
CANCER INCIDENCE AND MORTALITY IN MASSACHUSETTS 2005 – 2009:

STATEWIDE REPORT

Bureau of Health Information, Statistics,
Research, and Evaluation

Massachusetts Department of Public Health

December 2012



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CANCER INCIDENCE AND MORTALITY IN MASSACHUSETTS 2005 – 2009:

STATEWIDE REPORT

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Gerald F. O’Keefe, Director, Bureau of Health Information, Statistics, Research, and
Evaluation

Susan T. Gershman, Director, Massachusetts Cancer Registry, Bureau of Health
Information, Statistics, Research, and Evaluation

Massachusetts Department of Public Health

December 2012

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Massachusetts Cancer Registry Staff

Susan T. Gershman, M.S., M.P.H., Ph.D., C.T.R., <i>Director</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>	Jayne Nussdorfer, C.T.R., <i>Cancer Registrar</i>
Patricia J. Drew, C.T.R., <i>Cancer Registrar/Quality Assurance Coordinator</i>	Barbara J. Rhodes, C.M.A., C.T.R., <i>Cancer Registrar/Death Clearance Coordinator</i>
Loi Huynh, <i>Software Developer</i>	Pamela Shuttle, C.T.R., R.H.I.T., <i>Cancer Registrar/Non-Hospital Reporting Coordinator</i>
Richard Knowlton, M.S., <i>Epidemiologist</i>	Hung Tran, <i>Software Developer</i>
Ann MacMillan, M.P.H., <i>Epidemiologist</i>	Donna J. Vincent, R.H.I.A., <i>Geocoder</i>

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Reggie Mead	Janet McGrail Spillane, RN
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J. David Naparstek, Sc.M., C.H.O.	Susan Sturgeon, Dr.P.H., M.P.H.

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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
Bureau of Environmental Health.....	(617) 624-5757
Cancer Prevention and Control Initiative.....	(617) 624-5484
Massachusetts Department of Public Health website.....	www.mass.gov/dph

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EXECUTIVE SUMMARY

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EXECUTIVE SUMMARY

Cancer Incidence and Mortality in Massachusetts, 2005-2009: Statewide Report presents cancer incidence and mortality data for the Commonwealth from 2005 through 2009. The report includes numbers and rates for 24 types of cancer, information on age-specific patterns, a discussion of cancer trends, an examination of patterns by race/ethnicity, and a comparison of Massachusetts and national cancer rates. Data are provided on invasive cancers only, with the exceptions of urinary bladder (which includes *in situ* and invasive cancers combined) and *in situ* breast cancer.

Highlights from the report

- From 2005 through 2009, there were 184,339 newly diagnosed cases of cancer and 65,531 cancer deaths among Massachusetts residents, an average of 36,868 cases and 13,106 deaths annually. The average annual age-adjusted incidence rate for all cancers combined was 513.0 per 100,000 persons and the average annual age-adjusted mortality rate was 179.4 per 100,000 persons. Over the period 2005-2009, incidence rates for all invasive cancer sites decreased annually by 1.8% for males and increased by 0.4% for females, although neither change was statistically significant. Mortality from all types of cancer combined decreased from 2005-2009 by 2.1% annually for males and 1.2% for females. As for incidence, neither mortality decrease was statistically significant.
- Prostate cancer was the most common type of newly diagnosed cancer among Massachusetts males from 2005-2009, accounting for 28.1% of all new cancers among Massachusetts males. The average annual age-adjusted incidence rate of prostate cancer was 160.4 per 100,000 males, and the mortality rate was 23.1 per 100,000. From 2005 through 2009, the annual incidence rate of prostate cancer decreased an average of 3.3% per year and the mortality rate decreased by 2.1% per year, neither change being statistically significant.
- From 2005-2009, invasive breast cancer was the most common type of newly diagnosed cancer among Massachusetts females, accounting for 28.5% of new cancers among females. The average annual age-adjusted incidence rate of breast cancer was 134.2 per 100,000 females. The incidence rate of female invasive breast cancer increased an average of 2.1% per year from 2005-2009 but this increase was not statistically significant. The average annual age-adjusted mortality rate of invasive breast cancer was 21.8. per 100,000 and decreased from 2005 through 2009 by 1.7% annually; this change also was not statistically significant. The age-adjusted incidence rate of *in situ* breast cancer for Massachusetts females was 46.9 per 100,000. From 2005 through 2009, the incidence of *in situ* breast cancer increased 1.4% annually, although this was not a statistically significant change.
- Cancer of the bronchus and lung was the most common cause of cancer deaths among both Massachusetts males and females during 2005-2009, accounting for 28.4% of all cancer deaths among males and 26.7% of all cancer deaths among females. During this time period, the mortality rate of cancer of the bronchus and lung in Massachusetts decreased

2.7% annually for males and 1.4% for females. Neither of these decreases was statistically significant. The incidence rate of cancer of the bronchus and lung remained stable for Massachusetts females during 2005-2009, but decreased significantly by 2.6% annually for males.

- Colorectal cancer incidence decreased significantly among both Massachusetts males and females during 2005-2009. For males, the incidence rate decreased 5.3% per year and 3.5% for females. Mortality from colorectal cancer also declined among Massachusetts males and females (3.2% and 4.4% per year for males and females, respectively). Only the decline for females was statistically significant.
- The incidence of thyroid cancer increased significantly among both Massachusetts males and females during 2005-2009. The incidence rate increased 6.0%, per year for males and 7.1% for females. Mortality from thyroid cancer increased 12.5% per year for males and 6.9% for females, although neither increase was statistically significant.
- Other significant decreases in deaths due to cancer included esophageal cancer (4.3%), non-Hodgkin's lymphoma (5.9%) and pancreatic cancer (2.0%) for males and non-Hodgkin lymphoma for females (8.2%).

During 2005-2009, the following patterns in cancer incidence and mortality for Massachusetts males and females were seen:

- Black, non-Hispanic males had the highest total cancer age-adjusted incidence and mortality rates among Massachusetts males. Both rates were significantly higher than those of all other racial/ethnic groups (white, non-Hispanics, Asians, non-Hispanics, and Hispanics).
- Cancers of the prostate, bronchus and lung, and colon/rectum were the top three most commonly diagnosed cancers among men.
- Cancer of the bronchus and lung was the most common cause of cancer death for each male racial/ethnic group, while prostate ranked second among white and black, non-Hispanics and Hispanics, colon/rectum third among all male racial/ethnic groups, and liver and intrahepatic bile ducts second among Asian, non-Hispanics.
- For all types of cancer combined, white, non-Hispanic women had the highest age-adjusted incidence rate among Massachusetts females and black, non-Hispanic women had the highest age-adjusted mortality rate. The incidence rate for white, non-Hispanic females was statistically significantly higher than those of all other groups. The mortality rate for black non-Hispanic females was significantly higher than for Asian, non-Hispanics and Hispanics, but not white, non-Hispanics.
- Breast cancer was the most commonly diagnosed cancer for each female racial/ethnic group. Cancers of the bronchus and lung, colon/rectum, and thyroid were also leading cancers among females. Cancer of the bronchus and lung ranked second and colon/rectum

third for white, non-Hispanic and black, non-Hispanic females. For Asian, non-Hispanic females and Hispanics, colon/rectum was second and thyroid was third.

- Cancer of the bronchus and lung was the leading cause of cancer death among all female race/ethnicities in Massachusetts. Breast cancer was ranked second among white and black, non-Hispanics and Hispanics while it ranked third among Asian, non-Hispanics. Colorectal cancer ranked third among black and white, non-Hispanics and Hispanics while it ranked second for Asian, non-Hispanics.
- Overall age-adjusted cancer incidence rates in Massachusetts were significantly higher than their national counterparts for both males and females. The Massachusetts male and female incidence rates for all sites combined for the period 2005 through 2009 were 588.5 per 100,000 and 464.3 per 100,000 respectively, while the 2005-2009 rates for the North American Association of Central Cancer Registries (NAACCR) were 550.7 and 419.3 per 100,000 respectively.
- Comparisons of overall age-adjusted cancer mortality rates between Massachusetts and the United States for 2005-2009 indicate significantly higher rates among Massachusetts females, but not among Massachusetts males. The Massachusetts male and female mortality rates for all sites combined were 221.1 and 153.5 per 100,000, respectively, while the national rates for males and females were 219.4 and 151.1 per 100,000, respectively.

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INTRODUCTION

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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, 2005-2009: Statewide Report*, is produced annually with the most recently available statewide data. 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. Electronic versions of these reports may be found on the internet at www.mass.gov/dph/mcr.

Overall Content

This report:

- Provides statewide information on cancer incidence and mortality in Massachusetts for twenty-four types of cancer and for all cancers combined for 2005 through 2009;*
- Provides detailed information on the most commonly occurring types of cancer for 2005 through 2009;
- Examines cancer incidence patterns by age, sex, and race/ethnicity;
- Reviews Massachusetts cancer incidence and mortality trends for 2005 through 2009; and
- Compares Massachusetts incidence and mortality data with respective national data.

The report is organized into the following sections:

- **METHODS** which provides a detailed explanation of the data collection, data processing, and statistical techniques employed in this report and a discussion of the limitations to consider when reviewing the data.
- **OVERVIEW** which provides a summary of cancer incidence and mortality data in Massachusetts from 2005 through 2009, including leading types of cancer, cancer incidence by age and sex, cancer trends, cancer patterns by race/ethnicity, and a comparison of rates for Massachusetts with those for the U.S.
- **FIGURES & TABLES** which present cancer incidence and mortality data for 24 types of cancer for 2005-2009. There are 6 figures and 24 tables in this section with breakdowns by sex, race/ethnicity, year, age group, state and national comparisons, and cancer type.
- **APPENDICES** which provides information supplemental to this report, including a listing of codes used to prepare the report, information on population and rate changes, and population estimates.
- **REFERENCES**

**The Massachusetts incidence data in this report include only invasive cancers for 22 of the 24 types of cancer. Cancer of the urinary bladder includes both in situ and invasive cases. Cancer of the breast in situ is presented as a separate category, but is not included in the “all sites combined” data.*

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METHODS

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METHODS

Data Sources

Cancer Incidence

The MCR collects reports of newly diagnosed cancer cases from health care facilities and practitioners throughout Massachusetts. Facilities currently reporting to the MCR in 2012 include 65 Massachusetts acute care hospitals, 6 radiation centers, 3 endoscopy centers, 4 surgical centers, 19 independent laboratories, 2 medical practice associations, 4 radiation/oncology centers and approximately 500 private practice physicians. Additionally, the MCR has reciprocal reporting agreements with 18 states to obtain data on Massachusetts residents diagnosed out of state (see section “Border Areas and Neighboring States” on page 15 for a listing of states currently participating in this data exchange). 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, some hospitals report such cases as if the patients had been diagnosed and treated by the hospital directly. Collecting these types of data makes the MCR’s overall case ascertainment more complete. Some cancer types that may be reported to the MCR in this manner are melanoma, prostate, colon/rectum, and oral cancers.

In addition, the MCR identifies previously unreported cancer cases through review of death certificate data to further improve case completeness. This process is referred to as death clearance and 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, hospice residences, 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. Thus these “death certificate only” cancer diagnoses are poorly documented and have not been confirmed by review of clinical and pathological information. Such cases are included in this report, but they comprise less than 3% of all cancer cases.

All case reports that provided the basis for this report were coded following the *International Classification of Diseases for Oncology, Third Edition (ICD-O-3)*, which was implemented in North America with cases diagnosed as of January 1, 2001 (1).

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 2005-2009 are presented in Table A. For 2005-2009, the MCR’s annual case count was estimated by NAACCR to be more than 95% complete each year. The MCR has achieved the gold standard for this certification element as well as for six other certification elements for each case year since 1997. (See Table A.)

The Massachusetts cancer cases presented in this report are primary cases of cancer diagnosed among Massachusetts residents during 2005-2009 and reported to the MCR as of July 23, 2012. These data included some additional cases diagnosed in 2005-2008 that were not counted in the previous report,

Cancer Incidence and Mortality in Massachusetts 2004-2008: Statewide Report because they were reported to the MCR too late to be incorporated in that report.

Cancer sites/types are grouped according to coding definitions adapted from the National Cancer Institute (NCI)'s Surveillance, Epidemiology and End Results (SEER) Program (Appendix I). 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. (See section 'Definition of Cancer Sites' on page 14 for additional information about the urinary bladder category.) *In situ* cancers are neoplasms diagnosed at the earliest stage, before they have spread; they are limited to a small number of cells and have not invaded the organ itself. Invasive cancers have spread beyond the layer of cells where they started and have the potential to spread to other parts of the body. 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. Because a substantial number of breast cancers are diagnosed at a pre-invasive (*in situ*) stage, we present an additional category for these data that is separate from the invasive breast cancer data. The *in situ* breast cancer cases are not included in the totals for all cancer sites combined. Due to the specific nature of the diagnostic techniques and treatment patterns for bladder cancer, *in situ* and invasive cancers of the urinary bladder are combined and *in situ* urinary bladder cases are included in the totals for all cancer sites combined.

The national incidence data for comparison are from NAACCR. The NAACCR incidence rates are for the period 2005-2009 and include data from all 50 states, Puerto Rico, and Washington, D.C. (2).

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 2005 to 2009 were coded using the *International Classification of Diseases, Tenth Revision* (ICD-10)(3). The cancer site/type groups for deaths in this report were based on cancer site/type categories from the NCI's SEER Program (Appendix I). These SEER cancer site/type definitions are the standard categories commonly used by cancer registries. 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 because *Massachusetts Deaths* uses cancer site/type groupings from the National Center for Health Statistics.

All national mortality data used in this report were from the CDC's National Center for Health Statistics (NCHS). Two publications using NCHS data were referenced in this report. Data on mortality trends were taken from the 'Annual Report to the Nation on the Status of Cancer, 1975-2008'. These data represent the most recent available data on mortality trends at the time of the publication of this report. In this report, 2005-2009 Massachusetts cancer mortality trends were compared with 2004-2008 U.S. trends. Data that compared average annual age-adjusted mortality rates were for the period 2005-2009 for both Massachusetts and the U.S. (see Table 24). The source of the national average annual age-adjusted mortality rates was the North American Association of Central Cancer Registries (NAACCR) report 'Cancer in North America' (CINA). While data from CINA do not include mortality trends, more current average annual age-adjusted rates were available.

Definitions

Population Estimates

All of the population estimates used in this report were produced by the National Center for Health Statistics in collaboration with the U.S. Census Bureau's Population Estimation program. The NCHS

reallocates the multiple race categories from the Census Bureau population estimates file to create four mutually exclusive race categories that are consistent with the race categories used to collect cancer incidence and cancer mortality data. The population data used in this report for the calculation of rates are presented in Appendix III.

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 Native Americans. As a result, the number of cases for the total population is not the sum of cases by race/ethnicity presented in the tables.

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 that 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 eliminated when comparing age-adjusted rates for populations with different age structures. The 2000 U.S. Census Bureau population distribution was used as a standard. Rates were age-adjusted using eighteen 5-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 a number of age groups used, may cause slight variations in results.
- *Confidence Intervals (CI) or Confidence Limits (CL)* – The confidence interval (CI) – also called a confidence limit (CL) – is a range of values determined by the degree of variability of the data within which the true value should lie. The 95% confidence intervals presented in this report indicate 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. The overlap of confidence intervals was 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 of 5% or less ($p \leq 0.05$). Rates and confidence intervals were not calculated when there were fewer than 20 cases.
- *Annual Percent Change (APC)* – The APC is a statistical method for trend analysis. It shows how much 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 APC for a short time period (2005-2009 for this report) was calculated using the SEER method. The $APC = 100 * (e^{m-1})$, 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 (5). A positive APC corresponds to an increasing trend, while a negative APC corresponds to a decreasing trend. All of the APC values calculated in this report were statistically tested for significance ($p \leq 0.05$) using the t-test against the hypothesis that they are equal to zero (the rate is neither increasing nor decreasing)

- *Median Age at Diagnosis* – The median age at diagnosis is the point (in age) where half of cancer cases occurred below this age and half of cases occurred above this age.

Interpreting the Data

When 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 Massachusetts resident cases who are diagnosed in neighboring or other states and not reported to the MCR. 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. On March 24, 2011 the MCR signed the NAACCR Agreement for Administering the Central Cancer Registry Inter-Registry Data Exchange which expanded data exchange to ten additional states: Alabama, Idaho, Kentucky, Michigan, Mississippi, Montana, North Dakota, Oklahoma, Utah, and Virginia.

Cases Diagnosed in Non-Hospital Settings

During the time period covered by this report, the MCR's primary information source for most newly diagnosed cases of cancer was 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 these new reporting sources may elevate the incidence of melanoma diagnosed in the years 2001 and later. In 2002, urologists' offices and a general laboratory were added as reporting sources. Some types of cancer in this report, such as prostate cancer, may be under-reported because they are diagnosed primarily by private physicians, private laboratories, health maintenance organizations, or 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

Reports published by the MCR since 2004 use a definition of urinary bladder that includes both *in situ* and invasive cancers. Prior reports included only invasive cases in the urinary bladder category. This change was made to conform to the definitions of the NCI's SEER Program. The addition of *in situ* cases in this category has elevated both the number of cases and rates for this site and for all sites combined compared with reports published prior to 2004. The first statewide report to use this expanded definition was *Cancer Incidence and Mortality in Massachusetts 1997-2001: Statewide Report*.

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 2005-2009 rates, as well as the incidence of all sites combined and average annual incidence rates.

Trends

Trend data also 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 (6). Typically, statewide Massachusetts cancer incidence data are released about two years after the close of diagnosis year; for example, data for cases diagnosed between January 1, 2009 and December 31, 2009 are being released for the first time in mid 2012. The MCR continues to receive case reports on an ongoing basis even after the data are released. These delayed case reports, as well as corrections to cases based on subsequent details from the reporting facilities, result in reporting delay and data changes; thus, the more recent diagnosis years may be less complete and accurate than the earlier diagnosis years. Finally, the following should be considered when interpreting trend data:

- The APC 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 the years 2005 and 2009 is small, the statistical significance of the APC may have no practical importance.

Race/Ethnicity

Race/ethnicity data for cancer cases are based on information in the medical record. These 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 vary for cancer cases and cancer deaths. Some race/ethnicity categories may be under-reported; thus, counts and rates may under-represent the true incidence of cancer in these populations.

National Data Comparisons:

Age-adjusted incidence and mortality rates in Massachusetts were compared with national rates shown in Table 24 of this report. As mentioned in the section on data sources, the national incidence data are from the North American Association of Central Cancer Registries (NAACCR) and the death data are from the CDC's National Center for Health Statistics. It is important to interpret these data comparisons cautiously. Cancer rates may be affected by differences in the racial/ethnic composition of the population, differences in population estimates used for rate calculations, the prevalence of cancer risk factors, and cancer screening rates. Thus, cancer rates in Massachusetts and NAACCR areas or the United States may differ because of one or more of these variations.

Table A.
North American Association of Central Cancer Registries (NAACCR) Certification Results
for the Massachusetts Cancer Registry (MCR), 2005-2009

Registry Element	Gold Standard	Silver Standard	MCR Results By Year					Standard Achieved
			2005	2006	2007	2008	2009	
Completeness of case ascertainment [§]	95%	90%	>95%	95%	>95%	>95%	>95%	Gold
Unknown "age at diagnosis"	≤2%	≤3%	0.0%	0.0%	0.0%	0.0%	0.0%	Gold
Unknown "sex"	≤2%	≤3%	0.0%	0.0%	0.0%	0.0%	0.0%	Gold
Unknown "race"	≤3%	≤5%	1.6%	1.5%	1.5%	0.9%	2.9%	Gold
"Death certificate only" cases [†]	≤3%	≤5%	1.5%	1.9%	1.6%	2.8%	3.1%	Gold
Duplicate primary cases	≤0.1%	≤0.2%	0.03%	0.02%	0.02%	0.0%	0.02%	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

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OVERVIEW

From 2005 through 2009, there were 184,339¹ newly diagnosed cases of cancer in Massachusetts residents – 92,144 in males and 92,180 in females. On average, 36,868 new cancer cases were diagnosed annually during this time period. For all types of cancer combined, the average annual age-adjusted incidence rate was 588.5 cases per 100,000 among males and 464.3 cases per 100,000 among females.

