

Cancer in Minnesota, 1988 - 2009

*Report to the Minnesota Legislature
2013*

Minnesota Department of Health

December 2012



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Protecting, maintaining and improving the health of all Minnesotans

December 2012

Dear Colleague,

The Minnesota Department of Health (MDH) is pleased to present the twelfth biennial report of the Minnesota Cancer Surveillance System (MCSS) on the occurrence of cancer in Minnesota.

This report covers the 22-year history of population-based cancer registration in Minnesota. It suggests that the decades of unrelenting increases in cancer rates may be nearing an end. Since cancer reporting was implemented in 1988, the overall cancer mortality rate in Minnesota has fallen by 18 percent among males and by 14 percent among females. Cancers of the liver and esophagus are the only cancers for which mortality is still significantly increasing. Progress in reversing the decades-long increase in the risk of developing cancer is more modest, but gains are being made. Averaging trends over the most recent ten-year period, the overall cancer incidence rate was slightly decreasing for males and slightly increasing for women, but neither trend was statistically significant. Incidence rates for several of the most common cancers (prostate, female breast, male lung and bronchus and colorectal) are either stable or declining.

Nonetheless, the need for intensified cancer prevention efforts has never been clearer. Nearly half of all Minnesotans will be diagnosed with a potentially serious cancer during their lives. Cancer is Minnesota's leading cause of death, causing the deaths of 32 percent more Minnesotans than heart disease in 2009. An estimated 217,170 Minnesotans, and nearly 25 percent of residents ages 80-84, are living with a history of cancer, many of whom need ongoing medical care. Persons of color experience a disproportionate burden of cancer. Of special concern are American Indians, whose risk of developing and dying of cancer is two times higher in Minnesota than in the nation as a whole. With the inevitable increase in the number of elderly Minnesotans as the baby boomer generation ages, the demands on health care services will continue to increase, even if cancer rates decrease.

The MCSS is a powerful tool for public health, and its value increases with each year of data collection. The MDH is an active partner in the Minnesota Cancer Alliance, a voluntary collaboration of public, private, and non-profit organizations created to implement *Cancer Plan Minnesota*, our state's comprehensive cancer control plan. We encourage all organizations and individuals interested in cancer control to join with us and the Alliance to reduce the burden of cancer for all Minnesotans.

This report was prepared by MCSS staff under the direction of Dr. Sally Bushhouse. Questions and comments on the report can be directed to the MCSS at (651) 201-5900.

Sincerely,

A handwritten signature in black ink, appearing to read "Edward P. Ehlinger". The signature is fluid and cursive, with a long, sweeping underline.

Edward P. Ehlinger, M.D., M.S.P.H.
Commissioner
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Upon request, this material will be made available in an alternative format such as large print, Braille or cassette tape.

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Summary

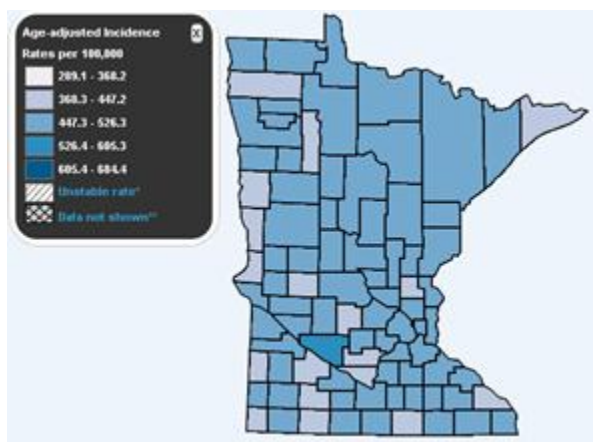
This report describes the occurrence of cancer in Minnesota from 1988 through 2009 as required by Minnesota Statute 144.672 Subdivision 2. It contains detailed analyses of the available cancer data by the Minnesota Cancer Surveillance System. Cancer rates, trends, and prevalence are presented, as well as the variation in risk by age, gender, race and ethnicity, and geographic area.

- In 2009, 26,281 Minnesotans were diagnosed with cancer, and 9,570 Minnesotans died of this group of diseases.
- Heart disease remains the leading cause of death nationwide, but cancer has been the leading cause of death in Minnesota since 2000. In 2009, 32 percent more Minnesotans, or 2,345 more people, died of cancer than heart disease.
- Despite these sobering facts, cancer mortality continues to steadily and significantly decline after decades of increase. Since cancer reporting was implemented in 1988, the overall cancer mortality rate in Minnesota has fallen by 18 percent among males and by 14 percent among females. Liver and esophagus cancers are the only cancers for which mortality rates are significantly increasing for both genders combined.
- Progress in reversing the decades-long increase in the risk of developing cancer is more modest, but gains are being made. Averaging trends over the most recent ten-year period, the overall cancer incidence rate was slightly decreasing for males and slightly increasing for women, but neither trend was statistically significant.
- This deceleration in the rate of increase of the overall risk of being diagnosed with cancer in Minnesota is being driven by encouraging trends for several of the most common cancers. Prostate, female breast, male lung and bronchus and colorectal cancer incidence rates are either stable or declining.
- Nonetheless, the risk of being diagnosed with a number of cancers is increasing rapidly, both in Minnesota and nationally: cancers of the thyroid and kidney, melanoma of the skin and non-Hodgkin lymphoma. Mortality rates for these cancers remain stable or decreasing.
- Lung cancer is still the leading cause of cancer deaths; more Minnesotans died of lung cancer (2,398 deaths) in 2009 than the next three leading cancers combined: colorectal (812), female breast (684) and prostate (537).
- Progress in reducing cancer rates is outstripped by growth and aging of the population. From 1988 to 2009, the number of Minnesotans diagnosed with cancer each year increased by 46 percent, and the number dying of cancer increased by 18 percent.
- American Indians residing in CHSDA counties (Appendix C) had the highest cancer rates in Minnesota; they were 33 percent more likely to develop cancer than non-Hispanic whites and 78 percent more likely to die of cancer. African Americans were six percent more likely to develop cancer than non-Hispanic whites and 37 percent more likely to die of cancer.
- Aggregating Minnesota counties into eight regions (Appendix C), the risk of developing cancer among non-Hispanic whites varied by six percent comparing the region with the highest rate to the lowest. Larger regional variation was found for the four most common cancers. It is likely that at least some of the variation reflects differences in the smoking histories and in the adoption of cancer screening guidelines in regional populations.
- The mesothelioma incidence rate in northeast Minnesota was significantly higher than in the state as a whole for men, but not for women.
- In general, Minnesotans have a lower risk of developing most types of cancer than the nation as a whole. The exceptions were leukemia (each gender), uterine cancer among females, and non-Hodgkin lymphoma, prostate, and testis cancers among males. These sites were significantly elevated among non-Hispanic whites in Minnesota compared to those in the SEER 18 areas.
- Among American Indians, the overall cancer incidence and mortality rates in Minnesota were two times higher than nationally.
- On January 1, 2009, an estimated 217,170 Minnesotans, 4.2 percent of the state population, were living with a history of cancer.

Cancer Incidence Data Now Available Online at Minnesota Public Health Data Access

Minnesota Public Health Data Access is an online query and information system designed to provide the public with easy access to Minnesota data about health, the environment, and risk factors that may impact health. Cancer incidence data are now included on MNPH Data Access. On the site, maps and tables can be created to download for use in spreadsheets, reports, and presentations. Minnesota Public Health Data Access is free of charge and is available at <https://apps.health.state.mn.us/mndata>.

Users can create tables for about 20 cancers using a data query system. The interactive maps provide county-level data for all cancer sites combined and breast cancer, lung cancer, melanoma of the skin, mesothelioma and non-Hodgkin lymphoma. Additional types of cancer are being added to the site. No data are presented that could be used to identify individuals diagnosed with cancer.



To view interactive maps, go to Minnesota Public Health Data Access, click on Cancer, and then click on the “Map the Data” button.

Cancer incidence data are provided by the Minnesota Cancer Surveillance System and currently include incidence data for 1988-2009. Because MCSS is a dynamic database, the data presented in *Cancer in Minnesota, 1988-2009* may not exactly match what is available on Minnesota Public Health Data Access.

Topics related to cancer and its risk factors (such as smoking, obesity, and environmental tobacco smoke) are also available at Minnesota Public Health Data Access.

To learn more about Minnesota Public Health Data Access, send an email to health.dataportal@state.mn.us or visit <https://apps.health.state.mn.us/mndata>. To receive email updates when new cancer material is available, go to Minnesota Public Health Data Access and click on “Email updates.”

MNPH Data Access is updated and maintained by the Minnesota Environmental Public Health Tracking Program (MN EPHT) at the Minnesota Department of Health through a cooperative agreement with the CDC National Environmental Public Health Tracking Network.



The Minnesota Cancer Alliance and Cancer Plan Minnesota

Established in 2005, the Minnesota Cancer Alliance (MCA) is a coalition of more than 100 organizations from diverse backgrounds and disciplines dedicated to reducing the burden of cancer across the continuum from prevention and detection to treatment, survivorship, and end of life care. The MCA supports and facilitates partnerships to advocate for policies, to implement programs and to support health system changes. It supports partner networking and alignment to reduce duplication among its members, thereby leveraging dwindling resources to address cancer control priorities.

The MCA created and uses *Cancer Plan Minnesota 2011-2016* as its framework for action for planners, providers, policymakers, the public health community and other advocates. It includes evidenced-based strategies and effective policy interventions across the spectrum of cancer care, as well as measures of effectiveness.

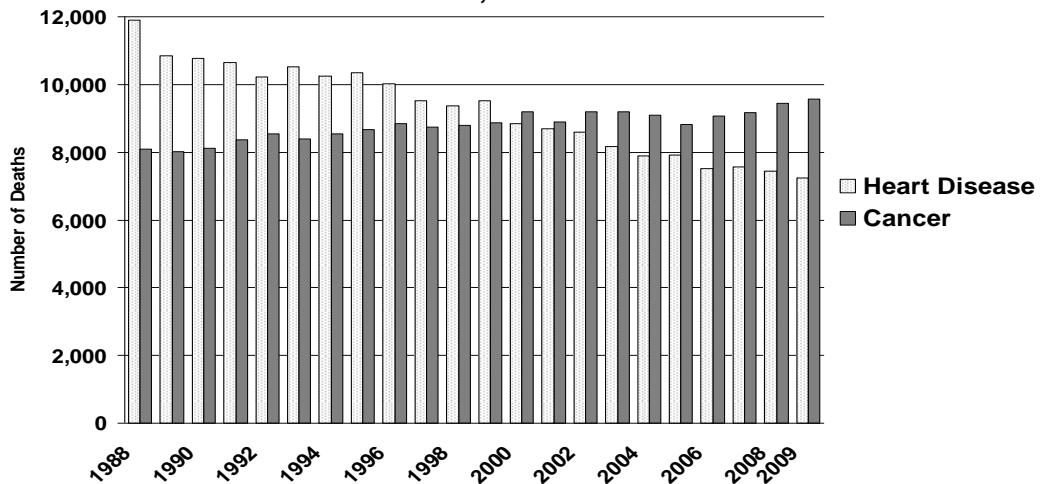
Notable achievements supporting implementation of *Cancer Plan Minnesota 2011-2016* include recently securing federal funding to develop a

cancer specific policy agenda, the development of new clinic-level colon screening measures publicly reported by Minnesota Community Measurement, the launch of a colon cancer screening learning collaborative and performance improvement project, the creation of a culturally competent end-of-life care Allied Health Worker curriculum and activities to build capacity to address cancer disparities.

The Minnesota Cancer Surveillance System (MCSS) has been instrumental in developing data-driven objectives for *Cancer Plan Minnesota* and continues to serve as the key source of population-based data to assess the outcome of cancer control efforts in Minnesota. In addition to this biennial report, MCSS works closely with the American Cancer Society (a MCA partner) to produce *Minnesota Facts and Figures* in alternate years.

Visit www.mncanceralliance.org for additional information about the Minnesota Cancer Alliance and *Cancer Plan Minnesota 2011-2016*. Or contact Craig Wethington, Program Director, at (651) 201-3608.

Deaths due to Heart Disease and Cancer, Minnesota, 1988-2009



Source: Minnesota Center for Health Statistics. Analyses were conducted by MCSS.

Questions and Answers about MCSS Data Privacy

The Minnesota Cancer Surveillance System (MCSS) is Minnesota's statewide, population-based cancer registry. It was mandated by the state legislature in 1987 to collect information on all newly diagnosed cancers among Minnesota residents. By law, new cancer cases must be reported to the MCSS, including the name, date of birth, and social security number of the person diagnosed with cancer. These data enable the Minnesota Department of Health (MDH) to protect and improve public health by monitoring cancer rates throughout the state and over time. The MCSS also benefits all Minnesotans by serving as a resource for education and research to prevent, detect, treat, and cure cancer.

Why does the MCSS need to obtain the names of individuals diagnosed with cancer? There are five primary reasons why MCSS functions depend on having information identifying individuals:

1. Most cancer cases are reported to the MCSS more than once. To determine how many new cancers have been diagnosed, multiple reports must be combined into a single summary of the case. Without personal information, separate reports from laboratories, physicians, treatment facilities, and hospitals could not be identified as representing the same case. Using patient names and other personal information to link multiple reports on the same person is essential to maintain the accuracy of the MCSS. Inaccurate data would undermine the public's investment in cancer registration and render it ineffective in protecting public health.
2. No single source of information captures all cancer diagnoses or provides all the information needed for cancer surveillance. For example, pathology reports do not contain critical information such as stage at diagnosis or treatment received. The name of the patient allows this information to be obtained from the hospital or from the physician, if the patient was not admitted to a hospital. Since an increasing number of cancer patients are treated on an outpatient basis, the ability to request additional information from physicians and treatment facilities is very important to obtain complete and unbiased data.
3. Personal identifiers are needed to link MCSS cases with death certificates. This is done to make sure that all cancer cases have been reported, and to lay the groundwork for assessing cancer survival. About two percent of MCSS cases, and a higher proportion of certain cancers, would not be identified without this linkage. The MCSS hopes to have sufficient resources in the future to evaluate cancer survival, which is a critical element in identifying disparities in cancer care. This cannot be done in a cost-effective manner without linkage to death certificates.
4. Names are needed if cancer patients are to be given the opportunity to contribute to knowledge about their disease by participating in research. The MCSS is authorized to contact cancer patients, after obtaining consent from their physician, to see if they are interested in participating in specific cancer research projects. Participation is completely voluntary. MCSS data have enabled research to be conducted on such questions as the efficacy of colorectal cancer screening, the causes of pancreatic cancer, associations between cancer and occupational exposures such as mesothelioma and mining, and the epidemiology of childhood leukemia.
5. To protect the health of Minnesotans, the MCSS must be able to evaluate whether communities or workplaces are experiencing a higher occurrence of cancer than would be expected. Although names are never released in these investigations, they are vitally important to their conduct. For example, when a concern arises in an occupational setting, names of former and current employees can be linked to the MCSS by MDH staff to determine whether workers are experiencing an excess of cancer. Because personal identifiers enable MCSS to be highly complete and accurate, as discussed above, the MDH can be confident that investigations

of cancer occurrence reflect reality, and not the artifacts of poor data collection.

Do other cancer registries obtain the names of people diagnosed with cancer? Yes. All 50 states and the District of Columbia have statewide cancer registries. All of them obtain personally identifying information on cancer cases for the reasons discussed above. Nine geographic areas (states or metropolitan areas) in the U.S. have been participating in the Surveillance, Epidemiology, and End Results (SEER) program of the National Cancer Institute since 1973. Each of the SEER registries has collected personally identifying information for more than three decades.

How does the MCSS protect the privacy of cancer patients? Protecting data privacy is a high priority for the MCSS and is mandated by Minnesota law. The MCSS is housed in a guarded, key-pass protected location that is not accessible to the general public. MCSS employees must sign confidentiality pledges as a condition of employment, and they are subject to criminal penalty for any breach of privacy. MCSS employees are given access to personally identifying information only as needed to perform their duties, and they are trained and monitored to keep private data secure. Data encryption, passwords, and computer firewalls are used to protect electronic data. By law, MCSS data are considered private. Data are only released in accordance with the Minnesota Government Data Practices Act. Minnesota law also protects the data from being discovered (i.e., released) during litigation without consent of the patient.

Was patient privacy taken into consideration when the legislature mandated the creation of MCSS? Yes. Prior to establishing the MCSS, the Commissioner of Health empanelled an advisory committee charged with assessing whether the benefits of statewide cancer registration to the citizens of Minnesota outweighed the potential costs to individual privacy. The committee consisted of members from the legal profession, business, labor, medicine, government, patient advocates such as the American Cancer Society, and the community. It deliberated for more than a year. Based on the importance of the proposed

system to protecting public health and the ability to protect individually identifying medical data, the committee unanimously concluded that the benefits far outweighed the costs. On their recommendation, statutes that provided for both the collection of personal medical information and its stringent protection were adopted by the state.

Are patients asked for consent to have information about their cancer reported to the MCSS? No. Patient consent is not required by Minnesota statutes. Requiring consent would undermine the public's investment in cancer registration and render it ineffective in protecting public health. Federal standards require that at least 95 percent of the expected number of cases must be reported before cancer registration is complete. MCSS completeness currently meets that standard. If even 10 percent of people with cancer refused to have their information reported to the MCSS, Minnesota cancer rates would appear to be much lower than they are. In addition, persons refusing consent would likely differ from those giving consent in unknown ways, such as gender, age, race and ethnicity, location of residence, type of cancer, or year of diagnosis. Because of this, data would be biased. It would be impossible to reliably compare rates among these important factors, which is the basis of cancer surveillance. In fact, the refusal rate could be even higher, given the challenges facing patients coping with new cancer diagnoses, and the physician's need to discuss treatment, prognosis and quality of life issues with the patient. Obtaining consent for cancer reporting in this context arguably represents an unnecessary and inappropriate burden on both patients and physicians.

Do other states require informed consent for cancer registration? No. For the same reasons as discussed above, no cancer registry in the U.S. requires informed consent for cancer reporting.

How are Minnesota cancer patients given an opportunity to participate in research projects? Before a patient is invited to participate in research, his or her physician is contacted by the MCSS to determine if there is any reason why the patient or the patient's family should not be approached. This step is required by the statute

Data Privacy

that created the MCSS. If the physician consents, the patient is invited to participate, as specified in the study protocol. Participation is always voluntary, and the MCSS does not inform the patient's physician of his or her decision. Patients may request that they are never approached by the MCSS to participate in research by contacting the MCSS (see contact information below).

Cancer patients who are approached to participate in research are sometimes unaware that their names have been reported to the MCSS. The invitation may, therefore, come as a surprise and cause concern. Although first consulting the physician is intended to prevent patients and their families from being contacted at inappropriate times, this unfortunately can happen despite the best of intentions. Nonetheless, experience indicates that most cancer patients welcome the opportunity to contribute to knowledge about their illness.

How is data privacy protected by researchers?

Data from the MCSS are only provided to a researcher whose project has been reviewed and approved both by the MCSS Peer Review Committee, which evaluates proposed studies for social and scientific merit, and by a federally approved Committee for the Protection of Human Subjects. These latter committees, also called Institutional Review Boards (IRBs), carefully review research protocols, including the provision of informed consent and methods to protect data confidentiality, to determine whether potential risks have been well explained prior to obtaining consent and are justified by potential benefits. Failure to protect confidentiality can result in the termination of the project and its funding. Research projects are reviewed annually, and

complaints must be reported to the governing IRB. Researchers who receive private patient information from the MCSS are also contractually bound to protect the information under all the requirements of Minnesota law.

Does cancer reporting represent a risk to patient privacy?

Yes, although the risk is small. Any time that data are exchanged, whether between individuals, between health care providers, between providers and insurers, or between providers and the MCSS, it is possible for breaches in data privacy, either inadvertent or intentional, to occur. The state legislature and MDH have taken extreme care to minimize these risks by the protections described above, with an outstanding record of success.

The underlying issue today is the same as deliberated by the Commissioner's advisory committee more than 20 years ago: "Are the benefits of cancer surveillance greater than its costs?" The answer remains an emphatic "Yes." The lifetime risk of developing a life-threatening cancer is approximately 50 percent. Thus, each of us will be affected directly or indirectly by this group of diseases. The methods used by the MCSS to collect and release data effectively balance the need to protect public health through cancer surveillance, the desire of the public for progress in preventing, detecting, and treating cancer, and the rights of individuals to privacy.

Where can more information about the MCSS be obtained?

More information can be obtained by visiting the MCSS Web site (www.health.state.mn.us/divs/hpcd/cdee/mcss), by telephoning the MCSS office at (651) 201-5900, or by writing to MCSS, P.O. Box 64882, St. Paul, MN 55164-0882.

Chapter I: Introduction

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Chapter I: Introduction

This report contains information on the incidence and mortality of cancer in Minnesota from 1988, when cancer registration was implemented, to 2009, the most recent year for which incidence data are considered complete. Cancer incidence and mortality provide two important measures of the impact of cancer. Incidence measures how many new cases of the disease are diagnosed, while mortality measures how many people die of the disease. Statewide cancer incidence data are reported to and collected by the Minnesota Cancer Surveillance System (MCSS), and mortality data are reported to the Minnesota Center for Health Statistics (MCHS). Both programs are part of the Minnesota Department of Health (MDH).

The primary objectives of MCSS are to: (1) monitor the occurrence of cancer in Minnesota and describe the risks of developing cancer, (2) inform health professionals and educate citizens regarding specific cancer risks, (3) answer the public's questions and concerns about cancer, (4) promote cancer research, and (5) guide decisions about targeting cancer control resources.

The Minnesota legislature recognized the need for accurate information about the occurrence of cancer in 1981, when legislation was introduced to establish a statewide cancer surveillance system. In 1987, following a 6-year process which included consensus building, development of methods, and a feasibility study, legislation (Minnesota Statutes 144.671-144.69) was passed to establish MCSS. MCSS began operations on January 1, 1988.

MCSS receives part of its funding from the National Program of Cancer Registries (NPCR), administered by the U.S. Centers for Disease Control and Prevention (CDC). NPCR funding began in October 1994 and is scheduled to continue at least through June 2017. The support of the NPCR enables MCSS to collect additional information on each case of cancer, perform death clearance and quality control studies, provide specialized training to Minnesota professionals who collect and code cancer data, and increase the analysis and utilization of the collected data.

An attempt has been made to minimize the use of technical jargon in this report. However, because of the nature of the material and the diverse audience that this report must serve, some technical terms remain. The Glossary (Appendix D) and other appendices will assist those desiring more basic definitions, as well as those requiring additional detail.

This and previous MCSS reports are available on the MCSS Web site (www.health.state.mn.us/divs/hpcd/cdee/mcss/index.html) or by request from MCSS.

Data Sources

Cancer Cases

The MCSS database contains information on nearly all microscopically confirmed malignant and *in situ* tumors diagnosed in Minnesota residents, as well as benign tumors occurring in the head and spinal cord. The primary exceptions are the most common forms of skin cancer (basal and squamous cell carcinomas) and *in situ* carcinomas of the uterine cervix. These exclusions are consistent with guidelines for cancer registration practice in the U.S.

Cancers diagnosed in Minnesota residents are identified in two primary ways. Hospitals that have in-house cancer registries routinely submit standardized case abstracts to MCSS for each cancer patient diagnosed or treated at the hospital. This reporting is almost entirely electronic. Cancer cases not reported to MCSS through hospital-based cancer registries are identified through information from pathology laboratories. Pathology laboratories submit photocopies or electronic files of the pathology report, which contains information about the microscopic review of the tissue, and the medical record face sheet or an equivalent form, which contains the patient's demographic data. MCSS registrars then complete the standardized patient abstract from the patient's hospital and clinic records.

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Since 1995, MCSS has routinely reviewed death certificates to identify cancer cases that may have been missed through other reporting methods, a process referred to as death clearance. Deaths recorded as caused by cancer are first linked to cases on MCSS. If not found on MCSS, attempts are made to confirm the diagnosis by contacting the physician of record and by searching medical records and pathology reports. If the death certificate remains the only source of information, the case is added to the MCSS database as a “death clearance only” case (DCO). Unlike all other MCSS cases, DCO cases, by definition, have not been verified as microscopically confirmed. They comprise a small fraction (about 1.7%) of MCSS cases. Death clearance review is also a recommended registry practice.

More than one million reports on approximately 614,748 cancers were registered with MCSS as of October 17, 2012. For the period covered by this report, January 1, 1988 to December 31, 2009, a total of 483,189 invasive cancers and 32,857 *in situ* cancers were diagnosed among Minnesota residents and registered on MCSS. *In situ* cancers of the urinary bladder are included with invasive cancers so that Minnesota data are consistent with national standards.

The data upon which this report is based are dynamic. That is, they are always being updated and improved. For example, in MCSS’ first legislative report, 17,728 cancers were reported as diagnosed in 1988. The current database for 1988 contains information on 18,014 cancers (some of the increase is because the initial report of data for 1988 did not include *in situ* cancers of the bladder). MCSS updates data for any year when new information becomes available. In this regard, all data are subject to change when appropriate. For purposes of analyses, the data are “frozen” (closed) in order that numbers and rates are consistent throughout the report. The date of closure for 1988-2009 data included in this report was December 5, 2011.

Cancer Deaths

Mortality data are obtained from death certificates. Death certificates are collected, coded, and computerized by the MCHS. MCSS

obtains the computerized files from MCHS and analyzes the data for MCSS reports. Only the underlying cause of death was used in calculating cancer mortality rates.

Population Estimates

Minnesota population estimates were obtained from the National Cancer Institute’s (NCI) Surveillance, Epidemiology, and End Results (SEER) Program Web site (www.seer.cancer.gov/popdata). They were calculated using a modified version of the annual time series of July 1 county population estimates by age, sex, race, and Hispanic origin that are produced by the Population Estimates Program of the U.S. Census Bureau (www.census.gov/popest/estimates.php) with support from the NCI through an interagency agreement. Descriptions of the methodologies employed by the Census Bureau for various sets of estimates may be found on the same Web site.

Race-specific population estimates for 2000 and more recent years must be bridged from the 31 race categories used in the 2000 census to the four race and ethnicity categories specified under earlier OMB standards, and commonly available to cancer registries. Bridged estimates attempt to re-categorize those selecting more than one race on the Census form to a single race (what they would have chosen if only given one choice), based on data from other surveys. A description of the methodology used to develop the bridged single-race estimates is available on the National Center for Health Statistics Web site (www.cdc.gov/nchs/nvss/bridged_race.htm).

The population estimates used in this report are referred to as the Vintage 2009 population estimates, and were the most up to date estimates available with the detail needed. However, they were not benchmarked to the 2010 Census. It is likely that rates for this time period will change in the future due to revised population estimates.

Data Presentation and Interpretation

Coding and Inclusion of Cancer Cases

Cancer registries code the site (anatomic location) and histology (cell type) of cancers according to

the International Classification of Diseases for Oncology (ICD-O), which is periodically revised to remain current with discoveries and issues in cancer surveillance and treatment. Cancers diagnosed from 1988 to 1991 were originally coded according to the 1987 Field Trial Edition (ICD-O-FT). Cancers diagnosed between 1992 and 2000 were originally coded according to the 2nd edition (ICD-O-2), and cancers diagnosed from 2001 forward were coded according to the 3rd edition (ICD-O-3). Codes for all cancers have been translated, using a computer algorithm either alone or in combination with review, into the ICD-O-3 standard. To facilitate comparisons of cancer rates across geographic areas, cancers in this report are grouped by site and histology using definitions developed by the SEER program (Appendices A and B).

Some specific cell types (ICD-O histology codes 9950, 9960-9962, 9980-9984, and 9989) were defined as having “borderline malignancy” under ICD-O-2 and therefore were not reportable to MCSS. However, these histologies were redefined as “invasive” under ICD-O-3 and were registered on MCSS starting in 2001. These histologies include chronic myeloproliferative disorders and myelodysplastic syndromes; on average, 450 cases were reported annually to MCSS from 2001 to 2009. To maintain the ability to assess changes in the overall cancer incidence rate over time, and following SEER reporting practices, these histologic types are not included in this report.

Another group of cell types (ICD-O histology codes 8442, 8451, 8462, 8472, and 8473) were coded as “invasive” under ICD-O-2 but as having “uncertain behavior” under ICD-O-FT and ICD-O-3. Most of these are ovarian tumors; they accounted for approximately 75 diagnoses per year from 1992 to 2000 while ICD-O-2 rules were in use. For consistency over time and with SEER, tumors with these histologies are not included in this report. Data are available upon request.

Most tables included in this chapter present incidence data for invasive cancers only, with the exception of *in situ* bladder cancers. Following SEER reporting practices, *in situ* bladder cancers are included in data on invasive bladder cancers and in data on all cancer sites combined because

the distinction between *in situ* and invasive bladder cancer is often unclear, and some *in situ* bladder cancers may be life threatening. *In situ* cancers for other sites are only included in tables showing stage distribution for that specific site.

Coding and Inclusion of Cancer Deaths

The information presented in this report includes all deaths with cancer specified as the underlying cause of death during the specified time period, regardless of when the cancer was diagnosed, if this is known. The underlying cause of death for reports from 1988 to 1998 were coded to International Classification of Diseases, Ninth Revision; for reports occurring in 1999 forward, the International Classification of Diseases, Tenth Revision was used. Cancers were grouped according to SEER’s algorithm, using the ICD version that was in use at the time the death occurred (Appendix B).

Age-adjustment

Age-adjustment is a statistical method that minimizes differences in rates that would occur solely because the populations being compared do not have the same age distributions. Because cancer occurs more frequently with increasing age, a population with a larger proportion of elderly individuals will have more cancers occur than a younger population of the same size, even if cancer rates at any given age are exactly the same in the two groups. Age-adjustment produces a hypothetical summary rate, the rate that would occur if the group had the age distribution of a “standard” population. If cancer rates among groups being compared are age-adjusted to the same standard population, rates will not be biased by differences in age, and a determination of whether one group has a greater risk of developing or dying from cancer will be more meaningful.

All rates presented in this report were directly age-adjusted to the 2000 U.S. standard population using 19 age groups, provided in Appendix E. A number of different population standards have been utilized in the past. Compared to previously used standard populations, using the 2000 U.S. standard increases the absolute value of the rate,

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and therefore, rates in this report cannot be compared to those in MCSS or other cancer reports using other standards.

Comparing Minnesota and U.S. cancer rates

The SEER program has collected population-based cancer incidence data from nine selected geographic areas in the U.S. since 1975. Four more areas were added in 1992, and an additional four areas in 2000. Because a cancer registry covering the entire U.S. does not exist, SEER data on cancer occurrence are widely cited as national data. The SEER race-specific incidence rates presented in Chapter III are from the SEER 18 areas covering about 28 percent of the U.S. population, from the report *SEER Cancer Statistics Review, 1975-2009 (Vintage 2009 Populations)*. Consistent with SEER reporting practices, national cancer mortality rates are for the entire U.S. When long-term trends are presented in Chapter II, the SEER incidence rates are for the white population residing in the SEER 9 areas and the U.S. mortality rates are for all U.S. whites.

Caution should be used in comparing Minnesota and SEER/U.S. cancer rates for all races combined. Because cancer rates vary markedly by race and ethnicity, the overall risk of developing cancer in a geographic area depends in part on the relative proportion of race and ethnic groups in the population. The race and ethnic distributions of Minnesota and the SEER areas are very different. In particular, Hispanics, who tend to have considerably lower cancer rates than non-Hispanic whites, comprised 4.0 percent of the Minnesota population during 2005-2009 and approximately 20 percent of the overall population in the SEER Program. This means that for many sites, cancer rates for all races combined will be higher in Minnesota than reported by the SEER 18 areas. Comparison of rates among non-Hispanic whites better reflects the difference in risk of developing cancer in the two areas.

When comparing Minnesota and SEER, it is also important to recognize that rates reported by the SEER program include cases that were diagnosed based on clinical observations, while the MCSS does not currently collect information on those

cases, with the exception of DCO cases as discussed above. During 2005-2009, 3.7 percent of invasive cancers in the SEER 18 registries were not microscopically confirmed. If all other factors were the same, one would therefore expect the overall cancer rate in Minnesota to be 3.7 percent lower than SEER simply because of the exclusion of these cases, and not because Minnesotans have a lower risk of cancer. However, there are several factors that indicate that excluding clinically diagnosed cancers from the SEER database may not make SEER and MCSS rates more comparable. First, the quality of health care in Minnesota is high, and the proportion of clinically diagnosed cancers that are sent to a laboratory for confirmation appears to be higher than in other geographical areas. Second, some cases that are originally reported to SEER based on clinical observations may eventually be confirmed microscopically, but the information is not updated in the registry. And third, audits of MCSS operations have indicated that case ascertainment is extremely high.

Nonetheless, certain types of cancer typically have a substantial proportion of cases that are not microscopically confirmed, and Minnesota incidence rates may be artificially low for these sites; these include cancers of the liver (27%), pancreas (15%), brain (12%), and Kaposi sarcoma, kidney, and lung and bronchus (each about 8%). For these sites, mortality rates should be used to assess how Minnesota compares to national data.

Completeness and Quality of Data

MCSS data are very complete and of very high quality. This is documented by several measures.

In addition to routinely receiving data from pathology laboratories as described above, MCSS Field Service staff routinely conducts independent reviews of pathology labs to identify cases that may have been missed. This review is an important feature of MCSS quality control in that it assures that virtually all eligible cancers are included in the data. Among cancers diagnosed during 1988-2009, 4.7 percent (over 25,000 cancers) would have been missed without this review.

As discussed above, MCSS began performing death clearance in 1995. Death clearance can identify sources where cancer reporting might be improved. A high-quality cancer registry should have between one percent and three percent of its cases as DCO. Results indicate that MCSS case ascertainment is excellent. Of all the reportable cancers diagnosed between 1995 and 2009 (the years for which death clearance has been performed), 5,932 (1.5%) were initially identified by death clearance and confirmed as reportable during follow-back, and another 5,015 (1.4%) remained DCO after follow-back was completed.

In December 2011, MCSS submitted a de-identified file of its provisional data through 2009 to the Registry Certification Committee of the North American Association of Central Cancer Registries (NAACCR). NAACCR is the organization in North America that develops standards and models for the collection of cancer data in central cancer registries. Table I-1 contains the results of the certification process. MCSS achieved the highest rating, the Gold Standard, for all criteria except “Timeliness.” Because of the state shutdown during 2011, the file was submitted late.

In March-April 2008 a contractor of NPCR performed an external audit of the completeness and quality of MCSS data. Estimated case completeness was 99.7 percent, with 3 missed cases. Data accuracy was also very high, with an overall accuracy of 96.5 percent (197 errors identified out of 5,688 data items reviewed). A copy of the full report is available from MCSS.

MCSS has also conducted several of its own studies of the accuracy of the data. These studies indicate that MCSS data are of comparable quality to data of other central cancer registries in the U.S. The four most recent reports are available on the MCSS Web site (www.health.state.mn.us/divs/hpcd/cdee/mcss). Special attention was paid to the data fields that were new to MCSS in 1995, stage at diagnosis and the information on the first course of cancer therapy. MCSS has not had the resources to conduct its own audits in more recent years.

Data on Race and Ethnicity

Race is an important factor in cancer surveillance because the risk of being diagnosed with cancer varies considerably by race and ethnicity. The reasons for the variations have yet to be fully delineated, but most likely include cultural, economic, societal, and genetic factors. It is therefore important to be able to compute race-specific cancer rates.

Calculating a cancer rate requires two sets of numbers: numerators, or counts of events (i.e., cancer diagnoses or deaths); and denominators, or the number of people in the population being studied. There are a number of serious challenges to obtaining accurate race- and/or ethnicity-specific counts for both the numerators and the denominators in cancer registration. MCSS has worked diligently to improve the completeness and accuracy of the reported race and ethnicity of cancer patients.

Race is not always recorded in the medical record, and when this is the case, the patient is reported with unknown race. Among cases diagnosed from 1988 to 1994, no indication of the patient’s race was reported for 6.9 percent of cases, and MCSS did not have the resources to perform active follow-up to find the missing information. When funding became available through the NPCR program in 1995, MCSS began active follow-up; these efforts have reduced the percentage of cases with unknown race on the cancer abstract to about 3.1 percent. MCSS has also elected to recode persons with unknown race to white if they reside in a county where more than 95 percent of residents are white. When this approach is taken, the number of cases with unknown race is further reduced, leaving approximately one percent of cases with unknown race for cases diagnosed 1995 forward.

Identifying cases reported with the wrong race is a challenge as well. In particular, American Indians are often not identified as such in the medical record. Since 2003, NPCR has supported the linkage of state cancer registry data with the roster of American Indians enrolled in the Indian Health Service (IHS). With appropriate data privacy protections in place, MCSS has been participating

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in this linkage project, and cancers newly diagnosed from 1995 forward are routinely linked with the IHS roster. The number of cancers in American Indians in the MCSS database for the years 1995-2009 increased by 49 percent because of the linkage; 80 percent of the cases reclassified as American Indian were originally reported to MCSS as white, 17 percent with unknown race, and three percent as another non-white race. Minnesota death certificates were also linked with the IHS roster for the same years, increasing the number of cancer deaths among American Indians by about ten percent.

Despite these efforts, it is likely that cancer rates among American Indians statewide continue to be underestimated, especially outside of the IHS Contract Health Service Delivery Area (CHSDA), where fewer American Indians use IHS health services and fewer are likely to be noted in the medical record as American Indian. Therefore, MCSS presents cancer incidence and mortality rates among American Indians for two geographic areas: statewide, and for residents of CHSDA counties. The IHS has designated 29 Minnesota counties as part of CHSDA. These counties are estimated to include about 50 percent of the American Indian population in the state. Overall cancer incidence and mortality rates are approximately 20 percent higher for American Indians in CHSDA counties than statewide. Cancer rates calculated for the CHSDA counties are thought to provide a more accurate picture of cancer rates among American Indians, but this is difficult to verify.

The ethnicity (Hispanic origin) of cancer patients is also very difficult to collect accurately. Even when medical records are reviewed, usually no mention is found of whether or not a person is of Hispanic origin. Recognizing this common problem for cancer registries, NAACCR developed the Hispanic Identification Algorithm (NHIA) to identify misclassified Hispanics using the patient's last name (<http://www.naacr.org/DataandPublications/CallforData.aspx>, click on "NHIA v2.2"). NHIA excludes individuals from Hispanic name matching if their race is Filipino or American Indian, or if they were born in a country with a high prevalence of Spanish surnames but low probability of Hispanic ethnicity. To avoid

over-identification of Hispanics in geographic areas known to include few Hispanics, MCSS limits Hispanic name matching to cases residing in counties that had at least four percent Hispanics in the 2000 census. Eleven counties, representing 90 percent of Hispanics in Minnesota, met this criterion. After applying the modified version of NHIA, cancer incidence rates for Hispanics were more consistent both with other states' Hispanic cancer incidence data and with mortality data for Minnesota Hispanics. Hispanic incidence rates presented in this report include cases reclassified as Hispanic through this process. After examining the effects of applying NHIA to Minnesota mortality data, it was decided that reporting of Hispanic ethnicity on the death certificate appeared complete enough without additional manipulation.

Despite these improvements in the completeness and accuracy of data on the patient's race and ethnicity, the ability of MCSS to evaluate racial and ethnic differences in cancer risk among Minnesotans remains limited by several factors. First, although the Minnesota population is increasingly diverse, populations of color are still relatively small. Out of a total Minnesota population of 5.3 million, the 2010 census enumerated 898,783 residents who were African American, Asian/Pacific Islander, American Indian, Hispanic, or of mixed or "other" race, together representing 16.9 percent of the total Minnesota population. Because all but the five most common cancers occur infrequently, only a few cases or deaths will be reported each year for most cancers from populations of color in Minnesota. This means that the random fluctuation of a few cases or deaths can cause rates for these groups to vary considerably from year to year.

Secondly, race and ethnicity as recorded in the medical record may not match what the individual reported on the Census form. Ideally, individuals should be allowed to report their own race(s) and ethnicity. Admission practices and forms at health care facilities do not always follow this practice, so the race recorded in the medical record might be based on assumptions made by an observer at the facility.

Finally, the population estimates that are available to calculate rates may be inaccurate because they represent (1) undercounts of persons of color during the national census, (2) inaccurate population estimates during the intercensal period, and/or (3) inappropriate recoding of individuals who report more than one race into single-race categories.

An example of the second, “intercensal,” problem was the discovery, following completion of the 2000 census, that the estimates of the Hispanic population in Minnesota for the late 1990’s had been nearly 75% too low. Population estimates for the years between the 1990 and 2000 censuses were subsequently revised, and thus the Minnesota Hispanic cancer mortality rates published since 2005 are considerably different from those published previously. It is likely that race-specific cancer rates will also be affected by revisions to the population estimates for the intercensal period 2001-2009 when they are benchmarked to the 2010 census.

A potential example of the third, “recoding to single-race,” problem relates to the data on American Indians. Although only 1.2 percent of Minnesotans overall reported more than one race in the 2000 census, 32 percent of American Indians reported at least one race in addition to American Indian. The MCSS database contains only 49 (0.02 percent) cases with more than one reported race. Thus, there is a mismatch between how race is identified in the numerator (MCSS) and how it was identified in the denominator (census), especially for American Indians. As previously stated, the bridged census estimates attempt to re-categorize individuals selecting more than one race to the single race they would have chosen if only given one choice. It is not known how American Indian individuals enrolled in IHS would report their racial identity on a Census form, nor whether IHS-enrolled American Indians are any different in this respect from American Indians not enrolled in the IHS, and thus it is unknown whether the current bridging method is the appropriate one to use when calculating American Indian cancer rates after incorporating an IHS linkage.

These factors limit our confidence in race- and ethnic-specific cancer rates in Minnesota, and make it challenging to interpret the differences we find. Despite these limitations, we believe that identifying race and ethnic differences in cancer risks is an important function of MCSS, and is important in developing policies and interventions directed at cancer control. We have, therefore, aggregated data over the five-year period, 2005-2009, to present cancer data by race and ethnicity. In addition, rates based on fewer than ten cases or deaths are suppressed. Nonetheless, the shortcomings discussed above should be kept in mind when evaluating race and ethnic differences in cancer rates presented in this report.

Uses of MCSS Data

MCSS meets five primary objectives. The following is a brief summary of how MCSS is accomplishing each objective.

Monitoring the occurrence of cancer in Minnesota and describing the risks of developing cancer. Using programs developed in-house or obtained from SEER (www.seer.cancer.gov/software), MCSS epidemiologists have analyzed data and produced a series of publications describing cancer occurrence and risks (Table I-2b). Cancer mortality data have also been analyzed and included in this description of cancer occurrence in Minnesota. Estimates of cancer prevalence (the number of persons living with a diagnosis of cancer) in Minnesota, using software designed by SEER and methods developed by MCSS epidemiologists, are included as well.

MCSS provides data files without personal identifiers to NPCR, NAACCR, and the Central Brain Tumor Registry of the United States. These organizations combine data from multiple registries to produce publications describing cancer incidence and trends in the United States and/or North America (included in Table I-2c).

Informing health professionals and educating citizens regarding specific cancers. Formal presentations are frequently made to local public health, community, academic, legislative and regulatory groups on the occurrence of cancer in Minnesota and related topics. *Minnesota Cancer*

Introduction

Facts & Figures is authored by MCSS epidemiologists and issued every two years in collaboration with the American Cancer Society and the Minnesota Cancer Alliance. A list of publications recently authored by MCSS staff is found in Table I-2a, b.

Answering the public's questions and concerns about cancer. MCSS receives numerous requests for information on cancer rates or cancer risks. These inquiries represent all geographic regions of the state. Although most of these inquiries are from individual citizens, inquiries also frequently come from citizens' groups, schools, and workplaces, as well as the public health, scientific, and medical communities. Responses to these inquiries range from providing simple, descriptive statistics to detailed record-linkage studies of a defined cohort.

Promoting cancer research. MCSS has assisted cancer researchers by providing information and data needed for the planning and support of grant applications. MCSS has also received 48 data use applications since 1988, which are described in Table I-3. The involvement of MCSS in the approved studies has varied from providing information about the completeness of case finding to providing rapid identification of cases for case-control studies. In addition, MCSS data have been used to investigate concerns about cancer occurrence in the workplace. Many scientific articles related to cancer etiology and prevention have been published based on these studies (Table I-2c).

Guiding decisions about targeting cancer control resources. MCSS data were essential in developing the statewide comprehensive cancer control plan, *Cancer Plan Minnesota*, and continue to be vital in assessing progress in

meeting the objectives. This data-based strategic plan, developed and implemented by the Minnesota Cancer Alliance (www.mncanceralliance.org), is a framework for action to reduce the burden of cancer among all Minnesotans.

Health care professionals, community and civic leaders, hospital administrators, and public health professionals use MCSS data to identify populations who would benefit from screening programs, write grant proposals to obtain funds for establishing screening programs for particular cancers, aid in deciding where satellite treatment facilities should be built and additional staff hired to serve patients who otherwise have to travel long distances to obtain treatment, and identify populations needing public education programs for cancer prevention.

Statistical Methods

The statistical methods and constructs used in this report conform to standards established by the National Cancer Institute and are described in Appendix E.

Protection of Individual Privacy

Privacy of information that could identify an individual (e.g., name and address) is strictly protected by Minnesota law. Furthermore, this information is considered privileged in that the MDH cannot be compelled by court order to release any personal data collected by MCSS.

For more details on this issue, please see "Questions and Answers about MCSS Data Privacy" which follows the Summary section at the beginning of this report.

Table I-1: North American Association of Central Cancer Registries certification results: quality, completeness, and timeliness of 2009 data, Minnesota Cancer Surveillance System

Registry Element	Gold Standard	Silver Standard	MCSS Measure	Standard Achieved
1. Completeness of case ascertainment	95 %	90 %	105.2 %	Gold
2. Completeness of information recorded				
• Missing/unknown “age at diagnosis”	<= 2 %	<= 3 %	0.0 %	Gold
• Missing/unknown “sex”	<= 2 %	<= 3 %	0.0 %	Gold
• Missing/unknown “race”	<= 3 %	<= 5 %	1.9 %	Gold
• Missing/unknown “county”	<= 2 %	<= 3 %	0.5 %	Gold
3. Death certificate only cases	<= 3 %	<= 5 %	2.1 %	Gold
4. Duplicate primary cases	<= 0.1 %	<= 0.2 %	NA	NA
5. Passing EDITS	100.0 %	97 %	100.0 %	Gold
6. Timeliness	Data submitted within 23 months of close of calendar year			NA

Table I-2: Reports and Publications, August 1, 2011 – July 30, 2012**Table I-2a: Publications co-authored by MCSS/MDH staff**

Bender AP, Williams AN, Soler J, Brown M. A nonparametric approach for determining significance of county cancer rates compared to the overall state rate: illustrated with Minnesota data. *Cancer Causes Control*. 2012 Jun;23(6):791-805.

Ross JA, Blair CK, Cerhan JR, Soler JT, Hirsch BA, Roesler MA, Higgins RR, Nguyen PL. Nonsteroidal anti-inflammatory drug and acetaminophen use and risk of adult myeloid leukemia. *Cancer Epidemiol Biomarkers Prev*. 2011 Aug;20(8):1741-50.

Table I-2b: Reports published by MCSS or in collaboration with other organizations

Cancer in Minnesota, 1988-2008: Report to the Minnesota Legislature 2012. Minnesota Cancer Surveillance System, St. Paul, MN, March 2012.

Copeland G, Lake A, Firth R, Wohler B, Wu XC, Stroup A, Russell C, Boyuk K, Schymura M, Hofferkamp J, Kohler B (eds). Cancer in North America: 2005-2009. Volume One: Combined Cancer Incidence for the United States, Canada and North America. Springfield, IL: North American Association of Central Cancer Registries, Inc. June 2012.

Copeland G, Lake A, Firth R, Wohler B, Wu XC, Stroup A, Russell C, Boyuk K, Schymura M, Hofferkamp J, Kohler B (eds). Cancer in North America: 2005-2009. Volume Two: Registry-specific Cancer Incidence in the United States and Canada. Springfield, IL: North American Association of Central Cancer Registries, Inc. June 2012.

Copeland G, Lake A, Firth R, Wohler B, Wu XC, Stroup A, Russell C, Boyuk K, Schymura M, Hofferkamp J, Kohler B (eds). Cancer In North America, 2005-2009. Volume Three: Registry-specific Cancer Mortality in the United States and Canada. Springfield, IL: North American Association of Central Cancer Registries, Inc. June 2012.

Table I-2c: Publications incorporating or based on data from MCSS

Johnson KJ, Blair CM, Fink JM, Cerhan JR, Roesler MA, Hirsch BA, Nguyen PL, Ross JA. Medical conditions and risk of adult myeloid leukemia. *Cancer Causes Control*. 2012 Jul;23(7): 1083-9.

Ross JA. Birth weight and childhood leukemia: time to tackle bigger lessons. *Pediatric Blood Cancer*. 2012 Jan;58(1):1-2.

Lazovich D, Vogel RI, Berwick M, Weinstock MA, Warshaw EM, Anderson KE. Melanoma risk in relation to use of sunscreen or other sun protection methods. *Cancer Epidemiol Biomarkers Prev*. 2011 Dec;20(12):2583-93.

Genkinger JM, Spiegelman D, Anderson KE, Bernstein L, van den Brandt PA, Calle EE, English DR, Folsom AR, Freudenheim JL, Fuchs CS, Giles GG, Giovannucci E, Horn-Ross PL, Larsson SC, Leitzmann M, Mannisto S, Marshall JR, Miller AB, Patel AV, Rohan TE, Stolzenberg-Solomon RZ, Verhage BA, Virtamo J, Willcox BJ, Wolk A, Ziegler RG, Smith-Warner SA. A pooled analysis of 14 cohort studies of anthropometric factors and pancreatic cancer risk. *Int J Cancer*. 2011 Oct 1;129(7):1708-17.

State and regional cancer registry staffs and Behavioral Risk Factor Surveillance System state coordinators. State-specific trends in lung cancer incidence and smoking – United States, 1999-2008. *MMWR* 2011 Sept;60(36):1243-1247.

German RR, Wike JM, Bauer KR, Fleming ST, Trentham-Dietz A, Namiak M, Almon L, Knight K, Perkins C; Patterns of Care Study Group. Quality of cancer registry data: findings from CDC-NPCR's Breast Cancer Data Quality and Patterns of Care Study. *J Registry Manag*. 2011 Summer;38(2):75-86.

Table I-3: Applications requesting data for research as of October 2012

Year*	Nature of Study	Status (Institution)
1989	International study of the effectiveness of screening for neuroblastoma at birth	Completed: Study period 1989-1998. Minnesota was one of the control areas. (U of MN)
1990	Population-based, case-control study of the epidemiology of childhood acute lymphoblastic leukemia	Completed: MCSS provided data on the completeness of ascertainment. (U of MN)
1991	International, population-based, case-control study of renal cell carcinoma	Completed: MCSS provided rapid ascertainment for identification of cases. (U of MN)
1991	National, multi-center, population-based, case-control study of colon cancer	Completed: MCSS provided rapid ascertainment for identification of cases. (U of MN)
1993	Record linkage with a 4,000-member cohort characterized for cardiovascular disease risk factors	Biennial linkage project. Fourth linkage completed fall 2003. (U of MN)
1994	Record linkage with a 14,000-member cohort who completed a nutrition survey (American Cancer Society CPS-II Nutrition study)	Completed: Pilot linkage to estimate sensitivity and specificity of cancer identification using central cancer registries. (American Cancer Society - National Home Office)
1994	Record linkage with the list of women screened through the Minnesota Breast and Cervical Cancer Control Program	Annual linkage project. Most recent linkage completed Fall 2004. (MN Dept. of Health)
1995	Record linkage with Indian Health Service patient registries to characterize cancer incidence	Completed: Report describing cancer incidence in American Indians in Minnesota was released Fall 1996. (MN Dept. of Health)
1995	Multi-center, population-based, case-control study of gliomas in rural areas	Completed: MCSS provided rapid ascertainment for identification of cases. (U of MN)
1996	Multi-center, population-based, case-control study of proximity to toxic waste sites and occurrence of Wilms tumor	Application denied because of major methodological flaws. (Agency for Toxic Substances and Disease Registry)
1996	Randomized trial to assess whether risk-appropriate counseling increases utilization of screening by individuals with a first-degree relative who had colorectal cancer	Application withdrawn before peer review because study was not funded. (MN Dept. of Health)
1997	Multi-center, population-based, case-control study of acoustic neuromas and use of cellular phones	Application inactive because of funding issues. (U of IL - Chicago)
1997	Randomized, controlled clinical trial to determine whether screening for fecal occult blood reduces colorectal cancer mortality	Completed: MCSS validated cancer incidence in the 46,000 study participants via record linkage. MCSS also linked the study cohort with 1995 MCSS data. (U of MN)
1997	Population-based study of the role of aromatic amines in pancreatic cancer etiology	Completed: MCSS provided rapid ascertainment for identification and recruitment of cases. MCSS also linked the study cases with incidence and mortality data

* Year application submitted

Introduction

Year*	Nature of Study	Status (Institution)
		to assist in estimating response rates. (U of MN)
1997	Population-based pilot study of the quality of life in cancer survivors	Completed: MCSS identified and recruited a random sample of cases. (American Cancer Society - National Home Office)
1997	Occupational cohort linkage study to describe cancer incidence in a group of workers	Completed: MCSS linked a list of workers with MCSS data and provided aggregated results to the investigator. (3M)
1997	Occupational cohort linkage study to describe cancer incidence in two groups of workers, and to compare the results of incidence follow-up with the results of mortality follow-up	Completed: MCSS linked lists of workers with MCSS and death certificate data. (MN Dept. of Health)
1997, 2002	Identification and recruitment of families at high risk of colorectal cancer into a Familial Colorectal Cancer Registry (Re-applied in 2002 for extension of funding)	Completed: MCSS identified individuals diagnosed with colorectal cancer between 1997 and 2007, who were then invited to provide information on familial cancer histories and possibly invited to participate in a national database that will be used to investigate the genetics of colorectal cancer. (Mayo Clinic and U of MN)
1998	Evaluation of Treatment Information in the Cancer Registry through Linkage	Completed: MCSS linked the list of cancer patients diagnosed in 1995 with lists of enrollees in several sets of claims and encounter data. The study compared completeness of treatment information between the two sources. (MN Dept. of Health)
1998	Mesothelioma Incidence in the Mining Industry: A Case Study	Completed: A list of 70,000 individuals who worked in the mining industry was linked with all individuals in MCSS who developed mesotheliomas. The goal was to ascertain if mesotheliomas among miners could be explained by occupational exposure to commercial asbestos. (MN Dept. of Health)
1999	Minnesota/Wisconsin Men's Health Study	Completed: MCSS identified individuals with prostate cancer diagnosed in 1999 and 2000. The study is looking for associations between genetic markers, exposure variables (pesticides, occupational, farming), and risk of prostate cancer. (U of MN)
1999	Pilot Test for Linking Population-Based Cancer Registries with CCG/POG Pediatric Registries	Completed: The MCSS list of cancer patients age 0 - 19 was linked with the CCG/POG databases for Minnesota to describe the completeness of ascertainment for both databases. (MN Dept. of Health)
2001	American Cancer Society CPS-II Nutrition study	Completed: Linkage with more than 500 Minnesotans who completed nutritional surveys to verify and update their cancer status. (American Cancer Society - National Home Office)
2001	National Quality of Life Study	Completed: MCSS identified and invited cancer survivors to participate in this study of behavioral, psychosocial, treatment, and support factors that influence quality of life and cancer survivorship in the U.S. (American Cancer Society - National Home Office)
2002	Incidence of Endometrial Adenocarcinoma Following	Completed: The MCSS assisted in determining how many women who underwent endometrial ablation

Year*	Nature of Study	Status (Institution)
	Endometrial Ablation in a Low Risk Population	subsequently developed endometrial cancer. (St. Luke's Roosevelt Hospital)
2002	Family Health Study/Validation of a Family History of Cancer Questionnaire for Risk Factor Surveillance	Completed: MCSS assisted with assessing the validity of self-reported family history of cancer. (National Cancer Institute)
2003	Statistical Models for Cancer Control and Epidemiology	Completed: MCSS improved its geocoding information so that cancer treatment and survival could be assessed in relationship to distance from appropriate medical facilities. (U of MN)
2004	Relationship of Increasing Indoor Tanning Use to Melanoma Risk	Completed: MCSS identified patients diagnosed with melanoma skin cancer between April 2003 and March 2008. The study looked for associations between genetic markers, indoor tanning booth use, and other know risk factors and melanoma skin cancer. (U of MN)
2005	Predictors of Adult Leukemia	Completed: MCSS used rapid ascertainment to identify patients diagnosed with chronic or acute myelogenous or monocytic leukemia between June 2005 and November 2009. The study looked for associations with farming exposures, nonsteroidal antiinflammatory drug use, and genetic markers. (U of MN)
2005	Breast and Prostate Cancer Data Quality and Patterns of Care	Completed: A collaborative agreement between CDC and seven population-based cancer registries or affiliated research institutions to determine the proportion of patients diagnosed with breast or prostate cancer who received first course of therapy in accordance with guidelines issued by the National Comprehensive Cancer Network. (MN Dept. of Health)
2005	Annual Report to the Nation on the Status of Cancer, 1975-2003, with a Special Feature on Cancer in US/Hispanic/Latino Populations, 1999-2003.	Completed: MCSS submitted data to NAACCR with a county identifier to be used to link with the Bureau of the Census files that include the percent of the county residents that live below poverty, and to the U.S. Department of Agriculture Beale codes to designate urbanicity of the county of the patient's residence at the time of diagnosis. The data was used to facilitate the statistical comparisons among the three population groups: Hispanic/Latino; non-Hispanic White; and non-Hispanic Black.(NAACCR)
2006	Birth Factors and Childhood cancers in Minnesota: A Data Linkage Study.	Completed: A linkage study of over 2400 cases of cancer diagnosed in children in Minnesota to their birth files and additionally to select controls from the birth files to identify certain birth risk factors and the development of cancer.
2007	Mayo Mammography Health Study Linkage	Ongoing: MCSS will be linking its database at intervals with records of more than 21,000 women who received routine mammography and consented to participate in the study. The aim is to assess whether changes in breast

Introduction

Year*	Nature of Study	Status (Institution)
		density over time are associated with breast cancer. The secondary aim is to examine whether breast density responses that accompany HRT initiation are associated with breast cancer risk. (Mayo Clinic)
2007	Forteo Post-Approval Surveillance Study: Case Series	Ongoing: MCSS is identifying cases of adult osteosarcoma and inviting them or their next-of-kin to participate in an interview. The goal is to discover whether this type of cancer might be associated with the use of a drug called Forteo, a biosynthetic human parathyroid hormone used to treat osteoporosis. (RTI Health Solutions, for Eli Lilly)
2007	Occupational and Demographic Factors of Iron Miners that Developed Mesothelioma in Minnesota (1988-2006)	Completed: Linkage study to establish the detailed protocol for a future case-control study to evaluate the role (if any) of historical exposure to taconite dust as a factor in mesothelioma occurrence and to describe, within data privacy limitations, the miners that have developed mesothelioma. (MN Dept. of Health)
2009	Mortality and Cancer Incidence Studies of Workers in the Minnesota Taconite Industry	Ongoing: A cohort of taconite workers is being linked to MCSS to investigate whether 1) taconite industry workers have an increased risk of mesothelioma specifically associated with exposure to mineral fibers in the dust from mining and processing taconite, and 2) the incidence of other cancers is associated with exposure to dust from the taconite industry. (U of MN)
2009	Cancer Incidence in 3M Chemical Workers	Ongoing: MCSS will link its database with a list of fluorochemical-exposed workers (approximately 7,500) to identify any increased cancer risks. (U of MN)
2009	Cancer Epidemiology in Adventists, a low risk group	Ongoing: MCSS oversees a linkage between its database and a list of Adventists who had consented to participate in the study, to identify incident cancers among cohort members and investigate cancer risk associated with dietary and other lifestyle factors. (Loma Linda University)
2010	Predictors of Myelodysplastic Syndrome (MDS) in Minnesota	Ongoing: This study uses rapid ascertainment to identify adult patients diagnosed with MDS between April 2010 and October 2014. This case-control study will look at both genetic and environmental predictors for MDS. It is the first population-based study looking for etiologic risk factors of MDS.
2010	Forteo Patient Registry	Ongoing: MCSS has linked its database annually with a registry of patients taking the osteoporosis drug Forteo, a biosynthetic human parathyroid hormone used to treat osteoporosis, to estimate the incidence of osteosarcoma in patients who have been treated with Forteo. (RTI Health Solutions, for Eli Lilly)

Year*	Nature of Study	Status (Institution)
2011	Adenoma Detection Rates and Missed Cancers	In process: This study has linked 60,000 records with MCSS to determine patient, procedure and physician related risk factors for colorectal cancer subsequent to colonoscopies in average risk patients. (VA Medical Center and University of Minnesota).
2010 and 2011	American Cancer Society CPS-II and Nutrition Survey	Ongoing: Linkage with more than 500 Minnesotans who completed nutritional surveys to verify and update their cancer status. (American Cancer Society - National Home Office)
2012	Medullary Thyroid Carcinoma Surveillance Study: Case-Series Registry	In process: The application has been approved and the contract-signature process has been initiated. This study is an FDA post-marketing requirement. This trial will systematically monitor the annual incidence of Medullary Thyroid Carcinoma (MTC) in the United States to identify any possible incidence increase related to the introduction of Liraglutide, a treatment for type 2 diabetes, into the United States market. It will also establish a registry of incident cases of MTC in adults in the United States in order to characterize their medical histories and possible risk factors, including history of treatment with Liraglutide.
2012	Continued Follow-Up of PLCO Participants	In process: The Data Use Application has been approved and contract-writing is in process. This study is a continued follow-up of the cohort of men and women who enrolled in the Prostate Lung Colorectal and Ovarian (PLCO) Cancer Screening Trial initiated by the NCI in 1993. The purpose of the study is to determine whether screening reduces the disease specific mortality rate for prostate, lung, colorectal, and ovarian cancers.
2012	Assisted Reproductive Technology (ART) and the Risk of Childhood Cancer	In process: The Data Use Application has been approved and contract-writing is in process. This study is a multi-state study that will link women who have received ART with records of MN women who have given birth. The linked birth records will then be linked with MCSS to determine cancer incidence among children born as a result of ART. Control births will also be chosen. This will test the null hypothesis that use of ART has no childhood cancer effect on the offspring.

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Chapter II: Overview

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Chapter II: Overview

Cancer surveillance plays an important role in the protection and improvement of public health. The data presented in this report enable the Minnesota Department of Health to identify health concerns, to target and evaluate goals for cancer control, and to inform the public and medical professionals about cancer risks.

This chapter provides an overview of the status of cancer in Minnesota, using cases reported to the Minnesota Cancer Surveillance System (MCSS) and deaths reported to the Minnesota Center for Health Statistics (MCHS). The first section highlights the relative importance of various cancers by gender and age. Following this is a section that provides an assessment of the cancer burden in Minnesota by race and ethnicity. Changes in cancer incidence and mortality rates over the 22-year period 1988-2009 are summarized in the third section, and next section presents estimates of Minnesota cancer prevalence. Geographic variation in cancer occurrence in Minnesota is discussed in the final section of this chapter.

Cancer is not a single disease, and does not have a single cause or a single cure. Table II-1 presents the number of new cancer cases and deaths for the most common cancers in Minnesota in 2009, the most recent year for which cancer reporting was considered complete at the time this report was prepared. Data are presented for males, females, and both genders combined, and are accompanied by the annual age-adjusted rates.

In 2009, 26,281 potentially serious cancers (13,668 in males and 12,613 in females) were diagnosed in Minnesotans. These figures do not include common skin cancers or *in situ* (pre-invasive) cancers for sites other than the urinary bladder. The actual number of persons diagnosed with cancer in 2009 was about 2.4 percent lower than the number of cancers diagnosed because some individuals were diagnosed with more than one cancer in 2009. The overall annual age-adjusted incidence rate in Minnesota in 2009 was 467.0 new cases per 100,000 persons per year

(529.4 and 423.7 for males and females, respectively).

During 2009, 9,570 Minnesotans (4,979 males and 4,591 females) died with cancer as the underlying cause of death on the death certificate. The age-adjusted mortality rate was 169.1 deaths per 100,000 persons per year (206.6 and 144.2 for males and females, respectively). In 2000, cancer became the leading cause of death in Minnesota, surpassing heart disease. Cancer now causes one in every four (25.3%) deaths in Minnesota, while heart disease causes one in five (19.1%). In 2009, 2,345 (32%) more Minnesotans died from cancer than from heart disease.

Table II-2 presents cancer data in more detailed categories. Because some of the cancers are quite rare, data are aggregated over the five-year period 2005-2009. The more than 65 types of cancer listed in Table II-2 vary considerably in their risk factors, in frequency and prognosis, and in the age group and gender most likely to be affected.

Cancer Incidence and Mortality in Minnesota by Gender and Age

The risk of being diagnosed with and dying from cancer varies by both gender and age. In general, males are at greater risk of developing and of dying from cancer than females. Over the five-year period 2005-2009, the overall cancer incidence rate was 33 percent higher among males than females, and the overall cancer mortality rate was 42 percent higher. However, men were four times more likely than women to be diagnosed with Kaposi sarcoma, mesothelioma, and cancers of the esophagus, larynx and urinary bladder, and mortality was similarly elevated among males for these sites. The higher risk among men for some sites may be directly attributable to historically higher smoking rates among men and to occupational exposures. For many cancers, the reason for higher rates among men is not known. Excluding the sex-specific cancers, women are at greater risk than men for only three cancers: breast, gall bladder and thyroid.

