	2.3	1839	2.3	51	1.6	25	2.6	57	2.9
Liver & Intrahepatic Bile Ducts	1197	1.4	944	1.2	61	1.9	96	9.8	75	3.8
Melanoma of Skin	3329	3.8	3131	4.0	5	0.2	7	0.7	16	0.8
Multiple Myeloma	900	1.0	802	1.0	61	1.9	5	0.5	21	1.1
Non-Hodgkin Lymphoma	3284	3.8	2944	3.7	119	3.7	58	5.9	101	5.1
Oral Cavity & Pharynx	2470	2.9	2182	2.8	102	3.1	47	4.8	94	4.8
Pancreas	1849	2.1	1674	2.1	81	2.5	18	1.8	44	2.2
Prostate	26148	30.2	23389	29.7	1351	41.7	193	19.8	582	29.6
Stomach	1694	2.0	1460	1.9	89	2.7	51	5.2	73	3.7
Testis	1029	1.2	955	1.2	13	0.4	6	0.6	38	1.9
Thyroid	649	0.7	575	0.7	14	0.4	23	2.4	15	0.8
Urinary Bladder	6438	7.4	6157	7.8	86	2.7	36	3.7	83	4.2
Other Sites	5686	6.6	5132	6.5	222	6.8	65	6.7	169	8.6

<sup>1</sup> Race/ethnicity categories are mutually exclusive. Cases are only included in one race/ethnicity category.

<sup>2</sup> The number of cases for all races is not the sum of cases by race/ethnicity. <sup>3</sup> Breast *in situ* cases are not presented due to being less than 20 cases.

**Table 13.**  
**INCIDENCE CASES AND PERCENTAGE OF CASES FOR SELECTED CANCER SITES BY RACE/ETHNICITY<sup>1</sup>**  
**Massachusetts, 1998-2002**  
**FEMALES**

Cancer Site/Type	All Races <sup>2</sup>		White, non-Hispanic		Black, non-Hispanic		Asian, non-Hispanic		Hispanic	
	Cases	% of Cases	Cases	% of Cases	Cases	% of Cases	Cases	% of Cases	Cases	% of Cases
All Sites	85117	100.0	78179	100.0	2513	100.0	1020	100.0	1819	100.0
Brain & Other Nervous System	1119	1.3	1026	1.3	20	0.8	12	1.2	45	2.5
Breast <sup>3</sup>	25936	30.5	23928	30.6	767	30.5	282	27.6	504	27.7
Bronchus & Lung	11460	13.5	10789	13.8	309	12.3	99	9.7	121	6.7
Cervix Uteri	1229	1.4	955	1.2	95	3.8	35	3.4	107	5.9
Colon / Rectum	10234	12.0	9515	12.2	295	11.7	119	11.7	167	9.2
Corpus Uteri & Uterus, NOS	5080	6.0	4660	6.0	132	5.3	56	5.5	134	7.4
Esophagus	502	0.6	443	0.6	27	1.1	2	0.2	19	1.0
Hodgkin Lymphoma	505	0.6	452	0.6	17	0.7	7	0.7	24	1.3
Kidney & Renal Pelvis	1776	2.1	1644	2.1	71	2.8	4	0.4	33	1.8
Larynx	315	0.4	291	0.4	12	0.5	1	0.1	6	0.3
Leukemia	1753	2.1	1588	2.0	55	2.2	25	2.5	55	3.0
Liver & Intrahepatic Bile Ducts	485	0.6	400	0.5	25	1.0	26	2.5	26	1.4
Melanoma of Skin	2791	3.3	2584	3.3	9	0.4	10	1.0	24	1.3
Multiple Myeloma	779	0.9	693	0.9	46	1.8	9	0.9	17	0.9
Non-Hodgkin Lymphoma	3125	3.7	2843	3.6	90	3.6	41	4.0	92	5.1
Oral Cavity & Pharynx	1262	1.5	1128	1.4	42	1.7	35	3.4	27	1.5
Ovary	2662	3.1	2465	3.2	42	1.7	39	3.8	52	2.9
Pancreas	2125	2.5	1969	2.5	69	2.7	22	2.2	34	1.9
Stomach	1088	1.3	946	1.2	53	2.1	32	3.1	41	2.3
Thyroid	2135	2.5	1837	2.3	64	2.5	83	8.1	76	4.2
Urinary Bladder	2500	2.9	2370	3.0	45	1.8	15	1.5	36	2.0
Other Sites	6256	7.3	5653	7.2	228	9.1	66	6.5	179	9.8

<sup>1</sup> Race/ethnicity categories are mutually exclusive. Cases are only included in one race/ethnicity category.

<sup>2</sup> The number of cases for all races is not the sum of cases by race/ethnicity. <sup>3</sup> Breast *in situ* cases are excluded from all sites and from breast cancer type.

**Table 14.**  
**INCIDENCE CASES AND PERCENTAGE OF CASES FOR SELECTED CANCER SITES BY RACE/ETHNICITY<sup>1</sup>**  
**Massachusetts, 1998-2002**  
**TOTAL<sup>3</sup>**

Cancer Site/Type	All Races <sup>2</sup>		White, non-Hispanic		Black, non-Hispanic		Asian, non-Hispanic		Hispanic	
	Cases	% of Cases	Cases	% of Cases	Cases	% of Cases	Cases	% of Cases	Cases	% of Cases
All Sites	171729	100.0	156968	100.0	5754	100.0	1998	100.0	3785	100.0
Brain & Other Nervous System	2398	1.4	2179	1.4	48	0.8	36	1.8	97	2.6
Breast <sup>4</sup>	26134	15.2	24106	15.4	777	13.5	285	14.3	506	13.4
Bronchus & Lung	24074	14.0	22519	14.3	731	12.7	239	12.0	320	8.5
Cervix Uteri	1229	0.7	955	0.6	95	1.7	35	1.8	107	2.8
Colon / Rectum	20179	11.8	18716	11.9	589	10.2	248	12.4	347	9.2
Corpus Uteri & Uterus, NOS	5081	3.0	4661	3.0	132	2.3	56	2.8	134	3.5
Esophagus	2064	1.2	1869	1.2	96	1.7	13	0.6	58	1.5
Hodgkin Lymphoma	1087	0.6	970	0.6	32	0.6	13	0.6	53	1.4
Kidney & Renal Pelvis	4354	2.5	4002	2.5	159	2.8	28	1.4	90	2.4
Larynx	1475	0.9	1326	0.8	72	1.3	11	0.6	46	1.2
Leukemia	3767	2.2	3427	2.2	106	1.8	50	2.5	112	3.0
Liver & Intrahepatic Bile Ducts	1682	1.0	1344	0.9	86	1.5	122	6.1	101	2.7
Melanoma of Skin	6121	3.6	5716	3.6	14	0.2	17	0.8	40	1.1
Multiple Myeloma	1679	1.0	1495	1.0	107	1.9	14	0.7	38	1.0
Non-Hodgkin Lymphoma	6410	3.7	5787	3.7	209	3.6	100	5.0	193	5.1
Oral Cavity & Pharynx	3732	2.2	3310	2.1	144	2.5	82	4.1	121	3.2
Ovary	2662	1.6	2465	1.6	42	0.7	39	2.0	52	1.4
Pancreas	3974	2.3	3643	2.3	150	2.6	40	2.0	78	2.1
Prostate	26148	15.2	23389	14.9	1351	23.5	193	9.7	582	15.4
Stomach	2782	1.6	2406	1.5	142	2.5	83	4.2	114	3.0
Testis	1030	0.6	956	0.6	13	0.2	6	0.3	38	1.0
Thyroid	2784	1.6	2412	1.5	78	1.4	106	5.3	91	2.4
Urinary Bladder	8940	5.2	8529	5.4	131	2.3	51	2.6	119	3.1
Other Sites	11943	7.0	10786	6.9	450	7.8	131	6.6	348	9.2

<sup>1</sup> Race/ethnicity categories are mutually exclusive. <sup>2</sup> Cases are only included in one race/ethnicity category. The number of cases for all races is not the sum of cases by race/ethnicity. <sup>3</sup> Total includes persons classified as transsexual and persons of unknown sex. <sup>4</sup> Breast *in situ* cases are excluded from all sites and from breast cancer type.

**Table 15.**  
**AGE-ADJUSTED<sup>1</sup> INCIDENCE RATES<sup>2</sup> AND 95% CONFIDENCE LIMITS (95% CL) FOR SELECTED CANCER SITES BY**  
**RACE/ETHNICITY<sup>3</sup>**  
**Massachusetts, 1998-2002**  
**MALES**

Cancer Site/Type	All Races		White, non-Hispanic		Black, non-Hispanic		Asian, non-Hispanic		Hispanic	
	Rate	95%CL	Rate	95%CL	Rate	95%CL	Rate	95%CL	Rate	95%CL
All Sites	620.0	615.9–624.2	612.3	608.0–616.6	723.6	697.3–749.9	345.1	321.0–369.2	525.2	498.9–551.5
Brain & Other Nervous System	8.8	8.3–9.3	8.9	8.4–9.4	4.5	2.6–6.4	6.1	3.4–8.8	7.3	4.9–9.8
Breast <sup>4</sup>	1.4	1.2–1.6	1.4	1.2–1.6	*	*	*	*	*	*
Bronchus & Lung	91.1	89.5–92.7	91.2	89.6–92.9	98.1	88.2–107.9	57.1	46.9–67.3	60.8	51.5–70.0
Colon / Rectum	72.7	71.2–74.1	72.5	71.0–74.0	67.1	59.0–75.3	47.0	37.9–56.1	51.6	43.1–60.1
Esophagus	11.2	10.6–11.7	11.0	10.5–11.6	15.6	11.7–19.4	*	*	11.7	7.7–15.8
Hodgkin Lymphoma	3.8	3.5–4.1	3.9	3.6–4.3	*	*	*	*	3.7	2.0–5.4
Kidney & Renal Pelvis	18.1	17.4–18.8	18.1	17.4–18.8	17.3	13.5–21.2	7.4	4.1–10.7	14.7	10.3–19.1
Larynx	8.2	7.7–8.7	7.9	7.5–8.4	13.7	10.0–17.4	*	*	11.0	7.2–14.9
Leukemia	14.4	13.7–15.0	14.5	13.8–15.1	10.2	7.1–13.2	6.8	3.5–10.2	10.6	7.2–14.1
Liver & Intrahepatic Bile Ducts	8.4	8.0–8.9	7.3	6.8–7.8	11.4	8.4–14.3	26.4	20.7–32.0	17.8	13.3–22.4
Melanoma of Skin	23.3	22.5–24.1	24.1	23.2–24.9	*	*	*	*	*	*
Multiple Myeloma	6.5	6.1–7.0	6.3	5.9–6.7	14.0	10.3–17.8	*	*	6.4	3.4–9.4
Non-Hodgkin Lymphoma	23.3	22.5–24.1	22.9	22.1–23.7	21.8	17.6–25.9	18.7	13.2–24.2	21.0	16.0–25.9
Oral Cavity & Pharynx	17.2	16.6–17.9	16.7	16.0–17.4	21.0	16.7–25.2	12.8	8.6–16.9	23.2	18.1–28.4
Pancreas	13.5	12.9–14.1	13.2	12.6–13.8	18.4	14.1–22.7	*	*	13.0	8.7–17.2
Prostate	186.2	183.9–188.5	179.9	177.6–182.2	312.7	295.4–330.0	78.4	66.6–90.2	177.5	162.1–192.9
Stomach	12.5	11.9–13.1	11.7	11.1–12.3	22.3	17.3–27.2	18.2	12.6–23.8	20.7	15.4–26.1
Testis	6.4	6.0–6.7	7.0	6.6–7.5	*	*	*	*	3.2	2.1–4.2
Thyroid	4.3	3.9–4.6	4.3	3.9–4.6	*	*	5.9	3.1–8.7	*	*
Urinary Bladder	47.4	46.3–48.6	48.7	47.5–50.0	22.1	17.1–27.0	14.4	9.2–19.6	28.4	21.7–35.0

<sup>1</sup> age-adjusted to the 2000 U.S. Standard Population <sup>2</sup> per 100,000

<sup>3</sup> Race/ethnicity categories are mutually exclusive. Cases are only included in one race/ethnicity category.