During the same time period, there were 65,531 deaths due to cancer – 32,856 males and 32,675 females or an average of 13,106 total cancer deaths annually. For all cancer sites combined, the age-adjusted mortality rate was 221.1 deaths per 100,000 among males and 153.5 deaths per 100,000 among females.

Leading Types of Cancer

Incidence

Males

The most commonly diagnosed type of cancer in Massachusetts males from 2005-2009 was prostate cancer, followed by cancers of the bronchus and lung, colon/rectum, and urinary bladder. These four cancer types comprised approximately 58% of newly diagnosed cases. Prostate cancer alone comprised approximately 28% of all male incident cases (Figure 1).

From 2005-2009, the age-adjusted incidence rates for these four leading types of cancer were 160.4 cases per 100,000 for prostate, 81.7 cases per 100,000 for bronchus and lung, 53.6 cases per 100,000 for colon/rectum cancer, and 45.4 cases per 100,000 for urinary bladder. Other leading cancer types for males included melanoma, non-Hodgkin lymphoma, cancer of the kidney and renal pelvis, cancer of the oral cavity and pharynx, leukemia, and pancreatic cancer (Figure 2).

Females

Among Massachusetts females, the most commonly diagnosed cancer types were cancers of the breast, bronchus and lung, colon/rectum, and corpus uteri (uterus), representing approximately 58% of new cancer cases diagnosed during 2005-2009. Invasive breast cancer alone comprised nearly 29% of all female incident cases (Figure 1).

From 2005-2009, the age-adjusted incidence rates for these four leading types of cancer were 134.2 cases per 100,000 for breast, 64.8 cases per 100,000 for bronchus and lung, 40.6 cases per 100,000 for colon/rectum cancer, and 30.0 cases per 100,000 for the uterus. Other leading cancer types for females included thyroid cancer, melanoma, non-Hodgkin lymphoma, ovarian cancer, urinary bladder cancer, and pancreatic cancer (Figure 2).

¹ The male and female case counts will not add up to the total case count because the MCR collects two additional sex/gender classifications (transsexuals and persons with sex chromosome abnormalities/hermaphrodites).

Cancer Incidence Patterns by Age

The likelihood of being diagnosed with cancer increased steadily with age for most cancers. The age-specific incidence rate for all sites combined for males rose from 24.1 per 100,000 in the age group 0-4 to 3,433.9 per 100,000 in the age group 85+ (Table 1). For females, the age-specific rate for all sites combined increased from 24.4 per 100,000 for ages 0-4 to 2,245.9 per 100,000 for ages 80-84 (Table 2). The cancer incidence rate for people aged 85 and above declined for females, but not for males. (Tables 1 and 2).

The median age of diagnosis for all cancers combined was 66.0 years for males and 66.0 years for females (Tables 1 and 2). For many of the cancer types presented in this report, the median age at diagnosis was age 60 or older. The following cancers were diagnosed at a younger median age (males and females are combined for cancers occurring in both sexes): brain and other nervous system (median age – 58.0), breast *in situ* (median age – 56.0), cervix (median age – 50.0), Hodgkin lymphoma (median age – 40.0), testis (median age – 35.0), and thyroid (median age – 49) (Tables 1-3).

Mortality

Males

Cancer of the bronchus and lung was the leading cause of cancer death for Massachusetts males during 2005 and 2009 accounting for 28.4% of all cancer deaths in males. Prostate cancer ranked second in mortality. The third and fourth most common causes of cancer death were cancers of the colon/rectum and pancreas, respectively. These four types of cancer comprised 52.8% of all cancer deaths for this time period (Figure 3).

From 2005 through 2009, the age-adjusted mortality rates for the four leading causes of cancer death in males were 62.3 deaths per 100,000 for cancer of the bronchus and lung, 23.1 deaths per 100,000 for prostate cancer, 19.4 deaths per 100,000 for colorectal cancer, and 13.0 deaths per 100,000 for pancreatic cancer. Other leading causes of cancer death for males during this time period included cancer of the esophagus, liver and intrahepatic bile ducts, urinary bladder, leukemia, non-Hodgkin lymphoma, and cancer of the kidney and renal pelvis (Figure 4).

Females

Cancer of the bronchus and lung was also the leading cause of cancer death for Massachusetts females for 2005 through 2009. Bronchus and lung cancer accounted for 26.7% of all cancer deaths in females. Breast cancer ranked second in mortality for females. The third and fourth most common causes of cancer death were cancers of the colon/rectum and pancreas, respectively. These four types of cancer comprised 57.1% of all cancer deaths for this time period (Figure 3).

From 2005 to 2009, the age-adjusted mortality rates for these four leading causes of cancer death were 42.4 deaths per 100,000 for bronchus and lung, 21.8 deaths per 100,000 for breast, 13.7 deaths per 100,000 for colon/rectum, and 10.2 deaths per 100,000 for the pancreas. Other leading causes of cancer death among females during this time period included ovarian cancer, leukemia, non-Hodgkin lymphoma, cancers of the uterus, brain and other nervous system, and liver and intrahepatic bile ducts (Figure 4).

Cancer Trends

Incidence

All of the data describing increasing and decreasing trends are based upon the annual percent change (APC) methodology. From 2005 through 2009, overall cancer incidence in Massachusetts declined 1.8% per year, a non-statistically significant change. For state females, a slight but non-significant increase was seen (0.4%). Nationally during 2004-2008, cancer incidence rates for all cancer sites combined decreased by 1% per year for males and by 0.4% per year for females, both decreases being statistically significant (4). Incidence trends for the leading cancers affecting Massachusetts males and females are discussed below and are shown in Figures 5 and 6. Tables 4, 5, and 6 present age-adjusted incidence rates by diagnosis year for males, females and both sexes respectively.

Males

Among Massachusetts males between 2005 and 2009, the incidence rate of prostate cancer decreased by 3.3% per year, although this decrease was not statistically significant (Figure 5). The incidence rate of prostate cancer declined from 162.0 cases per 100,000 males in 2005 to 143.6 cases per 100,000 males in 2009 (Table 4). In addition, there was an overall decrease in prostate cancer from its peak incidence of 217.4 per 100,000 in 1992. Nationally, the incidence of prostate cancer showed a significant decrease of 1.6% per year from 2004-2008. The 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 (4). Since 1992, the national incidence rate for prostate cancer has fluctuated with a statistically significant decline from 1992-1995, and a non-significant increase from 1995-2000, and another significant decrease from 2000-2008 (4).

In Massachusetts, the age-adjusted incidence rate of cancer of the bronchus and lung in males declined by 2.6% per year between 2005 and 2009, a statistically significant decline (Figure 5). The incidence rate for cancer of the bronchus and lung fell from 87.0 cases per 100,000 males in 2005 to 78.2 cases per 100,000 in 2009 (Table 4). Nationally, the incidence rates for male cancer of the lung and bronchus also declined significantly by 2.6% per year from 2004-2008 (4).

The incidence rate of colorectal cancer in Massachusetts males decreased from 59.4 in 2005 to 48.1 cases per 100,000 in 2009. The estimated annual percent decrease was 5.3% and was statistically significant (Figure 5). National data show that colorectal cancer incidence rates in males decreased significantly by 3.7% per year from 2004-2008. (4).

Two cancers showed a significant increase from 2005 - 2009 among males in Massachusetts. Thyroid cancer increased 6.0% per year, and leukemia by 2.9% per year. Nationally, thyroid cancer also increased significantly by 6.3% annually from 2004-2008 while leukemia decreased significantly by 2.2% (4).

Females

Invasive breast cancer incidence in Massachusetts females showed a non-significant increase of 2.1% annually during the period 2005-2009 (Figure 6). The incidence rate increased from 130.3 cases per 100,000 females in 2005 to 135.8 cases per 100,000 in 2009 (Table 5). Breast cancer incidence in the U.S. rose during the 1990s which was attributed to increased mammography screening (7). Nationally, breast cancer incidence rates stabilized from 2004-2008 (4). This followed a sharp decrease from 2002 to 2003, which correlated with the dramatic decrease in the use of hormone replacement therapy (HRT). The

stabilization of the rates after 2003 may in part reflect the role of HRT as a promoting rather than an initiating agent in the development of breast cancer (8). The incidence rate of cancer of the bronchus and lung among Massachusetts females decreased non-significantly by 0.4% per year between 2005 and 2009. The rate declined from 65.7 cases per 100,000 females in 2005 to 64.2 cases per 100,000 in 2009 (Table 5). The national rate of bronchus and lung cancer among females decreased significantly by 0.8% per year from 2004-2008. This national decrease in lung cancer incidence rates is a reflection of tobacco control strategies, the decline being largely driven by declines in states with strong and established tobacco control programs (4).

The incidence rate of colorectal cancer, which is the third most common cancer among Massachusetts females, decreased significantly by 3.5 % per year from 2005- 2009. The rate declined from 44.1 per 100,000 in 2005 to 38.2 per 100,000 in 2009. Nationally, the rates for colorectal cancer also decreased significantly by 3.0% per year from 2004-2008. This national decrease is most likely attributable to significant improvements in colorectal cancer screening which can prevent cancer development through the removal of precancerous polyps (4).

The annual incidence rate for uterine cancer, the fourth most commonly diagnosed cancer among Massachusetts women, showed a non-significant increases of 2.2 % annually over the period 2005 to 2009 (Figure 6). Nationally, the rates for uterine cancer increased non-significantly by 0.3% per year from 2004-2008 (4).

Among Massachusetts females, thyroid cancer incidence rates increased significantly by 7.1% per year from 2005-2009. Nationally, the rates for thyroid cancer in females also increased significantly by 7.3% per year from 2004-2008 (4). From 1997-2007 in Massachusetts, 95% of the increase in thyroid cancer has been due to the papillary type, and among papillary cancers, 45% of the increase was due to tumors 1 centimeter or smaller. Changes in diagnostic procedures, including the introduction and greater use of ultrasound and fine-needle biopsy, have likely contributed to the increase in incidence, but more research on the relationship between temporal trends, diagnostic procedures, and exposure to radiation and other potential risk factors is needed. For more detailed information on thyroid cancer in Massachusetts, please refer to the MCR publication *Data Report: Thyroid Cancer in Massachusetts* (9). This report, which was updated in January 2011, can be accessed at www.mass.gov/dph/mcr under “Special Reports.”

In addition to the trends mentioned above, incidence rates of urinary bladder cancer decreased significantly in Massachusetts women for 2005-2009 (2.6% per year). Nationally, urinary bladder cancer incidence rates decreased significantly by 2.2% annually from 2004 to 2008 (4).

Liver cancer incidence rates increased significantly by 7.9% per year from 2005-2009. Nationally, rates for liver cancer increased significantly for females by 2.7% from 2004-2008. The increase in liver cancer incidence can be explained in part by increases in chronic hepatitis B and hepatitis C infections which lead to liver cancer. These infections account for an estimated 78% of liver cancer worldwide, and many of the estimated 3.8-5.3 million persons living with chronic viral hepatitis in the United States are unaware of their infection (9).

Mortality

For 2005 through 2009, overall cancer mortality decreased by 2.1% per year for Massachusetts males and 1.2 % per year for females, although neither of these decreases was statistically significant (Figures 5 and 6). Recent national data for all cancer sites combined for 2004-2008 showed statistically significant declines in mortality rates of 1.8% per year for men and 1.5% per year for women. (4).

Males

Among Massachusetts males, mortality from bronchus and lung, prostate, and colorectal cancers all decreased for 2005 to 2009, although none of the declines were statistically significant. Deaths due to prostate cancer decreased 2.1% per year; cancer of the bronchus and lung, 2.7 % per year; and colorectal cancer, 3.2 % per year. Additionally, deaths from esophageal cancer, non- Hodgkin lymphoma and pancreatic cancer decreased significantly by 4.3%, 5.9%, and 2.0% per year respectively (Figure 5). Nationally, deaths from multiple cancers decreased significantly from 2004-2008 including prostate (3.6%), stomach (3.4%), non-Hodgkin lymphoma (2.8%), colon/rectum (3.0%), larynx (2.5%), bronchus and lung (2.6%), oral and pharynx (1.1%), myeloma (1.1%), leukemia (0.9%) and brain and central nervous system (1.0%) (4).

Females

For Massachusetts females, mortality rates for cancers of the bronchus and lung and breast declined 1.4% and 1.7% per year, respectively, although neither decline was statistically significant. The female colorectal cancer mortality rate declined significantly by 4.4% per year. Additionally, deaths from non-Hodgkin lymphoma also decreased significantly by 8.2%. Nationally, deaths from various cancers showed statistically significant declines from 2004-2008 including non-Hodgkin lymphoma (3.5%), stomach (3.0%), colon/rectum (2.9%), ovarian (2.4%), myeloma (2.3%) cervical (0.2%), oral and pharynx (1.7%), esophagus (1.5%), leukemia (1.5%) kidney/renal pelvis (1.3%), breast (2.0%), brain and central nervous system (1.0%) and lung and bronchus (0.9%) (4).

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 APC for these sites may have no practical public health importance.

Cancer Patterns by Race/Ethnicity

Incidence

Table 10 presents the five leading cancers (based on age-adjusted rates) occurring among Massachusetts residents by race/ethnicity and sex for 2005-2009. Tables 11, 12, and 13 show the distribution of cases by cancer type for all races combined and by race/ethnicity for males, females, and both sexes for the same period. Age-adjusted rates and respective 95% confidence intervals or limits (95% CL) for all races combined and by race/ethnicity, cancer type, and sex are presented in Tables 14, 15, and 16. (See the Methods section of this report for more information about confidence intervals.)

Overall, of the total 184,339 newly diagnosed cancer cases during 2005-2009, 165,069 (89.5%) occurred in white, non-Hispanics, 7,383 (4.0%) in black, non-Hispanics, 3545 (1.9%) in Asian, non-Hispanics, and 5336 (2.9%) in Hispanics (Table 13). Of the remaining cases, 130 (0.1%) occurred in American Indians and 2,876 (1.6%) occurred in those whose race/ethnicity was unknown.

Males

Based on age-adjusted rates, the rankings of the most common types of cancer among Massachusetts males by race/ethnicity (as shown in Table 10) are as follows:

- Prostate cancer: First among all racial/ethnic groups.
- Lung cancer: Second among all racial/ethnic groups.
- Colorectal cancer: Third among all racial/ethnic groups.
- Urinary bladder cancer: Fourth among white, non-Hispanic, black, non-Hispanic and Hispanic men;
- Liver cancer: Fourth among Asian, non-Hispanic men, and fifth among Hispanic men.
- Melanoma: Fifth among white, non-Hispanic men.
- Kidney cancer: Fifth among black, non-Hispanic men.
- Non-Hodgkin Lymphoma: Fifth among Asian, non-Hispanic men

From 2005 through 2009, black, non-Hispanic males had the highest incidence rate of all cancer types combined (626.3 per 100,000), significantly higher than the rates for all other male racial/ethnic groups (Table 14). Asian non-Hispanic males had the significantly lowest incidence rate of all sites combined (335.8 per 100,000). Black non-Hispanic males had a significantly elevated rate of prostate cancer (244.7 per 100,000) when compared to the rates for other racial/ethnic groups. Nationally, prostate cancer incidence rates decreased significantly by 1.7% from 1999-2008 among black, non-Hispanic males. The 2004-2008 national incidence rate, however, still remained higher than that of white, non-Hispanic males (230.8 vs. 142.8 per 100,000) (4). Asian, non-Hispanic men in Massachusetts had a significantly higher rate of liver cancer compared with the other groups, nearly two-fold higher than white non-Hispanic men. Nationally, the rate for liver cancer among Asians from 2004-2008 was nearly triple that of white, non-Hispanics (21.7 vs. 8.6 per 100,000) (4). It is believed that much of this increase is due to chronic hepatitis B infection acquired through maternal transmission. This disproportionately affects East Asians, with prevalence figures among those screened in New York City varying from 4.6% among those born in South Korea to 21.4% among those born in China (10).

Females

Based on age-adjusted rates, the most common types of cancer diagnosed among Massachusetts females (as shown in Table 10) include:

- Breast cancer: First among women of all racial/ethnic groups.
- Lung cancer: Second among, white, non-Hispanic and black, non-Hispanic women; fourth among Asian, non-Hispanic, and Hispanic women.
- Colorectal cancer: Second among Asian, non-Hispanic and Hispanic women; third among white, non-Hispanic and black, non-Hispanic women.
- Uterine cancer: Fourth among white, non-Hispanic, black, non-Hispanic, fifth among Asian non-Hispanic and Hispanic women.
- Thyroid cancer: Third among Asian, non-Hispanic and Hispanic women; fifth among white non-Hispanic and black, non-Hispanic women.

During 2005-2009, white, non-Hispanic females had the highest incidence rate of all cancer types combined (474.4 per 100,000) among all racial/ethnic groups (Table 15). This rate was significantly higher than the rates for the other female groups. Asian, non-Hispanic females had an incidence rate for all sites combined (308.0 per 100,000) which was significantly lower than the rate for white and black, non-Hispanics (474.4 and 406.1 per 100,000, respectively). The rates of invasive breast and lung cancer were statistically significantly higher for white, non-Hispanic females—138.4 and 68.4 cases per 100,000, respectively—than for the other racial/ethnic groups. The breast cancer *in situ* incidence rate was also statistically significantly higher among white, non-Hispanic females (48.2 cases per 100,000) than among the other racial/ethnic groups (Table 15).

Mortality

Table 17 presents the five leading causes of cancer mortality among Massachusetts residents 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 65,531 deaths from cancer from 2005 through 2009, 60,474 (92.3%) occurred among white, non-Hispanics, 2,694 (4.1%) among black, non-Hispanics, 999 (1.5%) among Asian, non-Hispanics, and 1,281 (2.0%) among Hispanics (Table 20). Overall death rates were significantly higher in the black, non-Hispanic population as compared with all other racial/ethnic groups (Table 23), which is consistent with national data through 2008(4).

Males

Based on age-adjusted rates, rankings of the five most common causes of cancer deaths among Massachusetts males (as shown in Table 17) are:

- Lung Cancer: First among men of all racial/ethnic groups.
- Prostate cancer: Second among white, non-Hispanic, black, non-Hispanic, and Hispanic men; fourth among Asian, non-Hispanic men.
- Liver cancer: Second among Asian, non-Hispanic men, fourth among Hispanic men; fifth among black, non-Hispanic men.
- Colorectal cancer: Third among men of all racial/ethnic groups.
- Pancreatic cancer: Fourth among white, non-Hispanic and black, non-Hispanic men.
- Stomach cancer: Fifth among Asian, non-Hispanic and Hispanic men.
- Esophageal cancer: Fifth among white, non-Hispanic men.

For all types of cancer deaths combined for 2005-2009, black, non-Hispanic males had the highest age-adjusted mortality rate (267.1 deaths per 100,000 males), significantly higher than the rates for the three other racial/ethnic groups (Table 21). Compared with white, non-Hispanics, black, non-Hispanic males also had 1.7 to 2.3 times significantly higher mortality rates for the following cancers:

- Liver cancer (8.5 per 100,000 vs. 14.4 per 100,000)
- Multiple myeloma (4.3 per 100,000 vs. 7.3 per 100,000)
- Larynx (2.0 per 100,000 vs. 4.2 per 100,000)
- Prostate cancer (23.0 per 100,000 vs. 46.5 per 100,000) and
- Stomach cancer (4.9 per 100,000 vs. 11.1 per 100,000).