Overview

Despite these differences in risk, the most common cancers diagnosed among men and women in Minnesota are similar (Figures II-1 and II-2). During 2005-2009, prostate cancer was the most commonly diagnosed cancer among men, and breast cancer was the most commonly diagnosed among women. Each of these cancers accounted for approximately one third of cancers diagnosed among each gender. Lung and bronchus cancer was the second most commonly diagnosed cancer among both men and women and accounted for about 12 percent of diagnoses for each gender. Cancer of the colon and rectum was the third most commonly diagnosed cancer for each gender and accounted for about 10 percent of diagnoses.

The fourth most commonly diagnosed cancer in Minnesota was urinary bladder cancer for men and uterine cancer for women. Urinary bladder cancer accounted for about seven percent of cancers diagnosed among males and uterine cancer accounted for about seven percent of the cancers among females. Melanoma of the skin was the fifth most commonly diagnosed cancer for each gender, accounting for five percent of cancers. Non-Hodgkin lymphoma was the sixth most common cancer for each gender, accounting for less than five percent of cancers diagnosed among Minnesotans. Because of rapid increases in the incidence of melanoma of the skin, it became more common than non-Hodgkin lymphoma for the first time in Minnesota in 2006. Aggregating incidence over the five-year period 2005-2009, 15 percent more cases of melanoma of the skin were diagnosed than non-Hodgkin lymphoma.

Although prostate cancer and breast cancer were diagnosed much more frequently, lung and bronchus cancer was the leading cause of cancer mortality for each gender, accounting for 25 percent of cancer deaths in the state. In 2009, lung cancer killed almost as many Minnesotans (2,425 deaths) as the next four leading causes of cancer mortality combined: colorectal (846), breast (679), pancreas (592), and prostate (546).

In general, cancer is a disease of the elderly. Tables II-2 through II-5 show the age-specific incidence and mortality rates by detailed cancer site and gender for the five-year period 2005-2009

in Minnesota. The overall cancer incidence rate increased by more than 100 fold with age, and the overall cancer mortality rate increased by more than 675 fold among women, and by 1,350 fold among males.

The relationship between cancer risk and age varies with the type of cancer (Figure II-3). While less than ten percent of prostate, lung, and colorectal cancers were diagnosed among persons under the age of 50 years, more than 20 percent of breast cancers, 30 percent of melanomas, 40 percent of brain cancers, 50 percent of cervical cancers, 60 percent of Hodgkin lymphomas, and 75 percent of acute lymphocytic leukemias were diagnosed among persons less than 50 years of age.

Race and Ethnic Disparities in Cancer in Minnesota

It is clear from national data that race and ethnic differences exist in the risk of developing and dying from cancer, and data from Minnesota are consistent with that picture. However, assessing race and ethnic disparities in the burden of cancer in Minnesota is limited by the relatively small size of populations of color in our state, incomplete or inaccurate reporting of race and ethnicity on the medical record and death certificate, and differences in the way race and ethnicity are defined and collected for cases and deaths (the numerator for rates) and population estimates (the denominator for rates). These difficulties are not unique to Minnesota and are well recognized in cancer registration.

As discussed in Chapter I, several steps to improve the classification of race and ethnicity in the MCSS have been undertaken, and cancer incidence and mortality are reported for five major race and ethnic groups in Minnesota: American Indian/Alaska Native, Asian/Pacific Islander, black/African American including African-born, non-Hispanic white, and Hispanic (all races). In addition, cancer rates for American Indians are presented for two geographic areas: statewide, and for residents of the Contract Health Service Delivery Area (CHSDA). The Indian Health Service has designated 29 Minnesota counties as part of CHSDA (Appendix C).

Over the five-year period 2005-2009, these counties are estimated to have included about 50 percent of the American Indian population in the state.

Despite improvements in race classification, it is likely that an unknown degree of misclassification and inconsistency between numerators and denominators still exists. For small populations, this may result in substantial error; therefore race and ethnic differences in cancer rates should be interpreted cautiously.

Persons of unknown or “other” race who were not Hispanic were not assigned to a specific race group, but were included in data for all races combined. The category “Hispanic” used in this report combined data for the entire Hispanic population in Minnesota, regardless of race. This was done because a substantial proportion of Hispanics were not identified by race on the medical record and frequently reported themselves as “other” race on the census. Although the category “non-Hispanic white” excludes Hispanics reported as white race, Hispanics were not excluded from the other race groups. Therefore, Hispanics are not mutually exclusive from race and ethnic categories other than “non-Hispanic white”. In some instances, the sum of counts by race and ethnicity could therefore exceed the total number of cases or deaths.

It should also be noted that cancer mortality data presented here differs somewhat from cancer mortality data reported by the MCHS. For data presented here, race and ethnicity reported on the death certificate was supplemented with information from the Indian Health Service to better identify cancer deaths among American Indians. This process increased the overall cancer mortality rate among American Indians by approximately 14 percent, and decreased rates among other race and ethnic groups (primarily non-Hispanic whites) by a small percent. To our knowledge, MCHS has not similarly updated race classification on electronic death certificate files.

This section provides an overview of race and ethnic differences in the occurrence of cancer in Minnesota. To simplify the presentation, the rates

referred to below are for both sexes combined, found in Table II-8. Race- and sex-specific counts and rates are found in Table II-8 and in Chapter III.

American Indian/Alaska Native

During 2005-2009, the overall cancer incidence and mortality rates for American Indians living in CHSDA counties were about 15 percent higher than for American Indians statewide, although the magnitude differed from site to site. The rates for American Indians living in the CHSDA counties may better reflect the cancer experience of American Indians in Minnesota, but they are based on fewer cases, and therefore can be more affected by random variation. If not otherwise stated, the text below discusses cancer data for American Indians living in the CHSDA counties. Comparable data for American Indians statewide can be found in the referenced tables and figures.

During the five-year period 2005-2009, an average of 224 American Indians in Minnesota were diagnosed with cancer each year, and on average, 138 were residents of CHSDA counties (Table III-1.4). During the same period, an average of 91 American Indians statewide died of cancer annually, and on average, 58 were residents of CHSDA counties (Table III-1.4). American Indians had the highest overall cancer incidence and mortality rates compared to other race/ethnic groups in the state (Table II-8 and Figure II-4). American Indians in CHSDA counties were 33 percent more likely to be diagnosed with cancer than non-Hispanic whites and 78 percent more likely to die of cancer.

During 2005-2009, the overall cancer incidence rate among American Indians was nearly two times higher in Minnesota than in the SEER 18 areas (Figures II-4 and II-5), where the majority of the American Indian population resides in Alaska, California, New Mexico or Seattle. From the limited data available, it appears that this elevated cancer risk is found among American Indians in the northern plains, and is not limited to Minnesota. The overall cancer mortality rate among American Indians was also two times higher in Minnesota than in the U.S. as a whole. In the SEER Program, American Indian/Alaska

Native populations had among the lowest overall cancer incidence rates compared to other race and ethnic groups, while in Minnesota they had the highest. In contrast, overall cancer incidence and mortality rates among other race and ethnic groups in Minnesota were similar to or lower than comparable race-specific rates reported by SEER.

The majority of the excess in cancer incidence in Minnesota among American Indians compared to non-Hispanic whites was due to lung cancer. The lung cancer incidence rate was more than twice as high among American Indians as among non-Hispanic whites, and the lung cancer mortality rate was similarly elevated (Table II-8). Colorectal cancer, another smoking-related cancer, also contributed significantly to the excess burden of cancer in the American Indian population in Minnesota. American Indians had the highest incidence and mortality rates for this cancer in the state (Table II-8). Rates compared to non-Hispanic whites were significantly elevated for other smoking-related cancers as well: cervix (four times higher), larynx (almost four times higher), kidney (almost three times higher), stomach (2.5 times higher) and oral (almost two times higher). American Indian women had the highest cervical cancer incidence rate in the state.

Asian/Pacific Islander

During the five-year period 2005-2009, an average of 266 Asian/Pacific Islanders in Minnesota were diagnosed with cancer each year and 104 died of cancer annually (Table III-1.4). After adjusting for population size and age distribution, Asian/Pacific Islanders had the lowest overall cancer incidence rate and the second lowest overall cancer mortality rate compared to other race and ethnic groups in the state (Table II-8 and Figure II-4). Asian/Pacific Islanders were 45 percent less likely to be diagnosed with cancer than non-Hispanic whites and 28 percent less likely to die of cancer.

The overall cancer incidence rate among Asian/Pacific Islanders over this period was 17 percent lower in Minnesota than in the SEER Program, while mortality was 12 percent higher than in the U.S. as a whole (Figures II-4 and II-5).

Asian/Pacific Islanders in Minnesota and nationally consistently have a considerably lower risk than non-Hispanic whites of being diagnosed with many common cancers, such as prostate, female breast, lung, and kidney cancers and non-Hodgkin lymphoma. However, they have among the highest rates of liver and stomach cancers. Asian/Pacific Islanders in Minnesota were about four times more likely than non-Hispanic whites to be diagnosed with liver cancer and nearly three times more likely to be diagnosed with stomach cancer (Table II-8). Mortality rates for these sites were similarly elevated. Asian/Pacific Islander women in Minnesota had one of the highest incidence rates of cervical cancer, more than twice as high as the rate among non-Hispanic white women. Cervical cancer rates were also elevated among black, American Indian, and Hispanic women.

Black/African American

During the five-year period 2005-2009, an average of 577 blacks in Minnesota were diagnosed with cancer each year and 218 died of cancer annually (Table III-1.4). After adjusting for population size and age distribution, blacks had the second highest overall cancer incidence and mortality rates compared to other race and ethnic groups in the state (Table II-8 and Figure II-4), second only to American Indians. Blacks were six percent more likely to be diagnosed with cancer than non-Hispanic whites but 37 percent more likely to die of cancer.

Cancer incidence and mortality rates among blacks in Minnesota over this period were very similar to those in the SEER Program and the U.S. (Figures II-4 and II-5).

Nationally, blacks consistently have the highest incidence rate of many types of cancer compared to other race and ethnic groups. Over this five-year period in Minnesota, blacks only had the highest rate for a limited number of sites, primarily because of even higher rates among American Indians (Table II-8). Black males had the highest prostate cancer rates in Minnesota; incidence was 19 percent higher than among non-Hispanic whites, while mortality was 88 percent higher. Blacks also had the highest incidence rate

in the state for liver cancer (nearly six times higher than among non-Hispanic whites), pancreas cancer (two times higher than among non-Hispanic whites), and myeloma (two times higher than among non-Hispanic whites). Mortality rates for these sites were similarly elevated. The breast cancer incidence rate among black women was 15 percent lower than among non-Hispanic white women, but they had the highest breast cancer mortality rate in the state, 29 percent higher than among non-Hispanic white women.

Non-Hispanic White

During the five-year period 2005-2009, an average of 23,861 non-Hispanic white Minnesotans were diagnosed with cancer each year and 8,724 died of cancer annually (Table III-1.4). After adjusting for population size and age distribution, cancer rates among non-Hispanic whites were intermediate between American Indians and blacks, who had significantly higher overall cancer incidence and mortality rates, and Asian/Pacific Islanders and Hispanics, who had significantly lower overall cancer incidence and mortality rates (Table II-8 and Figure II-4).

Over the five-year period 2005-2009, the overall cancer incidence and mortality rates among non-Hispanic whites were four and seven percent lower, respectively, in Minnesota than nationally (Figures II-4 and II-5).

Compared to other race and ethnic groups in Minnesota, non-Hispanic whites had the highest incidence of female breast, thyroid and urinary bladder cancers, non-Hodgkin lymphoma, and melanoma of the skin. They also appeared to have the highest incidence of testis cancer, Hodgkin lymphoma and mesothelioma, but most populations of color did not have sufficient cases to calculate incidence rates for these sites. Non-Hispanic whites had the lowest incidence and mortality rates for cervix, liver, and stomach cancer.

Hispanic (all races)

During the five-year period 2005-2009, an average of 253 Hispanics in Minnesota were

diagnosed with cancer each year and 59 died of cancer annually (Table III-1.4). After adjusting for population size and age distribution, Hispanics had the second lowest overall cancer incidence rate compared to other race and ethnic groups in the state, and the lowest overall cancer mortality rate (Table II-8 and Figure II-4). Hispanics were 34 percent less likely to be diagnosed with cancer and 46 percent less likely to die of cancer than non-Hispanic whites.

The overall cancer incidence and mortality rates among Hispanics in Minnesota were similar to those reported nationally (Figures II-4 and II-5).

Hispanics in Minnesota had a significantly lower risk than non-Hispanic whites of being diagnosed with colorectal, prostate and female breast cancers, which are among the most common cancers diagnosed, as well as leukemia, lung, oral, ovary, testis and bladder cancers (Table II-8). However, similar to Asian/Pacific Islanders, Hispanic Minnesotans had significantly elevated rates for liver and stomach cancers, for which survival tends to be poor. Hispanics in Minnesota were two times more likely than non-Hispanic whites to be diagnosed with liver or stomach cancers, and mortality was similarly elevated. In addition, Hispanic women in Minnesota had a significantly elevated incidence of cervical cancer; the rate was nearly two times higher than among non-Hispanic white women.

Conclusions

Many of the same race and ethnic disparities in cancer that occur nationally exist in Minnesota. The most notable exception is that American Indians have the lowest cancer rates nationally, but the highest cancer rates in Minnesota. Much remains to be learned about what causes these differences in cancer incidence and mortality. It is likely that a combination of behavioral, cultural, socioeconomic, and genetic differences are involved, but the relative importance of each factor is controversial and is likely to vary by cancer site. For some cancers, research has shown that disparities are eliminated when access to quality care is equal.

Despite the marked disparities in the occurrence

of cancer discussed above, many similarities exist. From 2005 to 2009, cancer was the leading cause of death for each major race and ethnic group in Minnesota. Breast cancer was the most commonly diagnosed cancer among women except among American Indian women in CHSDA counties, for whom lung cancer was the most commonly diagnosed (Table II-7). Prostate cancer is the most commonly diagnosed cancer among men, regardless of race and ethnicity (Table II-7). Lung and colorectal cancers are among the top three cancers for each race and gender group except Hispanic women, for whom thyroid cancer ranks second, uterus cancer is third, colorectal is fourth and lung cancer fifth.

Eliminating disparities in health is a priority for MDH, and a number of interventions funded by the MDH Office of Minority and Multicultural Health (OMMH) are directed toward reducing disparities in the burden of cancer described above. More information on these projects can be found on the OMMH Web site (www.health.state.mn.us/ommh/). In addition, the statewide comprehensive cancer control plan, *Cancer Plan Minnesota*, has identified reducing disparities in cancer screening and treatment as a priority. More information on *Cancer Plan Minnesota*, activities related to priorities, and the Minnesota Cancer Alliance can be found on their Web site (www.mncanceralliance.org).

Cancer Trends in Minnesota

Background

Trends in cancer incidence and mortality in Minnesota from 1988 to 2009 were assessed using Joinpoint regression (Appendix E) on the annual age-adjusted rates. This statistical technique, developed by the National Cancer Institute, identifies the years, if any, in which trends significantly changed direction, and calculates the linear trend during the interval between changes in trend. The trend during the interval is expressed as the percent change in the age-adjusted rate per year and is called the average percent change (APC). To simplify comparisons between groups during recent periods, Joinpoint regression also provides an average trend for the most recent ten-year and five-year periods, referred to as the

average annual percent changes (AAPC). An AAPC can be thought of as a weighted average of the interval trends during the specified period. The AAPCs have fixed intervals, while the APCs vary based on identified changes in trends. Tables in Chapter III show the intervals, APCs, and AAPCs by gender for each site. This section provides an overview of changes in cancer rates in Minnesota.

Trends in overall cancer incidence and mortality rates

Beginning around 1990, the long-standing increases in overall cancer mortality were finally interrupted, both in Minnesota and nationwide, and the cancer mortality rate has continued to decline significantly among both men and women since then (Figure II-6). Measured by the AAPC (2000-2009), the overall cancer mortality rate in Minnesota decreased significantly by 1.4 percent per year among males and by 0.6 percent per year among females. Using the same methodology, declines in cancer mortality for the white population nationwide were very similar to those in Minnesota, a 1.6 percent decline per year among males and a 1.3 percent decline among females (Figure II-6). Although efforts to reduce incidence and improve survival have not been uniformly successful for all types of cancer, this continued and consistent reduction in overall cancer mortality is a major achievement.

Despite significant declines in mortality over the last twenty years, the overall cancer incidence rate continued to steadily increase until very recently. This is now beginning to change. Starting with data collected through the end of 2003, the SEER Program began reporting a slowing down or decline in the overall cancer incidence rate, although it was not always statistically significant or consistent over the next few years across geographic areas, genders, or race groups.

Among the white population in the SEER 9 areas, the overall delay-adjusted cancer incidence rate from 2000 to 2009 (AAPC) declined significantly by 0.8 percent per year among males, but did not significantly change among females (Figure II-7). Over the same period, the overall cancer incidence rate in Minnesota declined by 0.4 percent per year for males, but the decline was not statistically

significant; among females, overall incidence increased by 0.3 percent per year, but again, the change was not statistically significant. Even though MCSS uses the same methodology as SEER, changes in trends can be more difficult to identify in Minnesota because the population is smaller. Because of this, a trend in Minnesota may not be detected using statistical methods until several years after the trend is later identified to have begun. However, the discussion below points to some reasons why the overall cancer trends in Minnesota and nationwide are not the same.

Site-specific trends

Cancer trends vary considerably by cancer site, and in some cases, by gender for the same site. Unless otherwise specified, the discussion below is based on the AAPCs for the ten-year period 2000-2009 (Figures II-8 through II-11) and trends are similar for each gender. For selected sites, trends are displayed graphically (Figures II-12 through II-17).

For a limited number of cancers, both incidence and mortality rates declined significantly from 2000 to 2009 in Minnesota and have been declining fairly consistently since cancer registration was initiated in 1988: male lung, colorectal (Figure II-12), cervix, stomach, and ovary. The incidence of cancer of the larynx is significantly declining among males and mortality is decreasing as well, but the mortality trend is not statistically significant. No other cancers declined significantly in incidence during the period 2000-2009.

Incidence and mortality rates both increased significantly for liver cancer in each gender, lung cancer in females and esophagus cancer in males.

For the two most common cancers, female breast (Figure II-13) and prostate, incidence rates declined somewhat from 2000 to 2009, but not statistically significantly, while mortality rates continued long standing, substantial and statistically significant declines. Hodgkin lymphoma and cancers of the oral cavity and brain also showed stable incidence rates but significant declines in mortality during this period.

For a number of cancers, incidence rates increased significantly while mortality remained stable. This group includes three of the most rapidly increasing cancers, kidney and renal pelvis, thyroid, and melanoma of the skin (Figure II-14). Other cancers that increased significantly over this period with stable mortality rates include pancreas cancer for each gender, breast and bladder cancers and leukemia and non-Hodgkin lymphoma in males, and cancers of the uterus, esophagus, soft tissues and myeloma in females. Two cancers showed statistically significant increases in incidence while mortality was significantly decreasing: testis cancer in males and non-Hodgkin lymphoma in females (Figure II-15).

Among the cancers presented in Chapter III, no significant trends were found in either incidence or mortality for childhood cancers (all sites combined), for myeloma and soft tissue cancer among males, and larynx and bladder cancers among females.

In general, site-specific trends in Minnesota are very similar to national trends. One exception to this is female lung cancer. In Minnesota, the rate of increase in female lung cancer mortality slowed down in 1995, but is still increasing significantly. In contrast, the female lung cancer mortality rate among the white population in the U.S. has been significantly declining since about 2003 (Figure II-16). The rate of decline in lung cancer mortality among males in Minnesota has been somewhat slower than among white males in the SEER 9 areas, but the rate of decline recently became more rapid in both geographic areas. These differences may exist because lung cancer rates in Minnesota have been, and continue to be, considerably lower than nationally (Figure II-16). Because smoking prevalence was historically lower in Minnesota than in the U.S. as a whole, it is more difficult to achieve the same proportional reduction in smoking as in the rest of the U.S. and hence, in the occurrence of cancers caused by smoking.

Changes in the burden of cancer

While assessing trends in age-adjusted cancer rates provides an important measure of changes in the risk of developing or dying from cancer, the

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number of individuals affected by cancer is important for addressing many health-related policy issues, such as planning for demands on health care services. These two measures do not always match, because the number of individuals diagnosed with or dying from cancer is affected by the growth and aging of the population, while the age-adjusted rate is not.

For example, the overall cancer incidence rate in Minnesota for both genders combined increased by five percent over the 22-year period, from 1988 (445.5 new cases per 100,000 persons per year) to 2009 (467.0). Over the same period, the number of Minnesotans diagnosed with a new cancer each year increased from 18,014 in 1988 to 26,281 in 2009, a 46 percent increase (Figure II-18). The overall age-adjusted cancer mortality rate decreased by 15 percent (from 199.5 in 1988 to 169.1 in 2009), but the number of Minnesotans dying from cancer each year still increased by 18 percent (from 8,100 in 1988 to 9,570 in 2009)(Figure II-19).

Minnesota Cancer Prevalence

Cancer prevalence is the number of persons alive in a population on a specified date who were previously diagnosed with cancer. Because individuals continue to require services, support, and care beyond the year in which they were diagnosed, it is an important measure of the burden of cancer in society. The SEER Program estimates that 12.6 million Americans, or 4.1 percent of the U.S. population, were living with a history of cancer on January 1, 2009.

Cancer prevalence estimates typically exclude people diagnosed with common skin cancers or *in situ* disease. Prevalent cancers include both newly diagnosed cases and individuals who have survived, whether they are considered cancer-free or are still undergoing treatment. It is affected by present and past cancer incidence, cancer survival rates, and death from other causes. Because these factors vary by age, race/ethnicity, and gender, prevalence is also affected by the demographic characteristics of the population.

Prevalence can count persons ever diagnosed with cancer and still alive (complete prevalence), or

those who were diagnosed during a specified time period such as the previous five, ten, or twenty-five years (limited duration prevalence). Prevalence percents are calculated by dividing the number of prevalent cases by the total number of people in the population at the given point in time. People can be diagnosed with and survive more than one cancer. The prevalence counts presented here count a person only once, for the first cancer he or she was diagnosed with, ignoring any cancer(s) that might have developed after the first diagnosis.

Because people with a history of cancer can live a normal lifespan, few cancer registries have registered cancer patients for a sufficient length of time to directly measure complete prevalence. In the U.S., the Connecticut cancer registry has registered cancer patients since 1940, and is the source used to estimate complete prevalence in other geographic areas. The SEER Program has registered cancer patients in nine geographic regions covering about ten percent of the U.S. population since 1975, and has nearly complete (95%) follow-up on the vital status of patients. Prevalence percents from the SEER regions can be used to estimate limited duration cancer prevalence in geographic areas such as Minnesota where cancer registries have operated for a shorter period of time or where follow-up is incomplete.

Methods

MCSS cannot directly calculate prevalence for Minnesota because MCSS has only registered cancers in Minnesota since 1988 and does not have complete follow-up information on the vital status of the individual. However, prevalence percents based on cancer registration in the SEER Program are available from SEER as part of the SEER*Stat limited duration prevalence module, and are the basis for estimating complete and five-year prevalence for Minnesota.

The age-, sex- and site-specific cancer prevalence percents (5-year and 34-year) for the white population in the nine regions participating in the SEER Program since 1975 were calculated in SEER*Stat v. 7.1.0 for all sites combined and the most common cancers. Using the program ProjPrev v. 1.0.2 available from SEER, 34-year

prevalence counts for Minnesota were calculated by multiplying SEER prevalence percents by the corresponding age- and sex-specific population estimates for Minnesota on January 1, 2009, obtained by averaging estimates for the mid-year of 2008 and 2009 obtained from SEER.

To adjust for generally lower cancer rates in Minnesota, the resulting numbers were multiplied by age-, sex- and site-specific rate ratios for cancer incidence in Minnesota and in the SEER 9 Region white population during 2005-2009. Age-specific estimates were summed for site and sex totals and rounded to the nearest ten persons. The prevalence estimates for males and females were summed to estimate prevalence for both sexes combined. To calculate complete prevalence, 34-year prevalence estimates were adjusted by completeness indexes generated in the program ComPrev version 2.0 developed by the National Cancer Institute.

Limitations

The prevalence data presented here are estimates, not actual counts of Minnesotans living with cancer. Adjusting the prevalence percents for the white population in the nine SEER regions by known differences in cancer incidence between Minnesota and SEER lowered cancer prevalence estimates for Minnesota. This is appropriate given that overall cancer incidence has historically been lower in Minnesota than in the geographic areas participating in the SEER program.

However, other factors affecting cancer prevalence could not be adjusted for. If Minnesotans have higher cancer survival rates than the SEER 9 Region white population, our prevalence estimates will be too low. MCSS is not yet able to calculate cancer survival rates for Minnesotans because of incomplete follow-up information. However, given the recognized high quality of health care in Minnesota, higher survival rates in Minnesota may occur. Similarly, Minnesotans have a higher life expectancy than many other states, due in part to having one of the lowest heart disease mortality rates in the nation. Since Minnesotans live longer and therefore have more “opportunity” to develop cancer, these prevalence estimates may be too low. It is

therefore likely that the prevalence estimates presented here represent the lower limits of actual prevalence.

Results

On January 1, 2009, an estimated 217,170 Minnesotans were living with a history of cancer (Table II-9), or 4.2 percent of the Minnesota population. An estimated 74,810 of these survivors had been diagnosed in the previous five years (Table II-10), or 1.4 percent of Minnesotans. By comparison, a total of 26,281 Minnesotans were diagnosed with cancer in 2009.

The proportion of Minnesotans who were ever diagnosed with cancer and alive on January 1, 2009 increases with age (Figure II-20). Among persons less than 50 years of age, the proportion is well below the average of 4.1 percent. Among Minnesotans 80-84 years old, nearly one out of four (23.4%) have been diagnosed with cancer at some time during their lives.

Among female cancer survivors in Minnesota, two out of five (42% or 47,590 women) have a history of breast cancer; among male cancer survivors, more than two out of five (46% or 47,350 men) have a history of prostate cancer. These large numbers reflect the facts that breast and prostate cancer account for about a third of all cancers diagnosed among men and women, and that survival is very high. Lung cancer, on the other hand, accounts for 12 percent of cancers diagnosed but only three percent of cancer survivors because survival is poor.

Conclusions

The number of Minnesotans diagnosed with cancer in a given year is only a fraction of those who are living with a history of cancer. It is hoped that these estimates will be useful for those involved in planning and policy related to cancer control.

Geographic Variation in the Occurrence of Cancer in Minnesota

To evaluate geographic variation in the occurrence of cancer in Minnesota, the state was

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divided into eight regions. The counties included in each region are shown in Appendix C, Table 1. Regions are used rather than counties because most counties have populations which are too small to produce rates stable enough to make meaningful comparisons. In addition, regions may better reflect economic, topographical and occasionally cultural differences in the state than do individual counties. Chapter IV provides cancer incidence data for Minnesota counties.

The regional names given in Appendix C, Table 1 are abbreviated in the text and graphs as follows:

Metro	Metropolitan Minnesota
SE	Southeastern Minnesota
SC	South Central Minnesota
SW	Southwestern Minnesota
Central	Central Minnesota
WC	West Central Minnesota
NW	Northwestern Minnesota
NE	Northeastern Minnesota

Geographic variation was assessed for all cancers combined and for the five most commonly diagnosed cancers (lung and bronchus, colon and rectum, female breast, prostate and melanoma of the skin). Mesothelioma was also included in this discussion because of long-standing concerns related to the geographic distribution of this cancer in Minnesota. Data were aggregated over the five-year period 2005-2009 and age-adjusted. Comparisons were made using rates for non-Hispanic whites, who constitute about 87 percent of the Minnesota population and about 94 percent of the cancer cases reported to the MCSS. As discussed in previous sections, cancer rates vary considerably by race and ethnicity and by age. Comparing regional variation in cancer incidence among non-Hispanic whites and age-adjusting the rates minimizes race and age as factors in observed differences. Regional rates were compared to the statewide rate and tested for statistical significance.

MCSS only records microscopically confirmed cancers. Therefore, regional variations in medical practices pertaining to the likelihood of obtaining tissue from suspected cancer cases may produce differences in cancer rates from region to region for some cancers.

The overall cancer incidence rate among non-Hispanic white Minnesotans was remarkably similar across regions (Figure II-21). No regional rate was more than one percent higher than the statewide rate and none was significantly higher than the statewide rate. Only one region (WC) was significantly lower than the statewide rate. The region with the highest rate was only six percent higher than the region with the lowest. For perspective, the variation in overall cancer incidence among whites from the participating registries in the SEER Program (states, counties or cities nationwide) during the same time period was 26 percent. Internationally, rates differ by as much as a factor of eight. Even within Minnesota, race-specific rates vary by more than two-fold (Figure II-4). Although specific cancers show more variation, the modest variation in the overall age-adjusted cancer incidence rate among non-Hispanic whites in Minnesota regions is consistent with a relatively high degree of homogeneity in cancer risk factors.

Melanoma of the skin is one of the cancers for which there is considerable regional variation (Figure II-22). Among the non-Hispanic white population, the highest rate, in the SE region, was 75% higher than the lowest rate, in the NW region, and both were significantly different from the state average. It is estimated that 86 percent of melanomas are caused by exposure to ultraviolet radiation from the sun and other sources, such as tanning beds. Although it is likely that regional variation in sun exposure contributes to the observed differences, it is also possible that the percentage of cases that are reported to and/or identified by MCSS varies regionally. It is well established that melanoma is underreported to cancer registries, in part because most patients are not seen in hospitals and tissue examination may be performed in the clinic rather than sent to an outside laboratory.

Lung cancer, which primarily reflects the smoking behaviors of the population two to three decades ago, showed relatively modest variation across regions for non-Hispanic white males; no region was significantly higher than the statewide rate, and the highest rate was only 18 percent higher than the lowest (Figure II-23). Among women, lung cancer incidence rates in Minnesota varied to

a larger degree (Figure II-24). Two regions were significantly higher than the statewide rate, and four regions were significantly lower; the highest rate was 40 percent higher than the lowest.

In three regions, the comparison to the sex-specific statewide rate for lung cancer was different for males and females: in the NW and SE regions the female rate was significantly lower than the statewide rate while the male rate was somewhat higher than the statewide rate, and in the Metro region, the female rate was significantly elevated while the male rate was not.

Colon and rectum cancer incidence rates among non-Hispanic whites varied by 23 percent from the highest to lowest among Minnesota regions (Figure II-25). The Metro region had the lowest colorectal cancer incidence rate and was significantly lower than the statewide rate. The SW and SC regions had significantly higher rates, 17 and nine percent higher than the state average, respectively. Colorectal cancer incidence and mortality have been declining since the 1980s both in Minnesota and nationally. Some of the decline may be due to screening, which can identify and remove polyps before they become cancerous. If colorectal cancer screening has been more common in residents of the Metro region than in the rest of the state, this would help to explain the observed differences between the Metro and non-Metro regions.

The invasive female breast cancer incidence rate among non-Hispanic white women showed smaller geographic differences within the state than female lung cancer, varying by 15 percent from the highest to lowest rate (Figure II-26). In contrast to colorectal cancer, the Metro region had the highest female breast cancer incidence rate; all other regions were at or below the state average. Mammography screening rates can affect incidence rates, although its effect tends to vary over time and by stage. In areas with higher rates of screening, some cases may be discovered that would not have been identified had the cancer been allowed to take its natural course. However, these data do not include *in situ* cancers, which may be more affected by screening intensity, and it is not known whether this has played any role in the differences of breast cancer rates among the

regions of Minnesota. Socioeconomic status is also correlated with breast cancer risk and may explain some portion of the higher rates in the Metro area. Nonetheless, the Metro area has considerable socioeconomic variations within it, and taking the Metro region as a whole ignores these internal differences.

Incidence rates for prostate cancer have varied considerably over time, and have been strongly influenced by the PSA screening test that was widely implemented starting in the late 1980s (Figure II-27). During 2005-2009, the prostate cancer incidence rate among non-Hispanic whites varied by 13 percent from the highest to the lowest among Minnesota regions (Figure II-28), about the same degree of variation as seen in female breast cancer. The incidence rate in the Metro area was significantly lower than the state average, while the rates in the Central and SW regions were significantly higher.

As mentioned before, it has been clearly demonstrated that prostate cancer incidence rates are influenced by the extent to which the PSA test is used to screen for prostate cancer, which can in turn be influenced by the medical practice “culture” in a geographic area. Recommendations for the use of the PSA test for routine testing have been controversial, and its popularity has varied over time. It is not known how this might be playing a role in regional differences in prostate cancer incidence in Minnesota.

A consistent regional pattern in cancer occurrence has been an elevated incidence of mesothelioma (cancer of the pleura, pericardium, and peritoneum) among males in the NE region. The only known cause of mesothelioma is exposure to asbestos. Latency periods for mesothelioma are typically 30 to 50 years. Between 2005 and 2009, the incidence rate for mesothelioma among non-Hispanic white men continued to be highest in NE Minnesota, where the rate was twice that of the state average (Figure II-29). However, the mesothelioma incidence rate among non-Hispanic white women in NE Minnesota was not elevated (Figure II-30). Elevated mesothelioma rates in NE Minnesota among men but not among women has been observed since the implementation of MCSS in 1988. This suggests an exposure unique to

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males, most likely occupational exposures. This has been and continues to be part of an ongoing study examining risk factors that may be causing this excess.

While differences in the various types of cancer noted in this report may or may not reflect real differences in etiologic factors by region, they should be interpreted with caution, keeping the facts below in mind:

1) Comparison of numerous types of cancers by region and by sex will, by chance alone, find a number of rates that are significantly different from the state average. In general, differences are more likely to be real when they are consistent over time, are evident for both sexes (when appropriate) and across similar regions, and when the increase is found for mortality (when appropriate) as well as incidence.

2) Differences may result from regional coding practices. Although MCSS, local cancer registrars and national organizations work hard to standardize coding practices, this is an ongoing and challenging effort given the many changes in coding practices over the years.

3) Small numbers produce greater variability and less reliability. However, even with small numbers regional differences can be informative for certain cancers with clearly delineated causes, such as mesothelioma and Kaposi sarcoma.

4) Some differences in cancer incidence may be the result of variations in regional medical

practices and screening rates (for example, prostate cancer).

5) Differences may occur if a geographic area has been growing rapidly and projected population counts are too low or not distributed accurately across age groups. This becomes more likely as the number of years between the national census and the projected estimates increases. This may be occurring in the counties north of the Twin Cities Metro and in the rapidly growing corridor between the Twin Cities and the St. Cloud area. These counties are part of the Central region, which had the highest overall cancer incidence rate.

In summary, the overall risk of developing cancer does not vary to a large degree among Minnesota regions. The cancers that show the most striking geographic variation in Minnesota (mesothelioma, melanoma, and female lung cancer) have well-known causes (asbestos, ultraviolet radiation and tobacco exposure, respectively). It is likely that the observed geographic variation in these cancers can be explained by geographic differences in exposure to these risk factors. Cancers of the colon and rectum, prostate, and female breast also vary significantly across regions of the state. Because the diagnosis of these cancers is affected by the extent to which the population is screened, it is likely that at least some of the variation is due to geographic variation in screening. The MCSS will continue to monitor regional variation in cancer rates as part of ongoing surveillance of cancer in Minnesota.

Table II-1: Number of new cases and deaths and age-adjusted incidence and mortality rates by cancer site and gender, all races combined, Minnesota, 2009

Cancer Site	Incidence						Mortality					
	New Cases 2009			Age-adjusted Rate§			Deaths 2009			Age-adjusted Rate§		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
All Sites Combined	13,668	12,613	26,281	529.4	423.7	467.0	4,979	4,591	9,570	206.6	144.2	169.1
Childhood (0-14)	95	79	174	17.7	15.3	16.5	16	12	28	3.0	2.4	2.7
Brain and Other Nervous System	221	148	369	8.3	5.2	6.7	142	106	248	5.4	3.6	4.4
Breast	29	3,925	3,954	1.1	131.5	69.5	4	684	688	0.2	21.3	11.8
Cervix Uteri	-	170	-	-	6.5	-	-	40	-	-	1.4	-
Colon and Rectum	1,162	1,176	2,338	45.8	38.0	41.5	404	408	812	16.6	12.1	14.1
Corpus and Uterus, NOS	-	828	-	-	27.0	-	-	129	-	-	4.1	-
Esophagus	230	72	302	9.0	2.3	5.3	207	54	261	8.4	1.6	4.6
Hodgkin Lymphoma	93	82	175	3.6	3.1	3.3	13	9	22	0.5	0.3	0.4
Kaposi Sarcoma	11	4	15	0.4	0.2	0.3	0	1	1	0.0	0.0	0.0
Kidney and Renal Pelvis	530	313	843	19.9	10.6	15.0	166	93	259	6.8	2.9	4.6
Larynx	159	24	183	5.9	0.8	3.2	34	8	42	1.4	0.2	0.8
Leukemia	485	308	793	19.9	10.1	14.4	255	184	439	10.9	5.7	7.9
Liver and Intrahepatic Bile Duct	215	86	301	7.8	2.8	5.2	182	84	266	6.9	2.6	4.6
Lung and Bronchus	1,636	1,491	3,127	65.9	50.2	56.5	1,243	1,155	2,398	50.9	37.9	43.2
Melanoma of the Skin	775	685	1,460	29.6	24.6	26.2	94	50	144	3.8	1.6	2.5
Mesothelioma†	36	12	48	1.6	0.4	0.9	51	19	70	2.2	0.6	1.3
Myeloma	183	150	333	7.3	4.9	6.0	126	85	211	5.3	2.6	3.8
Non-Hodgkin Lymphoma	697	578	1,275	27.6	18.9	22.9	241	172	413	10.4	5.1	7.4
Oral Cavity and Pharynx	472	231	703	17.6	7.7	12.3	83	31	114	3.3	0.9	2.0
Ovary‡	-	361	-	-	11.8	-	-	252	-	-	7.9	-
Pancreas	312	256	568	12.0	8.1	9.9	315	282	597	12.7	8.7	10.5
Prostate	4,182	-	-	156.3	-	-	537	-	-	24.3	-	-
Soft Tissues	92	74	166	3.5	2.6	3.0	55	38	93	2.2	1.3	1.7
Stomach	185	112	297	7.4	3.7	5.3	100	71	171	4.1	2.2	3.0
Testis	199	-	-	7.7	-	-	4	-	-	0.1	-	-
Thyroid	156	488	644	5.9	18.4	12.1	17	17	34	0.6	0.6	0.6
Urinary Bladder	943	316	1,259	39.0	10.2	22.7	173	71	244	7.4	2.0	4.2

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality) with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cases except those of the urinary bladder were excluded. Deaths include all deaths with the specified cancer as the underlying cause of death during the time period, regardless of the year of diagnosis.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

† Mesotheliomas of the pleura are included in the group Mesothelioma rather than Pleura.

‡ Cases with borderline malignancy or histologies 8442, 8451, 8462, 8472 and 8373 were excluded.

- Not applicable; sex-specific site.

Table II-2: Number of new cases and deaths and average annual incidence and mortality rates by cancer site and gender, all races combined, Minnesota, 2005-2009

Cancer Site	Incidence						Mortality					
	New Cases 2005-2009			Average Annual Rate§			Deaths 2005-2009			Average Annual Rate§		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
All Sites Combined	67,689	60,215	127,904	554.6	417.1	474.7	23,700	22,365	46,065	206.6	145.9	169.8
Oral Cavity and Pharynx	2,093	1,051	3,144	16.4	7.2	11.4	364	195	559	3.0	1.2	2.0
Lip	261	85	346	2.3	0.6	1.3	3	0	3	0.0	0.0	0.0
Tongue	543	298	841	4.1	2.0	3.0	83	51	134	0.7	0.3	0.5
Salivary Gland	175	164	339	1.5	1.2	1.3	40	28	68	0.4	0.2	0.3
Floor of Mouth	142	63	205	1.1	0.4	0.7	9	5	14	0.1	0.0	0.1
Gum and Other Mouth	243	240	483	2.0	1.6	1.8	42	52	94	0.4	0.3	0.3
Nasopharynx	84	35	119	0.7	0.3	0.5	40	13	53	0.3	0.1	0.2
Tonsil	421	103	524	3.0	0.7	1.8	47	18	65	0.4	0.1	0.2
Oropharynx	63	18	81	0.5	0.1	0.3	29	14	43	0.2	0.1	0.2
Hypopharynx	139	35	174	1.1	0.2	0.6	23	2	25	0.2	0.0	0.1
Other Oral Cavity and Pharynx	22	10	32	0.2	0.1	0.1	48	12	60	0.4	0.1	0.2
Digestive System	11,351	9,829	21,180	93.7	65.7	78.3	5,993	4,979	10,972	51.1	31.6	40.2
Esophagus	1,108	316	1,424	9.0	2.1	5.2	940	267	1,207	7.8	1.7	4.5
Stomach	866	525	1,391	7.3	3.5	5.2	475	303	778	4.1	2.0	2.9
Small Intestine	351	315	666	2.9	2.2	2.5	70	49	119	0.6	0.3	0.4
Colon and Rectum	6,159	6,041	12,200	51.2	40.1	45.1	2,069	2,057	4,126	18.0	12.7	15.0
Colon excluding Rectum	4,169	4,682	8,851	35.4	30.8	32.9	1,646	1,761	3,407	14.4	10.8	12.4
Rectum and Rectosigmoid Junction	1,990	1,359	3,349	15.8	9.3	12.3	423	296	719	3.6	1.9	2.6
Anus, Anal Canal and Anorectum	131	205	336	1.0	1.4	1.2	14	34	48	0.1	0.2	0.2
Liver and Intrahepatic Bile Duct	880	371	1,251	6.8	2.6	4.5	847	433	1,280	6.9	2.9	4.7
Liver	762	299	1,061	5.8	2.1	3.8	628	230	858	5.1	1.5	3.1
Intrahepatic Bile Duct	118	72	190	1.0	0.5	0.7	219	203	422	1.8	1.4	1.6
Gallbladder	87	231	318	0.8	1.6	1.2	61	150	211	0.6	1.0	0.8
Other Biliary	203	165	368	1.7	1.1	1.4	68	65	133	0.6	0.4	0.5
Pancreas	1,441	1,321	2,762	11.8	8.9	10.3	1,385	1,476	2,861	11.8	9.5	10.5
Retroperitoneum	51	53	104	0.4	0.4	0.4	4	8	12	0.0	0.1	0.0
Peritoneum, Omentum and Mesentery	13	242	255	0.1	1.7	1.0	9	92	101	0.1	0.6	0.4
Other Digestive Organs	61	44	105	0.5	0.3	0.4	51	45	96	0.5	0.3	0.4

(Continues on next page)

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality) with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cases except those of the urinary bladder were excluded. Deaths include all deaths with the specified cancer as the underlying cause of death during the time period, regardless of the year of diagnosis.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

Table II-2: Number of new cases and deaths and average annual incidence and mortality rates by cancer site and gender, all races combined, Minnesota, 2005-2009 (continued)

Cancer Site	Incidence						Mortality					
	New Cases 2005-2009			Average Annual Rate§			Deaths 2005-2009			Average Annual Rate§		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Respiratory System	8,781	7,408	16,189	73.6	51.8	61.1	6,629	5,566	12,195	57.1	37.8	45.8
Nose, Nasal Cavity and Middle Ear	90	82	172	0.7	0.6	0.6	24	25	49	0.2	0.2	0.2
Larynx	730	179	909	5.8	1.3	3.4	201	53	254	1.7	0.4	0.9
Lung and Bronchus	7,910	7,127	15,037	66.7	49.8	56.8	6,391	5,481	11,872	55.1	37.2	44.6
Pleura	5	2	7	0.0	0.0	0.0	4	1	5	0.0	0.0	0.0
Trachea, Mediastinum, and Other	46	18	64	0.4	0.1	0.3	9	6	15	0.1	0.0	0.1
Mesothelioma (all sites)†	234	75	309	2.1	0.5	1.2	217	69	286	2.0	0.4	1.1
Bones and Joints	172	118	290	1.4	0.9	1.1	72	67	139	0.6	0.5	0.5
Soft Tissue including Heart	451	407	858	3.6	2.9	3.2	198	170	368	1.7	1.1	1.4
Skin ††	3,723	3,148	6,871	30.3	22.9	25.6	529	297	826	4.5	1.9	3.0
Melanoma of the Skin	3,344	2,860	6,204	27.0	20.9	23.2	400	229	629	3.3	1.5	2.3
Other Non-Epithelial Skin	379	288	667	3.3	2.0	2.5	129	68	197	1.1	0.4	0.7
Kaposi Sarcoma (all sites)	52	10	62	0.4	0.1	0.2	2	3	5	0.0	0.0	0.0
Breast	162	18,515	18,677	1.4	128.5	68.3	27	3,258	3,285	0.2	21.3	11.9
Female Genital System	-	7,202	-	-	49.8	-	-	2,240	-	-	14.8	-
Cervix Uteri	-	810	-	-	6.1	-	-	210	-	-	1.5	-
Corpus and Uterus, NOS	-	4,028	-	-	27.5	-	-	625	-	-	4.1	-
Ovary ‡	-	1,773	-	-	12.3	-	-	1,243	-	-	8.2	-
Vagina	-	83	-	-	0.6	-	-	17	-	-	0.1	-
Vulva	-	382	-	-	2.5	-	-	94	-	-	0.6	-
Other Female Genital Organs	-	126	-	-	0.9	-	-	51	-	-	0.3	-
Male Genital System	23,283	-	-	187.4	-	-	2,602	-	-	24.7	-	-
Prostate	22,216	-	-	179.0	-	-	2,556	-	-	24.3	-	-
Testis	892	-	-	7.0	-	-	20	-	-	0.1	-	-
Penis	116	-	-	1.0	-	-	23	-	-	0.2	-	-
Other Male Genital Organs	59	-	-	0.5	-	-	3	-	-	0.0	-	-

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Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality) with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cases except those of the urinary bladder were excluded. Deaths include all deaths with the specified cancer as the underlying cause of death during the time period, regardless of the year of diagnosis.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

† Mesotheliomas of the pleura are included in the group Mesothelioma rather than Pleura.

†† Skin does not include squamous or basal cell skin cancers or Kaposi Sarcoma of the skin.

‡ Cases with borderline malignancy or histologies 8442, 8451, 8462, 8472 and 8373 were excluded.

- Not applicable; sex-specific site.

Table II-2: Number of new cases and deaths and average annual incidence and mortality rates by cancer site and gender, all races combined, Minnesota, 2005-2009 (continued)

Cancer Site	Incidence						Mortality					
	New Cases 2005-2009			Average Annual Rate§			Deaths 2005-2009			Average Annual Rate§		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Urinary System	7,413	3,104	10,517	62.5	21.2	39.2	1,578	784	2,362	13.9	4.9	8.7
Urinary Bladder	4,589	1,452	6,041	40.0	9.6	22.6	789	313	1,102	7.2	1.9	4.0
Kidney and Renal Pelvis	2,674	1,575	4,249	21.1	11.0	15.7	758	429	1,187	6.4	2.7	4.4
Ureter	95	59	154	0.8	0.4	0.6	15	20	35	0.1	0.1	0.1
Other Urinary Organs	55	18	73	0.5	0.1	0.3	16	22	38	0.2	0.1	0.1
Eye and Orbit	101	82	183	0.8	0.6	0.7	14	8	22	0.1	0.1	0.1
Brain and Other Nervous System	959	714	1,673	7.5	5.2	6.3	645	522	1,167	5.2	3.6	4.3
Brain	906	675	1,581	7.1	4.9	6.0	-	-	-	-	-	-
Other Nervous System	53	39	92	0.4	0.3	0.4	-	-	-	-	-	-
Endocrine System	834	2,190	3,024	6.5	16.6	11.5	103	126	229	0.8	0.8	0.9
Thyroid	747	2,117	2,864	5.8	16.1	10.9	64	83	147	0.5	0.5	0.5
Other Endocrine including Thymus	87	73	160	0.7	0.6	0.6	39	43	82	0.3	0.3	0.3
Lymphoma	3,683	3,013	6,696	30.4	20.8	25.0	1,137	886	2,023	10.1	5.6	7.5
Hodgkin Lymphoma	433	352	785	3.4	2.7	3.0	63	51	114	0.5	0.4	0.4
Non-Hodgkin Lymphoma	3,250	2,661	5,911	26.9	18.1	22.0	1,074	835	1,909	9.6	5.2	7.0
Myeloma	906	652	1,558	7.6	4.4	5.8	542	461	1,003	4.7	3.0	3.8
Leukemia	2,437	1,622	4,059	20.4	11.1	15.1	1,208	878	2,086	10.8	5.7	7.8
Lymphocytic Leukemia	1,423	850	2,273	11.8	5.8	8.5	422	259	681	3.8	1.6	2.5
Acute Lymphocytic Leukemia	188	170	358	1.5	1.3	1.4	71	47	118	0.6	0.4	0.5
Chronic Lymphocytic Leukemia	1,138	649	1,787	9.6	4.3	6.6	328	199	527	3.0	1.2	1.9
Other Lymphocytic Leukemia	97	31	128	0.8	0.2	0.5	23	13	36	0.2	0.1	0.1
Myeloid and Monocytic Leukemia	946	715	1,661	8.0	4.9	6.2	603	489	1,092	5.3	3.2	4.1
Acute Myeloid Leukemia	574	425	999	4.8	2.9	3.8	497	401	898	4.3	2.7	3.4
Acute Monocytic Leukemia	30	38	68	0.3	0.3	0.3	6	4	10	0.1	0.0	0.0
Chronic Myeloid Leukemia	322	233	555	2.7	1.6	2.1	45	43	88	0.4	0.3	0.3
Other Myeloid/Monocytic Leukemia	20	19	39	0.2	0.1	0.1	55	41	96	0.5	0.3	0.4
Other Leukemia	68	57	125	0.6	0.4	0.5	183	130	313	1.7	0.8	1.2
Miscellaneous	1,054	1,075	2,129	8.9	7.1	7.9	1,839	1,856	3,695	16.1	11.7	13.5

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality) with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cases except those of the urinary bladder were excluded. Deaths include all deaths with the specified cancer as the underlying cause of death during the time period, regardless of the year of diagnosis.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Mortality data are not available.

Table II-3: Age-specific rates§ of newly diagnosed cancers by cancer site, Minnesota, 2005-2009, all races combined, males

Cancer Site	Age at Diagnosis (Years)																	
	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+
All Sites Combined	22.8	13.7	15.0	24.0	35.4	52.1	71.4	97.8	149	279	559	989	1551	2298	2831	3131	3189	2899
Oral Cavity and Pharynx	0.0	0.2	0.1	0.2	0.8	1.4	2.3	5.0	8.6	19.3	28.6	39.5	44.5	54.4	58.8	66.4	83.7	70.7
Lip	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.5	1.0	1.4	1.8	1.5	4.8	7.0	10.9	12.8	18.6	23.8
Tongue	0.0	0.0	0.0	0.0	0.2	0.4	0.9	1.6	2.2	6.0	8.0	11.2	12.7	15.5	12.4	14.3	17.1	9.3
Salivary Gland	0.0	0.0	0.0	0.2	0.4	0.2	0.2	0.7	0.5	1.2	2.2	1.5	1.7	2.6	7.0	6.4	12.9	14.5
Floor of Mouth	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.5	1.3	2.6	2.4	2.9	5.8	3.3	4.5	4.1	3.3
Gum and Other Mouth	0.0	0.0	0.0	0.0	0.0	0.2	0.4	0.9	0.3	0.9	1.6	4.0	6.3	7.9	7.6	9.8	14.5	13.9
Nasopharynx	0.0	0.2	0.1	0.0	0.2	0.2	0.2	0.7	0.8	0.4	1.7	1.0	1.7	1.2	2.4	2.3	1.6	0.7
Tonsil	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.6	3.1	6.5	8.3	13.5	8.4	7.6	6.4	6.8	3.6	0.7
Oropharynx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.3	0.6	1.6	1.7	2.6	1.8	2.6	2.6	0.7
Hypopharynx	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	1.0	1.6	2.0	3.9	4.2	5.5	6.0	8.3	3.3
Other Oral Cavity and Pharynx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.1	0.6	0.3	0.2	1.5	1.1	0.5	0.7
Digestive System	1.1	0.2	0.7	0.4	2.0	3.1	5.5	16.9	30.8	57.0	111	165	230	329	444	529	627	650
Esophagus	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.5	2.4	6.5	11.7	16.7	27.6	34.5	41.8	51.4	55.3	49.6
Stomach	0.0	0.0	0.0	0.0	0.2	0.1	0.6	1.0	2.6	3.5	6.1	10.0	17.5	24.1	34.9	45.8	56.3	64.8
Small Intestine	0.0	0.0	0.1	0.0	0.0	0.2	0.2	0.8	1.1	2.5	3.9	4.3	6.9	11.4	12.7	18.8	13.4	15.9
Colon and Rectum	0.0	0.1	0.2	0.2	1.3	1.8	2.9	12.6	16.7	30.1	60.9	82.8	116	173	240	295	353	395
Colon excluding Rectum	0.0	0.1	0.2	0.2	1.0	1.2	1.6	8.0	8.9	15.5	31.7	50.2	72.3	119	174	222	267	327
Rectum and Rectosigmoid Junction	0.0	0.0	0.0	0.0	0.3	0.6	1.3	4.5	7.8	14.6	29.2	32.6	43.5	53.7	65.5	73.5	85.8	68.1
Anus, Anal Canal and Anorectum	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.9	1.8	1.6	2.5	2.4	3.9	2.7	4.5	1.6	6.6
Liver and Intrahepatic Bile Duct	0.8	0.0	0.3	0.2	0.2	0.4	0.6	0.6	2.0	5.3	12.8	22.2	19.2	21.1	26.1	29.6	34.1	30.4
Liver	0.8	0.0	0.3	0.2	0.2	0.3	0.6	0.3	1.7	4.9	11.5	20.2	17.8	17.6	20.0	26.3	26.4	22.5
Intrahepatic Bile Duct	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.2	0.3	0.5	1.3	2.0	1.4	3.5	6.1	3.4	7.8	7.9
Gallbladder	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.2	0.5	1.2	2.3	5.5	6.0	7.8	4.6
Other Biliary	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.7	0.8	1.4	1.8	3.8	6.5	9.7	10.9	12.9	13.9
Pancreas	0.0	0.0	0.0	0.0	0.2	0.2	0.4	0.8	4.2	5.4	11.2	21.7	34.4	49.3	65.2	61.1	83.7	64.1
Retroperitoneum	0.3	0.1	0.0	0.0	0.1	0.1	0.1	0.2	0.1	0.1	0.3	1.1	0.3	1.9	2.1	1.5	2.6	1.3
Peritoneum, Omentum and Mesentery	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.2	0.3	0.0	0.2	0.6	0.8	0.5	0.7
Other Digestive Organs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.4	0.9	1.0	1.2	3.3	3.8	6.2	2.6

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Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cases except those of the urinary bladder were excluded.

§ Rates are per 100,000 males.

Table II-3: Age-specific rates§ of newly diagnosed cancers by cancer site, Minnesota, 2005-2009, all races combined, males (continued)

Cancer Site	Age at Diagnosis (Years)																	
	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+
Respiratory System	0.4	0.1	0.3	0.4	1.0	1.2	1.8	2.7	11.6	27.5	59.7	108	204	313	426	525	502	375
Nose, Nasal Cavity and Middle Ear	0.0	0.0	0.1	0.0	0.2	0.0	0.0	0.1	0.4	0.6	0.6	2.2	1.2	2.3	3.0	4.5	3.6	4.6
Larynx	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	2.1	3.8	7.5	13.0	20.9	25.0	31.5	30.8	25.3	19.2
Lung and Bronchus	0.2	0.0	0.1	0.3	0.4	0.6	0.9	2.3	8.7	22.9	51.1	92.5	182	285	391	489	471	350
Pleura	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.4	0.5	0.7
Trachea, Mediastinum, and Other	0.2	0.1	0.1	0.1	0.2	0.7	0.9	0.2	0.5	0.2	0.4	0.3	0.2	0.5	1.2	0.4	1.6	0.0
Mesothelioma (all sites)†	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.5	0.1	1.0	5.1	8.6	10.3	19.9	20.2	17.2
Bones and Joints	0.0	1.0	1.0	2.5	1.9	0.7	0.5	0.8	1.1	1.1	0.7	0.9	2.1	3.2	1.5	4.1	5.2	4.0
Soft Tissue including Heart	2.0	0.9	1.1	2.1	1.4	1.7	1.2	2.2	2.7	2.7	4.1	6.2	3.8	9.3	13.6	12.0	16.5	16.5
Skin ††	0.3	0.1	0.3	1.3	3.0	5.5	11.3	14.6	18.2	27.6	35.5	52.8	72.3	90.1	115	138	173	192
Melanoma of the Skin	0.3	0.1	0.3	0.9	3.0	4.8	10.1	13.1	17.3	25.1	34.0	48.8	66.8	82.4	103	120	145	152
Other Non-Epithelial Skin	0.0	0.0	0.0	0.3	0.0	0.7	1.2	1.5	0.9	2.5	1.5	3.9	5.5	7.6	11.8	18.8	27.4	39.7
Kaposi Sarcoma (all sites)	0.0	0.0	0.0	0.0	0.1	0.3	0.6	1.0	0.4	1.0	0.4	0.9	0.3	0.2	0.0	0.4	2.1	0.7
Breast	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.2	0.5	0.8	1.5	1.9	3.1	5.1	6.7	10.5	7.8	6.6
Female Genital System	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cervix Uteri	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Corpus and Uterus, NOS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ovary ‡	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vagina	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vulva	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other Female Genital Organs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Male Genital System	0.3	0.1	0.2	4.8	11.9	18.6	20.0	14.8	20.2	50.9	182	395	671	1010	1105	1008	782	619
Prostate	0.1	0.0	0.0	0.0	0.0	0.1	0.1	1.5	8.0	43.4	177	390	667	1000	1097	999	767	606
Testis	0.2	0.1	0.2	4.7	11.8	18.4	19.9	13.1	11.7	6.4	4.7	2.9	1.4	2.6	2.1	1.5	1.0	1.3
Penis	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.4	1.0	0.3	1.3	1.0	5.1	3.9	5.3	9.8	8.6
Other Male Genital Organs	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.2	0.5	0.5	1.5	2.1	2.1	2.6	4.7	2.6

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Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cases except those of the urinary bladder were excluded.

§ Rates are per 100,000 males.

† Mesotheliomas of the pleura are included in the group Mesothelioma rather than Pleura.

†† Skin does not include squamous or basal cell skin cancers or Kaposi Sarcoma of the skin.

‡ Cases with borderline malignancy or histologies 8442, 8451, 8462, 8472 and 8373 were excluded.

- Not applicable; sex-specific site.

Table II-3: Age-specific rates§ of newly diagnosed cancers by cancer site, Minnesota, 2005-2009, all races combined, males (continued)

Cancer Site	Age at Diagnosis (Years)																	
	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+
Urinary System	3.0	1.3	0.1	0.1	0.3	1.9	3.6	9.2	16.3	32.8	51.6	93.1	140	226	322	398	470	453
Urinary Bladder	0.0	0.0	0.0	0.1	0.2	0.4	1.3	2.3	4.9	11.3	22.9	46.3	74.5	134	219	293	363	385
Kidney and Renal Pelvis	3.0	1.3	0.1	0.0	0.1	1.4	2.3	6.7	11.2	21.2	28.1	46.1	63.2	86.8	95.2	97.1	92.0	56.2
Ureter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.3	0.4	1.9	3.9	4.6	4.1	12.4	6.0
Other Urinary Organs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.3	0.3	0.4	0.7	0.9	3.3	3.8	2.6	6.6
Eye and Orbit	0.4	0.1	0.0	0.0	0.0	0.0	0.2	0.1	0.6	0.9	1.0	1.9	2.2	3.5	2.4	1.5	2.6	6.0
Brain and Other Nervous System	3.9	2.7	3.4	2.0	3.5	3.1	5.3	6.5	4.1	8.6	9.9	12.6	14.4	19.2	25.8	21.8	18.1	13.9
Brain	3.9	2.4	2.6	1.7	3.0	2.8	5.0	6.1	4.1	8.1	9.5	12.1	13.4	19.0	24.6	21.0	17.6	13.9
Other Nervous System	0.0	0.2	0.8	0.3	0.5	0.3	0.4	0.3	0.0	0.5	0.4	0.5	1.0	0.2	1.2	0.8	0.5	0.0
Endocrine System	1.2	0.7	0.5	1.6	1.4	2.8	5.1	6.8	8.0	8.8	11.3	11.2	12.3	15.1	19.4	16.1	18.1	8.6
Thyroid	0.1	0.1	0.2	1.3	1.3	2.3	4.7	6.8	7.5	8.3	10.5	10.2	11.1	13.2	16.7	14.6	15.5	7.9
Other Endocrine including Thymus	1.1	0.6	0.2	0.3	0.1	0.4	0.4	0.0	0.5	0.5	0.7	1.0	1.2	1.9	2.7	1.5	2.6	0.7
Lymphoma	0.9	2.4	3.3	5.1	6.0	8.5	8.5	11.2	16.1	22.5	31.2	43.4	64.1	90.1	126	165	180	182
Hodgkin Lymphoma	0.2	0.7	1.8	3.0	3.8	5.5	4.0	3.3	3.9	2.6	3.1	3.5	3.6	5.8	6.4	9.0	5.2	6.0
Non-Hodgkin Lymphoma	0.7	1.7	1.5	2.1	2.2	3.0	4.5	7.9	12.2	19.9	28.1	39.9	60.5	84.3	120	156	175	176
Myeloma	0.0	0.0	0.0	0.0	0.0	0.3	0.6	0.9	2.3	3.5	6.4	13.0	16.6	32.7	37.9	49.5	55.8	42.3
Leukemia	8.5	3.6	3.8	3.4	2.1	2.8	3.6	3.4	5.6	10.2	15.5	27.9	45.4	64.4	81.9	116	138	158
Lymphocytic Leukemia	6.7	2.6	2.3	2.0	0.3	0.7	0.9	1.6	2.8	5.8	9.4	18.8	27.6	39.6	50.0	61.5	75.4	91.2
Acute Lymphocytic Leukemia	6.7	2.4	2.3	2.0	0.3	0.3	0.7	0.7	0.1	0.3	1.0	1.0	1.2	1.9	0.9	2.3	1.0	1.3
Chronic Lymphocytic Leukemia	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.6	1.8	4.2	7.4	16.0	25.2	36.1	46.1	56.6	72.3	84.6
Other Lymphocytic Leukemia	0.0	0.1	0.0	0.0	0.0	0.2	0.1	0.3	0.9	1.3	1.1	1.8	1.2	1.6	3.0	2.6	2.1	5.3
Myeloid and Monocytic Leukemia	1.1	0.9	1.2	1.3	1.4	2.0	2.7	1.8	2.7	4.2	5.8	8.3	16.8	23.6	30.0	52.5	57.9	62.1
Acute Myeloid Leukemia	1.0	0.7	1.1	0.7	0.7	0.7	1.5	0.9	1.5	2.4	3.9	5.4	10.3	15.5	19.7	32.3	27.9	37.7
Acute Monocytic Leukemia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.1	0.5	0.5	0.5	0.6	1.5	2.6	3.3
Chronic Myeloid Leukemia	0.1	0.1	0.1	0.5	0.6	1.2	1.1	0.9	0.9	1.3	1.7	2.4	5.8	7.4	9.7	17.6	26.9	16.5
Other Myeloid/Monocytic Leukemia	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.2	0.1	0.0	0.2	0.2	0.0	1.1	0.5	4.6
Other Leukemia	0.7	0.1	0.3	0.1	0.4	0.1	0.1	0.0	0.1	0.2	0.3	0.8	1.0	1.2	1.8	1.9	5.2	4.6
Miscellaneous	0.8	0.1	0.1	0.1	0.0	0.4	0.7	1.7	2.4	3.4	8.2	15.4	18.8	25.2	34.6	49.1	86.8	84.6

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cases except those of the urinary bladder were excluded.

§ Rates are per 100,000 males.