<sup>4</sup> Incidence cases for breast *in situ* are not presented due to being less than 20 cases.

\* age-adjusted incidence rate not calculated when number of cases are less than 20.

**Table 16.**  
**AGE-ADJUSTED<sup>1</sup> INCIDENCE RATES<sup>2</sup> AND 95% CONFIDENCE LIMITS (95% CL) FOR SELECTED CANCER SITES BY**  
**RACE/ETHNICITY<sup>3</sup>**  
**Massachusetts, 1998-2002**  
**FEMALES**

Cancer Site/Type	All Races		White, non-Hispanic		Black, non-Hispanic		Asian, non-Hispanic		Hispanic	
	Rate	95%CL	Rate	95%CL	Rate	95%CL	Rate	95%CL	Rate	95%CL
<b>All Sites</b>	459.0	455.9-462.1	460.1	456.8-463.4	394.8	379.2-410.5	277.0	258.8-295.2	334.3	317.5-351.1
<b>Brain &amp; Other Nervous System</b>	6.3	5.9-6.7	6.5	6.1-6.9	2.6	1.4-3.7	*	1.0-4.0	5.6	3.7-7.4
<b>Breast</b>	144.8	143.0-146.5	146.7	144.8-148.5	116.3	107.9-124.6	69.6	61.1-78.2	90.1	81.6-98.5
<b>Bronchus &amp; Lung</b>	61.1	60.0-62.2	62.2	61.0-63.4	51.2	45.5-57.0	33.0	26.2-39.8	26.1	21.2-31.0
<b>Cervix Uteri</b>	7.1	6.7-7.5	6.2	5.8-6.6	13.5	10.7-16.2	8.9	5.8-12.1	16.4	12.9-19.8
<b>Colon / Rectum</b>	51.2	50.2-52.2	51.0	49.9-52.0	49.7	44.0-55.4	39.9	32.4-47.5	35.2	29.5-40.9
<b>Corpus Uteri &amp; Uterus, NOS</b>	28.6	27.8-29.3	28.7	27.8-29.5	21.2	17.6-24.9	14.3	10.4-18.1	24.8	20.4-29.3
<b>Esophagus</b>	2.5	2.3-2.8	2.4	2.2-2.6	4.4	2.7-6.0	*	*	*	*
<b>Hodgkin Lymphoma</b>	3.0	2.7-3.2	3.1	2.8-3.4	*	*	*	0.2-2.3	2.6	1.3-3.9
<b>Kidney &amp; Renal Pelvis</b>	9.6	9.2-10.1	9.7	9.2-10.2	10.7	8.2-13.2	*	*	6.1	3.9-8.3
<b>Larynx</b>	1.7	1.6-1.9	1.8	1.6-2.0	*	*	*	*	*	*
<b>Leukemia</b>	9.4	8.9-9.8	9.3	8.9-9.8	8.0	5.8-10.1	5.7	3.3-8.2	7.9	5.4-10.3
<b>Liver &amp; Intrahepatic Bile Ducts</b>	2.5	2.3-2.7	2.2	2.0-2.4	4.0	2.4-5.7	8.6	5.2-12.1	6.2	3.7-8.8
<b>Melanoma of Skin</b>	15.7	15.1-16.3	16.3	15.7-17.0	*	*	*	*	3.5	1.9-5.0
<b>Multiple Myeloma</b>	4.0	3.7-4.3	3.8	3.5-4.1	7.9	5.6-10.2	*	*	*	*
<b>Non-Hodgkin Lymphoma</b>	16.6	16.0-17.2	16.4	15.7-17.0	13.7	10.8-16.6	10.2	6.7-13.7	16.3	12.6-20.0
<b>Oral Cavity &amp; Pharynx</b>	6.9	6.5-7.3	6.7	6.3-7.1	6.6	4.6-8.6	9.1	5.9-12.4	5.1	3.0-7.1
<b>Ovary</b>	14.7	14.1-15.2	14.9	14.3-15.5	6.6	4.6-8.7	9.1	6.0-12.2	8.7	6.2-11.3
<b>Pancreas</b>	10.6	10.1-11.1	10.5	10.1-11.0	11.9	9.1-14.7	7.6	4.3-10.8	8.1	5.2-11.0
<b>Stomach</b>	5.3	5.0-5.6	4.9	4.6-5.2	9.2	6.7-11.7	9.4	5.9-12.8	8.9	6.0-11.8
<b>Thyroid</b>	12.6	12.1-13.1	12.5	11.9-13.1	8.5	6.3-10.6	16.4	12.6-20.2	9.9	7.5-12.3
<b>Urinary Bladder</b>	12.8	12.3-13.3	13.1	12.6-13.7	7.8	5.5-10.1	*	*	8.3	5.5-11.2
<b>Breast <i>in situ</i><sup>4</sup></b>	47.5	46.5-48.6	48.0	46.9-49.1	31.1	26.8-35.5	29.2	23.9-34.5	31.3	26.6-36.1

<sup>1</sup> age-adjusted to the 2000 U.S. Standard Population<sup>2</sup> per 100,000

<sup>3</sup> Race/ethnicity categories are mutually exclusive. Cases are only included in one race/ethnicity category.

<sup>4</sup> Breast *in situ* is excluded from all sites

\* age-adjusted incidence rate not calculated when there are less than 20 cases.

**Table 17.**  
**AGE-ADJUSTED<sup>1</sup> INCIDENCE RATES<sup>2</sup> AND 95% CONFIDENCE LIMITS (95% CL) FOR SELECTED CANCER SITES BY**  
**RACE/ETHNICITY<sup>3</sup>**  
**Massachusetts, 1998-2002**  
**TOTAL**

Cancer Site/Type	All Races		White, non-Hispanic		Black, non-Hispanic		Asian, non-Hispanic		Hispanic	
	Rate	95%CL	Rate	95%CL	Rate	95%CL	Rate	95%CL	Rate	95%CL
<b>All Sites</b>	522.0	519.6-524.5	519.1	516.5-521.6	527.6	513.6-541.6	305.3	290.7-319.8	412.5	398.0-427.1
<b>Brain &amp; Other Nervous System</b>	7.4	7.1-7.7	7.6	7.2-7.9	3.4	2.4-4.4	4.2	2.7-5.6	6.4	4.9-7.9
<b>Breast</b>	80.1	79.2-81.1	81.0	80.0-82.0	66.1	61.3-70.8	37.0	32.4-41.6	50.4	45.6-55.3
<b>Bronchus &amp; Lung</b>	73.0	72.1-73.9	73.7	72.7-74.6	70.2	65.0-75.4	43.8	37.9-49.6	40.5	35.7-45.3
<b>Cervix Uteri</b>	-	-	-	-	-	-	-	-	-	-
<b>Colon / Rectum</b>	60.2	59.4-61.1	60.0	59.1-60.9	57.2	52.5-62.0	43.4	37.6-49.3	42.0	37.2-46.8
<b>Corpus Uteri &amp; Uterus, NOS</b>	-	-	-	-	-	-	-	-	-	-
<b>Esophagus</b>	6.3	6.0-6.5	6.1	5.9-6.4	9.0	7.2-10.8	*	*	8.0	5.8-10.2
<b>Hodgkin Lymphoma</b>	3.3	3.1-3.5	3.5	3.3-3.7	2.0	1.3-2.8	*	*	3.1	2.1-4.2
<b>Kidney &amp; Renal Pelvis</b>	13.3	12.9-13.7	13.4	12.9-13.8	13.4	11.3-15.6	4.1	2.5-5.7	9.7	7.5-11.9
<b>Larynx</b>	4.5	4.3-4.8	4.4	4.2-4.7	6.7	5.1-8.3	*	*	5.2	3.6-6.8
<b>Leukemia</b>	11.5	11.1-11.8	11.5	11.1-11.9	8.7	6.9-10.4	6.2	4.2-8.1	9.1	7.1-11.1
<b>Liver &amp; Intrahepatic Bile Ducts</b>	5.1	4.9-5.4	4.4	4.2-4.7	7.5	5.8-9.1	17.3	14.0-20.6	11.4	9.0-13.9
<b>Melanoma of Skin</b>	18.7	18.2-19.1	19.4	18.8-19.9	*	*	*	*	3.6	2.3-4.9
<b>Multiple Myeloma</b>	5.1	4.8-5.3	4.8	4.6-5.1	10.5	8.5-12.5	*	*	5.3	3.5-7.0
<b>Non-Hodgkin Lymphoma</b>	19.4	18.9-19.9	19.1	18.6-19.6	17.4	15.0-19.9	14.0	11.0-17.1	18.4	15.4-21.4
<b>Oral Cavity &amp; Pharynx</b>	11.5	11.1-11.9	11.1	10.8-11.5	12.8	10.6-14.9	10.9	8.3-13.5	13.0	10.5-15.5
<b>Ovary</b>	-	-	-	-	-	-	-	-	-	-
<b>Pancreas</b>	11.9	11.5-12.2	11.7	11.3-12.1	14.7	12.3-17.1	7.2	4.9-9.6	10.3	7.8-12.7
<b>Prostate</b>	-	-	-	-	-	-	-	-	-	-
<b>Stomach</b>	8.3	8.0-8.6	7.7	7.4-8.0	14.4	12.0-16.8	13.3	10.2-16.4	13.9	11.1-16.7
<b>Testis</b>	-	-	-	-	-	-	-	-	-	-
<b>Thyroid</b>	8.6	8.2-8.9	8.5	8.2-8.9	5.6	4.3-6.9	11.2	8.8-13.6	6.3	4.9-7.8
<b>Urinary Bladder</b>	26.8	26.3-27.4	27.5	27.0-28.1	13.4	11.1-15.8	9.4	6.7-12.2	16.5	13.3-19.6
<b>Breast <i>in situ</i><sup>4</sup></b>	25.5	25.0-26.1	25.7	25.1-26.3	17.6	15.1-20.0	15.2	12.4-18.0	17.1	14.5-19.8

<sup>1</sup> age-adjusted to the 2000 U.S. Standard Population <sup>2</sup> per 100,000 <sup>3</sup> Race/ethnicity categories are mutually exclusive. Cases are only included in one race/ethnicity category; <sup>4</sup> Breast *in situ* is excluded from all sites. \* age-adjusted incidence rate not calculated when there are less than 20 cases. Dashed out cancers are found in only one sex.