Mortality data were limited for both Asian, non-Hispanic and Hispanic males due to small numbers, but Asian, non-Hispanic males had the highest mortality rate of cancer of the liver and intrahepatic bile ducts, 21.6 per 100,000 (Table 21). This rate was significantly higher than that for white, non-Hispanic males and Hispanics, but not for black non-Hispanic males.

Females

The five most common causes of cancer deaths among Massachusetts females based on age-adjusted rates (as shown in Table 17) are:

- Lung cancer: First among women of all racial/ethnic groups.
- Breast cancer: Second among white, non-Hispanic, black, non-Hispanic, and Hispanic women; third among Asian, non-Hispanic women.
- Colorectal cancer: Third among white, non-Hispanic, black, non-Hispanic, and Hispanic women; second among Asian, non-Hispanic women.
- Pancreatic cancer: Fourth among women of all racial/ethnic groups.
- Ovarian cancer: Fifth among white, non-Hispanic and Hispanic women.
- Uterine cancer: Fifth among black, non-Hispanic women.
- Liver cancer: Fifth among Asian, non-Hispanic women.

For all types of cancer deaths combined during 2005-2009, black, non-Hispanic females had the highest age-adjusted mortality rate among females, with 167.9 deaths per 100,000 females (Table 22). This rate was statistically significantly elevated compared with the rates for Asian, non-Hispanic females and Hispanic females, but not white, non-Hispanic females. When comparing female white, non-Hispanic mortality rates with black, non-Hispanic rates, statistically significant differences were evident for the following cancers:

- Breast cancer (22.1 per 100,000 vs. 29.8 per 100,000);
- Lung cancer (44.7 per 100,000 vs. 31.0 per 100,000);
- Cervical cancer (1.3 per 100,000 vs. 2.7 per 100,000);
- Uterine cancer (4.1 per 100,000 vs. 7.2 per 100,000);
- Multiple myeloma (2.4 per 100,000 vs. 5.7 per 100,000);
- Ovarian cancer (8.7 per 100,000 vs. 5.8 per 100,000);
- Pancreatic cancer (10.2 per 100,000 vs. 14.2 per 100,000); and
- Stomach cancer (2.1 per 100,000 vs. 5.7 per 100,000)

Massachusetts and U.S. Comparisons

Age-adjusted incidence and mortality rates in Massachusetts are compared with national rates in Table 24. The national incidence data are from the North American Association of Central Cancer Registries (NAACCR) (2) and the mortality data are from CDC's National Center for Health Statistics (NCHS). It is important to interpret these data cautiously. Cancer rates may be affected by differences in the racial/ethnic composition of the population, difference in population estimates, the prevalence of cancer risk factors, and cancer screening rates. Cancer rates in Massachusetts and NAACCR areas or the United States may differ because of these variations. For example, the 2005-2009 racial/ethnic population of Massachusetts differed from that included in the NAACCR data. Appendix IV presents a detailed breakdown of the racial/ethnic population for each. One notable difference is that white, non-Hispanics in Massachusetts comprised 80% of the state's total population compared with 66% for states represented by the NAACCR data. The NAACCR incidence data represent 93% of the U.S. population, including 93% of whites, 92% of blacks, 95% of Asian/Pacific Islanders, and 96% of Hispanics/Latinos (2). The national mortality data cover the entire United States population. For this section, both Massachusetts and national incidence and mortality data cover the period 2005-2009.

Incidence

For all cancer sites combined, the age-adjusted incidence rates were higher for Massachusetts females than for females in the NAACCR areas (464.3 vs. 419.3/100,000 respectively); the rates for Massachusetts males were also higher (588.5 vs. 550.7/100,000) (Table 24). Among males, the incidence rates in Massachusetts

were statistically significantly higher than the incidence rates in the NAACCR areas for the following cancers: esophageal, Hodgkin lymphoma, kidney, liver, melanoma, pancreatic, prostate, stomach, testicular, thyroid, and urinary bladder. Among females, breast cancer (invasive and *in situ*), lung cancer, esophageal cancer, uterine cancer, Hodgkin lymphoma, liver cancer, melanoma, pancreatic cancer, thyroid cancer, and urinary bladder cancer were statistically significantly elevated compared with NAACCR incidence rates. Cervical cancer was the only cancer in Massachusetts with a significantly lower incidence rate compared with NAACCR data.

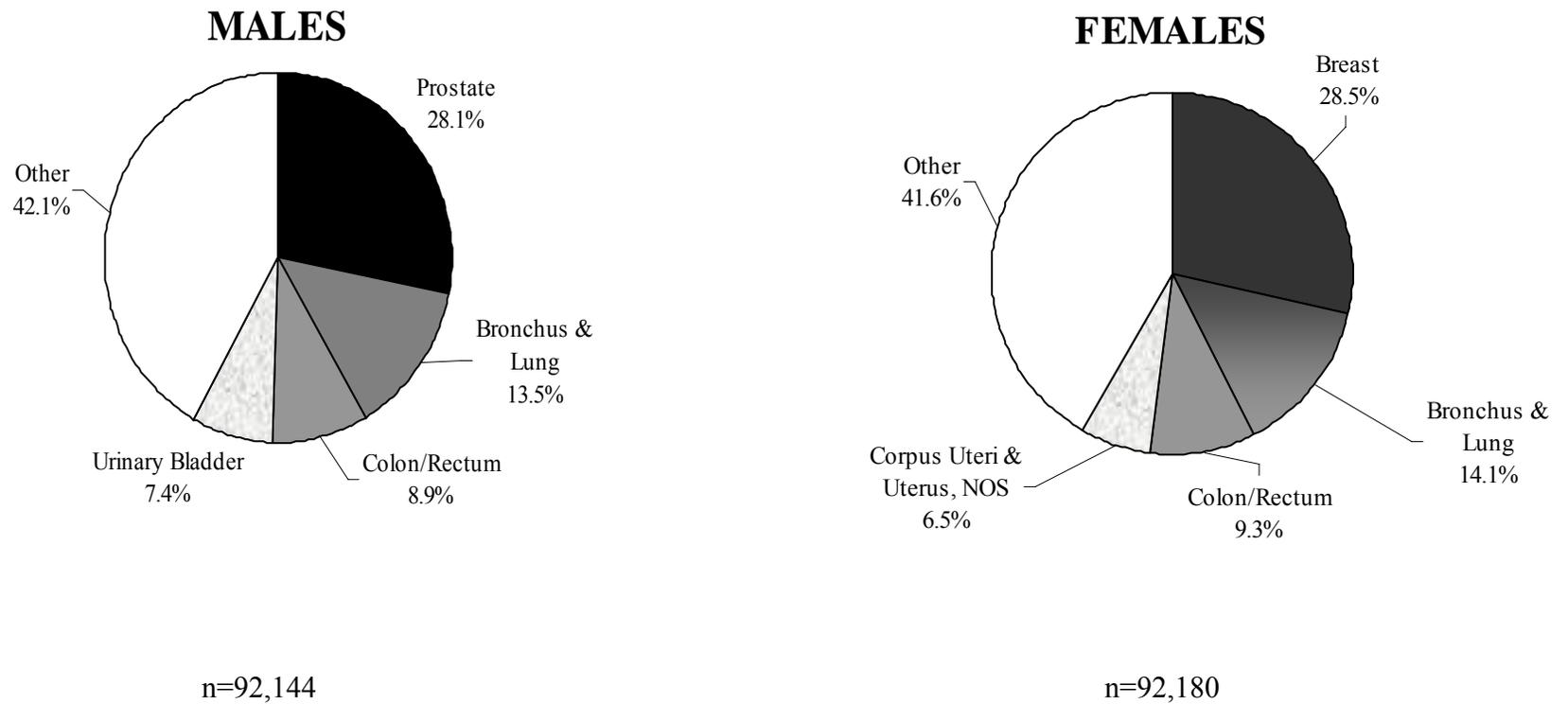
Mortality

For males, 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, 221.1 versus 219.4 per 100,000 males, but the difference was not statistically significant. Among Massachusetts males, mortality rates for the following cancers were significantly higher when compared with the U.S.: esophageal, liver, and urinary bladder, while the lung cancer mortality rate was significantly lower. Among Massachusetts females, the age-adjusted mortality rate for all cancer sites combined was significantly elevated compared with the U.S. (153.5 versus 151.1 per 100,000) (Table 25). Other cancers that were significantly elevated among Massachusetts females were lung, esophageal, liver, pancreas, urinary bladder and melanoma of the skin, while cervical, breast, and colorectal cancer mortality rates were statistically significantly lower than U.S. rates (Table 25).

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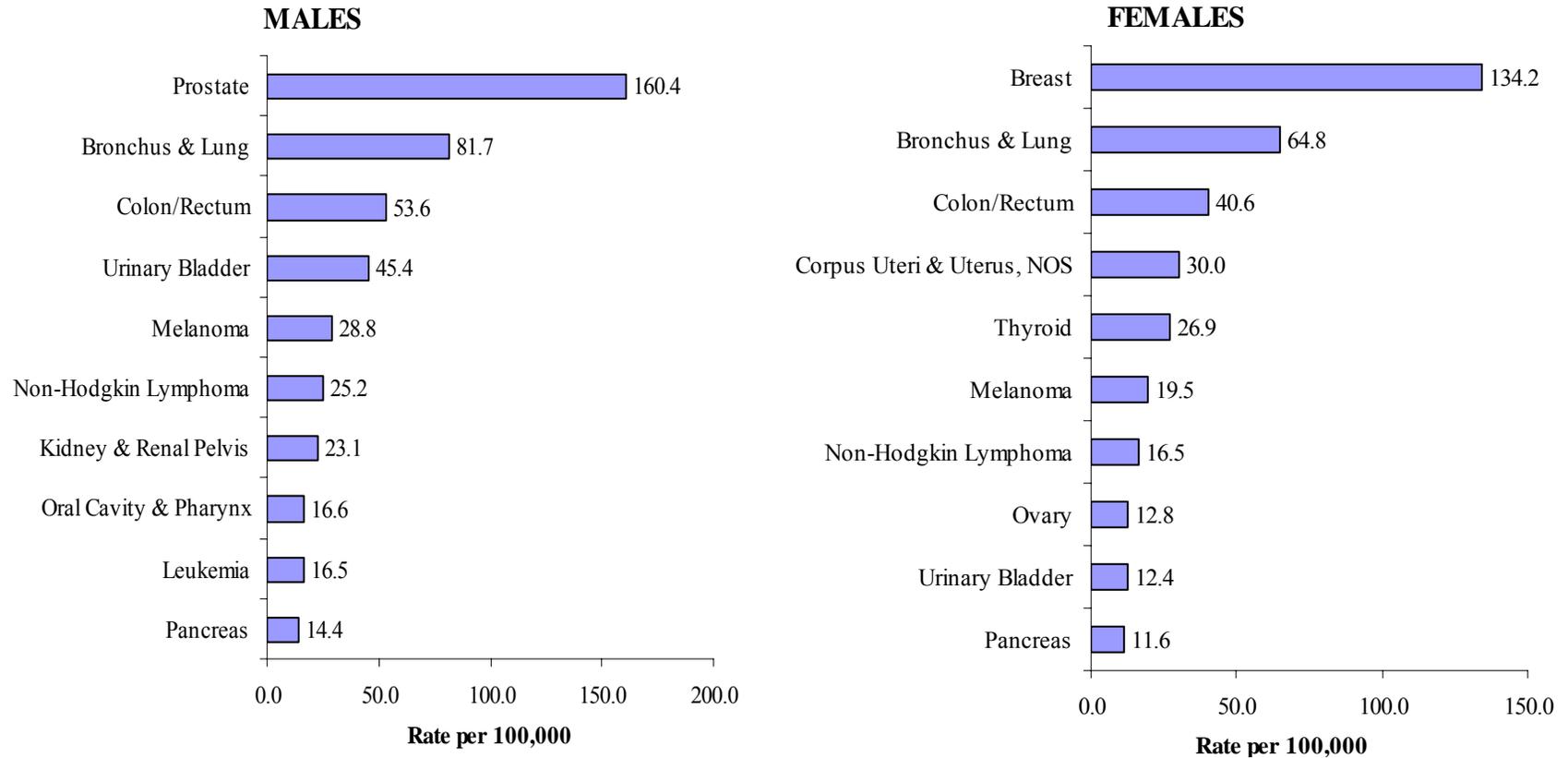
FIGURES & TABLES

Figure 1.
PERCENTAGE OF CANCER INCIDENT CASES BY CANCER TYPE AND SEX
Massachusetts, 2005-2009



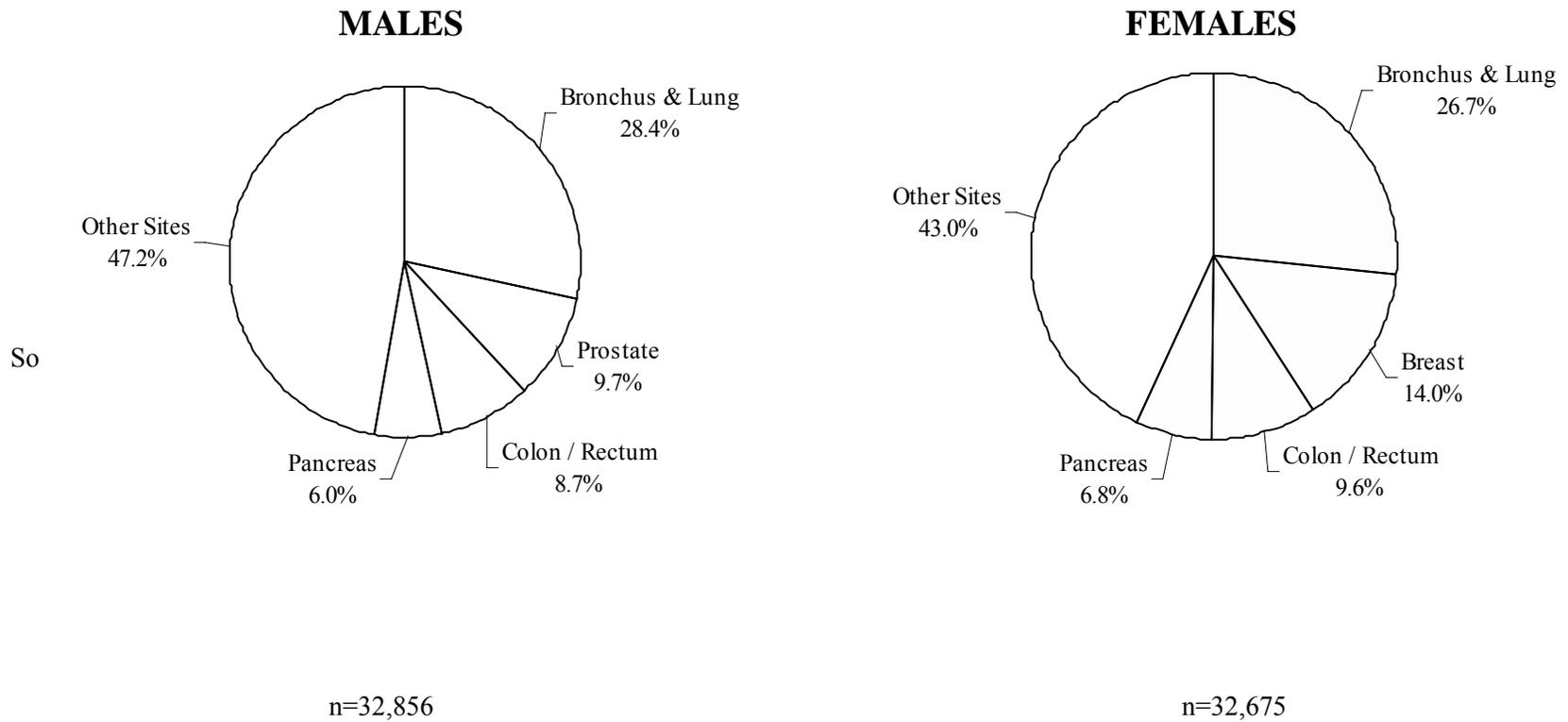
Source: Massachusetts Cancer Registry

Figure 2.
INCIDENCE RATES¹ FOR TEN LEADING CANCER TYPES BY SEX
Massachusetts,
2005-2009



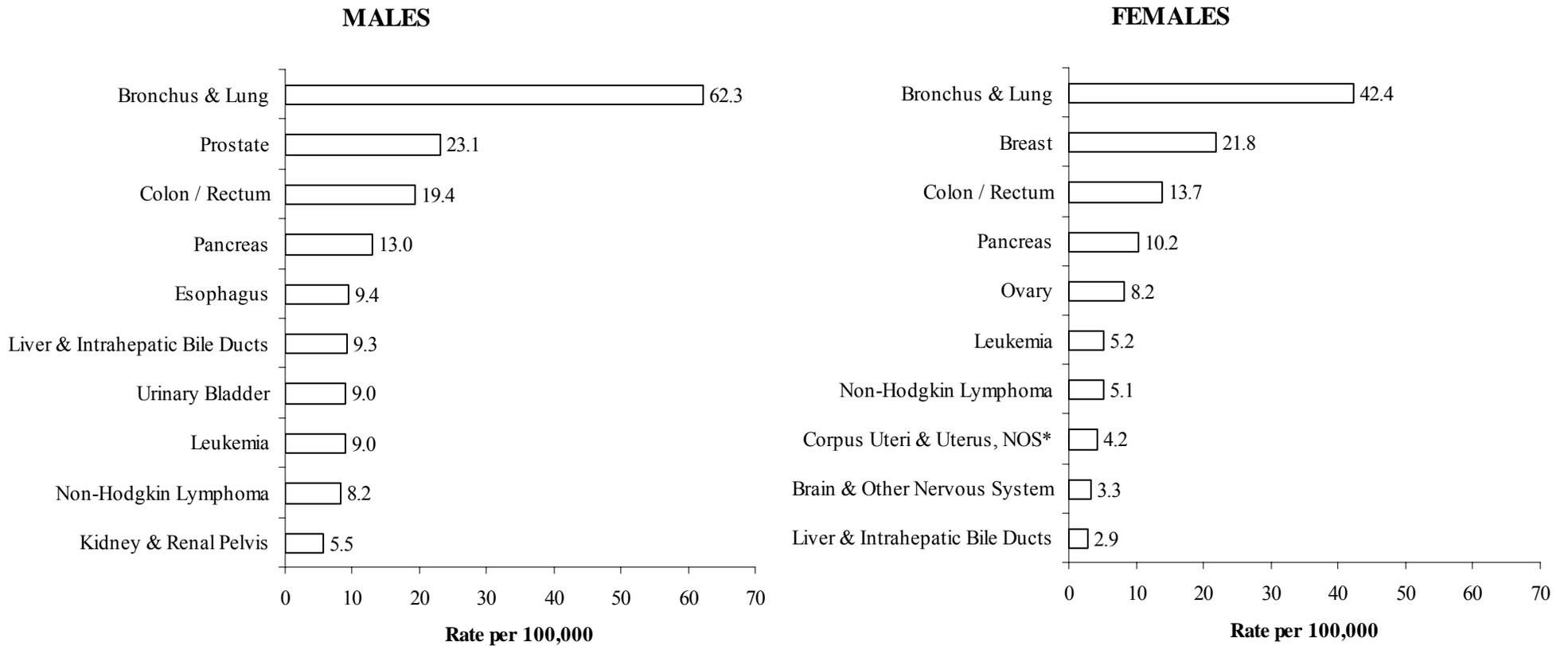
¹Rates are age-adjusted to the 2000 U.S. Standard Population. *NOS – Not Otherwise Specified.
 Source: Massachusetts Cancer Registry

Figure 3.
PERCENTAGE OF CANCER DEATHS BY CANCER TYPE AND SEX
Massachusetts, 2005-2009