Table II-4: Age-specific rates§ of newly diagnosed cancers by cancer site, Minnesota, 2005-2009, all races combined, females

Cancer Site	Age at Diagnosis (Years)																	
	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+
All Sites Combined	21.6	9.9	11.0	23.1	43.6	75.8	120	184	290	435	618	791	1064	1409	1616	1852	1894	1569
Oral Cavity and Pharynx	0.0	0.1	0.5	0.4	1.1	1.0	2.7	2.8	5.4	7.9	10.1	14.6	21.4	20.6	25.9	26.0	33.6	34.1
Lip	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.4	0.7	0.6	0.5	1.3	1.5	3.1	4.1	1.7	4.2
Tongue	0.0	0.0	0.0	0.0	0.2	0.2	0.9	0.9	2.1	2.4	3.0	5.7	6.8	5.5	6.5	5.6	7.8	7.6
Salivary Gland	0.0	0.1	0.1	0.4	0.7	0.2	0.8	0.9	1.1	1.6	1.3	2.0	2.1	3.2	3.7	3.5	4.8	3.9
Floor of Mouth	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.7	0.8	1.0	1.0	1.9	1.6	1.2	3.1	1.7
Gum and Other Mouth	0.0	0.0	0.2	0.0	0.1	0.2	0.4	0.4	0.7	1.3	1.3	2.3	4.5	4.3	5.0	9.4	11.2	13.5
Nasopharynx	0.0	0.0	0.1	0.0	0.1	0.1	0.1	0.4	0.4	0.2	0.6	0.5	1.0	0.6	0.3	0.0	0.7	0.0
Tonsil	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.4	1.0	2.0	1.6	3.6	2.1	2.9	0.6	1.7	1.4
Oropharynx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.6	0.2	0.4	0.8	0.0	1.0	0.6
Hypopharynx	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.4	0.4	0.8	0.9	1.3	1.5	1.4	0.8
Other Oral Cavity and Pharynx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.2	0.2	0.8	0.3	0.3	0.3
Digestive System	0.5	0.0	0.4	0.9	1.7	2.6	7.9	13.1	24.1	39.0	75.6	99.4	145	224	316	402	453	457
Esophagus	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.4	0.7	1.4	4.9	5.3	10.2	10.2	15.5	10.9	13.0
Stomach	0.0	0.0	0.1	0.0	0.2	0.7	0.9	1.4	1.7	1.7	4.6	3.8	6.4	10.4	15.4	23.1	23.8	26.5
Small Intestine	0.1	0.0	0.0	0.0	0.0	0.0	0.5	0.9	1.7	2.5	3.6	5.2	4.8	6.2	9.9	10.8	9.2	7.0
Colon and Rectum	0.0	0.0	0.0	0.3	1.2	1.5	5.4	7.5	16.4	24.8	47.3	54.7	76.8	125	193	246	293	316
Colon excluding Rectum	0.0	0.0	0.0	0.2	0.7	0.8	3.3	4.6	10.1	15.6	27.4	36.9	55.5	96.1	154	206	250	274
Rectum and Rectosigmoid Junction	0.0	0.0	0.0	0.1	0.5	0.7	2.0	2.9	6.3	9.2	19.9	17.9	21.3	29.3	38.4	39.2	43.1	41.7
Anus, Anal Canal and Anorectum	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.8	2.2	3.5	5.0	4.0	4.3	2.6	4.1	5.4	4.2
Liver and Intrahepatic Bile Duct	0.3	0.0	0.1	0.2	0.2	0.0	0.3	0.7	0.5	1.8	3.4	3.4	7.3	9.6	12.8	14.6	15.6	10.7
Liver	0.3	0.0	0.1	0.2	0.2	0.0	0.3	0.7	0.3	1.6	3.0	2.8	5.9	7.9	9.7	11.4	12.6	7.9
Intrahepatic Bile Duct	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.4	0.6	1.3	1.7	3.1	3.2	3.1	2.8
Gallbladder	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.6	0.9	3.0	4.0	6.4	9.4	8.5	14.9	7.6
Other Biliary	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.2	0.1	0.4	0.9	1.4	1.8	4.3	6.5	5.9	9.2	9.9
Pancreas	0.0	0.0	0.1	0.1	0.1	0.1	0.5	1.3	1.4	3.5	6.9	13.2	26.4	36.1	46.3	59.7	60.1	54.9
Retroperitoneum	0.0	0.0	0.0	0.2	0.0	0.1	0.0	0.2	0.2	0.2	0.4	0.5	1.3	2.8	1.1	1.8	1.4	0.3
Peritoneum, Omentum and Mesentery	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.1	0.5	0.3	2.0	4.0	5.9	7.7	7.8	10.5	8.1	4.8
Other Digestive Organs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.6	0.3	0.8	0.4	1.1	2.1	2.0	2.3

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Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cases except those of the urinary bladder were excluded.

§ Rates are per 100,000 females.

Table II-4: Age-specific rates§ of newly diagnosed cancers by cancer site, Minnesota, 2005-2009, all races combined, females (continued)

Cancer Site	Age at Diagnosis (Years)																	
	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+
Respiratory System	0.5	0.0	0.0	0.2	0.5	0.7	1.3	3.5	12.0	30.0	51.9	80.7	147	247	321	353	273	144
Nose, Nasal Cavity and Middle Ear	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.5	0.2	0.5	1.1	1.0	1.3	1.1	2.9	3.2	2.7	2.3
Larynx	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.5	1.2	1.4	2.6	5.3	6.8	5.2	6.4	3.7	2.3
Lung and Bronchus	0.0	0.0	0.0	0.1	0.3	0.6	1.2	2.9	11.0	28.1	49.2	76.6	140	238	313	343	266	139
Pleura	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.2	0.0	0.0	0.0	0.0
Trachea, Mediastinum, and Other	0.5	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.2	0.3	0.2	0.3	0.2	0.0	0.0	0.3	0.7	0.0
Mesothelioma (all sites)†	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.1	0.8	0.3	1.0	2.1	1.8	4.4	3.1	4.5
Bones and Joints	0.1	0.6	1.0	1.3	0.7	1.1	0.8	0.6	0.8	0.6	1.0	1.0	1.7	1.1	1.6	1.2	1.4	1.7
Soft Tissue including Heart	3.6	1.2	0.8	1.1	0.9	1.8	1.5	1.6	2.0	2.6	3.6	4.0	4.6	6.2	8.4	7.6	11.9	10.7
Skin ††	0.0	0.2	0.1	3.4	11.1	20.7	20.2	25.5	34.2	32.4	34.5	36.0	36.1	47.6	47.6	57.9	61.1	52.9
Melanoma of the Skin	0.0	0.2	0.1	3.2	10.5	20.0	19.0	23.9	33.3	30.6	33.1	33.2	33.1	44.4	40.8	45.9	47.5	39.1
Other Non-Epithelial Skin	0.0	0.0	0.0	0.2	0.7	0.7	1.3	1.6	0.8	1.7	1.4	2.8	3.0	3.2	6.8	12.0	13.6	13.8
Kaposi Sarcoma (all sites)	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	1.0	0.6
Breast	0.1	0.0	0.0	0.3	1.2	7.4	25.1	62.0	119	194	242	286	372	430	426	443	455	357
Female Genital System	0.1	0.0	1.0	2.3	3.5	9.5	20.2	23.3	32.2	53.8	97.0	135	154	173	162	159	164	130
Cervix Uteri	0.0	0.0	0.1	0.3	1.3	5.3	11.0	10.6	10.5	10.5	8.9	8.9	8.9	9.4	9.2	9.4	5.8	7.9
Corpus and Uterus, NOS	0.0	0.0	0.0	0.1	0.3	1.5	4.1	6.3	11.5	27.3	57.2	89.9	103	108	98.8	85.7	88.2	61.1
Ovary ‡	0.0	0.0	0.8	1.8	1.6	1.8	4.0	5.0	7.5	13.0	24.6	30.5	33.9	41.9	39.2	46.2	45.5	34.6
Vagina	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.1	1.1	1.0	1.3	1.5	2.6	4.7	3.1	2.5
Vulva	0.0	0.0	0.0	0.0	0.1	0.4	0.9	1.1	2.2	2.0	3.4	3.0	4.6	7.7	8.4	9.7	18.3	22.8
Other Female Genital Organs	0.0	0.0	0.0	0.0	0.1	0.5	0.4	0.0	0.3	0.9	1.8	2.1	2.3	4.5	3.4	3.2	2.7	1.4
Male Genital System	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Prostate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Testis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Penis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other Male Genital Organs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cases except those of the urinary bladder were excluded.

§ Rates are per 100,000 females.

† Mesotheliomas of the pleura are included in the group Mesothelioma rather than Pleura.

†† Skin does not include squamous or basal cell skin cancers or Kaposi Sarcoma of the skin.

‡ Cases with borderline malignancy or histologies 8442, 8451, 8462, 8472 and 8373 were excluded.

- Not applicable; sex-specific site.

Table II-4: Age-specific rates§ of newly diagnosed cancers by cancer site, Minnesota, 2005-2009, all races combined, females (continued)

Cancer Site	Age at Diagnosis (Years)																	
	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+
Urinary System	1.5	0.2	0.4	0.3	0.8	1.2	3.4	3.9	8.6	14.8	24.2	35.9	56.0	77.8	97.5	125	132	102
Urinary Bladder	0.0	0.0	0.0	0.1	0.2	0.2	0.5	1.2	2.0	4.8	8.3	13.2	23.2	36.1	45.5	64.6	78.4	68.7
Kidney and Renal Pelvis	1.5	0.2	0.4	0.2	0.5	1.0	2.9	2.7	6.5	9.9	15.6	22.0	31.6	40.2	49.4	55.6	50.2	29.0
Ureter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.4	1.0	1.3	2.1	5.0	2.7	2.5
Other Urinary Organs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.2	0.3	0.2	0.2	0.5	0.3	1.0	1.4
Eye and Orbit	1.5	0.1	0.0	0.0	0.1	0.1	0.5	0.0	0.2	0.5	0.5	1.3	0.5	1.3	3.1	1.5	1.0	3.1
Brain and Other Nervous System	3.8	2.9	2.3	2.1	1.8	3.8	3.3	3.5	4.0	5.8	5.3	9.2	10.7	14.2	12.6	12.3	16.0	6.8
Brain	3.3	2.4	2.1	2.0	1.7	3.8	2.9	3.3	3.6	5.4	5.0	8.9	10.7	13.6	12.0	11.7	15.6	6.2
Other Nervous System	0.5	0.5	0.1	0.1	0.1	0.0	0.4	0.2	0.4	0.4	0.3	0.3	0.0	0.6	0.5	0.6	0.3	0.6
Endocrine System	0.9	0.4	1.3	3.0	10.2	16.2	21.6	30.0	29.6	26.4	28.5	25.0	26.4	21.7	19.9	16.7	13.2	7.9
Thyroid	0.0	0.2	1.1	2.9	10.0	15.8	21.1	29.3	29.2	26.0	27.7	24.4	25.9	20.2	18.3	15.5	11.9	7.6
Other Endocrine including Thymus	0.9	0.1	0.2	0.1	0.2	0.4	0.5	0.7	0.4	0.4	0.9	0.6	0.5	1.5	1.6	1.2	1.4	0.3
Lymphoma	0.1	0.7	1.2	4.9	7.8	7.3	7.8	8.8	10.5	14.8	22.7	30.3	41.7	72.5	78.2	105	121	102
Hodgkin Lymphoma	0.0	0.2	0.6	3.6	5.7	5.4	4.2	2.9	1.9	1.2	2.2	2.3	2.1	4.5	3.9	5.3	3.7	2.3
Non-Hodgkin Lymphoma	0.1	0.5	0.6	1.3	2.1	1.9	3.6	5.9	8.6	13.7	20.5	28.1	39.5	68.0	74.3	99.7	118	100
Myeloma	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.2	1.1	2.4	4.5	7.2	10.9	15.9	22.5	33.6	29.5	23.4
Leukemia	8.1	3.4	2.0	2.7	2.2	2.2	3.1	3.4	3.9	6.1	10.1	15.4	19.9	32.9	39.7	56.2	64.5	73.8
Lymphocytic Leukemia	6.1	2.9	1.7	1.5	0.8	0.7	0.6	0.6	1.1	2.6	4.8	7.7	11.4	19.3	23.0	30.4	30.5	38.6
Acute Lymphocytic Leukemia	6.1	2.9	1.7	1.5	0.8	0.7	0.5	0.2	0.2	0.7	0.6	0.5	1.0	1.3	1.6	1.2	0.7	0.8
Chronic Lymphocytic Leukemia	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.6	1.8	3.6	7.1	10.2	17.4	21.2	29.3	27.5	35.5
Other Lymphocytic Leukemia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.1	0.5	0.1	0.2	0.6	0.3	0.0	2.4	2.3
Myeloid and Monocytic Leukemia	1.8	0.4	0.2	1.2	1.2	1.4	2.4	2.8	2.8	3.3	4.9	7.3	7.9	12.8	14.6	24.6	31.6	31.3
Acute Myeloid Leukemia	1.1	0.2	0.0	0.9	0.9	1.2	1.3	2.1	1.8	2.0	2.4	3.8	5.3	8.7	9.4	13.2	17.3	18.0
Acute Monocytic Leukemia	0.2	0.0	0.1	0.0	0.0	0.1	0.0	0.1	0.0	0.2	0.3	0.8	0.3	0.6	0.5	1.2	2.4	1.1
Chronic Myeloid Leukemia	0.5	0.1	0.1	0.3	0.3	0.1	1.2	0.5	1.1	1.0	2.1	2.5	2.0	3.4	4.4	9.4	10.2	11.3
Other Myeloid/Monocytic Leukemia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.3	0.3	0.0	0.3	0.9	1.7	0.8
Other Leukemia	0.2	0.1	0.1	0.0	0.2	0.1	0.0	0.0	0.0	0.2	0.4	0.4	0.7	0.9	2.1	1.2	2.4	3.9
Miscellaneous	0.9	0.0	0.2	0.2	0.1	0.2	0.0	1.6	2.4	3.6	5.1	9.3	15.7	21.7	32.9	46.8	59.7	57.7

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cases except those of the urinary bladder were excluded.

§ Rates are per 100,000 females.

Table II-5: Age-specific rates§ of cancer deaths by cancer site, Minnesota, 2005-2009, all races combined, males

Cancer Site	Age at Death (Years)																	
	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+
All Sites Combined	2.2	2.6	2.4	3.0	4.8	6.7	7.8	16.1	31.5	61.9	130	237	389	623	959	1341	1860	2600
Oral Cavity and Pharynx	0.0	0.0	0.0	0.0	0.1	0.3	0.2	0.5	0.5	1.9	3.6	6.3	9.1	8.3	11.8	12.8	22.2	26.4
Lip	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.3	0.4	0.0	0.0
Tongue	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.3	0.3	0.5	1.0	0.8	2.4	2.1	1.5	1.5	6.2	6.6
Salivary Gland	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.6	0.7	0.7	1.5	1.5	4.1	6.0
Floor of Mouth	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.5	0.2	0.3	0.0	0.0	0.7
Gum and Other Mouth	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.8	1.0	0.9	1.5	1.9	2.1	5.3
Nasopharynx	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.0	0.6	0.7	0.8	0.5	1.9	0.9	0.8	1.0	0.0
Tonsil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.5	1.4	1.4	0.0	1.5	3.0	2.1	0.0
Oropharynx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.5	0.9	1.6	1.2	0.4	1.0	1.3
Hypopharynx	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.2	0.5	0.9	0.2	0.3	0.4	2.6	2.0
Other Oral Cavity and Pharynx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.8	0.9	0.7	2.7	3.0	3.1	4.6
Digestive System	0.1	0.1	0.1	0.1	0.6	1.2	2.1	4.5	11.1	19.9	43.1	77.6	111	156	243	306	407	560
Esophagus	0.1	0.0	0.0	0.0	0.0	0.0	0.4	0.5	1.7	3.6	8.5	13.4	21.1	26.6	37.3	52.5	51.7	59.5
Stomach	0.0	0.0	0.0	0.0	0.3	0.0	0.1	0.1	1.5	2.3	3.2	4.0	8.7	9.5	17.6	23.3	39.3	53.5
Small Intestine	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.5	1.0	0.7	1.6	3.3	2.6	4.1	9.9
Colon and Rectum	0.0	0.0	0.1	0.0	0.2	0.8	0.7	2.3	3.5	6.5	11.4	23.6	31.7	50.0	80.7	107	159	249
Colon excluding Rectum	0.0	0.0	0.1	0.0	0.1	0.8	0.7	1.9	2.7	4.4	7.6	17.2	25.4	40.3	67.6	84.0	126	213
Rectum and Rectosigmoid Junction	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.3	0.8	2.1	3.8	6.4	6.3	9.7	13.0	23.3	33.1	35.7
Anus, Anal Canal and Anorectum	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.2	0.3	0.2	0.2	0.6	0.0	0.5	0.7
Liver and Intrahepatic Bile Duct	0.0	0.1	0.0	0.1	0.0	0.2	0.6	0.6	1.5	3.8	9.4	17.0	17.1	20.2	32.1	38.6	42.9	49.6
Liver	0.0	0.1	0.0	0.1	0.0	0.1	0.5	0.3	1.0	2.7	7.8	13.8	13.4	14.8	20.0	27.0	28.4	41.0
Intrahepatic Bile Duct	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.5	1.1	1.6	3.3	3.8	5.3	12.1	11.6	14.5	8.6
Gallbladder	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.1	1.2	1.9	4.2	4.9	5.7	2.6
Other Biliary	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.4	0.8	0.7	1.4	2.1	4.1	4.1	13.2
Pancreas	0.0	0.0	0.0	0.0	0.1	0.2	0.1	1.0	2.4	3.1	8.7	17.3	29.0	41.5	62.2	69.8	96.1	114
Retroperitoneum	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.5	0.0
Peritoneum, Omentum and Mesentery	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.2	0.2	0.6	0.4	0.0	2.0
Other Digestive Organs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.4	0.1	0.9	1.9	1.8	3.0	3.6	6.6

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Source: Minnesota Center for Health Statistics with Vintage 2009 population estimates. All deaths with the specified cancer as the underlying cause of death during the period are included, regardless of year of diagnosis. All analyses were conducted by MCSS.

§ Rates are per 100,000 males.

Table II-5: Age-specific rates§ of cancer deaths by cancer site, Minnesota, 2005-2009, all races combined, males (continued)

Cancer Site	Age at Death (Years)																	
	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+
Respiratory System	0.0	0.0	0.0	0.0	0.0	0.1	0.1	1.7	5.6	14.9	35.8	72.7	129	206	321	418	491	476
Nose, Nasal Cavity and Middle Ear	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.2	0.1	0.9	0.2	1.2	0.4	2.1	3.3
Larynx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.9	1.6	4.0	3.9	4.2	9.4	12.4	9.8	12.6
Lung and Bronchus	0.0	0.0	0.0	0.0	0.0	0.1	0.1	1.7	5.1	14.0	34.0	68.4	124	202	310	405	478	457
Pleura	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.4	0.0	1.3
Trachea, Mediastinum, and Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.1	0.2	0.0	0.3	0.4	0.5	1.3
Mesothelioma (all sites)†	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.5	0.6	3.3	7.9	9.1	20.3	17.1	22.5
Bones and Joints	0.0	0.0	0.3	0.6	0.6	0.4	0.2	0.5	0.2	0.1	0.3	0.6	0.7	1.6	0.9	2.3	5.2	4.0
Soft Tissue including Heart	0.0	0.6	0.0	0.4	0.4	0.4	0.4	0.7	0.4	1.2	2.0	2.3	2.6	3.0	5.2	10.5	12.9	13.2
Skin ††	0.1	0.0	0.0	0.1	0.2	0.7	0.4	0.7	2.0	2.7	4.4	6.6	8.4	13.4	14.0	18.4	38.2	61.5
Melanoma of the Skin	0.1	0.0	0.0	0.1	0.2	0.7	0.4	0.6	1.8	2.3	4.0	4.9	6.9	9.7	11.8	14.3	25.8	36.4
Other Non-Epithelial Skin	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.4	0.4	1.6	1.5	3.7	2.1	4.1	12.4	25.1
Kaposi Sarcoma (all sites)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7
Breast	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.1	0.7	0.5	0.9	1.1	2.6	4.6
Female Genital System	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cervix Uteri	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Corpus and Uterus, NOS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ovary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vagina	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vulva	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other Female Genital Organs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Male Genital System	0.0	0.0	0.0	0.0	0.1	0.6	0.0	0.1	0.3	0.8	2.6	7.6	17.1	43.5	76.4	161	289	642
Prostate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.5	2.3	7.1	16.6	41.7	75.2	159	287	638
Testis	0.0	0.0	0.0	0.0	0.1	0.6	0.0	0.0	0.1	0.1	0.3	0.4	0.2	0.9	0.0	0.0	0.0	0.7
Penis	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.1	0.3	0.7	1.2	1.1	2.6	2.0
Other Male Genital Organs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.4	0.0	0.7

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Source: Minnesota Center for Health Statistics with Vintage 2009 population estimates. All deaths with the specified cancer as the underlying cause of death during the period are included, regardless of year of diagnosis. All analyses were conducted by MCSS.

§ Rates are per 100,000 males.

† Mesotheliomas of the pleura are included in the group Mesothelioma rather than Pleura.

†† Skin does not include Kaposi Sarcoma of the skin.

- Not applicable; sex-specific site.

Table II-5: Age-specific rates§ of cancer deaths by cancer site, Minnesota, 2005-2009, all races combined, males (continued)

Cancer Site	Age at Death (Years)																	
	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+
Urinary System	0.3	0.1	0.1	0.0	0.0	0.0	0.2	0.5	0.9	3.4	7.5	13.5	25.7	44.9	65.2	83.3	124	213
Urinary Bladder	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.8	1.9	4.5	9.3	18.1	34.0	47.3	70.8	143
Kidney and Renal Pelvis	0.3	0.1	0.1	0.0	0.0	0.0	0.1	0.2	0.8	2.5	5.4	8.8	16.3	26.6	30.6	34.1	49.1	64.8
Ureter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.2	0.1	0.0	0.0	0.6	0.4	2.6	2.0
Other Urinary Organs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.2	0.2	0.0	1.5	1.6	3.3
Eye and Orbit	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.2	0.9	0.6	1.1	0.0	1.3
Brain and Other Nervous System	0.6	0.6	0.9	0.7	0.7	0.8	1.0	2.7	3.5	5.1	6.9	8.5	12.5	16.9	23.4	22.5	21.2	20.5
Endocrine System	0.2	0.2	0.0	0.1	0.1	0.2	0.1	0.1	0.4	0.9	1.2	0.8	1.9	3.0	3.6	3.0	6.7	4.0
Thyroid	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4	0.8	0.8	0.5	1.5	2.1	1.5	1.5	4.1	2.6
Other Endocrine including Thymus	0.2	0.2	0.0	0.1	0.1	0.2	0.1	0.0	0.0	0.1	0.3	0.3	0.3	0.9	2.1	1.5	2.6	1.3
Lymphoma	0.0	0.0	0.2	0.2	0.7	0.4	1.0	1.4	2.0	2.6	5.3	8.6	14.2	27.1	40.3	72.4	109	133
Hodgkin Lymphoma	0.0	0.0	0.0	0.0	0.4	0.1	0.1	0.2	0.4	0.7	0.4	0.4	0.9	1.4	2.1	3.0	2.6	4.0
Non-Hodgkin Lymphoma	0.0	0.0	0.2	0.2	0.3	0.3	0.9	1.1	1.5	1.9	4.9	8.2	13.4	25.7	38.2	69.4	106	129
Myeloma	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.4	0.8	2.8	5.7	9.3	13.4	26.1	37.5	47.5	43.6
Leukemia	0.8	0.8	0.6	0.5	0.7	1.3	0.9	1.5	2.0	2.3	3.8	6.9	17.1	29.4	47.6	70.5	103	158
Lymphocytic Leukemia	0.2	0.5	0.1	0.1	0.6	0.4	0.4	0.7	0.2	0.3	1.4	2.8	5.7	7.4	17.3	21.0	33.6	74.0
Acute Lymphocytic Leukemia	0.2	0.5	0.1	0.1	0.6	0.4	0.2	0.7	0.2	0.0	0.5	1.1	0.9	1.6	1.5	1.9	1.0	3.3
Chronic Lymphocytic Leukemia	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.3	0.6	1.5	4.6	5.3	14.6	17.6	31.0	66.8
Other Lymphocytic Leukemia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.2	0.5	1.2	1.5	1.6	4.0
Myeloid and Monocytic Leukemia	0.6	0.2	0.1	0.1	0.1	0.8	0.5	0.6	1.7	1.5	2.1	3.3	10.1	18.1	24.9	37.1	52.7	52.2
Acute Myeloid Leukemia	0.6	0.2	0.1	0.1	0.1	0.8	0.5	0.3	1.4	1.4	1.6	2.8	9.3	15.3	20.6	31.5	39.3	39.0
Acute Monocytic Leukemia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.3	0.0	1.0	1.3
Chronic Myeloid Leukemia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.1	0.1	0.3	0.5	1.2	2.1	2.6	4.1	4.6
Other Myeloid/Monocytic Leukemia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3	1.6	1.8	3.0	8.3	7.3
Other Leukemia	0.0	0.1	0.3	0.3	0.0	0.1	0.0	0.2	0.1	0.5	0.3	0.9	1.4	3.9	5.5	12.4	17.1	31.7
Miscellaneous	0.1	0.1	0.1	0.2	0.3	0.2	1.0	1.2	2.1	5.1	9.9	18.2	26.0	47.5	70.6	100	163	216

Source: Minnesota Center for Health Statistics with Vintage 2009 population estimates. All deaths with the specified cancer as the underlying cause of death during the period are included, regardless of year of diagnosis. All analyses were conducted by MCSS.

§ Rates are per 100,000 males.

Table II-6: Age-specific rates§ of cancer deaths by cancer site, Minnesota, 2005-2009, all races combined, females

Cancer Site	Age at Death (Years)																	
	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+
All Sites Combined	2.2	1.6	2.3	2.4	3.6	5.3	10.8	18.1	37.3	69.7	125	207	324	486	691	908	1123	1346
Oral Cavity and Pharynx	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.3	0.8	1.1	2.1	2.5	5.7	5.2	5.3	8.8	14.1
Lip	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tongue	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.4	0.6	0.5	1.9	1.1	1.5	2.4	3.1
Salivary Gland	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.1	0.2	0.9	1.6	0.9	1.4	1.7
Floor of Mouth	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.4	0.0	0.0	0.3	0.3
Gum and Other Mouth	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.5	0.3	1.5	1.6	0.9	1.4	6.8
Nasopharynx	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.1	0.0	0.2	0.6	0.3	0.3	0.3	0.6
Tonsil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.5	0.5	0.2	0.0	0.6	0.7	0.6
Oropharynx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.5	0.0	0.3	0.3	1.4	0.8
Hypopharynx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.3	0.0
Other Oral Cavity and Pharynx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.5	0.9	0.7	0.3
Digestive System	0.2	0.1	0.1	0.0	0.5	0.8	2.4	3.3	6.2	12.2	22.9	38.3	61.3	93.5	144	197	272	387
Esophagus	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.6	1.3	2.3	4.6	6.2	9.2	13.5	10.2	17.5
Stomach	0.0	0.0	0.0	0.0	0.0	0.1	0.8	0.6	0.8	1.2	1.9	1.5	3.1	4.9	7.8	10.8	18.7	21.7
Small Intestine	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.2	0.5	0.6	0.5	0.9	1.6	2.6	1.4	2.5
Colon and Rectum	0.0	0.0	0.0	0.0	0.3	0.5	1.2	1.5	3.4	4.8	9.6	14.4	19.4	33.4	50.5	69.9	114	197
Colon excluding Rectum	0.0	0.0	0.0	0.0	0.2	0.5	0.9	1.3	2.8	3.9	7.3	10.8	15.5	29.1	42.9	60.0	100	175
Rectum and Rectosigmoid Junction	0.0	0.0	0.0	0.0	0.1	0.0	0.3	0.2	0.5	0.9	2.4	3.5	4.0	4.3	7.6	9.9	13.9	22.2
Anus, Anal Canal and Anorectum	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.5	0.9	0.8	0.5	0.4	0.5	0.0	0.7	1.4
Liver and Intrahepatic Bile Duct	0.1	0.1	0.1	0.0	0.2	0.1	0.1	0.4	0.2	1.8	3.0	3.9	4.8	8.9	14.1	18.7	25.8	22.0
Liver	0.1	0.1	0.1	0.0	0.2	0.0	0.1	0.2	0.1	0.8	1.5	1.9	2.8	4.5	6.0	11.4	12.9	13.0
Intrahepatic Bile Duct	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1	1.1	1.5	2.0	2.0	4.5	8.1	7.3	12.9	9.0
Gallbladder	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.4	0.3	0.8	2.3	3.2	6.5	6.4	9.5	8.7
Other Biliary	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.5	0.8	0.9	2.1	2.9	4.4	5.4
Pancreas	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.5	1.3	2.7	4.8	11.8	23.2	31.2	46.0	66.7	80.4	102
Retroperitoneum	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.3	0.3	0.3	0.6
Peritoneum, Omentum and Mesentery	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	1.3	1.8	2.3	3.9	3.8	4.4	4.2
Other Digestive Organs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.2	0.5	0.2	0.9	1.3	1.5	2.0	4.5

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Source: Minnesota Center for Health Statistics with Vintage 2009 population estimates. All deaths with the specified cancer as the underlying cause of death during the period are included, regardless of year of diagnosis. All analyses were conducted by MCSS.

§ Rates are per 100,000 females.

Table II-6: Age-specific rates§ of cancer deaths by cancer site, Minnesota, 2005-2009, all races combined, females (continued)

Cancer Site	Age at Death (Years)																	
	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+
Respiratory System	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.8	5.3	15.0	29.6	50.6	94.7	154	222	282	283	203
Nose, Nasal Cavity and Middle Ear	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.1	0.7	0.9	0.5	1.2	1.7	0.8
Larynx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.3	0.6	1.5	1.9	2.4	1.8	1.4	1.4
Lung and Bronchus	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.8	5.0	14.7	29.3	49.8	92.6	151	219	278	279	200
Pleura	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0
Trachea, Mediastinum, and Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	1.1
Mesothelioma (all sites)†	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.3	0.5	0.3	1.9	2.4	2.9	3.1	5.6
Bones and Joints	0.0	0.2	0.2	0.4	0.5	0.1	0.4	0.0	0.2	0.2	0.8	0.4	1.3	0.6	1.3	2.3	1.4	2.3
Soft Tissue including Heart	0.1	0.0	0.2	0.3	0.1	0.5	0.3	0.0	1.3	0.5	1.4	2.0	3.1	4.3	4.2	2.6	3.4	10.4
Skin ††	0.0	0.0	0.0	0.1	0.0	0.1	0.6	0.7	0.6	1.2	1.9	3.5	5.1	6.0	5.2	10.5	15.3	16.9
Melanoma of the Skin	0.0	0.0	0.0	0.0	0.0	0.1	0.6	0.7	0.6	1.2	1.8	3.3	3.8	4.9	3.9	9.1	10.2	9.6
Other Non-Epithelial Skin	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	1.3	1.1	1.3	1.5	5.1	7.3
Kaposi Sarcoma (all sites)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3
Breast	0.0	0.0	0.0	0.0	0.1	0.6	2.4	5.4	10.2	17.2	28.0	40.8	53.7	68.4	84.2	96.5	129	182
Female Genital System	0.0	0.0	0.0	0.0	0.3	0.7	1.5	2.5	4.9	7.9	16.4	28.7	38.9	50.8	63.5	85.1	94.3	113
Cervix Uteri	0.0	0.0	0.0	0.0	0.2	0.1	1.0	0.9	2.4	1.7	2.4	2.6	3.8	4.3	3.7	5.6	4.8	4.8
Corpus and Uterus, NOS	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.5	0.5	1.2	4.3	7.6	10.5	12.8	19.6	26.0	30.9	34.1
Ovary	0.0	0.0	0.0	0.0	0.1	0.4	0.3	1.1	1.7	4.8	8.5	17.1	22.9	30.2	37.7	46.8	51.2	59.4
Vagina	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.2	0.6	0.0	1.2	0.3	1.4
Vulva	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.8	0.5	0.7	1.1	1.6	3.5	4.4	11.0
Other Female Genital Organs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4	0.8	0.8	1.9	1.1	2.1	2.7	2.0
Male Genital System	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Prostate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Testis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Penis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other Male Genital Organs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Source: Minnesota Center for Health Statistics with Vintage 2009 population estimates. All deaths with the specified cancer as the underlying cause of death during the period are included, regardless of year of diagnosis. All analyses were conducted by MCSS.

§ Rates are per 100,000 females.

† Mesotheliomas of the pleura are included in the group Mesothelioma rather than Pleura.

†† Skin does not include Kaposi Sarcoma of the skin.

- Not applicable; sex-specific site.

Table II-6: Age-specific rates§ of cancer deaths by cancer site, Minnesota, 2005-2009, all races combined, females (continued)

Cancer Site	Age at Death (Years)																	
	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+
Urinary System	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.2	1.0	1.0	3.4	5.0	7.6	13.6	21.7	34.5	43.4	70.4
Urinary Bladder	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.2	0.2	0.5	0.9	0.9	2.6	3.8	8.4	12.0	17.3	36.6
Kidney and Renal Pelvis	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.7	0.5	2.4	3.7	4.8	8.9	12.8	19.3	22.7	31.5
Ureter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.4	0.3	1.8	1.0	1.7
Other Urinary Organs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4	0.2	0.4	0.3	1.5	2.4	0.6
Eye and Orbit	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.3	0.0	0.0	0.3	0.3	0.0	0.8
Brain and Other Nervous System	0.2	1.0	0.5	0.7	0.5	0.7	0.6	1.5	2.9	3.4	6.1	6.2	9.7	10.2	13.1	13.2	17.3	14.4
Endocrine System	0.6	0.0	0.1	0.0	0.1	0.2	0.0	0.4	0.3	0.3	1.3	0.9	0.8	3.6	3.4	3.8	4.8	7.6
Thyroid	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.8	0.6	0.2	2.6	2.6	3.2	4.1	6.5
Other Endocrine including Thymus	0.6	0.0	0.1	0.0	0.1	0.2	0.0	0.4	0.1	0.3	0.5	0.3	0.7	1.1	0.8	0.6	0.7	1.1
Lymphoma	0.0	0.0	0.1	0.1	0.4	0.1	0.6	0.9	0.7	2.1	1.5	4.7	8.6	14.7	23.3	39.5	56.7	77.1
Hodgkin Lymphoma	0.0	0.0	0.0	0.0	0.3	0.0	0.1	0.1	0.1	0.6	0.1	0.8	0.7	1.5	0.8	2.3	2.7	0.6
Non-Hodgkin Lymphoma	0.0	0.0	0.1	0.1	0.1	0.1	0.5	0.8	0.6	1.6	1.4	3.9	7.9	13.2	22.5	37.1	53.9	76.6
Myeloma	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	1.7	3.0	6.1	9.1	17.0	23.1	30.5	28.4
Leukemia	0.8	0.1	0.7	0.7	0.7	0.5	0.6	1.4	1.3	2.5	3.0	5.3	6.9	14.7	26.1	36.9	51.9	65.6
Lymphocytic Leukemia	0.3	0.1	0.4	0.2	0.1	0.0	0.4	0.4	0.2	0.7	0.2	1.0	1.5	4.7	7.3	11.1	13.6	24.5
Acute Lymphocytic Leukemia	0.3	0.1	0.4	0.2	0.1	0.0	0.4	0.4	0.2	0.5	0.1	0.3	0.3	1.1	1.1	2.1	0.3	0.6
Chronic Lymphocytic Leukemia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.5	1.2	3.4	6.0	9.1	12.6	22.2
Other Lymphocytic Leukemia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.3	0.0	0.2	0.3	0.0	0.7	1.7
Myeloid and Monocytic Leukemia	0.3	0.0	0.4	0.3	0.3	0.5	0.1	1.1	1.0	1.7	2.4	3.8	5.1	8.3	15.7	19.0	29.2	29.3
Acute Myeloid Leukemia	0.2	0.0	0.4	0.3	0.2	0.5	0.1	0.8	0.8	1.4	2.1	3.5	4.9	6.6	13.6	16.1	21.4	22.0
Acute Monocytic Leukemia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.6
Chronic Myeloid Leukemia	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.3	0.1	0.1	0.2	0.6	1.1	1.5	4.1	2.8
Other Myeloid/Monocytic Leukemia	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.0	1.1	1.1	1.2	3.4	3.9
Other Leukemia	0.1	0.0	0.0	0.1	0.2	0.0	0.1	0.0	0.1	0.2	0.4	0.5	0.3	1.7	3.1	6.7	9.2	11.8
Miscellaneous	0.2	0.1	0.1	0.1	0.2	0.4	0.6	1.1	1.8	4.8	5.2	15.0	23.4	34.6	53.9	71.7	108	148

Source: Minnesota Center for Health Statistics with Vintage 2009 population estimates. All deaths with the specified cancer as the underlying cause of death during the period are included, regardless of year of diagnosis. All analyses were conducted by MCSS.

§ Rates are per 100,000 females.

Table II-7: The five most commonly diagnosed cancers by race/ethnicity and gender, Minnesota, 2005-2009

Race/Ethnicity‡	Cancer Site	Males			Females			
		Cases	Percent†	Rate§	Cancer Site	Cases	Percent†	Rate§
American Indian Statewide	Prostate	137	23.4	158.1	Breast	109	20.3	88.1
	Lung and Bronchus	115	19.6	147.8	Lung and Bronchus	109	20.3	107.0
	Colon and Rectum	58	9.9	69.0	Colon and Rectum	51	9.5	55.6
	Kidney and Renal Pelvis	58	9.9	48.6	Corpus and Uterus, NOS	35	6.5	26.9
	Leukemia	25	4.3	27.2	Kidney and Renal Pelvis	31	5.8	25.8
	All Sites Combined	586	100.0	640.6	All Sites Combined	537	100.0	477.3
American Indian CHSDA††	Prostate	81	22.6	172.4	Lung and Bronchus	74	22.4	126.1
	Lung and Bronchus	70	19.6	162.9	Breast	62	18.7	96.3
	Colon and Rectum	40	11.2	90.7	Colon and Rectum	36	10.9	69.4
	Kidney and Renal Pelvis	35	9.8	56.2	Corpus and Uterus, NOS	22	6.6	32.3
	Oral Cavity and Pharynx	15	4.2	25.2	Kidney and Renal Pelvis	20	6.0	32.5
	All Sites Combined	358	100.0	729.5	All Sites Combined	331	100.0	547.5
Asian/Pacific Islander	Prostate	107	18.0	62.3	Breast	199	27.1	62.3
	Lung and Bronchus	72	12.1	35.3	Colon and Rectum	70	9.5	26.7
	Colon and Rectum	63	10.6	30.6	Lung and Bronchus	60	8.2	24.7
	Liver and Intrahepatic Bile Duct	53	8.9	24.8	Thyroid	57	7.8	14.5
	Oral Cavity and Pharynx	38	6.4	13.9	Corpus and Uterus, NOS	56	7.6	17.3
	All Sites Combined	596	100.0	284.5	All Sites Combined	733	100.0	249.0
Black	Prostate	524	31.4	209.7	Breast	360	29.6	109.8
	Lung and Bronchus	207	12.4	89.0	Lung and Bronchus	145	11.9	56.5
	Colon and Rectum	141	8.4	49.9	Colon and Rectum	116	9.5	41.7
	Liver and Intrahepatic Bile Duct	102	6.1	37.5	Corpus and Uterus, NOS	57	4.7	21.0
	Kidney and Renal Pelvis	91	5.5	26.7	Non-Hodgkin Lymphoma	49	4.0	13.1
	All Sites Combined	1,669	100.0	624.1	All Sites Combined	1,218	100.0	399.0

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Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cases except those of the urinary bladder were excluded.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

† Percent of all cases diagnosed in the race/gender group.

†† American Indian residents of a county defined by the Indian Health Service as part of the Minnesota Contract Health Service Delivery Area. See Appendix C.

‡ Persons reported with unknown or other race are included in all races combined, but are excluded from race-specific data unless they are Hispanic. Hispanic includes persons of any race, including unknown and other race. Refer to the Methods section for comments on the accuracy of race-specific rates.

Table II-7: The five most commonly diagnosed cancers by race/ethnicity and gender, Minnesota, 2005-2009 (continued)

Race/Ethnicity‡	Cancer Site	Males			Females			
		Cases	Percent†	Rate§	Cancer Site	Cases	Percent†	Rate§
Non-Hispanic White	Prostate	20,739	32.9	176.2	Breast	17,452	31.1	129.5
	Lung and Bronchus	7,417	11.8	65.9	Lung and Bronchus	6,738	12.0	49.6
	Colon and Rectum	5,768	9.1	50.9	Colon and Rectum	5,656	10.1	39.5
	Urinary Bladder	4,405	7.0	40.3	Corpus and Uterus, NOS	3,781	6.7	27.5
	Melanoma of the Skin	3,234	5.1	28.1	Melanoma of the Skin	2,688	4.8	21.8
	All Sites Combined	63,113	100.0	550.2	All Sites Combined	56,193	100.0	415.8
Hispanic all races	Prostate	154	24.5	107.9	Breast	179	28.1	84.9
	Lung and Bronchus	57	9.1	37.2	Thyroid	52	8.2	14.4
	Colon and Rectum	49	7.8	26.0	Corpus and Uterus, NOS	47	7.4	23.9
	Non-Hodgkin Lymphoma	38	6.0	18.9	Colon and Rectum	45	7.1	25.8
	Kidney and Renal Pelvis	35	5.6	17.9	Lung and Bronchus	40	6.3	26.3
	All Sites Combined	629	100.0	339.6	All Sites Combined	637	100.0	295.8

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cases except those of the urinary bladder were excluded.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

† Percent of all cases diagnosed in the race/gender group.

‡ Persons reported with unknown or other race are included in all races combined, but are excluded from race-specific data unless they are Hispanic. Hispanic includes persons of any race, including unknown and other race. Refer to the Methods section for comments on the accuracy of race-specific rates.

Table II-8: Cancer incidence and mortality rates by race/ethnicity†, both genders combined, Minnesota, 2005-2009

Cancer Site	Average Annual Incidence Rate§						Average Annual Mortality Rate§					
	NH White	AI Statewide	AI CHSDA	A/PI	Black	Hispanic	NH White	AI Statewide	AI CHSDA	A/PI	Black	Hispanic
All Sites Combined	472.1	548.8 *	629.4 *	260.6 *	501.0 *	313.7 *	168.9	257.1 *	299.7 *	122.2 *	231.9 *	91.9 *
Childhood (0-14)	15.5	16.2	17.3	15.3	11.8	14.3	2.1	~	~	~	~	~
Brain††	6.5	5.6	9.6	1.9 *	4.0 *	3.3 *	4.5	4.0	~	1.9 *	2.2 *	~
Breast, Female ‡	129.5	88.1 *	96.3 *	62.3 *	109.8 *	84.9 *	21.4	12.1 *	~	14.3 *	27.6	8.6 *
Cervix Uteri ‡	5.7	15.9 *	22.4 *	13.1 *	9.9 *	11.0 *	1.3	~	~	8.3 *	4.1 *	~
Colon and Rectum	44.6	62.3 *	79.3 *	28.4 *	45.7	26.2 *	14.9	25.7 *	28.7 *	9.3 *	16.5	8.3 *
Corpus Uteri†† ‡	27.4	26.9	32.3	17.3 *	21.0	23.9	4.1	~	~	~	7.4	~
Esophagus	5.2	~	~	3.7	7.9 *	~	4.5	~	~	~	5.2	~
Hodgkin Lymphoma	3.1	~	~	~	2.1	2.5	0.4	~	~	~	~	~
Kidney††	15.5	36.8 *	44.1 *	2.8 *	21.1 *	15.7	4.3	11.0 *	15.3 *	~	5.5	4.9
Larynx	3.3	9.0 *	12.5 *	~	4.7	~	0.9	~	~	~	2.3 *	~
Leukemia	15.0	16.7	19.8	6.9 *	11.9	7.8 *	7.8	5.2	~	5.3	4.0 *	2.7 *
Liver††	3.8	13.4 *	16.2 *	14.5 *	21.7 *	7.7 *	4.0	11.7 *	~	19.8 *	19.8 *	5.2
Lung and Bronchus	56.3	124.0 *	141.7 *	29.3 *	70.8 *	31.8 *	44.5	103.0 *	124.9 *	22.6 *	56.7 *	16.9 *
Melanoma††	24.1	5.1 *	~	3.8 *	~	4.1 *	2.4	~	~	~	~	~
Mesothelioma††	1.2	~	~	~	~	~	1.1	~	~	~	~	~
Myeloma	5.7	6.0	~	2.6 *	11.3 *	5.8	3.7	~	~	~	7.9 *	~
NHL††	21.9	18.3	14.9	13.8 *	16.8 *	16.2	7.1	6.4	~	5.6	4.0 *	4.5
Oral Cavity††	11.2	16.5 *	18.5 *	10.8	13.3	7.1 *	1.9	~	~	4.7 *	2.7	~
Ovary †† ‡	12.4	14.2	14.7	5.9 *	8.8	5.6 *	8.3	~	~	4.3 *	10.2	~
Pancreas	10.1	9.7	11.4	9.1	19.5 *	9.2	10.5	9.0	11.3	6.5 *	17.5 *	5.8 *
Prostate ‡	176.2	158.1	172.4	62.3 *	209.7 *	107.8 *	24.2	33.1	32.7	8.3 *	45.5 *	~
Stomach	4.7	11.3 *	11.7 *	11.6 *	9.7 *	10.4 *	2.6	6.7 *	10.3 *	8.3 *	6.3 *	5.4
Testis ‡	7.7	5.2	~	~	1.7 *	2.8 *	0.2	~	~	~	~	~
Thyroid	11.0	8.6	~	9.6	4.2 *	8.2	0.5	~	~	~	~	~
Urinary Bladder	22.8	17.5	21.9	9.6 *	16.6 *	13.5 *	4.1	~	~	~	4.7	~

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality) with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cases except those of the urinary bladder were excluded. Deaths include all deaths with the specified cancer as the underlying cause of death during the time period, regardless of the year of diagnosis.

† AI=American Indian; CHSDA=resident of the Minnesota Contract Health Service Delivery Area. See Appendix C; A/PI=Asian/Pacific Islander; NH=non-Hispanic; Hispanic=Hispanic all races. Persons reported with unknown or other race are excluded from race-specific data unless they are Hispanic. Hispanic includes persons of any race, including unknown and other race.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

†† Brain=brain and other nervous system; Corpus Uteri=corpus uteri and uterus, NOS; Kaposi Sarcoma=Kaposi sarcoma (all sites); Kidney=kidney and renal pelvis; Liver=liver and intrahepatic bile duct; Melanoma=melanoma of the skin; Mesothelioma=mesothelioma (all sites); NHL=non-Hodgkin lymphoma; Oral Cavity=oral cavity and pharynx; Ovary excludes borderline malignancies and histologies 8442, 8451, 8462, 8472, 8373.

‡ Rates for sex-specific sites are per 100,000 persons of the affected gender.

* Rate is significantly different from the rate among non-Hispanic whites ($p < 0.05$).

~ Rate is based on fewer than ten cases or deaths.

Table II-9: Estimated complete cancer prevalence† by cancer site and gender, all races combined, Minnesota, January 1, 2009

Cancer Site	Males		Females		Total	
	Count	Percent	Count	Percent	Count	Percent
All Sites Combined	102,730	100.0	114,440	100.0	217,170	100.0
Brain and Other Nervous System	1,290	1.3	1,120	1.0	2,410	1.1
Breast	270	0.3	47,590	41.6	47,860	22.0
Cervix Uteri	0	0.0	3,860	3.4	3,860	1.8
Colon and Rectum	9,690	9.4	9,950	8.7	19,640	9.0
Corpus and Uterus, NOS	0	0.0	10,980	9.6	10,980	5.1
Esophagus	480	0.5	130	0.1	610	0.3
Hodgkin Lymphoma	1,590	1.5	1,480	1.3	3,070	1.4
Kidney and Renal Pelvis	3,430	3.3	2,330	2.0	5,760	2.7
Larynx	1,230	1.2	290	0.3	1,520	0.7
Leukemia	3,160	3.1	2,240	2.0	5,400	2.5
Liver and Intrahepatic Bile Duct	290	0.3	140	0.1	430	0.2
Lung and Bronchus	2,870	2.8	3,240	2.8	6,110	2.8
Melanoma of the Skin	6,780	6.6	7,710	6.7	14,490	6.7
Myeloma	680	0.7	480	0.4	1,160	0.5
Non-Hodgkin Lymphoma	4,700	4.6	4,200	3.7	8,900	4.1
Oral Cavity and Pharynx	3,130	3.0	1,740	1.5	4,870	2.2
Ovary‡	0	0.0	2,960	2.6	2,960	1.4
Pancreas	290	0.3	270	0.2	560	0.3
Prostate	47,350	46.1	0	0.0	47,350	21.8
Soft Tissues	940	0.9	860	0.8	1,800	0.8
Stomach	490	0.5	370	0.3	860	0.4
Testis	4,420	4.3	0	0.0	4,420	2.0
Thyroid	1,740	1.7	5,530	4.8	7,270	3.3
Urinary Bladder	7,420	7.2	2,570	2.2	9,990	4.6

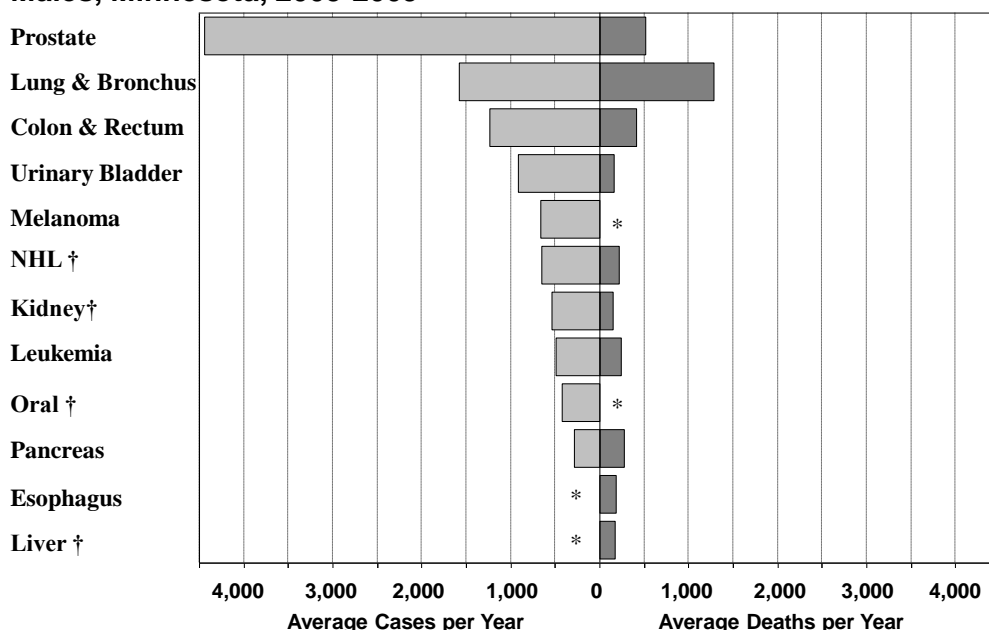
† Estimated number of Minnesotans ever diagnosed with an invasive cancer and alive on January 1, 2009, using the first malignant primary for a person and rounding to the nearest ten persons. Estimates are based on 34-year prevalence percentages for the white population in the SEER 9 areas and completeness indices for all races combined. Estimates are adjusted for differences in cancer incidence between Minnesota and SEER. See the Methods section for more information.

Table II-10: Estimated five-year cancer prevalence† by cancer site and gender, all races combined, Minnesota, January 1, 2009

Cancer Site	Males		Females		Total	
	Count	Percent	Count	Percent	Count	Percent
All Sites Combined	39,290	100.0	35,520	100.0	74,810	100.0
Brain and Other Nervous System	410	1.0	320	0.9	730	1.0
Breast	110	0.3	13,940	39.2	14,050	18.8
Cervix Uteri	0	0.0	580	1.6	580	0.8
Colon and Rectum	3,560	9.1	3,350	9.4	6,910	9.2
Corpus and Uterus, NOS	0	0.0	2,920	8.2	2,920	3.9
Esophagus	320	0.8	90	0.3	410	0.5
Hodgkin Lymphoma	340	0.9	300	0.8	640	0.9
Kidney and Renal Pelvis	1,530	3.9	970	2.7	2,500	3.3
Larynx	420	1.1	100	0.3	520	0.7
Leukemia	1,280	3.3	860	2.4	2,140	2.9
Liver and Intrahepatic Bile Duct	220	0.6	90	0.3	310	0.4
Lung and Bronchus	1,690	4.3	1,870	5.3	3,560	4.8
Melanoma of the Skin	2,260	5.8	2,230	6.3	4,490	6.0
Myeloma	430	1.1	310	0.9	740	1.0
Non-Hodgkin Lymphoma	1,890	4.8	1,630	4.6	3,520	4.7
Oral Cavity and Pharynx	1,200	3.1	570	1.6	1,770	2.4
Ovary‡	0	0.0	910	2.6	910	1.2
Pancreas	220	0.6	200	0.6	420	0.6
Prostate	18,540	47.2	0	0.0	18,540	24.8
Soft Tissues	290	0.7	250	0.7	540	0.7
Stomach	260	0.7	170	0.5	430	0.6
Testis	820	2.1	0	0.0	820	1.1
Thyroid	540	1.4	1,720	4.8	2,260	3.0
Urinary Bladder	2,660	6.8	830	2.3	3,490	4.7

† Estimated number of Minnesotans diagnosed with an invasive cancer between 2005-2009 and alive on January 1, 2009, using the first malignant primary for a person and rounded to the nearest ten persons. Estimates are based on prevalence percentages for the white population in the SEER 9 areas and are adjusted for differences in cancer incidence between Minnesota and SEER. See the Methods section for more information.

Figure II-1: Ten Most Common Cancer Diagnoses and Deaths among Males, Minnesota, 2005-2009

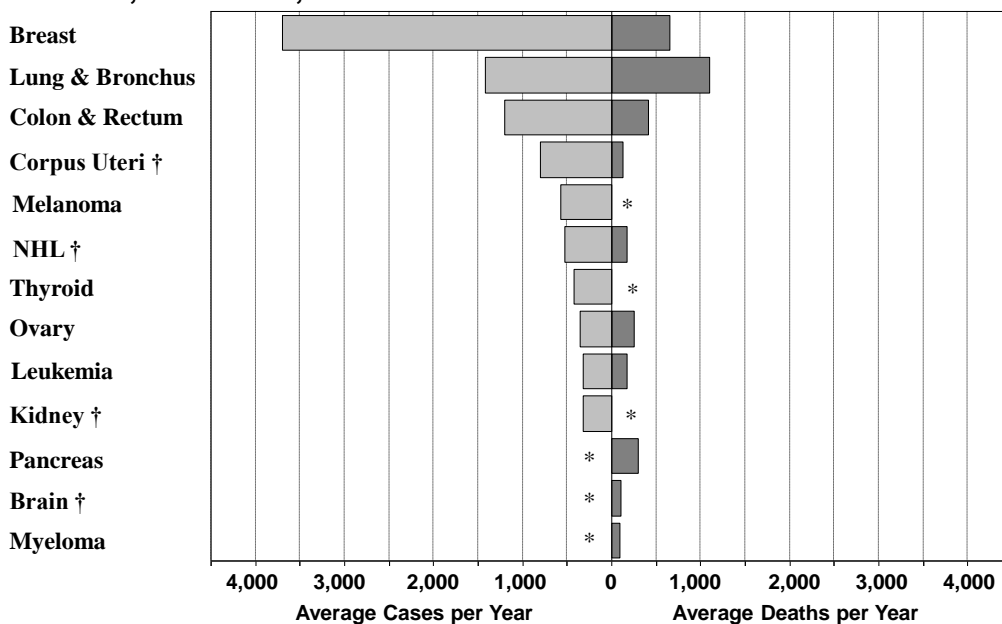


Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.

† NHL is non-Hodgkin lymphoma; kidney includes renal pelvis; oral is oral cavity and pharynx; liver includes intrahepatic bile duct.

* Not among the ten leading causes.

Figure II-2: Ten Most Common Cancer Diagnoses and Deaths among Females, Minnesota, 2005-2009

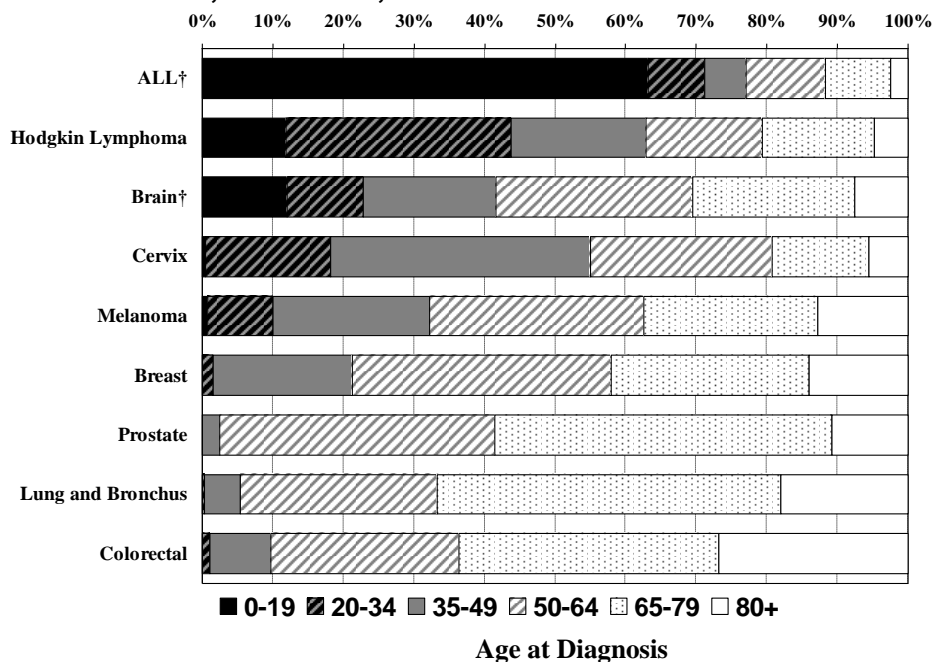


Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.

† Corpus uteri includes uterus, NOS; NHL is non-Hodgkin lymphoma; kidney includes renal pelvis; brain includes other nervous system.

* Not among the ten leading causes.

Figure II-3: Percent of Cancers Diagnosed by Age Category for Selected Cancers, Minnesota, 2005-2009

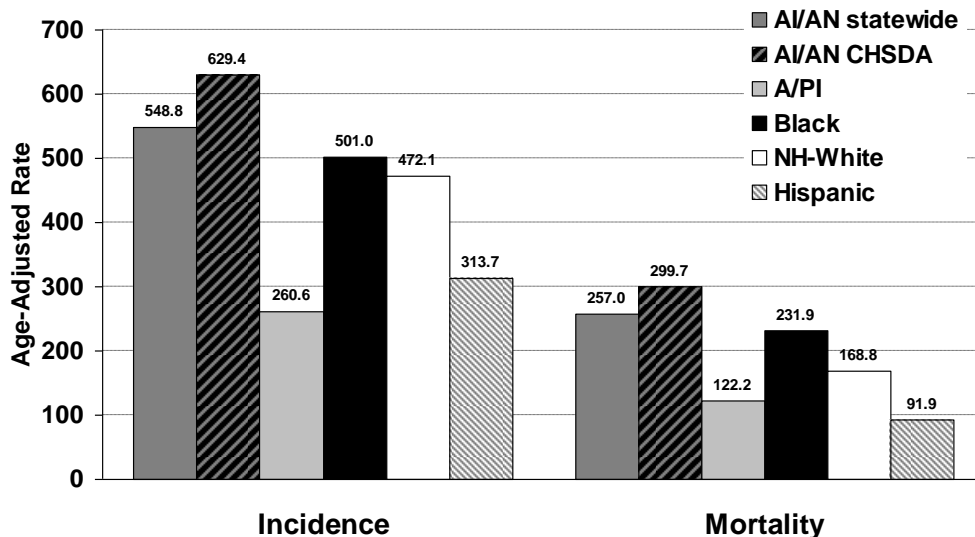


Source: MCSS December 2011, with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.

† ALL is acute lymphocytic leukemia; brain includes other nervous system.

* Not among the ten leading causes.

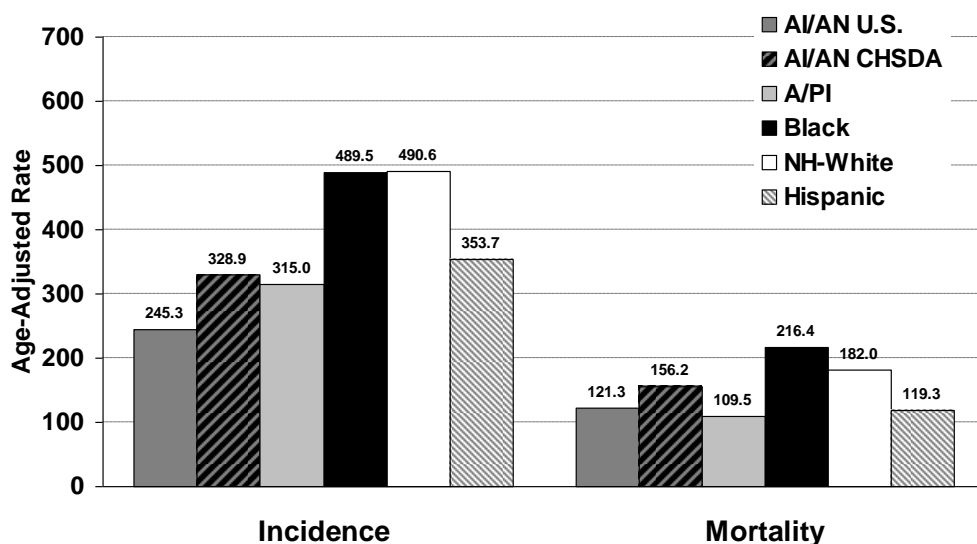
Figure II-4: Cancer Incidence and Mortality Rates by Race and Ethnicity,† Minnesota, 2005-2009, All Cancer Sites Combined



Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Rates are per 100,000 persons and are age-adjusted to the 2000 US population.

† AI/AN is American Indian/Alaska Native; CHSDA is a resident in a Contract Health Services Delivery Area; A/PI is Asian/Pacific Islander; NH is non-Hispanic; Hispanic includes all races.

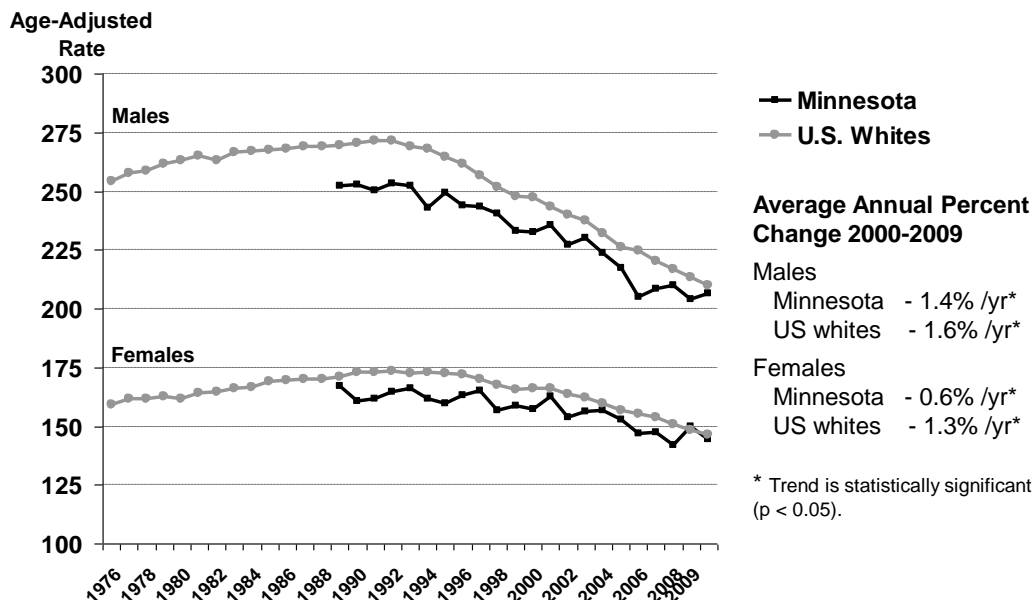
Figure II-5: Cancer Incidence and Mortality Rates by Race and Ethnicity,† U.S., 2005-2009, All Cancer Sites Combined



Source: *SEER Cancer Statistics Review, 1975-2009*, with Vintage 2009 population estimates. Incidence data are from the SEER 18 areas. Mortality data are for the entire US. *In situ* cancers except those of the urinary bladder were excluded. Rates are per 100,000 persons and are age-adjusted to the 2000 US population.

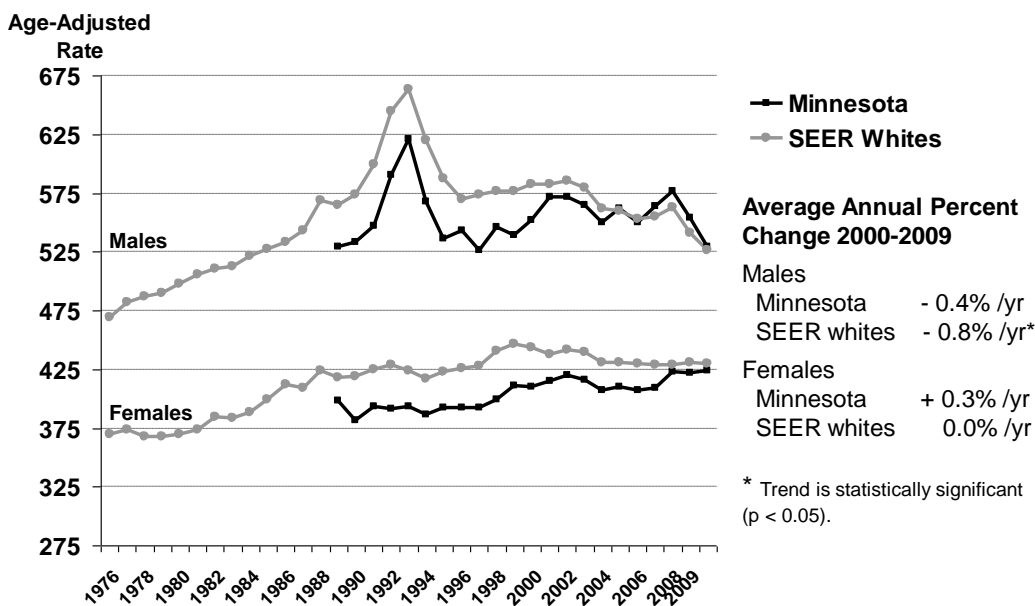
† AI/AN is American Indian/Alaska Native; CHSDA is a resident in a Contract Health Services Delivery Area; A/PI is Asian/Pacific Islander; NH is non-Hispanic; Hispanic includes all races.