**Table 18.**  
**MORTALITY CASES AND PERCENTAGE OF CASES FOR SELECTED CANCER SITES BY RACE/ETHNICITY<sup>1</sup>**  
**Massachusetts, 1998-2002**  
**MALES**

Cancer Site/Type	All Races <sup>2</sup>		White, non-Hispanic		Black, non-Hispanic		Asian, non-Hispanic		Hispanic	
	Cases	% of Cases	Cases	% of Cases	Cases	% of Cases	Cases	% of Cases	Cases	% of Cases
<b>All Sites</b>	34531	100.0	32248	100.0	1375	100.0	365	100.0	515	100.0
<b>Brain &amp; Other Nervous System</b>	827	2.4	783	2.4	18	1.3	10	2.7	16	3.1
<b>Breast</b>	33	0.1	31	0.1	1	0.1	1	0.3	0	0.0
<b>Bronchus &amp; Lung</b>	9964	28.9	9364	29.0	388	28.2	95	26.0	115	22.3
<b>Colon / Rectum</b>	3682	10.7	3465	10.7	144	10.5	30	8.2	40	7.8
<b>Esophagus</b>	1341	3.9	1251	3.9	62	4.5	7	1.9	19	3.7
<b>Hodgkin Lymphoma</b>	100	0.3	85	0.3	9	0.6	0	0.0	6	1.2
<b>Kidney &amp; Renal Pelvis</b>	810	2.3	776	2.4	19	1.4	7	1.9	7	1.4
<b>Larynx</b>	397	1.1	362	1.1	23	1.7	1	0.3	10	1.9
<b>Leukemia</b>	1285	3.7	1207	3.7	34	2.5	13	3.6	29	5.6
<b>Liver &amp; Intrahepatic Bile Ducts</b>	1007	2.9	846	2.6	52	3.8	66	18.1	43	8.3
<b>Melanoma of Skin</b>	608	1.8	593	1.8	3	0.2	2	0.5	10	1.9
<b>Multiple Myeloma</b>	588	1.7	540	1.7	36	2.6	0	0.0	11	2.1
<b>Non-Hodgkin Lymphoma</b>	1381	4.0	1315	4.1	28	2.0	18	4.9	17	3.3
<b>Oral Cavity &amp; Pharynx</b>	604	1.7	543	1.7	27	2.0	14	3.8	17	3.3
<b>Pancreas</b>	1754	5.1	1623	5.0	86	6.3	19	5.2	23	4.5
<b>Prostate</b>	3803	11.0	3548	11.0	187	13.6	14	3.8	50	9.7
<b>Stomach</b>	1008	2.9	896	2.8	63	4.6	20	5.5	28	5.4
<b>Testis</b>	44	0.1	41	0.1	1	0.1	1	0.3	1	0.2
<b>Thyroid</b>	60	0.2	52	0.2	7	0.5	1	0.3	0	0.0
<b>Urinary Bladder</b>	1138	3.3	1100	3.4	25	1.8	6	1.6	6	1.2
<b>Other Sites</b>	4097	11.9	3827	11.9	162	11.8	40	11.0	67	13.0

<sup>1</sup>Race/ethnicity categories are mutually exclusive. Deaths are only included in one race/ethnicity category.

<sup>2</sup>The number of cases for all races is not the sum of cases by race/ethnicity.

**Table 19.**  
**MORTALITY CASES AND PERCENTAGE OF CASES FOR SELECTED CANCER SITES BY RACE/ETHNICITY<sup>1</sup>**  
**Massachusetts, 1998-2002**  
**FEMALES**

Cancer Site / Type	All Races <sup>2</sup>		White, non-Hispanic		Black, non-Hispanic		Asian, non-Hispanic		Hispanic	
	Cases	% of Cases	Cases	% of Cases	Cases	% of Cases	Cases	% of Cases	Cases	% of Cases
<b>All Sites</b>	34767	100.0	32760	100.0	1176	100.0	339	100.0	452	100.0
<b>Brain &amp; Other Nervous System</b>	651	1.9	628	1.9	12	1.0	5	1.5	6	1.3
<b>Breast</b>	5300	15.2	4971	15.2	196	16.7	52	15.3	73	16.2
<b>Bronchus &amp; Lung</b>	8531	24.5	8168	24.9	227	19.3	68	20.1	58	12.8
<b>Cervix Uteri</b>	344	1.0	289	0.9	29	2.5	14	4.1	12	2.6
<b>Colon / Rectum</b>	3971	11.4	3745	11.4	138	11.7	37	10.9	47	10.4
<b>Corpus Uteri &amp; Uterus, NOS</b>	845	2.4	771	2.4	50	4.3	8	2.4	12	2.6
<b>Esophagus</b>	406	1.2	377	1.2	19	1.6	1	0.3	9	2.0
<b>Hodgkin Lymphoma</b>	87	0.3	84	0.3	1	0.1	0	0.0	2	0.4
<b>Kidney &amp; Renal Pelvis</b>	523	1.5	503	1.5	14	1.2	2	0.6	4	0.9
<b>Larynx</b>	107	0.3	97	0.3	8	0.7	1	0.3	1	0.2
<b>Leukemia</b>	1143	3.3	1069	3.3	37	3.1	13	3.8	24	5.3
<b>Liver &amp; Intrahepatic Bile Ducts</b>	497	1.4	439	1.3	19	1.6	18	5.3	21	4.6
<b>Melanoma of Skin</b>	384	1.1	381	1.2	1	0.1	0	0.0	1	0.2
<b>Multiple Myeloma</b>	629	1.8	571	1.7	43	3.7	2	0.6	13	2.9
<b>Non-Hodgkin Lymphoma</b>	1442	4.1	1363	4.2	39	3.3	16	4.7	22	4.9
<b>Oral Cavity &amp; Pharynx</b>	340	1.0	317	1.0	8	0.7	7	2.1	5	1.1
<b>Ovary</b>	1720	4.9	1645	5.0	35	3.0	14	4.1	25	5.5
<b>Pancreas</b>	2094	6.0	1975	6.0	72	6.1	17	5.0	27	6.0
<b>Stomach</b>	762	2.2	684	2.1	40	3.4	21	6.2	17	3.8
<b>Thyroid</b>	91	0.3	84	0.3	2	0.2	5	1.5	0	0.0
<b>Urinary Bladder</b>	604	1.7	574	1.8	22	1.9	1	0.3	6	1.3
<b>Other Sites</b>	4296	12.4	4025	12.3	164	13.9	37	10.9	67	14.8

<sup>1</sup> Race/ethnicity categories are mutually exclusive. Deaths are only included in one race/ethnicity category. <sup>2</sup> The number of cases for all races is not the sum of cases by race/ethnicity\* Age-adjusted mortality rate not calculated when number of deaths was less than 20.

**Table 20.**  
**MORTALITY CASES AND PERCENTAGE OF CASES FOR SELECTED CANCER SITES BY RACE/ETHNICITY<sup>1</sup>**  
**Massachusetts, 1998-2002**  
**TOTAL**

Cancer Site/Type	All Races <sup>2</sup>		White, non-Hispanic		Black, non-Hispanic		Asian, non-Hispanic		Hispanic	
	Cases	% of Cases	Cases	% of Cases	Cases	% of Cases	Cases	% of Cases	Cases	% of Cases
All Sites	69298	100.0	65008	100.0	2551	100.0	704	100.0	967	100.0
Brain & Other Nervous System	1478	2.1	1411	2.2	30	1.2	15	2.1	22	2.3
Breast	5333	7.7	5002	7.7	197	7.7	53	7.5	73	7.5
Bronchus & Lung	18495	26.7	17532	27.0	615	24.1	163	23.2	173	17.9
Cervix Uteri	344	0.5	289	0.4	29	1.1	14	2.0	12	1.2
Colon / Rectum	7653	11.0	7210	11.1	282	11.1	67	9.5	87	9.0
Corpus Uteri & Uterus, NOS	845	1.2	771	1.2	50	2.0	8	1.1	12	1.2
Esophagus	1747	2.5	1628	2.5	81	3.2	8	1.1	28	2.9
Hodgkin Lymphoma	187	0.3	169	0.3	10	0.4	0	0.0	8	0.8
Kidney & Renal Pelvis	1333	1.9	1279	2.0	33	1.3	9	1.3	11	1.1
Larynx	504	0.7	459	0.7	31	1.2	2	0.3	11	1.1
Leukemia	2428	3.5	2276	3.5	71	2.8	26	3.7	53	5.5
Liver & Intrahepatic Bile Ducts	1504	2.2	1285	2.0	71	2.8	84	11.9	64	6.6
Melanoma of Skin	992	1.4	974	1.5	4	0.2	2	0.3	11	1.1
Multiple Myeloma	1217	1.8	1111	1.7	79	3.1	2	0.3	24	2.5
Non-Hodgkin Lymphoma	2823	4.1	2678	4.1	67	2.6	34	4.8	39	4.0
Oral Cavity & Pharynx	944	1.4	860	1.3	35	1.4	21	3.0	22	2.3
Ovary	1720	2.5	1645	2.5	35	1.4	14	2.0	25	2.6
Pancreas	3848	5.6	3598	5.5	158	6.2	36	5.1	50	5.2
Prostate	3803	5.5	3548	5.5	187	7.3	14	2.0	50	5.2
Stomach	1770	2.6	1580	2.4	103	4.0	41	5.8	45	4.7
Testis	44	0.1	41	0.1	1	0.0	1	0.1	1	0.1
Thyroid	151	0.2	136	0.2	9	0.4	6	0.9	0	0.0
Urinary Bladder	1742	2.5	1674	2.6	47	1.8	7	1.0	12	1.2
Other Sites	8393	12.1	7852	12.1	326	12.8	77	10.9	134	13.9

<sup>1</sup> Race/ethnicity categories are mutually exclusive. Deaths are only included in one race/ethnicity category. <sup>2</sup> The number of cases for all races is not the sum of cases by race/ethnicity.