Source: Massachusetts Vital Statistics

Figure 4.
MORTALITY RATES¹ FOR TEN LEADING CANCER TYPES BY SEX
Massachusetts, 2005-2009



¹Rates are age-adjusted to the 2000 U.S. Standard Population. *NOS – Not Otherwise Specified.
 Source: Massachusetts Vital Statistics

Table 1.
AGE-SPECIFIC INCIDENCE RATES¹ AND MEDIAN AGE AT DIAGNOSIS FOR SELECTED CANCER SITES
Massachusetts, 2005-2009
MALES

Cancer Site / Type	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+	Median Age
All Sites	24.1	15.0	14.7	26.3	35.8	56.3	73.9	99.7	167.8	311.6	637.5	1057.2	1645.2	2340.7	2889.1	3206.6	3384.9	3433.9	66.0
Brain & Other Nervous System	4.4	4.6	2.3	2.4	1.6	3.7	4.7	4.7	5.3	8.8	9.6	14.7	16.0	17.8	27.3	31.0	36.1	28.1	58.0
Breast	³ -	-	-	-	-	-	-	-	0.4	0.6	0.9	1.9	3.4	5.9	4.9	8.7	9.2	12.2	61.0
Breast <i>in situ</i> ²	-	-	-	-	-	0.1	-	-	0.2	0.2	0.1	0.4	0.1	0.7	1.9	0.3		0.5	56.0
Bronchus & Lung		0.3	0.1	0.3	0.2	0.8	1.5	3.5	9.6	27.2	64.9	114.6	204.2	344.6	472.4	575.4	606.2	498.3	71.0
Colon / Rectum	-	-	0.1	0.6	0.2	1.9	4.4	9.6	18.4	30.7	68.9	80.3	114.6	182.1	241.5	308.6	363.2	464.6	72.0
Esophagus	-	-	-	-	-	0.1	0.3	1.1	2.4	5.4	13.1	24.7	37.2	48.9	57.5	61.9	62.7	54.1	68.0
Hodgkin Lymphoma	0.1	0.7	1.7	3.8	5.3	7.0	5.5	3.9	4.6	3.3	3.0	4.0	4.9	4.3	5.9	6.5	6.9	4.6	40.0
Kidney & Renal Pelvis	1.9	0.4	0.2	0.2	0.6	0.9	3.4	6.3	12.3	24.1	32.8	46.8	63.3	89.7	97.1	110.4	110.7	88.2	64.5
Larynx	-	-	-	-	-	-	0.2	0.6	1.3	3.3	8.5	14.6	21.8	31.6	31.1	31.8	34.2	30.1	66.0
Leukemia	8.5	3.7	3.0	3.5	2.6	2.8	3.0	3.1	6.2	9.0	13.8	20.7	32.6	42.6	67.2	87.0	109.2	138.7	68.0
Liver & Intrahepatic Bile Ducts	-	-	-	0.9	0.1	0.4	0.9	1.3	3.2	9.9	24.1	34.7	36.8	40.2	52.8	57.2	55.4	42.3	64.0
Melanoma of Skin		0.1	0.4	1.2	2.6	5.1	7.8	12.4	15.0	23.7	32.3	49.7	69.3	93.8	124.9	146.7	160.7	163.7	62.0
Multiple Myeloma	-	-	-	-	-	0.1	0.3	1.0	2.2	3.3	8.5	12.4	18.1	22.4	41.0	43.6	49.6	54.1	71.0
Non-Hodgkin Lymphoma	0.7	2.1	3.3	3.4	3.3	4.0	7.0	9.0	13.4	18.2	29.0	41.1	55.6	72.5	101.3	123.0	165.7	160.1	67.0
Oral Cavity & Pharynx	-	0.2	0.3	0.7	1.0	0.7	1.5	4.4	10.1	18.5	31.4	46.6	56.4	57.9	56.8	58.6	56.5	63.2	62.0
Pancreas	-	-	-	-	0.1	0.2	0.4	1.1	2.5	6.7	11.6	21.1	37.6	49.6	73.0	99.1	106.1	114.2	73.0
Prostate	-	-	-	-	-	0.1	0.2	1.3	13.8	55.5	190.4	388.2	640.6	874.0	927.0	777.0	583.5	566.6	66.0
Stomach	-	-	-	-	0.1	0.3	0.9	1.1	2.9	6.3	9.5	13.6	23.7	38.5	49.5	61.9	77.6	87.7	72.0
Testis	-	0.3	0.3	0.2	4.0	10.1	15.8	15.5	14.1	10.3	7.8	5.3	3.7	2.4	1.1	0.9	0.8	1.5	35.0
Thyroid	-	-	0.1	1.9	2.7	5.0	6.4	8.6	11.0	14.4	16.7	16.6	22.5	22.8	25.9	22.5	13.8	14.3	49.0
Urinary Bladder	-	0.1	0.1	0.1	0.5	1.1	2.2	2.9	6.6	12.7	26.7	52.5	98.8	162.5	232.3	329.4	407.8	400.9	73.0
Other Sites	6.7	2.7	2.9	4.1	4.9	6.4	7.8	9.6	16.2	22.4	36.5	54.5	85.2	138	198.6	265.5	369.8	446.3	71

¹ per 100,000 ² Breast *in situ* is excluded from 'All Sites'. ³ Dashes indicate age groups with no incident cases.

Source: Massachusetts Cancer Registry

Table 2.
AGE-SPECIFIC INCIDENCE RATES¹ AND MEDIAN AGE AT DIAGNOSIS FOR SELECTED CANCER SITES
Massachusetts, 2005-2009
FEMALES

Cancer Site / Type	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+	Median Age
All Sites	24.4	9.8	13.1	23.6	45.5	72.7	129.5	200.7	322.3	498.5	664.9	854.8	1165.2	1525.7	1795.0	2066.3	2245.9	1950.5	66.0
Brain & Other Nervous System	5.2	3.1	2.7	2.4	2.6	3.4	3.6	3.2	4.3	5.4	5.9	9.9	10.9	15.9	18.6	17.3	26.2	17.2	59.0
Breast	- ³	-	-	0.1	1.5	7.5	26.4	67.9	137.4	218.0	251.5	287.2	361.2	438.0	433.8	464.8	482.6	363.3	61.0
Breast <i>in situ</i> ²	-	-	-	-	0.2	1.4	4.0	18.1	65.0	109.7	123.9	113.1	126.3	125.4	127.2	115.0	90.7	37.4	56.0
Bronchus & Lung	-	-	-	0.1	0.5	0.8	2.3	4.4	13.6	34.4	59.0	101.5	189.3	295.4	394.5	417.4	385.5	249.0	71.0
Cervix Uteri	-	-	-	0.3	1.0	3.6	8.2	8.9	9.2	10.7	8.0	10.7	8.0	11.4	9.2	8.4	8.5	8.1	50.0
Colon / Rectum	-	-	-	-	1.4	1.4	4.2	8.3	15.6	30.5	49.8	55.0	81.1	113.6	168.0	242.5	329.4	349.5	75.0
Corpus Uteri & Uterus, NOS	-	-	-	0.1	0.3	1.4	4.7	8.2	15.8	28.7	62.5	89.9	120.5	117.1	105.8	103.0	83.5	60.8	62.0
Esophagus	-	-	-	-	-	-	-	0.3	0.5	1.2	1.6	3.8	5.6	10.2	14.3	19.1	19.6	15.9	74.0
Hodgkin Lymphoma	-	0.2	1.2	3.9	6.3	4.6	3.3	3.6	3.9	1.6	2.2	2.5	3.3	4.0	3.6	4.8	4.4	2.9	40.0
Kidney & Renal Pelvis	-	1.7	0.9	0.1	0.7	0.9	2.4	4.3	6.1	10.4	15.2	21.3	29.6	40.7	53.6	51.6	53.6	33.5	66.0
Larynx	-	-	-	-	-	0.1	0.2	0.3	0.6	1.1	2.9	3.7	5.8	7.5	8.5	6.0	4.4	3.7	65.0
Leukemia	8.9	2.8	3.2	2.0	1.5	2.5	3.0	3.4	4.9	6.5	8.1	11.5	18.8	25.9	34.8	44.8	58.9	60.3	69.0
Liver & Intrahepatic Bile Ducts	1.0	0.1	0.1	0.2	0.1	0.6	0.3	0.5	1.1	2.0	4.9	6.9	8.5	11.3	13.3	19.3	23.9	17.4	70.0
Melanoma of Skin	-	0.2	0.5	2.7	8.5	10.8	16.4	17.6	20.7	27.3	28.7	31.2	42.6	43.5	50.0	60.8	70.7	53.3	58.0
Multiple Myeloma	-	-	-	-	-	0.1	-	0.2	1.2	2.5	5.4	8.6	10.9	15.4	20.7	28.5	31.3	29.3	72.0
Non-Hodgkin Lymphoma	0.3	0.5	0.9	2.3	1.8	2.4	4.0	5.1	7.6	11.4	18.1	28.0	39.7	57.7	67.3	91.9	98.7	88.0	70.0
Oral Cavity & Pharynx	-	-	0.3	0.3	0.5	1.3	1.6	2.2	4.1	6.2	11.1	13.8	17.9	22.9	24.1	30.1	26.7	29.1	65.0
Ovary	-	0.3	0.3	1.1	1.9	1.8	3.7	5.8	7.1	13.9	24.0	26.1	38.1	40.7	45.7	48.0	51.3	51.7	63.0
Pancreas	-	-	-	-	0.1	0.2	0.4	0.9	2.7	5.0	9.2	17.6	25.9	39.7	59.6	78.5	89.8	95.1	75.0
Stomach	-	-	-	-	0.1	0.4	0.8	1.0	1.6	2.9	4.3	6.1	7.7	12.9	20.3	28.5	36.6	49.0	76.0
Thyroid	0.1	0.1	1.0	5.0	13.3	22.8	36.2	42.3	43.9	47.8	47.1	46.0	40.4	48.3	36.8	33.1	23.7	9.9	48.0
Urinary Bladder	-	-	-	0.1	0.2	0.5	0.6	1.6	2.3	5.6	9.4	19.8	29.8	48.5	63.3	81.5	87.2	92.0	74.0
Other Sites	7.3	1.5	2.9	2.8	3.4	5.6	7.2	10.7	18	25.3	36	54	69.7	105	149.2	186.3	249.3	271.6	72

¹ per 100,000 ² Breast *in situ* is excluded from 'All Sites'. ³ Dashes indicate age groups with no incident cases.

Source: Massachusetts Cancer Registry

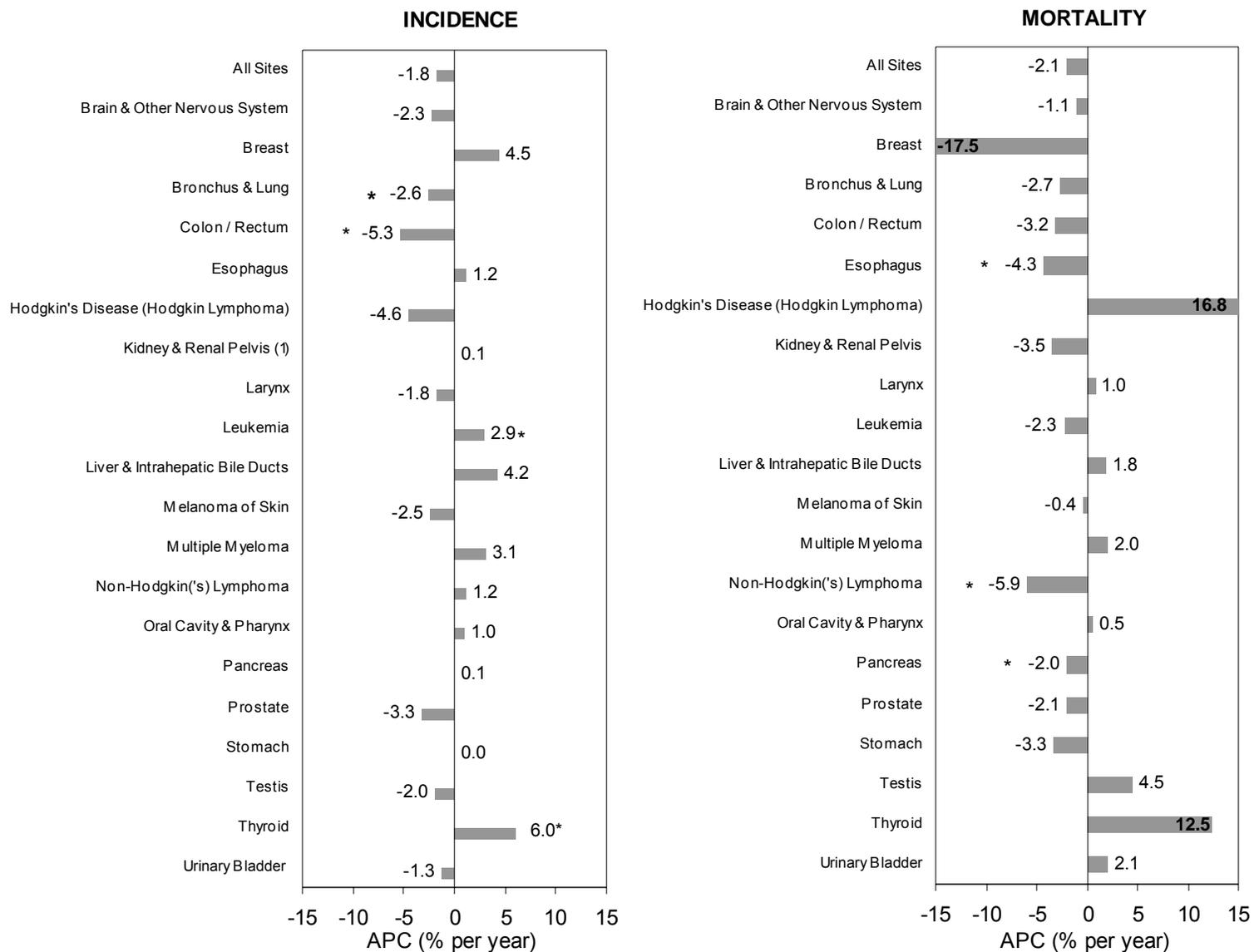
Table 3.
AGE-SPECIFIC INCIDENCE RATES¹ AND MEDIAN AGE AT DIAGNOSIS FOR SELECTED CANCER SITES
Massachusetts, 2005-2009
TOTAL

Cancer Site / Type	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+	Median Age
All Sites	24.3	12.5	13.9	25.0	40.7	64.4	101.8	151.0	246.0	406.5	651.7	952.6	1393.0	1902.4	2280.5	2541.0	2672.4	2378.4	66.0
Brain & Other Nervous System	4.8	3.9	2.5	2.4	2.1	3.6	4.2	4.0	4.8	7.1	7.7	12.2	13.3	16.8	22.5	23.0	29.9	20.3	58.0
Breast	³ -	-	-	0.0	0.8	3.7	13.3	34.5	69.7	111.0	129.3	149.5	191.5	238.4	243.5	274.9	305.3	262.1	61.0
Breast <i>in situ</i> ²	-	-	-	-	0.1	0.8	2.0	9.2	32.9	55.8	63.6	58.7	66.5	67.8	71.6	67.3	56.7	26.8	56.0
Bronchus & Lung	-	0.2	0.0	0.2	0.4	0.8	1.9	4.0	11.6	30.9	61.9	107.9	196.4	318.1	429.1	483.2	468.2	320.9	71.0
Cervix Uteri	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	50.0
Colon / Rectum	-	-	0.0	0.3	0.8	1.6	4.3	9.0	17.0	30.6	59.1	67.3	97.0	145.3	200.6	270.0	342.0	382.7	72.0
Corpus Uteri & Uterus, NOS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	62.0
Esophagus	-	-	-	-	-	0.0	0.1	0.6	1.4	3.2	7.2	13.8	20.6	28.0	33.5	36.9	35.7	26.9	68.0
Hodgkin Lymphoma	0.1	0.5	1.5	3.9	5.8	5.8	4.4	3.8	4.3	2.4	2.6	3.3	4.0	4.1	4.6	5.5	5.3	3.4	40.0
Kidney & Renal Pelvis	1.8	0.7	0.1	0.1	0.7	0.9	2.9	5.3	9.2	17.1	23.8	33.6	45.6	63.4	72.9	76.1	75.0	49.3	64.5
Larynx	-	-	-	-	-	0.0	0.2	0.5	1.0	2.2	5.6	8.9	13.4	18.6	18.5	16.8	15.5	11.3	66.0
Leukemia	8.7	3.3	3.1	2.8	2.1	2.6	3.0	3.2	5.6	7.8	10.8	15.9	25.4	33.6	49.1	62.3	77.7	82.9	68.0
Liver & Intrahepatic Bile Ducts	0.9	0.1	0.0	0.1	0.0	0.5	0.6	0.9	2.1	5.9	14.2	20.3	21.9	24.6	30.8	35.0	35.7	24.6	64.0
Melanoma of Skin	-	0.2	0.4	1.9	5.5	7.9	12.1	15.0	17.9	25.5	30.5	40.1	55.3	66.8	83.2	96.6	104.4	85.3	62.0
Multiple Myeloma	-	-	-	-	-	0.1	0.1	0.6	1.7	2.9	6.9	10.4	14.3	18.7	29.7	34.8	38.1	36.5	71.0
Non-Hodgkin Lymphoma	0.5	1.3	2.1	2.8	2.6	3.2	5.5	7.1	10.5	14.8	23.5	34.3	47.3	64.6	82.4	104.9	123.8	108.8	67.0
Oral Cavity & Pharynx	-	0.1	0.3	0.5	0.7	1.0	1.6	3.3	7.1	12.2	21.0	29.6	36.1	39.1	38.6	42.0	37.9	39.0	62.0
Ovary	0.2	0.1	0.6	0.9	0.9	1.9	2.9	3.6	7.1	12.3	13.5	20.1	22.0	25.4	28.0	32.1	36.8	.	63.0
Pancreas	-	-	-	0.0	0.0	0.2	0.4	1.0	2.6	5.8	10.4	19.3	31.5	44.3	65.6	87.1	95.9	100.6	73.0
Prostate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	66.0
Stomach	-	-	-	0.0	0.0	0.3	0.8	1.1	2.3	4.5	6.8	9.7	15.3	24.7	33.2	42.4	52.0	60.2	72.0
Testis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	35.0
Thyroid	0.1	0.1	0.5	3.4	8.0	13.8	21.3	25.7	27.6	31.4	32.3	31.8	32.0	36.5	32.0	28.7	20.0	11.2	49.0
Urinary Bladder	-	0.1	0.1	0.1	0.4	0.8	1.4	2.2	4.4	9.1	17.8	35.6	62.5	101.1	138.3	184.7	207.3	181.0	73.0
Other Sites	7	2.1	2.9	3.5	4.2	6	7.5	10.2	17.1	23.9	36.3	54.2	77	120.3	171.2	219.3	294.4	321.9	71

¹ per 100,000 ² Breast *in situ* is excluded from 'All Sites'. ³ Dashes indicate age groups with no incident cases or cancers found in only one sex.