Figure II-6: Long-term Trends in Overall Cancer Mortality by Gender, Minnesota and the U.S., 1975-2009



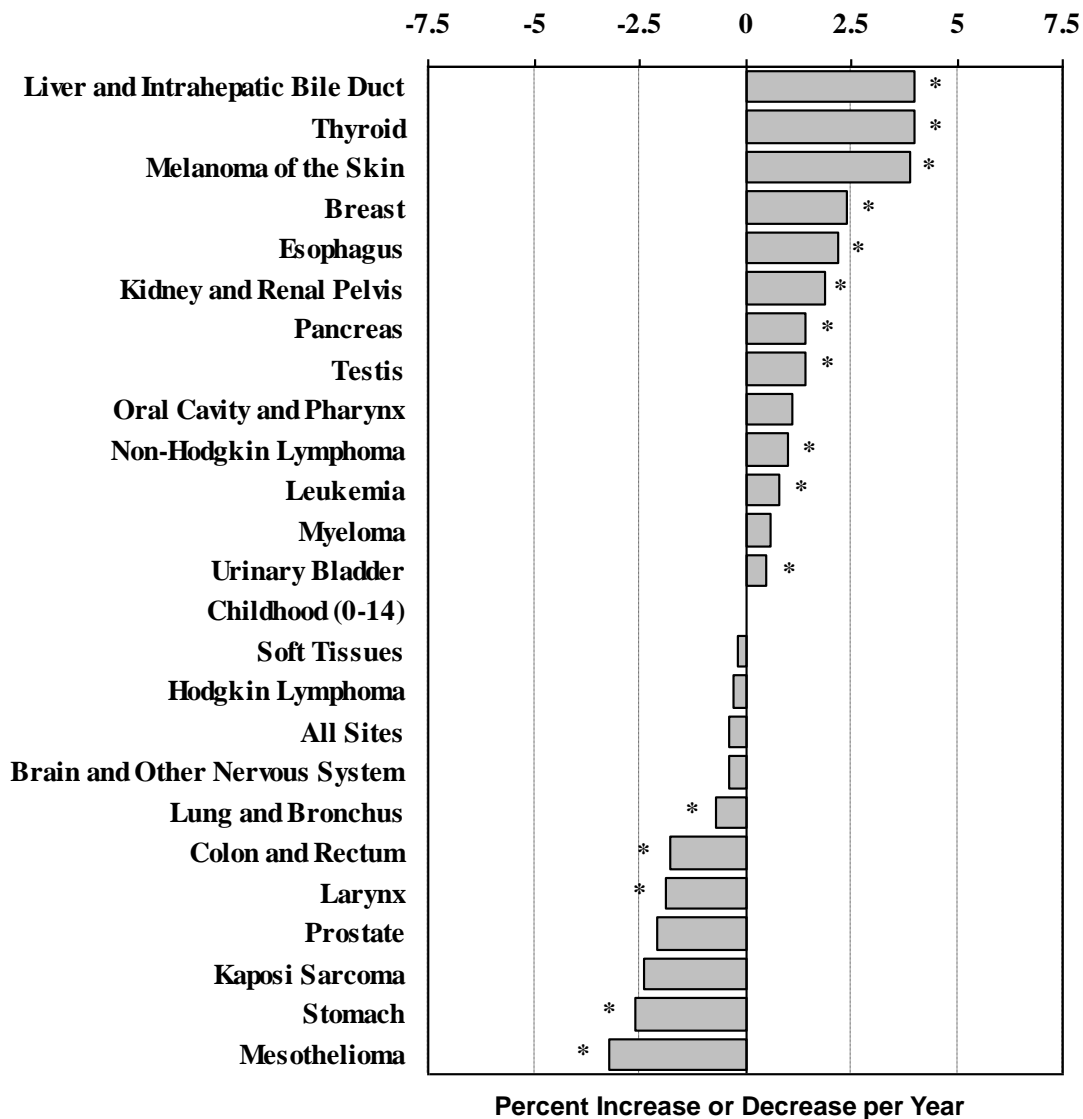
Source: Minnesota Center for Health Statistics and *SEER Cancer Statistics Review, 1975-2009*, with Vintage 2009 population estimates. Deaths include all deaths with cancer listed as the underlying cause of death during the time period. Rates for Minnesota are for all races combined. Rates for the US are for white persons, including Hispanics. Rates are per 100,000 persons and are age-adjusted to the 2000 US population.

Figure II-7: Long-term Trends in Overall Cancer Incidence by Gender, Minnesota and SEER, 1975-2009



Source: MCSS December 2011 and *SEER Cancer Statistics Review, 1975-2009*, with Vintage 2009 population estimates. Rates for Minnesota do not include cancers only clinically diagnosed and are for all races combined. Rates for the SEER 9 areas include clinically diagnosed cancers and are for white persons, including Hispanics. *In situ* cancers except those of the urinary bladder were excluded by both registries. Rates are per 100,000 persons and are age-adjusted to the 2000 US population.

Figure II-8: Average Annual Percent Change in Cancer Incidence among Males, Minnesota, 2000-2009

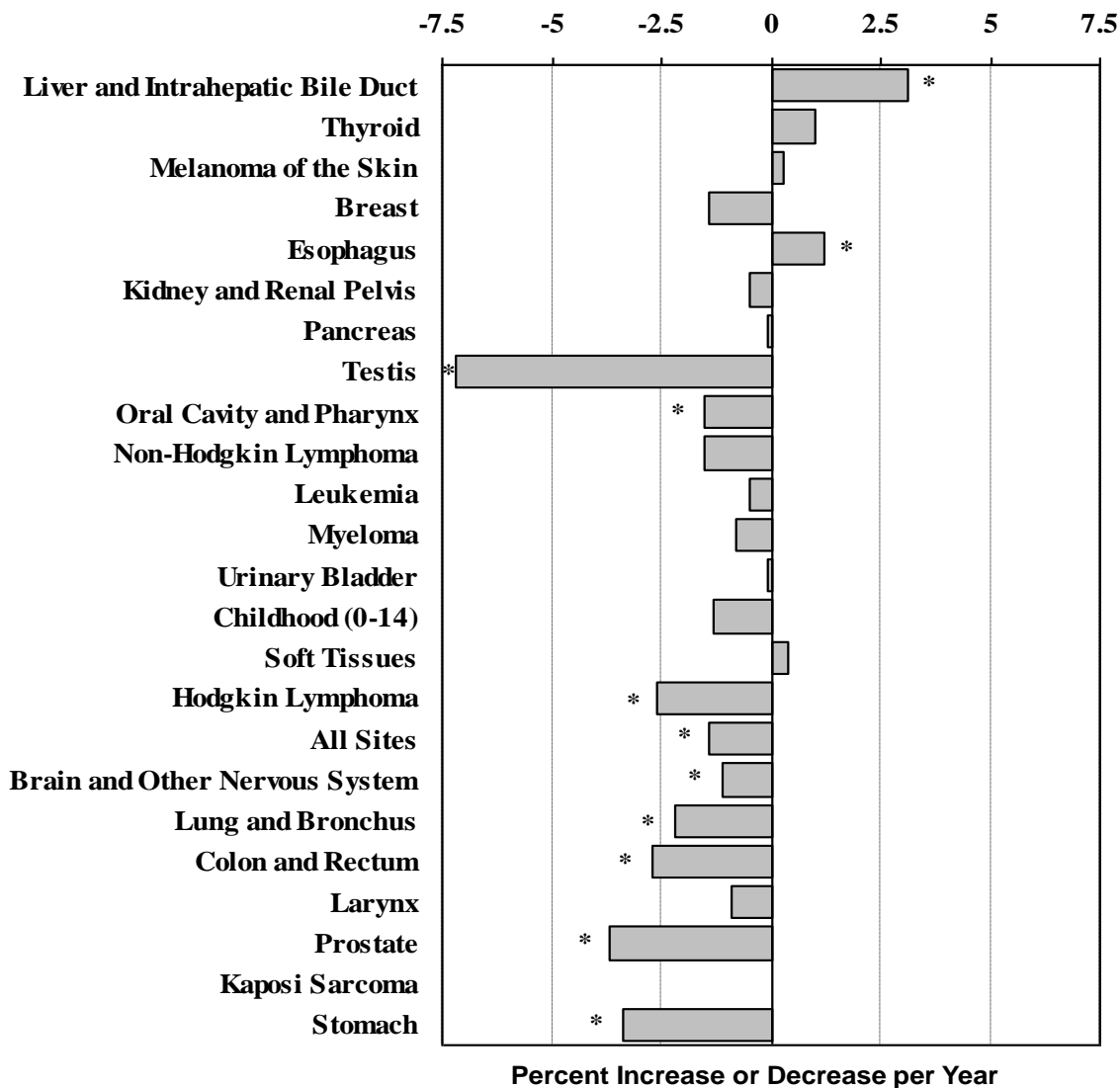


Source: MCSS December 2011, with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.

The Average Annual Percent Change (AAPC) is from Joinpoint regression on the annual age-adjusted rates from 1988 to 2009, and represents a weighted average of the trends during the most recent ten-year period. Please see the text for more details.

* The AAPC is statistically significant.

Figure II-9: Average Annual Percent Change in Cancer Mortality among Males, Minnesota, 2000-2009

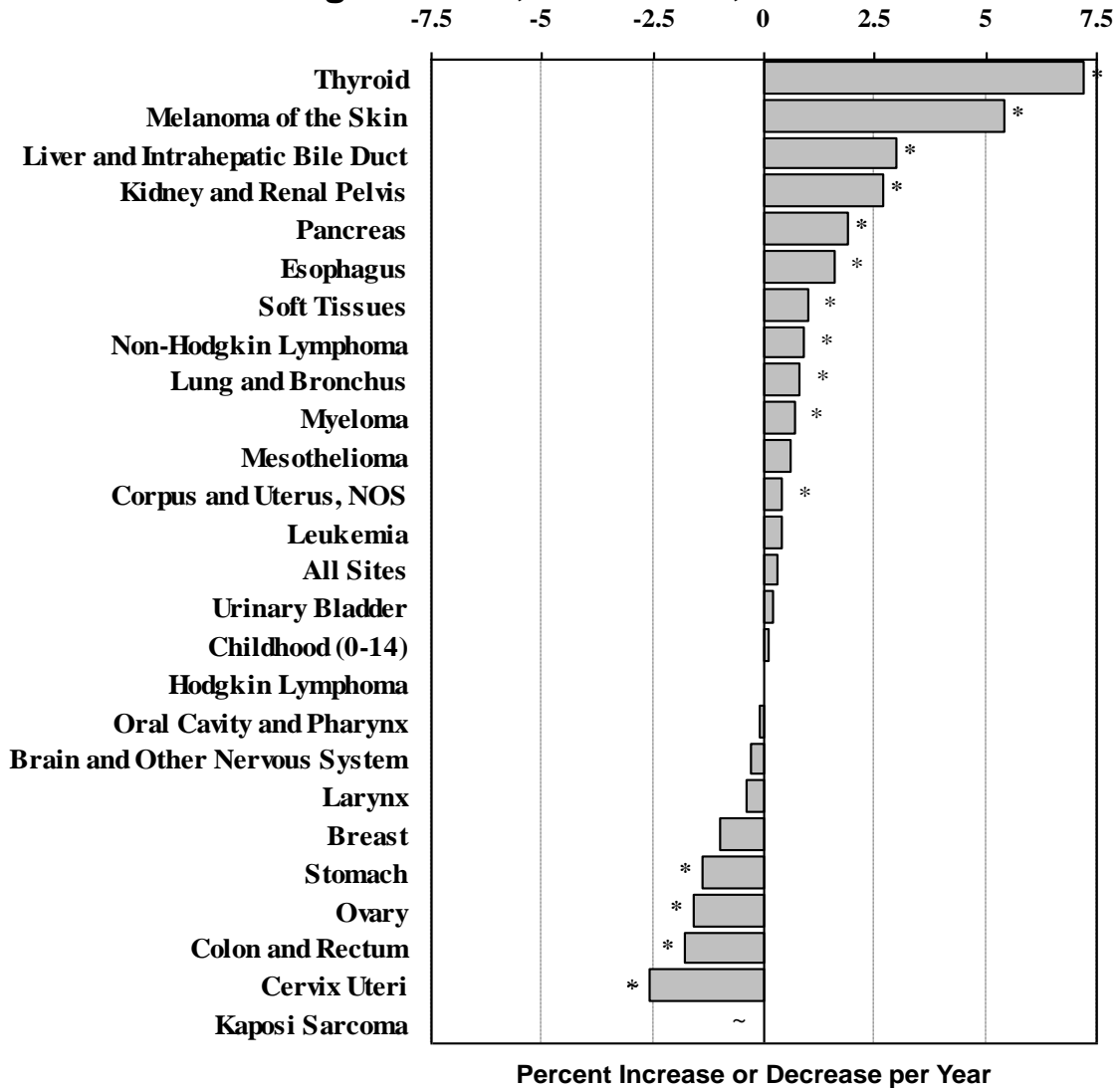


Source: Minnesota Center for Health Statistics, with Vintage 2009 population estimates. All analyses were conducted by MCSS.

The Average Annual Percent Change (AAPC) is from Joinpoint regression on the annual age-adjusted rates from 1988 to 2009, and represents a weighted average of the trends during the most recent ten-year period. Please see the text for more details.

* The AAPC is statistically significant.

Figure II-10: Average Annual Percent Change in Cancer Incidence among Females, Minnesota, 2000-2009

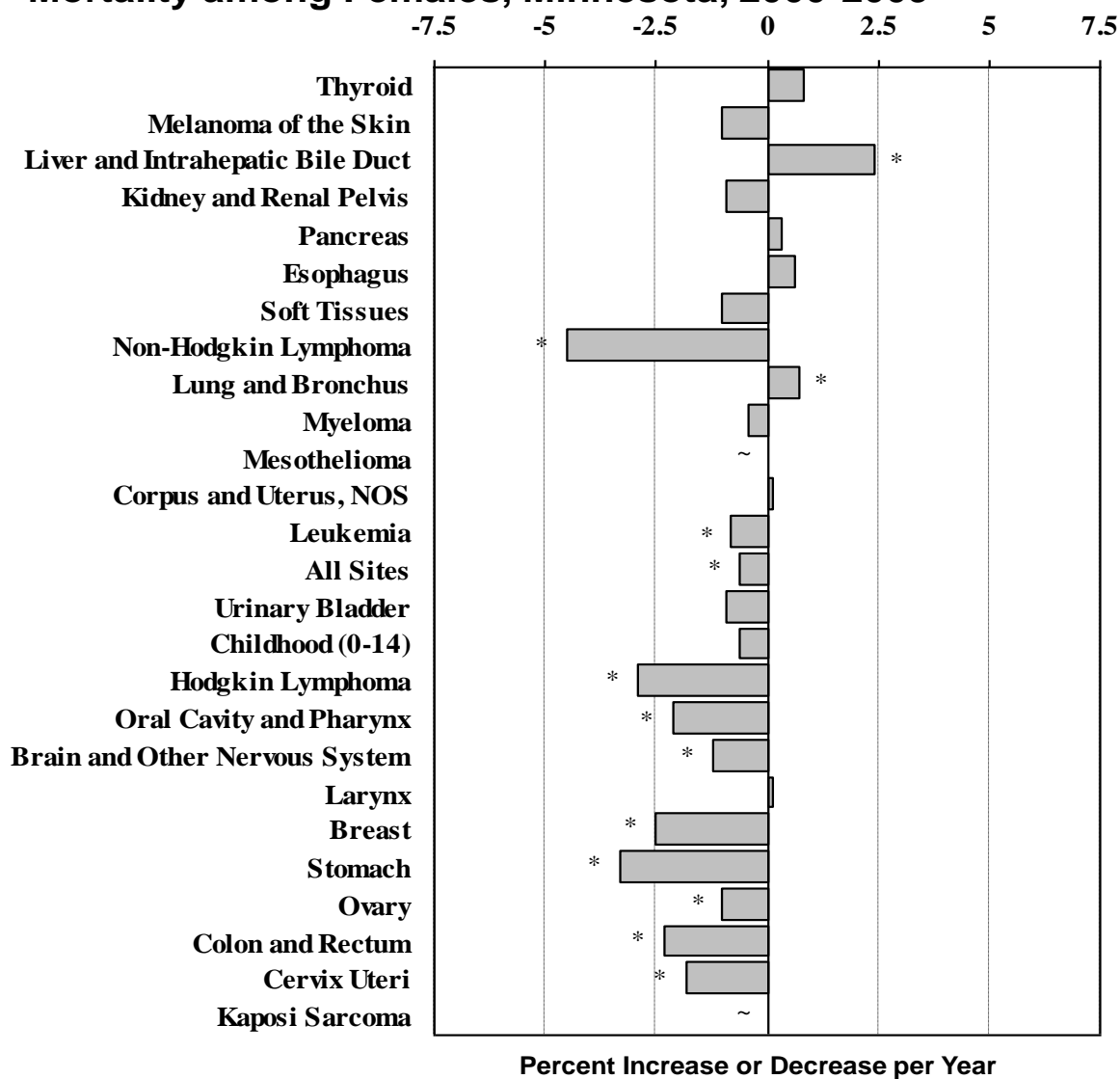


Source: MCSS December 2011, with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.

The Average Annual Percent Change (AAPC) is from Joinpoint regression on the annual age-adjusted rates from 1988 to 2009, and represents a weighted average of the trends during the most recent ten-year period. Please see the text for more details.

* The AAPC is statistically significant.

Figure II-11: Average Annual Percent Change in Cancer Mortality among Females, Minnesota, 2000-2009

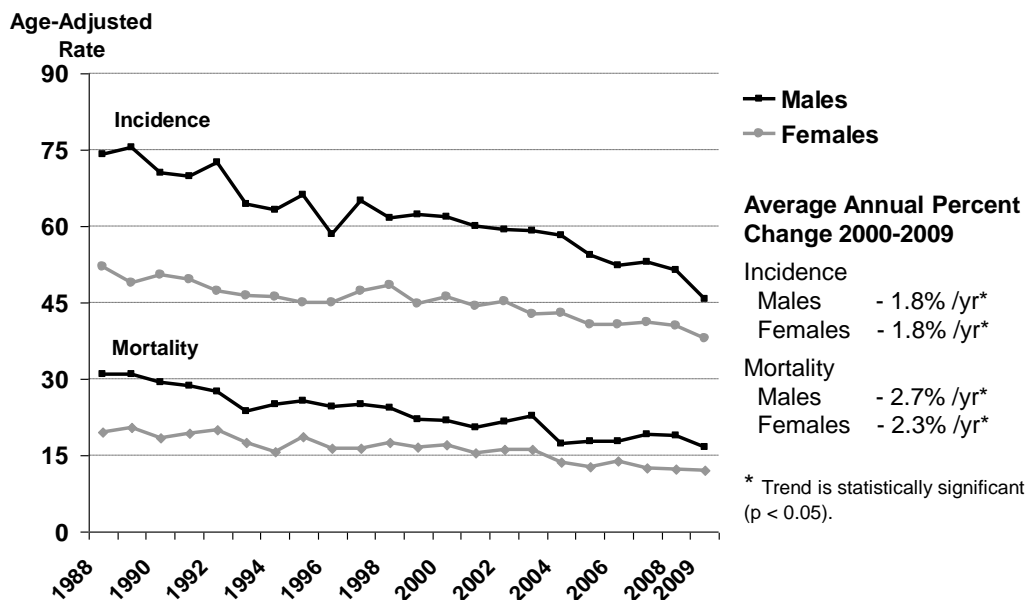


Source: Minnesota Center for Health Statistics, with Vintage 2009 population estimates. All analyses were conducted by MCSS.

The Average Annual Percent Change (AAPC) is from Joinpoint regression on the annual age-adjusted rates from 1988 to 2009, and represents a weighted average of the trends during the most recent ten-year period. Please see the text for more details.

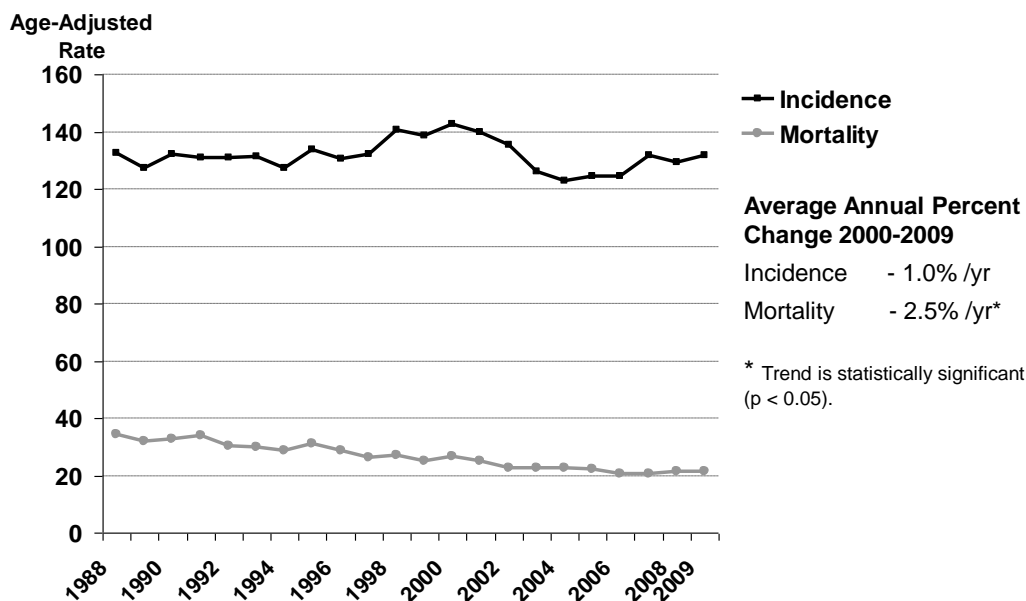
* The AAPC is statistically significant.

Figure II-12: Trends in Colorectal Cancer Incidence and Mortality by Gender, Minnesota, 1988-2009



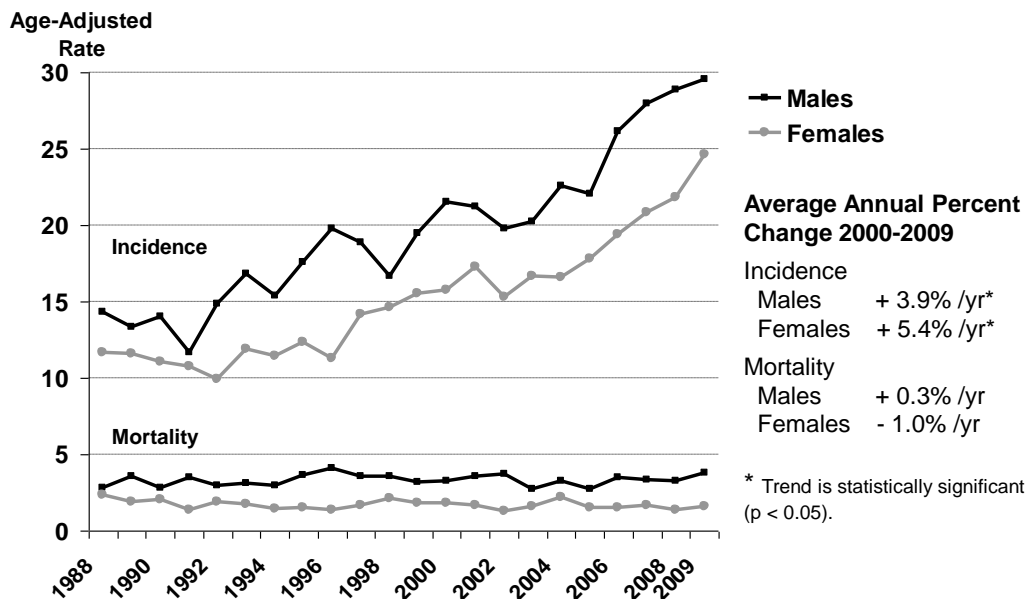
Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Deaths include all deaths with cancer listed as the underlying cause of death during the time period. Rates are per 100,000 persons and are age-adjusted to the 2000 US population.

Figure II-13: Trends in Female Breast Cancer Incidence and Mortality, Minnesota, 1988-2009



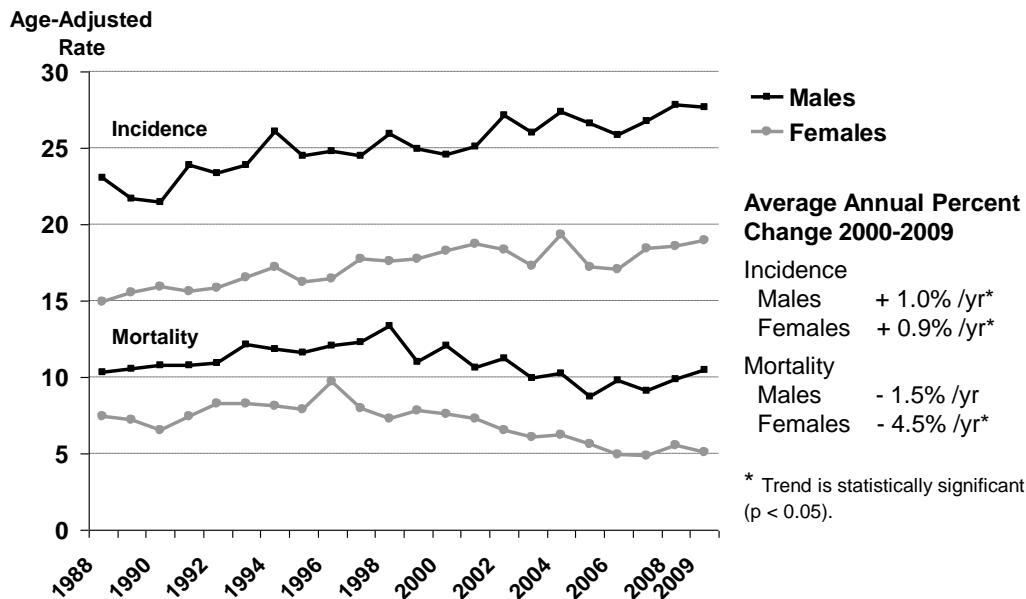
Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Deaths include all deaths with cancer listed as the underlying cause of death during the time period. Rates are per 100,000 females and are age-adjusted to the 2000 US population.

Figure II-14: Trends in Melanoma of the Skin Incidence and Mortality by Gender, Minnesota, 1988-2009



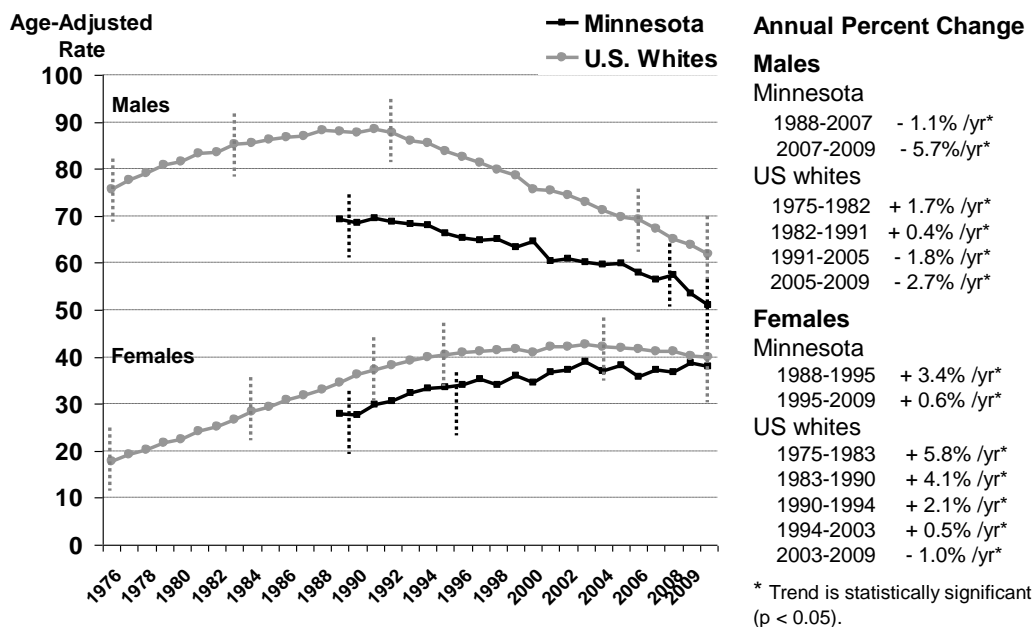
Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Deaths include all deaths with cancer listed as the underlying cause of death during the time period. Rates are per 100,000 persons and are age-adjusted to the 2000 US population.

Figure II-15: Trends in Non-Hodgkin Lymphoma Incidence and Mortality by Gender, Minnesota, 1988-2009



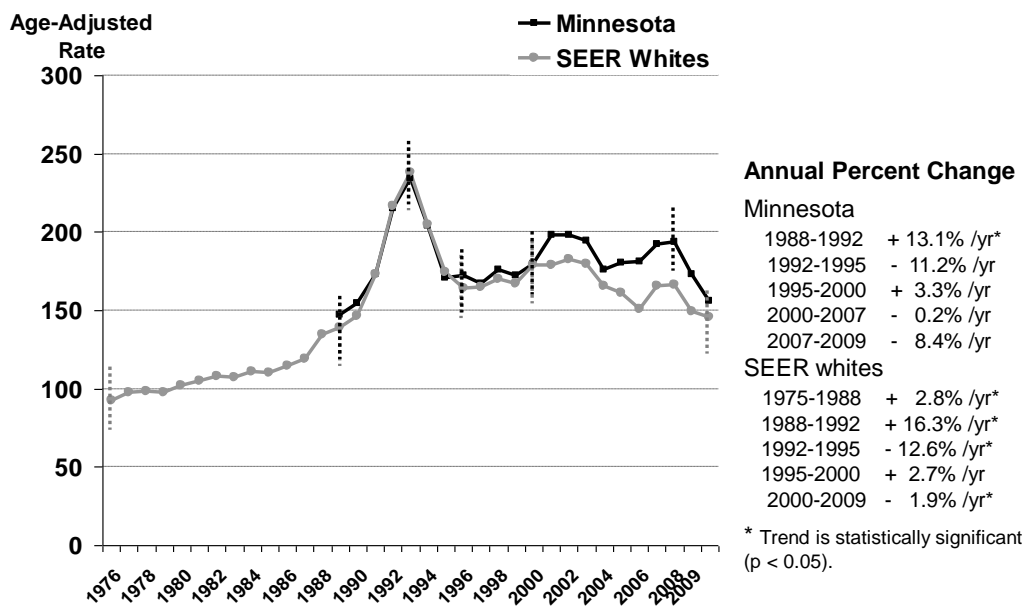
Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Deaths include all deaths with cancer listed as the underlying cause of death during the time period. Rates are per 100,000 persons and are age-adjusted to the 2000 US population.

Figure II-16: Long-term Trends in Lung Cancer Mortality by Gender, Minnesota and the U.S., 1975-2009



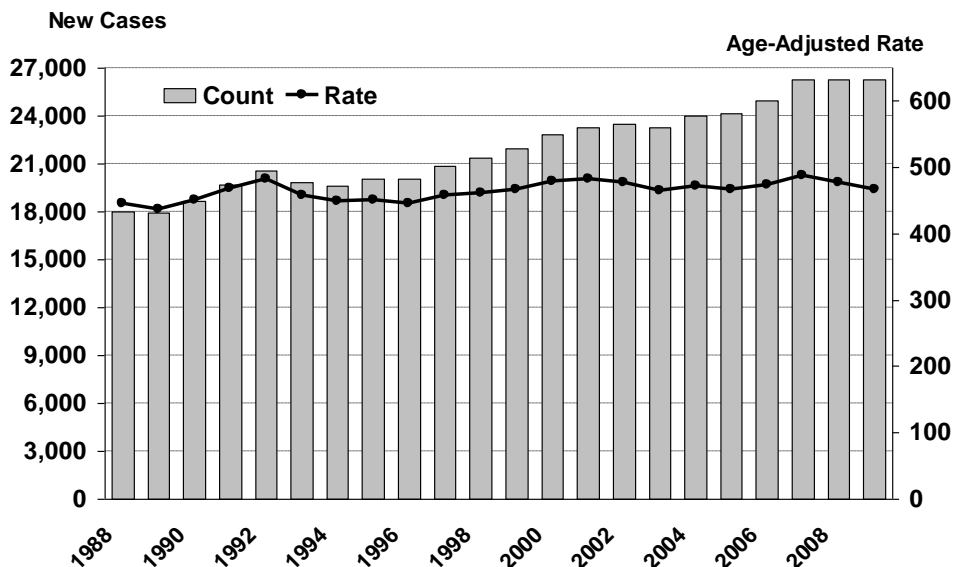
Source: Minnesota Center for Health Statistics and *SEER Cancer Statistics Review, 1975-2009*, with Vintage 2009 population estimates. Deaths include all deaths with cancer listed as the underlying cause of death during the time period. Rates for Minnesota are for all races combined. Rates for the US are for white persons, including Hispanics. Rates are per 100,000 persons and are age-adjusted to the 2000 US population.

Figure II-17: Trends in Prostate Cancer Incidence, Minnesota and SEER, 1988-2009



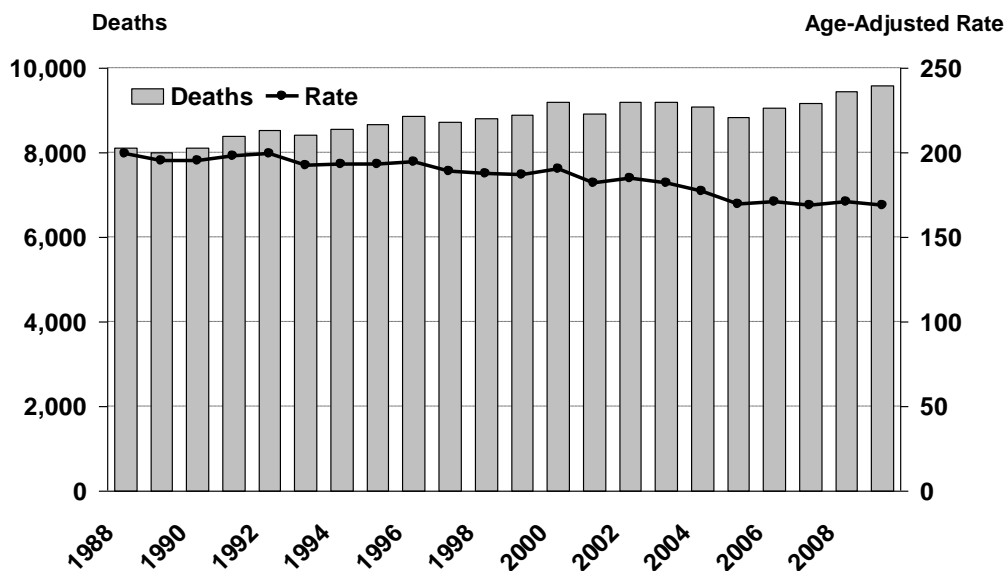
Source: MCSS December 2011 and *SEER Cancer Statistics Review, 1975-2009*, with Vintage 2009 population estimates. Rates for Minnesota do not include cancers only clinically diagnosed and are for all races combined. Rates for the SEER 9 areas include clinically diagnosed cancers and are for white persons, including Hispanics. *In situ* cancers except those of the urinary bladder were excluded by both registries. Rates are per 100,000 persons and are age-adjusted to the 2000 US population.

Figure II-18: Cancer Incidence in Minnesota by Year, 1988-2009



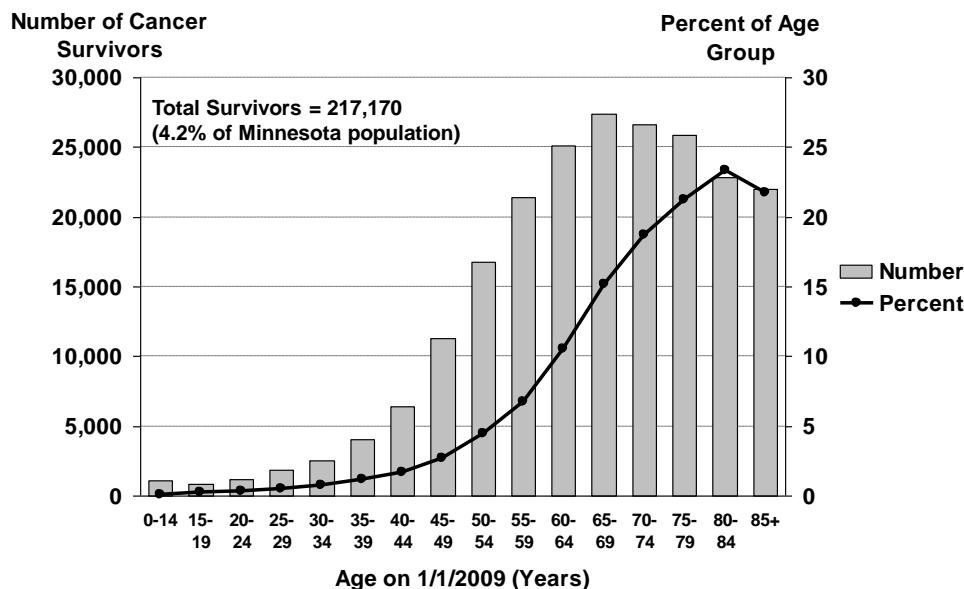
Source: MCSS December 2011, with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Rates are per 100,000 persons and are age-adjusted to the 2000 US population.

Figure II-19: Cancer Mortality in Minnesota by Year, 1988-2009



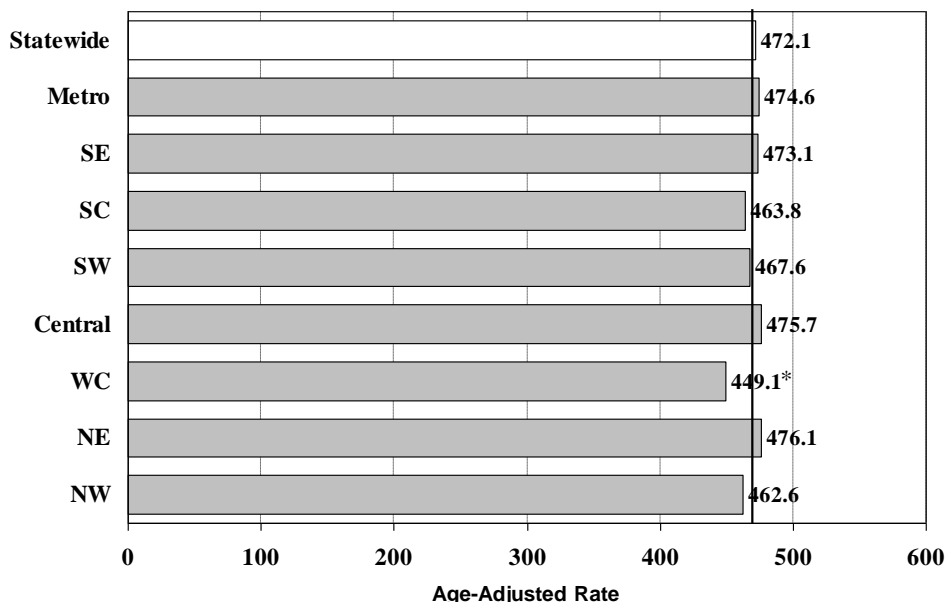
Source: Minnesota Center for Health Statistics, with Vintage 2009 population estimates. All analyses were conducted by MCSS. Deaths include all deaths with cancer listed as the underlying cause of death during the time period. Rates are per 100,000 persons and are age-adjusted to the 2000 US population.

Figure II-20: Number of Cancer Survivors and Percent of the Population with a History of Cancer by Age, Minnesota, January 1, 2009



Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Deaths include all deaths with cancer listed as the underlying cause of death during the time period. Rates are per 100,000 persons and are age-adjusted to the 2000 US population.

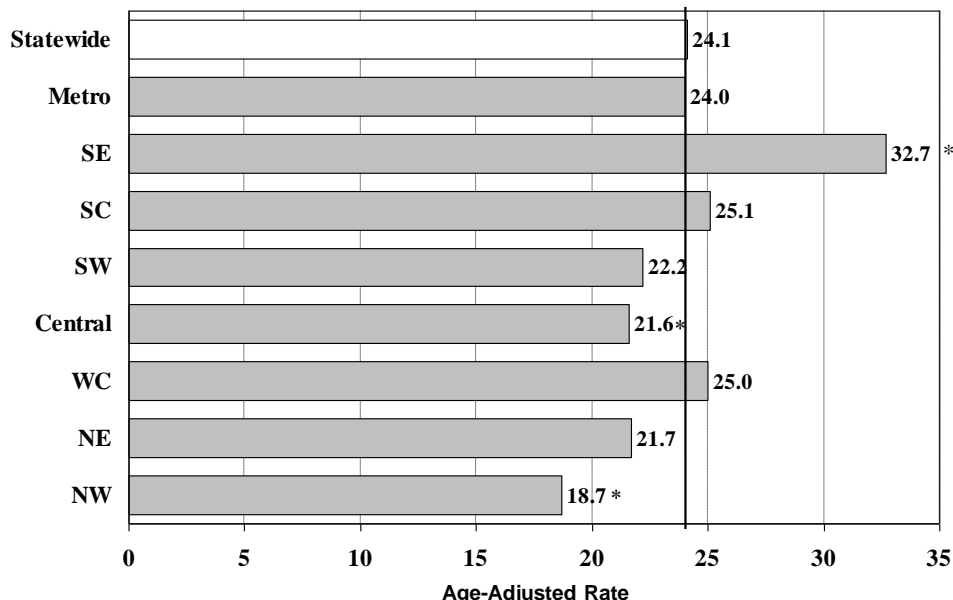
Figure II-21: Cancer Incidence among Non-Hispanic Whites by Region, Minnesota, 2005-2009, All Cancer Sites Combined



Source: MCSS December 2011, with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Rates are per 100,000 persons and are age-adjusted to the 2000 US population.

* Regional rate is significantly ($p < 0.05$) different from the statewide rate.

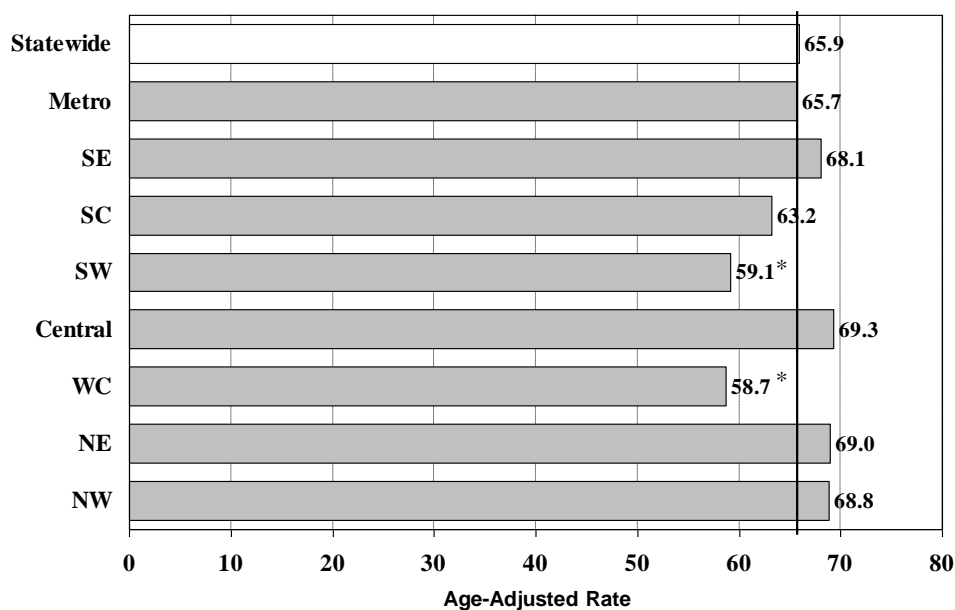
Figure II-22: Melanoma of the Skin Incidence among Non-Hispanic Whites by Region, Minnesota, 2005-2009



Source: MCSS December 2011, with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Rates are per 100,000 persons and are age-adjusted to the 2000 US population.

* Regional rate is significantly ($p < 0.05$) different from the statewide rate.

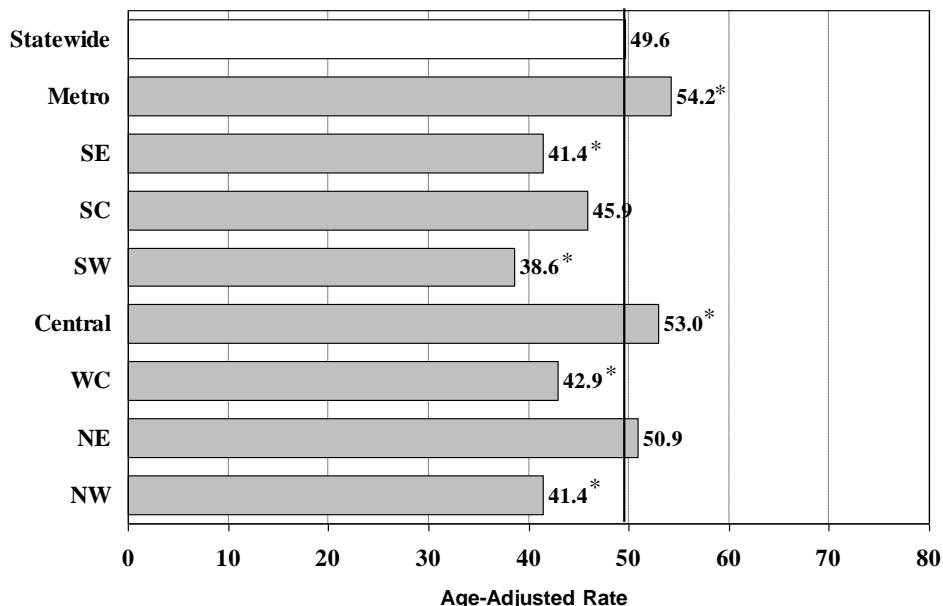
Figure II-23: Lung and Bronchus Cancer Incidence among Non-Hispanic White Males by Region, Minnesota, 2005-2009



Source: MCSS December 2011, with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Rates are per 100,000 persons and are age-adjusted to the 2000 US population.

* Regional rate is significantly ($p < 0.05$) different from the statewide rate.

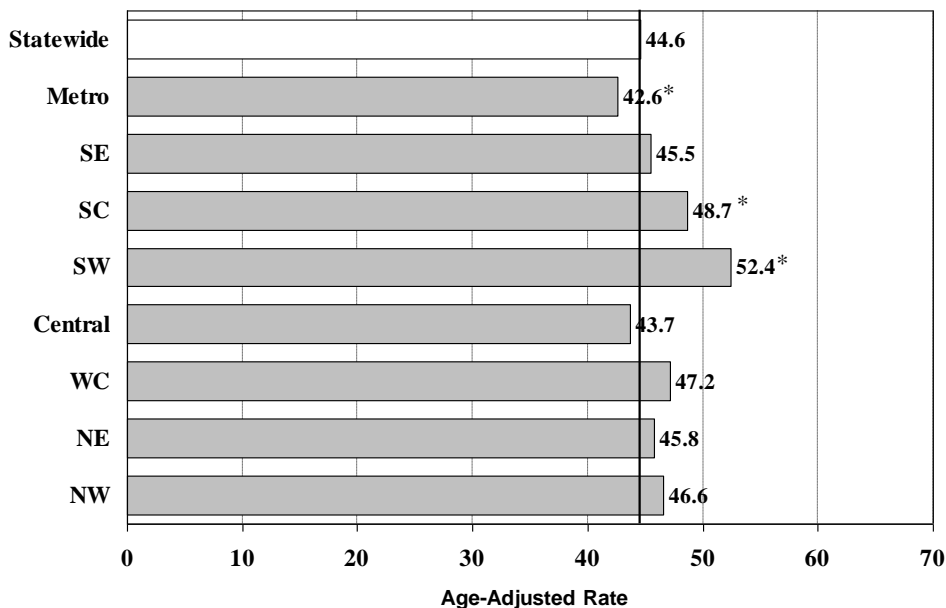
Figure II-24: Lung and Bronchus Cancer Incidence among Non-Hispanic White Females by Gender and Region, Minnesota, 2005-2009



Source: MCSS December 2011, with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Rates are per 100,000 persons and are age-adjusted to the 2000 US population.

* Regional rate is significantly ($p < 0.05$) different from the statewide rate.

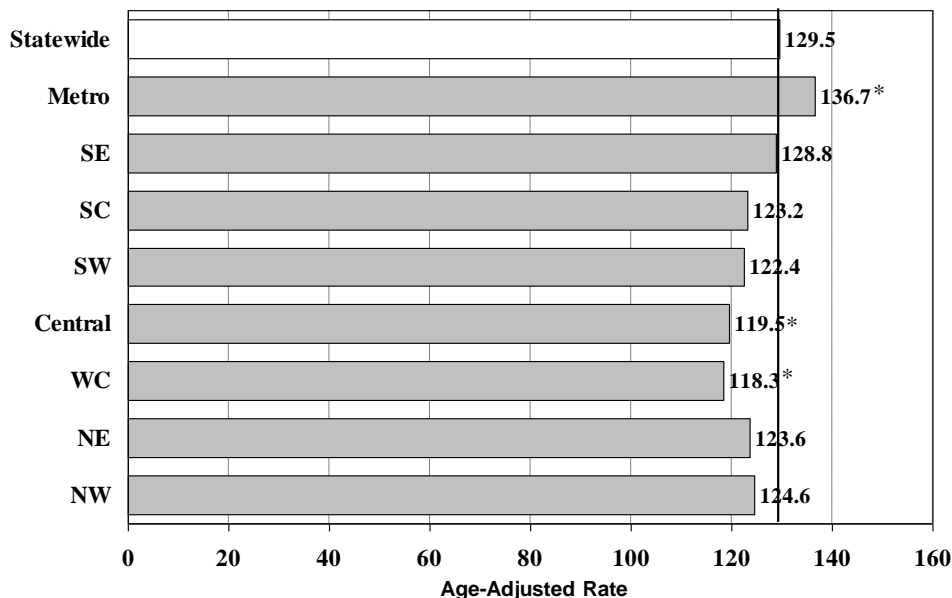
Figure II-25: Colon and Rectum Cancer Incidence among Non-Hispanic Whites by Region, Minnesota, 2005-2009



Source: MCSS December 2011, with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Rates are per 100,000 persons and are age-adjusted to the 2000 US population.

* Regional rate is significantly ($p < 0.05$) different from the statewide rate.

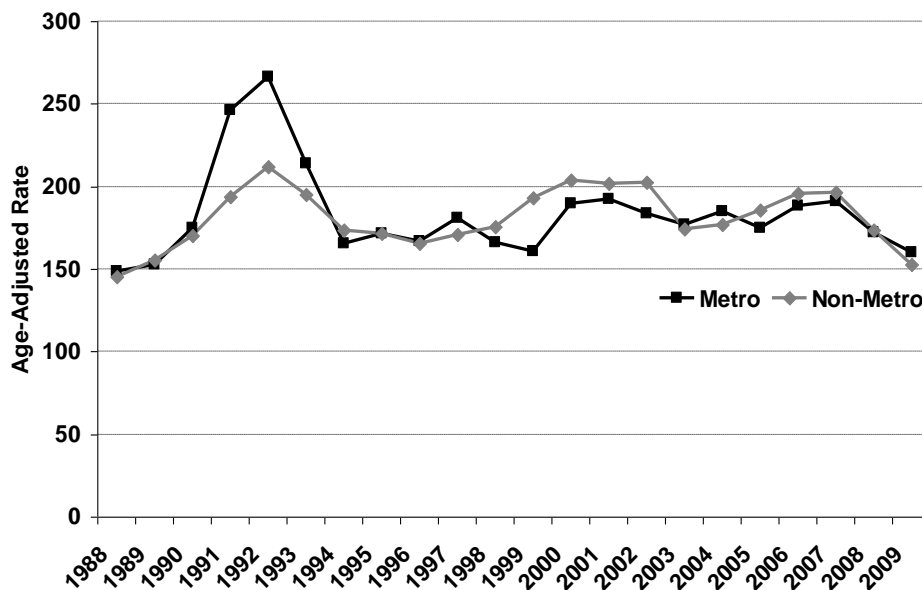
Figure II-26: Female Breast Cancer Incidence among Non-Hispanic Whites by Region, Minnesota, 2005-2009



Source: MCSS December 2011, with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Rates are per 100,000 persons and are age-adjusted to the 2000 US population.

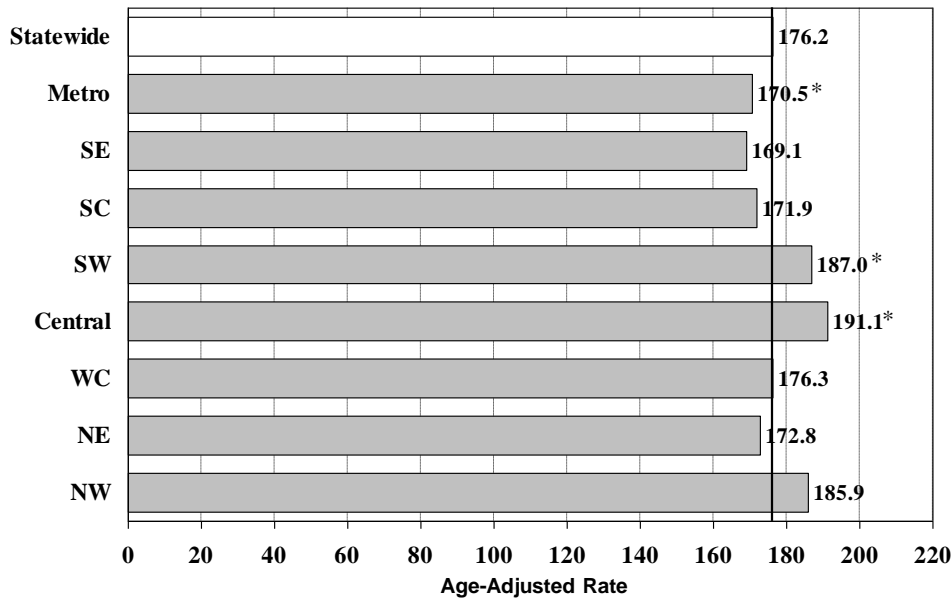
* Regional rate is significantly ($p < 0.05$) different from the statewide rate.

Figure II-27: Prostate Cancer Incidence Trends by Region, All Races Combined, Minnesota, 1988-2009



Source: MCSS December 2011, with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Rates are per 100,000 persons and are age-adjusted to the 2000 US population.

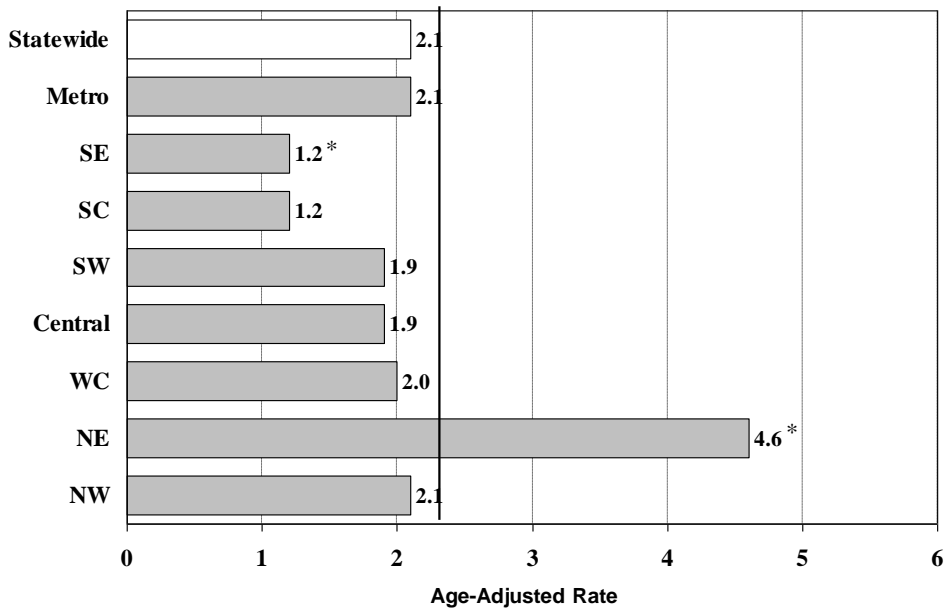
Figure II-28: Prostate Cancer Incidence among Non-Hispanic Whites by Region, Minnesota, 2005-2009



Source: MCSS December 2011, with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Rates are per 100,000 persons and are age-adjusted to the 2000 US population.

* Regional rate is significantly ($p < 0.05$) different from the statewide rate.

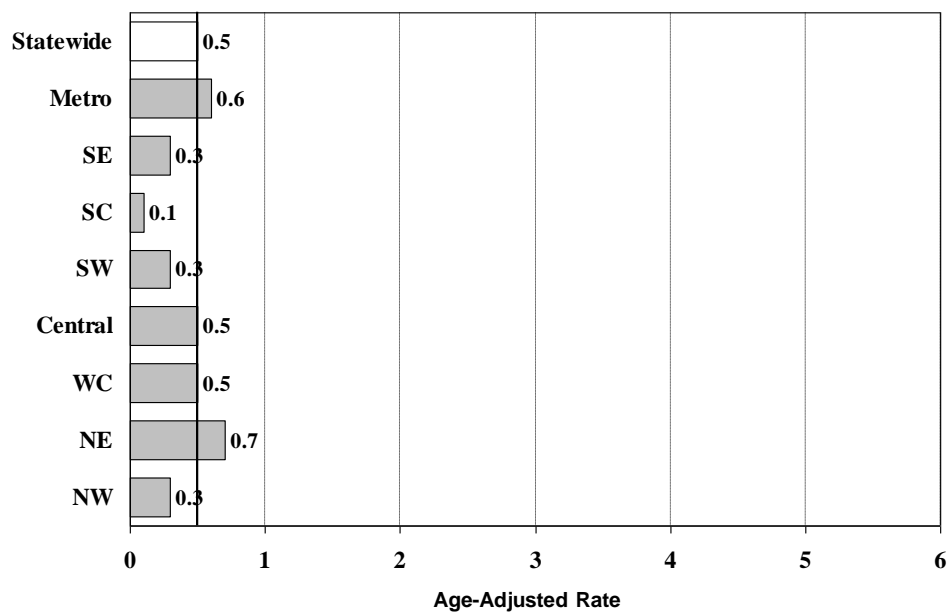
Figure II-29: Mesothelioma Incidence among Non-Hispanic White Males by Region, Minnesota, 2005-2009



Source: MCSS December 2011, with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Rates are per 100,000 persons and are age-adjusted to the 2000 US population.

* Regional rate is significantly ($p < 0.05$) different from the statewide rate.

Figure II-30: Mesothelioma Incidence among Non-Hispanic White Females by Region, Minnesota, 2005-2009



Source: MCSS December 2011, with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Rates are per 100,000 persons and are age-adjusted to the 2000 US population.

* Regional rate is significantly ($p < 0.05$) different from the statewide rate.

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Chapter III: Summary of Data for Specific Cancers

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Chapter III: Summary of Data for Specific Cancers

Introduction

This chapter provides detailed information on the most common cancers, using cases reported to the Minnesota Cancer Surveillance System (MCSS) and deaths reported to the Minnesota Center for Health Statistics (MCHS).

As discussed in Chapter I, data for American Indians in Minnesota are presented for American Indians statewide and also for those living in counties designated by the Indian Health Service as part of a Contract Health Service Delivery Area (CHSDA) (Appendix C, Table 2). Rates for American Indians based on CHSDA residents may be more accurate.

Cancer incidence rates in Minnesota are compared to those from the National Cancer Institute's Surveillance, Epidemiology, and End Results (SEER) Program. Cancer mortality rates in Minnesota are compared to those for the United States as a whole.

See Chapter I, Introduction, for more information about data sources and other information about interpreting the data. See also the Glossary (Appendix D) and Statistical Methods (Appendix E).

All Cancer Sites Combined

Table III-1.1: Number of new cases and deaths and incidence and mortality rates by year and gender, Minnesota, 1988-2009, All Cancer Sites Combined

Year	Incidence				Mortality			
	New Cases		Rate§		Deaths		Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
1988	9,147	8,867	528.8	398.3	4,205	3,895	252.3	166.8
1989	9,336	8,583	533.2	381.4	4,220	3,789	252.5	160.4
1990	9,723	8,928	547.3	392.9	4,256	3,857	250.3	161.8
1991	10,696	8,985	590.4	391.0	4,362	4,014	253.1	164.8
1992	11,388	9,188	620.8	393.3	4,422	4,116	252.3	166.0
1993	10,651	9,149	567.8	386.8	4,317	4,088	242.7	161.7
1994	10,226	9,405	536.1	391.8	4,487	4,055	249.3	159.6
1995	10,484	9,547	543.2	392.1	4,463	4,209	243.9	162.8
1996	10,338	9,688	526.6	392.6	4,541	4,309	243.4	164.8
1997	10,835	10,005	546.0	399.4	4,556	4,178	240.5	156.7
1998	10,890	10,449	539.3	411.3	4,480	4,314	233.2	158.7
1999	11,367	10,549	552.2	410.2	4,575	4,301	232.5	156.9
2000	11,992	10,809	571.5	414.9	4,696	4,503	235.7	162.4
2001	12,195	11,086	571.3	420.3	4,610	4,296	227.0	153.7
2002	12,316	11,161	565.0	416.2	4,745	4,455	229.9	156.0
2003	12,218	11,062	550.0	407.5	4,700	4,482	223.6	156.5
2004	12,721	11,301	562.1	409.6	4,644	4,445	217.3	152.5
2005	12,748	11,378	550.3	406.6	4,464	4,359	204.7	147.0
2006	13,353	11,600	564.2	409.0	4,661	4,404	208.3	147.1
2007	14,033	12,248	576.9	423.1	4,813	4,355	209.7	141.9
2008	13,887	12,376	553.4	422.2	4,783	4,656	203.8	149.5
2009	13,668	12,613	529.4	423.7	4,979	4,591	206.6	144.2

Source: See footnotes for Table III-1.2.

Table III-1.2: Trends in incidence and mortality by gender using the Joinpoint Regression Program† with up to four joinpoints, Minnesota, 1988-2009, All Cancer Sites Combined

	Incidence				Mortality			
	Males		Females		Males		Females	
	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†
Interval 1	1988-1992	3.8*	1988-1995	0.0	1988-1996	-0.5	1988-2009	-0.6*
Interval 2	1992-1995	-3.9	1995-2001	1.3*	1996-2009	-1.4*		
Interval 3	1995-2007	0.6*	2001-2004	-1.2				
Interval 4	2007-2009	-3.8	2004-2009	1.0*				
AAPC(%)†	2005-2009	-1.6	2005-2009	1.0*	2005-2009	-1.4*	2005-2009	-0.6*
	2000-2009	-0.4	2000-2009	0.3	2000-2009	-1.4*	2000-2009	-0.6*

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cancers and histologies 8442, 8451, 8462, 8472 and 8473. § Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

† Joinpoint Regression version 3.5.2, National Cancer Institute. Annual age-adjusted rates 1988-2009 were analyzed to identify points in time where the trend significantly changed (joinpoints). The trend between joinpoints is the Annual Percent Change (APC) in the rate. The Average Annual Percent Change (AAPC) is a summary measure of the APCs during the most recent five- and ten-year periods. If no joinpoints were identified, the AAPC is the same as the APC. If joinpoints were identified during the specified period, the AAPC is a weighted average of the APCs. Trends are not calculated if one or more years have no cases/deaths. See Appendix E for more information..

- Not applicable (sex-specific site), or not available (no unique cause of death code prior to 1999).

* The APC/AAPC is significantly different from zero ($p < 0.05$).

All Cancer Sites Combined

Table III-1.3: Number of new cases and deaths and average annual incidence and mortality rates by age and gender, Minnesota, 2005-2009, All Cancer Sites Combined

Age (Yr)	Incidence 2005-2009				Mortality 2005-2009			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
0-19	687	577	19.0	16.7	92	73	2.5	2.1
20-34	1,398	1,989	52.1	77.8	170	163	6.3	6.4
35-49	5,241	8,820	180.5	310.6	1,097	1,229	37.8	43.3
50-64	22,195	18,532	954.4	792.6	5,376	4,779	231.2	204.4
65-74	19,261	12,811	2528.8	1501.8	5,855	4,927	768.7	577.6
75-84	14,519	11,913	3154.9	1871.1	7,176	6,413	1559.3	1007.3
85+	4,386	5,572	2899.0	1568.7	3,934	4,781	2600.2	1346.0

Source: See footnotes for Table III-1.4.

Table III-1.4: Number of new cases and deaths and average annual incidence and mortality rates by race/ethnicity and gender, Minnesota, 2005-2009, All Cancer Sites Combined

Race/Ethnicity**	Incidence 2005-2009				Mortality 2005-2009			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
All Races Combined	67,687	60,214	554.6	417.1	23,700	22,365	206.6	145.9
American Indian								
Statewide	586	537	640.6	477.3	236	218	302.8	226.0
CHSDA**	358	331	729.5	547.5	148	142	336.6	271.0
Asian/PI	596	733	284.5	249.0	270	250	145.9	105.6
Black	1,669	1,218	624.1	399.0	640	450	305.5	177.3
Non-Hispanic White	63,113	56,193	550.2	415.8	22,345	21,274	205.1	145.5
Hispanic all races	629	637	339.6	295.8	159	137	106.5	79.7

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cancers and histologies 8442, 8451, 8462, 8472 and 8473.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

** Persons reported with unknown or other race are included in all races combined, but are excluded from race-specific data unless they are Hispanic. Hispanic includes persons of any race, including unknown and other race. CHSDA includes counties in the Contract Health Services Delivery Area, as defined by the Indian Health Services. Refer to Chapter I for a discussion of CHSDA counties and for comments on the accuracy of race-specific rates.

- Not applicable; sex-specific site.

~ Race-specific rates based on fewer than 10 cases or deaths are not presented.