**Table 21.**  
**AGE-ADJUSTED<sup>1</sup> MORTALITY RATES<sup>2</sup> AND 95% CONFIDENCE LIMITS (95% CL) FOR SELECTED CANCER SITES BY**  
**RACE/ETHNICITY<sup>3</sup>**  
**Massachusetts, 1998-2002**  
**MALES**

Cancer Site / Type	All Races		White, non-Hispanic		Black, non-Hispanic		Asian, non-Hispanic		Hispanic	
	Rate	95%CL	Rate	95%CL	Rate	95%CL	Rate	95%CL	Rate	95%CL
<b>All Sites</b>	258.7	255.9-261.4	259.8	256.9-262.6	345.3	325.9-364.8	143.4	126.9-160.0	157.4	142.0-172.8
<b>Brain &amp; Other Nervous System</b>	5.7	5.4-6.1	6.0	5.6-6.4	*	*	*	*	*	*
<b>Breast</b>	0.2	0.2-0.3	0.2	0.2-0.3	*	*	*	*	*	*
<b>Bronchus &amp; Lung</b>	73.1	71.6-74.5	73.8	72.3-75.3	94.4	84.6-104.3	39.4	30.8-48.0	36.8	29.5-44.2
<b>Colon / Rectum</b>	27.9	27.0-28.9	28.2	27.3-29.2	37.0	30.6-43.5	11.2	6.7-15.8	13.3	8.7-18.0
<b>Esophagus</b>	9.7	9.2-10.3	9.8	9.3-10.3	14.4	10.6-18.2	*	*	*	*
<b>Hodgkin Lymphoma</b>	0.7	0.6-0.8	0.7	0.5-0.8	*	*	*	*	*	*
<b>Kidney &amp; Renal Pelvis</b>	5.9	5.5-6.4	6.1	5.7-6.6	*	*	*	*	*	*
<b>Larynx</b>	2.9	2.6-3.2	2.9	2.6-3.1	5.4	3.1-7.7	*	*	*	*
<b>Leukemia</b>	9.6	9.1-10.1	9.7	9.2-10.3	8.0	5.1-10.9	*	*	6.0	3.3-8.7
<b>Liver &amp; Intrahepatic Bile Ducts</b>	7.2	6.8-7.7	6.6	6.2-7.1	11.1	7.8-14.3	19.9	14.7-25.1	11.3	7.5-15.1
<b>Melanoma of Skin</b>	4.4	4.0-4.7	4.6	4.3-5.0	*	*	*	*	*	*
<b>Multiple Myeloma</b>	4.4	4.1-4.8	4.4	4.0-4.7	8.9	5.8-12.0	*	*	*	*
<b>Non-Hodgkin Lymphoma</b>	10.3	9.7-10.8	10.5	10.0-11.1	6.3	3.8-8.7	*	*	*	*
<b>Oral Cavity &amp; Pharynx</b>	4.4	4.0-4.7	4.3	3.9-4.6	5.8	3.5-8.1	*	*	*	*
<b>Pancreas</b>	13.0	12.3-13.6	12.9	12.3-13.5	20.4	15.8-25.0	*	*	6.9	3.8-10.0
<b>Prostate</b>	31.1	30.1-32.1	30.8	29.8-31.9	60.0	51.0-68.9	*	*	22.3	15.8-28.8
<b>Stomach</b>	7.6	7.1-8.1	7.3	6.8-7.8	15.9	11.7-20.1	8.3	4.0-12.5	8.9	5.1-12.6
<b>Testis</b>	0.3	0.2-0.4	0.3	0.2-0.4	*	*	*	*	*	*
<b>Thyroid</b>	0.4	0.3-0.6	0.4	0.3-0.5	*	*	*	*	*	*
<b>Urinary Bladder</b>	9.0	8.4-9.5	9.2	8.7-9.8	7.3	4.2-10.3	*	*	*	*

<sup>1</sup> age-adjusted to the 2000 U.S. Standard Population

<sup>2</sup> per 100,000

<sup>3</sup> Race/ethnicity categories are mutually exclusive. Deaths are only included in one race/ethnicity category.

\*age-adjusted mortality rate not calculated when number of deaths was less than 20.

**Table 22.**  
**AGE-ADJUSTED<sup>1</sup> MORTALITY RATES<sup>2</sup> AND 95% CONFIDENCE LIMITS (95% CL) FOR SELECTED CANCER SITES BY**  
**RACE/ETHNICITY<sup>3</sup>**  
**Massachusetts, 1998-2002**  
**FEMALES**

Cancer Site / Type	All Races		White, non-Hispanic		Black, non-Hispanic		Asian, non-Hispanic		Hispanic	
	Rate	95%CL	Rate	95%CL	Rate	95%CL	Rate	95%CL	Rate	95%CL
<b>All Sites</b>	174.1	172.2–175.9	176.0	174.0–177.9	197.4	186.0–208.8	109.1	96.8–121.4	100.2	90.4–110.1
<b>Brain &amp; Other Nervous System</b>	3.5	3.3–3.8	3.7	3.4–4.0	*	*	*	*	*	*
<b>Breast</b>	27.4	26.6–28.1	27.7	26.9–28.5	31.0	26.6–35.4	15.3	10.9–19.7	13.8	10.5–17.2
<b>Bronchus &amp; Lung</b>	44.1	43.2–45.1	45.5	44.4–46.5	38.5	33.5–43.5	23.8	17.9–29.7	14.5	10.6–18.3
<b>Cervix Uteri</b>	1.9	1.7–2.1	1.8	1.5–2.0	4.5	2.8–6.1	*	*	*	*
<b>Colon / Rectum</b>	18.6	18.0–19.2	18.7	18.0–19.3	24.4	20.3–28.5	13.8	9.1–18.5	11.5	8.0–14.9
<b>Corpus Uteri &amp; Uterus, NOS</b>	4.2	3.9–4.5	4.1	3.8–4.4	8.6	6.2–11.0	*	*	*	*
<b>Esophagus</b>	2.0	1.8–2.2	2.0	1.7–2.2	*	*	*	*	*	*
<b>Hodgkin Lymphoma</b>	0.5	0.4–0.6	0.5	0.4–0.6	*	*	*	*	*	*
<b>Kidney &amp; Renal Pelvis</b>	2.6	2.4–2.8	2.7	2.5–2.9	*	*	*	*	*	*
<b>Larynx</b>	0.6	0.4–0.7	0.5	0.4–0.7	*	*	*	*	*	*
<b>Leukemia</b>	5.6	5.3–5.9	5.6	5.2–5.9	5.8	3.9–7.8	*	*	4.0	2.1–5.8
<b>Liver &amp; Intrahepatic Bile Ducts</b>	2.4	2.2–2.6	2.2	2.0–2.4	*	*	*	*	5.2	2.9–7.5
<b>Melanoma of Skin</b>	2.0	1.8–2.2	2.2	2.0–2.4	*	*	*	*	*	*
<b>Multiple Myeloma</b>	3.1	2.9–3.4	3.0	2.8–3.3	7.4	5.2–9.7	*	*	*	*
<b>Non-Hodgkin Lymphoma</b>	7.0	6.6–7.4	7.1	6.7–7.4	6.6	4.5–8.7	*	*	4.7	2.6–6.8
<b>Oral Cavity &amp; Pharynx</b>	1.7	1.5–1.9	1.7	1.5–1.9	*	*	*	*	*	*
<b>Ovary</b>	9.0	8.5–9.4	9.3	8.8–9.7	6.0	4.0–8.0	*	*	5.1	3.0–7.2
<b>Pancreas</b>	10.2	9.8–10.6	10.3	9.8–10.7	12.4	9.5–15.3	*	*	7.0	4.3–9.8
<b>Stomach</b>	3.6	3.3–3.9	3.4	3.2–3.7	7.2	5.0–9.4	6.6	3.6–9.5	*	*
<b>Thyroid</b>	0.4	0.3–0.5	0.4	0.3–0.5	*	*	*	*	*	*
<b>Urinary Bladder</b>	2.8	2.5–3.0	2.8	2.6–3.0	3.9	2.3–5.6	*	*	*	*

<sup>1</sup> age-adjusted to the 2000 U.S. Standard Population

<sup>2</sup> per 100,000

<sup>3</sup> Race/ethnicity categories are mutually exclusive. Deaths are only included in one race/ethnicity category.

\*age-adjusted mortality rate not calculated when number of deaths was less than 20.

**Table 23.**  
**AGE-ADJUSTED<sup>1</sup> MORTALITY RATES<sup>2</sup> AND 95% CONFIDENCE LIMITS (95% CL) FOR SELECTED**  
**CANCER SITES BY RACE/ETHNICITY<sup>3</sup>**  
**Massachusetts, 1998-2002**  
**TOTAL**

Cancer Site / Type	All Races		White, non-Hispanic		Black, non-Hispanic		Asian, non-Hispanic		Hispanic	
	Rate	95%CL	Rate	95%CL	Rate	95%CL	Rate	95%CL	Rate	95%CL
All Sites	205.6	204.1-207.2	207.0	205.4-208.5	254.8	244.6-264.9	123.9	114.0-133.8	123.7	115.1-132.2
Brain & Other Nervous System	4.5	4.3-4.8	4.7	4.5-5.0	2.4	1.5-3.3	*	*	1.6	0.8-2.4
Breast	15.9	15.5-16.3	16.1	15.6-16.5	18.1	15.5-20.7	8.6	6.1-11.0	7.8	5.8-9.7
Bronchus & Lung	55.5	54.7-56.3	56.6	55.7-57.4	61.0	56.1-65.9	30.9	25.8-35.9	23.9	20.1-27.7
Cervix Uteri	- <sup>4</sup>	-	-	-	-	-	-	-	-	-
Colon / Rectum	22.4	21.9-22.9	22.5	22.0-23.0	29.6	26.1-33.1	13.0	9.6-16.4	12.1	9.4-14.9
Corpus Uteri & Uterus, NOS	-	-	-	-	-	-	-	-	-	-
Esophagus	5.3	5.0-5.5	5.3	5.0-5.5	7.9	6.1-9.6	*	*	4.1	2.5-5.7
Hodgkin Lymphoma	0.6	0.5-0.6	0.6	0.5-0.7	*	*	*	*	*	*
Kidney & Renal Pelvis	4.0	3.8-4.2	4.1	3.9-4.3	3.3	2.2-4.5	*	*	*	*
Larynx	1.5	1.4-1.7	1.5	1.3-1.6	3.1	2.0-4.2	*	*	*	*
Leukemia	7.2	6.9-7.5	7.2	6.9-7.5	6.7	5.1-8.3	4.4	2.5-6.3	4.9	3.3-6.5
Liver & Intrahepatic Bile Ducts	4.5	4.3-4.7	4.1	3.9-4.4	6.6	5.0-8.2	12.4	9.6-15.3	7.9	5.8-10.0
Melanoma of Skin	3.0	2.8-3.2	3.2	3.0-3.4	*	*	*	*	*	*
Multiple Myeloma	3.6	3.4-3.8	3.5	3.3-3.7	8.1	6.3-9.9	*	*	3.6	2.1-5.1
Non-Hodgkin Lymphoma	8.3	8.0-8.6	8.5	8.1-8.8	6.7	5.0-8.3	6.6	4.1-9.0	4.5	2.9-6.0
Oral Cavity & Pharynx	2.9	2.7-3.0	2.8	2.6-3.0	3.2	2.1-4.3	2.9	1.5-4.3	2.6	1.4-3.8
Ovary	-	-	-	-	-	-	-	-	-	-
Pancreas	11.4	11.0-11.8	11.4	11.0-11.8	15.8	13.3-18.3	6.2	4.1-8.4	7.1	5.0-9.2
Prostate	-	-	-	-	-	-	-	-	-	-
Stomach	5.2	5.0-5.4	4.9	4.7-5.2	10.8	8.7-12.9	7.2	4.8-9.6	5.5	3.7-7.3
Testis	-	-	-	-	-	-	-	-	-	-
Thyroid	0.4	0.4-0.5	0.4	0.4-0.5	*	*	*	*	*	*
Urinary Bladder	5.0	4.8-5.3	5.2	4.9-5.4	5.2	3.7-6.7	*	*	*	*

<sup>1</sup> age-adjusted to the 2000 U.S. Standard Population <sup>2</sup> per 100,000

<sup>3</sup> Race/ethnicity categories are mutually exclusive <sup>4</sup> Dashed out cancers are found in only one sex

\*age-adjusted mortality rate not calculated when number of deaths was less than 20.