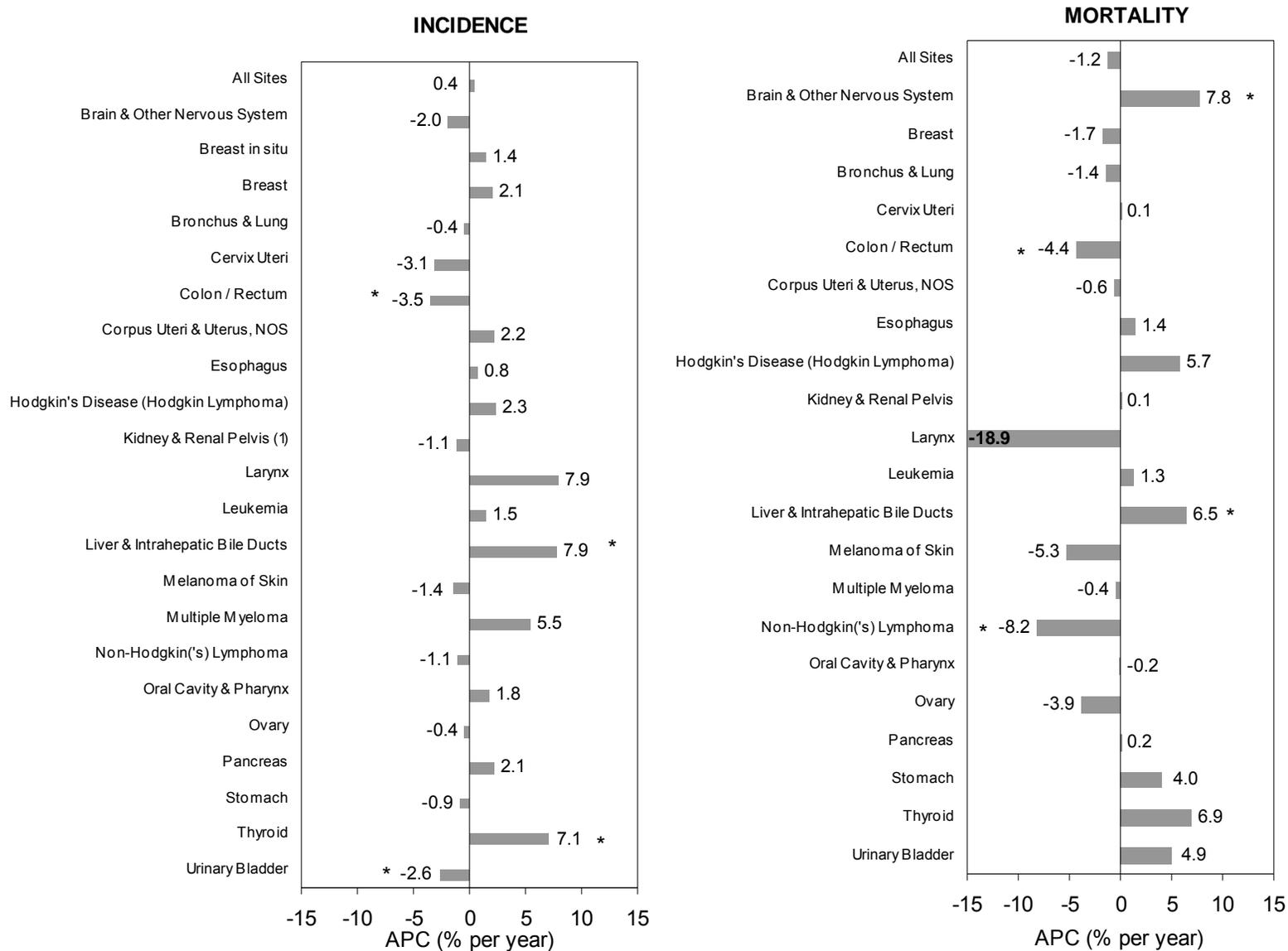
Source: Massachusetts Cancer Registry

Figure 5.
ANNUAL PERCENT CHANGE (APC) IN AGE-ADJUSTED CANCER RATES AMONG MALES
Massachusetts, 2005-2009



*APC is statistically significant ($p \leq 0.05$). Values appearing directly on a bar have been bolded for ease of reading only.
 Source: Massachusetts Cancer Registry.

Figure 6.
ANNUAL PERCENT CHANGE (APC) IN AGE-ADJUSTED CANCER RATES AMONG FEMALES
Massachusetts, 2005-2009



*APC is statistically significant ($p \leq 0.05$). Values appearing directly on a bar have been bolded for ease of reading only.
 Source: Massachusetts Cancer Registry.

Table 4.
ANNUAL AGE-ADJUSTED¹ INCIDENCE RATES² FOR SELECTED CANCER SITES
Massachusetts, 2005-2009
MALES

Cancer Site / Type	2005	2006	2007	2008	2009
All Sites	596.3	612.6	596.2	578.6	560.8
Brain & Other Nervous System	8.7	8.2	9.4	8.3	7.7
Breast	1.0	1.6	1.3	1.1	1.5
Breast <i>in situ</i>³	0.2	0.3	0.1	0.2	0.1
Bronchus & Lung	87.0	83.4	80.7	79.6	78.2
Colon / Rectum	59.4	57.6	52.8	50.7	48.1
Esophagus	10.7	11.3	11.6	11.4	11.3
Hodgkin Lymphoma	4.1	3.9	4.2	4.0	3.2
Kidney & Renal Pelvis	22.8	23.6	22.3	24.0	22.7
Larynx	6.7	7.3	5.9	5.9	6.8
Leukemia	15.6	15.8	16.9	16.4	17.7
Liver & Intrahepatic Bile Ducts	10.6	12.5	11.5	12.6	13.0
Melanoma of Skin	28.0	32.5	28.9	28.3	26.5
Multiple Myeloma	7.0	7.1	7.2	7.2	8.1
Non-Hodgkin Lymphoma	24.8	24.7	25.5	24.8	26.3
Oral Cavity & Pharynx	16.3	16.5	16.3	17.3	16.7
Pancreas	14.4	14.5	14.2	14.4	14.5
Prostate	162.0	172.0	168.9	156.4	143.6
Stomach	10.7	9.2	10.8	11.4	9.6
Testis	7.0	6.2	6.4	5.9	6.5
Thyroid	8.4	8.2	9.0	9.6	10.4
Urinary Bladder	45.5	47.3	45.8	44.7	43.9

¹ Rates are age-adjusted to the 2000 U.S. Standard Population.

²per 100,000 males

³Breast *in situ* is excluded from "All Sites"

Source: Massachusetts Cancer Registry

Table 5.
ANNUAL AGE-ADJUSTED¹ INCIDENCE RATES² FOR SELECTED CANCER SITES
Massachusetts, 2005-2009

FEMALES

Cancer Site / Type	2005	2006	2007	2008	2009
All Sites	455.4	469.6	460.2	471.7	464.4
Brain & Other Nervous System	6.0	6.8	6.3	6.4	5.6
Breast	130.3	132.0	132.8	140.0	135.8
Breast <i>in situ</i>³	45.1	44.6	48.1	48.6	47.9
Bronchus & Lung	65.7	65.2	63.9	65.4	64.2
Cervix Uteri	6.0	6.2	5.3	5.4	5.5
Colon / Rectum	44.1	41.7	40.4	39.0	38.2
Corpus Uteri & Uterus, NOS	27.6	30.7	29.6	31.8	30.2
Esophagus	2.6	2.5	2.5	2.7	2.6
Hodgkin Lymphoma	2.6	3.4	2.7	3.2	3.0
Kidney & Renal Pelvis	11.1	12.0	10.8	11.3	10.8
Larynx	1.3	1.6	1.4	1.6	1.9
Leukemia	9.3	9.8	9.6	10.5	9.7
Liver & Intrahepatic Bile Ducts	2.8	3.2	3.5	3.7	3.8
Melanoma of Skin	19.5	20.8	19.2	19.4	18.8
Multiple Myeloma	3.6	4.9	4.2	4.7	4.8
Non-Hodgkin Lymphoma	16.6	16.7	17.2	15.7	16.2
Oral Cavity & Pharynx	6.0	7.2	6.4	6.3	7.0
Ovary	13.5	12.6	11.9	12.7	13.2
Pancreas	10.4	12.6	11.0	11.9	11.9
Stomach	4.5	4.9	4.7	4.7	4.4
Thyroid	22.2	25.8	28.3	27.8	30.1
Urinary Bladder	13.2	12.5	12.2	12.4	11.6

¹ Rates are age-adjusted to the 2000 U.S. Standard Population.

²per 100,000 males

³Breast *in situ* is excluded from "All Sites"

Source: Massachusetts Cancer Registry

Table 6.
ANNUAL AGE-ADJUSTED¹ INCIDENCE RATES² FOR SELECTED CANCER SITES
Massachusetts, 2005-2009
TOTAL

Cancer Site / Type	2005	2006	2007	2008	2009
All Sites	512.3	525.5	513.9	512.7	501.4
Brain & Other Nervous System	7.2	7.4	7.7	7.3	6.5
Breast	71.5	72.4	72.5	76.3	74.0
Breast <i>in situ</i> ³	24.1	23.9	25.5	25.8	25.3
Bronchus & Lung	74.3	72.2	70.4	70.7	69.6
Cervix Uteri	-- ⁴	--	--	--	--
Colon / Rectum	50.8	48.4	45.7	44.1	42.5
Corpus Uteri & Uterus, NOS	--	--	--	--	--
Esophagus	6.2	6.4	6.5	6.6	6.4
Hodgkin Lymphoma	3.3	3.6	3.4	3.5	3.1
Kidney & Renal Pelvis	16.3	17.0	15.9	17.0	16.2
Larynx	3.7	4.1	3.4	3.5	4.0
Leukemia	12.0	12.2	12.7	12.9	13.0
Liver & Intrahepatic Bile Ducts	6.3	7.4	7.2	7.7	8.0
Melanoma of Skin	22.7	25.5	23.1	22.8	21.8
Multiple Myeloma	5.1	5.8	5.5	5.7	6.2
Non-Hodgkin Lymphoma	20.2	20.2	20.7	19.6	20.6
Oral Cavity & Pharynx	10.7	11.4	10.9	11.3	11.4
Ovary	7.5	6.9	6.6	6.9	7.2
Pancreas	12.2	13.5	12.4	13.0	13.0
Prostate	--	--	--	--	--
Stomach	7.1	6.7	7.3	7.6	6.7
Testis	--	--	--	--	--
Thyroid	15.5	17.2	18.8	18.9	20.4
Urinary Bladder	26.6	26.7	26.1	25.7	25.0

¹ Rates are age-adjusted to the 2000 U.S. Standard Population.

² per 100,000 total population

³ Breast *in situ* is excluded from "All Sites"

⁴ Dashes indicate cancers found in only one sex.

Source: Massachusetts Cancer Registry

Table 7.
ANNUAL AGE-ADJUSTED¹ MORTALITY RATES² FOR SELECTED CANCER SITES
Massachusetts, 2005-2009
MALES

Cancer Site / Type	2005	2006	2007	2008	2009
All Sites	224.5	233.1	222.3	217.6	209.2
Brain & Other Nervous System	5.4	5.6	5.4	4.8	5.5
Breast	0.3	0.5	0.3	0.3	0.2
Bronchus & Lung	64.1	66.6	62.2	60.4	58.8
Colon / Rectum	20.3	21.2	19.0	18.0	18.8
Esophagus	10.3	10.0	9.0	9.0	8.7
Hodgkin Lymphoma	0.3	0.4	0.4	0.4	0.7
Kidney & Renal Pelvis	5.3	6.1	6.1	5.4	4.7
Larynx	2.0	1.7	2.0	2.4	1.8
Leukemia	8.9	10.0	9.2	8.9	8.4
Liver & Intrahepatic Bile Ducts	9.3	8.8	9.0	9.8	9.6
Melanoma of Skin	4.3	4.4	4.3	3.8	4.5
Multiple Myeloma	4.0	4.3	4.6	4.6	4.3
Non-Hodgkin Lymphoma	9.2	8.8	8.0	8.0	7.1
Oral Cavity & Pharynx	3.4	3.6	4.1	4.1	3.3
Pancreas	13.7	13.2	13.0	12.9	12.5
Prostate	22.6	25.1	24.2	22.3	21.6
Stomach	5.6	5.9	5.0	5.7	4.8
Testis	0.1	0.1	0.2	0.2	0.1
Thyroid	0.3	0.4	0.7	0.5	0.5
Urinary Bladder	8.2	9.5	8.6	10.2	8.8

¹ Rates are age-adjusted to the 2000 U.S. Standard Population.

² per 100,000 males

Source: Massachusetts Vital Statistics

Table 8
ANNUAL AGE-ADJUSTED¹ MORTALITY RATES² FOR SELECTED CANCER SITES
Massachusetts, 2005-2009
FEMALES

Cancer Site / Type	2005	2006	2007	2008	2009
All Sites	158.3	157.2	150.5	149.6	152.4
Brain & Other Nervous System	3.0	3.0	3.2	3.4	4.1
Breast	22.9	23.1	20.0	21.0	22.0
Bronchus & Lung	43.7	43.1	42.5	40.9	41.8
Cervix Uteri	1.6	1.4	1.1	1.2	1.7
Colon / Rectum	15.3	14.1	13.5	13.5	12.5
Corpus Uteri & Uterus, NOS	4.4	4.3	3.7	4.2	4.3
Esophagus	2.0	2.0	2.0	2.2	2.1
Hodgkin Lymphoma	0.2	0.3	0.3	0.3	0.3
Kidney & Renal Pelvis	2.4	2.7	2.4	2.1	2.7
Larynx	0.7	0.4	0.6	0.3	0.3
Leukemia	5.1	5.5	4.5	5.5	5.5
Liver & Intrahepatic Bile Ducts	2.5	2.8	3.0	3.0	3.3
Melanoma of Skin	2.7	2.0	1.9	2.2	2.0
Multiple Myeloma	2.6	2.6	2.5	2.1	2.8
Non-Hodgkin Lymphoma	6.2	5.3	4.7	4.9	4.2
Oral Cavity & Pharynx	1.1	1.7	1.3	1.2	1.3
Ovary	8.3	9.5	8.2	7.4	7.7
Pancreas	10.0	9.8	11.1	10.4	9.8
Stomach	2.1	2.1	2.5	2.7	2.2
Thyroid	0.4	0.6	0.4	0.4	0.6
Urinary Bladder	2.8	2.0	2.4	2.9	3.0

¹ Rates are age-adjusted to the 2000 U.S. Standard Population.

² per 100,000 females

Source: Massachusetts Vital Statistics

Table 9.
ANNUAL AGE-ADJUSTED¹ MORTALITY RATES² FOR SELECTED CANCER SITES
Massachusetts, 2005-2009
TOTAL

Cancer Site / Type	2005	2006	2007	2008	2009
All Sites	184.1	186.1	177.8	175.6	173.7
Brain & Other Nervous System	4.1	4.2	4.1	4.1	4.7
Breast	13.1	13.3	11.5	12.0	12.5
Bronchus & Lung	51.9	52.5	50.3	48.7	48.5
Cervix Uteri	– ³	–	–	–	–
Colon / Rectum	17.4	17.0	15.7	15.3	15.0
Corpus Uteri & Uterus, NOS	–	–	–	–	–
Esophagus	5.6	5.5	5.0	5.2	5.0
Hodgkin Lymphoma	0.3	0.4	0.3	0.3	0.5
Kidney & Renal Pelvis	3.6	4.1	3.9	3.4	3.5
Larynx	1.3	1.0	1.2	1.2	0.9
Leukemia	6.6	7.3	6.2	6.7	6.6
Liver & Intrahepatic Bile Ducts	5.5	5.4	5.6	5.9	6.1
Melanoma of Skin	3.3	3.0	2.9	2.8	3.0
Multiple Myeloma	3.2	3.3	3.3	3.2	3.4
Non-Hodgkin Lymphoma	7.4	6.8	6.0	6.1	5.4
Oral Cavity & Pharynx	2.1	2.5	2.6	2.5	2.2
Ovary	–	–	–	–	–
Pancreas	11.6	11.3	11.9	11.5	11.0
Prostate	–	–	–	–	–
Stomach	3.5	3.6	3.5	3.9	3.3
Testis	–	–	–	–	–
Thyroid	0.3	0.5	0.5	0.4	0.6
Urinary Bladder	4.9	4.9	4.7	5.7	5.2

¹ Rates are age-adjusted to the 2000 U.S. Standard Population.

² per 100,000 total population

³ Dashes indicate cancers found in only one sex.

Source: Massachusetts Vital Statistics

Table 10.
FIVE LEADING CANCER INCIDENCE RATES BY RACE/ETHNICITY AND SEX
Massachusetts, 2005-2009

MALES

AGE-ADJUSTED¹ INCIDENCE RATE²				
RANK	White, non-Hispanic	Black, non-Hispanic	Asian, non-Hispanic	Hispanic
1	Prostate 151.8	Prostate 244.7	Prostate 74.8	Prostate 160.6
2	Bronchus & Lung 83.6	Bronchus & Lung 82.0	Bronchus & Lung 55.5	Bronchus & Lung 44.0
3	Colon / Rectum 53.6	Colon / Rectum 57.0	Colon / Rectum 40.0	Colon / Rectum 40.2
4	Urinary Bladder 47.3	Urinary Bladder 25.2	Liver 33.3	Urinary Bladder 19.5
5	Melanoma 29.9	Kidney & Renal Pelvis 24.2	Non-Hodgkin Lymphoma 15.4	Liver 17.8

FEMALES

AGE-ADJUSTED¹ INCIDENCE RATE²				
RANK	White, non-Hispanic	Black, non-Hispanic	Asian, non-Hispanic	Hispanic
1	Breast ³ 138.4	Breast 121.1	Breast 80.6	Breast 88.2
2	Bronchus & Lung 68.4	Bronchus & Lung 42.9	Colon/Rectum 39.0	Colon/Rectum 35.3
3	Colon/Rectum 40.5	Colon/Rectum 39.5	Thyroid 32.3	Thyroid 24.8
4	Corpus Uteri & Uterus, NOS 30.6	Corpus Uteri & Uterus, NOS 26.5	Bronchus & Lung 28.8	Bronchus & Lung 23.4
5	Thyroid 26.7	Thyroid 24.7	Corpus Uteri & Uterus, NOS 18.9	Corpus Uteri & Uterus, NOS 22.2

¹ Rates are age-adjusted to the 2000 U.S. Standard Population.

² per 100,000

³Breast cancer rates do not include *in situ* cases.

Source: Massachusetts Cancer Registry

Table 11.
NUMBER AND PERCENTAGE OF INCIDENT CASES FOR SELECTED CANCER SITES BY RACE/ETHNICITY¹
Massachusetts, 2005-2009
MALES

Cancer Site / Type	All Races ²		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	92144	100.0	81949	100.0	3900	100.0	1628	100.0	2644	100.0
Brain & Other Nervous System	1333	1.4	1228	1.5	24	0.6	24	1.5	53	2.0
Breast³	200	0.2	188	0.2	7	0.2	1	0.1	2	0.1
Bronchus & Lung	12457	13.5	11512	14.0	467	12.0	237	14.6	209	7.9
Colon / Rectum	8243	8.9	7378	9.0	351	9.0	195	12.0	228	8.6
Esophagus	1792	1.9	1675	2.0	63	1.6	21	1.3	31	1.2
Hodgkin Lymphoma	617	0.7	536	0.7	28	0.7	12	0.7	38	1.4
Kidney & Renal Pelvis	3694	4.0	3320	4.1	173	4.4	61	3.7	122	4.6
Larynx	1042	1.1	948	1.2	38	1.0	7	0.4	42	1.6
Leukemia	2508	2.7	2257	2.8	69	1.8	53	3.3	76	2.9
Liver & Intrahepatic Bile Ducts	1980	2.1	1535	1.9	124	3.2	185	11.4	126	4.8
Melanoma of Skin	4513	4.9	4145	5.1	7	0.2	6	0.4	18	0.7
Multiple Myeloma	1129	1.2	966	1.2	91	2.3	16	1.0	47	1.8
Non-Hodgkin Lymphoma	3932	4.3	3508	4.3	152	3.9	82	5.0	133	5.0
Oral Cavity & Pharynx	2752	3.0	2471	3.0	107	2.7	61	3.7	88	3.3
Pancreas	2198	2.4	2012	2.5	85	2.2	33	2.0	63	2.4
Prostate	25896	28.1	22002	26.8	1544	39.6	328	20.1	862	32.6
Stomach	1582	1.7	1312	1.6	98	2.5	59	3.6	102	3.9
Testis	1021	1.1	931	1.1	15	0.4	13	0.8	50	1.9
Thyroid	1503	1.6	1325	1.6	48	1.2	56	3.4	51	1.9
Urinary Bladder	6789	7.4	6418	7.8	128	3.3	55	3.4	96	3.6
Other Sites	6963	7.6	6282	7.7	281	7.2	123	7.6	207	7.8

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

² The number of cases for all races is not the sum of cases by race/ethnicity. ³Breast *in situ* cases are excluded from 'All Sites' and breast cancer counts.