Table III-1.5: Median age at diagnosis/death, lifetime risk of diagnosis/death, and cancer prevalence, Minnesota, 2007-2009, All Cancer Sites Combined

	Males	Females
Median Age at Diagnosis (Yr)	66.0	64.0
Median Age at Death (Yr)	73.0	74.0
Lifetime Risk of Diagnosis (%)	50.1	42.4
Lifetime Risk of Death (%)	25.1	21.2
Complete prevalence†	102,730	114,440
Five-year prevalence‡	39,290	35,520

Source: MCSS December 2011 with Vintage 2009 population estimates. See Appendix E for prevalence calculations.

† Estimated Minnesotans ever diagnosed with this cancer and alive on 1/1/2009, rounded to the nearest 10.

‡ Estimated Minnesotans diagnosed with this cancer in the last five years and alive on 1/1/2009, rounded to the nearest 10.

- Not applicable; sex-specific site.

Table III-1.6: Causes of death, Minnesota, 2009

Rank and Cause of Death	Deaths	Percent
1 Cancer	9,570	25.3
2 Heart Disease	7,225	19.1
3 Cerebrovascular Disease	2,029	5.4
4 Chronic Lung Disease	1,957	5.2
5 Accidents	2,034	5.4
6 Alzheimer's Disease	1,358	3.6
7 Diabetes	1,019	2.7
8 Pneumonia and Influenza	589	1.6
9 Nephritis	806	2.1
10 Suicide	581	1.5
All Other Causes of Death	10,632	28.1
Total Deaths	37,800	100.0

Source: Minnesota Center for Health Statistics.

All Cancer Sites Combined

Table III-1.7: Average annual incidence and mortality rates§ in the U.S. by race/ethnicity and gender, 2005-2009, All Cancer Sites Combined**

		Males	Females
Incidence	All Races Combined	541.8	412.3
	American Indian		
	Total	264.3	233.5
	CHSDA**	352.8	313.8
	Asian/PI	342.6	299.4
	Black	627.1	398.3
	Non-Hispanic White	564.7	439.0
	Hispanic all races	402.0	324.1
	Mortality	All Races Combined	219.4
American Indian			
Total		143.2	105.7
CHSDA**		184.9	135.9
Asian/PI		132.6	93.2
Black		288.3	174.6
Non-Hispanic White		222.0	154.6
Hispanic all races		146.3	100.5

Source: SEER Cancer Statistics Review 1975-2009 (Vintage 2009 Populations). Incidence data are from the SEER 18 areas, which cover 26% of the US population. Mortality data are for the entire US.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

** See footnote for Table III-1.4.

~ See footnote for Table III-1.4.

Descriptive Epidemiology

Incidence and Mortality: Cancer is very common, even after excluding cancers that are rarely life threatening, such as basal and squamous cell carcinomas of the skin and most *in situ* cancers. Based on current rates, five out of ten Minnesota males (50%) and four out of ten Minnesota females (42%) will be diagnosed with a potentially serious cancer during their lifetimes. One out of four (25%) males will die from cancer, and one out of five (21%) females. Cancer became the leading cause of death in Minnesota in 2000, and continues to be the number one killer in the state. In 2009, 2,345 (32%) more Minnesotans died from cancer than heart disease.

Over the most recent five-year period for which complete data are available (2005-2009), an average of 25,580 Minnesotans were diagnosed with a potentially serious cancer each year and 9,213 died from one of these diseases annually.

During 2005-2009, the overall cancer incidence rate for all races combined was two percent higher in Minnesota than in the 18 geographic areas participating in the SEER Program. However, cancer rates for non-

Hispanic whites were four percent lower in Minnesota than in the SEER 18 areas. Similarly, the cancer mortality rate for all races combined was five percent lower in Minnesota than for the US as a whole, but seven percent lower when comparing non-Hispanic whites.

Trends: Trends in the overall cancer incidence rate in Minnesota varied considerably over the 22-year period 1988-2009, and sometimes in different directions for males and females. Averaging trends over the most recent ten-year period 2000-2009 (AAPC), trends were not statistically significant for either males or females. In contrast, the overall cancer mortality rate declined significantly over the entire 22-year period for both males and females in Minnesota, and began declining even more rapidly among males in 1996. Among females, the overall cancer mortality rate has been declining at a somewhat slower rate than among males, but the decrease has been steady and statistically significant. Much of the difference in trends between males and females was due to the fact that lung cancer incidence and mortality rates declined sharply among males but not females.

Nationally, the overall cancer incidence rate appears to be declining. Among the non-Hispanic white population in the SEER 13 areas, the overall cancer incidence rate from 2000 through 2009 declined by an average of 0.8 percent per year among males and by 0.4 percent among females. Although the change was not statistically significant for females, the incidence trend (AAPC) over the ten-year period was statistically significant for both genders combined (-0.5% per year). **Age:** The likelihood of being diagnosed with cancer increases with age. Over the most recent five-year period, 54 percent of cancers in Minnesota were diagnosed among persons age 65 years and older, and 72 percent of cancer deaths occurred in this age group. However, as discussed in the sections that follow, the age at which cancer is most likely to occur depends on the type of cancer.

Gender: During 2005-2009, the overall cancer incidence rate in Minnesota was 33 percent higher among men than women. Men are at greater risk than women for developing most types of cancer. The only common cancers that occur more frequently among women are those of breast, gallbladder, and thyroid. The overall cancer mortality rate in Minnesota was 42 percent higher among men than women. The gender differences in Minnesota are similar to those reported for the nation.

Race: Cancer risk varies markedly by race and ethnicity. This is true both in Minnesota and nationwide, but in Minnesota, American Indians had the highest risk of developing and dying from cancer while nationally they had the lowest. The overall

All Cancer Sites Combined

cancer incidence and mortality rates among American Indians were two times higher in Minnesota than nationally. Cancer rates among the other race/ethnic groups in Minnesota were similar to or lower than those reported nationally.

In Minnesota, the overall cancer incidence rate among American Indians living in CHSDA counties was 33% higher than among non-Hispanic whites, followed by American Indians statewide (16% higher than among non-Hispanic whites) and then blacks (6% higher than among non-Hispanic whites). The difference in overall cancer mortality for these three groups compared to non-Hispanic whites was even greater. Overall cancer incidence and mortality rates in Minnesota were lowest among Hispanics and Asian/Pacific Islanders.

Risk Factors

Cancer deaths in the United States are thought to be caused by:

- Tobacco use (approximately 30%);
- Diet and obesity in adults (another 30%). A diet that reduces cancer risk is high in fruits and vegetables, high in legumes and grains (including bread, pasta, and cereals), and low in red meat, salt, and saturated animal fat;
- Sedentary lifestyle, occupational factors, a family history of cancer, infectious agents, and prenatal factors and growth (about 5% each);
- Reproductive factors, socioeconomic status, and alcohol (about 3% each);
- Environmental pollution and ionizing and ultraviolet radiation (about 2% each);
- Prescription drugs and medical procedures (about 1%); and
- Salt and other food additives or contaminants (about 1%).

Early Detection / Prevention

While research into the causes of many specific cancers is still ongoing, current scientific information shows that about one-third of cancer deaths would be prevented if no one smoked cigarettes or used tobacco products, and another third could be prevented if individuals maintained a healthy weight, ate a healthy diet, and exercised regularly. In addition, screening for colorectal and cervical cancer can largely prevent these cancers by identifying precancerous lesions.

The human papilloma virus (HPV) vaccine is the first vaccine targeted specifically at preventing cancer. Two cervical cancer vaccines were approved in 2006, and either is recommended. An estimated 95% of cervical cancers are caused by HPV, and a number of other specific cancers (e.g., anal and oropharyngeal) have been associated with the HPV virus.

Cancers detected at an early stage of development are more likely to be cured. However, there are relatively few types of cancer for which screening has been shown to be effective in reducing mortality among asymptomatic persons with an average risk of developing the cancer, and not all organizations are in agreement about screening recommendations.

The U.S. Preventive Services Task Force (<http://www.ahrq.gov/clinic/uspstfix.htm>), an independent panel of experts, recommends routine screening for cancers of the colon and rectum, female breast, and cervix. Recommended screening ages and intervals can be found on their Web site.

In addition to recommending screening for these three cancers, the American Cancer Society (ACS) (<http://www.cancer.org>) also recommends that people ages 20 and over having periodic health exams should receive a cancer-related checkup, and suggests that men age 50 and older should discuss screening for prostate cancer with their physicians. Recommended screening ages and intervals can be found on the ACS Web site.

Prompt reporting of symptoms may also lead to earlier diagnosis of cancer. The resources above also provide information on the early warning signs of cancer.

Childhood (0-14 Years of Age) Cancer

Table III-2.1: Number of new cases and deaths and incidence and mortality rates by year and gender, Minnesota, 1988-2009, Childhood (0-14 Years of Age) Cancer

Year	Incidence				Mortality			
	New Cases		Rate§		Deaths		Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
1988	95	69	19.4	14.7	19	10	3.8	2.2
1989	92	74	18.3	15.6	17	12	3.4	2.4
1990	93	68	17.9	13.6	15	12	2.9	2.5
1991	82	72	15.6	14.4	16	13	3.1	2.6
1992	81	65	15.3	12.9	12	13	2.3	2.6
1993	86	66	16.2	13.1	12	10	2.3	2.0
1994	98	75	18.4	14.8	12	13	2.3	2.6
1995	85	58	16.0	11.7	15	9	2.8	1.8
1996	89	68	16.8	13.5	19	7	3.6	1.4
1997	78	71	14.7	14.2	15	13	2.8	2.6
1998	90	72	16.9	14.2	9	12	1.7	2.4
1999	74	69	13.7	13.4	12	7	2.2	1.4
2000	99	79	18.3	15.4	20	8	3.7	1.5
2001	99	75	18.4	14.5	9	11	1.7	2.1
2002	105	65	19.6	12.6	13	11	2.4	2.2
2003	78	67	14.5	13.1	18	16	3.4	3.1
2004	102	84	19.0	16.4	11	10	2.1	2.0
2005	82	66	15.3	12.9	11	7	2.1	1.4
2006	84	69	15.7	13.4	17	9	3.2	1.7
2007	98	68	18.3	13.1	10	13	1.9	2.6
2008	99	82	18.3	15.7	9	10	1.7	1.9
2009	95	79	17.7	15.3	16	12	3.0	2.4

Source: See footnotes for Table III-2.2.

Table III-2.2: Trends in incidence and mortality by gender using the Joinpoint Regression Program† with up to four joinpoints, Minnesota, 1988-2009, Childhood (0-14 Years of Age) Cancer

	Incidence				Mortality			
	Males		Females		Males		Females	
	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†
Interval 1	1988-2009	0.0	1988-2009	0.1	1988-2009	-1.3	1988-2009	-0.6
AAPC(%)†	2005-2009	0.0	2005-2009	0.1	2005-2009	-1.3	2005-2009	-0.6
	2000-2009	0.0	2000-2009	0.1	2000-2009	-1.3	2000-2009	-0.6

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

† Joinpoint Regression version 3.5.2, National Cancer Institute. Annual age-adjusted rates 1988-2009 were analyzed to identify points in time where the trend significantly changed (joinpoints). The trend between joinpoints is the Annual Percent Change (APC) in the rate.

The Average Annual Percent Change (AAPC) is a summary measure of the APCs during the most recent five- and ten-year periods. If no joinpoints were identified, the AAPC is the same as the APC. If joinpoints were identified during the specified period, the AAPC is a weighted average of the APCs. Trends are not calculated if one or more years have no cases/deaths. See Appendix E for more information.

- Not applicable (sex-specific site), or not available (no unique cause of death code prior to 1999).

* The APC/AAPC is significantly different from zero ($p < 0.05$).

Childhood (0-14 Years of Age) Cancer

Table III-2.3: Number of new cases and deaths and average annual incidence and mortality rates by age and gender, Minnesota, 2005-2009, Childhood (0-14 Years of Age) Cancer

Age (Yr)	Incidence 2005-2009				Mortality 2005-2009			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
0-4	207	189	22.8	21.6	20	19	2.2	2.2
5-9	118	82	13.7	9.9	22	13	2.6	1.6
10-14	133	93	15.0	11.0	21	19	2.4	2.3

Source: See footnotes for Table III-2.5.

Table III-2.4: Number of new cases and deaths and average annual incidence and mortality rates by race/ethnicity and gender, Minnesota, 2005-2009, Childhood (0-14 Years of Age) Cancer

Race/Ethnicity**	Incidence 2005-2009				Mortality 2005-2009			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
All Races Combined	458	364	17.0	14.1	63	51	2.4	2.0
American Indian								
Statewide	8	10	~	18.0	1	1	~	~
CHSDA**	6	4	~	~	1	0	~	~
Asian/PI	25	22	16.2	14.3	5	4	~	~
Black	30	23	13.2	10.3	6	3	~	~
Non-Hispanic White	354	279	17.0	14.0	49	37	2.4	1.9
Hispanic all races	29	28	14.6	13.9	2	6	~	~

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

** Persons reported with unknown or other race are included in all races combined, but are excluded from race-specific data unless they are Hispanic. Hispanic includes persons of any race, including unknown and other race. CHSDA includes counties in the Contract Health Services Delivery Area, as defined by the Indian Health Services. Refer to Chapter I for a discussion of CHSDA counties and for comments on the accuracy of race-specific rates.

- Not applicable; sex-specific site.

~ Race-specific rates based on fewer than 10 cases or deaths are not presented.

Table III-2.5: Number of new cases and deaths and average annual incidence and mortality rates by cancer site and gender, Minnesota, 2005-2009, Childhood (0-14 Years of Age) Cancer

Cancer Site	Incidence 2005-2009				Mortality 2005-2009			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
Bones and Joints	18	14	0.7	0.6	3	4	0.1	0.2
Brain†	88	76	3.3	3.0	18	14	0.7	0.6
Hodgkin Lymphoma	24	7	0.9	0.3	0	0	0.0	0.0
Kidney and Renal Pelvis	39	18	1.4	0.7	5	1	0.2	0.0
Leukemia	142	116	5.3	4.5	19	14	0.7	0.5
ALL†	102	91	3.8	3.5	7	7	0.3	0.3
NHL†	34	10	1.3	0.4	2	1	0.1	0.0
Soft Tissue†	36	48	1.3	1.8	5	3	0.2	0.1

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.

§ Rates are per 100,000 children (0-14) and are age-adjusted to the 2000 US standard population (4 age groups).

† Brain includes other nervous system; ALL is acute lymphocytic leukemia; NHL is non-Hodgkin lymphoma; Soft Tissue includes heart.

Childhood (0-14 Years of Age) Cancer

Table III-2.6: Median age at diagnosis/death and risk of diagnosis/death to 15 years of age, Minnesota, 2007-2009, Childhood (0-14 Years of Age) Cancer

	Males	Females
Median Age at Diagnosis (Yr)	6.0	4.0
Median Age at Death (Yr)	8.0	6.0
Lifetime Risk of Diagnosis (%)	0.3	0.2
Lifetime Risk of Death (%)	0.0	0.0

Source: MCSS December 2011.

Table III-2.7: Distribution of cases and five-year relative survival by cancer site, Childhood (0-14 Years of Age) Cancer

Cancer Site	Cases(%)†	Five-Year Survival(%)‡
Bones and Joints	4.0	78.8
Brain & Other Nervous System	20.5	74.5
Hodgkin Lymphoma	3.5	97.4
Leukemia	29.8	86.6
ALL††	23.8	91.2
Non-Hodgkin Lymphoma	6.9	85.3
All Childhood Cancers	100.0	82.8

† Among Minnesota cases diagnosed 2007-2009.

‡ Among SEER18 cases diagnosed 2002-2008 followed into 2009 from *SEER Cancer Statistics Review, 1975-2009 (Vintage 2009 Populations)*.

†† ALL is acute lymphocytic leukemia.

Table III-2.8: Average annual incidence and mortality rates§ in the U.S. by cancer site and gender, 2005-2009, Childhood (0-14 Years of Age) Cancer

		Males	Females
Incidence	All Childhood Cancers		
	All Races Combined	16.4	14.4
	Non-Hispanic White	17.3	15.1
	Bones and Joints	0.8	0.7
	Brain†	3.4	3.1
	Hodgkin Lymphoma	0.8	0.5
	Kidney and Renal Pelvis	0.8	0.9
	Leukemia	5.5	4.5
	ALL†	4.4	3.6
	NHL†	1.3	0.6
	Soft Tissue†	1.1	1.0
Mortality	All Childhood Cancers		
	All Races Combined	2.4	2.1
	Non-Hispanic White	2.4	2.1

Source: *SEER Cancer Statistics Review 1975-2009 (Vintage 2009 Populations)*. Incidence data are from the SEER 18 areas, which cover 26% of the US population. Mortality data are for the entire US.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (4 age groups).

† See footnote for Table III-2.5.

Descriptive Epidemiology

Incidence and Mortality: On average, 164 children under 15 years of age were diagnosed with and 23 children died of cancer in Minnesota each year from 2005 to 2009. Of all cancers diagnosed in the state, 0.6 percent, or six out of every 1,000, were in children. Based on current incidence and mortality rates in Minnesota, it is estimated that one out of every 333 boys and one out of every 500 girls will be diagnosed with cancer before age 15. Cancer remains the leading cause of death from disease among children. Comparing non-Hispanic whites, the overall childhood cancer incidence rate was four percent lower in Minnesota than in the SEER 18 areas, and overall childhood cancer mortality was eight percent lower in Minnesota than in the U.S. as a whole.

Cancer Types: The types of cancer diagnosed among children are different than those diagnosed among adults. While breast, prostate, lung and colorectal cancers are the most common among adults, children with cancer are more likely to be diagnosed with leukemia (30% of childhood cancers), brain cancer (20%), or lymphomas (10%). The rates and distribution of specific cancer types among children in Minnesota are similar to what is seen nationally.

Survival: Based on cases diagnosed in the SEER Program, the overall five-year relative survival rate for childhood cancer is 83 percent. Survival varies by

Childhood (0-14 Years of Age) Cancer

cancer type, but is more than 75 percent for the most common childhood cancers.

Trends: Overall childhood cancer incidence and mortality rates in Minnesota have not changed significantly since cancer reporting was implemented in 1988. This may be due in part to the relatively small number of cases and deaths. The overall cancer incidence rate in children ages 0-14 years in the SEER 9 areas increased significantly by 0.6 percent per year from 1975 to 2009. The overall childhood cancer mortality rate in the U.S. declined by 2.9 percent per year from 1975 to 1998, stabilized from 1998-2003, and then began declining again by 2.8 percent per year from 2003 to 2009.

Age: The overall cancer incidence rate was higher among children under five years of age than among those 5-14 years old. However, the age distribution varied by cancer type.

Gender: Cancer incidence and mortality rates were about 20 percent higher among boys than girls in Minnesota.

Race: It is difficult to assess race-specific differences in childhood cancer rates in Minnesota because of the relatively small number of cases and deaths. Based on national data, childhood cancer incidence is highest among non-Hispanic white children.

Risk Factors

Despite active research, the causes of most childhood cancers remain unknown. Although genetics and ionizing radiation have been associated with increased risk for certain childhood cancers, it is likely that these factors only account for a small percentage of cases. Burkitt's lymphoma, a form of non-Hodgkin lymphoma that is common among children in Africa, has been associated with Epstein-Barr virus. Because childhood leukemia has sometimes been reported to

cluster geographically and temporally, it too, has been suspected of being associated directly or indirectly with exposure to a virus. However, a viral agent has yet to be identified, and the theory remains controversial. Some research using interview data has pointed to pesticides as a possible cause of certain childhood cancers, but findings are inconsistent. In addition, evidence of elevated pesticide exposure in the bodies or environments of children with cancer has not been found. The possible association between childhood cancer, especially leukemia and brain cancer, and electromagnetic fields (power lines, electrical wiring, household appliances), has been the focus of numerous epidemiologic studies over the last several decades. The results have been inconsistent and limited. More information on this subject can be found on the NCI factsheet "Magnetic Field Exposure and Cancer: Questions and Answers" (<http://www.cancer.gov/cancertopics/factsheet/risk/magneticfields>). Recent research funded by the National Cancer Institute has not found associations between childhood cancer and radon, ultrasound during pregnancy, or specific occupational exposures of parents. More information on the causes of childhood cancer can be found on the NCI factsheet "Childhood Cancers" (<http://www.cancer.gov/cancertopics/factsheet/sites-types/childhood>).

Early Detection / Prevention

There are no screening methods to detect cancer in asymptomatic children, and cancer is often difficult to diagnose in children until they are quite ill. Sudden, unexplained symptoms such as loss of energy, bruising, persistent localized pain or limping, rapid weight loss, or frequent headaches with vomiting should be brought to the attention of a physician.

Brain and Other Nervous System Cancer

Table III-3.1: Number of new cases and deaths and incidence and mortality rates by year and gender, Minnesota, 1988-2009, Brain and Other Nervous System Cancer

Year	Incidence				Mortality			
	New Cases		Rate§		Deaths		Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
1988	161	132	8.4	6.1	129	103	7.0	4.7
1989	148	115	7.5	5.1	100	94	5.4	4.3
1990	168	136	8.4	6.2	124	96	6.6	4.2
1991	168	127	8.4	5.7	119	100	6.5	4.4
1992	174	115	8.6	5.1	122	104	6.4	4.5
1993	172	136	8.4	5.9	126	120	6.4	5.1
1994	179	113	8.3	4.8	129	100	6.4	4.3
1995	173	129	7.9	5.5	114	103	5.7	4.3
1996	162	112	7.7	4.7	118	90	5.8	3.7
1997	166	134	7.5	5.5	119	96	5.7	3.9
1998	187	135	8.5	5.5	130	103	6.2	4.0
1999	195	152	8.6	6.2	139	104	6.4	4.2
2000	191	119	8.3	4.8	159	98	7.2	3.8
2001	189	141	8.1	5.6	147	99	6.5	3.8
2002	204	162	8.6	6.4	126	108	5.5	4.1
2003	180	135	7.4	5.3	134	105	5.5	4.0
2004	202	134	8.5	5.1	129	98	5.6	3.6
2005	164	117	6.7	4.4	112	90	4.8	3.2
2006	196	155	8.0	5.8	128	84	5.3	2.9
2007	184	138	7.2	5.1	141	120	5.6	4.2
2008	194	156	7.5	5.6	122	122	4.8	4.1
2009	221	148	8.3	5.2	142	106	5.4	3.6

Source: See footnotes for Table III-3.2.

Table III-3.2: Trends in incidence and mortality by gender using the Joinpoint Regression Program† with up to four joinpoints, Minnesota, 1988-2009, Brain and Other Nervous System Cancer

	Incidence				Mortality			
	Males		Females		Males		Females	
	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†
Interval 1	1988-2009	-0.4	1988-2009	-0.3	1988-2009	-1.1*	1988-2009	-1.2*
AAPC(%)†	2005-2009	-0.4	2005-2009	-0.3	2005-2009	-1.1*	2005-2009	-1.2*
	2000-2009	-0.4	2000-2009	-0.3	2000-2009	-1.1*	2000-2009	-1.2*

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

† Joinpoint Regression version 3.5.2, National Cancer Institute. Annual age-adjusted rates 1988-2009 were analyzed to identify points in time where the trend significantly changed (joinpoints). The trend between joinpoints is the Annual Percent Change (APC) in the rate.

The Average Annual Percent Change (AAPC) is a summary measure of the APCs during the most recent five- and ten-year periods. If no joinpoints were identified, the AAPC is the same as the APC. If joinpoints were identified during the specified period, the AAPC is a weighted average of the APCs. Trends are not calculated if one or more years have no cases/deaths. See Appendix E for more information.

- Not applicable (sex-specific site), or not available (no unique cause of death code prior to 1999).

* The APC/AAPC is significantly different from zero ($p < 0.05$).

Brain and Other Nervous System Cancer

Table III-3.3: Number of new cases and deaths and average annual incidence and mortality rates by age and gender, Minnesota, 2005-2009, Brain and Other Nervous System Cancer

Age (Yr)	Incidence 2005-2009				Mortality 2005-2009			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
0-19	107	95	3.0	2.7	25	20	0.7	0.6
20-34	105	75	3.9	2.9	22	16	0.8	0.6
35-49	187	128	6.4	4.5	111	76	3.8	2.7
50-64	278	188	12.0	8.0	205	165	8.8	7.1
65-74	168	115	22.1	13.5	150	98	19.7	11.5
75-84	93	89	20.2	14.0	101	96	22.0	15.1
85+	21	24	13.9	6.8	31	51	20.5	14.4

Source: See footnotes for Table III-3.4.

Table III-3.4: Number of new cases and deaths and average annual incidence and mortality rates by race/ethnicity and gender, Minnesota, 2005-2009, Brain and Other Nervous System Cancer

Race/Ethnicity**	Incidence 2005-2009				Mortality 2005-2009			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
All Races Combined	959	714	7.5	5.2	645	522	5.2	3.6
American Indian								
Statewide	6	9	~	~	6	4	~	~
CHSDA**	6	7	~	~	4	3	~	~
Asian/PI	11	9	2.4	~	7	7	~	~
Black	22	14	4.9	3.1	9	4	~	~
Non-Hispanic White	893	664	7.8	5.4	616	501	5.4	3.7
Hispanic all races	13	11	4.1	2.3	2	6	~	~

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

** Persons reported with unknown or other race are included in all races combined, but are excluded from race-specific data unless they are Hispanic. Hispanic includes persons of any race, including unknown and other race. CHSDA includes counties in the Contract Health Services Delivery Area, as defined by the Indian Health Services. Refer to Chapter I for a discussion of CHSDA counties and for comments on the accuracy of race-specific rates.

- Not applicable; sex-specific site.

~ Race-specific rates based on fewer than 10 cases or deaths are not presented.

Table III-3.5: Median age at diagnosis/death, lifetime risk of diagnosis/death, and cancer prevalence, Minnesota, 2007-2009, Brain and Other Nervous System Cancer

	Males	Females
Median Age at Diagnosis (Yr)	54.0	56.0
Median Age at Death (Yr)	61.0	63.0
Lifetime Risk of Diagnosis (%)	0.7	0.5
Lifetime Risk of Death (%)	0.5	0.5
Complete prevalence†	1,290	1,120
Five-year prevalence‡	410	320

Source: MCSS December 2011 with Vintage 2009 population estimates. See Appendix E for prevalence calculations.

† Estimated Minnesotans ever diagnosed with this cancer and alive on 1/1/2009, rounded to the nearest 10.

‡ Estimated Minnesotans diagnosed with this cancer in the last five years and alive on 1/1/2009, rounded to the nearest 10.

- Not applicable; sex-specific site.

Table III-3.6: Distribution of Brain and Other Nervous System cancers by cell type, Minnesota, 2007-2009

Cell Type (Histologic Code)†	Cases	Percent
Glioblastoma (9440-9442)	466	44.8
Astrocytoma ††	316	30.4
Oligodendroglioma (9450,9451,9460)	54	5.2
Ependymoma (9391-9394)	52	5.0
Mixed glioma (9382)	62	6.0
Medulloblastoma (9470-9472)	16	1.5
Other glioma (9380,9381)	8	0.8
All others	67	6.4
Total	1,041	100.0

Source: MCSS December 2011.

† International Classification of Diseases for Oncology, 3rd edition.

†† (9400,9401,9410-9411,9420-9421,9423-9430)

Brain and Other Nervous System Cancer

Table III-3.7: Average annual incidence and mortality rates§ in the U.S. by race/ethnicity and gender, 2005-2009, Brain and Other Nervous System Cancer**

		Males	Females
Incidence	All Races Combined	7.7	5.4
	American Indian		
	Total	3.3	2.8
	CHSDA**	3.9	3.8
	Asian/PI	4.1	3.1
	Black	4.7	3.6
Mortality	Non-Hispanic White	9.0	6.2
	Hispanic all races	5.9	4.7
	All Races Combined	5.2	3.5
	American Indian		
	Total	2.2	1.6
	CHSDA**	2.9	2.0
	Asian/PI	2.3	1.5
	Black	3.1	2.1
	Non-Hispanic White	5.9	3.9
	Hispanic all races	3.3	2.4

Source: SEER Cancer Statistics Review 1975-2009 (Vintage 2009 Populations). Incidence data are from the SEER 18 areas, which cover 26% of the US population. Mortality data are for the entire US.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

** See footnote for Table III-3.4.

~ See footnote for Table III-3.4.

Descriptive Epidemiology

Incidence and Mortality: On average, 335 cases of invasive brain and other nervous system cancer were diagnosed and 233 deaths were caused by these cancers each year in Minnesota from 2005 to 2009. They accounted for 1.3 percent of all new cancers diagnosed and 2.5 percent of cancer deaths in the state. Incidence and mortality rates in Minnesota were similar to those for the U.S. for all races combined, but were about ten percent lower among non-Hispanic whites.

Survival: Based on SEER data, the five-year relative survival rate for brain cancers diagnosed during 2002-2008 was 33.5 percent, but was considerably higher among children.

Trends: Over the ten-year period 2000-2009, the incidence of invasive brain and other nervous system cancer in Minnesota was stable. Over the same period, the mortality rate declined significantly by more than one percent per year among both men and women. These are consistent with national trends.

Age: Unlike many cancers, the incidence rate for brain and nervous system cancer increases only modestly with age. During the most recent five-year period, 70 percent of brain and nervous system cancers in Minnesota were diagnosed before the age of 65, and 55 percent of brain cancer deaths occurred in this age group.

Gender: Brain and nervous system cancer incidence and mortality rates were 44 percent higher among males than females.

Race: There are too few cases of brain cancer in Minnesota among persons of color to assess racial disparities. National data show that non-Hispanic whites are at higher risk of developing and dying from these cancers than other racial/ethnic groups.

Risk Factors

The causes of most brain cancers are unknown. Ionizing radiation is the only well-established environmental risk factor for brain and nervous system cancers. Cell phones, which use radio waves, a form of non-ionizing radiation, have been studied as a possible risk factor for cancers of the brain, nerves, and other tissues of the head and neck, but a consistent link has not been found. More information on this subject can be found on the NCI factsheet “Cell Phones and Cancer Risk”

(http://www.cancer.gov/cancertopics/factsheet/risk/cell_phones). Occupational exposure to vinyl chloride and exposure to electromagnetic fields have been proposed as potential risk factors for brain cancers, but research is not conclusive. These types of cancers are difficult to investigate due in part to their morphologic, genetic, and etiologic diversity.

Early Detection / Prevention

Brain cancer is usually detected once it becomes symptomatic. In most cases, the histologic type and location of the tumor is more important than early detection.

Breast Cancer

Table III-4.1: Number of new cases and deaths and incidence and mortality rates by year and gender, Minnesota, 1988-2009, Breast Cancer

Year	Incidence				Mortality			
	New Cases		Rate§		Deaths		Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
1988	16	2,861	0.9	132.7	6	765	0.4	34.3
1989	13	2,772	0.7	127.2	5	716	0.3	32.0
1990	14	2,906	0.8	132.3	2	746	0.1	32.8
1991	18	2,926	1.0	130.9	6	786	0.4	33.8
1992	12	2,952	0.6	130.8	3	726	0.2	30.4
1993	15	3,020	0.8	131.3	5	732	0.3	30.0
1994	22	2,979	1.2	127.1	9	708	0.5	28.9
1995	24	3,169	1.3	133.9	4	773	0.2	31.0
1996	18	3,154	0.9	130.5	7	725	0.4	28.5
1997	16	3,238	0.9	132.2	11	678	0.6	26.1
1998	23	3,509	1.2	140.5	5	720	0.2	27.0
1999	21	3,496	1.0	138.7	4	670	0.2	24.9
2000	30	3,656	1.5	142.6	8	729	0.4	26.8
2001	27	3,643	1.3	139.7	10	685	0.5	24.9
2002	27	3,605	1.2	135.5	2	640	0.1	22.6
2003	23	3,400	1.1	126.1	8	639	0.4	22.8
2004	25	3,375	1.2	122.9	1	655	0.1	22.5
2005	36	3,476	1.6	124.6	6	656	0.3	22.4
2006	30	3,530	1.4	124.5	5	609	0.2	20.5
2007	31	3,798	1.3	131.9	6	636	0.2	20.7
2008	36	3,786	1.4	129.1	6	673	0.3	21.5
2009	29	3,925	1.1	131.5	4	684	0.2	21.3

Source: See footnotes for Table III-4.2.

Table III-4.2: Trends in incidence and mortality by gender using the Joinpoint Regression Program† with up to four joinpoints, Minnesota, 1988-2009, Breast Cancer

	Incidence				Mortality			
	Males		Females		Males		Females	
	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†
Interval 1	1988-2009	2.4*	1988-1996	0.0	1988-2009	-1.4	1988-2009	-2.5*
Interval 2			1996-2000	2.4				
Interval 3			2000-2004	-3.9*				
Interval 4			2004-2009	1.4*				
AAPC(%)†	2005-2009	2.4*	2005-2009	1.4*	2005-2009	-1.4	2005-2009	-2.5*
	2000-2009	2.4*	2000-2009	-1.0	2000-2009	-1.4	2000-2009	-2.5*

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

† Joinpoint Regression version 3.5.2, National Cancer Institute. Annual age-adjusted rates 1988-2009 were analyzed to identify points in time where the trend significantly changed (joinpoints). The trend between joinpoints is the Annual Percent Change (APC) in the rate.

The Average Annual Percent Change (AAPC) is a summary measure of the APCs during the most recent five- and ten-year periods. If no joinpoints were identified, the AAPC is the same as the APC. If joinpoints were identified during the specified period, the AAPC is a weighted average of the APCs. Trends are not calculated if one or more years have no cases/deaths. See Appendix E for more information.

- Not applicable (sex-specific site), or not available (no unique cause of death code prior to 1999).

* The APC/AAPC is significantly different from zero ($p < 0.05$).

Specific Cancers

Breast Cancer

Table III-4.3: Number of new cases and deaths and average annual incidence and mortality rates by age and gender, Minnesota, 2005-2009, Breast Cancer

Age (Yr)	Incidence 2005-2009				Mortality 2005-2009			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
0-19	0	4	0.0	0.1	0	0	0.0	0.0
20-34	3	271	0.1	10.6	0	25	0.0	1.0
35-49	15	3,664	0.5	129.1	2	320	0.1	11.3
50-64	47	6,802	2.0	290.9	5	912	0.2	39.0
65-74	44	3,653	5.8	428.2	5	644	0.7	75.5
75-84	43	2,853	9.3	448.1	8	711	1.7	111.7
85+	10	1,267	6.6	356.7	7	646	4.6	181.9

Source: See footnotes for Table III-4.4.

Table III-4.4: Number of new cases and deaths and average annual incidence and mortality rates by race/ethnicity and gender, Minnesota, 2005-2009, Breast Cancer

Race/Ethnicity**	Incidence 2005-2009				Mortality 2005-2009			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
All Races Combined	162	18,514	1.4	128.5	27	3,258	0.2	21.3
American Indian								
Statewide	0	109	~	88.1	0	14	~	12.1
CHSDA**	0	62	~	96.3	0	5	~	~
Asian/PI	2	199	~	62.3	0	33	~	14.3
Black	3	360	~	109.8	0	82	~	27.6
Non-Hispanic White	154	17,452	1.4	129.5	27	3,101	0.3	21.4
Hispanic all races	2	179	~	84.9	0	27	~	16.8

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

** Persons reported with unknown or other race are included in all races combined, but are excluded from race-specific data unless they are Hispanic. Hispanic includes persons of any race, including unknown and other race. CHSDA includes counties in the Contract Health Services Delivery Area, as defined by the Indian Health Services. Refer to Chapter I for a discussion of CHSDA counties and for comments on the accuracy of race-specific rates.

- Not applicable; sex-specific site.

~ Race-specific rates based on fewer than 10 cases or deaths are not presented.

Table III-4.5: Median age at diagnosis/death, lifetime risk of diagnosis/death, and cancer prevalence, Minnesota, 2007-2009, Breast Cancer

	Males	Females
Median Age at Diagnosis (Yr)	66.0	61.0
Median Age at Death (Yr)	75.5	71.0
Lifetime Risk of Diagnosis (%)	0.1	13.5
Lifetime Risk of Death (%)	0.0	2.9
Complete prevalence†	270	47,590
Five-year prevalence‡	110	13,940

Source: MCSS December 2011 with Vintage 2009 population estimates. See Appendix E for prevalence calculations.

† Estimated Minnesotans ever diagnosed with this cancer and alive on 1/1/2009, rounded to the nearest 10.

‡ Estimated Minnesotans diagnosed with this cancer in the last five years and alive on 1/1/2009, rounded to the nearest 10.

- Not applicable; sex-specific site.

Table III-4.6: Distribution of cases and five-year relative survival by extent of disease at diagnosis, Breast Cancer

Stage at Diagnosis	Cases(%)†	Five-Year Survival(%)‡
All Stages	100.0	89.0
<i>In situ</i>	19.9	100.0
Localized	49.7	98.4
Regional	23.2	83.9
Distant	3.7	23.8
Unstaged	3.6	50.7

† Among Minnesota cases diagnosed 2007-2009.

‡ Among SEER18 cases diagnosed 2002-2008 followed into 2009 from *SEER Cancer Statistics Review, 1975-2009 (Vintage 2009 Populations)*. Survival for All Stages excludes *in situ* tumors.

- There were not enough intervals to produce the statistic.

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Table III-4.7: Number of new cases and average annual incidence rates of late-stage disease by MMSA†, Minnesota, 2005-2009, Female Breast Cancer

Area	MMSA†	Late-Stage‡	
		Cases	Rate§
Statewide		6,428	45.1
Micropolitan	Albert Lea	47	45.7
	Alexandria	53	42.4
	Austin	54	44.8
	Bemidji	40	35.5
	Brainerd	126	41.6
	Faribault-Northfield	75	47.6
	Fairmont	33	50.2
	Fergus Falls	78	39.3
	Hutchinson	51	49.6
	Marshall	32	45.6
	New Ulm	44	50.9
	Owatonna	40	38.9
	Red Wing	61	44.5
	Willmar	45	35.1
	Winona	59	45.5
	Worthington	21	35.4
Metropolitan	Duluth	294	42.4
	Mankato-North Mankato	85	38.3
	Minneapolis-StPaul-Bloomington	3,724	46.8
	Rochester	230	47.4
	St Cloud	209	46.1

Source: MCSS December 2011 with Vintage 2009 population estimates.

§ Rates are per 100,000 females and are age-adjusted to the 2000 US standard population (19 age groups).

† MMSAs are Micropolitan and Metropolitan Statistical Areas, defined by the US Census Bureau. MMSAs are named after the largest city or cities in the area, but are based on county boundaries. See Appendix C.

‡ Late-stage tumors were diagnosed at regional or distant stage.

* The MMSA rate is significantly different from the statewide rate ($p < 0.05$).

Table III-4.8: Average annual incidence and mortality rates§ in the U.S. by race/ethnicity and gender, 2005-2009, Breast Cancer**

Incidence		Males	Females
		All Races Combined	1.2
	American Indian		
	Total	~	59.6
	CHSDA**	~	80.6
	Asian/PI	0.7	94.5
	Black	1.7	121.2
	Non-Hispanic White	1.3	132.8
	Hispanic all races	0.7	92.7
Mortality	All Races Combined	0.3	23.0
	American Indian		
	Total	~	13.3
	CHSDA**	~	16.6
	Asian/PI	0.1	11.9
	Black	0.5	31.6
	Non-Hispanic White	0.3	23.0
	Hispanic all races	0.1	14.9

Source: *SEER Cancer Statistics Review 1975-2009 (Vintage 2009 Populations)*. Incidence data are from the SEER 18 areas, which cover 26% of the US population. Mortality data are for the entire US.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

** See footnote for Table III-4.4.

~ See footnote for Table III-4.4.

Descriptive Epidemiology

Incidence and Mortality: Breast cancer is the most commonly diagnosed cancer among women. Based on current rates, 1 out of 7 women in Minnesota will be diagnosed with this disease. Female breast cancer rates have changed markedly since cancer reporting was implemented in Minnesota in 1988. Due to steady declines in mortality, breast cancer accounted for 15 percent of cancer deaths among women in 2009 compared to 20 percent in 1988. Breast cancer incidence among women began declining sharply around 2000, and accounted for 31 percent of cancer diagnoses among women in 2009 compared to 34 percent in 2000. The incidence rate among non-Hispanic white women over the most recent five-year period was two percent lower in Minnesota than in the SEER 18 areas, and the mortality rate was seven percent lower in Minnesota than in the U.S.

Survival: About 20 percent of breast cancers in Minnesota were diagnosed at the earliest, *in situ*, stage, when SEER data indicate that five-year relative survival is 100 percent. Another 50 percent of breast cancers in Minnesota were diagnosed when still

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confined to the breast, when SEER data indicate that five-year relative survival is still very high, 98.4 percent. However, the five-year relative survival rate for localized breast cancer in the SEER program was 99 percent for white women and 93 percent for black women.

Trends: Incidence rates of invasive female breast cancer in Minnesota decreased significantly by 3.9 percent per year from 2000-2004 and then increased significantly by 1.4 percent per year from 2004-2009; the average trend (AAPC) during 2000-2009 was a decline of 1.0 percent per year, but was not statistically significant. The mortality rate decreased significantly by 2.5 percent per year from 1988 to 2009. These are similar to national trends. The decline in incidence may have resulted from a decrease in the use of menopausal hormone therapy (see below), the documented reduction in the use of mammography, and/or other factors. The sharp decrease in mortality among women has resulted from a combination of increased breast cancer screening with mammography and improvement in the medical management of this disease.

Age: Breast cancer risk increases with age, but has a younger average age at diagnosis than many common cancers. From 2005 to 2009, about 58 percent of breast cancer diagnoses in Minnesota and 40 percent of deaths occurred among women less than 65 years of age.

Race: In Minnesota and nationally, non-Hispanic white women are the mostly likely to be diagnosed with breast cancer, but black women are more likely to die. From 2005 to 2009, female breast cancer incidence rates in Minnesota were 15 percent lower among black compared to non-Hispanic white women, but mortality rates were 30 percent higher. Female breast cancer incidence rates were somewhat lower in Minnesota than in the SEER 18 areas for each race/ethnic group except American Indians. Among American Indian women statewide, breast cancer incidence was 40 percent higher in Minnesota.

Geography: In general, the rate of late-stage disease should decline as breast cancer screening becomes more widely adopted. Over the five-year period 2005-2009, the rate of late-stage breast cancer varied among the state's Micropolitan and Metropolitan Statistical Areas, but none were significantly different than the statewide rate.

Risk Factors

Cumulative exposure of the breast tissue to the naturally occurring hormone estrogen is a strong

predictor of risk. Therefore, early age at menarche, late onset of menopause, late childbearing, and having fewer children increase risk. Other established risk factors include benign breast disease with atypical hyperplasia, obesity, alcohol consumption, physical inactivity, and higher socioeconomic status. Family history, especially of premenopausal breast cancer, is strongly associated with increased breast cancer risk. Mutations in the BRCA1 or BRCA2 gene are specific inherited risk factors. However, known risk factors only account for 50 percent of breast cancers, at best.

The Women's Health Initiative (WHI) is a large randomized clinical trial of the effects of menopausal hormone therapy (MHT) on the risks of many diseases in women, including breast cancer. In 2002, the WHI announced that use of combined MHT (estrogen plus progestin, given to women with an intact uterus) increased the risk of breast cancer. In addition, the tumors were larger and more likely to have spread to the lymph nodes than in the placebo group. The risk of developing breast cancer increased with the length of time women were taking the hormones, and decreased once they stopped taking them. The FDA advises women to use MHT to treat menopausal symptoms for the shortest possible time at the lowest possible dose. More information on the findings from the WHI, including the risks and benefits of MHT related to diseases other than breast cancer, can be found on the NCI factsheet "Menopausal Hormone Therapy and Cancer Risk" (<http://www.cancer.gov/cancertopics/factsheet/risk/menopausal-hormones>).

Early Detection / Prevention

Even regular screening will not find all breast cancers at an early stage because some breast cancers grow rapidly and spread beyond the breast in the interval between mammograms. Nonetheless, the best available evidence indicates that breast cancer screening saves lives.

The U.S. Preventive Services Task Force (USPSTF) revised its recommendations on mammography in 2009. It recommends that biennial screening begin at age 50, and that younger women discuss the benefits and harms of screening with their physician to make an informed decision. More information on the rationale for this change can be found on the USPSTF Web site <http://www.ahrq.gov/clinic/uspstf/uspstfbrca.htm>.

The American Cancer Society recommends yearly mammograms beginning at age 40.

Cervix Uteri Cancer

Table III-5.1: Number of new cases and deaths and incidence and mortality rates by year and gender, Minnesota, 1988-2009, Cervix Uteri Cancer

Year	Incidence				Mortality			
	New Cases		Rate§		Deaths		Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
1988	-	213	-	9.9	-	46	-	2.2
1989	-	204	-	9.3	-	43	-	2.0
1990	-	248	-	11.1	-	51	-	2.4
1991	-	202	-	9.2	-	41	-	1.8
1992	-	167	-	7.3	-	44	-	1.9
1993	-	198	-	8.7	-	36	-	1.5
1994	-	205	-	8.9	-	46	-	2.0
1995	-	201	-	8.5	-	51	-	2.2
1996	-	200	-	8.2	-	61	-	2.6
1997	-	175	-	7.3	-	45	-	1.8
1998	-	142	-	5.8	-	37	-	1.5
1999	-	176	-	7.0	-	49	-	1.9
2000	-	173	-	6.9	-	42	-	1.5
2001	-	175	-	6.9	-	35	-	1.3
2002	-	171	-	6.8	-	34	-	1.3
2003	-	172	-	6.7	-	48	-	1.8
2004	-	162	-	6.2	-	52	-	1.9
2005	-	169	-	6.3	-	48	-	1.7
2006	-	156	-	6.0	-	45	-	1.6
2007	-	152	-	5.7	-	28	-	1.0
2008	-	163	-	6.3	-	49	-	1.7
2009	-	170	-	6.5	-	40	-	1.4

Source: See footnotes for Table III-5.2.

Table III-5.2: Trends in incidence and mortality by gender using the Joinpoint Regression Program† with up to four joinpoints, Minnesota, 1988-2009, Cervix Uteri Cancer

	Incidence				Mortality			
	Males		Females		Males		Females	
	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†
Interval 1	-	-	1988-2009	-2.6*	-	-	1988-2009	-1.8*
AAPC(%)†	-	-	2005-2009	-2.6*	-	-	2005-2009	-1.8*
	-	-	2000-2009	-2.6*	-	-	2000-2009	-1.8*

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

† Joinpoint Regression version 3.5.2, National Cancer Institute. Annual age-adjusted rates 1988-2009 were analyzed to identify points in time where the trend significantly changed (joinpoints). The trend between joinpoints is the Annual Percent Change (APC) in the rate.

The Average Annual Percent Change (AAPC) is a summary measure of the APCs during the most recent five- and ten-year periods. If no joinpoints were identified, the AAPC is the same as the APC. If joinpoints were identified during the specified period, the AAPC is a weighted average of the APCs. Trends are not calculated if one or more years have no cases/deaths. See Appendix E for more information.

- Not applicable (sex-specific site), or not available (no unique cause of death code prior to 1999).

* The APC/AAPC is significantly different from zero ($p < 0.05$).

Specific Cancers

Cervix Uteri Cancer

Table III-5.3: Number of new cases and deaths and average annual incidence and mortality rates by age and gender, Minnesota, 2005-2009, Cervix Uteri Cancer

Age (Yr)	Incidence 2005-2009				Mortality 2005-2009			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
0-19	-	4	-	0.1	-	0	-	0.0
20-34	-	143	-	5.6	-	11	-	0.4
35-49	-	299	-	10.5	-	49	-	1.7
50-64	-	208	-	8.9	-	66	-	2.8
65-74	-	79	-	9.3	-	34	-	4.0
75-84	-	49	-	7.7	-	33	-	5.2
85+	-	28	-	7.9	-	17	-	4.8

Source: See footnotes for Table III-5.4.

Table III-5.4: Number of new cases and deaths and average annual incidence and mortality rates by race/ethnicity and gender, Minnesota, 2005-2009, Cervix Uteri Cancer

Race/Ethnicity**	Incidence 2005-2009				Mortality 2005-2009			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
All Races Combined	-	810	-	6.1	-	210	-	1.5
American Indian								
Statewide	-	21	-	15.9	-	7	-	~
CHSDA**	-	15	-	22.4	-	6	-	~
Asian/PI	-	35	-	13.1	-	18	-	8.3
Black	-	40	-	9.9	-	13	-	4.1
Non-Hispanic White	-	666	-	5.7	-	164	-	1.3
Hispanic all races	-	34	-	11.0	-	8	-	~

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

** Persons reported with unknown or other race are included in all races combined, but are excluded from race-specific data unless they are Hispanic. Hispanic includes persons of any race, including unknown and other race. CHSDA includes counties in the Contract Health Services Delivery Area, as defined by the Indian Health Services. Refer to Chapter I for a discussion of CHSDA counties and for comments on the accuracy of race-specific rates.

- Not applicable; sex-specific site.

~ Race-specific rates based on fewer than 10 cases or deaths are not presented.

Table III-5.5: Median age at diagnosis/death, lifetime risk of diagnosis/death, and cancer prevalence, Minnesota, 2007-2009, Cervix Uteri Cancer

	Males	Females
Median Age at Diagnosis (Yr)	-	46.0
Median Age at Death (Yr)	-	59.0
Lifetime Risk of Diagnosis (%)	-	0.5
Lifetime Risk of Death (%)	-	0.1
Complete prevalence†	-	3,860
Five-year prevalence‡	-	580

Source: MCSS December 2011 with Vintage 2009 population estimates. See Appendix E for prevalence calculations.

† Estimated Minnesotans ever diagnosed with this cancer and alive on 1/1/2009, rounded to the nearest 10.

‡ Estimated Minnesotans diagnosed with this cancer in the last five years and alive on 1/1/2009, rounded to the nearest 10.

- Not applicable; sex-specific site.

Table III-5.6: Distribution of cases and five-year relative survival by extent of disease at diagnosis, Cervix Uteri Cancer

Stage at Diagnosis	Cases(%)†	Five-Year Survival(%)‡
All Stages	100.0	67.9
<i>In situ</i>	-	-
Localized	46.8	90.7
Regional	37.7	56.7
Distant	9.9	16.2
Unstaged	5.6	54.8

† Among Minnesota cases diagnosed 2007-2009.

‡ Among SEER18 cases diagnosed 2002-2008 followed into 2009 from *SEER Cancer Statistics Review, 1975-2009 (Vintage 2009 Populations)*.

- *In situ* tumors of the cervix are not registered.

Cervix Uteri Cancer

Table III-5.7: Number of new cases and average annual incidence rates of invasive disease by MMSA†, Minnesota, 2005-2009, Cervix Uteri Cancer

Area	MMSA†	Invasive‡ Disease	
		Cases	Rate§
Statewide		810	6.1
Micropolitan	Albert Lea	3	3.6
	Alexandria	7	9.2
	Austin	7	7.5
	Bemidji	12	11.3
	Brainerd	15	7.3
	Faribault-Northfield	6	4.3
	Fairmont	9	17.4*
	Fergus Falls	11	7.9
	Hutchinson	2	1.4*
	Marshall	6	8.1
	New Ulm	8	13.1
	Owatonna	6	6.6
	Red Wing	5	5.5
	Willmar	8	8.6
	Winona	5	4.1
	Worthington	7	13.1
Metropolitan	Duluth	37	6.4
	Mankato-North Mankato	10	5.1
	Minneapolis-StPaul-Bloomington	463	5.9
	Rochester	29	6.2
	St Cloud	21	5.2

Source: MCSS December 2011 with Vintage 2009 population estimates.

§ Rates are per 100,000 females and are age-adjusted to the 2000 US standard population (19 age groups).

† MMSAs are Micropolitan and Metropolitan Statistical Areas, defined by the US Census Bureau. MMSAs are named after the largest city or cities in the area, but are based on county boundaries. See Appendix C.

‡ Invasive cancers of the cervix have penetrated the basement membrane and are largely preventable through Pap testing.

* The MMSA rate is significantly different from the statewide rate ($p < 0.05$).

Table III-5.8: Average annual incidence and mortality rates§ in the U.S. by race/ethnicity and gender, 2005-2009, Cervix Uteri Cancer**

Incidence		Males	Females
Incidence	All Races Combined	-	8.1
	American Indian		
	Total	-	5.8
	CHSDA**	-	8.1
	Asian/PI	-	7.2
Mortality	Black	-	9.8
	Non-Hispanic White	-	7.1
	Hispanic all races	-	11.8
	All Races Combined	-	2.4
	American Indian		
Mortality	Total	-	2.6
	CHSDA**	-	3.5
	Asian/PI	-	2.0
	Black	-	4.3
	Non-Hispanic White	-	2.1
	Hispanic all races	-	3.0

Source: SEER Cancer Statistics Review 1975-2009 (Vintage 2009 Populations). Incidence data are from the SEER 18 areas, which cover 26% of the US population. Mortality data are for the entire US.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

** See footnote for Table III-5.4.

~ See footnote for Table III-5.4.

Descriptive Epidemiology

Incidence and Mortality: On average, 162 women were diagnosed with invasive cervical cancer in Minnesota each year from 2005 to 2009. Most cancer registries no longer collect information on non-invasive (*in situ*) cervical cancers, but the American Cancer Society estimates that four times more cervical cancers are diagnosed at this early stage. Over the same five-year period, 42 Minnesota women died from cervical cancer annually. Incidence rates in Minnesota were 25 percent lower than in the SEER 18 areas for all races combined, and 20 percent lower for non-Hispanic white women. Minnesota has one of the lowest cervical cancer mortality rates in the U.S., more than a third lower than the national rate.

Survival: Nearly half of invasive cervical cancers in Minnesota are diagnosed at the localized stage, when still confined to the cervix. SEER cases diagnosed at the localized stage from 2002 to 2008 had a five-year relative survival rate of 91 percent. However, survival decreased sharply when the cancer was diagnosed at later stages.

Cervix Uteri Cancer

Trends: The invasive cervical cancer incidence rate decreased significantly by 2.6 percent per year in Minnesota from 1988 to 2009, while the mortality rate decreased significantly by 1.8 percent per year. Similar trends were seen nationally. These declines are attributed to the widespread adoption of cervical cancer screening with the Pap test. HPV vaccination was approved in the U.S. in 2006, but it will require more time and wider usage before decreases in risk are seen at the population level.

Age: The incidence rate for invasive cervical cancer tends to increase with age beginning at age 20, and then starts to decrease after age 50. From 2005 to 2009, approximately 80 percent of women diagnosed with cervical cancer in Minnesota were less than 65 years of age. The median age at diagnosis for cervical cancer is one of the youngest of all cancers.

Race: Compared to non-Hispanic white women, cervical cancer incidence rates in Minnesota were two to four times higher among women from each of the other race/ethnic groups. The rate of cervical cancer among non-Hispanic white women was 20 percent lower in Minnesota than in the SEER 18 areas, but was considerably higher in Minnesota for American Indian and Asian/Pacific Islander women.

Geography: During the five-year period 2005-2009, invasive cervical cancer incidence rates were significantly higher in the Fairmont Micropolitan Area than in the state as a whole, and significantly lower in the Hutchinson Micropolitan Area. However, these rates were based on relatively few cases.

Risk Factors

It is now thought that essentially all cervical cancers are caused by persistent infection with one of several strains of the human papilloma virus (HPV), a sexually

transmitted infection. HPV infections appear to be very common, and usually regress without any symptoms. However, in a small percentage of women the infection becomes persistent, and abnormalities develop that can eventually become malignant. HPV vaccination prevents infection with the two most common HPV strains that cause about 70 percent of cervical cancers. CDC reported in 2010 that only 32 percent of teenage girls in the US between 13 and 17 years of age had received the series of three HPV shots. Because HPV vaccines do not prevent infection with all strains of HPV, even vaccinated women need to continue routine screening with the Pap test. Pap tests can identify lesions in a pre-malignant state when they can be removed with minimally invasive procedures.

Therefore, any factors that interfere with HPV vaccination and routine screening, such as low socioeconomic status and lack of access to medical care, increase risk for this cancer.

Early Detection / Prevention

Cervical cancer can be prevented through a combination of HPV vaccination and screening with the Pap test. The U.S. Preventive Services Task Force recommends that women should receive regular Pap tests starting at age 21 or within 3 years of sexual debut, whichever comes first.

The HPV vaccine is the first vaccine targeted specifically at preventing cancer. The Advisory Committee on Immunization Practices, which advises CDC, recommends that HPV vaccinations occur routinely for girls at ages 11 or 12, and that the series may be started for girls as early as 9 years of age.

For more information on the HPV vaccine, visit the MDH Web site at <http://www.health.state.mn.us/divs/idepc/dtopics/vpds/hpv>.

Colon and Rectum Cancer

Table III-6.1: Number of new cases and deaths and incidence and mortality rates by year and gender, Minnesota, 1988-2009, Colon and Rectum Cancer

Year	Incidence				Mortality			
	New Cases		Rate§		Deaths		Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
1988	1,254	1,235	74.1	52.0	507	482	31.0	19.5
1989	1,291	1,179	75.4	48.8	515	518	30.9	20.5
1990	1,218	1,229	70.4	50.5	497	462	29.4	18.3
1991	1,230	1,219	69.8	49.6	482	496	28.6	19.3
1992	1,291	1,179	72.5	47.3	464	522	27.4	20.0
1993	1,176	1,174	64.3	46.3	416	473	23.6	17.5
1994	1,181	1,190	63.3	46.2	446	432	24.9	15.7
1995	1,245	1,178	66.2	45.0	470	517	25.7	18.6
1996	1,117	1,180	58.4	45.0	454	461	24.6	16.3
1997	1,250	1,259	65.0	47.3	466	461	25.0	16.3
1998	1,217	1,304	61.7	48.5	462	498	24.3	17.4
1999	1,254	1,223	62.3	44.8	426	475	22.1	16.6
2000	1,275	1,275	61.9	46.1	429	497	21.7	17.1
2001	1,262	1,237	60.0	44.4	410	458	20.4	15.4
2002	1,268	1,272	59.2	45.2	451	481	21.7	16.0
2003	1,292	1,216	59.1	42.7	473	487	22.8	16.1
2004	1,303	1,235	58.2	42.9	371	425	17.3	13.7
2005	1,248	1,194	54.4	40.6	383	408	17.8	12.7
2006	1,212	1,192	52.2	40.6	393	429	17.7	13.8
2007	1,275	1,252	52.9	41.1	444	411	19.2	12.4
2008	1,262	1,227	51.3	40.4	445	401	18.8	12.2
2009	1,162	1,176	45.8	38.0	404	408	16.6	12.1

Source: See footnotes for Table III-6.2.

Table III-6.2: Trends in incidence and mortality by gender using the Joinpoint Regression Program† with up to four joinpoints, Minnesota, 1988-2009, Colon and Rectum Cancer

	Incidence				Mortality			
	Males		Females		Males		Females	
	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†
Interval 1	1988-2009	-1.8*	1988-1995	-1.9*	1988-2009	-2.7*	1988-2009	-2.3*
Interval 2			1995-1998	1.8				
Interval 3			1998-2009	-1.8*				
AAPC(%)†	2005-2009	-1.8*	2005-2009	-1.8*	2005-2009	-2.7*	2005-2009	-2.3*
	2000-2009	-1.8*	2000-2009	-1.8*	2000-2009	-2.7*	2000-2009	-2.3*

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

† Joinpoint Regression version 3.5.2, National Cancer Institute. Annual age-adjusted rates 1988-2009 were analyzed to identify points in time where the trend significantly changed (joinpoints). The trend between joinpoints is the Annual Percent Change (APC) in the rate.

The Average Annual Percent Change (AAPC) is a summary measure of the APCs during the most recent five- and ten-year periods. If no joinpoints were identified, the AAPC is the same as the APC. If joinpoints were identified during the specified period, the AAPC is a weighted average of the APCs. Trends are not calculated if one or more years have no cases/deaths. See Appendix E for more information.

- Not applicable (sex-specific site), or not available (no unique cause of death code prior to 1999).

* The APC/AAPC is significantly different from zero ($p < 0.05$).

Colon and Rectum Cancer

Table III-6.3: Number of new cases and deaths and average annual incidence and mortality rates by age and gender, Minnesota, 2005-2009, Colon and Rectum Cancer

Age (Yr)	Incidence 2005-2009				Mortality 2005-2009			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
0-19	5	3	0.1	0.1	1	0	0.0	0.0
20-34	52	66	1.9	2.6	15	16	0.6	0.6
35-49	589	476	20.3	16.8	122	94	4.2	3.3
50-64	1,910	1,344	82.1	57.5	480	322	20.6	13.8
65-74	1,535	1,327	201.5	155.6	482	350	63.3	41.0
75-84	1,470	1,703	319.4	267.5	593	576	128.9	90.5
85+	598	1,122	395.3	315.9	376	699	248.5	196.8

Source: See footnotes for Table III-6.4.

Table III-6.4: Number of new cases and deaths and average annual incidence and mortality rates by race/ethnicity and gender, Minnesota, 2005-2009, Colon and Rectum Cancer

Race/Ethnicity**	Incidence 2005-2009				Mortality 2005-2009			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
All Races Combined	6,159	6,041	51.2	40.1	2,069	2,057	18.0	12.7
American Indian								
Statewide	58	51	69.0	55.6	25	16	33.9	20.8
CHSDA**	40	36	90.7	69.4	18	9	39.8	~
Asian/PI	63	70	30.6	26.7	16	25	9.0	9.8
Black	141	116	49.9	41.7	51	29	24.2	10.9
Non-Hispanic White	5,768	5,656	50.9	39.5	1,953	1,971	17.9	12.6
Hispanic all races	49	45	26.0	25.8	20	11	11.0	5.6

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

** Persons reported with unknown or other race are included in all races combined, but are excluded from race-specific data unless they are Hispanic. Hispanic includes persons of any race, including unknown and other race. CHSDA includes counties in the Contract Health Services Delivery Area, as defined by the Indian Health Services. Refer to Chapter I for a discussion of CHSDA counties and for comments on the accuracy of race-specific rates.

- Not applicable; sex-specific site.

~ Race-specific rates based on fewer than 10 cases or deaths are not presented.

Table III-6.5: Median age at diagnosis/death, lifetime risk of diagnosis/death, and cancer prevalence, Minnesota, 2007-2009, Colon and Rectum Cancer

	Males	Females
Median Age at Diagnosis (Yr)	67.0	73.0
Median Age at Death (Yr)	72.0	80.0
Lifetime Risk of Diagnosis (%)	5.3	5.2
Lifetime Risk of Death (%)	2.2	2.0
Complete prevalence†	9,690	9,950
Five-year prevalence‡	3,560	3,350

Source: MCSS December 2011 with Vintage 2009 population estimates. See Appendix E for prevalence calculations.

† Estimated Minnesotans ever diagnosed with this cancer and alive on 1/1/2009, rounded to the nearest 10.

‡ Estimated Minnesotans diagnosed with this cancer in the last five years and alive on 1/1/2009, rounded to the nearest 10.

- Not applicable; sex-specific site.

Table III-6.6: Distribution of cases and five-year relative survival by extent of disease at diagnosis, Colon and Rectum Cancer

Stage at Diagnosis	Cases(%)†	Five-Year Survival(%)‡
All Stages	100.0	64.3
<i>In situ</i>	3.8	95.0
Localized	41.6	89.9
Regional	31.6	69.6
Distant	16.7	11.9
Unstaged	6.3	33.9

† Among Minnesota cases diagnosed 2007-2009.

‡ Among SEER18 cases diagnosed 2002-2008 followed into 2009 from *SEER Cancer Statistics Review, 1975-2009 (Vintage 2009 Populations)*. Survival for All Stages excludes *in situ* tumors.

- There were not enough intervals to produce the statistic.

Colon and Rectum Cancer

Table III-6.7: Number of new cases and average annual incidence rates of late-stage disease by MMSA†, Minnesota, 2005-2009, Colon and Rectum Cancer

Area	MMSA†	Late-Stage‡	
		Cases	Rate§
Statewide		6,131	22.7
Micropolitan	Albert Lea	58	25.0
	Alexandria	69	26.3
	Austin	56	21.4
	Bemidji	57	26.4
	Brainerd	146	23.8
	Faribault-Northfield	59	19.8
	Fairmont	50	33.5*
	Fergus Falls	129	29.5*
	Hutchinson	36	16.7
	Marshall	43	29.6
	New Ulm	54	29.9
	Owatonna	62	31.8*
	Red Wing	69	24.8
	Willmar	56	21.3
	Winona	66	25.1
	Worthington	36	26.6
Metropolitan	Duluth	336	23.2
	Mankato-North Mankato	93	20.7
	Minneapolis-StPaul-Bloomington	3,024	21.5*
	Rochester	214	23.1
	St Cloud	177	19.6

Source: MCSS December 2011 with Vintage 2009 population estimates.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

† MMSAs are Micropolitan and Metropolitan Statistical Areas, defined by the US Census Bureau. MMSAs are named after the largest city or cities in the area, but are based on county boundaries. See Appendix C.

‡ Late-stage tumors were diagnosed at regional or distant stage.

* The MMSA rate is significantly different from the statewide rate ($p < 0.05$).

Table III-6.8: Average annual incidence and mortality rates§ in the U.S. by race/ethnicity and gender, 2005-2009, Colon and Rectum Cancer**

Incidence		Males	Females
		54.0	40.2
	American Indian		
	Total	32.5	27.4
	CHSDA**	45.2	38.0
	Asian/PI	44.9	34.2
	Black	66.9	50.3
	Non-Hispanic White	54.2	40.2
	Hispanic all races	45.2	31.6
Mortality	All Races Combined	20.2	14.1
	American Indian		
	Total	14.3	11.1
	CHSDA**	18.8	14.6
	Asian/PI	13.1	9.6
	Black	29.8	19.8
	Non-Hispanic White	19.8	13.8
	Hispanic all races	15.3	10.2

Source: *SEER Cancer Statistics Review 1975-2009 (Vintage 2009 Populations)*. Incidence data are from the SEER 18 areas, which cover 26% of the US population. Mortality data are for the entire US.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

** See footnote for Table III-6.4.

~ See footnote for Table III-6.4.