**Table 24.**  
**INCIDENCE AND MORTALITY RATES<sup>1</sup> FOR SELECTED CANCER SITES BY SEX<sup>2</sup>**  
**Massachusetts Residents, 1998-2002, and NAACCR Registries , 1997-2001**

Cancer Site / Type	MALES				FEMALES			
	Incidence		Mortality		Incidence		Mortality	
	MA	NAACCR	MA	NAACCR	MA	NAACCR	MA	NAACCR
<b>All Sites</b>	620.0	566.1	258.7	258.3	459.0	420.0	174.1	173.9
<b>Brain &amp; Other Nervous System</b>	8.8	8.0	5.7	5.6	6.3	6.4	3.5	3.6
<b>Breast</b>	1.4	1.4	0.2	0.3	144.8	132.2	27.4	27.8
<b>Bronchus &amp; Lung</b>	91.1	90.0	73.1	73.2	61.1	54.0	44.1	43.5
<b>Cervix Uteri</b>	— <sup>3</sup>	—	—	—	7.1	9.7	1.9	2.0
<b>Colon / Rectum</b>	72.7	67.1	27.9	28.2	51.2	48.7	18.6	18.7
<b>Corpus Uteri &amp; Uterus, NOS</b>	—	—	—	—	28.6	23.5	4.2	4.1
<b>Esophagus</b>	11.2	8.5	9.7	9.4	2.5	2.2	2.0	2.0
<b>Hodgkin Lymphoma</b>	3.8	3.2	0.7	0.6	3.0	2.5	0.5	0.5
<b>Kidney &amp; Renal Pelvis</b>	18.1	16.7	5.9	6.1	9.6	8.5	2.6	2.6
<b>Larynx</b>	8.2	8.1	2.9	2.8	1.7	1.7	0.6	0.5
<b>Leukemia</b>	14.4	15.7	9.6	9.7	9.4	9.4	5.6	5.6
<b>Liver &amp; Intrahepatic Bile Ducts</b>	8.4	6.7	7.2	5.9	2.5	2.3	2.4	1.8
<b>Melanoma of Skin</b>	23.3	19.2	4.4	4.5	15.7	12.3	2.0	2.1
<b>Multiple Myeloma</b>	6.5	6.6	4.4	4.3	4.0	4.5	3.1	3.0
<b>Non-Hodgkin Lymphoma</b>	23.3	22.7	10.3	10.3	16.6	16.1	7.0	7.2
<b>Oral Cavity &amp; Pharynx</b>	17.2	16.4	4.4	4.3	6.9	6.5	1.7	1.7
<b>Ovary</b>	—	—	—	—	14.7	14.2	9.0	8.6
<b>Pancreas</b>	13.5	12.7	13.0	12.5	10.6	9.9	10.2	10.0
<b>Prostate</b>	186.2	166.7	31.1	31.7	—	—	—	—
<b>Stomach</b>	12.5	11.4	7.6	7.8	5.3	5.3	3.6	3.6
<b>Testis</b>	6.4	5.3	0.3	0.3	—	—	—	—
<b>Thyroid</b>	4.3	3.7	0.4	0.5	12.6	10.1	0.4	0.4
<b>Urinary Bladder</b>	47.4	39	9.0	9.1	12.8	10.1	2.8	2.7
<b>Breast <i>in situ</i><sup>2</sup></b>	—	—	—	—	47.5	27.9	—	—

<sup>1</sup> Rates are age- adjusted to the 2000 U.S. Standard Population

<sup>2</sup> Breast *in situ* is excluded from all sites, from breast cancer type and is not presented for males

<sup>3</sup> Dashed out cancers found in only one sex.

**SPECIAL SECTION:**  
**LUNG CANCER**



## LUNG CANCER

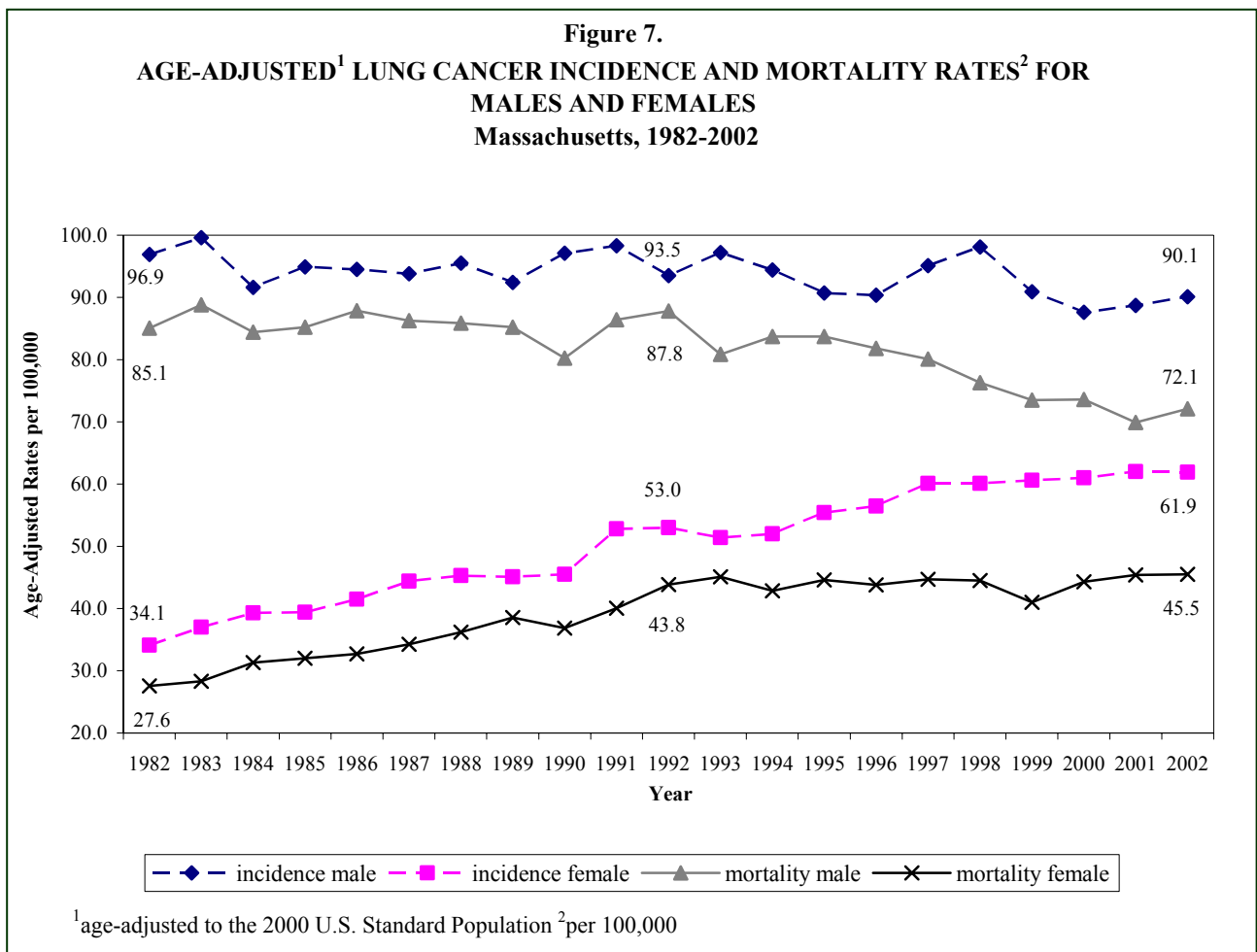
### Introduction

*Note: All information and data below refer to both lung cancer and to cancer of the bronchus.*

Lung cancer is the second leading type of cancer diagnosed in both males and females and the number one cause of cancer death among both sexes in Massachusetts. For the period 1998-2002, the average annual age-adjusted incidence rates of lung cancer were 91 cases per 100,000 males and 61 cases per 100,000 females (Tables 15,16). Massachusetts males were 1.5 times more likely to develop lung cancer than females. The age-adjusted mortality rate of lung cancer was higher in males (73 deaths per 100,000 males) than in females (44 deaths per 100,000 females) in the period 1998-2002 (Tables 21,22). Massachusetts males were about 1.6 times more likely to die from lung cancer than females.

The national survival rates for lung cancer during 1995-2000 demonstrated that 13.6% of males and 17.2% of females survived five years after diagnosis (16). There are no screening tests to detect lung cancer at its early stages and the main risk factor of smoking has a cumulative effect on the lungs. The Massachusetts Tobacco Control Program promotes cessation programs among smokers in the state in an effort to decrease lung cancer incidence.