Source: Massachusetts Cancer Registry

Table 12.
NUMBER AND PERCENTAGE OF INCIDENT CASES FOR SELECTED CANCER SITES BY RACE/ETHNICITY¹
Massachusetts, 2005-2009
FEMALES

Cancer Site / Type	All Races ²		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	92180	100.0	83107	100.0	3482	100.0	1917	100.0	2691	100.0
Brain & Other Nervous System	1154	1.3	1053	1.3	23	0.7	26	1.4	48	1.8
Breast ³	26248	28.5	23742	28.6	1067	30.6	547	28.5	765	28.4
Bronchus & Lung	13041	14.1	12341	14.8	360	10.3	149	7.8	152	5.6
Cervix Uteri	1023	1.1	775	0.9	83	2.4	47	2.5	103	3.8
Colon / Rectum	8596	9.3	7748	9.3	323	9.3	207	10.8	251	9.3
Corpus Uteri & Uterus, NOS	5955	6.5	5359	6.4	227	6.5	123	6.4	192	7.1
Esophagus	529	0.6	472	0.6	29	0.8	10	0.5	16	0.6
Hodgkin Lymphoma	509	0.6	443	0.5	21	0.6	9	0.5	31	1.2
Kidney & Renal Pelvis	2192	2.4	1957	2.4	120	3.4	25	1.3	76	2.8
Larynx	311	0.3	284	0.3	13	0.4	2	0.1	11	0.4
Leukemia	1928	2.1	1708	2.1	74	2.1	48	2.5	68	2.5
Liver & Intrahepatic Bile Ducts	700	0.8	560	0.7	42	1.2	51	2.7	41	1.5
Melanoma of Skin	3704	4.0	3336	4.0	9	0.3	13	0.7	28	1.0
Multiple Myeloma	927	1.0	776	0.9	86	2.5	9	0.5	41	1.5
Non-Hodgkin Lymphoma	3329	3.6	2983	3.6	125	3.6	67	3.5	109	4.1
Oral Cavity & Pharynx	1316	1.4	1180	1.4	43	1.2	42	2.2	41	1.5
Ovary	2545	2.8	2330	2.8	73	2.1	52	2.7	72	2.7
Pancreas	2446	2.7	2225	2.7	121	3.5	43	2.2	54	2.0
Stomach	993	1.1	810	1.0	72	2.1	55	2.9	53	2.0
Thyroid	4755	5.2	3900	4.7	234	6.7	249	13.0	279	10.4
Urinary Bladder	2587	2.8	2433	2.9	57	1.6	21	1.1	46	1.7
Other Sites	7392	8.0	6692	8.1	280	8.0	122	6.4	214	8.0

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

² The number of cases for all races is not the sum of cases by race/ethnicity. ³Breast *in situ* cases are excluded from 'All Sites' and from breast cancer counts.

Source: Massachusetts Cancer Registry

Table 13.
NUMBER AND PERCENTAGE OF INCIDENT CASES FOR SELECTED CANCER SITES BY RACE/ETHNICITY¹
Massachusetts, 2005-2009
TOTAL²

Cancer Site / Type	All Races ³		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	184339	100.0	165069	100.0	7383	100.0	3545	100.0	5336	100.0
Brain & Other Nervous System	2487	1.3	2281	1.4	47	0.6	50	1.4	101	1.9
Breast⁴	26449	14.3	23931	14.5	1074	14.5	548	15.5	767	14.4
Bronchus & Lung	25500	13.8	23855	14.5	827	11.2	386	10.9	361	6.8
Cervix Uteri	1023	0.6	775	0.5	83	1.1	47	1.3	103	1.9
Colon / Rectum	16840	9.1	15127	9.2	674	9.1	402	11.3	479	9.0
Corpus Uteri & Uterus, NOS	5955	3.2	5359	3.2	227	3.1	123	3.5	192	3.6
Esophagus	2322	1.3	2148	1.3	92	1.2	31	0.9	47	0.9
Hodgkin Lymphoma	1126	0.6	979	0.6	49	0.7	21	0.6	69	1.3
Kidney & Renal Pelvis	5886	3.2	5277	3.2	293	4.0	86	2.4	198	3.7
Larynx	1353	0.7	1232	0.7	51	0.7	9	0.3	53	1.0
Leukemia	4436	2.4	3965	2.4	143	1.9	101	2.8	144	2.7
Liver & Intrahepatic Bile Ducts	2680	1.5	2095	1.3	166	2.2	236	6.7	167	3.1
Melanoma of Skin	8218	4.5	7482	4.5	16	0.2	19	0.5	46	0.9
Multiple Myeloma	2057	1.1	1743	1.1	177	2.4	25	0.7	88	1.6
Non-Hodgkin Lymphoma	7264	3.9	6493	3.9	278	3.8	149	4.2	242	4.5
Oral Cavity & Pharynx	4068	2.2	3651	2.2	150	2.0	103	2.9	129	2.4
Ovary	2547	1.4	2332	1.4	73	1.0	52	1.5	72	1.3
Pancreas	4644	2.5	4237	2.6	206	2.8	76	2.1	117	2.2
Prostate	25898	14.0	22004	13.3	1544	20.9	328	9.3	862	16.2
Stomach	2575	1.4	2122	1.3	170	2.3	114	3.2	155	2.9
Testis	1021	0.6	931	0.6	15	0.2	13	0.4	50	0.9
Thyroid	6258	3.4	5225	3.2	282	3.8	305	8.6	330	6.2
Urinary Bladder	9376	5.1	8851	5.4	185	2.5	76	2.1	142	2.7
Other Sites	14356	7.8	12974	7.9	561	7.6	245	6.9	422	7.9

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

²Total includes persons classified as a transsexual and persons of unknown sex. ³The number of cases for all races is not the sum of cases by race/ethnicity.

⁴Breast in situ cases are excluded from 'All Sites' and from breast cancer counts. Source: Massachusetts Cancer Registry

Table 14.
AGE-ADJUSTED¹ INCIDENCE RATES² AND 95% CONFIDENCE LIMITS (95% CL)
FOR SELECTED CANCER SITES BY RACE/ETHNICITY³
Massachusetts, 2005-2009
MALES

Cancer Site / Type	All Races		White, non-Hispanics		Black, non-Hispanics		Asian, non-Hispanics		Hispanics	
	Rates	95% CL	Rates	95% CL	Rates	95% CL	Rates	95% CL	Rates	95% CL
All Sites	588.5	584.6-592.4	587.5	583.5-591.6	626.3	604.8-647.7	335.8	318.1-353.5	443.2	424-462.5
Brain & Other Nervous System	8.4	8.0-8.9	9.1	8.6-9.7	2.9	1.6-4.3	4.2	2.3-6.1	5.9	3.9-7.9
Breast	1.3	1.1-1.5	1.4	1.2-1.6	*	*	*	*	*	*
Breast <i>in situ</i>⁴	0.2	0.1-0.2	0.2	0.1-0.2	*	*	*	*	*	*
Bronchus & Lung	81.7	80.2-83.1	83.6	82-85.1	82.0	74.0-90.1	55.5	47.9-63.0	44.0	37.4-50.6
Colon / Rectum	53.6	52.4-54.8	53.6	52.3-54.8	57.0	50.4-63.5	40.0	33.9-46.1	40.2	34.3-46.1
Esophagus	11.3	10.8-11.8	11.8	11.2-12.3	10.7	7.8-13.5	4.5	2.4-6.6	5.2	3.2-7.3
Hodgkin Lymphoma	3.9	3.6-4.2	4.2	3.8-4.5	3.0	1.8-4.2	1.5	0.6-2.3	3.5	2.1-4.9
Kidney & Renal Pelvis	23.1	22.3-23.8	23.4	22.6-24.2	24.2	20.3-28	11.7	8.5-15.0	17.5	14.0-21.1
Larynx	6.5	6.1-6.9	6.6	6.2-7.1	6.2	4.1-8.4	1.6	0.3-2.8	6.9	4.6-9.1
Leukemia	16.5	15.8-17.1	16.9	16.2-17.6	11.4	8.3-14.5	10.1	7.0-13.1	8.8	6.3-11.4
Liver & Intrahepatic Bile Ducts	12.1	11.6-12.6	10.6	10.0-11.1	18.6	15.0-22.2	33.3	28.1-38.4	17.8	14.3-21.2
Melanoma of Skin	28.8	27.9-29.6	29.9	29.0-30.8	*	*	*	*	*	*
Multiple Myeloma	7.3	6.9-7.8	7.0	6.6-7.4	16.0	12.4-19.7	3.4	1.6-5.2	9.5	6.5-12.6
Non-Hodgkin Lymphoma	25.2	24.4-26	25.6	24.7-26.4	21.1	17.5-24.8	15.4	11.7-19	17.3	13.8-20.8
Oral Cavity & Pharynx	16.6	16-17.2	16.9	16.2-17.6	14.7	11.7-17.7	9.2	6.7-11.8	13.1	10.1-16.2
Pancreas	14.4	13.8-15	14.6	14-15.3	15.8	12.0-19.5	8.3	5.3-11.3	13.2	9.6-16.8
Prostate	160.4	158.4-162.4	151.8	149.8-153.8	244.7	231.6-257.8	74.8	66.3-83.3	160.6	149-172.3
Stomach	10.4	9.8-10.9	9.6	9.1-10.1	17.0	13.5-20.6	13.3	9.7-16.9	17.8	13.8-21.7
Testis	6.4	6-6.8	7.5	7.1-8.0	*	*	*	*	*	*
Thyroid	9.1	8.7-9.6	9.5	9.0-10.0	5.6	4.0-7.2	7.8	5.6-9.9	6.8	4.6-9.0
Urinary Bladder	45.4	44.3-46.5	47.3	46.1-48.5	25.2	20.4-30.0	12.8	9.1-16.4	19.5	15.1-23.8

¹ Rates are age-adjusted to the 2000 U.S. Standard Population.

² per 100,000

³ Race/ethnicity categories are mutually exclusive. Cases are only included in one race/ethnicity category. ⁴ Breast *in situ* is excluded from 'All Sites'.

*An age-adjusted incidence rate was not calculated when there were fewer than 20 cases.

Source: Massachusetts Cancer Registry

Table 15.
AGE-ADJUSTED¹ INCIDENCE RATES² AND 95% CONFIDENCE LIMITS (95% CL)
FOR SELECTED CANCER SITES BY RACE/ETHNICITY³
Massachusetts, 2005-2009
FEMALES

Cancer Site / Type	All Races		White, non-Hispanics		Black, non-Hispanics		Asian, non-Hispanics		Hispanics	
	Rates	95% CL	Rates	95% CL	Rates	95% CL	Rates	95% CL	Rates	95% CL
All Sites	464.3	461.2-467.3	474.4	471.1-477.7	406.1	392.4-419.8	308.0	293.4-322.5	325.1	311.7-338.5
Brain & Other Nervous System	6.2	5.9-6.6	6.7	6.3-7.1	2.4	1.4-3.5	3.3	2.0-4.7	3.9	2.7-5.1
Breast	134.2	132.5-135.8	138.4	136.6-140.2	121.1	113.7-128.5	80.6	73.5-87.6	88.2	81.5-94.9
Breast <i>in situ</i>⁴	46.9	45.9-47.9	48.2	47.1-49.3	39.1	35-43.3	34.6	30.0-39.2	34.1	30.1-38.1
Bronchus & Lung	64.8	63.7-66.0	68.4	67.2-69.6	42.9	38.4-47.4	28.8	24.0-33.6	23.4	19.5-27.3
Cervix Uteri	5.7	5.3-6.0	5.1	4.8-5.5	9.3	7.3-11.4	7.0	4.9-9.1	10.5	8.3-12.7
Colon / Rectum	40.6	39.8-41.5	40.5	39.6-41.4	39.5	35.1-43.9	39.0	33.5-44.6	35.3	30.6-40.0
Corpus Uteri & Uterus, NOS	30.0	29.2-30.8	30.6	29.8-31.4	26.5	23.0-30.0	18.9	15.4-22.3	22.2	18.9-25.6
Esophagus	2.6	2.3-2.8	2.5	2.3-2.7	3.6	2.3-4.9	*	*	*	*
Hodgkin Lymphoma	3.0	2.7-3.2	3.2	2.9-3.5	2.2	1.2-3.1	*	*	3.1	1.9-4.3
Kidney & Renal Pelvis	11.2	10.7-11.6	11.3	10.8-11.8	13.9	11.4-16.5	4.5	2.6-6.3	9.5	7.2-11.8
Larynx	1.6	1.4-1.8	1.6	1.4-1.8	*	*	*	*	*	*
Leukemia	9.8	9.3-10.2	9.9	9.4-10.4	8.5	6.6-10.5	7.1	5.0-9.2	7.2	5.3-9.2
Liver & Intrahepatic Bile Ducts	3.4	3.2-3.7	3.0	2.8-3.3	4.9	3.4-6.4	9.8	7.0-12.5	6.2	4.2-8.2
Melanoma of Skin	19.5	18.9-20.2	20.7	20-21.4	*	*	*	*	3.0	1.8-4.2
Multiple Myeloma	4.4	4.1-4.7	4.1	3.8-4.4	10.7	8.4-13.0	*	*	5.9	3.9-7.8
Non-Hodgkin Lymphoma	16.5	15.9-17.0	16.5	15.9-17.1	14.4	11.8-16.9	11.5	8.6-14.3	14.4	11.5-17.4
Oral Cavity & Pharynx	6.6	6.2-6.9	6.7	6.3-7.0	4.9	3.4-6.4	6.5	4.5-8.6	5.6	3.7-7.5
Ovary	12.8	12.3-13.3	13.3	12.7-13.9	8.2	6.3-10.1	7.3	5.2-9.4	8.3	6.2-10.4
Pancreas	11.6	11.1-12.1	11.7	11.2-12.1	15.2	12.4-17.9	8.3	5.8-10.9	8.4	6-10.8
Stomach	4.6	4.3-4.9	4.1	3.8-4.4	9.4	7.2-11.6	9.9	7.2-12.6	7.5	5.3-9.7
Thyroid	26.9	26.1-27.6	26.7	25.8-27.6	24.7	21.5-27.9	32.3	28.1-36.5	24.8	21.7-27.9
Urinary Bladder	12.4	11.9-12.9	12.9	12.4-13.5	7.7	5.7-9.7	4.2	2.3-6.0	6.8	4.7-9.0

¹ Rates are age-adjusted to the 2000 U.S. Standard Population.

² per 100,000

³ Race/ethnicity categories are mutually exclusive. Cases are only included in one race/ethnicity category. ⁴ Breast *in situ* cases are excluded from 'All Sites'.

* An age-adjusted incidence rate was not calculated when there were fewer than 20 cases.

Source: Massachusetts Cancer Registry

Table 16.
AGE-ADJUSTED¹ INCIDENCE RATES² AND 95% CONFIDENCE LIMITS (95% CL)
FOR SELECTED CANCER SITES BY RACE/ETHNICITY³
Massachusetts, 2005-2009
TOTAL

Cancer Site / Type	All Races		White, non-Hispanics		Black, non-Hispanics		Asian, non-Hispanics		Hispanics	
	Rates	95% CL	Rates	95% CL	Rates	95% CL	Rates	95% CL	Rates	95% CL
All Sites	513.0	510.7-515.4	518.1	515.6-520.6	493.1	481.4-504.8	318.7	307.5-329.9	372.8	361.7-383.9
Brain & Other Nervous System	7.2	6.9-7.5	7.8	7.5-8.1	2.6	1.9-3.4	3.7	2.6-4.8	4.7	3.6-5.8
Breast	73.4	72.5-74.2	75.5	74.5-76.5	68.8	64.5-73.1	42.0	38.3-45.7	48.6	44.9-52.4
Breast <i>in situ</i>⁴	24.9	24.4-25.4	25.5	25-26.1	21.7	19.3-24.0	17.9	15.5-20.3	18.5	16.3-20.7
Bronchus & Lung	71.4	70.5-72.3	74.1	73.2-75.1	57.9	53.8-62.0	41.0	36.7-45.3	32.0	28.4-35.5
Cervix Uteri	-	-	-	-	-	-	-	-	-	-
Colon / Rectum	46.2	45.5-46.9	46.1	45.4-46.9	47.0	43.3-50.8	39.9	35.7-44	37.6	33.9-41.3
Corpus Uteri & Uterus, NOS	-	-	-	-	-	-	-	-	-	-
Esophagus	6.4	6.2-6.7	6.6	6.3-6.9	6.4	5.1-7.8	3.0	1.9-4.1	3.7	2.5-4.8
Hodgkin Lymphoma	3.4	3.2-3.6	3.7	3.4-3.9	2.6	1.9-3.4	1.2	0.7-1.8	3.3	2.4-4.2
Kidney & Renal Pelvis	16.4	16-16.9	16.7	16.2-17.1	18.5	16.3-20.7	7.9	6.1-9.6	13.1	11.1-15.1
Larynx	3.7	3.5-3.9	3.8	3.6-4.0	3.4	2.5-4.4	*	*	3.8	2.7-4.9
Leukemia	12.6	12.2-12.9	12.8	12.4-13.2	9.4	7.8-11.1	8.3	6.5-10.0	8.0	6.4-9.5
Liver & Intrahepatic Bile Ducts	7.3	7.1-7.6	6.4	6.1-6.7	10.7	9.0-12.4	21.1	18.2-23.9	11.5	9.6-13.4
Melanoma of Skin	23.2	22.7-23.7	24.3	23.7-24.9	*	*	*	*	2.7	1.8-3.6
Multiple Myeloma	5.7	5.4-5.9	5.3	5.1-5.6	12.7	10.8-14.7	2.4	1.4-3.4	7.3	5.7-9.0
Non-Hodgkin Lymphoma	20.3	19.8-20.8	20.5	19.9-21.0	17.4	15.3-19.5	13.3	11.0-15.6	15.9	13.6-18.1
Oral Cavity & Pharynx	11.1	10.8-11.5	11.3	11.0-11.7	9.2	7.6-10.7	7.9	6.2-9.5	9.0	7.3-10.7
Ovary	-	-	-	-	-	-	-	-	-	-
Pancreas	12.8	12.4-13.2	12.9	12.5-13.3	15.3	13.1-17.5	8.3	6.3-10.2	10.4	8.4-12.5
Prostate	-	-	-	-	-	-	-	-	-	-
Stomach	7.1	6.8-7.4	6.4	6.2-6.7	12.8	10.8-14.7	11.4	9.2-13.6	12.0	9.9-14.0
Testis	-	-	-	-	-	-	-	-	-	-
Thyroid	18.2	17.8-18.7	18.3	17.8-18.8	16.0	14.1-17.9	20.4	18-22.8	16.0	14.1-17.9
Urinary Bladder	26.0	25.5-26.5	27.2	26.6-27.7	14.5	12.3-16.7	8.1	6.2-10.0	12.1	9.9-14.2

¹ Rates are age-adjusted to the 2000 U.S. Standard Population.

² per 100,000

³ Race/ethnicity categories are mutually exclusive. Cases are only included in one race/ethnicity category. ⁴ Breast *in situ* cases are excluded from 'All Sites'.

⁵ Dashes indicate cancers found in only one sex.