Descriptive Epidemiology

Incidence and Mortality: Colorectal cancer is the third most commonly diagnosed cancer among men and among women. From 2005 to 2009, an average of 2,440 cases of invasive colon and rectum cancer were diagnosed and 825 deaths occurred each year in Minnesota. Minnesota rates were slightly lower than national rates. Colorectal cancer was the second leading cause of cancer-related death in Minnesota; only lung cancer killed more Minnesotans.

Survival: About 42 percent of colorectal cancers in Minnesota are diagnosed at the localized stage, before having spread to adjacent tissues or distant organs. SEER cases diagnosed at the localized stage from 2002 to 2008 had a five-year relative survival rate of 90 percent.

Trends: Colon and rectum cancer rates have declined sharply over the last two decades in Minnesota and nationally. Research indicates that these declines may be due in part to increased screening and polyp removal, which may prevent the progression of polyps

Colon and Rectum Cancer

to invasive cancers. Other factors, such as use of hormone replacement therapy among women and use of aspirin to prevent heart disease, may also reduce the risk of colorectal cancer.

Age: Over the five-year period, about 65 percent of diagnoses and 75 percent of deaths occurred among persons 65 years and older.

Gender: Colorectal cancer rates were about 30 percent higher among men than women.

Race: In Minnesota, American Indians had the highest incidence and mortality rates of colorectal cancer from 2005 to 2009, about 80 percent higher than among non-Hispanic whites and blacks. Among American Indians, colorectal cancer rates in Minnesota were two times higher than in the U.S. as a whole.

Geography: In general, the rate of late-stage disease should decline as colorectal cancer screening becomes more widely adopted. Over the five-year period 2005-2009, the rate of late-stage colorectal cancer was significantly higher in the Fairmont, Fergus Falls and Owatonna Micropolitan Areas compared the state as a whole, and significantly lower in the Minneapolis-Saint Paul-Bloomington Metropolitan Area.

Risk Factors

A personal or family history of colorectal cancer, adenomatous polyposis coli or inflammatory bowel disease increases colorectal cancer risk. Other risk

factors include obesity, physical inactivity, alcohol consumption, tobacco, diets high in red meat or processed meats, as well as a diet low in fruits and vegetables. Because screening can prevent colorectal cancer by removing precancerous polyps, not being screened is actually a risk factor for the disease. Studies suggest that estrogen and progestin hormone therapy and nonsteroidal anti-inflammatory drugs, such as aspirin, may reduce colorectal cancer risk.

Early Detection / Prevention

Many colorectal cancers could be prevented through screening. For asymptomatic persons at average risk, screening is recommended to begin at age 50 with one of several options. In March 2008, the American Cancer Society revised their screening guidelines for this cancer to separate the available tests into those that can prevent colorectal cancer by finding precancerous polyps (sigmoidoscopy, colonoscopy, colonography, and double contrast barium enema), and those whose primary benefit is finding cancer at an earlier stage (fecal occult blood test, fecal immunochemical test, and stool DNA test). They recommend screening tests that can find precancerous polyps if these tests are available and you are willing to have a more invasive test at longer intervals. For more information, talk to your doctor or view the ACS guidelines at <http://www.cancer.org>.

Corpus and Uterus, NOS Cancer

Table III-7.1: Number of new cases and deaths and incidence and mortality rates by year and gender, Minnesota, 1988-2009, Corpus and Uterus, NOS Cancer

Year	Incidence				Mortality			
	New Cases		Rate§		Deaths		Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
1988	-	562	-	26.2	-	115	-	4.8
1989	-	547	-	25.3	-	96	-	4.0
1990	-	551	-	25.2	-	82	-	3.3
1991	-	588	-	27.0	-	117	-	4.8
1992	-	585	-	25.8	-	104	-	4.1
1993	-	586	-	25.4	-	97	-	3.8
1994	-	594	-	25.3	-	89	-	3.4
1995	-	633	-	26.9	-	99	-	3.9
1996	-	635	-	26.6	-	114	-	4.2
1997	-	646	-	26.5	-	96	-	3.5
1998	-	649	-	26.5	-	112	-	4.1
1999	-	668	-	26.7	-	122	-	4.6
2000	-	627	-	24.7	-	99	-	3.5
2001	-	706	-	27.2	-	111	-	4.0
2002	-	759	-	28.7	-	114	-	3.9
2003	-	669	-	25.0	-	138	-	4.9
2004	-	769	-	28.0	-	135	-	4.7
2005	-	785	-	28.2	-	120	-	4.2
2006	-	760	-	26.3	-	140	-	4.7
2007	-	818	-	27.9	-	109	-	3.5
2008	-	837	-	27.9	-	127	-	4.0
2009	-	828	-	27.0	-	129	-	4.1

Source: See footnotes for Table III-7.2.

Table III-7.2: Trends in incidence and mortality by gender using the Joinpoint Regression Program† with up to four joinpoints, Minnesota, 1988-2009, Corpus and Uterus, NOS Cancer

	Incidence				Mortality			
	Males		Females		Males		Females	
	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†
Interval 1	-	-	1988-2009	0.4*	-	-	1988-2009	0.1
AAPC(%)†	-	-	2005-2009	0.4*	-	-	2005-2009	0.1
	-	-	2000-2009	0.4*	-	-	2000-2009	0.1

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

† Joinpoint Regression version 3.5.2, National Cancer Institute. Annual age-adjusted rates 1988-2009 were analyzed to identify points in time where the trend significantly changed (joinpoints). The trend between joinpoints is the Annual Percent Change (APC) in the rate.

The Average Annual Percent Change (AAPC) is a summary measure of the APCs during the most recent five- and ten-year periods. If no joinpoints were identified, the AAPC is the same as the APC. If joinpoints were identified during the specified period, the AAPC is a weighted average of the APCs. Trends are not calculated if one or more years have no cases/deaths. See Appendix E for more information.

- Not applicable (sex-specific site), or not available (no unique cause of death code prior to 1999).

* The APC/AAPC is significantly different from zero ($p < 0.05$).

Corpus and Uterus, NOS Cancer

Table III-7.3: Number of new cases and deaths and average annual incidence and mortality rates by age and gender, Minnesota, 2005-2009, Corpus and Uterus, NOS Cancer

Age (Yr)	Incidence 2005-2009				Mortality 2005-2009			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
0-19	-	1	-	0.0	-	0	-	0.0
20-34	-	48	-	1.9	-	4	-	0.2
35-49	-	445	-	15.7	-	21	-	0.7
50-64	-	1,876	-	80.2	-	164	-	7.0
65-74	-	888	-	104.1	-	135	-	15.8
75-84	-	553	-	86.9	-	180	-	28.3
85+	-	217	-	61.1	-	121	-	34.1

Source: See footnotes for Table III-7.4.

Table III-7.4: Number of new cases and deaths and average annual incidence and mortality rates by race/ethnicity and gender, Minnesota, 2005-2009, Corpus and Uterus, NOS Cancer

Race/Ethnicity**	Incidence 2005-2009				Mortality 2005-2009			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
All Races Combined	-	4,028	-	27.5	-	625	-	4.1
American Indian								
Statewide	-	35	-	26.9	-	1	-	~
CHSDA**	-	22	-	32.3	-	1	-	~
Asian/PI	-	56	-	17.3	-	5	-	~
Black	-	57	-	21.0	-	16	-	7.4
Non-Hispanic White	-	3,781	-	27.5	-	597	-	4.1
Hispanic all races	-	47	-	23.9	-	5	-	~

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

** Persons reported with unknown or other race are included in all races combined, but are excluded from race-specific data unless they are Hispanic. Hispanic includes persons of any race, including unknown and other race. CHSDA includes counties in the Contract Health Services Delivery Area, as defined by the Indian Health Services. Refer to Chapter I for a discussion of CHSDA counties and for comments on the accuracy of race-specific rates.

- Not applicable; sex-specific site.

~ Race-specific rates based on fewer than 10 cases or deaths are not presented.

Table III-7.5: Median age at diagnosis/death, lifetime risk of diagnosis/death, and cancer prevalence, Minnesota, 2007-2009, Corpus and Uterus, NOS Cancer

	Males	Females
Median Age at Diagnosis (Yr)	-	61.0
Median Age at Death (Yr)	-	74.0
Lifetime Risk of Diagnosis (%)	-	3.1
Lifetime Risk of Death (%)	-	0.6
Complete prevalence†	-	10,980
Five-year prevalence‡	-	2,920

Source: MCSS December 2011 with Vintage 2009 population estimates. See Appendix E for prevalence calculations.

† Estimated Minnesotans ever diagnosed with this cancer and alive on 1/1/2009, rounded to the nearest 10.

‡ Estimated Minnesotans diagnosed with this cancer in the last five years and alive on 1/1/2009, rounded to the nearest 10.

- Not applicable; sex-specific site.

Table III-7.6: Distribution of cases and five-year relative survival by extent of disease at diagnosis, Corpus and Uterus, NOS Cancer

Stage at Diagnosis	Cases(%)†	Five-Year Survival(%)‡
All Stages	100.0	81.5
<i>In situ</i>	1.0	98.6
Localized	70.0	95.4
Regional	18.0	66.8
Distant	6.1	16.4
Unstaged	4.9	49.5

† Among Minnesota cases diagnosed 2007-2009.

‡ Among SEER18 cases diagnosed 2002-2008 followed into 2009 from *SEER Cancer Statistics Review, 1975-2009 (Vintage 2009 Populations)*. Survival for All Stages excludes *in situ* tumors.

- There were not enough intervals to produce the statistic.

Corpus and Uterus, NOS Cancer

Table III-7.7: Average annual incidence and mortality rates§ in the U.S. by race/ethnicity and gender, 2005-2009, Corpus and Uterus, NOS Cancer**

		Males	Females
Incidence	All Races Combined	-	24.1
	American Indian		
	Total	-	14.6
	CHSDA**	-	19.2
	Asian/PI	-	18.7
	Black	-	21.8
	Non-Hispanic White	-	25.5
	Hispanic all races	-	19.3
	Mortality	All Races Combined	-
American Indian			
Total		-	2.4
CHSDA**		-	3.0
Asian/PI		-	2.6
Black		-	7.3
Non-Hispanic White		-	3.9
Hispanic all races		-	3.3

Source: *SEER Cancer Statistics Review 1975-2009 (Vintage 2009 Populations)*. Incidence data are from the SEER 18 areas, which cover 26% of the US population. Mortality data are for the entire US.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

** See footnote for Table III-7.4.

~ See footnote for Table III-7.4.

Survival: The majority (70%) of uterine cancers in Minnesota were diagnosed when still confined to the uterus. The five-year relative survival rate among SEER cases diagnosed at the localized stage from 2002 to 2008 was over 95 percent. However, similar to the disparity seen for breast cancer, the five-year relative survival rate for localized uterine cancer was 96 percent for white women, and 85 percent for black women.

Trends: The uterine cancer incidence rate in Minnesota increased significantly by 0.4 percent per year from 1988 to 2009, while the mortality rate remained stable. These were similar to national trends.

Age: Over the five-year period, about 40 percent of diagnoses and 70 percent of deaths occurred among women 65 years of age or older.

Race: Nationally, uterine cancer risk was highest among non-Hispanic white women. In Minnesota, the uterine cancer incidence rate was highest among American Indian women living in CHSDA counties; their rate was 17 percent higher than among non-Hispanic white women in the state, and 70 percent higher than among American Indian women in CHSDA counties in the SEER 18 areas. There are too few deaths from uterine cancer among women of color in Minnesota to assess disparities. However, differences between incidence and mortality among non-Hispanic white and black women in Minnesota are consistent with what is reported for the U.S., where black women have the highest mortality rate. This is consistent with the poorer survival cited above.

Descriptive Epidemiology

Incidence and Mortality: Cancer of the corpus uteri (uterus) is often referred to as endometrial cancer, since the cells of the lining of the uterus, or endometrium, are the most likely to become malignant. Only women who have not had a hysterectomy can develop uterine cancer. Although it is the fourth most commonly diagnosed cancer among women, interpreting uterine cancer rates is limited by the fact that we do not know what proportion of women in each age group have had a hysterectomy. Rates are therefore calculated using population estimates for all women, which will underestimate the rate among women who are truly at risk. It should also be kept in mind that differences in uterine cancer rates between groups of women or over time will be influenced by how common it is to have had a hysterectomy, or by changes in this over time.

From 2005-2009, an average of 806 cases of uterine cancer were diagnosed among women in Minnesota each year and 125 women died from the disease annually. Rates in Minnesota were somewhat higher than what was reported nationally.

Risk Factors

A high cumulative exposure to estrogen is the major risk factor for uterine cancer. Estrogen exposure may be increased by estrogen replacement therapy, tamoxifen, early menarche, late menopause, never having children, a history of failure to ovulate, and obesity. Increased production of endogenous estrogens due to estrogen-secreting ovarian tumors or polycystic ovarian syndrome also increases risk. Other factors associated with an increased likelihood of developing uterine cancer include obesity, high body mass, and a high fat diet. Hormone replacement therapy (HRT), which is a combination of progesterone and estrogen replacement therapy, is thought to largely offset the increased risk related to HRT using only estrogen. Research has not implicated estrogen exposures in the development of the other types of uterine corpus cancer, which are more aggressive and have a poorer prognosis. Other risk factors for uterine cancer include infertility and hereditary nonpolyposis colon cancer

Specific Cancers

Corpus and Uterus, NOS Cancer

(HNPCC). Pregnancy and use of oral contraceptives provide protection against endometrial cancer.

Early Detection / Prevention

There are no proven screening methods for detecting asymptomatic uterine cancer. However, vaginal bleeding or other abnormal discharge after menopause is a warning sign and should be promptly reported to a physician.

Esophagus Cancer

Table III-8.1: Number of new cases and deaths and incidence and mortality rates by year and gender, Minnesota, 1988-2009, Esophagus Cancer

Year	Incidence				Mortality			
	New Cases		Rate§		Deaths		Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
1988	106	31	6.2	1.4	94	46	5.5	2.0
1989	110	50	6.1	2.1	129	31	7.6	1.2
1990	123	44	7.0	1.8	98	44	5.6	1.8
1991	106	37	5.9	1.5	129	41	7.2	1.6
1992	104	41	5.6	1.6	110	47	6.0	1.8
1993	118	29	6.3	1.2	116	29	6.3	1.2
1994	121	37	6.4	1.5	116	32	6.2	1.2
1995	139	51	7.1	2.0	155	40	8.1	1.6
1996	149	46	7.6	1.8	138	43	7.2	1.6
1997	142	46	7.2	1.7	145	46	7.3	1.6
1998	156	41	7.7	1.6	160	44	8.1	1.6
1999	174	54	8.5	1.9	140	40	6.9	1.4
2000	157	52	7.5	1.9	179	53	8.6	1.9
2001	157	62	7.3	2.2	140	51	6.7	1.8
2002	203	47	9.4	1.7	174	56	8.2	1.9
2003	203	48	9.0	1.8	170	48	7.7	1.7
2004	200	61	8.6	2.2	189	37	8.4	1.3
2005	235	59	10.0	2.0	189	46	8.3	1.5
2006	216	51	8.8	1.8	184	50	7.8	1.7
2007	220	67	9.0	2.2	180	51	7.4	1.7
2008	207	67	8.2	2.4	180	66	7.4	2.2
2009	230	72	9.0	2.3	207	54	8.4	1.6

Source: See footnotes for Table III-8.2.

Table III-8.2: Trends in incidence and mortality by gender using the Joinpoint Regression Program† with up to four joinpoints, Minnesota, 1988-2009, Esophagus Cancer

	Incidence				Mortality			
	Males		Females		Males		Females	
	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†
Interval 1	1988-2009	2.2*	1988-2009	1.6*	1988-2009	1.2*	1988-2009	0.6
AAPC(%)†	2005-2009	2.2*	2005-2009	1.6*	2005-2009	1.2*	2005-2009	0.6
	2000-2009	2.2*	2000-2009	1.6*	2000-2009	1.2*	2000-2009	0.6

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

† Joinpoint Regression version 3.5.2, National Cancer Institute. Annual age-adjusted rates 1988-2009 were analyzed to identify points in time where the trend significantly changed (joinpoints). The trend between joinpoints is the Annual Percent Change (APC) in the rate.

The Average Annual Percent Change (AAPC) is a summary measure of the APCs during the most recent five- and ten-year periods. If no joinpoints were identified, the AAPC is the same as the APC. If joinpoints were identified during the specified period, the AAPC is a weighted average of the APCs. Trends are not calculated if one or more years have no cases/deaths. See Appendix E for more information.

- Not applicable (sex-specific site), or not available (no unique cause of death code prior to 1999).

* The APC/AAPC is significantly different from zero ($p < 0.05$).

Esophagus Cancer

Table III-8.3: Number of new cases and deaths and average annual incidence and mortality rates by age and gender, Minnesota, 2005-2009, Esophagus Cancer

Age (Yr)	Incidence 2005-2009				Mortality 2005-2009			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
0-19	0	0	0.0	0.0	1	0	0.0	0.0
20-34	3	0	0.1	0.0	3	1	0.1	0.0
35-49	95	14	3.3	0.5	58	6	2.0	0.2
50-64	404	84	17.4	3.6	310	58	13.3	2.5
65-74	287	87	37.7	10.2	238	64	31.3	7.5
75-84	244	85	53.0	13.4	240	76	52.2	11.9
85+	75	46	49.6	13.0	90	62	59.5	17.5

Source: See footnotes for Table III-8.4.

Table III-8.4: Number of new cases and deaths and average annual incidence and mortality rates by race/ethnicity and gender, Minnesota, 2005-2009, Esophagus Cancer

Race/Ethnicity**	Incidence 2005-2009				Mortality 2005-2009			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
All Races Combined	1,108	316	9.0	2.1	940	267	7.8	1.7
American Indian								
Statewide	6	3	~	~	6	1	~	~
CHSDA**	5	2	~	~	3	1	~	~
Asian/PI	12	2	6.9	~	5	2	~	~
Black	31	14	11.5	4.5	20	7	7.7	~
Non-Hispanic White	1,050	291	9.0	2.1	906	253	8.0	1.7
Hispanic all races	5	3	~	~	3	2	~	~

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

** Persons reported with unknown or other race are included in all races combined, but are excluded from race-specific data unless they are Hispanic. Hispanic includes persons of any race, including unknown and other race. CHSDA includes counties in the Contract Health Services Delivery Area, as defined by the Indian Health Services. Refer to Chapter I for a discussion of CHSDA counties and for comments on the accuracy of race-specific rates.

- Not applicable; sex-specific site.

~ Race-specific rates based on fewer than 10 cases or deaths are not presented.

Table III-8.5: Median age at diagnosis/death, lifetime risk of diagnosis/death, and cancer prevalence, Minnesota, 2007-2009, Esophagus Cancer

	Males	Females
Median Age at Diagnosis (Yr)	66.0	70.0
Median Age at Death (Yr)	69.0	76.0
Lifetime Risk of Diagnosis (%)	1.0	0.3
Lifetime Risk of Death (%)	1.0	0.3
Complete prevalence†	480	130
Five-year prevalence‡	320	90

Source: MCSS December 2011 with Vintage 2009 population estimates. See Appendix E for prevalence calculations.

† Estimated Minnesotans ever diagnosed with this cancer and alive on 1/1/2009, rounded to the nearest 10.

‡ Estimated Minnesotans diagnosed with this cancer in the last five years and alive on 1/1/2009, rounded to the nearest 10.

- Not applicable; sex-specific site.

Table III-8.6: Distribution of cases and five-year relative survival by extent of disease at diagnosis, Esophagus Cancer

Stage at Diagnosis	Cases(%)†	Five-Year Survival(%)‡
All Stages	100.0	16.9
<i>In situ</i>	0.8	75.4
Localized	17.9	37.8
Regional	36.0	19.8
Distant	33.9	3.4
Unstaged	11.4	10.5

† Among Minnesota cases diagnosed 2007-2009.

‡ Among SEER18 cases diagnosed 2002-2008 followed into 2009 from *SEER Cancer Statistics Review, 1975-2009 (Vintage 2009 Populations)*. Survival for All Stages excludes *in situ* tumors.

- There were not enough intervals to produce the statistic.

Esophagus Cancer

Table III-8.7: Average annual incidence and mortality rates§ in the U.S. by race/ethnicity and gender, 2005-2009, Esophagus Cancer**

		Males	Females
Incidence	All Races Combined	7.8	1.9
	American Indian		
	Total	4.8	1.9
	CHSDA**	5.8	2.8
	Asian/PI	3.8	1.2
	Black	8.9	2.8
	Non-Hispanic White	8.5	1.9
	Hispanic all races	5.0	1.0
	Mortality	All Races Combined	7.7
American Indian			
Total		4.9	1.2
CHSDA**		6.4	1.5
Asian/PI		3.0	0.9
Black		8.2	2.2
Non-Hispanic White		8.2	1.6
Hispanic all races		4.1	0.8

Source: *SEER Cancer Statistics Review 1975-2009 (Vintage 2009 Populations)*. Incidence data are from the SEER 18 areas, which cover 26% of the US population. Mortality data are for the entire US.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

** See footnote for Table III-8.4.

~ See footnote for Table III-8.4.

Descriptive Epidemiology

Incidence and Mortality: From 2005 to 2009, an average of 285 cases of esophageal cancer were diagnosed in Minnesota each year and about 240 deaths resulted from this disease annually. Rates among non-Hispanic whites were similar to those reported by SEER for the same time period.

Survival: Based on SEER data, the five-year relative survival rate for esophageal cancer was 17 percent among cases diagnosed from 2002 to 2008, and 38 percent when diagnosed at the localized stage. Most esophageal cancers in Minnesota were diagnosed when the tumor had already spread to adjacent tissues (36%) or distant organs (34%).

Trends: Esophageal cancer incidence and mortality rates both increased significantly among males in Minnesota. Among females, incidence increased significantly, but at a somewhat slower pace than among males, while mortality remained stable. In the SEER program, the trend in esophageal cancer varied by gender, race, and geographic area. Among non-Hispanic whites in the SEER 13 areas, esophageal

cancer incidence increased significantly among males (AAPC 2000-2009 of 1.2% per year) and was stable among females. Among non-Hispanic whites in the US, esophageal cancer mortality was stable among males and decreased significantly (AAPC 2000-2009 of 1.0 percent per year) among females.

Age: In Minnesota, 58 percent of esophageal cancer diagnoses and 64 percent of deaths occurred among persons 65 years of age and older.

Gender: Esophageal cancer rates were four times higher among males than females.

Race: There are too few cases of esophageal cancer among persons of color in Minnesota to assess race/ethnic differences in esophagus cancer rates. Nationally, black and non-Hispanic white men had the highest, and very similar, incidence and mortality rates; among women, American Indians living in CHSDA counties and black women had the highest incidence rates, while black women had the highest mortality rate.

Risk Factors

Cigarette smoking and long-term alcohol consumption are major risk factors for this disease and are thought to be responsible for 80 to 90 percent of squamous cell carcinomas of the esophagus in the U.S. Chronic gastric reflux, including Barrett's esophagus, is a major risk factor for adenocarcinomas of the esophagus. In epidemiologic studies of esophageal adenocarcinoma, elevated body mass index (BMI) has been consistently shown to be a significant risk factor. Chronic injury to the esophagus through ingestion of hot food or beverages or accidental ingestion of caustic substances like lye may also increase risk. Some epidemiologic evidence indicates that although *H. pylori* infection increases the risk of non-cardia stomach cancer, it may actually be associated with a lower risk of esophageal adenocarcinoma. Research suggests that nutritional deficiencies related to lack of fresh fruits and vegetables and overall deficiencies of certain vitamins and minerals, including vitamins A and C, iron, and riboflavin are associated with increased risk of disease, and may explain some of the wide international variation in the occurrence of this cancer.

Early Detection / Prevention

No screening tests are recommended to screen the general population for esophageal cancer. However, persons who are at high risk for esophageal cancer, such as those with Barrett esophagus, should be followed closely to determine the advisability of having regular endoscopic examinations.

Hodgkin Lymphoma

Table III-9.1: Number of new cases and deaths and incidence and mortality rates by year and gender, Minnesota, 1988-2009, Hodgkin Lymphoma

Year	Incidence				Mortality			
	New Cases		Rate§		Deaths		Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
1988	77	69	3.9	2.9	14	15	0.7	0.6
1989	72	58	3.3	2.6	18	13	1.0	0.6
1990	88	53	4.1	2.3	14	16	0.8	0.7
1991	72	70	3.4	3.1	17	12	0.9	0.5
1992	75	73	3.5	3.1	23	11	1.1	0.4
1993	78	72	3.6	3.0	22	18	1.2	0.7
1994	85	62	3.8	2.6	13	13	0.7	0.5
1995	78	48	3.5	2.1	8	13	0.4	0.5
1996	75	67	3.2	2.8	11	11	0.6	0.4
1997	72	63	3.1	2.6	7	15	0.3	0.6
1998	83	68	3.6	2.8	19	9	0.9	0.3
1999	80	80	3.4	3.2	18	12	0.9	0.5
2000	111	67	4.6	2.7	12	12	0.6	0.5
2001	73	60	3.1	2.4	19	3	0.9	0.1
2002	77	63	3.2	2.5	12	9	0.5	0.3
2003	95	79	3.8	3.1	15	18	0.7	0.7
2004	84	70	3.4	2.7	9	9	0.4	0.3
2005	77	65	3.1	2.5	8	11	0.4	0.4
2006	73	54	3.0	2.1	12	13	0.6	0.5
2007	89	66	3.5	2.5	22	10	0.9	0.3
2008	101	85	3.9	3.2	8	8	0.3	0.3
2009	93	82	3.6	3.1	13	9	0.5	0.3

Source: See footnotes for Table III-9.2.

Table III-9.2: Trends in incidence and mortality by gender using the Joinpoint Regression Program† with up to four joinpoints, Minnesota, 1988-2009, Hodgkin Lymphoma

	Incidence				Mortality			
	Males		Females		Males		Females	
	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†
Interval 1	1988-2009	-0.3	1988-2009	0.0	1988-2009	-2.6*	1988-2009	-2.9*
AAPC(%)†	2005-2009	-0.3	2005-2009	0.0	2005-2009	-2.6*	2005-2009	-2.9*
	2000-2009	-0.3	2000-2009	0.0	2000-2009	-2.6*	2000-2009	-2.9*

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

† Joinpoint Regression version 3.5.2, National Cancer Institute. Annual age-adjusted rates 1988-2009 were analyzed to identify points in time where the trend significantly changed (joinpoints). The trend between joinpoints is the Annual Percent Change (APC) in the rate.

The Average Annual Percent Change (AAPC) is a summary measure of the APCs during the most recent five- and ten-year periods. If no joinpoints were identified, the AAPC is the same as the APC. If joinpoints were identified during the specified period, the AAPC is a weighted average of the APCs. Trends are not calculated if one or more years have no cases/deaths. See Appendix E for more information.

- Not applicable (sex-specific site), or not available (no unique cause of death code prior to 1999).

* The APC/AAPC is significantly different from zero ($p < 0.05$).

Hodgkin Lymphoma

Table III-9.3: Number of new cases and deaths and average annual incidence and mortality rates by age and gender, Minnesota, 2005-2009, Hodgkin Lymphoma

Age (Yr)	Incidence 2005-2009				Mortality 2005-2009			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
0-19	53	40	1.5	1.2	0	0	0.0	0.0
20-34	119	132	4.4	5.2	6	4	0.2	0.2
35-49	94	55	3.2	1.9	13	8	0.5	0.3
50-64	78	52	3.4	2.2	12	11	0.5	0.5
65-74	46	36	6.0	4.2	13	10	1.7	1.2
75-84	34	29	7.4	4.6	13	16	2.8	2.5
85+	9	8	6.0	2.3	6	2	4.0	0.6

Source: See footnotes for Table III-9.4.

Table III-9.4: Number of new cases and deaths and average annual incidence and mortality rates by race/ethnicity and gender, Minnesota, 2005-2009, Hodgkin Lymphoma

Race/Ethnicity**	Incidence 2005-2009				Mortality 2005-2009			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
All Races Combined	433	352	3.4	2.7	63	51	0.5	0.4
American Indian								
Statewide	3	2	~	~	0	1	~	~
CHSDA**	1	2	~	~	0	0	~	~
Asian/PI	2	5	~	~	1	0	~	~
Black	15	11	2.4	1.8	0	1	~	~
Non-Hispanic White	390	321	3.5	2.8	59	49	0.5	0.4
Hispanic all races	19	6	3.5	~	3	0	~	~

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

** Persons reported with unknown or other race are included in all races combined, but are excluded from race-specific data unless they are Hispanic. Hispanic includes persons of any race, including unknown and other race. CHSDA includes counties in the Contract Health Services Delivery Area, as defined by the Indian Health Services. Refer to Chapter I for a discussion of CHSDA counties and for comments on the accuracy of race-specific rates.

- Not applicable; sex-specific site.

~ Race-specific rates based on fewer than 10 cases or deaths are not presented.

Table III-9.5: Median age at diagnosis/death, lifetime risk of diagnosis/death, and cancer prevalence, Minnesota, 2007-2009, Hodgkin Lymphoma

	Males	Females
Median Age at Diagnosis (Yr)	41.0	36.0
Median Age at Death (Yr)	60.0	67.0
Lifetime Risk of Diagnosis (%)	0.3	0.3
Lifetime Risk of Death (%)	0.1	0.0
Complete prevalence†	1,590	1,480
Five-year prevalence‡	340	300

Source: MCSS December 2011 with Vintage 2009 population estimates. See Appendix E for prevalence calculations.

† Estimated Minnesotans ever diagnosed with this cancer and alive on 1/1/2009, rounded to the nearest 10.

‡ Estimated Minnesotans diagnosed with this cancer in the last five years and alive on 1/1/2009, rounded to the nearest 10.

- Not applicable; sex-specific site.

Table III-9.6: Distribution of cases and five-year relative survival by age at diagnosis, Hodgkin Lymphoma

Age at Diagnosis	Cases(%)†	Five-Year Survival(%)‡
All Ages	100.0	84.7
< 45	56.8	93.1
45-54	9.7	84.6
55-64	12.0	75.3
65-74	11.6	60.6
75+	9.9	40.2

† Among Minnesota cases diagnosed 2007-2009.

‡ Among SEER18 cases diagnosed 2002-2008 followed into 2009 from *SEER Cancer Statistics Review, 1975-2009 (Vintage 2009 Populations)*.

Hodgkin Lymphoma

Table III-9.7: Average annual incidence and mortality rates§ in the U.S. by race/ethnicity and gender, 2005-2009, Hodgkin Lymphoma**

		Males	Females
Incidence	All Races Combined	3.2	2.5
	American Indian		
	Total	0.7	0.8
	CHSDA**	0.8	0.9
	Asian/PI	1.5	1.2
	Black	3.1	2.4
	Non-Hispanic White	3.6	2.9
Mortality	Hispanic all races	2.7	2.2
	All Races Combined	0.5	0.3
	American Indian		
	Total	0.3	~
	CHSDA**	0.3	~
	Asian/PI	0.2	0.1
	Black	0.5	0.3
Non-Hispanic White	0.5	0.4	
Hispanic all races	0.5	0.3	

Source: *SEER Cancer Statistics Review 1975-2009 (Vintage 2009 Populations)*. Incidence data are from the SEER 18 areas, which cover 26% of the US population. Mortality data are for the entire US.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

** See footnote for Table III-9.4.

~ See footnote for Table III-9.4.

Descriptive Epidemiology

Incidence and Mortality: Lymphomas are malignancies of the white blood cells. There are two kinds of malignant lymphomas: Hodgkin lymphoma contains Reed-Sternberg cells, and non-Hodgkin lymphoma does not. Hodgkin lymphoma is less common, accounting for about 12 percent of lymphomas and 0.6 percent of all cancer diagnoses. Over the five-year period, an average of 157 cases were diagnosed each year in Minnesota and 23 people died from the disease annually. Rates among non-Hispanic whites were similar to those reported nationally.

Survival: The SEER five-year relative survival rate for Hodgkin lymphoma is about 85 percent, and decreases with increasing age.

Trends: The incidence rate of Hodgkin lymphoma in Minnesota has been stable among both men and women since cancer reporting was implemented in 1988, while the mortality rate declined significantly among both men and women over the 22-year period. This was similar to national trends.

Age: Approximately 80 percent of newly diagnosed cases of Hodgkin lymphoma occurred in persons less than 65 years of age. Hodgkin lymphoma has a unique age distribution -- incidence peaks at about age 30, declines until age 55, and then increases to a second peak at age 75. This indicates that there may be two different etiologies for this cancer.

Gender: From 2005 to 2009, the incidence and mortality rates of Hodgkin lymphoma were about 25 percent higher among males than females.

Race: Based on cases reported to SEER, the incidence rate of Hodgkin lymphoma from 2005 to 2009 was highest among non-Hispanic whites.

Risk Factors

No major risk factors for Hodgkin lymphoma have been identified, although the unusual epidemiologic patterns of the disease suggest that Hodgkin lymphoma pathogenesis may involve an infectious agent. An increased rate of Hodgkin lymphoma has been noted among people who have had infectious mononucleosis, caused by the Epstein-Barr virus. The risk of developing Hodgkin lymphoma appears to be as much as 4 times higher in people who have had mononucleosis than in people who have not. Research suggests that risk is also increased among individuals with certain primary immunodeficiencies. Siblings of persons with Hodgkin lymphoma have an increased risk of the disease that does not appear to be genetic, but may be due to the same childhood exposures, such as infections. There does not appear to be a connection between Hodgkin lymphoma and lifestyle factors such as smoking, diet, exercise, and alcohol intake. Hodgkin lymphoma occurs at a higher rate in people with a higher socioeconomic background.

Early Detection / Prevention

No strategies for the early detection of Hodgkin lymphoma have been identified.

Kaposi Sarcoma

Table III-10.1: Number of new cases and deaths and incidence and mortality rates by year and gender, Minnesota, 1988-2009, Kaposi Sarcoma

Year	Incidence				Mortality			
	New Cases		Rate§		Deaths		Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
1988	24	4	1.2	0.2	-	-	-	-
1989	35	2	1.6	0.1	-	-	-	-
1990	35	3	1.5	0.1	-	-	-	-
1991	41	0	2.0	0.0	-	-	-	-
1992	46	2	2.0	0.1	-	-	-	-
1993	37	1	1.6	0.0	-	-	-	-
1994	36	1	1.5	0.0	-	-	-	-
1995	36	6	1.5	0.2	-	-	-	-
1996	16	0	0.8	0.0	-	-	-	-
1997	20	0	0.9	0.0	-	-	-	-
1998	9	1	0.4	0.0	-	-	-	-
1999	8	0	0.3	0.0	0	0	0.0	0.0
2000	14	1	0.6	0.0	0	0	0.0	0.0
2001	14	1	0.6	0.0	1	0	0.0	0.0
2002	10	2	0.4	0.1	0	0	0.0	0.0
2003	7	2	0.3	0.1	0	1	0.0	0.0
2004	12	2	0.5	0.1	0	0	0.0	0.0
2005	9	2	0.4	0.1	1	0	0.0	0.0
2006	10	1	0.4	0.0	0	1	0.0	0.0
2007	13	1	0.5	0.0	1	0	0.1	0.0
2008	9	2	0.3	0.1	0	1	0.0	0.0
2009	11	4	0.4	0.2	0	1	0.0	0.0

Source: See footnotes for Table III-10.2.

Table III-10.2: Trends in incidence and mortality by gender using the Joinpoint Regression Program† with up to four joinpoints, Minnesota, 1988-2009, Kaposi Sarcoma

	Incidence				Mortality			
	Males		Females		Males		Females	
	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†
Interval 1	1988-1992	14.3						
Interval 2	1992-1999	-19.1*						
Interval 3	1999-2009	-2.4						
AAPC(%)†	2005-2009	-2.4						
	2000-2009	-2.4						

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

† Joinpoint Regression version 3.5.2, National Cancer Institute. Annual age-adjusted rates 1988-2009 were analyzed to identify points in time where the trend significantly changed (joinpoints). The trend between joinpoints is the Annual Percent Change (APC) in the rate.

The Average Annual Percent Change (AAPC) is a summary measure of the APCs during the most recent five- and ten-year periods. If no joinpoints were identified, the AAPC is the same as the APC. If joinpoints were identified during the specified period, the AAPC is a weighted average of the APCs. Trends are not calculated if one or more years have no cases/deaths. See Appendix E for more information.

- Not applicable (sex-specific site), or not available (no unique cause of death code prior to 1999).

* The APC/AAPC is significantly different from zero ($p < 0.05$).

Kaposi Sarcoma

Table III-10.3: Number of new cases and deaths and average annual incidence and mortality rates by age and gender, Minnesota, 2005-2009, Kaposi Sarcoma

Age (Yr)	Incidence 2005-2009				Mortality 2005-2009			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
0-19	0	0	0.0	0.0	0	0	0.0	0.0
20-34	9	3	0.3	0.1	0	0	0.0	0.0
35-49	23	0	0.8	0.0	1	0	0.0	0.0
50-64	13	0	0.6	0.0	0	0	0.0	0.0
65-74	1	1	0.1	0.1	0	0	0.0	0.0
75-84	5	4	1.1	0.6	0	2	0.0	0.3
85+	1	2	0.7	0.6	1	1	0.7	0.3

Source: See footnotes for Table III-10.4.

Table III-10.4: Number of new cases and deaths and average annual incidence and mortality rates by race/ethnicity and gender, Minnesota, 2005-2009, Kaposi Sarcoma

Race/Ethnicity**	Incidence 2005-2009				Mortality 2005-2009			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
All Races Combined	52	10	0.4	0.1	2	3	~	~
American Indian								
Statewide	1	0	~	~	0	0	~	~
CHSDA**	0	0	~	~	0	0	~	~
Asian/PI	0	0	~	~	0	0	~	~
Black	10	0	3.3	~	0	0	~	~
Non-Hispanic White	35	7	0.3	~	2	3	~	~
Hispanic all races	2	2	~	~			~	~

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

** Persons reported with unknown or other race are included in all races combined, but are excluded from race-specific data unless they are Hispanic. Hispanic includes persons of any race, including unknown and other race. CHSDA includes counties in the Contract Health Services Delivery Area, as defined by the Indian Health Services. Refer to Chapter I for a discussion of CHSDA counties and for comments on the accuracy of race-specific rates.

- Not applicable; sex-specific site.

~ Race-specific rates based on fewer than 10 cases or deaths are not presented.

Table III-10.5: Median age at diagnosis/death and lifetime risk of diagnosis/death, Minnesota, 2007-2009, Kaposi Sarcoma

	Males	Females
Median Age at Diagnosis (Yr)	47.0	82.0
Median Age at Death (Yr)	88.0	79.0
Lifetime Risk of Diagnosis (%)	0.0	0.0
Lifetime Risk of Death (%)	0.0	0.0

Source: MCSS December 2011 with Vintage 2009 population estimates.

Table III-10.6: Distribution of cases and five-year relative survival by age at diagnosis, Kaposi Sarcoma

Age at Diagnosis	Cases(%)†	Five-Year Survival(%)‡
All Ages	100.0	68.5
< 45	37.5	62.0
45-54	20.0	66.4
55-64	17.5	78.9
65-74	2.5	80.1
75+	22.5	88.7

† Among Minnesota cases diagnosed 2007-2009.

‡ Among SEER18 cases diagnosed 2002-2008 followed into 2009 from SEER Cancer Statistics Review, 1975-2009 (Vintage 2009 Populations).

Kaposi Sarcoma

Table III-10.7: Average annual incidence and mortality rates§ in the U.S. by race/ethnicity and gender, 2005-2009, Kaposi Sarcoma**

		Males	Females
Incidence	All Races Combined	1.1	0.1
	American Indian		
	Total	0.5	~
	CHSDA**	~	~
	Asian/PI	0.4	~
	Black	2.1	0.2
	Non-Hispanic White	0.8	0.1
	Hispanic all races	1.4	0.2

Source: *SEER Cancer Statistics Review 1975-2009 (Vintage 2009 Populations)*. Incidence data are from the SEER 18 areas, which cover 26% of the US population. Mortality data are for the entire US.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

** See footnote for Table III-10.4.

~ See footnote for Table III-10.4.

Descriptive Epidemiology

Incidence and Mortality: Kaposi sarcoma (KS) is a cancer of the connective tissue that typically causes raised, dark lesions on the skin. When these become widespread and affect other organs, the disease can be fatal. KS used to be extremely rare, primarily occurring in elderly men of Jewish or Italian descent or in persons taking immunosuppressive medications. However, infection with the human immunodeficiency virus (HIV) greatly increases the risk of developing KS, and in fact, the unusual development of KS among young men was one of the first signs of the AIDS epidemic. Over the most recent five-year period, 2005-2009, an average of 12 cases of KS were diagnosed in Minnesota each year. Deaths from KS cannot be accurately assessed because those associated with AIDS are likely to have AIDS listed as the underlying cause of death rather than KS. Incidence rates among non-Hispanic white males in Minnesota were 55 percent lower than reported by SEER.

Survival: Persons diagnosed with KS in the SEER Program from 2002 to 2008 had a five-year relative survival of 68 percent. Survival increased with increasing age.

Trends: The incidence of KS has been dramatically affected by the AIDS epidemic. In the SEER 9 areas, incidence rates increased more than 20-fold from 0.4 new cases per 100,000 men per year in 1975-1979 to a peak of 9.3 in 1990-1991, and then decreased to 1.2 in 2007-2009. Decreases in incidence are thought to be due to the introduction of medications that better protect the immune system once HIV infection has occurred. Although consistently lower than in the SEER Program, KS incidence rates among males in Minnesota have followed a somewhat similar pattern, peaking in 1990-1991 at 2.0 new cases per 100,000, declining by 19.1 percent per year from 1992 to 1999, and then stabilizing at around 0.4 per 100,000 males.

Age: About 80 percent of men diagnosed with KS in Minnesota were less than 65 years of age.

Gender: In Minnesota, males were four times more likely to be diagnosed with KS than females.

Race: Based on a fairly limited number of cases, KS incidence rates in Minnesota were considerably higher among black males than non-Hispanic white males. This is consistent with what was reported by the SEER 18 areas for the same five-year period.

Risk Factors

Research indicates that the vast majority of KS cases are caused by infection with a virus in the herpes family, called human herpesvirus 8 (HHV-8). This virus is spread by sexual contact, as is HIV. Although as many as 10 percent of the U.S. population are infected with HHV-8, researchers believe that only those with suppressed immune systems will go on to develop KS.

Early Detection / Prevention

The best protection against KS is to avoid behaviors that increase risk for HIV infection, such as unprotected sexual intercourse and needle-sharing. There is no test to identify persons with KS before the lesions develop, but anonymous HIV testing is widely available. Knowing your HIV status means that medications to protect your immune system can be initiated.

Kidney and Renal Pelvis Cancer

Table III-11.1: Number of new cases and deaths and incidence and mortality rates by year and gender, Minnesota, 1988-2009, Kidney and Renal Pelvis Cancer

Year	Incidence				Mortality			
	New Cases		Rate§		Deaths		Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
1988	284	160	16.2	7.3	136	65	7.9	2.8
1989	257	147	14.6	6.5	90	70	5.3	2.9
1990	289	164	15.8	7.0	116	72	6.8	2.9
1991	308	148	16.7	6.3	141	86	8.0	3.5
1992	311	200	16.7	8.6	132	98	7.4	4.0
1993	282	159	14.9	6.7	128	78	7.0	3.1
1994	336	175	17.4	7.3	114	79	6.2	3.1
1995	346	195	17.7	8.1	113	76	6.1	2.9
1996	305	160	15.3	6.6	126	87	6.6	3.2
1997	290	209	14.4	8.4	141	90	7.3	3.4
1998	323	213	15.6	8.4	102	89	5.2	3.2
1999	340	224	16.0	8.9	129	68	6.4	2.4
2000	390	237	18.0	9.2	134	103	6.5	3.7
2001	405	224	18.4	8.6	117	82	5.5	3.0
2002	428	256	19.1	9.6	147	74	6.9	2.5
2003	465	274	20.2	10.2	144	77	6.8	2.7
2004	478	269	20.1	9.8	129	91	5.8	3.1
2005	469	295	19.6	10.6	135	81	5.9	2.7
2006	536	300	21.7	10.7	158	88	6.8	2.9
2007	532	344	21.0	11.9	153	96	6.4	3.1
2008	607	323	23.4	11.1	146	71	6.1	2.2
2009	530	313	19.9	10.6	166	93	6.8	2.9

Source: See footnotes for Table III-11.2.

Table III-11.2: Trends in incidence and mortality by gender using the Joinpoint Regression Program† with up to four joinpoints, Minnesota, 1988-2009, Kidney and Renal Pelvis Cancer

	Incidence				Mortality			
	Males		Females		Males		Females	
	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†
Interval 1	1988-2009	1.9*	1988-2009	2.7*	1988-2009	-0.5	1988-2009	-0.9
AAPC(%)†	2005-2009	1.9*	2005-2009	2.7*	2005-2009	-0.5	2005-2009	-0.9
	2000-2009	1.9*	2000-2009	2.7*	2000-2009	-0.5	2000-2009	-0.9

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

† Joinpoint Regression version 3.5.2, National Cancer Institute. Annual age-adjusted rates 1988-2009 were analyzed to identify points in time where the trend significantly changed (joinpoints). The trend between joinpoints is the Annual Percent Change (APC) in the rate. The Average Annual Percent Change (AAPC) is a summary measure of the APCs during the most recent five- and ten-year periods. If no joinpoints were identified, the AAPC is the same as the APC. If joinpoints were identified during the specified period, the AAPC is a weighted average of the APCs. Trends are not calculated if one or more years have no cases/deaths. See Appendix E for more information.

- Not applicable (sex-specific site), or not available (no unique cause of death code prior to 1999).

* The APC/AAPC is significantly different from zero ($p < 0.05$).

Kidney and Renal Pelvis Cancer

Table III-11.3: Number of new cases and deaths and average annual incidence and mortality rates by age and gender, Minnesota, 2005-2009, Kidney and Renal Pelvis Cancer

Age (Yr)	Incidence 2005-2009				Mortality 2005-2009			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
0-19	39	20	1.1	0.6	5	1	0.1	0.0
20-34	33	36	1.2	1.4	1	0	0.0	0.0
35-49	390	187	13.4	6.6	36	12	1.2	0.4
50-64	1,001	513	43.1	21.9	216	80	9.3	3.4
65-74	689	378	90.5	44.3	216	91	28.4	10.7
75-84	437	338	95.0	53.1	186	133	40.4	20.9
85+	85	103	56.2	29.0	98	112	64.8	31.5

Source: See footnotes for Table III-11.4.

Table III-11.4: Number of new cases and deaths and average annual incidence and mortality rates by race/ethnicity and gender, Minnesota, 2005-2009, Kidney and Renal Pelvis Cancer

Race/Ethnicity**	Incidence 2005-2009				Mortality 2005-2009			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
All Races Combined	2,674	1,575	21.1	11.0	758	429	6.4	2.7
American Indian								
Statewide	58	31	48.6	25.8	10	10	11.2	11.0
CHSDA**	35	20	56.2	32.5	8	7	~	~
Asian/PI	12	5	3.1	~	0	0	~	~
Black	91	46	26.7	15.3	17	8	7.3	~
Non-Hispanic White	2,451	1,450	20.8	10.8	719	406	6.4	2.7
Hispanic all races	35	28	17.9	13.8	9	4	~	~

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

** Persons reported with unknown or other race are included in all races combined, but are excluded from race-specific data unless they are Hispanic. Hispanic includes persons of any race, including unknown and other race. CHSDA includes counties in the Contract Health Services Delivery Area, as defined by the Indian Health Services. Refer to Chapter I for a discussion of CHSDA counties and for comments on the accuracy of race-specific rates.

- Not applicable; sex-specific site.

~ Race-specific rates based on fewer than 10 cases or deaths are not presented.

Table III-11.5: Median age at diagnosis/death, lifetime risk of diagnosis/death, and cancer prevalence, Minnesota, 2007-2009, Kidney and Renal Pelvis Cancer

	Males	Females
Median Age at Diagnosis (Yr)	63.0	65.0
Median Age at Death (Yr)	71.0	77.0
Lifetime Risk of Diagnosis (%)	2.1	1.3
Lifetime Risk of Death (%)	0.8	0.4
Complete prevalence†	3,430	2,330
Five-year prevalence‡	1,530	970

Source: MCSS December 2011 with Vintage 2009 population estimates. See Appendix E for prevalence calculations.

† Estimated Minnesotans ever diagnosed with this cancer and alive on 1/1/2009, rounded to the nearest 10.

‡ Estimated Minnesotans diagnosed with this cancer in the last five years and alive on 1/1/2009, rounded to the nearest 10.

- Not applicable; sex-specific site.

Table III-11.6: Distribution of cases and five-year relative survival by extent of disease at diagnosis, Kidney and Renal Pelvis Cancer

Stage at Diagnosis	Cases(%)†	Five-Year Survival(%)‡
All Stages	100.0	70.6
<i>In situ</i>	2.3	91.2
Localized	60.9	91.1
Regional	18.2	63.7
Distant	13.2	11.6
Unstaged	5.4	34.3

† Among Minnesota cases diagnosed 2007-2009.

‡ Among SEER18 cases diagnosed 2002-2008 followed into 2009 from *SEER Cancer Statistics Review, 1975-2009 (Vintage 2009 Populations)*. Survival for All Stages excludes *in situ* tumors.

- There were not enough intervals to produce the statistic.

Kidney and Renal Pelvis Cancer

Table III-11.7: Average annual incidence and mortality rates§ in the U.S. by race/ethnicity and gender, 2005-2009, Kidney and Renal Pelvis Cancer**

		Males	Females
Incidence	All Races Combined	20.8	10.5
	American Indian		
	Total	17.3	10.4
	CHSDA**	24.7	15.4
	Asian/PI	10.9	5.7
	Black	24.4	12.0
	Non-Hispanic White	21.5	10.7
Mortality	Hispanic all races	19.5	10.9
	All Races Combined	5.8	2.6
	American Indian		
	Total	6.6	2.7
	CHSDA**	8.8	4.1
	Asian/PI	2.9	1.3
	Black	6.0	2.6
Non-Hispanic White	6.0	2.7	
Hispanic all races	5.0	2.3	

Source: *SEER Cancer Statistics Review 1975-2009 (Vintage 2009 Populations)*. Incidence data are from the SEER 18 areas, which cover 26% of the US population. Mortality data are for the entire US.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

** See footnote for Table III-11.4.

~ See footnote for Table III-11.4.

Descriptive Epidemiology

Incidence and Mortality: From 2005 to 2009, kidney and renal pelvis cancers were the seventh most commonly diagnosed cancer among males, and the tenth most commonly diagnosed cancer among females. During this period, an average of 850 cases of kidney and renal pelvis cancer were diagnosed each year in Minnesota, and 237 deaths resulted from this disease annually. Comparing non-Hispanic whites, Minnesota rates were very similar to those reported nationally.

Survival: Among cases diagnosed between 2002 and 2008, the five-year relative survival rate for kidney and renal pelvis cancers in the SEER 18 areas was 91 percent for localized tumors. Survival dropped to 64 percent for tumors diagnosed at the regional stage.

About 61 percent of kidney and renal pelvis cancers in Minnesota were diagnosed while in the localized stage.

Trends: Incidence rates in Minnesota increased significantly from 1988 to 2009 among both males (1.9% per year) and females (2.7% per year). Mortality rates remained relatively stable or decreased modestly for each gender. These trends are similar to those reported by the SEER Program.

Age: About 48 percent of kidney cancers were diagnosed and 70 percent of deaths occurred among persons 65 years of age or older.

Gender: Rates of kidney and renal pelvis cancer were two times higher in men than in women.

Race: Over the five-year period, the incidence rate of kidney and renal pelvis cancer in Minnesota was highest among American Indians, two times higher than among non-Hispanic whites. Their risk of developing this cancer was also two times higher than among American Indians in the SEER 17 areas. The relatively small number of deaths from kidney and renal pelvis cancer among persons who are not non-Hispanic white in Minnesota makes race/ethnic comparisons of mortality risk difficult.

Risk Factors

Cigarette smoking is strongly related to kidney and renal pelvis cancers. Smokers have twice the risk for kidney cancer and four times the risk for renal pelvis cancer compared to nonsmokers. Obesity is also positively associated with kidney cancer, but relationships to dietary factors are not well established. Hypertension and/or the medications used to treat it may increase risk for kidney cancer, but the cause-effect relationships have not been clearly identified. Occupationally-related risks for renal pelvis cancers resemble those of bladder cancer and include exposure to certain dyes and organic solvents such as trichloroethylene. People with advanced kidney disease and with certain inherited medical conditions may be at higher risk for kidney cancer.

Early Detection / Prevention

Screening for kidney cancer is not recommended. It is often difficult for a physical examination to detect asymptomatic tumors until they are quite large. Smoking cessation is the best step in preventing cancers of the kidney and renal pelvis.

Larynx Cancer

Table III-12.1: Number of new cases and deaths and incidence and mortality rates by year and gender, Minnesota, 1988-2009, Larynx Cancer

Year	Incidence				Mortality			
	New Cases		Rate§		Deaths		Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
1988	154	23	8.7	1.1	33	4	1.9	0.2
1989	152	26	8.6	1.2	31	8	1.8	0.3
1990	134	38	7.3	1.7	38	12	2.3	0.5
1991	132	28	7.1	1.3	35	11	1.9	0.4
1992	137	24	7.4	1.1	30	9	1.6	0.4
1993	123	26	6.6	1.2	38	7	2.1	0.3
1994	150	38	7.8	1.7	32	13	1.8	0.5
1995	135	30	7.0	1.3	27	4	1.5	0.2
1996	122	33	6.2	1.4	33	7	1.8	0.3
1997	157	31	7.8	1.2	36	9	1.8	0.3
1998	136	31	6.7	1.3	51	8	2.6	0.3
1999	136	29	6.6	1.2	45	10	2.2	0.4
2000	116	30	5.3	1.2	27	7	1.4	0.3
2001	125	32	5.7	1.3	45	12	2.2	0.5
2002	123	35	5.5	1.4	30	9	1.4	0.3
2003	126	31	5.6	1.2	21	9	1.0	0.4
2004	137	35	6.0	1.3	37	7	1.7	0.3
2005	146	40	6.0	1.4	39	11	1.7	0.4
2006	150	34	6.3	1.2	45	8	1.8	0.3
2007	128	41	5.2	1.5	48	9	2.0	0.3
2008	147	40	5.7	1.4	35	17	1.5	0.6
2009	159	24	5.9	0.8	34	8	1.4	0.2

Source: See footnotes for Table III-12.2.

Table III-12.2: Trends in incidence and mortality by gender using the Joinpoint Regression Program† with up to four joinpoints, Minnesota, 1988-2009, Larynx Cancer

	Incidence				Mortality			
	Males		Females		Males		Females	
	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†
Interval 1	1988-2009	-1.9*	1988-2009	-0.4	1988-2009	-0.9	1988-2009	0.1
AAPC(%)†	2005-2009	-1.9*	2005-2009	-0.4	2005-2009	-0.9	2005-2009	0.1
	2000-2009	-1.9*	2000-2009	-0.4	2000-2009	-0.9	2000-2009	0.1

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

† Joinpoint Regression version 3.5.2, National Cancer Institute. Annual age-adjusted rates 1988-2009 were analyzed to identify points in time where the trend significantly changed (joinpoints). The trend between joinpoints is the Annual Percent Change (APC) in the rate.

The Average Annual Percent Change (AAPC) is a summary measure of the APCs during the most recent five- and ten-year periods. If no joinpoints were identified, the AAPC is the same as the APC. If joinpoints were identified during the specified period, the AAPC is a weighted average of the APCs. Trends are not calculated if one or more years have no cases/deaths. See Appendix E for more information.

- Not applicable (sex-specific site), or not available (no unique cause of death code prior to 1999).

* The APC/AAPC is significantly different from zero ($p < 0.05$).

Specific Cancers

Larynx Cancer

Table III-12.3: Number of new cases and deaths and average annual incidence and mortality rates by age and gender, Minnesota, 2005-2009, Larynx Cancer

Age (Yr)	Incidence 2005-2009				Mortality 2005-2009			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
0-19	0	0	0.0	0.0	0	0	0.0	0.0
20-34	1	2	0.0	0.1	0	0	0.0	0.0
35-49	61	18	2.1	0.6	11	3	0.4	0.1
50-64	296	66	12.7	2.8	70	17	3.0	0.7
65-74	212	52	27.8	6.1	49	18	6.4	2.1
75-84	131	33	28.5	5.2	52	10	11.3	1.6
85+	29	8	19.2	2.3	19	5	12.6	1.4

Source: See footnotes for Table III-12.4.

Table III-12.4: Number of new cases and deaths and average annual incidence and mortality rates by race/ethnicity and gender, Minnesota, 2005-2009, Larynx Cancer

Race/Ethnicity**	Incidence 2005-2009				Mortality 2005-2009			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
All Races Combined	730	179	5.8	1.3	201	53	1.7	0.4
American Indian								
Statewide	15	3	17.3	~	6	1	~	~
CHSDA**	10	3	22.6	~	3	1	~	~
Asian/PI	2	0	~	~	0	0	~	~
Black	24	7	7.2	~	10	1	4.6	~
Non-Hispanic White	677	167	5.7	1.2	181	51	1.6	0.4
Hispanic all races	7	2	~	~	2	0	~	~

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

** Persons reported with unknown or other race are included in all races combined, but are excluded from race-specific data unless they are Hispanic. Hispanic includes persons of any race, including unknown and other race. CHSDA includes counties in the Contract Health Services Delivery Area, as defined by the Indian Health Services. Refer to Chapter I for a discussion of CHSDA counties and for comments on the accuracy of race-specific rates.

- Not applicable; sex-specific site.

~ Race-specific rates based on fewer than 10 cases or deaths are not presented.

Table III-12.5: Median age at diagnosis/death, lifetime risk of diagnosis/death, and cancer prevalence, Minnesota, 2007-2009, Larynx Cancer

	Males	Females
Median Age at Diagnosis (Yr)	65.0	66.0
Median Age at Death (Yr)	71.0	65.5
Lifetime Risk of Diagnosis (%)	0.6	0.1
Lifetime Risk of Death (%)	0.2	0.0
Complete prevalence†	1,230	290
Five-year prevalence‡	420	100

Source: MCSS December 2011 with Vintage 2009 population estimates. See Appendix E for prevalence calculations.

† Estimated Minnesotans ever diagnosed with this cancer and alive on 1/1/2009, rounded to the nearest 10.

‡ Estimated Minnesotans diagnosed with this cancer in the last five years and alive on 1/1/2009, rounded to the nearest 10.

- Not applicable; sex-specific site.

Table III-12.6: Distribution of cases and five-year relative survival by extent of disease at diagnosis, Larynx Cancer

Stage at Diagnosis	Cases(%)†	Five-Year Survival(%)‡
All Stages	100.0	60.5
<i>In situ</i>	11.0	94.6
Localized	52.2	76.4
Regional	17.4	41.8
Distant	12.1	34.8
Unstaged	7.3	48.7

† Among Minnesota cases diagnosed 2007-2009.

‡ Among SEER18 cases diagnosed 2002-2008 followed into 2009 from *SEER Cancer Statistics Review, 1975-2009 (Vintage 2009 Populations)*. Survival for All Stages excludes *in situ* tumors.

- There were not enough intervals to produce the statistic.

Larynx Cancer

Table III-12.7: Average annual incidence and mortality rates§ in the U.S. by race/ethnicity and gender, 2005-2009, Larynx Cancer**

		Males	Females
Incidence	All Races Combined	6.2	1.3
	American Indian		
	Total	3.2	0.7
	CHSDA**	4.2	1.0
	Asian/PI	2.3	0.3
	Black	10.0	1.8
	Non-Hispanic White	6.4	1.4
Mortality	Hispanic all races	4.7	0.6
	All Races Combined	2.1	0.5
	American Indian		
	Total	1.6	0.3
	CHSDA**	2.0	~
	Asian/PI	0.8	0.1
	Black	4.2	0.7
Non-Hispanic White	2.0	0.5	
Hispanic all races	1.6	0.2	

Source: *SEER Cancer Statistics Review 1975-2009 (Vintage 2009 Populations)*. Incidence data are from the SEER 18 areas, which cover 26% of the US population. Mortality data are for the entire US.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

** See footnote for Table III-12.4.

~ See footnote for Table III-12.4.

Descriptive Epidemiology

Incidence and Mortality: From 2005 to 2009, an average of 182 cases of laryngeal cancer were diagnosed among Minnesota residents each year, and 51 deaths were caused by this cancer annually. Among non-Hispanic whites, incidence and mortality rates were more than ten percent lower in Minnesota than nationally.

Survival: Among cases diagnosed between 2002 and 2008, the five-year relative survival rate for laryngeal cancer in the SEER 18 areas was 76 percent for localized tumors. Survival dropped to 42 percent for tumors diagnosed at the regional stage. About 52 percent of laryngeal cancers in Minnesota were diagnosed while in the localized stage.

Trends: The laryngeal cancer incidence rate in Minnesota from 1988 to 2009 decreased significantly by 1.9 percent each year among males, but did not decrease significantly among women. Laryngeal cancer mortality rates in Minnesota over the same period were stable for both men and women. Nationally, incidence and mortality rates for this cancer are decreasing significantly among both men and women.

Age: The risk of laryngeal cancer increases with age. Over the five-year period, 50 percent of cases and 60 percent of deaths occurred among persons age 65 and older.

Gender: During the same period, incidence and mortality rates for laryngeal cancer were more than four times higher among males than females in Minnesota.

Race: The laryngeal cancer incidence rate for American Indians in Minnesota was three times higher than among non-Hispanic whites, and five times higher than among American Indians living in the SEER 18 areas. However, there are too few cases among people of color in the state to assess racial disparities. Nationally, black males had the highest incidence and mortality rates, about 50 percent higher than among non-Hispanic whites, and American Indians had among the lowest.

Risk Factors

Smoking and alcohol use are the best established risk factors for laryngeal cancer, and research shows that these exposures act synergistically to increase risk. Smokers have an almost ten-fold greater risk of developing this cancer than nonsmokers, and risk increases with increased smoking. Heavy drinkers have two to five times greater risk of laryngeal cancer than nondrinkers. Occupational exposure to asbestos, nickel, and mustard gas may increase risk of laryngeal cancer. Recent studies indicate that human papilloma virus (HPV) may be associated with certain head and neck cancers, including laryngeal cancer.

Early Detection / Prevention

There are no methods to detect laryngeal cancer early in asymptomatic individuals. However, risk of developing the disease can be reduced by cessation of smoking and heavy alcohol use.

Specific Cancers

Leukemia

Table III-13.1: Number of new cases and deaths and incidence and mortality rates by year and gender, Minnesota, 1988-2009, Leukemia

Year	Incidence				Mortality			
	New Cases		Rate§		Deaths		Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
1988	302	259	17.1	11.2	167	154	10.2	6.4
1989	314	209	17.7	8.9	191	174	11.0	7.2
1990	336	253	18.3	10.8	212	169	12.3	6.9
1991	305	258	16.3	10.8	214	166	12.3	6.5
1992	375	246	20.2	10.1	222	171	12.7	6.7
1993	313	246	16.5	10.1	213	155	11.9	5.7
1994	392	277	20.2	11.3	211	155	11.6	6.0
1995	368	257	18.8	10.2	260	170	14.2	6.2
1996	361	268	18.4	10.4	226	191	12.1	7.2
1997	390	261	19.7	9.7	211	166	11.1	6.0
1998	365	300	17.8	11.5	192	163	10.0	5.7
1999	382	296	18.5	11.2	244	192	12.3	6.7
2000	386	269	18.3	9.9	229	185	11.7	6.6
2001	458	291	21.6	10.7	229	156	11.5	5.5
2002	417	283	19.3	10.2	227	196	11.0	6.6
2003	426	306	19.3	11.2	236	182	11.4	6.1
2004	491	331	21.9	11.9	232	168	10.9	5.8
2005	435	335	18.9	11.8	203	186	9.6	6.2
2006	491	308	20.8	10.5	236	152	10.8	5.0
2007	515	353	21.6	12.1	255	182	11.5	6.0
2008	511	318	20.7	10.7	259	174	11.2	5.4
2009	485	308	19.9	10.1	255	184	10.9	5.7

Source: See footnotes for Table III-13.2.

Table III-13.2: Trends in incidence and mortality by gender using the Joinpoint Regression Program† with up to four joinpoints, Minnesota, 1988-2009, Leukemia

	Incidence				Mortality			
	Males		Females		Males		Females	
	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†
Interval 1	1988-2009	0.8*	1988-2009	0.4	1988-2009	-0.5	1988-2009	-0.8*
AAPC(%)†	2005-2009	0.8*	2005-2009	0.4	2005-2009	-0.5	2005-2009	-0.8*
	2000-2009	0.8*	2000-2009	0.4	2000-2009	-0.5	2000-2009	-0.8*

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

† Joinpoint Regression version 3.5.2, National Cancer Institute. Annual age-adjusted rates 1988-2009 were analyzed to identify points in time where the trend significantly changed (joinpoints). The trend between joinpoints is the Annual Percent Change (APC) in the rate.

The Average Annual Percent Change (AAPC) is a summary measure of the APCs during the most recent five- and ten-year periods. If no joinpoints were identified, the AAPC is the same as the APC. If joinpoints were identified during the specified period, the AAPC is a weighted average of the APCs. Trends are not calculated if one or more years have no cases/deaths. See Appendix E for more information.

- Not applicable (sex-specific site), or not available (no unique cause of death code prior to 1999).

* The APC/AAPC is significantly different from zero ($p < 0.05$).