### Long Term Incidence and Mortality Trends

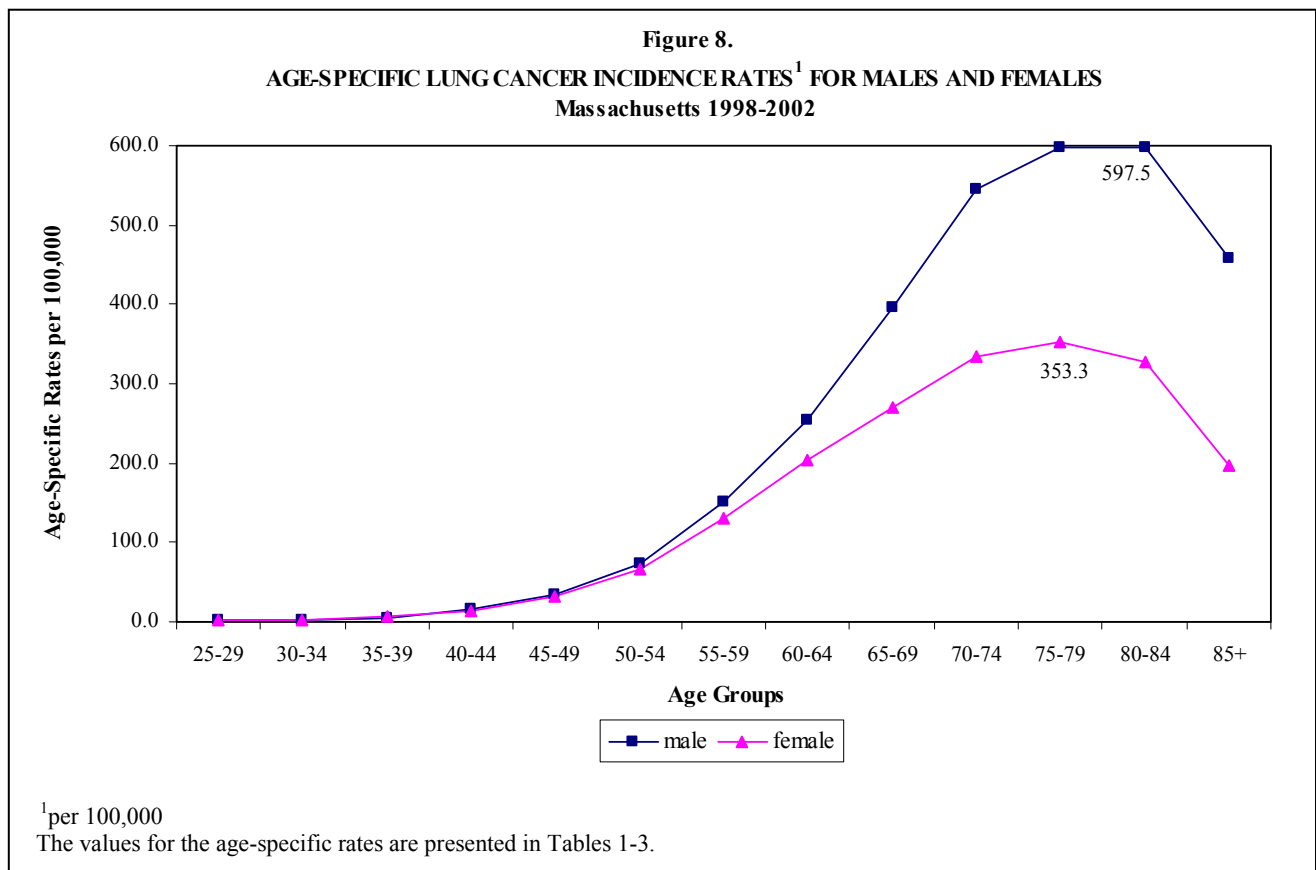


Age-adjusted incidence and mortality rates for Massachusetts males and females for the years 1982 to 2002 are presented in Figure 7. Both incidence and mortality rates remained higher for males than for females throughout the whole time period. Incidence and mortality rates for males exhibited an overall decrease, while incidence and mortality rates for females increased during the same time period.

The long-term incidence and mortality trends for each sex were analyzed using a Joinpoint regression model as described in the section METHODS of this report. The results of the analysis are as follows:

- The incidence rate for males steadily declined 0.4% per year for the whole period.
- The mortality rate for males declined an annual 0.3% until 1995, then adjusted to an annual 2.5% drop until 2002.
- The incidence rate for females showed an annual 4.0% growth until 1995, then adjusted to an annual 1.9 % increase until 2002.
- The mortality rate for females increased annually by 4.2% until 1993, then stabilized with only an annual 0.1% incline until 2002.

**Age-Specific Incidence Rates by Sex**



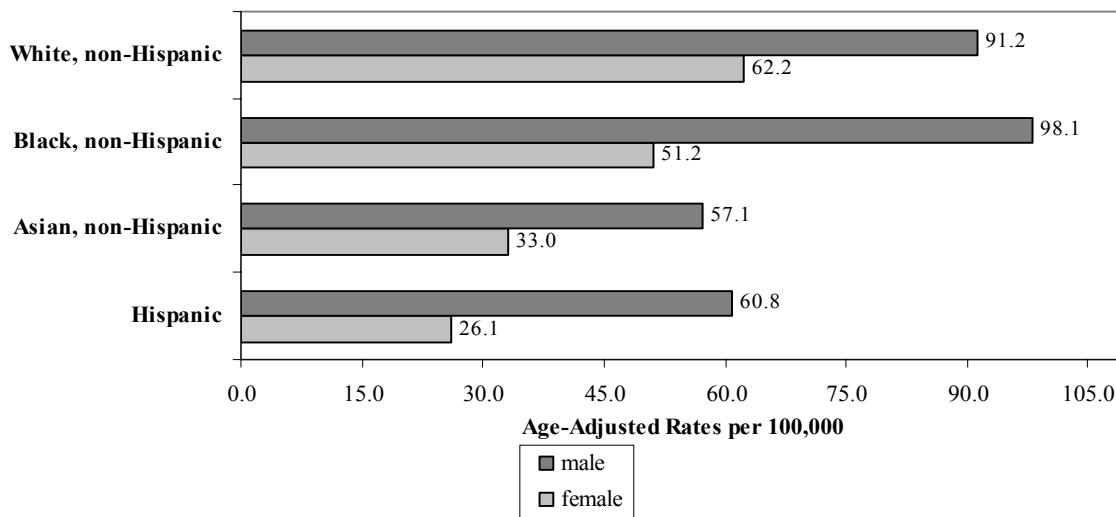
The age-specific incidence rates for all Massachusetts residents were low under the age 39, then made a dramatic rise starting at the age of 40. The males' rate rose to a plateau at 598 per 100,000 in the age groups 75-79 and 80-84 while the females' rate peaked at 353 per 100,000 in the age group 75-79. The median age for developing lung cancer was 71 years old for both males and females during the period of 1998-2002, as shown in Tables 1 through 3.

Several possible explanations exist for the patterns of age-adjusted and age-specific rates. Lung cancer became a milestone in epidemiology when its predominant cause, tobacco smoking, was revealed in a series of landmark studies beginning in 1950 (17). Tobacco smoking is a risk factor with a cumulative effect over time, and can manifest in a population as gradual changes in the rates. While the average age for people who develop lung cancer is over 70, most smokers start the habit in their teenage years (18). Until the mid-80's, smoking prevalence among females had been substantially lower than smoking prevalence among males. However, the gender gap narrowed during the mid-1980's and overall trend in Massachusetts has been for women smoking rates to be several percentage points below male smoking rates throughout the 90's and years 2000 through 2002. Similarly, adolescent girls throughout much of the 90's were more likely to acknowledge smoking in the past thirty days than were adolescent boys. Of those adolescents who acknowledged smoking, however, males were more likely to smoke more often than were adolescent females (19). Another explanation may come from the fact that females' prevalence of smoking reached its peak in the cohort of females born between 1935 and 1944 (20).

The best prevention for lung cancer is to not smoke or quit smoking. The Massachusetts Tobacco Control Program provides information about cessation services in the state and provides telephone counseling for those smokers who want to quit smoking.

***Incidence Rates by Race/Ethnicity and Sex***

**Figure 9.**  
**AVERAGE ANNUAL AGE-ADJUSTED<sup>1</sup> LUNG CANCER INCIDENCE<sup>2</sup> RATES FOR MALES AND FEMALES**  
**Massachusetts, 1998-2002**



<sup>1</sup>age-adjusted to the 2000 U.S. standard populations <sup>2</sup>per 100,000

- Black, non-Hispanic males and white, non-Hispanic females had the highest lung cancer incidence rates.
- Black, non-Hispanic males had an incidence rate 1.9 times higher than Asian, non-Hispanic males.
- White, non-Hispanic females had an incidence rate 2.4 times higher than Hispanic females.
- Mortality rates by sex and race/ethnicity showed the same patterns of incidence rates.

One of the possible reasons for the observed race/ethnicity discrepancies might be attributed to different smoking habits among the different population groups. In 2003, 20% of white, non-Hispanic, 17% of black, non-Hispanic, 19% of Hispanic, and 9% of Asian, non-Hispanic Massachusetts adults were current smokers (21). Incidence rates were highest in black, non-Hispanics male population (Figure 9). Whites are more likely to quit smoking than blacks. Furthermore, blacks are more likely to smoke mentholated cigarettes than whites. Mentholated cigarettes have qualities that may lead to a higher likelihood of lung cancer than non-mentholated brands (22, 4).

### ***Lung Cancer by Histology Groups and Sex***

The two main histological groups of lung cancer are small cell carcinomas and non-small cell carcinomas. The five-year relative survival rate for all stages of small cell lung cancer combined is 6.5% and for non-small cell lung cancer combined is 16.9% (16). The small cell carcinomas are more aggressive types of lung cancers in comparison to the non-small cell carcinomas. The histology is an important factor for making the correct treatment decisions for the patient. In Massachusetts from 1998-2002, small cell lung carcinoma comprised 12.7% of the male patients, 13.9% of the female patients and 13.2% among both sexes combined. Small cell lung cancer can have a serious impact on the prognosis. This type of lung cancer usually develops a resistance to chemotherapy (23). The recurrence of small cell lung carcinoma can develop into a metastasized cancer and repeated chemotherapy treatment may not be effective.

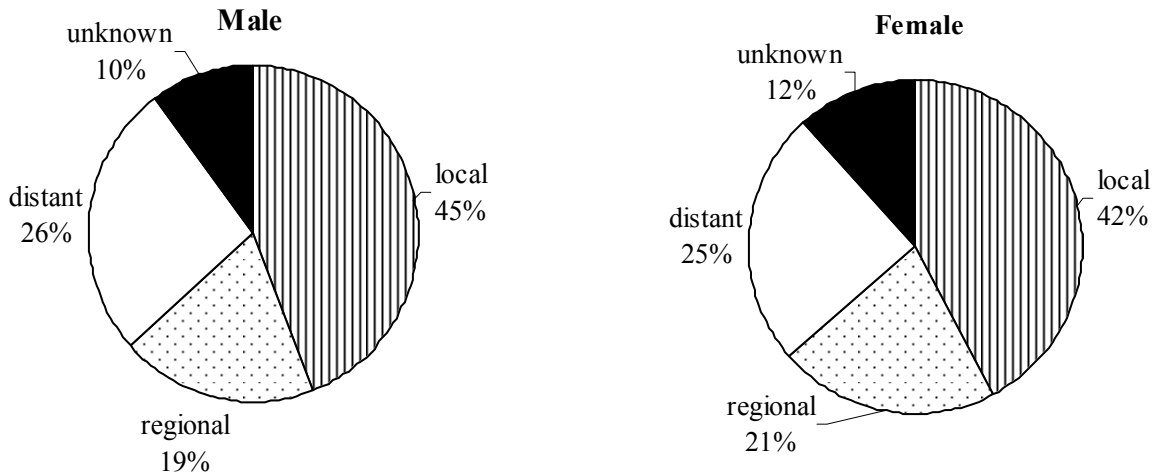
### ***Lung Cancer by Stage and Sex***

Lung cancer is staged according to the morphology that is found after a biopsy.

These are five definitions of stages when determining treatment options and prognosis (24).