Source: Massachusetts Cancer Registry

Table 17.
FIVE LEADING CANCER MORTALITY RATES BY RACE/ETHNICITY AND SEX
Massachusetts, 2005-2009

MALES

AGE-ADJUSTED¹ MORTALITY RATE²				
RANK	White, non-Hispanic	Black, non-Hispanic	Asian, non-Hispanic	Hispanic
1	Bronchus & Lung 63.9	Bronchus & Lung 69.9	Bronchus & Lung 38.5	Bronchus & Lung 25.6
2	Prostate 23.0	Prostate 46.5	Liver & Intrahepatic Bile Ducts 21.6	Prostate 15.3
3	Colon / Rectum 19.6	Colon / Rectum 23.7	Colon / Rectum 13.1	Colon / Rectum 10.9
4	Pancreas 13.3	Pancreas 16.2	Prostate 9.2	Liver & Intrahepatic Bile Ducts 10.9
5	Esophagus 9.8	Liver & Intrahepatic Bile Ducts 14.4	Stomach 6.7	Stomach 9.8

FEMALES

AGE-ADJUSTED¹ MORTALITY RATE²				
RANK	White, non-Hispanic	Black, non-Hispanic	Asian, non-Hispanic	Hispanic
1	Bronchus & Lung 44.7	Bronchus & Lung 31.0	Bronchus & Lung 17.7	Bronchus & Lung 13.2
2	Breast 22.1	Breast 29.8	Colon / Rectum 10.0	Breast 11.8
3	Colon / Rectum 13.8	Colon / Rectum 16.8	Breast 8.4	Colon / Rectum 10.5
4	Pancreas 10.2	Pancreas 14.2	Pancreas 8.3	Pancreas 6.3
5	Ovary 8.7	Corpus Uteri & Uterus, NOS 7.2	Liver & Intrahepatic Bile Duct 6.1	Ovary 4.0

¹ Rates are age-adjusted to the 2000 U.S. Standard Population.

² per 100,000

Source: Massachusetts Vital Statistics

Table 18.
NUMBER AND PERCENTAGE OF DEATHS FOR SELECTED CANCER SITES BY RACE/ETHNICITY¹
Massachusetts, 2005-2009
MALES

Cancer Site / Type	All Races ²		White, non-Hispanic		Black, non-Hispanic		Asian, non-Hispanic		Hispanic	
	Deaths	% of Deaths	Deaths	% of Deaths	Deaths	% of Deaths	Deaths	% of Deaths	Deaths	% of Deaths
All Sites	32856	100	30213	100	1358	100	567	100	672	100
Brain & Other Nervous System	844	2.6	797	2.6	15	1.1	11	1.9	20	3.0
Breast	45	0.1	39	0.1	3	0.2	1	0.2	2	0.3
Bronchus & Lung	9325	28.4	8670	28.7	367	27.0	154	27.2	126	18.8
Colon / Rectum	2860	8.7	2610	8.6	128	9.4	57	10.1	61	9.1
Esophagus	1464	4.5	1371	4.5	50	3.7	20	3.5	19	2.8
Hodgkin Lymphoma	73	0.2	67	0.2	4	0.3	1	0.2	1	0.1
Kidney & Renal Pelvis	837	2.5	791	2.6	24	1.8	9	1.6	13	1.9
Larynx	307	0.9	277	0.9	22	1.6	2	0.4	6	0.9
Leukemia	1317	4.0	1228	4.1	45	3.3	19	3.4	23	3.4
Liver & Intrahepatic Bile Ducts	1481	4.5	1210	4.0	88	6.5	105	18.5	77	11.5
Melanoma of Skin	647	2.0	638	2.1	2	0.1	2	0.4	4	0.6
Multiple Myeloma	637	1.9	570	1.9	39	2.9	4	0.7	21	3.1
Non-Hodgkin Lymphoma	1200	3.7	1100	3.6	48	3.5	20	3.5	25	3.7
Oral Cavity & Pharynx	585	1.8	524	1.7	27	2.0	22	3.9	12	1.8
Pancreas	1973	6.0	1822	6.0	84	6.2	22	3.9	44	6.5
Prostate	3188	9.7	2927	9.7	174	12.8	26	4.6	54	8.0
Stomach	803	2.4	664	2.2	56	4.1	27	4.8	55	8.2
Testis	22	0.1	21	0.1	0	0.0	0	0.0	1	0.1
Thyroid	74	0.2	68	0.2	1	0.1	3	0.5	2	0.3
Urinary Bladder	1283	3.9	1238	4.1	29	2.1	4	0.7	12	1.8
Other Sites	3891	11.8	3581	11.9	152	11.2	58	10.2	94	14.0

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

² The number of deaths for all races is not the sum of deaths by race/ethnicity.

Source: Massachusetts Vital Statistics

Table 19.
NUMBER AND PERCENTAGE OF DEATHS FOR SELECTED CANCER SITES BY RACE/ETHNICITY¹
Massachusetts, 2005-2009
FEMALES

Cancer Site / Type	All Races ²		White, non-Hispanic		Black, non-Hispanic		Asian, non-Hispanic		Hispanic	
	Deaths	% of Deaths	Deaths	% of Deaths	Deaths	% of Deaths	Deaths	% of Deaths	Deaths	% of Deaths
All Sites	32675	100	30261	100	1336	100	432	100	609	100
Brain & Other Nervous System	667	2.0	628	2.1	13	1.0	6	1.4	19	3.1
Breast	4570	14.0	4166	13.8	256	19.2	50	11.6	95	15.6
Bronchus & Lung	8737	26.7	8314	27.5	243	18.2	84	19.4	87	14.3
Cervix Uteri	273	0.8	231	0.8	24	1.8	8	1.9	10	1.6
Colon / Rectum	3123	9.6	2879	9.5	128	9.6	49	11.3	65	10.7
Corpus Uteri & Uterus, NOS	875	2.7	784	2.6	55	4.1	11	2.5	24	3.9
Esophagus	442	1.4	410	1.4	20	1.5	3	0.7	8	1.3
Hodgkin Lymphoma	54	0.2	49	0.2	1	0.1	1	0.2	3	0.5
Kidney & Renal Pelvis	528	1.6	499	1.6	18	1.3	5	1.2	5	0.8
Larynx	94	0.3	91	0.3	2	0.1	0	0.0	1	0.2
Leukemia	1104	3.4	1002	3.3	54	4.0	20	4.6	27	4.4
Liver & Intrahepatic Bile Ducts	620	1.9	530	1.8	36	2.7	29	6.7	22	3.6
Melanoma of Skin	441	1.3	429	1.4	4	0.3	2	0.5	4	0.7
Multiple Myeloma	548	1.7	480	1.6	43	3.2	4	0.9	19	3.1
Non-Hodgkin Lymphoma	1142	3.5	1060	3.5	36	2.7	18	4.2	26	4.3
Oral Cavity & Pharynx	287	0.9	267	0.9	8	0.6	5	1.2	7	1.1
Ovary	1725	5.3	1632	5.4	47	3.5	15	3.5	29	4.8
Pancreas	2210	6.8	2018	6.7	109	8.2	41	9.5	40	6.6
Stomach	520	1.6	436	1.4	43	3.2	21	4.9	18	3.0
Thyroid	100	0.3	89	0.3	4	0.3	2	0.5	4	0.7
Urinary Bladder	603	1.8	562	1.9	30	2.2	2	0.5	9	1.5
Other Sites	4012	12.3	3705	12.2	162	12.1	56	13.0	87	14.3

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

² The number of deaths for all races is not the sum of deaths by race/ethnicity.

Source: Massachusetts Vital Statistics

Table 20.
NUMBER AND PERCENTAGE OF DEATHS FOR SELECTED CANCER SITES BY RACE/ETHNICITY¹
Massachusetts, 2005-2009
TOTAL

Cancer Site / Type	All Races ²		White, non-Hispanic		Black, non-Hispanic		Asian, non-Hispanic		Hispanic	
	Deaths	% of Deaths	Deaths	% of Deaths	Deaths	% of Deaths	Deaths	% of Deaths	Deaths	% of Deaths
All Sites	65531	100	60474	100	2694	100	999	100	1281	100
Brain & Other Nervous System	1511	2.3	1425	2.4	28	1.0	17	1.7	39	3.0
Breast	4615	7.0	4205	7.0	259	9.6	51	5.1	97	7.6
Bronchus & Lung	18062	27.6	16984	28.1	610	22.6	238	23.8	213	16.6
Cervix Uteri	273	0.4	231	0.4	24	0.9	8	0.8	10	0.8
Colon / Rectum	5983	9.1	5489	9.1	256	9.5	106	10.6	126	9.8
Corpus Uteri & Uterus, NOS	875	1.3	784	1.3	55	2.0	11	1.1	24	1.9
Esophagus	1906	2.9	1781	2.9	70	2.6	23	2.3	27	2.1
Hodgkin Lymphoma	127	0.2	116	0.2	5	0.2	2	0.2	4	0.3
Kidney & Renal Pelvis	1365	2.1	1290	2.1	42	1.6	14	1.4	18	1.4
Larynx	401	0.6	368	0.6	24	0.9	2	0.2	7	0.5
Leukemia	2421	3.7	2230	3.7	99	3.7	39	3.9	50	3.9
Liver & Intrahepatic Bile Ducts	2101	3.2	1740	2.9	124	4.6	134	13.4	99	7.7
Melanoma of Skin	1088	1.7	1067	1.8	6	0.2	4	0.4	8	0.6
Multiple Myeloma	1185	1.8	1050	1.7	82	3.0	8	0.8	40	3.1
Non-Hodgkin Lymphoma	2342	3.6	2160	3.6	84	3.1	38	3.8	51	4.0
Oral Cavity & Pharynx	872	1.3	791	1.3	35	1.3	27	2.7	19	1.5
Ovary	1725	2.6	1632	2.7	47	1.7	15	1.5	29	2.3
Pancreas	4183	6.4	3840	6.3	193	7.2	63	6.3	84	6.6
Prostate	3188	4.9	2927	4.8	174	6.5	26	2.6	54	4.2
Stomach	1323	2.0	1100	1.8	99	3.7	48	4.8	73	5.7
Testis	22	0.0	21	0.0	0	0.0	0	0.0	1	0.1
Thyroid	174	0.3	157	0.3	5	0.2	5	0.5	6	0.5
Urinary Bladder	1886	2.9	1800	3.0	59	2.2	6	0.6	21	1.6
Other Sites	7903	12.1	7286	12.0	314	11.7	114	11.4	181	14.1

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

² The number of deaths for all races is not the sum of deaths by race/ethnicity.

Source: Massachusetts Vital Statistics

Table 21.
AGE-ADJUSTED¹ MORTALITY RATES² AND 95% CONFIDENCE LIMITS (95% CL)
FOR SELECTED CANCER SITES BY RACE/ETHNICITY³
Massachusetts, 2005-2009
MALES

Cancer Site / Type	All Races		White, non-Hispanics		Black, non-Hispanics		Asian, non-Hispanics		Hispanics	
	Rates	95% CL	Rates	95% CL	Rates	95% CL	Rates	95% CL	Rates	95% CL
All Sites	221.1	218.7-223.5	224.4	221.9-227.0	267.1	251.4-282.7	133.0	121.2-144.8	128.1	117.1-139.1
Brain & Other Nervous System	5.4	5.0-5.7	5.8	5.3-6.2	*	*	*	*	3.4	1.6-5.1
Breast	0.3	0.2-0.4	0.3	0.2-0.4	*	*	*	*	*	*
Bronchus & Lung	62.3	61.0-63.6	63.9	62.5-65.2	69.9	62.2-77.7	38.5	32.0-45.0	25.6	20.6-30.5
Colon / Rectum	19.4	18.7-20.2	19.6	18.8-20.3	23.7	19.2-28.3	13.1	9.4-16.7	10.9	7.8-14.0
Esophagus	9.4	8.9-9.9	9.8	9.3-10.3	7.9	5.6-10.3	4.7	2.5-6.9	*	*
Hodgkin Lymphoma	0.5	0.4-0.6	0.5	0.4-0.6	*	*	*	*	*	*
Kidney & Renal Pelvis	5.5	5.2-5.9	5.8	5.4-6.2	4.8	2.7-7.0	*	*	*	*
Larynx	2.0	1.8-2.2	2.0	1.8-2.2	4.2	2.3-6.1	*	*	*	*
Leukemia	9.0	8.6-9.5	9.3	8.8-9.9	8.4	5.7-11.1	*	*	3.6	1.8-5.4
Liver & Intrahepatic Bile Ducts	9.3	8.8-9.8	8.5	8.0-9.0	14.4	11.1-17.7	21.6	17.1-26.0	10.9	8.1-13.6
Melanoma of Skin	4.3	3.9-4.6	4.7	4.3-5.1	*	*	*	*	*	*
Multiple Myeloma	4.3	4.0-4.7	4.3	3.9-4.6	7.3	4.7-9.8	*	*	4.6	2.4-6.7
Non-Hodgkin Lymphoma	8.2	7.8-8.7	8.3	7.8-8.8	8.3	5.8-10.8	4.0	2.1-5.8	4.7	2.6-6.8
Oral Cavity & Pharynx	3.7	3.4-4.0	3.7	3.4-4.0	4.6	2.7-6.5	4.2	2.2-6.1	*	*
Pancreas	13.0	12.4-13.6	13.3	12.7-13.9	16.2	12.4-20.1	5.1	2.8-7.4	9.0	6.0-11.9
Prostate	23.1	22.3-23.9	23.0	22.1-23.8	46.5	39.1-53.9	9.2	5.6-12.9	15.3	11.0-19.6
Stomach	5.4	5.0-5.8	4.9	4.6-5.3	11.1	8.0-14.3	6.7	4.0-9.4	9.8	6.9-12.8
Testis	0.1	0.1-0.2	0.2	0.1-0.2	*	*	*	*	*	*
Thyroid	0.5	0.4-0.6	0.5	0.4-0.6	*	*	*	*	*	*
Urinary Bladder	9.0	8.5-9.5	9.5	9.0-10.0	6.5	3.9-9.2	*	*	*	*

¹ Rates are age-adjusted to the 2000 U.S. Standard Population.

² per 100,000

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

*An age-adjusted mortality rate was not calculated when there were fewer than 20 deaths.

Source: Massachusetts Vital Statistics

Table 22.
AGE-ADJUSTED¹ MORTALITY RATES² AND 95% CONFIDENCE LIMITS (95% CL)
FOR SELECTED CANCER SITES BY RACE/ETHNICITY³
Massachusetts, 2005-2009
FEMALES

Cancer Site / Type	All Races		White, non-Hispanics		Black, non-Hispanics		Asian, non-Hispanics		Hispanics	
	Rates	95% CL	Rates	95% CL	Rates	95% CL	Rates	95% CL	Rates	95% CL
All Sites	153.5	151.8-155.2	156.9	155.1-158.7	167.9	158.7-177.0	82.9	74.8-91.1	88.5	81.0-96.0
Brain & Other Nervous System	3.3	3.1-3.6	3.5	3.3-3.8	*	*	*	*	*	*
Breast	21.8	21.1-22.4	22.1	21.4-22.8	29.8	26.1-33.6	8.4	6.0-10.9	11.8	9.3-14.4
Bronchus & Lung	42.4	41.5-43.3	44.7	43.7-45.6	31.0	27.0-34.9	17.7	13.8-21.5	13.2	10.3-16.1
Cervix Uteri	1.4	1.2-1.6	1.3	1.2-1.5	2.7	1.6-3.8	*	*	*	*
Colon / Rectum	13.7	13.3-14.2	13.8	13.3-14.3	16.8	13.9-19.8	10.0	7.1-12.8	10.5	7.8-13.2
Corpus Uteri & Uterus, NOS	4.2	3.9-4.5	4.1	3.8-4.4	7.2	5.3-9.1	*	*	3.7	2.2-5.2
Esophagus	2.1	1.9-2.3	2.1	1.9-2.3	2.4	1.4-3.5	*	*	*	*
Hodgkin Lymphoma	0.3	0.2-0.3	0.3	0.2-0.4	*	*	*	*	*	*
Kidney & Renal Pelvis	2.4	2.2-2.6	2.5	2.3-2.8	*	*	*	*	*	*
Larynx	0.5	0.4-0.6	0.5	0.4-0.6	*	*	*	*	*	*
Leukemia	5.2	4.9-5.5	5.2	4.9-5.6	6.7	4.9-8.6	2.9	1.6-4.3	3.5	2.1-4.9
Liver & Intrahepatic Bile Ducts	2.9	2.7-3.2	2.8	2.5-3.0	4.4	3.0-5.9	6.1	3.8-8.3	3.6	2.0-5.2
Melanoma of Skin	2.1	1.9-2.3	2.3	2.1-2.6	*	*	*	*	*	*
Multiple Myeloma	2.5	2.3-2.7	2.4	2.2-2.6	5.7	4.0-7.4	*	*	*	*
Non-Hodgkin Lymphoma	5.1	4.8-5.4	5.1	4.8-5.4	4.9	3.3-6.5	*	*	4.0	2.3-5.6
Oral Cavity & Pharynx	1.3	1.2-1.5	1.4	1.2-1.5	*	*	*	*	*	*
Ovary	8.2	7.8-8.6	8.7	8.2-9.1	5.8	4.1-7.5	*	*	4.0	2.5-5.6
Pancreas	10.2	9.8-10.7	10.2	9.8-10.7	14.2	11.5-16.9	8.3	5.7-11.0	6.3	4.3-8.4
Stomach	2.3	2.1-2.5	2.1	1.9-2.3	5.7	4.0-7.4	3.7	2.1-5.4	*	*
Thyroid	0.5	0.4-0.6	0.5	0.4-0.5	*	*	*	*	*	*
Urinary Bladder	2.6	2.4-2.8	2.7	2.4-2.9	4.2	2.7-5.8	*	*	*	*

¹ Rates are age-adjusted to the 2000 U.S. Standard Population.

² per 100,000

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

* An age-adjusted mortality rate was not calculated when there were fewer than 20 deaths.

Source: Massachusetts Vital Statistics

Table 23.
AGE-ADJUSTED¹ MORTALITY RATES² AND 95% CONFIDENCE LIMITS (95% CL)
FOR SELECTED CANCER SITES BY RACE/ETHNICITY³
Massachusetts, 2005-2009
TOTAL

Cancer Site / Type	All Races		White, non-Hispanics		Black, non-Hispanics		Asian, non-Hispanics		Hispanics	
	Rates	95% CL	Rates	95% CL	Rates	95% CL	Rates	95% CL	Rates	95% CL
All Sites	179.3	177.9-180.7	182.6	181.1-184.0	203.3	195.3-211.3	105.3	98.4-112.2	105.1	98.8-111.4
Brain & Other Nervous System	4.2	4.0-4.4	4.5	4.3-4.8	1.7	1.0-2.3	*	*	2.5	1.6-3.4
Breast	12.5	12.1-12.8	12.7	12.3-13.0	17.5	15.3-19.8	4.5	3.2-5.8	6.8	5.3-8.3
Bronchus & Lung	50.3	49.6-51.1	52.3	51.5-53.1	46.1	42.3-49.8	27.1	23.5-30.6	18.3	15.7-21.0
Cervix Uteri	- ⁴	-	-	-	-	-	-	-	-	-
Colon / Rectum	16.1	15.7-16.5	16.1	15.7-16.6	19.8	17.3-22.3	11.5	9.2-13.8	10.9	8.8-12.9
Corpus Uteri & Uterus, NOS	-	-	-	-	-	-	-	-	-	-
Esophagus	5.2	5.0-5.5	5.4	5.2-5.7	4.8	3.6-5.9	2.4	1.4-3.5	2.1	1.3-3.0
Hodgkin Lymphoma	0.4	0.3-0.4	0.4	0.3-0.4	*	*	*	*	*	*
Kidney & Renal Pelvis	3.7	3.5-3.9	3.9	3.7-4.1	3.1	2.1-4.1	*	*	*	*
Larynx	1.1	1.0-1.2	1.1	1.0-1.2	1.7	1.0-2.4	*	*	*	*
Leukemia	6.7	6.4-6.9	6.8	6.5-7.1	7.3	5.8-8.8	3.6	2.4-4.8	3.6	2.5-4.7
Liver & Intrahepatic Bile Ducts	5.7	5.5-6.0	5.3	5.0-5.5	8.5	7.0-10.1	13.4	11.0-15.8	7.0	5.5-8.4
Melanoma of Skin	3.0	2.8-3.2	3.3	3.1-3.5	*	*	*	*	*	*
Multiple Myeloma	3.3	3.1-3.5	3.2	3.0-3.4	6.3	4.9-7.7	*	*	3.6	2.4-4.8
Non-Hodgkin Lymphoma	6.3	6.1-6.6	6.4	6.1-6.6	6.4	5.0-7.8	3.9	2.6-5.3	4.3	3.0-5.6
Oral Cavity & Pharynx	2.4	2.2-2.5	2.4	2.2-2.6	2.5	1.6-3.4	2.4	1.4-3.4	*	*
Ovary	-	-	-	-	-	-	-	-	-	-
Pancreas	11.4	11.1-11.8	11.6	11.2-11.9	15.0	12.8-17.2	6.9	5.1-8.7	7.5	5.8-9.2
Prostate	-	-	-	-	-	-	-	-	-	-
Stomach	3.6	3.4-3.8	3.3	3.1-3.5	7.9	6.3-9.5	5.1	3.6-6.6	5.6	4.2-7.0
Testis	-	-	-	-	-	-	-	-	-	-
Thyroid	0.5	0.4-0.5	0.5	0.4-0.5	*	*	*	*	*	*
Urinary Bladder	5.1	4.8-5.3	5.3	5.0-5.5	5.1	3.8-6.5	*	*	2.3	1.2-3.3

¹ Rates are age-adjusted to the 2000 U.S. Standard Population.