Leukemia

Table III-13.3: Number of new cases and deaths and average annual incidence and mortality rates by age and gender, Minnesota, 2005-2009, Leukemia

Age (Yr)	Incidence 2005-2009				Mortality 2005-2009			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
0-19	174	141	4.8	4.1	24	20	0.7	0.6
20-34	75	63	2.8	2.5	26	15	1.0	0.6
35-49	191	129	6.6	4.5	56	50	1.9	1.8
50-64	633	338	27.2	14.5	191	112	8.2	4.8
65-74	548	307	72.0	36.0	284	169	37.3	19.8
75-84	577	382	125.4	60.0	388	279	84.3	43.8
85+	239	262	158.0	73.8	239	233	158.0	65.6

Source: See footnotes for Table III-13.4.

Table III-13.4: Number of new cases and deaths and average annual incidence and mortality rates by race/ethnicity and gender, Minnesota, 2005-2009, Leukemia

Race/Ethnicity**	Incidence 2005-2009				Mortality 2005-2009			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
All Races Combined	2,437	1,622	20.4	11.1	1,208	878	10.8	5.7
American Indian								
Statewide	25	11	27.2	8.3	6	6	~	~
CHSDA**	14	8	28.7	~	3	3	~	~
Asian/PI	33	23	8.7	5.4	15	12	7.2	4.1
Black	56	29	15.0	8.8	20	9	5.8	~
Non-Hispanic White	2,248	1,506	20.2	11.0	1,154	842	10.9	5.7
Hispanic all races	34	25	8.8	6.9	9	5	~	~

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

** Persons reported with unknown or other race are included in all races combined, but are excluded from race-specific data unless they are Hispanic. Hispanic includes persons of any race, including unknown and other race. CHSDA includes counties in the Contract Health Services Delivery Area, as defined by the Indian Health Services. Refer to Chapter I for a discussion of CHSDA counties and for comments on the accuracy of race-specific rates.

- Not applicable; sex-specific site.

~ Race-specific rates based on fewer than 10 cases or deaths are not presented.

Table III-13.5: Median age at diagnosis/death, lifetime risk of diagnosis/death, and cancer prevalence, Minnesota, 2007-2009, Leukemia

	Males	Females
Median Age at Diagnosis (Yr)	68.0	68.0
Median Age at Death (Yr)	75.0	77.0
Lifetime Risk of Diagnosis (%)	2.3	1.4
Lifetime Risk of Death (%)	1.4	0.9
Complete prevalence†	3,160	2,240
Five-year prevalence‡	1,280	860

Source: MCSS December 2011 with Vintage 2009 population estimates. See Appendix E for prevalence calculations.

† Estimated Minnesotans ever diagnosed with this cancer and alive on 1/1/2009, rounded to the nearest 10.

‡ Estimated Minnesotans diagnosed with this cancer in the last five years and alive on 1/1/2009, rounded to the nearest 10.

- Not applicable; sex-specific site.

Table III-13.6: Distribution and five-year relative survival by type of leukemia

	Cases(%)†	Five-Year
Acute Lymphocytic Leukemia	224	65.2
Chronic Lymphocytic Leukemia	1,051	78.8
Acute Myeloid Leukemia	641	23.4
Chronic Myeloid Leukemia	351	59.1
All Other Leukemias	223	42.9
Total Leukemias	2,490	55.0

† Among Minnesota cases diagnosed 2007-2009.

‡ Among SEER18 cases diagnosed 2002-2008 followed into 2009 from *SEER Cancer Statistics Review, 1975-2009 (Vintage 2009 Populations)*.

Leukemia

Table III-13.7: Average annual incidence and mortality rates§ in the U.S. by race/ethnicity and gender, 2005-2009, Leukemia**

		Males	Females
Incidence	All Races Combined	16.0	9.8
	American Indian		
	Total	7.1	5.8
	CHSDA**	9.7	6.5
	Asian/PI	8.8	6.3
	Black	12.5	7.8
Mortality	Non-Hispanic White	17.2	10.2
	Hispanic all races	11.7	8.5
	All Races Combined	9.6	5.3
	American Indian		
	Total	4.5	2.7
	CHSDA**	6.3	3.3
Mortality	Asian/PI	4.9	3.1
	Black	8.5	4.8
	Non-Hispanic White	10.1	5.5
	Hispanic all races	5.9	3.9

Source: *SEER Cancer Statistics Review 1975-2009 (Vintage 2009 Populations)*. Incidence data are from the SEER 18 areas, which cover 26% of the US population. Mortality data are for the entire US.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

** See footnote for Table III-13.4.

~ See footnote for Table III-13.4.

Descriptive Epidemiology

Incidence and Mortality: From 2005 to 2009, leukemia was the eighth most common cancer diagnosed among males and the fifth most common cause of cancer-related death; among females it was the ninth most commonly diagnosed cancer and the sixth leading cause of cancer-related death. On average, 812 cases of leukemia were diagnosed each year in Minnesota and 417 deaths occurred annually.

Leukemias are a diverse group of cancers. Each subtype has a different etiology, treatment and prognosis. The most common types among adults are chronic lymphocytic leukemia (CLL, 44% of all leukemias) and acute myeloid leukemia (25%).

Over the five-year period, the leukemia incidence rate among non-Hispanic whites was 13 percent higher in Minnesota than in the SEER 18 areas, and was elevated statistically significantly for both males and females. It was one of the few cancers for which incidence rates were significantly higher in Minnesota than nationally. Much of the excess risk in leukemia in Minnesota was in CLL, the most common type of leukemia, for which the incidence rate among non-Hispanic whites was 37 percent higher in Minnesota.

Geographic variation in CLL is very hard to interpret, since rates are strongly affected by medical practice. Typically, CLL is found incidentally when people have blood tests for an unrelated reason, before symptoms appear. The leukemia mortality rate among non-Hispanic whites was higher in Minnesota than in the U.S. among males (7% higher) and females (3% higher), and the increase in risk was statistically significant for males but not females.

Survival: Based on cases diagnosed from 2002 to 2008 in the SEER 18 areas, the overall five-year relative survival rate was 55 percent, but survival varied considerably by subtype.

Trends: From 1988 to 2009, the incidence rate of leukemia in Minnesota increased significantly by 0.8 percent per year among males but was stable among females. During the same period, the leukemia mortality rate was stable among males but declined significantly by 0.8 percent per year among females. In the SEER 13 areas, leukemia incidence rates among non-Hispanic whites are stable for both males and females. In the U.S., leukemia mortality rates among non-Hispanic whites are decreasing significantly among both males and females. Leukemia mortality rates among children have decreased dramatically since the 1960s, primarily due to treatment advances.

Age: While leukemia is the most common childhood cancer, nearly 90 percent of cases and 97 percent of deaths occur in persons over the age of 19. Leukemia incidence was higher among children ages 19 and younger than among persons age 20-34 years, and then increased steadily with age.

Gender: Overall leukemia incidence and mortality rates in Minnesota were 80 percent higher among males than females, but this varied by subtype.

Race: Although based on relatively small numbers, American Indian males had the highest incidence of leukemia in Minnesota, 32 percent higher than among non-Hispanic whites. In the SEER 18 areas, non-Hispanic whites had the highest incidence and mortality rates.

Risk Factors

The causes of most of these cancers are unknown. Occupational exposures to benzene and radiation are the most established risk factors. Persons with certain chromosomal abnormalities are more likely to be diagnosed with leukemia. Cigarette smoking, formaldehyde exposure and ionizing radiation may be associated with leukemia. Leukemia may also occur as a side effect of cancer treatment. Certain leukemias may be caused by human T-cell lymphotropic virus type I (HTLV-I).

Leukemia

Early Detection / Prevention

Symptoms of leukemia often resemble those of less serious health conditions, making early detection difficult.

Specific Cancers

Liver and Intrahepatic Bile Duct Cancer

Table III-14.1: Number of new cases and deaths and incidence and mortality rates by year and gender, Minnesota, 1988-2009, Liver and Intrahepatic Bile Duct Cancer

Year	Incidence				Mortality			
	New Cases		Rate§		Deaths		Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
1988	57	32	3.1	1.4	59	44	3.5	1.9
1989	66	45	3.7	2.0	71	24	4.1	1.1
1990	73	32	4.0	1.5	86	57	4.9	2.4
1991	74	32	4.1	1.3	58	51	3.4	2.1
1992	79	45	4.3	1.9	74	52	4.1	2.1
1993	55	38	3.0	1.5	85	52	4.8	2.0
1994	71	38	3.6	1.5	87	57	4.6	2.3
1995	77	38	4.0	1.5	95	49	5.0	1.9
1996	85	42	4.2	1.6	96	52	4.9	2.0
1997	78	44	3.9	1.8	105	61	5.3	2.3
1998	82	41	3.9	1.6	85	71	4.4	2.6
1999	106	52	4.9	2.0	103	53	5.0	1.9
2000	118	51	5.5	2.0	119	64	5.8	2.3
2001	117	50	5.4	1.9	124	71	5.8	2.6
2002	131	49	5.9	1.8	136	61	6.3	2.1
2003	125	55	5.4	2.0	152	71	6.9	2.5
2004	147	51	6.1	1.8	120	91	5.2	3.2
2005	127	64	5.3	2.3	156	88	6.9	3.0
2006	191	53	7.6	1.9	152	77	6.3	2.6
2007	166	76	6.5	2.6	183	91	7.5	3.0
2008	181	92	6.8	3.1	174	93	6.9	3.1
2009	215	86	7.8	2.8	182	84	6.9	2.6

Source: See footnotes for Table III-14.2.

Table III-14.2: Trends in incidence and mortality by gender using the Joinpoint Regression Program† with up to four joinpoints, Minnesota, 1988-2009, Liver and Intrahepatic Bile Duct Cancer

	Incidence				Mortality			
	Males		Females		Males		Females	
	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†
Interval 1	1988-2009	4.0*	1988-2009	3.0*	1988-2009	3.1*	1988-2009	2.4*
AAPC(%)†	2005-2009	4.0*	2005-2009	3.0*	2005-2009	3.1*	2005-2009	2.4*
	2000-2009	4.0*	2000-2009	3.0*	2000-2009	3.1*	2000-2009	2.4*

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

† Joinpoint Regression version 3.5.2, National Cancer Institute. Annual age-adjusted rates 1988-2009 were analyzed to identify points in time where the trend significantly changed (joinpoints). The trend between joinpoints is the Annual Percent Change (APC) in the rate.

The Average Annual Percent Change (AAPC) is a summary measure of the APCs during the most recent five- and ten-year periods. If no joinpoints were identified, the AAPC is the same as the APC. If joinpoints were identified during the specified period, the AAPC is a weighted average of the APCs. Trends are not calculated if one or more years have no cases/deaths. See Appendix E for more information.

- Not applicable (sex-specific site), or not available (no unique cause of death code prior to 1999).

* The APC/AAPC is significantly different from zero ($p < 0.05$).

Liver and Intrahepatic Bile Duct Cancer

Table III-14.3: Number of new cases and deaths and average annual incidence and mortality rates by age and gender, Minnesota, 2005-2009, Liver and Intrahepatic Bile Duct Cancer

Age (Yr)	Incidence 2005-2009				Mortality 2005-2009			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
0-19	12	6	0.3	0.2	2	3	0.1	0.1
20-34	11	4	0.4	0.2	7	4	0.3	0.2
35-49	80	30	2.8	1.1	60	24	2.1	0.9
50-64	409	103	17.6	4.4	324	88	13.9	3.8
65-74	177	94	23.2	11.0	193	96	25.3	11.3
75-84	145	96	31.5	15.1	186	140	40.4	22.0
85+	46	38	30.4	10.7	75	78	49.6	22.0

Source: See footnotes for Table III-14.4.

Table III-14.4: Number of new cases and deaths and average annual incidence and mortality rates by race/ethnicity and gender, Minnesota, 2005-2009, Liver and Intrahepatic Bile Duct Cancer

Race/Ethnicity**	Incidence 2005-2009				Mortality 2005-2009			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
All Races Combined	880	371	6.8	2.6	847	433	6.9	2.9
American Indian								
Statewide	18	10	18.1	10.1	11	10	10.7	11.7
CHSDA**	13	6	21.1	~	4	4	~	~
Asian/PI	53	17	24.8	6.5	59	29	28.8	12.5
Black	102	24	37.5	8.1	84	21	34.5	7.5
Non-Hispanic White	669	306	5.6	2.2	677	364	5.9	2.5
Hispanic all races	32	4	13.4	~	13	9	5.8	~

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

** Persons reported with unknown or other race are included in all races combined, but are excluded from race-specific data unless they are Hispanic. Hispanic includes persons of any race, including unknown and other race. CHSDA includes counties in the Contract Health Services Delivery Area, as defined by the Indian Health Services. Refer to Chapter I for a discussion of CHSDA counties and for comments on the accuracy of race-specific rates.

- Not applicable; sex-specific site.

~ Race-specific rates based on fewer than 10 cases or deaths are not presented.

Table III-14.5: Median age at diagnosis/death, lifetime risk of diagnosis/death, and cancer prevalence, Minnesota, 2007-2009, Liver and Intrahepatic Bile Duct Cancer

	Males	Females
Median Age at Diagnosis (Yr)	61.0	70.0
Median Age at Death (Yr)	66.0	75.0
Lifetime Risk of Diagnosis (%)	0.7	0.4
Lifetime Risk of Death (%)	0.8	0.4
Complete prevalence†	290	140
Five-year prevalence‡	220	90

Source: MCSS December 2011 with Vintage 2009 population estimates. See Appendix E for prevalence calculations.

† Estimated Minnesotans ever diagnosed with this cancer and alive on 1/1/2009, rounded to the nearest 10.

‡ Estimated Minnesotans diagnosed with this cancer in the last five years and alive on 1/1/2009, rounded to the nearest 10.

- Not applicable; sex-specific site.

Table III-14.6: Distribution of cases and five-year relative survival by extent of disease at diagnosis, Liver and Intrahepatic Bile Duct Cancer

Stage at Diagnosis	Cases(%)†	Five-Year Survival(%)‡
All Stages	100.0	15.2
<i>In situ</i>	0.0	-
Localized	42.7	27.7
Regional	23.7	10.1
Distant	17.9	2.7
Unstaged	15.8	6.0

† Among Minnesota cases diagnosed 2007-2009.

‡ Among SEER18 cases diagnosed 2002-2008 followed into 2009 from *SEER Cancer Statistics Review, 1975-2009 (Vintage 2009 Populations)*. Survival for All Stages excludes *in situ* tumors.

- There were not enough intervals to produce the statistic.

Liver and Intrahepatic Bile Duct Cancer

Table III-14.7: Average annual incidence and mortality rates§ in the U.S. by race/ethnicity and gender, 2005-2009, Liver and Intrahepatic Bile Duct Cancer**

		Males	Females
Incidence	All Races Combined	11.6	4.0
	American Indian		
	Total	13.4	6.0
	CHSDA**	18.3	8.1
	Asian/PI	22.1	8.5
	Black	14.9	4.4
Mortality	Non-Hispanic White	8.9	2.9
	Hispanic all races	17.3	6.7
	All Races Combined	8.1	3.3
	American Indian		
	Total	8.6	4.5
	CHSDA**	11.9	6.0
	Asian/PI	14.5	6.1
	Black	11.9	4.0
	Non-Hispanic White	7.0	2.9
	Hispanic all races	11.8	5.3

Source: *SEER Cancer Statistics Review 1975-2009 (Vintage 2009 Populations)*. Incidence data are from the SEER 18 areas, which cover 26% of the US population. Mortality data are for the entire US.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

** See footnote for Table III-14.4.

~ See footnote for Table III-14.4.

Descriptive Epidemiology

Incidence and Mortality: MCSS does not register cancers that are diagnosed based on clinical observation only (i.e., are not microscopically confirmed) (see Chapter I). In the SEER Program, about 25 percent of liver cancers diagnosed from 2005 to 2009 were not microscopically confirmed. This indicates that MCSS liver cancer incidence rates may underestimate the diagnosis of this disease in our state. Mortality data, however, are collected in a comparable fashion in Minnesota and the U.S. The limitation of liver cancer mortality data is that a number of other cancers commonly metastasize to the liver when they spread, and death certificates may misclassify these deaths as due to liver cancer instead of cancer of the primary site, thus overestimating deaths due to primary liver cancer.

On average, 256 Minnesotans died of liver cancer each year from 2005 to 2009. The liver cancer mortality rate for non-Hispanic whites was a third

lower in Minnesota than in the U.S. as a whole.

Survival: Survival from liver cancer is quite poor. Based on cases diagnosed in the SEER Program from 2002 to 2008, five-year relative survival was 15 percent overall, and 28 percent if diagnosed before the cancer had spread to adjacent or distant tissues. In Minnesota, about 43 percent of reported liver cancers were diagnosed at this stage.

Trends: Liver cancer is one of the few cancers where both incidence and mortality rates are increasing significantly, and for each gender. Since 1988, the liver cancer mortality rate in Minnesota significantly increased by 3.1 percent per year for males and 2.4 percent per year for females. These are similar to national trends.

Age: Over 60 percent of liver cancer deaths in Minnesota occurred among persons 65 years of age or older.

Gender: Liver cancer rates were more than two times higher among males than females.

Race: Both in Minnesota and nationally, non-Hispanic whites had the lowest liver cancer mortality rates. However, in the U.S. as a whole, Asian/Pacific Islanders have the highest liver cancer mortality rate, while in Minnesota, African Americans have the highest rate, considerably higher than Asian/Pacific Islanders in either Minnesota or the U.S., and nearly three times higher than among African Americans in the U.S.

Risk Factors

Hepatitis B and C infections are the most important risk factors for liver cancer worldwide. Cirrhosis, often caused by chronic alcohol intake or infection with hepatitis B and C, increases risk. Aflatoxins produced by a fungus that contaminates wheat, peanuts, soybeans, corn, and rice are strongly associated with liver cancer. Industrial exposure to vinyl chloride or exposure to thorium dioxide (previously used in X-ray dye) increases the risk of developing liver and bile duct cancer. Studies examining drinking water contaminated with arsenic have also reported elevated risk of liver cancer.

Early Detection / Prevention

There are no screening tests for liver cancer in asymptomatic individuals. In the U.S., government agencies have worked to reduce exposure to certain chemicals and aflatoxins. Vaccination against hepatitis B is recommended, particularly in early infancy. There currently is no vaccine for hepatitis C.

Lung and Bronchus Cancer

Table III-15.1: Number of new cases and deaths and incidence and mortality rates by year and gender, Minnesota, 1988-2009, Lung and Bronchus Cancer

Year	Incidence				Mortality			
	New Cases		Rate§		Deaths		Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
1988	1,394	776	78.9	35.4	1,193	618	69.2	27.9
1989	1,344	779	75.4	35.3	1,182	627	68.4	27.6
1990	1,419	829	77.9	37.4	1,223	684	69.5	29.7
1991	1,346	862	73.7	38.1	1,222	708	68.6	30.5
1992	1,397	921	75.7	40.5	1,233	772	68.3	32.3
1993	1,418	882	75.2	38.1	1,244	797	68.0	33.2
1994	1,359	1,023	71.4	43.4	1,226	812	66.2	33.4
1995	1,454	953	75.3	39.8	1,228	839	65.2	34.0
1996	1,402	1,071	71.5	44.3	1,238	884	64.7	35.3
1997	1,477	1,033	75.1	42.3	1,259	859	65.0	33.9
1998	1,475	1,093	73.4	43.7	1,242	929	63.2	36.1
1999	1,496	1,151	73.3	45.4	1,293	906	64.5	34.5
2000	1,514	1,169	73.1	45.7	1,224	971	60.4	36.8
2001	1,525	1,247	72.3	48.1	1,263	996	60.8	37.2
2002	1,528	1,299	71.4	49.3	1,261	1,066	60.2	38.9
2003	1,570	1,356	72.2	50.8	1,267	1,017	59.6	36.9
2004	1,559	1,354	70.8	49.7	1,296	1,060	59.8	38.1
2005	1,599	1,327	70.6	48.5	1,272	1,009	57.8	35.7
2006	1,508	1,386	65.0	49.3	1,277	1,076	56.5	37.1
2007	1,612	1,442	68.7	50.2	1,327	1,088	57.5	36.6
2008	1,555	1,481	63.5	50.9	1,272	1,153	53.4	38.7
2009	1,636	1,491	65.9	50.2	1,243	1,155	50.9	37.9

Source: See footnotes for Table III-15.2.

Table III-15.2: Trends in incidence and mortality by gender using the Joinpoint Regression Program† with up to four joinpoints, Minnesota, 1988-2009, Lung and Bronchus Cancer

	Incidence				Mortality			
	Males		Females		Males		Females	
	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†
Interval 1	1988-2009	-0.7*	1988-2003	2.3*	1988-2007	-1.1*	1988-1995	3.4*
Interval 2			2003-2009	0.1	2007-2009	-5.7*	1995-2009	0.7*
AAPC(%)†	2005-2009	-0.7*	2005-2009	0.1	2005-2009	-3.4*	2005-2009	0.7*
	2000-2009	-0.7*	2000-2009	0.8*	2000-2009	-2.2*	2000-2009	0.7*

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

† Joinpoint Regression version 3.5.2, National Cancer Institute. Annual age-adjusted rates 1988-2009 were analyzed to identify points in time where the trend significantly changed (joinpoints). The trend between joinpoints is the Annual Percent Change (APC) in the rate.

The Average Annual Percent Change (AAPC) is a summary measure of the APCs during the most recent five- and ten-year periods. If no joinpoints were identified, the AAPC is the same as the APC. If joinpoints were identified during the specified period, the AAPC is a weighted average of the APCs. Trends are not calculated if one or more years have no cases/deaths. See Appendix E for more information.

- Not applicable (sex-specific site), or not available (no unique cause of death code prior to 1999).

* The APC/AAPC is significantly different from zero ($p < 0.05$).

Specific Cancers

Lung and Bronchus Cancer

Table III-15.3: Number of new cases and deaths and average annual incidence and mortality rates by age and gender, Minnesota, 2005-2009, Lung and Bronchus Cancer

Age (Yr)	Incidence 2005-2009				Mortality 2005-2009			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
0-19	6	1	0.2	0.0	0	0	0.0	0.0
20-34	16	17	0.6	0.7	2	8	0.1	0.3
35-49	344	420	11.9	14.8	211	207	7.3	7.3
50-64	2,279	1,920	98.0	82.1	1,588	1,232	68.3	52.7
65-74	2,520	2,318	330.9	271.7	1,893	1,550	248.5	181.7
75-84	2,215	1,957	481.3	307.4	2,005	1,775	435.7	278.8
85+	530	494	350.3	139.1	692	709	457.4	199.6

Source: See footnotes for Table III-15.4.

Table III-15.4: Number of new cases and deaths and average annual incidence and mortality rates by race/ethnicity and gender, Minnesota, 2005-2009, Lung and Bronchus Cancer

Race/Ethnicity**	Incidence 2005-2009				Mortality 2005-2009			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
All Races Combined	7,910	7,127	66.7	49.8	6,391	5,481	55.1	37.2
American Indian								
Statewide	115	109	147.8	107.0	85	87	118.4	93.2
CHSDA**	70	74	162.9	126.1	51	63	131.1	121.5
Asian/PI	72	60	35.3	24.7	59	34	32.4	15.3
Black	207	145	89.0	56.5	158	100	78.5	40.5
Non-Hispanic White	7,417	6,738	65.9	49.6	6,046	5,241	54.8	37.3
Hispanic all races	57	40	37.2	26.3	34	13	24.4	9.6

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

** Persons reported with unknown or other race are included in all races combined, but are excluded from race-specific data unless they are Hispanic. Hispanic includes persons of any race, including unknown and other race. CHSDA includes counties in the Contract Health Services Delivery Area, as defined by the Indian Health Services. Refer to Chapter I for a discussion of CHSDA counties and for comments on the accuracy of race-specific rates.

- Not applicable; sex-specific site.

~ Race-specific rates based on fewer than 10 cases or deaths are not presented.

Table III-15.5: Median age at diagnosis/death, lifetime risk of diagnosis/death, and cancer prevalence, Minnesota, 2007-2009, Lung and Bronchus Cancer

	Males	Females
Median Age at Diagnosis (Yr)	70.0	70.0
Median Age at Death (Yr)	72.0	73.0
Lifetime Risk of Diagnosis (%)	7.3	6.2
Lifetime Risk of Death (%)	6.4	5.3
Complete prevalence†	2,870	3,240
Five-year prevalence‡	1,690	1,870

Source: MCSS December 2011 with Vintage 2009 population estimates. See Appendix E for prevalence calculations.

† Estimated Minnesotans ever diagnosed with this cancer and alive on 1/1/2009, rounded to the nearest 10.

‡ Estimated Minnesotans diagnosed with this cancer in the last five years and alive on 1/1/2009, rounded to the nearest 10.

- Not applicable; sex-specific site.

Table III-15.6: Distribution of cases and five-year relative survival by extent of disease at diagnosis, Lung and Bronchus Cancer

Stage at Diagnosis	Cases(%)†	Five-Year Survival(%)‡
All Stages	100.0	15.9
<i>In situ</i>	0.1	37.1
Localized	18.8	52.2
Regional	22.4	25.1
Distant	51.7	3.7
Unstaged	7.0	7.9

† Among Minnesota cases diagnosed 2007-2009.

‡ Among SEER18 cases diagnosed 2002-2008 followed into 2009 from *SEER Cancer Statistics Review, 1975-2009 (Vintage 2009 Populations)*. Survival for All Stages excludes *in situ* tumors.

- There were not enough intervals to produce the statistic.

Lung and Bronchus Cancer

Table III-15.7: Average annual incidence and mortality rates§ in the U.S. by race/ethnicity and gender, 2005-2009, Lung and Bronchus Cancer**

		Males	Females
Incidence	All Races Combined	76.4	52.7
	American Indian		
	Total	40.9	28.9
	CHSDA**	51.9	37.4
	Asian/PI	52.2	28.8
	Black	99.9	52.6
	Non-Hispanic White	81.4	59.4
Mortality	Hispanic all races	40.5	25.8
	All Races Combined	65.7	39.7
	American Indian		
	Total	40.1	27.1
	CHSDA**	48.3	33.2
	Asian/PI	35.9	18.5
	Black	82.6	38.0
Non-Hispanic White	68.2	43.1	
Hispanic all races	30.8	14.0	

Source: *SEER Cancer Statistics Review 1975-2009 (Vintage 2009 Populations)*. Incidence data are from the SEER 18 areas, which cover 26% of the US population. Mortality data are for the entire US.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

** See footnote for Table III-15.4.

~ See footnote for Table III-15.4.

Descriptive Epidemiology

Incidence and Mortality: Over the most recent five-year period, lung and bronchus cancer continued to be the second most commonly diagnosed cancer among men and among women, and the leading cause of cancer death for each gender. Because of its high mortality, it accounted for 12 percent of cancers but 26 percent of cancer deaths in Minnesota. In 2009, more Minnesotans died of lung and bronchus cancer (2,398) than died from colorectal (812), breast (688), and prostate (537) cancer combined.

From 2005 to 2009, an average of 3,007 Minnesotans were diagnosed with lung and bronchus cancer each year, and 2,374 deaths occurred annually. The lung cancer mortality rate among non-Hispanic whites was about 20 percent lower in Minnesota than in the U.S.

Survival: Among cases diagnosed in the SEER 18 areas from 2002 to 2008, the five-year relative survival rate for lung and bronchus cancer was 52 percent for localized tumors, 25 percent for regional tumors, and four percent for distant tumors. In Minnesota, the

majority of lung cancers (52%) were diagnosed at the distant stage.

Trends: Lung cancer was a relatively rare cancer until smoking cigarettes became popular. The lung cancer mortality rate among males in the U.S. increased by more than 20-fold between 1930 and about 1990, when it peaked. From 1988 to 2007, the lung cancer mortality rate among males in Minnesota decreased significantly by 1.1 percent per year, and then declined significantly by 5.7 percent per year from 2007 to 2009. This is similar to U.S. trends among males. Among women nationwide, lung cancer has only recently shown signs of declining, and statistical trends in Minnesota are likely to fluctuate over the next few years until a clear downward trend is established. In Minnesota, the lung cancer mortality rate among women continued to significantly increase during this period, but the rate of increase slowed down in 1995 to 0.7 per cent per year. Nationally, the increase in lung cancer mortality among women gradually abated and finally decreased by 0.7 percent per year from 2002 to 2009.

Age: Mortality from lung and bronchus cancer increases with age. During 2005-2009, about 75 percent of deaths occurred among Minnesotans 65 years of age or older.

Gender: The lung and bronchus cancer mortality rate in Minnesota was about 50 percent higher among men than women.

Race: In Minnesota, American Indians had the highest mortality rate of lung and bronchus cancer, more than two times higher than among non-Hispanic whites. Their risk of dying of lung cancer was three times higher than among American Indians nationwide. High rates of lung cancer mortality have been reported for Northern Plains Indians in general.

Risk Factors

Smoking is the leading cause of lung and bronchus cancer worldwide, accounting for 80 to 90 percent of all lung cancers. Radon, an invisible, odorless gas has been recognized by the National Academy of Sciences as the second leading cause of lung cancer in the U.S. Passive smoking also contributes to development of the disease among nonsmokers. Occupational exposure to asbestos, arsenic, chromium, and metal dust, and environmental exposures to air pollution also increase risk of lung and bronchus cancer.

Early Detection / Prevention

Never starting to smoke or quitting if you do smoke is the best way to prevent lung and bronchus cancer.

Specific Cancers

Lung and Bronchus Cancer

Research indicates that risk for lung cancer returns to that of a non-smoker about 15 years after quitting.

Homeowners are encouraged to test their homes for radon. An estimated 35 percent of homes in Minnesota have elevated levels of radon. If it is present, a qualified contractor can usually mitigate the problem. For more information, contact the MDH Indoor Air Unit at (651) 201-4601 (or toll free at 1-800-798-9050).

Screening persons at high risk for lung cancer with low-dose spiral CT was tested in the National Lung Screening Trials. Heavy smokers screened with spiral CT had 20 percent lower lung cancer mortality than those screened with chest x-rays. However, researchers are still studying the results to determine if and for whom the benefits outweigh the additional risks. You can find a discussion of these issues and who might consider screening on the ACS Web site <http://www.cancer.org/cancer/lungcancer-non-smallcell/detailedguide/non-small-cell-lung-cancer-detection>.

Melanoma of the Skin

Table III-16.1: Number of new cases and deaths and incidence and mortality rates by year and gender, Minnesota, 1988-2009, Melanoma of the Skin

Year	Incidence				Mortality			
	New Cases		Rate§		Deaths		Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
1988	259	254	14.3	11.7	49	52	2.8	2.4
1989	249	251	13.3	11.6	61	42	3.6	1.9
1990	261	253	14.0	11.1	51	45	2.8	2.1
1991	226	237	11.7	10.7	62	32	3.5	1.4
1992	292	232	14.8	10.0	54	43	3.0	1.9
1993	330	275	16.8	11.9	59	44	3.1	1.8
1994	303	269	15.4	11.4	58	36	3.0	1.5
1995	352	297	17.5	12.4	72	38	3.7	1.5
1996	413	276	19.8	11.3	80	36	4.1	1.4
1997	395	347	18.9	14.2	69	43	3.6	1.7
1998	355	361	16.7	14.6	72	56	3.6	2.1
1999	427	389	19.5	15.5	67	52	3.2	1.9
2000	475	401	21.5	15.7	71	48	3.3	1.8
2001	476	447	21.2	17.3	75	45	3.6	1.7
2002	450	396	19.8	15.3	79	34	3.7	1.3
2003	466	440	20.3	16.7	62	45	2.8	1.6
2004	529	441	22.6	16.6	72	60	3.3	2.2
2005	527	476	22.0	17.8	62	44	2.7	1.6
2006	630	521	26.2	19.4	83	44	3.5	1.5
2007	695	574	28.0	20.9	79	49	3.3	1.6
2008	717	604	28.9	21.8	82	42	3.3	1.4
2009	775	685	29.6	24.6	94	50	3.8	1.6

Source: See footnotes for Table III-16.2.

Table III-16.2: Trends in incidence and mortality by gender using the Joinpoint Regression Program† with up to four joinpoints, Minnesota, 1988-2009, Melanoma of the Skin

	Incidence				Mortality			
	Males		Females		Males		Females	
	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†
Interval 1	1988-2009	3.9*	1988-1991	-3.6	1988-2009	0.3	1988-2009	-1.0
Interval 2			1991-2006	4.0*				
Interval 3			2006-2009	8.4*				
AAPC(%)†	2005-2009	3.9*	2005-2009	7.3*	2005-2009	0.3	2005-2009	-1.0
	2000-2009	3.9*	2000-2009	5.4*	2000-2009	0.3	2000-2009	-1.0

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

† Joinpoint Regression version 3.5.2, National Cancer Institute. Annual age-adjusted rates 1988-2009 were analyzed to identify points in time where the trend significantly changed (joinpoints). The trend between joinpoints is the Annual Percent Change (APC) in the rate.

The Average Annual Percent Change (AAPC) is a summary measure of the APCs during the most recent five- and ten-year periods. If no joinpoints were identified, the AAPC is the same as the APC. If joinpoints were identified during the specified period, the AAPC is a weighted average of the APCs. Trends are not calculated if one or more years have no cases/deaths. See Appendix E for more information.

- Not applicable (sex-specific site), or not available (no unique cause of death code prior to 1999).

* The APC/AAPC is significantly different from zero ($p < 0.05$).

Melanoma of the Skin

Table III-16.3: Number of new cases and deaths and average annual incidence and mortality rates by age and gender, Minnesota, 2005-2009, Melanoma of the Skin

Age (Yr)	Incidence 2005-2009				Mortality 2005-2009			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
0-19	16	32	0.4	0.9	2	0	0.1	0.0
20-34	155	415	5.8	16.2	11	6	0.4	0.2
35-49	547	837	18.8	29.5	46	24	1.6	0.9
50-64	1,100	775	47.3	33.2	117	66	5.0	2.8
65-74	696	365	91.4	42.8	81	38	10.6	4.5
75-84	600	297	130.4	46.7	88	61	19.1	9.6
85+	230	139	152.0	39.1	55	34	36.4	9.6

Source: See footnotes for Table III-16.4.

Table III-16.4: Number of new cases and deaths and average annual incidence and mortality rates by race/ethnicity and gender, Minnesota, 2005-2009, Melanoma of the Skin

Race/Ethnicity**	Incidence 2005-2009				Mortality 2005-2009			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
All Races Combined	3,344	2,860	27.0	20.9	400	229	3.3	1.5
American Indian								
Statewide	8	2	~	~	2	1	~	~
CHSDA**	6	1	~	~	2	1	~	~
Asian/PI	9	8	~	~	1	0	~	~
Black	3	2	~	~	3	0	~	~
Non-Hispanic White	3,234	2,688	28.1	21.8	393	226	3.5	1.6
Hispanic all races	5	13	~	6.4	0	1	~	~

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

** Persons reported with unknown or other race are included in all races combined, but are excluded from race-specific data unless they are Hispanic. Hispanic includes persons of any race, including unknown and other race. CHSDA includes counties in the Contract Health Services Delivery Area, as defined by the Indian Health Services. Refer to Chapter I for a discussion of CHSDA counties and for comments on the accuracy of race-specific rates.

- Not applicable; sex-specific site.

~ Race-specific rates based on fewer than 10 cases or deaths are not presented.

Table III-16.5: Median age at diagnosis/death, lifetime risk of diagnosis/death, and cancer prevalence, Minnesota, 2007-2009, Melanoma of the Skin

	Males	Females
Median Age at Diagnosis (Yr)	62.0	52.0
Median Age at Death (Yr)	67.0	69.0
Lifetime Risk of Diagnosis (%)	2.8	2.0
Lifetime Risk of Death (%)	0.4	0.2
Complete prevalence†	6,780	7,710
Five-year prevalence‡	2,260	2,230

Source: MCSS December 2011 with Vintage 2009 population estimates. See Appendix E for prevalence calculations.

† Estimated Minnesotans ever diagnosed with this cancer and alive on 1/1/2009, rounded to the nearest 10.

‡ Estimated Minnesotans diagnosed with this cancer in the last five years and alive on 1/1/2009, rounded to the nearest 10.

- Not applicable; sex-specific site.

Table III-16.6: Distribution of cases and five-year relative survival by extent of disease at diagnosis, Melanoma of the Skin

Stage at Diagnosis	Cases(%)†	Five-Year Survival(%)‡
All Stages	100.0	91.2
<i>In situ</i>	42.5	100.0
Localized	49.0	98.2
Regional	4.6	62.4
Distant	1.4	15.1
Unstaged	2.6	75.8

† Among Minnesota cases diagnosed 2007-2009.

‡ Among SEER18 cases diagnosed 2002-2008 followed into 2009 from *SEER Cancer Statistics Review, 1975-2009 (Vintage 2009 Populations)*. Survival for All Stages excludes *in situ* tumors.

- There were not enough intervals to produce the statistic.

Melanoma of the Skin

		Males	Females
Incidence	All Races Combined	27.2	16.7
	American Indian		
	Total	3.8	3.3
	CHSDA**	4.3	4.0
	Asian/PI	1.6	1.3
	Black	1.1	0.9
	Non-Hispanic White	36.4	23.5
Mortality	Hispanic all races	4.7	4.6
	All Races Combined	4.1	1.7
	American Indian		
	Total	1.1	0.6
	CHSDA**	1.7	0.8
	Asian/PI	0.5	0.3
	Black	0.5	0.4
Non-Hispanic White	5.0	2.1	
Hispanic all races	1.0	0.6	

Source: *SEER Cancer Statistics Review 1975-2009 (Vintage 2009 Populations)*. Incidence data are from the SEER 18 areas, which cover 26% of the US population. Mortality data are for the entire US.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

** See footnote for Table III-16.4.

~ See footnote for Table III-16.4.

Descriptive Epidemiology

Incidence and Mortality: Melanoma of the skin was the sixth most commonly diagnosed cancer among men and among women. Over the five-year period 2005-2009, an average of 1,241 new cases of invasive melanoma of the skin were diagnosed each year in Minnesota, and 126 deaths were caused by the disease annually. The incidence and mortality rates among non-Hispanic whites were 15 and 30 percent lower, respectively, in Minnesota than nationally.

Survival: Among cases diagnosed in Minnesota during this period, 43 percent were diagnosed at the pre-invasive (*in situ*) stage, and another 49 percent were diagnosed before spreading beyond the skin (localized stage). Among cases diagnosed in the SEER 18 areas, five-year relative survival was 100 percent for *in situ* tumors, and 98 percent for localized melanomas. Survival remains very high until the lesion has invaded the nearby or distant tissues.

Trends: From 1988 to 2009, the incidence rate of invasive melanoma of the skin among males increased

significantly by 3.9 percent per year in Minnesota. The rate among females was increasing by the same degree until 2006, when it began increasing more rapidly (8.4% per year). It is one of the most rapidly increasing cancers, both in Minnesota and in the SEER Program. During the same period, mortality rates remained stable in Minnesota, but increased significantly among males and decreased significantly among females in the U.S.

Age: About 65 percent of melanomas were diagnosed among persons 65 years of age or younger, and about 40 percent of deaths occurred in this age group.

Gender: The incidence rate of melanoma of the skin in Minnesota was about 30 percent higher among men than women. However, until age 50, the incidence rate is higher for women.

Race: Melanoma of the skin is primarily a cancer of white populations.

Risk Factors

Excessive exposure to sunlight and other sources of ultraviolet radiation, including tanning beds, particularly intense intermittent exposure early in life, is the primary risk factor for melanoma. Pigmentary traits, such as fair skin and light eyes, and genetic conditions of dysplastic nevi are associated with melanoma. Individuals with a personal or family history of melanoma or who are immunosuppressed also have increased risk of developing melanomas.

Early Detection / Prevention

The most effective way to identify early melanoma is through the recognition of changes in skin growth or appearance of new growths. The American Cancer Society recommends that people ages 20 and over having periodic health exams should receive a cancer-related checkup, including a skin examination. The ABCD rule can outline warning signals of melanoma: **A**symmetry: one half of the mole does not match the other half; **B**order irregularity: mole edges are ragged or notched; **C**olor: mole pigmentation is not uniform; and, **D**iameter: diameter of the mole is greater than six millimeters (about ¼ inch). Sudden or progressive changes in the size, shape, or color of moles should be examined by a physician. The risk of developing melanoma is reduced by avoiding prolonged exposure to intense sunlight. If it isn't possible to stay in the shade, wear protective clothing, sunglasses, and sunscreen. It is especially important that parents protect their children from excess sun exposure.

Specific Cancers

Mesothelioma

Table III-17.1: Number of new cases and deaths and incidence and mortality rates by year and gender, Minnesota, 1988-2009, Mesothelioma

Year	Incidence				Mortality			
	New Cases		Rate§		Deaths		Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
1988	26	8	1.5	0.4	-	-	-	-
1989	34	8	1.9	0.3	-	-	-	-
1990	33	11	1.9	0.5	-	-	-	-
1991	39	13	2.1	0.6	-	-	-	-
1992	33	15	1.8	0.6	-	-	-	-
1993	41	14	2.2	0.6	-	-	-	-
1994	39	9	2.1	0.4	-	-	-	-
1995	47	9	2.5	0.4	-	-	-	-
1996	48	5	2.4	0.2	-	-	-	-
1997	39	17	2.0	0.7	-	-	-	-
1998	57	12	2.9	0.4	-	-	-	-
1999	57	9	2.9	0.4	51	7	2.6	0.3
2000	58	14	2.9	0.5	44	8	2.2	0.3
2001	40	7	1.9	0.3	36	6	1.7	0.2
2002	52	14	2.5	0.5	34	12	1.7	0.4
2003	53	17	2.6	0.6	53	13	2.6	0.4
2004	48	18	2.3	0.6	45	11	2.2	0.4
2005	49	16	2.2	0.5	41	15	1.9	0.5
2006	42	23	2.0	0.8	50	15	2.4	0.5
2007	47	11	2.1	0.4	33	6	1.5	0.2
2008	60	13	2.6	0.4	42	14	1.9	0.5
2009	36	12	1.6	0.4	51	19	2.2	0.6

Source: See footnotes for Table III-17.2.

Table III-17.2: Trends in incidence and mortality by gender using the Joinpoint Regression Program† with up to four joinpoints, Minnesota, 1988-2009, Mesothelioma

	Incidence				Mortality			
	Males		Females		Males		Females	
	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†
Interval 1	1988-1999	4.4*	1988-2009	0.6	1999-2009	-1.2	1999-2009	7.1*
Interval 2	1999-2009	-3.2*						
AAPC(%)†	2005-2009	-3.2*	2005-2009	0.6	2005-2009	-1.2	2005-2009	7.1*
	2000-2009	-3.2*	2000-2009	0.6	2000-2009	-1.2	2000-2009	7.1*

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

† Joinpoint Regression version 3.5.2, National Cancer Institute. Annual age-adjusted rates 1988-2009 were analyzed to identify points in time where the trend significantly changed (joinpoints). The trend between joinpoints is the Annual Percent Change (APC) in the rate.

The Average Annual Percent Change (AAPC) is a summary measure of the APCs during the most recent five- and ten-year periods. If no joinpoints were identified, the AAPC is the same as the APC. If joinpoints were identified during the specified period, the AAPC is a weighted average of the APCs. Trends are not calculated if one or more years have no cases/deaths. See Appendix E for more information.

- Not applicable (sex-specific site), or not available (no unique cause of death code prior to 1999).

* The APC/AAPC is significantly different from zero ($p < 0.05$).

Mesothelioma

Table III-17.3: Number of new cases and deaths and average annual incidence and mortality rates by age and gender, Minnesota, 2005-2009, Mesothelioma

Age (Yr)	Incidence 2005-2009				Mortality 2005-2009			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
0-19	0	0	0.0	0.0	0	0	0.0	0.0
20-34	1	0	0.0	0.0	1	0	0.0	0.0
35-49	5	3	0.2	0.1	2	3	0.1	0.1
50-64	39	15	1.7	0.6	29	9	1.3	0.4
65-74	71	17	9.3	2.0	64	18	8.4	2.1
75-84	92	24	20.0	3.8	87	19	18.9	3.0
85+	26	16	17.2	4.5	34	20	22.5	5.6

Source: See footnotes for Table III-17.4.

Table III-17.4: Number of new cases and deaths and average annual incidence and mortality rates by race/ethnicity and gender, Minnesota, 2005-2009, Mesothelioma

Race/Ethnicity**	Incidence 2005-2009				Mortality 2005-2009			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
All Races Combined	234	75	2.1	0.5	217	69	2.0	0.4
American Indian								
Statewide	2	0	~	~	2	0	~	~
CHSDA**	0	0	~	~	0	0	~	~
Asian/PI	1	0	~	~	0	1	~	~
Black	0	1	~	~	2	0	~	~
Non-Hispanic White	230	74	2.1	0.5	211	67	2.0	0.5
Hispanic all races	1	0	~	~	0	1	~	~

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

** Persons reported with unknown or other race are included in all races combined, but are excluded from race-specific data unless they are Hispanic. Hispanic includes persons of any race, including unknown and other race. CHSDA includes counties in the Contract Health Services Delivery Area, as defined by the Indian Health Services. Refer to Chapter I for a discussion of CHSDA counties and for comments on the accuracy of race-specific rates.

- Not applicable; sex-specific site.

~ Race-specific rates based on fewer than 10 cases or deaths are not presented.

Table III-17.5: Median age at diagnosis/death, lifetime risk of diagnosis/death, and cancer prevalence, Minnesota, 2007-2009, Mesothelioma

	Males	Females
Median Age at Diagnosis (Yr)	73.0	75.0
Median Age at Death (Yr)	75.0	76.0
Lifetime Risk of Diagnosis (%)	0.3	0.1
Lifetime Risk of Death (%)	0.2	0.1

Source: MCSS December 2011 with Vintage 2009 population estimates. See Appendix E for prevalence calculations.

† Estimated Minnesotans ever diagnosed with this cancer and alive on 1/1/2009, rounded to the nearest 10.

‡ Estimated Minnesotans diagnosed with this cancer in the last five years and alive on 1/1/2009, rounded to the nearest 10.

- Not applicable; sex-specific site.

Table III-17.6: Distribution of cases and five-year relative survival by age at diagnosis, Mesothelioma

Age at Diagnosis	Cases(%)†	Five-Year Survival(%)‡
All Ages	100.0	7.5
< 45	0.6	40.6
45-54	2.8	15.6
55-64	16.2	7.5
65-74	34.6	7.1
75+	45.8	3.2

† Among Minnesota cases diagnosed 2007-2009.

‡ Among SEER18 cases diagnosed 2002-2008 followed into 2009 from *SEER Cancer Statistics Review, 1975-2009 (Vintage 2009 Populations)*.

Mesothelioma

Table III-17.7: Average annual incidence and mortality rates§ in the U.S. by race/ethnicity and gender, 2005-2009, Mesothelioma**

Incidence		Males Females	
		Males	Females
Incidence	All Races Combined	1.9	0.4
	American Indian		
	Total	0.9	~
	CHSDA**	1.4	~
	Asian/PI	0.6	0.2
	Black	1.1	0.3
	Non-Hispanic White	2.2	0.5
	Hispanic all races	1.6	0.5

Source: SEER Cancer Statistics Review 1975-2009 (Vintage 2009 Populations). Incidence data are from the SEER 18 areas, which cover 26% of the US population. Mortality data are for the entire US.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

** See footnote for Table III-17.4.

~ See footnote for Table III-17.4.

Descriptive Epidemiology

Incidence and Mortality: Mesothelioma is a cancer of the lining of the chest and abdominal cavity thought to be caused almost exclusively by exposure to asbestos fibers. From 2005 to 2009, an average of 62 Minnesotans were diagnosed with mesothelioma each year, and 57 deaths occurred annually. Among non-Hispanic whites, the mesothelioma incidence rate was very similar in Minnesota and the SEER 18 areas. During this period, mesothelioma incidence among males remained two times higher in the Northeast Region than in Minnesota as a whole (see Chapter II).

Survival: SEER data indicate that five-year relative survival from mesothelioma is less than ten percent, but is considerably higher among those diagnosed at a younger age.

Trends: The incidence of mesothelioma among males increased significantly in Minnesota by an average of 4.4 percent per year from 1988 to 1999, and then decreased significantly by 3.2 percent per year from 1999 to 2009. It appears that the risk for males of developing this cancer may have peaked. Because the delay between exposure to asbestos and the development of mesothelioma is 30-50 years, it is likely that increasing rates reflected exposures that

occurred before the hazards of asbestos were well known. Incidence rates among women in Minnesota were stable; statistical analysis showed that mortality has been significantly increasing among females, but this may reflect unstable rates due to the relatively small number of deaths each year. Joinpoint analysis of mesothelioma mortality in the U.S. was not reported by the SEER Program.

Age: About 80 percent of mesotheliomas diagnosed in Minnesota and 85 percent of the deaths were among persons age 65 years or older. This reflects both the long delay between exposure and diagnosis, and the fact that asbestos use in the U.S. has dropped by 98 percent since the early 1970s.

Gender: Mesothelioma was about four times more common among men than women, reflecting that historically, most exposure to asbestos occurred occupationally in jobs primarily held by men.

Race: There are too few mesotheliomas diagnosed among persons of color in Minnesota to assess race/ethnic differences in risk. National data indicate that mesothelioma incidence is highest among non-Hispanic white males.

Risk Factors

Mesothelioma is thought to be caused almost exclusively by inhalation of asbestos fibers, which can damage mesothelial tissues. Asbestos was widely used in manufacturing during and following World War II. Occupations which may have involved exposure to asbestos include mining, ship building, and railroad, factory, and construction work. Family members of people working with asbestos are also at increased risk because fibers may be brought into the home on work clothes. Persons exposed to airborne asbestos are also at greater risk of developing lung cancer. The combination of exposure to asbestos and smoking is associated with a 50-90 fold increase in the risk of lung cancer. More asbestos information can be found on the Minnesota Department of Health Web site (<http://www.health.state.mn.us/divs/eh/asbestos>) and on fact sheets developed by the National Cancer Institute (<http://cis.nci.nih.gov>).

Early Detection / Prevention

There are no effective screening tests for mesothelioma in the general population.

Myeloma

Table III-18.1: Number of new cases and deaths and incidence and mortality rates by year and gender, Minnesota, 1988-2009, Myeloma

Year	Incidence				Mortality			
	New Cases		Rate§		Deaths		Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
1988	135	89	7.9	3.7	77	72	4.6	3.0
1989	112	84	6.5	3.5	74	70	4.4	2.9
1990	105	85	6.1	3.6	99	80	6.2	3.3
1991	126	104	7.0	4.4	98	72	5.8	2.9
1992	136	103	7.7	4.2	119	85	6.8	3.4
1993	122	114	6.6	4.6	89	92	5.0	3.5
1994	112	96	6.2	3.8	111	89	6.4	3.2
1995	109	91	5.8	3.7	86	90	4.7	3.5
1996	132	96	7.0	3.9	91	96	5.0	3.6
1997	122	130	6.3	5.1	107	77	5.7	2.9
1998	125	103	6.2	4.0	73	96	4.0	3.6
1999	128	100	6.2	3.8	86	91	4.5	3.2
2000	118	98	5.8	3.7	113	85	5.7	3.0
2001	149	125	7.1	4.6	89	88	4.4	3.2
2002	134	114	6.2	4.2	110	85	5.4	2.9
2003	176	112	8.0	4.1	104	89	5.0	3.1
2004	158	119	7.1	4.4	102	85	4.8	2.8
2005	165	123	7.2	4.3	108	88	4.9	3.0
2006	180	129	7.6	4.4	112	100	5.0	3.3
2007	174	112	7.4	3.8	107	80	4.8	2.6
2008	204	138	8.3	4.7	89	108	3.8	3.4
2009	183	150	7.3	4.9	126	85	5.3	2.6

Source: See footnotes for Table III-18.2.

Table III-18.2: Trends in incidence and mortality by gender using the Joinpoint Regression Program† with up to four joinpoints, Minnesota, 1988-2009, Myeloma

	Incidence				Mortality			
	Males		Females		Males		Females	
	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†
Interval 1	1988-2009	0.6	1988-2009	0.7*	1988-2009	-0.8	1988-2009	-0.4
AAPC(%)†	2005-2009	0.6	2005-2009	0.7*	2005-2009	-0.8	2005-2009	-0.4
	2000-2009	0.6	2000-2009	0.7*	2000-2009	-0.8	2000-2009	-0.4

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

† Joinpoint Regression version 3.5.2, National Cancer Institute. Annual age-adjusted rates 1988-2009 were analyzed to identify points in time where the trend significantly changed (joinpoints). The trend between joinpoints is the Annual Percent Change (APC) in the rate.

The Average Annual Percent Change (AAPC) is a summary measure of the APCs during the most recent five- and ten-year periods. If no joinpoints were identified, the AAPC is the same as the APC. If joinpoints were identified during the specified period, the AAPC is a weighted average of the APCs. Trends are not calculated if one or more years have no cases/deaths. See Appendix E for more information.

- Not applicable (sex-specific site), or not available (no unique cause of death code prior to 1999).

* The APC/AAPC is significantly different from zero ($p < 0.05$).

Myeloma

Table III-18.3: Number of new cases and deaths and average annual incidence and mortality rates by age and gender, Minnesota, 2005-2009, Myeloma

Age (Yr)	Incidence 2005-2009				Mortality 2005-2009			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
0-19	0	0	0.0	0.0	0	0	0.0	0.0
20-34	8	4	0.3	0.2	1	0	0.0	0.0
35-49	67	37	2.3	1.3	13	6	0.5	0.2
50-64	261	165	11.2	7.1	126	77	5.4	3.3
65-74	266	161	34.9	18.9	144	108	18.9	12.7
75-84	240	202	52.2	31.7	192	169	41.7	26.5
85+	64	83	42.3	23.4	66	101	43.6	28.4

Source: See footnotes for Table III-18.4.

Table III-18.4: Number of new cases and deaths and average annual incidence and mortality rates by race/ethnicity and gender, Minnesota, 2005-2009, Myeloma

Race/Ethnicity**	Incidence 2005-2009				Mortality 2005-2009			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
All Races Combined	906	652	7.6	4.4	542	461	4.7	3.0
American Indian								
Statewide	5	9	~	~	3	3	~	~
CHSDA**	3	3	~	~	1	2	~	~
Asian/PI	6	7	~	~	3	5	~	~
Black	29	25	14.0	9.5	19	13	9.2	6.4
Non-Hispanic White	844	589	7.5	4.2	513	432	4.7	2.9
Hispanic all races	11	9	6.6	~	4	4	~	~

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

** Persons reported with unknown or other race are included in all races combined, but are excluded from race-specific data unless they are Hispanic. Hispanic includes persons of any race, including unknown and other race. CHSDA includes counties in the Contract Health Services Delivery Area, as defined by the Indian Health Services. Refer to Chapter I for a discussion of CHSDA counties and for comments on the accuracy of race-specific rates.

- Not applicable; sex-specific site.

~ Race-specific rates based on fewer than 10 cases or deaths are not presented.

Table III-18.5: Median age at diagnosis/death, lifetime risk of diagnosis/death, and cancer prevalence, Minnesota, 2007-2009, Myeloma

	Males	Females
Median Age at Diagnosis (Yr)	69.0	72.5
Median Age at Death (Yr)	74.0	78.0
Lifetime Risk of Diagnosis (%)	0.9	0.6
Lifetime Risk of Death (%)	0.6	0.5
Complete prevalence†	680	480
Five-year prevalence‡	430	310

Source: MCSS December 2011 with Vintage 2009 population estimates. See Appendix E for prevalence calculations.

† Estimated Minnesotans ever diagnosed with this cancer and alive on 1/1/2009, rounded to the nearest 10.

‡ Estimated Minnesotans diagnosed with this cancer in the last five years and alive on 1/1/2009, rounded to the nearest 10.

- Not applicable; sex-specific site.

Table III-18.6: Distribution of cases and five-year relative survival by age at diagnosis, Myeloma

Age at Diagnosis	Cases(%)†	Five-Year Survival(%)‡
All Ages	100.0	41.1
< 45	3.5	63.9
45-54	10.3	57.2
55-64	20.1	50.8
65-74	27.1	39.0
75+	39.0	24.5

† Among Minnesota cases diagnosed 2007-2009.

‡ Among SEER18 cases diagnosed 2002-2008 followed into 2009 from SEER Cancer Statistics Review, 1975-2009 (Vintage 2009 Populations).

Myeloma

Table III-18.7: Average annual incidence and mortality rates§ in the U.S. by race/ethnicity and gender, 2005-2009, Myeloma**

		<u>Males</u>	<u>Females</u>
Incidence	All Races Combined	7.4	4.7
	American Indian		
	Total	3.6	3.2
	CHSDA**	4.9	4.2
	Asian/PI	4.2	2.9
	Black	14.3	10.1
Mortality	Non-Hispanic White	7.0	4.0
	Hispanic all races	6.3	4.7
	All Races Combined	4.4	2.8
	American Indian		
	Total	3.1	1.9
	CHSDA**	3.8	2.5
	Asian/PI	2.1	1.4
	Black	8.0	5.4
	Non-Hispanic White	4.2	2.5
	Hispanic all races	3.3	2.3

Source: *SEER Cancer Statistics Review 1975-2009 (Vintage 2009 Populations)*. Incidence data are from the SEER 18 areas, which cover 26% of the US population. Mortality data are for the entire US.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

** See footnote for Table III-18.4.

~ See footnote for Table III-18.4.

Descriptive Epidemiology

Incidence and Mortality: Myeloma is a malignancy of the plasma cells, a component of the immune system. It can lead to the formation of multiple tumors in the bone marrow. Over the five-year period 2005-2009, an average of 312 cases of myeloma were diagnosed in Minnesota residents each year, and 201 deaths occurred annually. Comparing non-Hispanic whites, myeloma incidence and mortality rates in Minnesota were similar to those in the SEER 18 areas.

Survival: Based on SEER cases of myeloma diagnosed between 2002 and 2008, the five-year relative survival rate was 40 percent, but was higher among those diagnosed at younger ages.

Trends: From 1988 to 2009, the incidence of this cancer increased somewhat among both males and females in Minnesota, but the increase was statistically significant for females only. The mortality rate decreased somewhat among both males and females in Minnesota, but was not statistically significant for either gender. Nationally, incidence trends vary by geographic area, race and gender, but mortality is generally decreasing.

Age: The myeloma incidence rate increases with age. From 2005 to 2009, 65 percent of diagnoses and 78 percent of deaths occurred among Minnesotans 65 years of age or older.

Gender: The risk of developing myeloma was about 75 percent higher among males than females.

Race: Both in Minnesota and nationally, blacks continued to be at the greatest risk for myeloma, with rates that were roughly two times higher than for each of the other race/ethnic groups.

Risk Factors

Very little is known about the etiology of this cancer. Approximately 20 percent of individuals with monoclonal gammopathy of unknown significance or extramedullary plasmacytoma will go on to develop multiple myeloma. Certain autoimmune conditions and chronic immune system stimulation may increase risk of multiple myeloma. Specific viruses, particularly those that cause immunosuppression, may play a role in myeloma risk. Exposure to ionizing radiation and various occupational exposures have been linked with this cancer, but are likely to account for only a small percentage of cases.

Early Detection / Prevention

There are currently no proven screening methods for detecting multiple myeloma in asymptomatic individuals. The manifestations of multiple myeloma are variable and can be very difficult to diagnose. There are often no symptoms in the early stages of the disease. However, some common early symptoms of multiple myeloma include bone pain, anemia, kidney failure, and increased susceptibility to infection.

Non-Hodgkin Lymphoma

Table III-19.1: Number of new cases and deaths and incidence and mortality rates by year and gender, Minnesota, 1988-2009, Non-Hodgkin Lymphoma

Year	Incidence				Mortality			
	New Cases		Rate§		Deaths		Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
1988	401	345	23.0	15.0	174	183	10.3	7.4
1989	387	363	21.7	15.6	177	179	10.5	7.2
1990	388	370	21.4	15.9	179	163	10.8	6.5
1991	441	375	23.8	15.6	187	189	10.8	7.5
1992	429	389	23.3	15.8	192	216	10.9	8.3
1993	462	401	23.9	16.5	223	213	12.1	8.2
1994	505	418	26.0	17.2	216	210	11.8	8.1
1995	484	409	24.5	16.2	215	210	11.6	7.9
1996	494	418	24.8	16.5	232	261	12.1	9.7
1997	499	453	24.5	17.7	234	218	12.3	8.0
1998	526	458	25.9	17.6	259	204	13.3	7.3
1999	519	464	24.9	17.7	215	219	11.0	7.8
2000	526	486	24.6	18.3	243	216	12.0	7.6
2001	542	503	25.1	18.7	215	214	10.6	7.3
2002	597	495	27.1	18.3	231	198	11.2	6.5
2003	582	480	26.0	17.3	209	182	10.0	6.1
2004	619	533	27.4	19.3	218	185	10.2	6.2
2005	617	487	26.6	17.2	193	173	8.7	5.6
2006	604	495	25.8	17.1	215	154	9.8	4.9
2007	645	540	26.8	18.4	201	153	9.1	4.9
2008	687	561	27.8	18.6	224	183	9.8	5.5
2009	697	578	27.6	18.9	241	172	10.4	5.1

Source: See footnotes for Table III-19.2.

Table III-19.2: Trends in incidence and mortality by gender using the Joinpoint Regression Program† with up to four joinpoints, Minnesota, 1988-2009, Non-Hodgkin Lymphoma

	Incidence				Mortality			
	Males		Females		Males		Females	
	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†
Interval 1	1988-2009	1.0*	1988-2009	0.9*	1988-1998	2.1*	1988-1996	2.8*
Interval 2					1998-2005	-4.4*	1996-2009	-4.5*
Interval 3					2005-2009	2.4		
AAPC(%)†	2005-2009	1.0*	2005-2009	0.9*	2005-2009	2.4	2005-2009	-4.5*
	2000-2009	1.0*	2000-2009	0.9*	2000-2009	-1.5	2000-2009	-4.5*

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

† Joinpoint Regression version 3.5.2, National Cancer Institute. Annual age-adjusted rates 1988-2009 were analyzed to identify points in time where the trend significantly changed (joinpoints). The trend between joinpoints is the Annual Percent Change (APC) in the rate.

The Average Annual Percent Change (AAPC) is a summary measure of the APCs during the most recent five- and ten-year periods. If no joinpoints were identified, the AAPC is the same as the APC. If joinpoints were identified during the specified period, the AAPC is a weighted average of the APCs. Trends are not calculated if one or more years have no cases/deaths. See Appendix E for more information.

- Not applicable (sex-specific site), or not available (no unique cause of death code prior to 1999).

* The APC/AAPC is significantly different from zero ($p < 0.05$).

Non-Hodgkin Lymphoma

Table III-19.3: Number of new cases and deaths and average annual incidence and mortality rates by age and gender, Minnesota, 2005-2009, Non-Hodgkin Lymphoma

Age (Yr)	Incidence 2005-2009				Mortality 2005-2009			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
0-19	54	22	1.5	0.6	4	2	0.1	0.1
20-34	85	63	3.2	2.5	13	6	0.5	0.2
35-49	397	273	13.7	9.6	45	29	1.6	1.0
50-64	936	655	40.3	28.0	189	92	8.1	3.9
65-74	759	604	99.7	70.8	237	148	31.1	17.4
75-84	753	688	163.6	108.1	391	286	85.0	44.9
85+	266	356	175.8	100.2	195	272	128.9	76.6

Source: See footnotes for Table III-19.4.

Table III-19.4: Number of new cases and deaths and average annual incidence and mortality rates by race/ethnicity and gender, Minnesota, 2005-2009, Non-Hodgkin Lymphoma

Race/Ethnicity**	Incidence 2005-2009				Mortality 2005-2009			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
All Races Combined	3,250	2,661	26.9	18.1	1,074	835	9.6	5.2
American Indian								
Statewide	15	16	18.8	17.5	4	6	~	~
CHSDA**	8	7	~	~	3	3	~	~
Asian/PI	29	41	10.2	16.0	10	9	6.1	~
Black	67	49	21.9	13.1	15	4	8.3	~
Non-Hispanic White	3,058	2,480	27.1	17.8	1,033	809	9.7	5.3
Hispanic all races	38	25	18.9	14.1	11	4	6.8	~

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

** Persons reported with unknown or other race are included in all races combined, but are excluded from race-specific data unless they are Hispanic. Hispanic includes persons of any race, including unknown and other race. CHSDA includes counties in the Contract Health Services Delivery Area, as defined by the Indian Health Services. Refer to Chapter I for a discussion of CHSDA counties and for comments on the accuracy of race-specific rates.

- Not applicable; sex-specific site.

~ Race-specific rates based on fewer than 10 cases or deaths are not presented.

Table III-19.5: Median age at diagnosis/death, lifetime risk of diagnosis/death, and cancer prevalence, Minnesota, 2007-2009, Non-Hodgkin Lymphoma

	Males	Females
Median Age at Diagnosis (Yr)	67.0	70.0
Median Age at Death (Yr)	76.0	80.0
Lifetime Risk of Diagnosis (%)	3.0	2.4
Lifetime Risk of Death (%)	1.2	0.9
Complete prevalence†	4,700	4,200
Five-year prevalence‡	1,890	1,630

Source: MCSS December 2011 with Vintage 2009 population estimates. See Appendix E for prevalence calculations.

† Estimated Minnesotans ever diagnosed with this cancer and alive on 1/1/2009, rounded to the nearest 10.

‡ Estimated Minnesotans diagnosed with this cancer in the last five years and alive on 1/1/2009, rounded to the nearest 10.

- Not applicable; sex-specific site.