1. ***In Situ (early stage)***  
The earliest stage of cancer, before the cancer has spread, when it is limited to a small number of cells and has not invaded the organ itself.
2. ***Localized (early stage)***  
The cancer is found only in the body part (organ) where it began; it hasn't spread to any other parts.
3. ***Regional (late stage)***  
The cancer has spread beyond the original point where it started to the nearest surrounding part of the body (other tissues).
4. ***Distant (late stage)***  
The cancer has spread to parts of the body far away from the original point where it began. This is the most difficult stage to treat, since the cancer has spread throughout the body.
5. ***Unstaged***  
There is not enough information about the cancer to assign a stage.

**Figure 10.**  
**INVASIVE LUNG CANCER CASES DISTRIBUTION BY STAGE AND SEX**  
**Massachusetts, 1998-2002**



\* *In situ* excluded due to a small number of cases <20

As shown at the figure 10, lung cancer was detected at a local stage in 45% of the males and 42% of the females. Combining the distant and regional stages, 45% of males and 46% of females were diagnosed with a late stage of lung cancer.

***Probability of Developing or Dying from Lung Cancer***

The probability of being diagnosed with or dying from lung cancer was calculated using the SEER developed software, as described in the section METHODS of this report. The results are presented as tables 25,26 showing the probability (in percentage) of a person at a specific five-year age group and sex being diagnosed with or dying from lung cancer for every five years past their present age or remaining lifetime. The lifetime was restricted to the age 85 for this analysis.

It is important to note that the numbers in these tables combine smokers and non-smokers. Because smoking is the most important risk factor for lung cancer, the probabilities will differ depending on whether one is a smoker or non-smoker.

Steps on finding the probability of developing lung cancer or the probability of dying from lung cancer:

- Find the individual’s age in the ‘current age’ column
- Look across the row for the number that corresponds to the sex and age of interest for the probability of developing lung cancer or probability of dying from lung cancer
- The number is the probability of developing cancer or dying from cancer for an alive and cancer-free individual at the age of interest when you are at the current age.
- Example: For a 50 year old man, the probability of developing lung cancer by age 70 is 3.5%. A woman of the same age has a 2.8% probability of developing cancer by age 70.

**Table 25.**  
**PROBABILITY OF DEVELOPING LUNG CANCER BY A SPECIFIC AGE FOR MALES AND**  
**FEMALES**  
**Massachusetts, 1998-2002**

current age	Percentage Estimate of Developing Lung Cancer by a Certain Age																	
	45		50		55		60		65		70		75		80		85	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
<b>0-85 yrs</b>	0.1	0.1	0.3	0.3	0.6	0.6	1.2	1.1	2.2	1.9	3.5	3.0	5.1	4.2	6.6	5.3	7.6	6.1
<b>5 yrs</b>	0.1	0.1	0.3	0.3	0.6	0.6	1.2	1.1	2.2	1.9	3.6	3.0	5.2	4.2	6.6	5.3	7.6	6.1
<b>10 yrs</b>	0.1	0.1	0.3	0.3	0.6	0.6	1.2	1.1	2.2	1.9	3.6	3.0	5.2	4.2	6.6	5.3	7.6	6.1
<b>15 yrs</b>	0.1	0.1	0.3	0.3	0.6	0.6	1.2	1.1	2.2	1.9	3.6	3.0	5.2	4.2	6.6	5.3	7.6	6.1
<b>20 yrs</b>	0.1	0.1	0.3	0.3	0.6	0.6	1.2	1.1	2.2	1.9	3.6	3.0	5.2	4.2	6.6	5.3	7.6	6.1
<b>25 yrs</b>	0.1	0.1	0.3	0.3	0.6	0.6	1.2	1.1	2.2	1.9	3.6	3.0	5.2	4.2	6.7	5.3	7.7	6.1
<b>30 yrs</b>	0.1	0.1	0.3	0.3	0.6	0.6	1.2	1.1	2.2	1.9	3.6	3.0	5.2	4.2	6.7	5.3	7.7	6.1
<b>35 yrs</b>	0.1	0.1	0.3	0.2	0.6	0.5	1.2	1.1	2.2	1.9	3.6	3.0	5.3	4.2	6.7	5.3	7.7	6.1
<b>40 yrs</b>	0.1	0.1	0.2	0.2	0.6	0.5	1.2	1.1	2.2	1.9	3.6	3.0	5.3	4.2	6.8	5.3	7.8	6.1
<b>45 yrs</b>			0.2	0.1	0.5	0.5	1.2	1.0	2.2	1.9	3.6	2.9	5.3	4.1	6.8	5.3	7.8	6.1
<b>50 yrs</b>					0.3	0.3	1.0	0.9	2.1	1.7	3.5	2.8	5.2	4.0	6.7	5.2	7.8	6.0
<b>55 yrs</b>							0.7	0.6	1.8	1.5	3.2	2.6	5.0	3.8	6.6	5.0	7.7	5.8
<b>60 yrs</b>									1.1	0.9	2.7	2.0	4.5	3.3	6.2	4.5	7.3	5.4
<b>65 yrs</b>											1.7	1.2	3.6	2.5	5.4	3.8	6.6	4.7
<b>70 yrs</b>													2.2	1.4	4.2	2.8	5.5	3.8
<b>75 yrs</b>															2.3	1.5	4.0	2.6
<b>80 yrs</b>																	2.1	1.3

There was a less than a 0.1% chance of developing lung cancer or dying from lung cancer before the age of 45. Therefore, those age segments were not included in this table.

The overall probability of developing lung cancer over the lifespan (0-85 years) was 7.6% for males and 6.1% for females.

**Table 26.**  
**PROBABILITY OF DYING OF LUNG CANCER BY A SPECIFIC AGE FOR MALES AND FEMALES**  
**Massachusetts, 1998-2002**

current age	Percentage Estimate of Dying from Lung Cancer by a Certain Age																	
	45		50		55		60		65		70		75		80		85	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
<b>0-85 yrs</b>	0.1	0.1	0.2	0.1	0.4	0.3	0.9	0.7	1.6	1.3	2.7	2.0	4.0	2.9	5.4	3.9	6.4	4.7
<b>5 yrs</b>	0.1	0.1	0.2	0.1	0.4	0.3	0.9	0.7	1.6	1.3	2.7	2.0	4.1	3.0	5.4	3.9	6.5	4.7
<b>10 yrs</b>	0.1	0.1	0.2	0.1	0.4	0.3	0.9	0.7	1.6	1.3	2.7	2.0	4.1	3.0	5.4	3.9	6.5	4.7
<b>15 yrs</b>	0.1	0.1	0.2	0.1	0.4	0.3	0.9	0.7	1.6	1.3	2.7	2.0	4.1	3.0	5.4	3.9	6.5	4.7
<b>20 yrs</b>	0.1	0.1	0.2	0.1	0.4	0.3	0.9	0.7	1.6	1.3	2.7	2.0	4.1	3.0	5.4	3.9	6.5	4.7
<b>25 yrs</b>	0.1	0.1	0.2	0.1	0.4	0.3	0.9	0.7	1.6	1.3	2.7	2.0	4.1	3.0	5.5	3.9	6.5	4.8
<b>30 yrs</b>	0.1	0.1	0.2	0.1	0.4	0.3	0.9	0.7	1.6	1.3	2.7	2.0	4.1	3.0	5.5	3.9	6.6	4.8
<b>35 yrs</b>	0.1	0.1	0.2	0.1	0.4	0.3	0.9	0.7	1.6	1.3	2.7	2.0	4.1	3.0	5.5	4.0	6.6	4.8
<b>40 yrs</b>	0.0	0.0	0.2	0.1	0.4	0.3	0.9	0.7	1.6	1.3	2.7	2.0	4.2	3.0	5.5	4.0	6.6	4.8
<b>45 yrs</b>			0.1	0.1	0.4	0.3	0.8	0.6	1.6	1.2	2.7	2.0	4.2	3.0	5.6	3.9	6.7	4.8
<b>50 yrs</b>					0.2	0.2	0.7	0.6	1.5	1.2	2.7	1.9	4.1	2.9	5.5	3.9	6.7	4.7
<b>55 yrs</b>							0.5	0.4	1.3	1.0	2.5	1.8	4.0	2.8	5.4	3.8	6.6	4.6
<b>60 yrs</b>									0.8	0.6	2.1	1.4	3.6	2.5	5.2	3.5	6.4	4.4
<b>65 yrs</b>											1.3	0.9	3.0	1.9	4.6	3.0	6.0	3.9
<b>70 yrs</b>													1.9	1.1	3.7	2.3	5.2	3.3
<b>75 yrs</b>															2.2	1.3	3.9	2.4
<b>80 yrs</b>																	2.3	1.3

The overall probability of dying from lung cancer over the lifespan (0-85 years) was 6.4 % for males and 4.7% for females.

See Table 25 for further discussion of these charts and how to interpret them.

### SUMMARY

- Male incidence and mortality age-adjusted rates decreased over the last decade.
- Female incidence and mortality age-adjusted rates have continued to grow since 1982, but at a slower rate since mid-1990's.
- Male age-specific rates remained higher than female age-specific-rates for all ages.
- Black, non-Hispanic males and white, non-Hispanic females had the highest incidence rate of lung cancer among race/ethnicity groups.
- Lung cancer was detected at an early stage in less than 50% of males and females.
- The probability of developing lung cancer over the life span 0-85 years was 7.6% for males and 6.1% for females.

- The probability of dying from lung cancer over the life span 0-85 years was 6.4 % for males and 4.7 % for females.

References appear at the end of the report.



# **APPENDICES**

**APPENDIX I**

**ICD CODES USED FOR THIS REPORT**

<b>Cancer Site/Type</b>	<i>Codes</i>		
	<b>ICD-O-3*</b>	<b>ICD-9**</b>	<b>ICD-10***</b>
<b>Brain &amp; Other Nervous System</b>	C70.0 - C72.9 except 9590 - 9989	191 - 192	C70 - C72
<b>Breast Includes <i>in situ</i></b>	C50.0 - C50.9 except 9590 - 9989	174 - 175	C50
<b>Bronchus &amp; Lung</b>	C34.0 - C34.9 except 9590 - 9989	162.2 - 162.9	C34
<b>Cervix Uteri</b>	C53.0 - C53.9 except 9590 - 9989	180	C53
<b>Colon/Rectum</b>	C18.0 - C18.9, C19.9, C20.9, C26.0 except 9590 - 9989	153, 154.0 - 154.1, 159.0	C18 - C20, C26.0
<b>Corpus Uteri &amp; Uterus, NOS</b>	C54.0 - C54.9, C55.9 except 9590 - 9989	179, 182	C54 - C55
<b>Esophagus</b>	C15.0 - C15.9 except 9590 - 9989	150	C15
<b>Hodgkin Lymphoma</b>	C00.0 - C80.9 (includes 9650 - 9667)	201	C81
<b>Kidney &amp; Renal Pelvis</b>	C64.9, C65.9 except 9590 - 9989	189.0 - 189.1	C64 - C65
<b>Larynx</b>	C32.0 - C32.9 except 9590 - 9989	161	C32