² per 100,000

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

⁴ Dashes indicate cancers found in only one sex.

* An age-adjusted mortality rate was not calculated when there were fewer than 20 deaths.

Source: Massachusetts Vital Statistics

Table 24.
INCIDENCE RATES¹ FOR SELECTED CANCER SITES BY SEX
Massachusetts and U.S. (2005-2009)

Cancer Site / Type	MALES				FEMALES			
	Massachusetts		United States		Massachusetts		United States	
	Rate	95% CL						
All Sites	588.5*	584.6-592.4	550.7	550.1-560.0	464.3*	461.2-467.3	419.3	418.8-419.5
Brain & Other Nervous System	8.4*	8.0-8.9	7.9	7.8-7.9	6.2*	5.9-6.6	5.7	5.6-5.7
Breast	1.3	1.1-1.5	1.4	1.3-1.4	134.2*	132.5-135.8	122.3	122.0-122.4
Breast <i>in situ</i>²	0.2	0.1-0.2	0.2	0.1-0.2	46.9*	45.9-47.9	30.7	30.6-30.8
Bronchus & Lung	81.7	80.2-83.1	82.7	82.5-82.8	64.8*	63.7-66.0	55.9	55.7-56.0
Cervix Uteri	N/A	N/A	N/A	N/A	5.7*	5.3-6.0	8.1	8.0-8.1
Colon / Rectum	53.6	52.4-54.8	54.0	53.8-54.1	40.6	39.8-41.5	40.3	40.1-40.4
Corpus Uteri & Uterus, NOS	N/A	N/A	N/A	N/A	30.0*	29.2-30.8	23.8	23.7-23.9
Esophagus	11.3*	10.8-11.8	8.7	8.6-8.7	2.6*	2.3-2.8	1.9	1.8-1.9
Hodgkin Lymphoma	3.9*	3.6-4.2	3.2	3.1-3.2	3.0*	2.7-3.2	2.5	2.4-2.5
Kidney & Renal Pelvis	23.1*	22.3-23.8	21.2	21.1-21.2	11.2	10.7-11.6	11.1	11.0-11.1
Larynx	6.5	6.1-6.9	6.8	6.7-6.8	1.6	1.4-1.8	1.5	1.4-1.5
Leukemia	16.5	15.8-17.1	16.1	16.0-16.2	9.8	9.3-10.2	9.7	9.6-9.7
Liver & Intrahepatic Bile Ducts	12.1*	11.6-12.6	9.6	9.5-9.6	3.4*	3.2-3.7	2.9	2.8-2.9
Melanoma of Skin	28.8*	27.9-29.6	24.6	24.4-24.7	19.5*	18.9-20.2	15.8	15.7-15.9
Multiple Myeloma	7.3	6.9-7.8	7.2	7.1-7.2	4.4	4.1-4.7	4.7	4.6-4.7
Non-Hodgkin Lymphoma	25.2*	24.4-26.0	23.3	23.2-23.3	16.5	15.9-17.0	16.2	16.1-16.3
Oral Cavity & Pharynx	16.6	16.0-17.2	16.4	16.3-16.4	6.6	6.2-6.9	6.2	6.1-6.2
Ovary	N/A	N/A	N/A	N/A	12.8	12.3-13.3	12.5	12.4-12.5
Pancreas	14.4*	13.8-15.0	13.6	13.5-13.6	11.6*	11.1-12.1	10.5	10.4-10.5
Prostate	160.4*	158.4-162.4	151.4	151.1-151.6	N/A	N/A	N/A	N/A
Stomach	10.4*	9.8-10.9	9.4	9.3-9.4	4.6	4.3-4.9	4.7	4.6-4.7
Testis	6.4*	6.0-6.8	5.4	5.3-5.4	N/A	N/A	N/A	N/A
Thyroid	9.1*	8.7-9.6	6.0	5.9-6.0	26.9*	26.1-27.6	17.7	17.6-17.8
Urinary Bladder	45.4*	44.3-46.5	37.5	37.3-37.6	12.4*	11.9-12.9	9.3	9.2-9.3

¹ Rates are age-adjusted to the 2000 U.S. Standard Population.

²Breast *in situ* cases are excluded from “All Sites” and from breast cancer counts.

N/A – not applicable

* indicates that the Massachusetts mortality rate differed significantly from the national rate (p < 0.05).

Data Sources: Massachusetts: Massachusetts Vital Statistics and United States: National Center for Health Statistics (NCHS).

Table 25.
MORTALITY RATES¹ FOR SELECTED CANCER SITES BY SEX
Massachusetts and U.S. (2005-2009)

Cancer Site / Type	MALES				FEMALES			
	Massachusetts		United States		Massachusetts		United States	
	Rate	95% CL						
All Sites	221.1	218.7-223.5	219.4	219.0-219.6	153.5*	151.8-155.2	151.1	150.8-151.2
Brain & Other Nervous System	5.4	5.0-5.7	5.2	5.1-5.2	3.3	3.1-3.6	3.5	3.4-3.5
Breast	0.3	0.2-0.4	0.3	0.2-0.3	21.8*	21.1-22.4	23.0	22.9-23.1
Breast <i>in situ</i> ²	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bronchus & Lung	62.3*	61.0-63.6	65.7	65.5-65.8	42.4*	41.5-43.3	39.6	39.5-39.7
Cervix Uteri	N/A	N/A	N/A	N/A	1.4*	1.2-1.6	2.4	2.3-2.4
Colon / Rectum	19.4	18.7-20.2	20.2	20.1-20.2	13.7*	13.3-14.2	14.4	14.3-14.4
Corpus Uteri & Uterus, NOS	N/A	N/A	N/A	N/A	4.2	3.9-4.5	4.2	4.1-4.2
Esophagus	9.4*	8.9-9.9	8.7	8.6-8.7	2.1*	1.9-2.3	1.6	1.5-1.6
Hodgkin Lymphoma	0.5	0.4-0.6	0.5	0.4-0.5	0.3	0.2-0.3	0.3	0.2-0.3
Kidney & Renal Pelvis	5.5	5.2-5.9	5.8	5.7-5.8	2.4	2.2-2.6	2.6	2.5-2.6
Larynx	2.0	1.8-2.2	2.1	2.0-2.1	0.5	0.4-0.6	0.5	0.4-0.5
Leukemia	9.0	8.6-9.5	9.6	9.5-9.6	5.2	4.9-5.5	5.3	5.2-5.3
Liver & Intrahepatic Bile Ducts	9.3*	8.8-9.8	6.7	6.6-6.7	2.9*	2.7-3.2	2.2	2.1-2.2
Melanoma of Skin	4.3	3.9-4.6	4.1	4.0-4.1	2.1*	1.9-2.3	1.7	1.6-1.7
Multiple Myeloma	4.3	4.0-4.7	4.4	4.3-4.4	2.5	2.3-2.7	2.7	2.6-2.7
Non-Hodgkin Lymphoma	8.2	7.8-8.7	8.4	8.3-8.4	5.1	4.8-5.4	5.2	5.1-5.2
Oral Cavity & Pharynx	3.7	3.4-4.0	3.8	3.7-3.8	1.3	1.2-1.5	1.4	1.3-1.4
Ovary	N/A	N/A	N/A	N/A	8.2	7.8-8.6	8.2	8.1-8.2
Pancreas	13.0	12.4-13.6	12.5	12.4-12.5	10.2*	9.8-10.7	9.5	9.4-9.5
Prostate	23.1	22.3-23.9	23.6	23.5-23.6	N/A	N/A	N/A	N/A
Stomach	5.4	5.0-5.8	5.0	4.9-5.0	2.3	2.1-2.5	2.6	2.5-2.6
Testis	0.1	0.1-0.2	0.2	0.1-0.2	N/A	N/A	N/A	N/A
Thyroid	0.5	0.4-0.6	0.5	0.4-0.5	0.5	0.4-0.6	0.5	0.4-0.5
Urinary Bladder	9.0*	8.5-9.5	7.7	7.6-7.7	2.6*	2.4-2.8	2.2	2.1-2.2

¹ Rates are age-adjusted to the 2000 U.S. Standard Population.

²Breast *in situ* cases are excluded from "All Sites" and from breast cancer counts.

N/A – not applicable

* indicates that the Massachusetts mortality rate differed significantly from the national rate ($p < 0.05$).

Data Sources: Massachusetts: Massachusetts Vital Statistics and United States: National Center for Health Statistics (NCHS).

APPENDICES

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APPENDIX I

ICD CODES USED FOR THIS REPORT

Cancer Site/Type	<i>.....C o d e s.....</i>	
	ICD-O-3*	ICD-10**
Brain & Other Nervous System	C70.0-C72.9 except 9590-9989	C70-C72
Breast (includes <i>in situ</i>)	C50.0 – C50.9 except 9590 -9989	C50
Bronchus & Lung	C34.0 – C34.9 except 9590-9989	C34
Cervix Uteri	C53.0 – C53.9 except 9590-9989	C53
Colon/ Rectum	C18.0-C18.9, C19.9, C20.9, C26.0 except 9590-9989	C18 – C20, C26.0
Corpus Uteri & Uterus, NOS	C54.0 – C54.9, C55.9 except 9590 – 9989	C54 – C55
Esophagus	C15.0-C15.9 except 9590 – 9989	C15
Hodgkin Lymphoma	C00.00 – C80.9 (includes 9650-9667)	C81
Kidney & Renal Pelvis	C64.9, C65.9 except 9590-9989	C64- C65
Larynx	C32.0 – C32.9 except 9590- 9989	C32
Leukemia	C00.0 – C80.9 (includes 9733, 9742, 9800 – 9820, 9826, 9831 – 9948, 9963 – 9964) C42.0, C42.1, C42.4 (includes 9823, 9827)	C90.1, C91 – C95
Liver and Intrahepatic Bile Ducts	C22.0, C22.1 except 9590 – 9989	C22

Cancer Site/ TypeC o d e s.....	
	ICD-O-3*	ICD-10**
Melanoma of Skin	C44.0 – C44.9 (includes 8720-8790)	C43
Multiple Myeloma	C00.0-C80.9 (includes 9731, 9732, 9734)	C90.0, C90.2
Non – Hodgkin Lymphoma	C00.0 – C80.9 (includes 9590 – 9596, 9670 – 9729) All sites except C42.0, C42.1, C42.4 (includes 9823, 9827)	C82 – C85, C96.3
Oral Cavity & Pharynx	C00.0 – C14.8 except 9590 – 9989	C00 – C14
Ovary	C56.9 except 9590- 9989	C56
Pancreas	C25.0 – C25.9 except 9590 – 9989	
Prostate	C61.9 except 9590 – 9989	C61
Stomach	C16.0 – C16.9 except 9590- 9989	C16
Testis	C62.0 – C62.9 except 9590 – 9989	C62
Thyroid	C73.9 except 9590 – 9989	C73
Urinary Bladder (includes <i>in situ</i>)	C67.0 – C67.9 except 9590 – 9989	C67

* *International Classification of Diseases for Oncology, 3d Ed.* (1) (includes codes added since publication) for incidence data

** *International Classification of Diseases, Tenth Revision* (3) (includes codes added since publication) for mortality data

APPENDIX II:

Population and Rate Changes

The Population estimates for 2005-2009 that were used in this report were produced by the National Center for Health Statistics (NCHS) in collaboration with the U.S. Census Bureau's Population Estimation Program. The NCHS takes the Census Bureau population estimates file and reallocates the multiple race categories required by the 1997 Office of Management and Budget (OMB) specifications back into the four race categories specified in the 1977 OMB specifications so that the estimates will be compatible with previous years' populations. (11) The estimates are divided into mutually exclusive racial/ethnic categories similar to those of the MCR.

Please note that the statewide age-adjusted rates published in this report cannot be compared with those published in reports prior to July 2007, because the overall population count and the age distribution of the population, which were based on the Census 2000 count, differ.

The difference in the new population estimates is pronounced for Hispanics and black, non-Hispanics. The Hispanic and black, non-Hispanic populations have increased 15% since 2000, while the overall state population has increased by 1%. It is important to remember that both age-adjusted cancer incidence and cancer death rates are not a measure of the actual risk of cancer or of death from it. Rather, age-adjusted rates are summary measures used to compare cancer incidence and mortality trends over time or among different populations whose age distributions differ. For specific examples of the effect of new population estimates on age-adjusted rates, see Appendix II in the report *Cancer Incidence and Mortality in Massachusetts 2000-2004: Statewide Report*, available at www.mass.gov/dph/mcr.

Appendix III

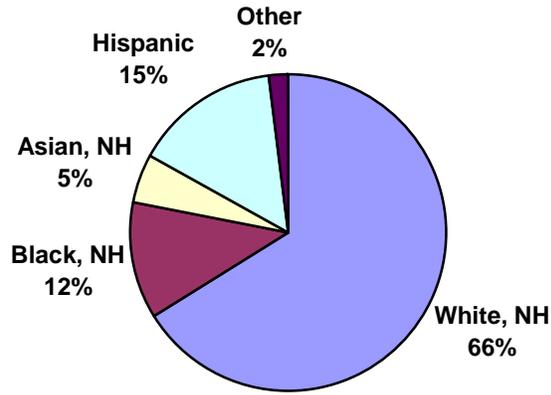
POPULATION ESTIMATES BY AGE, RACE/ETHNICITY, AND SEX Massachusetts, 2005-2009

Age Group	White, non-Hispanic			Black, non-Hispanic			Asian, non-Hispanic			Hispanic			Total
	Males	Females	Total	Males	Females	Total	Males	Females	Total	Males	Females	Total	
00-04	685,103	655,103	1,340,206	86,488	83,360	169,848	65,594	65,742	131,336	144,180	138,874	283,054	
05-09	728,224	696,313	1,424,537	80,157	76,248	156,405	56,842	57,834	114,676	127,435	123,137	250,572	
10-14	790,231	748,487	1,538,718	83,108	79,527	162,635	50,130	50,878	101,008	124,708	117,103	241,811	
15-19	886,598	867,117	1,753,715	91,835	90,693	182,528	56,140	61,208	117,348	132,027	125,299	257,326	
20-24	830,299	835,133	1,665,432	86,009	83,887	169,896	64,188	71,224	135,412	130,296	115,475	245,771	
25-29	776,553	776,132	1,552,685	81,854	77,068	158,922	74,798	80,849	155,647	137,211	117,334	254,545	
30-34	748,540	763,137	1,511,677	73,754	74,881	148,635	85,513	88,004	173,517	122,137	114,112	236,249	
35-39	881,593	910,738	1,792,331	71,082	77,404	148,486	78,949	78,783	157,732	107,415	107,769	215,184	
40-44	1,025,537	1,049,141	2,074,678	75,036	78,879	153,915	64,131	64,775	128,906	96,476	98,489	194,965	
45-49	1,084,666	1,115,499	2,200,165	71,589	74,664	146,253	53,150	54,743	107,893	76,082	81,318	157,400	
50-54	996,438	1,042,829	2,039,267	57,637	60,834	118,471	42,568	45,309	87,877	55,589	62,262	117,851	
55-59	874,748	930,266	1,805,014	43,416	49,414	92,830	32,861	36,204	69,065	40,172	47,016	87,188	
60-64	683,193	748,679	1,431,872	29,090	38,147	67,237	21,962	23,751	45,713	27,070	33,361	60,431	
65-69	483,277	558,643	1,041,920	20,592	28,254	48,846	17,680	17,968	35,648	17,732	23,248	40,980	
70-74	384,525	478,201	862,726	15,319	22,694	38,013	12,280	13,604	25,884	11,495	16,757	28,252	
75-79	327,600	458,320	785,920	10,963	17,191	28,154	8,105	10,351	18,456	7,951	11,510	19,461	
80-84	243,355	406,603	649,958	6,449	12,525	18,974	5,023	6,988	12,011	4,895	7,884	12,779	
85+	183,881	458,568	642,449	3,818	10,039	13,857	3,686	6,305	9,991	4,372	8,261	12,633	

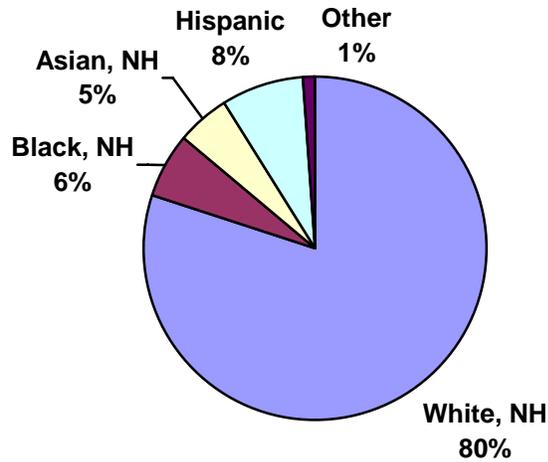
Source: United States Department of Health and Human Services (US DHHS), Centers for Disease Control and Prevention (CDC), National Center for Health Statistics (NCHS), Bridged-Race Population Estimates, United States July 1st resident population by state, county, age, sex, bridged-race, and Hispanic origin compiled from 1990-1999 bridged-race intercensal population estimates and 2000-2009 (Vintage 2009) bridged-race postcensal population estimates, on CDC WONDER On-line Database. Accessed at <http://wonder.cdc.gov/bridged-race-v2009.html> on Oct 4, 2010

Appendix IV
Racial/Ethnic Breakdown of the Massachusetts and NAACCR Populations, 2005-2009

Massachusetts



NAACCR



Data Sources: United States Department of Health and Human Services (US DHHS), Centers for Disease Control and Prevention (CDC), National Center for Health Statistics (NCHS), Bridged-Race Population Estimates, United States July 1st resident population by state, county, age, sex, bridged-race, and Hispanic origin compiled from 1990-1999 bridged-race intercensal population estimates and 2000-2009 (Vintage 2009) bridged-race postcensal population estimates, on CDC WONDER On-line Database. Accessed at <http://wonder.cdc.gov/bridged-race-v2009.html> on Oct 4, 2010

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