<b>Leukemia</b>	C00.0 - C80.9 (includes 9733,9742, 9800 - 9820, 9826, 9831 - 9948,9963- 9964) C42.0, C42.1, C42.4 (includes 9823, 9827)	202.4, 203.1, 204 - 208	C90.1, C91 - C95
<b>Liver and Intra- Hepatic Bile Ducts</b>	C22.0, C22.1 except 9590 - 9989	155.0 - 155.2	C22
<b>Melanoma of Skin</b>	C44.0 - C44.9 (includes 8720 - 8790)	172	C43
<b>Multiple Myeloma</b>	C00.0 - C80.9 (includes 9731, 9732, 9734)	203.0, 238.6	C90.0, C90.2
<b>Non-Hodgkin Lymphoma</b>	C00.0 - C80.9 (includes 9590 - 9596, 9670 - 9729) All sites except C42.0, C42.1, C42.4 (includes 9823, 9827)	200, 202.0 - 202.2, 202.8 - 202.9	C82 - C85, C96.3
<b>Oral Cavity &amp; Pharynx</b>	C00.0 - C14.8 except 9590 - 9989	140 - 149	C00 - C14
<b>Ovary</b>	C56.9 except 9590 - 9989	183.0	C56
<b>Pancreas</b>	C25.0 - C25.9 except 9590 - 9989	157	C25
<b>Prostate</b>	C61.9 except 9590 - 9989	185	C61
<b>Stomach</b>	C16.0 - C16.9 except 9590 - 9989	151	C16

<b>Testis</b>	C62.0 - C62.9 except 9590 - 9989	186	C62
<b>Thyroid</b>	C73.9 except 9590 - 9989	193	C73
<b>Urinary Bladder</b> <b>Includes <i>in situ</i></b>	C67.0 - C67.9 except 9590 - 9989	188	C67

- \* *International Classification of Diseases for Oncology, 3d Ed. (2)* (includes codes added since publication) for incidence data
- \*\* *International Classification of Diseases, Ninth Revision (5)* (includes codes added since publication) for 1998 mortality data
- \*\*\* *International Classification of Diseases, Tenth Revision (6)* (includes codes added since publication) for 1999-2002 mortality data

**Appendix II**

**POPULATION ESTIMATES BY AGE, RACE/ETHNICITY AND SEX**

**Massachusetts, 1998-2002**

<b>Age Group</b>	<b>White, non-Hispanic</b>			<b>Black, non-Hispanic</b>			<b>Asian, non-Hispanic</b>			<b>Hispanic</b>		
	<b>Males</b>	<b>Females</b>	<b>Total</b>	<b>Males</b>	<b>Females</b>	<b>Total</b>	<b>Males</b>	<b>Females</b>	<b>Total</b>	<b>Males</b>	<b>Females</b>	<b>Total</b>
<b>0-4</b>	790,690	751,815	1,542,505	68,286	65,367	133,653	44,229	44,195	88,424	113,241	109,015	222,256
<b>5-9</b>	858,193	812,959	1,671,152	75,754	72,817	148,571	41,685	40,342	82,027	114,995	109,413	224,408
<b>10-14</b>	865,379	819,041	1,684,420	69,658	67,651	137,309	38,988	37,401	76,389	99,317	95,515	194,832
<b>15-19</b>	844,114	824,467	1,668,581	66,264	64,046	130,310	45,282	47,698	92,980	95,450	91,449	186,899
<b>20-24</b>	823,196	844,667	1,667,863	63,608	66,885	130,493	53,706	59,841	113,547	99,531	97,680	197,211
<b>25-29</b>	897,685	917,703	1,815,388	63,646	67,877	131,523	64,125	64,767	128,892	96,567	96,503	193,070
<b>30-34</b>	1,005,153	1,028,468	2,033,621	65,894	69,978	135,872	58,591	58,109	116,700	93,403	95,634	189,037
<b>35-39</b>	1,118,291	1,145,200	2,263,491	67,129	70,978	138,107	52,030	50,251	102,281	82,128	85,560	167,688
<b>40-44</b>	1,095,250	1,137,659	2,232,909	59,766	62,676	122,442	41,529	42,567	84,096	62,424	66,581	129,005
<b>45-49</b>	983,968	1,030,252	2,014,220	46,705	51,115	97,820	33,204	35,366	68,570	45,407	50,216	95,623
<b>50-54</b>	874,482	924,679	1,799,161	36,805	41,710	78,515	24,676	25,967	50,643	33,853	39,107	72,960
<b>55-59</b>	652,422	701,112	1,353,534	26,242	32,225	58,467	17,424	17,688	35,112	22,623	26,559	49,182
<b>60-64</b>	497,485	551,781	1,049,266	19,363	24,731	44,094	13,471	13,808	27,279	15,784	19,889	35,673
<b>65-69</b>	462,198	547,792	1,009,990	15,129	20,652	35,781	10,358	11,652	22,010	11,045	14,803	25,848
<b>70-74</b>	432,153	567,147	999,300	12,251	17,771	30,022	7,295	9,325	16,620	7,895	11,208	19,103
<b>75-79</b>	344,405	523,262	867,667	8,348	13,923	22,271	4,919	6,309	11,228	5,149	7,931	13,080
<b>80-84</b>	215,594	395,628	611,222	4,565	9,109	13,674	2,417	3,588	6,005	2,970	5,277	8,247
<b>85+</b>	147,541	416,884	564,425	3,395	8,302	11,697	1,789	3,159	4,948	2,834	5,225	8,059

# **REFERENCES**

## REFERENCES

1. Percy C, VanHolten V, Muir C (eds). *International Classification of Diseases for Oncology, 2nd Ed.* World Health Organization, Geneva, 1990.
2. Fritz A, Percy C, Jack A, Shanmugaratham K, Sobin L, Parkin M, Whelan S (eds). *International Classification of Diseases for Oncology, 3d Ed.* World Health Organization, Geneva, 2000.
3. Fritz A, Percy C. *Implementing ICD-O-3: Impact of the New Edition.* Surveillance, Epidemiology, and End Results (SEER) Program, National Cancer Institute. Bethesda, MD. [http://training.seer.cancer.gov/module\\_icdo3/implementation.html](http://training.seer.cancer.gov/module_icdo3/implementation.html)
4. McLaughlin CC, Hotes JL, Wu XC, *et al.* (eds). *Cancer in North America, 1997-2001. Volume Two and Three: NAACCR Combined Incidence Rates.* North American Association of Central Cancer Registries, Springfield, IL, April 2004.
5. World Health Organization. *International Classification of Diseases, Ninth Revision, Clinical Modification.* Edwards Bros., Inc., Ann Arbor, MI, 1980.
6. World Health Organization. *International Statistical Classification of Diseases and Related Health Problems, Tenth Revision.* World Health Organization, Geneva, 1992.
7. Anderson RN, Minino AM, Hoyert DL, Rosenberg HM. Comparability of cause of death between ICD-9 and ICD-10: Preliminary estimates. *National Vital Statistics Reports 2001*; 49(2):1-32.
8. New York State Department of Health. About age adjusted rates, 95% confidence intervals and unstable rates. [www.health.state.ny.us/nysdoh/cancer/nyscr/age.htm](http://www.health.state.ny.us/nysdoh/cancer/nyscr/age.htm)
9. Ries LAG, Eisner MP, Kosary CL, *et al.* (eds). *SEER Cancer Statistics Review, 1975-2000.* National Cancer Institute, Bethesda, MD, 2002. [www.seer.cancer.gov/csr/1975\\_2000](http://www.seer.cancer.gov/csr/1975_2000)
10. Joinpoint Regression Program, Version 2.7. National Cancer Institute, Bethesda, MD, September 2003
11. DevCan: Probability of Developing or Dying of Cancer Software, Version 5.3; Statistical Research and Applications Branch, National Cancer Institute, Bethesda, MD, 2004. <http://srab.cancer.gov/devcan/>
12. Clegg LX, Feuer EJ, Midthune DN, Fay MP, Hankey BF. Impact of reporting delay and reporting error on cancer incidence rates and trends. *Journal of the National Cancer Institute* 2002; 94:1537-1545.
13. Jemal A, Clegg LX, Ward E, *et al.* Annual report to the nation on the status of cancer, 1975-2001, with a special feature regarding survival. *Cancer* 2004; 101:3-27.
14. Edwards BK, Howe HL, Ries LAG, *et al.* Annual report to the nation on the status of cancer, 1973-1999, featuring implications of age and aging on U.S. cancer burden. *Cancer* 2002; 94:2766-2792.
15. Weir HK, Thun MJ, *et al.* Annual report to the nation on the status of cancer, 1975-2000. *Journal of the National Cancer Institute*, 2003;95:1276-1299.

16. Ries LAG, Eisner MP, Kosary CL, *et al.* (eds). *SEER Cancer Statistics Review, 1975-2001*. National Cancer Institute, Bethesda, MD, 2004.  
[http://www.seer.cancer.gov/csr/1975\\_2001/results\\_merged/sect\\_15\\_lung\\_bronchus.pdf](http://www.seer.cancer.gov/csr/1975_2001/results_merged/sect_15_lung_bronchus.pdf)
17. Adami HO, Hunter D, and Trichopoulos D (eds). *Textbook of Cancer Epidemiology*. New York: Oxford University Press, 2002, pp. 248-280.
18. American Cancer Society News Center.  
[http://www.cancer.org/docroot/NWS/content/NWS\\_2\\_1x\\_AntiSmoking\\_Efforts\\_Cut\\_Lung\\_Cancer\\_Deaths.asp](http://www.cancer.org/docroot/NWS/content/NWS_2_1x_AntiSmoking_Efforts_Cut_Lung_Cancer_Deaths.asp)
19. Females and Smoking: A Report of the Surgeon General – 2001.  
[http://www.cdc.gov/tobacco/sgr/sgr\\_forfemales/ataglance.htm](http://www.cdc.gov/tobacco/sgr/sgr_forfemales/ataglance.htm)
20. Wingo PA, Ries LAG, Giovino GA, *et al.* Annual report to the nation on the status of cancer, 1973-1996, with a special section on lung cancer and tobacco smoke. *Journal of the National Cancer Institute* 1999; 91:675-690.
21. Health Survey Program. Center for Health Information, Statistics, Research, and Evaluation. *A Profile of Health Among Massachusetts Adults, 2003: Results from the Behavioral Risk Factor Surveillance System*. Massachusetts Department of Public Health, Boston, MA, December 2004.
22. Gardiner PS. The African Americanization of menthol cigarette use in the United States. *Nicotine & Tobacco Research* 2004; 6: S55-S65.  
[http://www.trdrp.org/Docs/CNTR\\_06\\_S1\\_07.pdf](http://www.trdrp.org/Docs/CNTR_06_S1_07.pdf)
23. Medical Oncology: A Comprehensive Review - Small Cell Lung Cancer  
<http://www.cancernetwork.com/textbook/morev11.htm>
24. Gershman ST, MacDougall LA, Hawk H and Liu M. *Cancer in Massachusetts Women 1989-1998 Data Report*. Massachusetts Department of Public Health, Boston, MA, August 2002.