Table III-19.6: Distribution of cases and five-year relative survival by age at diagnosis, Non-Hodgkin Lymphoma

Age at Diagnosis	Cases(%)†	Five-Year Survival(%)‡
All Ages	100.0	68.2
< 45	8.7	77.5
45-54	13.0	77.3
55-64	19.3	74.0
65-74	24.1	68.6
75+	34.9	52.3

† Among Minnesota cases diagnosed 2007-2009.

‡ Among SEER18 cases diagnosed 2002-2008 followed into 2009 from *SEER Cancer Statistics Review, 1975-2009 (Vintage 2009 Populations)*.

Non-Hodgkin Lymphoma

Table III-19.7: Average annual incidence and mortality rates§ in the U.S. by race/ethnicity and gender, 2005-2009, Non-Hodgkin Lymphoma**

		Males	Females
Incidence	All Races Combined	23.8	16.3
	American Indian		
	Total	10.3	8.2
	CHSDA**	14.6	10.7
	Asian/PI	16.3	10.9
	Black	17.5	11.8
	Non-Hispanic White	25.6	17.3
Mortality	Hispanic all races	19.5	15.4
	All Races Combined	8.4	5.2
	American Indian		
	Total	4.1	3.3
	CHSDA**	5.0	4.5
	Asian/PI	5.2	3.4
	Black	6.1	3.6
Non-Hispanic White	8.9	5.5	
Hispanic all races	6.3	4.3	

Source: *SEER Cancer Statistics Review 1975-2009 (Vintage 2009 Populations)*. Incidence data are from the SEER 18 areas, which cover 26% of the US population. Mortality data are for the entire US.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

** See footnote for Table III-19.4.

~ See footnote for Table III-19.4.

Descriptive Epidemiology

Incidence and Mortality: Lymphomas are malignancies of the white blood cells, also called lymphocytes. They are of two primary types: Hodgkin lymphoma and non-Hodgkin lymphoma (NHL). NHL is more common, accounting for more than 85 percent of lymphomas. Many subtypes of NHL have been identified which vary in both the specific type of lymphocyte involved and in prognosis.

Over the five-year period 2005-2009, an average of 1,182 Minnesotans were diagnosed with NHL each year, and 382 deaths occurred annually. It was the sixth most commonly diagnosed cancer among men and among women. Comparing non-Hispanic whites, incidence and mortality rates in Minnesota were four and three percent higher, respectively, in Minnesota than nationally.

Survival: Among cases diagnosed in the SEER Program between 2002 and 2008, the five-year relative survival rate from NHL was 68 percent, and was somewhat higher among those diagnosed at younger ages.

Trends: From 1988 to 2009, the incidence rate of NHL in Minnesota increased significantly by about one percent per year for each gender. The mortality rate increased significantly during the first decade of the period, and then decreased significantly by 4.4 percent each year among males and by 4.5 percent among females. These are similar to national trends. The recent sharp decline in mortality in the face of increasing incidence is thought to be due to improved treatment with monoclonal antibodies and radioimmunotherapy.

Age: During this period, about 60 percent of cases and 80 percent of deaths from NHL occurred among Minnesotans ages 65 years or older. However, it remained one of the most common forms of childhood cancer.

Gender: NHL rates in Minnesota were about 50 percent higher among men than women.

Race: Non-Hispanic whites were at greatest risk for NHL, both in Minnesota and nationally.

Risk Factors

The causes of NHL are relatively unknown, and most patients with NHL have no known risk factors. Congenital immunodeficiency, immunosuppression following organ transplantation, and certain autoimmune diseases are associated with increased risk for NHL. Similarly, persons infected with the human immunodeficiency virus, the cause of AIDS, are 60 times more likely to develop certain types of NHL. Other infectious agents have been associated with NHL in Japan, the Caribbean, and Africa, but appear to play a minor role in the U.S. *Helicobacter pylori* bacteria has been identified as causing some lymphomas of the stomach. Chemotherapy and radiation therapy for other cancers may also increase risk for NHL. Herbicides, pesticides, other occupational exposures and nitrates in drinking water have been studied, but their causal association with NHL is still unclear.

Early Detection / Prevention

There are no established methods to detect NHL early through population-based screening.

Oral Cavity and Pharynx Cancer

Table III-20.1: Number of new cases and deaths and incidence and mortality rates by year and gender, Minnesota, 1988-2009, Oral Cavity and Pharynx Cancer

Year	Incidence				Mortality			
	New Cases		Rate§		Deaths		Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
1988	340	168	19.6	7.6	70	44	4.1	1.8
1989	365	169	21.0	7.5	59	38	3.3	1.7
1990	377	177	20.8	7.5	83	41	4.7	1.6
1991	359	167	19.9	7.2	69	57	3.8	2.3
1992	326	160	17.4	7.0	72	44	4.0	1.8
1993	327	143	17.6	6.0	64	43	3.5	1.8
1994	328	196	17.2	8.2	66	39	3.5	1.5
1995	348	155	17.8	6.3	66	37	3.5	1.4
1996	328	184	16.5	7.6	67	39	3.4	1.5
1997	342	147	16.8	5.8	77	50	3.8	1.9
1998	337	156	16.3	6.2	80	43	4.0	1.6
1999	347	158	16.4	6.2	60	33	3.0	1.3
2000	348	172	15.9	6.6	66	36	3.1	1.2
2001	349	175	15.8	6.5	72	45	3.4	1.6
2002	343	208	15.2	7.5	81	45	3.8	1.5
2003	329	173	14.2	6.2	82	42	3.6	1.4
2004	363	205	15.2	7.5	70	42	3.2	1.4
2005	370	207	15.2	7.3	77	35	3.2	1.1
2006	386	215	15.7	7.3	75	44	3.1	1.5
2007	451	214	17.8	7.3	72	47	3.1	1.5
2008	414	184	15.5	6.1	57	38	2.2	1.2
2009	472	231	17.6	7.7	83	31	3.3	0.9

Source: See footnotes for Table III-20.2.

Table III-20.2: Trends in incidence and mortality by gender using the Joinpoint Regression Program† with up to four joinpoints, Minnesota, 1988-2009, Oral Cavity and Pharynx Cancer

	Incidence				Mortality			
	Males		Females		Males		Females	
	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†
Interval 1	1988-2003	-2.2*	1988-2009	-0.1	1988-2009	-1.5*	1988-2009	-2.1*
Interval 2	2003-2009	2.8*						
AAPC(%)†	2005-2009	2.8*	2005-2009	-0.1	2005-2009	-1.5*	2005-2009	-2.1*
	2000-2009	1.1	2000-2009	-0.1	2000-2009	-1.5*	2000-2009	-2.1*

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

† Joinpoint Regression version 3.5.2, National Cancer Institute. Annual age-adjusted rates 1988-2009 were analyzed to identify points in time where the trend significantly changed (joinpoints). The trend between joinpoints is the Annual Percent Change (APC) in the rate.

The Average Annual Percent Change (AAPC) is a summary measure of the APCs during the most recent five- and ten-year periods. If no joinpoints were identified, the AAPC is the same as the APC. If joinpoints were identified during the specified period, the AAPC is a weighted average of the APCs. Trends are not calculated if one or more years have no cases/deaths. See Appendix E for more information.

- Not applicable (sex-specific site), or not available (no unique cause of death code prior to 1999).

* The APC/AAPC is significantly different from zero ($p < 0.05$).

Oral Cavity and Pharynx Cancer

Table III-20.3: Number of new cases and deaths and average annual incidence and mortality rates by age and gender, Minnesota, 2005-2009, Oral Cavity and Pharynx Cancer

Age (Yr)	Incidence 2005-2009				Mortality 2005-2009			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
0-19	5	9	0.1	0.3	0	0	0.0	0.0
20-34	40	39	1.5	1.5	6	1	0.2	0.0
35-49	329	157	11.3	5.5	29	11	1.0	0.4
50-64	844	341	36.3	14.6	137	42	5.9	1.8
65-74	429	196	56.3	23.0	75	47	9.9	5.5
75-84	339	188	73.7	29.5	77	44	16.7	6.9
85+	107	121	70.7	34.1	40	50	26.4	14.1

Source: See footnotes for Table III-20.4.

Table III-20.4: Number of new cases and deaths and average annual incidence and mortality rates by race/ethnicity and gender, Minnesota, 2005-2009, Oral Cavity and Pharynx Cancer

Race/Ethnicity**	Incidence 2005-2009				Mortality 2005-2009			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
All Races Combined	2,093	1,051	16.4	7.2	364	195	3.0	1.2
American Indian								
Statewide	25	15	21.0	12.3	5	3	~	~
CHSDA**	15	9	25.2	~	3	2	~	~
Asian/PI	38	25	13.9	8.0	21	5	8.8	~
Black	56	30	19.3	8.2	11	3	4.3	~
Non-Hispanic White	1,930	942	16.2	6.8	326	182	2.8	1.2
Hispanic all races	18	17	6.9	7.3	1	2	~	~

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

** Persons reported with unknown or other race are included in all races combined, but are excluded from race-specific data unless they are Hispanic. Hispanic includes persons of any race, including unknown and other race. CHSDA includes counties in the Contract Health Services Delivery Area, as defined by the Indian Health Services. Refer to Chapter I for a discussion of CHSDA counties and for comments on the accuracy of race-specific rates.

- Not applicable; sex-specific site.

~ Race-specific rates based on fewer than 10 cases or deaths are not presented.

Table III-20.5: Median age at diagnosis/death, lifetime risk of diagnosis/death, and cancer prevalence, Minnesota, 2007-2009, Oral Cavity and Pharynx Cancer

	Males	Females
Median Age at Diagnosis (Yr)	61.0	63.0
Median Age at Death (Yr)	68.0	75.0
Lifetime Risk of Diagnosis (%)	1.7	0.8
Lifetime Risk of Death (%)	0.3	0.2
Complete prevalence†	3,130	1,740
Five-year prevalence‡	1,200	570

Source: MCSS December 2011 with Vintage 2009 population estimates. See Appendix E for prevalence calculations.

† Estimated Minnesotans ever diagnosed with this cancer and alive on 1/1/2009, rounded to the nearest 10.

‡ Estimated Minnesotans diagnosed with this cancer in the last five years and alive on 1/1/2009, rounded to the nearest 10.

- Not applicable; sex-specific site.

Table III-20.6: Distribution of cases and five-year relative survival by extent of disease at diagnosis, Oral Cavity and Pharynx Cancer

Stage at Diagnosis	Cases(%)†	Five-Year Survival(%)‡
All Stages	100.0	61.5
<i>In situ</i>	5.8	-
Localized	37.0	82.4
Regional	38.8	57.3
Distant	11.3	34.9
Unstaged	7.2	50.5

† Among Minnesota cases diagnosed 2007-2009.

‡ Among SEER18 cases diagnosed 2002-2008 followed into 2009 from *SEER Cancer Statistics Review, 1975-2009 (Vintage 2009 Populations)*. Survival for All Stages excludes *in situ* tumors.

- There were not enough intervals to produce the statistic.

Oral Cavity and Pharynx Cancer

Table III-20.7: Average annual incidence and mortality rates§ in the U.S. by race/ethnicity and gender, 2005-2009, Oral Cavity and Pharynx Cancer**

		Males	Females
Incidence	All Races Combined	16.1	6.2
	American Indian		
	Total	8.0	3.5
	CHSDA**	10.1	5.0
	Asian/PI	11.1	5.2
	Black	15.4	5.6
	Non-Hispanic White	17.8	6.6
	Hispanic all races	9.1	4.0
Mortality	All Races Combined	3.8	1.4
	American Indian		
	Total	2.9	1.1
	CHSDA**	3.5	1.3
	Asian/PI	3.0	1.3
	Black	5.7	1.4
	Non-Hispanic White	3.7	1.4
	Hispanic all races	2.4	0.7

Source: *SEER Cancer Statistics Review 1975-2009 (Vintage 2009 Populations)*. Incidence data are from the SEER 18 areas, which cover 26% of the US population. Mortality data are for the entire US.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

** See footnote for Table III-20.4.

~ See footnote for Table III-20.4.

increased significantly from 2003 to 2009. Mortality from this group of cancers decreased significantly for each gender during this period. Nationally, incidence rates did not show a significant increase among males. SEER data indicate that trends vary significantly among the subsites within this group of cancers. From 2005 to 2009, incidence increased significantly for cancers of the tongue, oropharynx, tonsil, and salivary gland, and decreased significantly for cancers of the mouth and lip. There is strong evidence that some of the subsites with increasing incidence rates may be initiated by exposure to the human papilloma virus (HPV), and that oral exposure to HPV is increasing.

Age: About 45 percent of diagnoses and 60 percent of deaths due to oral cavity and pharynx cancer occurred among Minnesotans 65 years of age or older.

Gender: Incidence and mortality rates of oral cavity and pharynx cancer were two times higher among males than females.

Race: From 2005 to 2009, American Indians had the highest risk of being diagnosed with cancer of the oral cavity and pharynx in Minnesota, while Hispanics had the lowest. Rates among American Indians living in CHSDA counties in Minnesota were more than two times more likely to develop this cancer than American Indians in the geographic areas covered by SEER. This may reflect different levels of tobacco use among Northern Plains Indians compared to those in the Southwest U.S., where the majority of American Indians reported by SEER reside.

Descriptive Epidemiology

Incidence and Mortality: Over the five-year period 2005-2009, an average of 629 cases of oral cavity and pharynx cancer were diagnosed each year in Minnesota, and 112 residents died from this cancer annually. Comparing non-Hispanic whites, oral cancer incidence and mortality rates were 6 and 25 percent lower, respectively, in Minnesota than nationally.

Survival: Among cases diagnosed between 2002 and 2008 in the SEER Program, five-year relative survival for oral cavity and pharynx cancer is 82 percent for localized tumors. In Minnesota, about 35 percent of these cancers were diagnosed when still localized.

Trends: From 1988 to 2009, the incidence rate of cancer of the oral cavity and pharynx in Minnesota was stable among females; among males, incidence decreased significantly from 1988 to 2003, and

Risk Factors

Tobacco use and heavy alcohol consumption are the most important risk factors for development of oral cavity and pharynx cancer, accounting for nearly 75 percent of cases in the U.S. As mentioned above, HPV may be an etiologic factor for certain types of oral cancer. Diets low in fruits and vegetables are also associated with increased risk of disease.

Early Detection / Prevention

Most cases of oral cavity and pharynx cancer are preventable. The single most effective measure to lowering risk of developing this cancer is to reduce exposure to tobacco and alcohol. If the association between HPV exposure and increasing rates for certain subsites of this cancer are confirmed, HPV vaccination may also be preventative.

Specific Cancers

Ovary Cancer

Table III-21.1: Number of new cases and deaths and incidence and mortality rates by year and gender, Minnesota, 1988-2009, Ovary Cancer

Year	Incidence				Mortality			
	New Cases		Rate§		Deaths		Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
1988	-	345	-	16.0	-	238	-	10.5
1989	-	354	-	16.3	-	239	-	10.3
1990	-	328	-	15.0	-	198	-	8.7
1991	-	356	-	15.9	-	240	-	9.9
1992	-	352	-	15.4	-	230	-	9.7
1993	-	346	-	15.1	-	221	-	9.1
1994	-	377	-	16.4	-	237	-	9.6
1995	-	389	-	16.6	-	217	-	8.8
1996	-	346	-	14.6	-	252	-	10.0
1997	-	322	-	13.1	-	218	-	8.4
1998	-	337	-	13.6	-	252	-	9.4
1999	-	358	-	14.2	-	225	-	8.6
2000	-	326	-	12.7	-	240	-	8.8
2001	-	363	-	14.0	-	249	-	9.1
2002	-	350	-	13.3	-	237	-	8.7
2003	-	360	-	13.2	-	253	-	9.0
2004	-	354	-	12.7	-	252	-	8.8
2005	-	363	-	13.2	-	261	-	8.9
2006	-	345	-	12.1	-	247	-	8.3
2007	-	348	-	12.0	-	218	-	7.2
2008	-	356	-	12.2	-	265	-	8.7
2009	-	361	-	11.8	-	252	-	7.9

Source: See footnotes for Table III-21.2.

Table III-21.2: Trends in incidence and mortality by gender using the Joinpoint Regression Program† with up to four joinpoints, Minnesota, 1988-2009, Ovary Cancer

	Incidence				Mortality			
	Males		Females		Males		Females	
	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†
Interval 1	-	-	1988-2009	-1.6*	-	-	1988-2009	-1.0*
AAPC(%)†	-	-	2005-2009	-1.6*	-	-	2005-2009	-1.0*
	-	-	2000-2009	-1.6*	-	-	2000-2009	-1.0*

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cancers and histologies 8442, 8451, 8462, 8472 and 8473.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

† Joinpoint Regression version 3.5.2, National Cancer Institute. Annual age-adjusted rates 1988-2009 were analyzed to identify points in time where the trend significantly changed (joinpoints). The trend between joinpoints is the Annual Percent Change (APC) in the rate.

The Average Annual Percent Change (AAPC) is a summary measure of the APCs during the most recent five- and ten-year periods. If no joinpoints were identified, the AAPC is the same as the APC. If joinpoints were identified during the specified period, the AAPC is a weighted average of the APCs. Trends are not calculated if one or more years have no cases/deaths. See Appendix E for more information.

- Not applicable (sex-specific site), or not available (no unique cause of death code prior to 1999).

* The APC/AAPC is significantly different from zero ($p < 0.05$).

Ovary Cancer

Table III-21.3: Number of new cases and deaths and average annual incidence and mortality rates by age and gender, Minnesota, 2005-2009, Ovary Cancer

Age (Yr)	Incidence 2005-2009				Mortality 2005-2009			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
0-19	-	24	-	0.7	-	0	-	0.0
20-34	-	61	-	2.4	-	6	-	0.2
35-49	-	248	-	8.7	-	74	-	2.6
50-64	-	678	-	29.0	-	355	-	15.2
65-74	-	347	-	40.7	-	286	-	33.5
75-84	-	292	-	45.9	-	311	-	48.9
85+	-	123	-	34.6	-	211	-	59.4

Source: See footnotes for Table III-21.4.

Table III-21.4: Number of new cases and deaths and average annual incidence and mortality rates by race/ethnicity and gender, Minnesota, 2005-2009, Ovary Cancer

Race/Ethnicity**	Incidence 2005-2009				Mortality 2005-2009			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
All Races Combined	-	1,773	-	12.3	-	1,243	-	8.2
American Indian								
Statewide	-	17	-	14.2	-	9	-	~
CHSDA**	-	10	-	14.7	-	5	-	~
Asian/PI	-	18	-	5.9	-	12	-	4.3
Black	-	28	-	8.8	-	21	-	10.2
Non-Hispanic White	-	1,677	-	12.4	-	1,194	-	8.3
Hispanic all races	-	14	-	5.6	-	6	-	~

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cancers and histologies 8442, 8451, 8462, 8472 and 8473.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

** Persons reported with unknown or other race are included in all races combined, but are excluded from race-specific data unless they are Hispanic. Hispanic includes persons of any race, including unknown and other race. CHSDA includes counties in the Contract Health Services Delivery Area, as defined by the Indian Health Services. Refer to Chapter I for a discussion of CHSDA counties and for comments on the accuracy of race-specific rates.

- Not applicable; sex-specific site.

~ Race-specific rates based on fewer than 10 cases or deaths are not presented.

Table III-21.5: Median age at diagnosis/death, lifetime risk of diagnosis/death, and cancer prevalence, Minnesota, 2007-2009, Ovary Cancer

	Males	Females
Median Age at Diagnosis (Yr)	-	62.0
Median Age at Death (Yr)	-	71.0
Lifetime Risk of Diagnosis (%)	-	1.4
Lifetime Risk of Death (%)	-	0.2
Complete prevalence†	-	2,960
Five-year prevalence‡	-	910

Source: MCSS December 2011 with Vintage 2009 population estimates. See Appendix E for prevalence calculations.

† Estimated Minnesotans ever diagnosed with this cancer and alive on 1/1/2009, rounded to the nearest 10.

‡ Estimated Minnesotans diagnosed with this cancer in the last five years and alive on 1/1/2009, rounded to the nearest 10.

- Not applicable; sex-specific site.

Table III-21.6: Distribution of cases and five-year relative survival by extent of disease at diagnosis, Ovary Cancer

Stage at Diagnosis	Cases(%)†	Five-Year Survival(%)‡
All Stages	100.0	43.7
<i>In situ</i>	0.8	-
Localized	15.9	91.5
Regional	22.0	71.9
Distant	54.7	26.9
Unstaged	6.6	22.0

† Among Minnesota cases diagnosed 2007-2009.

‡ Among SEER18 cases diagnosed 2002-2008 followed into 2009 from *SEER Cancer Statistics Review, 1975-2009 (Vintage 2009 Populations)*. Survival for All Stages excludes *in situ* tumors.

- There were not enough intervals to produce the statistic.

Ovary Cancer

Table III-21.7: Average annual incidence and mortality rates§ in the U.S. by race/ethnicity and gender, 2005-2009, Ovary Cancer**

		Males	Females
Incidence	All Races Combined	-	12.7
	American Indian		
	Total	-	8.3
	CHSDA**	-	11.2
	Asian/PI	-	9.8
	Black	-	9.8
Mortality	Non-Hispanic White	-	13.6
	Hispanic all races	-	11.3
	All Races Combined	-	8.2
	American Indian		
	Total	-	5.4
	CHSDA**	-	6.8
	Asian/PI	-	5.0
	Black	-	6.8
	Non-Hispanic White	-	8.8
	Hispanic all races	-	5.9

Source: *SEER Cancer Statistics Review 1975-2009 (Vintage 2009 Populations)*. Incidence data are from the SEER 18 areas, which cover 26% of the US population. Mortality data are for the entire US.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

** See footnote for Table III-21.4.

~ See footnote for Table III-21.4.

Descriptive Epidemiology

Incidence and Mortality: Over the five-year period 2005-2009, an average of 355 women in Minnesota were diagnosed with ovarian cancer each year, and 249 women died of this cancer annually. Among non-Hispanic white women, the incidence rate was nine percent lower in Minnesota than in the SEER 18 areas, and mortality was six percent lower in Minnesota than in the U.S.

Survival: Among cases diagnosed in the SEER 18 areas in 2002-2008, the five-year relative survival rate was 92 percent for localized tumors and 72 percent for regional tumors. However, more than half (55%) of ovarian cancers in Minnesota were diagnosed when the tumor had already spread to distant organs, when five-year survival was lower (27%).

Trends: Since cancer reporting was initiated in Minnesota in 1988, ovarian cancer incidence and mortality rates have declined significantly by 1.6 percent per year and 1.0 percent per year, respectively. This is consistent with national trends.

Age: The majority of ovarian cancers develop after menopause. About 80 percent of cases and 94 percent of deaths in Minnesota occur in women age 50 years or older.

Race: Although based on relatively few cases, the ovarian cancer incidence rate in Minnesota was highest among American Indian women, followed by non-Hispanic white women. Too few deaths from ovarian cancer occurred among women of color in Minnesota to calculate reliable mortality rates. Based on mortality rates in the U.S., non-Hispanic white women are the most likely to die of ovarian cancer.

Risk Factors

As with breast cancer, the risk for ovarian cancer is somewhat higher among women who begin menstruating at an early age, have no children or have their first child after the age of 30 years, or begin menopause after the age of 50 years. Infertility, use of fertility drugs, and use of unopposed estrogen replacement therapy may also increase risk for ovarian cancer, but research studies have shown conflicting results. On the other hand, long-term use of oral contraceptives reduces risk. Women who have had breast cancer or have a family history of breast or ovarian cancer are at increased risk for ovarian cancer, which may be linked to mutations in the BRCA1 or BRCA2 genes. A family history of colorectal cancer may also increase risk for ovarian cancer.

Early Detection / Prevention

Routine pelvic examination can help detect abnormalities in the size, shape, and consistency of the ovaries, and is recommended for all women age 18 years and older. However, most early stage ovarian tumors cannot be palpated. Screening is not recommended for women without strong known risk factors. Several large studies are underway to learn the best ways to find ovarian cancer in its earliest stage.

Pancreas Cancer

Table III-22.1: Number of new cases and deaths and incidence and mortality rates by year and gender, Minnesota, 1988-2009, Pancreas Cancer

Year	Incidence				Mortality			
	New Cases		Rate§		Deaths		Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
1988	177	156	10.2	6.8	201	221	11.9	9.1
1989	158	159	8.9	6.9	211	211	12.4	8.5
1990	153	137	8.8	5.8	200	223	11.9	8.9
1991	161	142	8.7	6.0	187	220	10.6	8.8
1992	207	172	11.2	7.2	231	236	13.0	9.2
1993	167	154	9.0	6.4	217	228	12.3	8.8
1994	173	152	9.0	6.3	242	238	13.2	9.0
1995	180	163	9.3	6.6	211	240	11.2	9.1
1996	208	181	10.7	7.1	234	233	12.4	8.7
1997	184	170	9.3	6.6	230	247	11.9	8.9
1998	209	192	10.4	7.2	261	258	13.4	9.0
1999	210	183	10.1	6.9	232	268	11.6	9.4
2000	221	232	10.6	8.6	242	270	11.9	9.4
2001	208	209	9.9	7.9	237	243	11.6	8.4
2002	208	215	9.4	8.0	257	269	12.0	9.4
2003	251	246	11.5	8.9	233	277	10.9	9.4
2004	255	219	11.3	7.6	271	239	12.6	7.9
2005	266	260	11.3	9.1	265	297	11.9	9.8
2006	269	261	11.5	9.0	263	301	11.4	9.8
2007	278	255	11.4	8.6	274	272	11.7	8.9
2008	316	289	12.9	9.5	268	324	11.3	10.3
2009	312	256	12.0	8.1	315	282	12.7	8.7

Source: See footnotes for Table III-22.2.

Table III-22.2: Trends in incidence and mortality by gender using the Joinpoint Regression Program† with up to four joinpoints, Minnesota, 1988-2009, Pancreas Cancer

	Incidence				Mortality			
	Males		Females		Males		Females	
	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†
Interval 1	1988-2009	1.4*	1988-2009	1.9*	1988-2009	-0.1	1988-2009	0.3
AAPC(%)†	2005-2009	1.4*	2005-2009	1.9*	2005-2009	-0.1	2005-2009	0.3
	2000-2009	1.4*	2000-2009	1.9*	2000-2009	-0.1	2000-2009	0.3

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

† Joinpoint Regression version 3.5.2, National Cancer Institute. Annual age-adjusted rates 1988-2009 were analyzed to identify points in time where the trend significantly changed (joinpoints). The trend between joinpoints is the Annual Percent Change (APC) in the rate.

The Average Annual Percent Change (AAPC) is a summary measure of the APCs during the most recent five- and ten-year periods. If no joinpoints were identified, the AAPC is the same as the APC. If joinpoints were identified during the specified period, the AAPC is a weighted average of the APCs. Trends are not calculated if one or more years have no cases/deaths. See Appendix E for more information.

- Not applicable (sex-specific site), or not available (no unique cause of death code prior to 1999).

* The APC/AAPC is significantly different from zero ($p < 0.05$).

Pancreas Cancer

Table III-22.3: Number of new cases and deaths and average annual incidence and mortality rates by age and gender, Minnesota, 2005-2009, Pancreas Cancer

Age (Yr)	Incidence 2005-2009				Mortality 2005-2009			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
0-19	0	2	0.0	0.1	0	0	0.0	0.0
20-34	7	6	0.3	0.2	4	2	0.2	0.1
35-49	105	60	3.6	2.1	64	44	2.2	1.6
50-64	479	330	20.6	14.1	389	280	16.7	12.0
65-74	428	347	56.2	40.7	384	323	50.4	37.9
75-84	325	381	70.6	59.8	372	465	80.8	73.0
85+	97	195	64.1	54.9	172	362	113.7	101.9

Source: See footnotes for Table III-22.4.

Table III-22.4: Number of new cases and deaths and average annual incidence and mortality rates by race/ethnicity and gender, Minnesota, 2005-2009, Pancreas Cancer

Race/Ethnicity**	Incidence 2005-2009				Mortality 2005-2009			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
All Races Combined	1,441	1,321	11.8	8.9	1,385	1,476	11.8	9.5
American Indian								
Statewide	11	9	12.0	~	8	9	~	~
CHSDA**	6	7	~	~	5	7	~	~
Asian/PI	20	15	13.2	6.5	13	11	9.0	5.0
Black	49	41	22.1	16.7	40	29	20.4	14.9
Non-Hispanic White	1,334	1,239	11.6	8.8	1,309	1,420	11.7	9.5
Hispanic all races	19	8	11.8	~	11	5	7.5	~

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

** Persons reported with unknown or other race are included in all races combined, but are excluded from race-specific data unless they are Hispanic. Hispanic includes persons of any race, including unknown and other race. CHSDA includes counties in the Contract Health Services Delivery Area, as defined by the Indian Health Services. Refer to Chapter I for a discussion of CHSDA counties and for comments on the accuracy of race-specific rates.

- Not applicable; sex-specific site.

~ Race-specific rates based on fewer than 10 cases or deaths are not presented.

Table III-22.5: Median age at diagnosis/death, lifetime risk of diagnosis/death, and cancer prevalence, Minnesota, 2007-2009, Pancreas Cancer

	Males	Females
Median Age at Diagnosis (Yr)	68.0	72.0
Median Age at Death (Yr)	71.0	76.0
Lifetime Risk of Diagnosis (%)	1.4	1.2
Lifetime Risk of Death (%)	1.4	1.4
Complete prevalence†	290	270
Five-year prevalence‡	220	200

Source: MCSS December 2011 with Vintage 2009 population estimates. See Appendix E for prevalence calculations.

† Estimated Minnesotans ever diagnosed with this cancer and alive on 1/1/2009, rounded to the nearest 10.

‡ Estimated Minnesotans diagnosed with this cancer in the last five years and alive on 1/1/2009, rounded to the nearest 10.

- Not applicable; sex-specific site.

Table III-22.6: Distribution of cases and five-year relative survival by extent of disease at diagnosis, Pancreas Cancer

Stage at Diagnosis	Cases(%)†	Five-Year Survival(%)‡
All Stages	100.0	5.8
<i>In situ</i>	0.3	89.4
Localized	7.2	23.3
Regional	35.1	8.9
Distant	47.6	1.8
Unstaged	9.8	3.9

† Among Minnesota cases diagnosed 2007-2009.

‡ Among SEER18 cases diagnosed 2002-2008 followed into 2009 from *SEER Cancer Statistics Review, 1975-2009 (Vintage 2009 Populations)*. Survival for All Stages excludes *in situ* tumors.

- There were not enough intervals to produce the statistic.

Pancreas Cancer

Table III-22.7: Average annual incidence and mortality rates§ in the U.S. by race/ethnicity and gender, 2005-2009, Pancreas Cancer**

		Males	Females
Incidence	All Races Combined	13.8	10.8
	American Indian		
	Total	8.1	7.8
	CHSDA**	11.5	10.3
	Asian/PI	10.5	8.8
	Black	17.7	14.4
	Non-Hispanic White	14.0	10.6
Mortality	Hispanic all races	11.6	10.3
	All Races Combined	12.5	9.5
	American Indian		
	Total	7.2	6.0
	CHSDA**	10.1	7.9
	Asian/PI	8.4	6.9
	Black	15.5	12.6
Non-Hispanic White	12.6	9.4	
Hispanic all races	9.2	7.5	

Source: *SEER Cancer Statistics Review 1975-2009 (Vintage 2009 Populations)*. Incidence data are from the SEER 18 areas, which cover 26% of the US population. Mortality data are for the entire US.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

** See footnote for Table III-22.4.

~ See footnote for Table III-22.4.

Descriptive Epidemiology

Incidence and Mortality: Over the five-year period 2005-2009, an average of 552 Minnesotans were diagnosed with a microscopically confirmed pancreas cancer each year, and about 572 Minnesotans died from this disease annually. The fact that more Minnesotans died of pancreas cancer than were diagnosed reflects the fact that MCSS does not register cancers that are not microscopically confirmed (see Chapter I). In the SEER Program, about 20 percent of pancreas cancers are not microscopically confirmed, indicating that MCSS may underestimate the diagnosis of this disease in our state. Mortality data, however, are collected in a comparable fashion in Minnesota and the U.S. Comparing non-Hispanic whites, mortality rates for this cancer were similar in Minnesota and the U.S.

Survival: Pancreatic cancer is one of the most rapidly fatal cancers and generally remains asymptomatic until

well advanced. Based on SEER cases diagnosed 2002-2008, the five-year relative survival rate was six percent.

Trends: From 1988 to 2009, the incidence rate of pancreatic cancer in Minnesota increased significantly in both males (1.4% per year) and females (1.9%). Over the same period, mortality was stable among males and females in the state. These are similar to national trends, except that nationally, pancreas cancer mortality increased significantly among both males and females.

Age: Pancreatic cancer is extremely rare in early life. Incidence rates increase sharply after 50 years of age and continue to increase steadily with age. About 64 percent of cases and 73 percent of deaths due to pancreas cancer in Minnesota occurred among persons age 65 year or older.

Gender: Rates were about 30 percent higher among males than females.

Race: In Minnesota, black men and women had the highest pancreas cancer incidence and mortality rates, about two times higher than among non-Hispanic white men and women. Blacks also had the highest rates of pancreas cancer nationally, but lower than in Minnesota.

Risk Factors

Cigarette smoking is the most consistent risk factor for pancreatic cancer, with a two- to three-fold risk for smokers relative to nonsmokers. An estimated 20 to 30 percent of pancreas cancers are caused by smoking. Little is known about the etiology of this disease, but research has suggested that obesity, diabetes mellitus, and occupational exposures to certain chemicals and petroleum can increase risk of developing pancreatic cancer. Data suggest an increased risk for pancreas cancer associated with meat consumption, and this may in part be due to cooking and processing methods such as grilling and frying.

Early Detection / Prevention

At present, only biopsy yields a certain diagnosis. Because of the “silent” early course of the disease, the need for biopsy may become obvious only with advanced disease. Researchers are focusing on ways to diagnose pancreatic cancer before symptoms occur.

Specific Cancers

Prostate Cancer

Table III-23.1: Number of new cases and deaths and incidence and mortality rates by year and gender, Minnesota, 1988-2009, Prostate Cancer

Year	Incidence				Mortality			
	New Cases		Rate§		Deaths		Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
1988	2,457	-	147.1	-	586	-	38.3	-
1989	2,626	-	154.8	-	636	-	41.5	-
1990	2,972	-	172.9	-	607	-	38.7	-
1991	3,829	-	214.9	-	646	-	41.1	-
1992	4,241	-	233.9	-	611	-	37.6	-
1993	3,780	-	204.1	-	604	-	37.2	-
1994	3,211	-	170.8	-	673	-	40.9	-
1995	3,280	-	172.3	-	653	-	39.4	-
1996	3,229	-	166.7	-	681	-	39.5	-
1997	3,454	-	175.7	-	596	-	34.3	-
1998	3,425	-	172.1	-	598	-	33.9	-
1999	3,641	-	179.5	-	565	-	31.2	-
2000	4,087	-	197.9	-	598	-	32.6	-
2001	4,174	-	198.2	-	598	-	32.2	-
2002	4,212	-	194.7	-	601	-	31.7	-
2003	3,894	-	175.9	-	545	-	28.3	-
2004	4,082	-	180.4	-	558	-	28.4	-
2005	4,203	-	181.1	-	491	-	24.7	-
2006	4,578	-	192.1	-	484	-	23.6	-
2007	4,797	-	193.8	-	498	-	23.7	-
2008	4,456	-	173.2	-	546	-	25.3	-
2009	4,182	-	156.3	-	537	-	24.3	-

Source: See footnotes for Table III-23.2.

Table III-23.2: Trends in incidence and mortality by gender using the Joinpoint Regression Program† with up to four joinpoints, Minnesota, 1988-2009, Prostate Cancer

	Incidence				Mortality			
	Males		Females		Males		Females	
	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†
Interval 1	1988-1992	13.0*	-	-	1988-1995	-0.3	-	-
Interval 2	1992-1995	-11.2	-	-	1995-2009	-3.7*	-	-
Interval 3	1995-2000	3.3	-	-	-	-	-	-
Interval 4	2000-2007	-0.2	-	-	-	-	-	-
Interval 5	2007-2009	-8.4	-	-	-	-	-	-
AAPC(%)†	2005-2009	-4.4	-	-	2005-2009	-3.7*	-	-
	2000-2009	-2.1	-	-	2000-2009	-3.7*	-	-

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

† Joinpoint Regression version 3.5.2, National Cancer Institute. Annual age-adjusted rates 1988-2009 were analyzed to identify points in time where the trend significantly changed (joinpoints). The trend between joinpoints is the Annual Percent Change (APC) in the rate.

The Average Annual Percent Change (AAPC) is a summary measure of the APCs during the most recent five- and ten-year periods. If no joinpoints were identified, the AAPC is the same as the APC. If joinpoints were identified during the specified period, the AAPC is a weighted average of the APCs. Trends are not calculated if one or more years have no cases/deaths. See Appendix E for more information.

- Not applicable (sex-specific site), or not available (no unique cause of death code prior to 1999).

* The APC/AAPC is significantly different from zero ($p < 0.05$).

Prostate Cancer

Table III-23.3: Number of new cases and deaths and average annual incidence and mortality rates by age and gender, Minnesota, 2005-2009, Prostate Cancer

Age (Yr)	Incidence 2005-2009				Mortality 2005-2009			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
0-19	1	-	0.0	-	0	-	0.0	-
20-34	2	-	0.1	-	0	-	0.0	-
35-49	546	-	18.8	-	8	-	0.3	-
50-64	8,667	-	372.7	-	175	-	7.5	-
65-74	7,934	-	1041.7	-	428	-	56.2	-
75-84	4,147	-	901.1	-	979	-	212.7	-
85+	917	-	606.1	-	966	-	638.5	-

Source: See footnotes for Table III-23.4.

Table III-23.4: Number of new cases and deaths and average annual incidence and mortality rates by race/ethnicity and gender, Minnesota, 2005-2009, Prostate Cancer

Race/Ethnicity**	Incidence 2005-2009				Mortality 2005-2009			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
All Races Combined	22,214	-	179.0	-	2,556	-	24.3	-
American Indian								
Statewide	137	-	158.1	-	19	-	33.1	-
CHSDA**	81	-	172.4	-	12	-	32.7	-
Asian/PI	107	-	62.3	-	10	-	8.3	-
Black	524	-	209.7	-	65	-	45.5	-
Non-Hispanic White	20,739	-	176.2	-	2,451	-	24.2	-
Hispanic all races	154	-	107.9	-	9	-	~	-

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

** Persons reported with unknown or other race are included in all races combined, but are excluded from race-specific data unless they are Hispanic. Hispanic includes persons of any race, including unknown and other race. CHSDA includes counties in the Contract Health Services Delivery Area, as defined by the Indian Health Services. Refer to Chapter I for a discussion of CHSDA counties and for comments on the accuracy of race-specific rates.

- Not applicable; sex-specific site.

~ Race-specific rates based on fewer than 10 cases or deaths are not presented.

Table III-23.5: Median age at diagnosis/death, lifetime risk of diagnosis/death, and cancer prevalence, Minnesota, 2007-2009, Prostate Cancer

	Males	Females
Median Age at Diagnosis (Yr)	66.0	-
Median Age at Death (Yr)	82.0	-
Lifetime Risk of Diagnosis (%)	19.6	-
Lifetime Risk of Death (%)	3.3	-
Complete prevalence†	47,350	-
Five-year prevalence‡	18,540	-

Source: MCSS December 2011 with Vintage 2009 population estimates. See Appendix E for prevalence calculations.

† Estimated Minnesotans ever diagnosed with this cancer and alive on 1/1/2009, rounded to the nearest 10.

‡ Estimated Minnesotans diagnosed with this cancer in the last five years and alive on 1/1/2009, rounded to the nearest 10.

- Not applicable; sex-specific site.

Table III-23.6: Distribution of cases and five-year relative survival by extent of disease at diagnosis, Prostate Cancer

Stage at Diagnosis	Cases(%)†	Five-Year Survival(%)‡
All Stages	100.0	99.2
<i>In situ</i>	0.0	-
Localized	79.9	100.0
Regional	11.7	100.0
Distant	3.6	27.8
Unstaged	4.8	71.1

† Among Minnesota cases diagnosed 2007-2009.

‡ Among SEER18 cases diagnosed 2002-2008 followed into 2009 from *SEER Cancer Statistics Review, 1975-2009 (Vintage 2009 Populations)*. Survival for All Stages excludes *in situ* tumors.

- There were not enough intervals to produce the statistic.

Prostate Cancer

Table III-23.7: Average annual incidence and mortality rates§ in the U.S. by race/ethnicity and gender, 2005-2009, Prostate Cancer**

		Males	Females
Incidence	All Races Combined	154.8	-
	American Indian		
	Total	60.3	-
	CHSDA**	78.4	-
	Asian/PI	85.4	-
	Black	236.0	-
Mortality	Non-Hispanic White	150.6	-
	Hispanic all races	125.9	-
	All Races Combined	23.6	-
	American Indian		
	Total	16.1	-
	CHSDA**	19.7	-
	Asian/PI	10.0	-
	Black	53.1	-
	Non-Hispanic White	21.9	-
	Hispanic all races	17.8	-

Source: *SEER Cancer Statistics Review 1975-2009 (Vintage 2009 Populations)*. Incidence data are from the SEER 18 areas, which cover 26% of the US population. Mortality data are for the entire US.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

** See footnote for Table III-23.4.

~ See footnote for Table III-23.4.

Descriptive Epidemiology

Incidence and Mortality: On average, 4,443 men were diagnosed with and 511 men died of prostate cancer in Minnesota each year from 2005 to 2009. Prostate cancer remained the most common cancer among Minnesota men, accounting for one out of three cancers diagnosed and one out of ten cancer deaths among males. Based on current rates, nearly one out of five men will be diagnosed with prostate cancer in their lifetimes and one out of thirty will die of the disease. Comparing non-Hispanic whites, prostate cancer incidence and mortality rates were 17 and 11 percent higher, respectively, in Minnesota than nationally. Prostate cancer incidence and mortality rates among American Indians were two times higher in Minnesota than reported nationally, but rates were somewhat lower among the other race/ethnic groups in the state. A higher risk for prostate cancer in Minnesota was first documented in the Third National Cancer Survey (1969-1971), and does not appear to be explained by screening.

Survival: Based on SEER cases diagnosed 2002-2008, five-year relative survival from prostate cancer is very

high unless the cancer has already spread to distant organs (e.g., bones, lungs, liver) when diagnosed.

Trends: Incidence rates for this cancer have been strongly influenced by the prostate cancer antigen (PSA) screening test, a very sensitive indicator of asymptomatic prostate cancer. After its introduction in the late 1980s, the prostate cancer incidence rate in the U.S. increased by an unprecedented 70 percent over a five-year period; after peaking in 1992, it declined sharply from 1992-1995, stabilized for five years, and then began to decrease significantly in 2000. Prostate cancer incidence in Minnesota has followed a very similar, but attenuated, trajectory, and few trends were statistically significant. From 2007 to 2009, prostate cancer incidence in Minnesota declined by 8.4 percent a year, but the trend was not statistically significant; nationally, the rate decreased by 1.7 percent per year during this period, and the decrease was statistically significant. Prostate cancer mortality is decreasing by 3.7 percent per year in Minnesota, similar to what is reported for the U.S. as a whole.

Age: During this five-year period, about 60 percent of all newly diagnosed prostate cancers and over 90 percent of deaths occurred among Minnesotans age 65 years and older.

Race: Black men were at highest risk for prostate cancer, both in Minnesota and nationally. Compared to non-Hispanic whites, the prostate cancer incidence rate among blacks in Minnesota was about 20 percent higher, while their mortality rate was almost two times higher. Prostate cancer incidence among American Indians was nearly two times higher in Minnesota than in SEER.

Risk Factors

Men with a family history of prostate cancer are at increased risk for developing the disease. It is unknown whether this association is genetically related or due to shared behaviors. Other strong risk factors for this disease remain elusive.

Early Detection / Prevention

Screening asymptomatic men for prostate cancer with the PSA test remains highly controversial. There is no question that screening finds cancers early, but it is unclear whether treating these cancers prolongs life. The two most recent epidemiologic studies were conflicting and did not provide clear answers. The American Cancer Society recommends that men should not be tested without learning about what we know and don't know about the potential risks and possible benefits of testing and treatment (<http://www.cancer.org>).

Prostate Cancer

In May 2012, the United States Preventive Services Task Force recommended against PSA-based screening for prostate cancer, concluding that the benefits do not outweigh the harms. Their statement can be found at <http://www.uspreventiveservicestaskforce.org/prostatecancerscreening.htm>.

A prostate cancer treatment vaccine was approved by the FDA in 2010. It does not prevent prostate cancer, and is used to treat certain men with metastatic disease. More information on cancer prevention and treatment vaccines can be found on the NCI factsheet titled “Cancer Vaccines” (<http://www.cancer.gov/cancertopics/factsheet/therapy/cancer-vaccines>).

Specific Cancers

Soft Tissue Cancer

Table III-24.1: Number of new cases and deaths and incidence and mortality rates by year and gender, Minnesota, 1988-2009, Soft Tissue Cancer

Year	Incidence				Mortality			
	New Cases		Rate§		Deaths		Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
1988	73	57	4.1	2.6	26	26	1.5	1.0
1989	59	42	3.1	1.9	24	26	1.3	1.3
1990	68	57	3.5	2.5	33	34	1.8	1.5
1991	85	67	4.4	2.9	27	20	1.4	0.9
1992	72	48	3.7	2.0	23	36	1.4	1.5
1993	88	59	4.6	2.5	39	26	2.0	1.1
1994	77	67	3.8	2.8	26	44	1.4	1.8
1995	58	45	2.9	1.8	27	31	1.4	1.2
1996	73	61	3.5	2.5	37	41	2.0	1.6
1997	76	66	3.6	2.7	32	35	1.6	1.4
1998	72	75	3.3	2.9	35	33	1.7	1.3
1999	57	58	2.7	2.3	32	21	1.5	0.8
2000	66	72	2.9	2.8	43	42	1.9	1.5
2001	88	62	3.8	2.4	34	36	1.5	1.3
2002	93	79	4.0	3.0	31	25	1.4	0.9
2003	73	62	3.1	2.3	37	28	1.6	1.1
2004	88	73	3.8	2.7	30	30	1.4	1.0
2005	80	83	3.4	3.0	36	31	1.6	1.0
2006	90	94	3.7	3.5	36	35	1.6	1.2
2007	91	82	3.7	2.9	37	30	1.5	0.9
2008	98	74	3.9	2.6	34	36	1.3	1.1
2009	92	74	3.5	2.6	55	38	2.2	1.3

Source: See footnotes for Table III-24.2.

Table III-24.2: Trends in incidence and mortality by gender using the Joinpoint Regression Program† with up to four joinpoints, Minnesota, 1988-2009, Soft Tissue Cancer

	Incidence				Mortality			
	Males		Females		Males		Females	
	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†
Interval 1	1988-2009	-0.2	1988-2009	1.0*	1988-2009	0.4	1988-2009	-1.0
AAPC(%)†	2005-2009	-0.2	2005-2009	1.0*	2005-2009	0.4	2005-2009	-1.0
	2000-2009	-0.2	2000-2009	1.0*	2000-2009	0.4	2000-2009	-1.0

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

† Joinpoint Regression version 3.5.2, National Cancer Institute. Annual age-adjusted rates 1988-2009 were analyzed to identify points in time where the trend significantly changed (joinpoints). The trend between joinpoints is the Annual Percent Change (APC) in the rate.

The Average Annual Percent Change (AAPC) is a summary measure of the APCs during the most recent five- and ten-year periods. If no joinpoints were identified, the AAPC is the same as the APC. If joinpoints were identified during the specified period, the AAPC is a weighted average of the APCs. Trends are not calculated if one or more years have no cases/deaths. See Appendix E for more information.

- Not applicable (sex-specific site), or not available (no unique cause of death code prior to 1999).

* The APC/AAPC is significantly different from zero ($p < 0.05$).

Soft Tissue Cancer

Table III-24.3: Number of new cases and deaths and average annual incidence and mortality rates by age and gender, Minnesota, 2005-2009, Soft Tissue Cancer

Age (Yr)	Incidence 2005-2009				Mortality 2005-2009			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
0-19	56	58	1.6	1.7	9	6	0.3	0.2
20-34	38	35	1.4	1.4	11	7	0.4	0.3
35-49	73	60	2.5	2.1	23	17	0.8	0.6
50-64	110	94	4.7	4.0	52	48	2.2	2.1
65-74	85	61	11.2	7.2	30	36	3.9	4.2
75-84	64	61	13.9	9.6	53	19	11.5	3.0
85+	25	38	16.5	10.7	20	37	13.2	10.4

Source: See footnotes for Table III-24.4.

Table III-24.4: Number of new cases and deaths and average annual incidence and mortality rates by race/ethnicity and gender, Minnesota, 2005-2009, Soft Tissue Cancer

Race/Ethnicity**	Incidence 2005-2009				Mortality 2005-2009			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
All Races Combined	451	407	3.6	2.9	198	170	1.7	1.1
American Indian								
Statewide	6	3	~	~	3	1	~	~
CHSDA**	3	0	~	~	3	0	~	~
Asian/PI	9	7	~	~	1	2	~	~
Black	21	17	4.2	5.0	5	12	~	4.5
Non-Hispanic White	408	365	3.6	2.9	189	154	1.7	1.1
Hispanic all races	2	8	~	~	0	2	~	~

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

** Persons reported with unknown or other race are included in all races combined, but are excluded from race-specific data unless they are Hispanic. Hispanic includes persons of any race, including unknown and other race. CHSDA includes counties in the Contract Health Services Delivery Area, as defined by the Indian Health Services. Refer to Chapter I for a discussion of CHSDA counties and for comments on the accuracy of race-specific rates.

- Not applicable; sex-specific site.

~ Race-specific rates based on fewer than 10 cases or deaths are not presented.

Table III-24.5: Median age at diagnosis/death, lifetime risk of diagnosis/death, and cancer prevalence, Minnesota, 2007-2009, Soft Tissue Cancer

	Males	Females
Median Age at Diagnosis (Yr)	57.0	54.0
Median Age at Death (Yr)	64.0	64.0
Lifetime Risk of Diagnosis (%)	0.4	0.3
Lifetime Risk of Death (%)	0.2	0.1
Complete prevalence†	940	860
Five-year prevalence‡	290	250

Source: MCSS December 2011 with Vintage 2009 population estimates. See Appendix E for prevalence calculations.

† Estimated Minnesotans ever diagnosed with this cancer and alive on 1/1/2009, rounded to the nearest 10.

‡ Estimated Minnesotans diagnosed with this cancer in the last five years and alive on 1/1/2009, rounded to the nearest 10.

- Not applicable; sex-specific site.

Table III-24.6: Distribution of cases and five-year relative survival by extent of disease at diagnosis, Soft Tissue Cancer

Stage at Diagnosis	Cases(%)†	Five-Year Survival(%)‡
All Stages	100.0	66.1
<i>In situ</i>	0.0	-
Localized	58.1	83.0
Regional	18.6	61.5
Distant	15.1	17.3
Unstaged	8.2	52.4

† Among Minnesota cases diagnosed 2007-2009.

‡ Among SEER18 cases diagnosed 2002-2008 followed into 2009 from *SEER Cancer Statistics Review, 1975-2009 (Vintage 2009 Populations)*. Survival for All Stages excludes *in situ* tumors.

- There were not enough intervals to produce the statistic.

Soft Tissue Cancer

Table III-24.7: Average annual incidence and mortality rates§ in the U.S. by race/ethnicity and gender, 2005-2009, Soft Tissue Cancer**

		Males	Females
Incidence	All Races Combined	3.9	2.8
	American Indian		
	Total	2.5	2.0
	CHSDA**	3.0	2.3
	Asian/PI	2.6	2.2
	Black	3.5	3.0
	Non-Hispanic White	4.2	2.8
Mortality	Hispanic all races	3.3	2.7
	All Races Combined	1.5	1.1
	American Indian		
	Total	0.9	0.7
	CHSDA**	1.2	1.0
	Asian/PI	1.0	0.8
	Black	1.5	1.4
Non-Hispanic White	1.6	1.1	
Hispanic all races	1.0	0.9	

Source: *SEER Cancer Statistics Review 1975-2009 (Vintage 2009 Populations)*. Incidence data are from the SEER 18 areas, which cover 26% of the US population. Mortality data are for the entire US.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

** See footnote for Table III-24.4.

~ See footnote for Table III-24.4.

Descriptive Epidemiology

Incidence and Mortality: Cancers of the soft tissues are malignant tumors that develop from mesenchymal tissues such as fat, muscle, nerve, joint, blood vessel, and deep skin tissues, and are predominantly sarcomas. About 50 percent of these tumors develop in the extremities. Soft tissue cancers are relatively uncommon. Over the five-year period 2005-2009, an average of 172 cancers of the soft tissues were diagnosed in Minnesota each year, and 74 deaths were caused by these cancers annually. The incidence and mortality rates of soft tissue sarcoma in Minnesota were similar to national rates.

Survival: In Minnesota, the majority (58%) of soft tissue cancers are diagnosed while the tumors are localized. Among persons diagnosed with soft tissue

cancers between 2002 and 2008 in the SEER 18 areas, five-year relative survival was 83 percent for localized disease.

Trends: Incidence and mortality rates of soft tissue sarcomas have been fairly stable since cancer reporting was implemented in Minnesota in 1988. The exception is incidence among females, which increased significantly by 1.0 percent per year over the 22 year period. National trends for this cancer were not reported by SEER.

Age: Compared to many other types of cancer, the incidence rate of soft tissue sarcoma increases only moderately with age. The majority of soft tissue sarcomas are diagnosed among persons less than 65 years of age. Approximately 13 percent are diagnosed among persons less than 20 years of age, and 48 percent between the ages of 20 and 64. Rhabdomyosarcoma is the most common type of soft tissue sarcoma in children.

Gender: Rates of soft tissue sarcomas were similar between males and females until age 65 years of age, when rates become about 50 percent higher among males than females.

Race: There are too few cases of soft tissue sarcomas among persons of color in Minnesota to assess racial disparities. National data indicate that both incidence and mortality rates are highest among non-Hispanic whites, followed closely by blacks.

Risk Factors

Ionizing radiation accounts for a small number, less than five percent, of soft tissue sarcomas. Research has linked occupational exposures of dioxin, phenoxyacetic acid, which is found in herbicides, and chlorophenols in wood preservatives to increased risk of disease, particularly angiosarcomas. Genetic conditions can lead to development of soft tissue sarcomas. Researchers have investigated the role of retroviruses in the development of sarcomas, particularly Kaposi's sarcoma which often occurs in AIDS patients, and found that immunosuppression increases disease risk.

Early Detection / Prevention

There are no direct measures currently available to detect soft tissue sarcomas early in development.

Stomach Cancer

Table III-25.1: Number of new cases and deaths and incidence and mortality rates by year and gender, Minnesota, 1988-2009, Stomach Cancer

Year	Incidence				Mortality			
	New Cases		Rate§		Deaths		Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
1988	204	121	12.0	5.0	143	100	8.7	4.1
1989	210	114	12.7	4.7	116	99	7.1	3.9
1990	176	110	10.2	4.4	120	85	7.2	3.4
1991	187	102	10.8	4.1	103	89	6.0	3.5
1992	226	125	12.9	5.0	141	82	7.9	3.1
1993	195	94	10.8	3.7	120	87	6.8	3.3
1994	205	116	11.3	4.4	130	82	7.4	3.0
1995	173	100	9.3	3.7	123	88	6.7	3.2
1996	195	98	10.2	3.6	115	77	6.3	2.8
1997	187	104	9.8	4.0	114	57	6.2	2.1
1998	189	104	9.6	3.9	91	76	4.8	2.7
1999	204	112	10.2	3.9	106	74	5.3	2.6
2000	156	118	7.8	4.3	97	73	4.9	2.5
2001	190	110	9.1	3.9	107	79	5.3	2.7
2002	181	109	8.6	3.8	95	75	4.6	2.5
2003	188	100	8.6	3.5	100	59	4.7	2.1
2004	178	107	8.0	3.7	114	81	5.3	2.6
2005	152	95	6.8	3.2	78	64	3.6	2.1
2006	172	97	7.4	3.4	85	51	3.8	1.7
2007	189	116	8.1	4.0	107	66	4.6	2.2
2008	168	105	7.0	3.4	105	51	4.4	1.6
2009	185	112	7.4	3.7	100	71	4.1	2.2

Source: See footnotes for Table III-25.2.

Table III-25.2: Trends in incidence and mortality by gender using the Joinpoint Regression Program† with up to four joinpoints, Minnesota, 1988-2009, Stomach Cancer

	Incidence				Mortality			
	Males		Females		Males		Females	
	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†
Interval 1	1988-2009	-2.6*	1988-2009	-1.4*	1988-2009	-3.4*	1988-2009	-3.3*
AAPC(%)†	2005-2009	-2.6*	2005-2009	-1.4*	2005-2009	-3.4*	2005-2009	-3.3*
	2000-2009	-2.6*	2000-2009	-1.4*	2000-2009	-3.4*	2000-2009	-3.3*

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

† Joinpoint Regression version 3.5.2, National Cancer Institute. Annual age-adjusted rates 1988-2009 were analyzed to identify points in time where the trend significantly changed (joinpoints). The trend between joinpoints is the Annual Percent Change (APC) in the rate.

The Average Annual Percent Change (AAPC) is a summary measure of the APCs during the most recent five- and ten-year periods. If no joinpoints were identified, the AAPC is the same as the APC. If joinpoints were identified during the specified period, the AAPC is a weighted average of the APCs. Trends are not calculated if one or more years have no cases/deaths. See Appendix E for more information.

- Not applicable (sex-specific site), or not available (no unique cause of death code prior to 1999).

* The APC/AAPC is significantly different from zero ($p < 0.05$).

Specific Cancers

Stomach Cancer

Table III-25.3: Number of new cases and deaths and average annual incidence and mortality rates by age and gender, Minnesota, 2005-2009, Stomach Cancer

Age (Yr)	Incidence 2005-2009				Mortality 2005-2009			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
0-19	0	1	0.0	0.0	0	0	0.0	0.0
20-34	8	15	0.3	0.6	4	7	0.2	0.3
35-49	71	46	2.4	1.6	40	25	1.4	0.9
50-64	239	112	10.3	4.8	113	49	4.9	2.1
65-74	219	108	28.8	12.7	99	53	13.0	6.2
75-84	231	149	50.2	23.4	138	92	30.0	14.5
85+	98	94	64.8	26.5	81	77	53.5	21.7

Source: See footnotes for Table III-25.4.

Table III-25.4: Number of new cases and deaths and average annual incidence and mortality rates by race/ethnicity and gender, Minnesota, 2005-2009, Stomach Cancer

Race/Ethnicity**	Incidence 2005-2009				Mortality 2005-2009			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
All Races Combined	866	525	7.3	3.5	475	303	4.1	2.0
American Indian								
Statewide	11	13	10.7	11.4	8	4	~	~
CHSDA**	7	6	~	~	6	4	~	~
Asian/PI	35	14	19.6	5.7	23	11	13.2	4.8
Black	37	21	13.3	6.4	25	10	11.2	2.4
Non-Hispanic White	755	453	6.8	3.2	407	272	3.7	1.8
Hispanic all races	21	16	14.8	7.3	10	6	8.4	~

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

** Persons reported with unknown or other race are included in all races combined, but are excluded from race-specific data unless they are Hispanic. Hispanic includes persons of any race, including unknown and other race. CHSDA includes counties in the Contract Health Services Delivery Area, as defined by the Indian Health Services. Refer to Chapter I for a discussion of CHSDA counties and for comments on the accuracy of race-specific rates.

- Not applicable; sex-specific site.

~ Race-specific rates based on fewer than 10 cases or deaths are not presented.

Table III-25.5: Median age at diagnosis/death, lifetime risk of diagnosis/death, and cancer prevalence, Minnesota, 2007-2009, Stomach Cancer

	Males	Females
Median Age at Diagnosis (Yr)	70.0	72.0
Median Age at Death (Yr)	72.0	77.5
Lifetime Risk of Diagnosis (%)	0.9	0.5
Lifetime Risk of Death (%)	0.5	0.3
Complete prevalence†	490	370
Five-year prevalence‡	260	170

Source: MCSS December 2011 with Vintage 2009 population estimates. See Appendix E for prevalence calculations.

† Estimated Minnesotans ever diagnosed with this cancer and alive on 1/1/2009, rounded to the nearest 10.

‡ Estimated Minnesotans diagnosed with this cancer in the last five years and alive on 1/1/2009, rounded to the nearest 10.

- Not applicable; sex-specific site.

Table III-25.6: Distribution of cases and five-year relative survival by extent of disease at diagnosis, Stomach Cancer

Stage at Diagnosis	Cases(%)†	Five-Year Survival(%)‡
All Stages	100.0	26.9
<i>In situ</i>	0.6	72.6
Localized	22.3	62.3
Regional	30.0	27.7
Distant	34.0	3.7
Unstaged	13.2	17.9

† Among Minnesota cases diagnosed 2007-2009.

‡ Among SEER18 cases diagnosed 2002-2008 followed into 2009 from *SEER Cancer Statistics Review, 1975-2009 (Vintage 2009 Populations)*. Survival for All Stages excludes *in situ* tumors.

- There were not enough intervals to produce the statistic.

Stomach Cancer

Table III-25.7: Average annual incidence and mortality rates§ in the U.S. by race/ethnicity and gender, 2005-2009, Stomach Cancer**

		Males	Females	
Incidence	All Races Combined	10.5	5.3	
	American Indian			
	Total	9.4	5.1	
	CHSDA**	13.6	7.3	
	Asian/PI	16.4	9.9	
	Black	17.0	8.7	
	Non-Hispanic White	8.5	3.7	
	Hispanic all races	14.4	8.5	
	Mortality	All Races Combined	5.0	2.6
		American Indian		
Total		5.5	2.7	
CHSDA**		8.3	3.8	
Asian/PI		9.0	5.3	
Black		10.3	4.8	
Non-Hispanic White		4.0	2.0	
Hispanic all races		7.4	4.3	

Source: *SEER Cancer Statistics Review 1975-2009 (Vintage 2009 Populations)*. Incidence data are from the SEER 18 areas, which cover 26% of the US population. Mortality data are for the entire US.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

** See footnote for Table III-25.4.

~ See footnote for Table III-25.4.

Descriptive Epidemiology

Incidence and Mortality: Over the five-year period 2005-2009, an average of 278 Minnesotans were diagnosed with stomach cancer each year, and 156 residents died of this disease annually. Among non-Hispanic whites, incidence and mortality rates for this cancer were 18 and 10 percent lower, respectively, in Minnesota than nationally.

Survival: Among stomach cancers diagnosed in the SEER 18 areas from 2002 to 2008, the five-year relative survival rate was 62 percent for localized tumors, 28 percent for regional tumors, and 4 percent for distant tumors. Most cases in Minnesota were diagnosed at the regional (30%) or distant (34%) stage.

Trends: Stomach cancer was the leading cause of cancer-related deaths in the U.S. in 1930. Since then, mortality has dropped to one-fifth that rate, and stomach cancer no longer ranks among the top ten causes of cancer deaths. Incidence and mortality rates in Minnesota have decreased steadily and significantly for each gender since cancer reporting was initiated in 1988. These are similar to national trends.

Age: Rates of stomach cancer increase steadily with age. In Minnesota, 65 percent of diagnoses and 70 percent of deaths occurred among persons age 65 years or older.

Gender: Stomach cancer rates were about two times higher among males than females.

Race: Both in Minnesota and nationally, non-Hispanic whites had the lowest rates of stomach cancer. The stomach cancer incidence rate was at least two times higher for each of the other race/ethnic groups. Too few deaths from stomach cancer occurred among people of color in Minnesota to calculate reliable mortality rates for every race/gender group. Nationally, blacks have the highest mortality rates from stomach cancer, followed closely by Asian/Pacific Islanders.

Risk Factors

There is very strong evidence that infection with *Helicobacter pylori*, a bacterium found in the stomach of two-thirds of the world's population, is responsible for a major portion of stomach cancers, especially those occurring in the lower (non-cardia) portion of the stomach. Because this bacterium is also the major cause of stomach ulcers, people with ulcers are at increased risk of stomach cancer. Stomach cancer is also associated with chronic active gastritis, gastric adenomatous polyps, smoking, diets low in fruits and vegetables and consumption of salted, smoked, or pickled foods. Individuals with a family history of stomach cancer are at greater risk of developing this cancer than those without a family history. The sharp decline in stomach cancer since the 1940s is thought to be associated with widespread use of refrigeration and freezing to preserve foods, rather than pickling, salting, and smoking. More information on this subject can be found on the NCI factsheet "Helicobacter pylori and Cancer" (<http://www.cancer.gov/cancertopics/factsheet/risk/h-pylori-cancer>).

Early Detection / Prevention

The CDC recommends that people with a history of or active stomach ulcers should be tested for *H. pylori*, and if positive, should be treated. Endoscopy is sometimes used to screen for stomach cancer. However, there is insufficient evidence to show that population-based screening or widespread treatment of *H. pylori* would result in a decrease in mortality from stomach cancer in a population such as the U.S., where the disease is relatively rare.

Specific Cancers

Testis Cancer

Table III-26.1: Number of new cases and deaths and incidence and mortality rates by year and gender, Minnesota, 1988-2009, Testis Cancer

Year	Incidence				Mortality			
	New Cases		Rate§		Deaths		Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
1988	123	-	5.3	-	10	-	0.5	-
1989	152	-	6.6	-	6	-	0.3	-
1990	115	-	4.9	-	6	-	0.3	-
1991	135	-	5.7	-	7	-	0.3	-
1992	141	-	6.0	-	5	-	0.2	-
1993	128	-	5.3	-	4	-	0.2	-
1994	151	-	6.2	-	3	-	0.1	-
1995	138	-	5.6	-	3	-	0.1	-
1996	150	-	6.1	-	6	-	0.3	-
1997	151	-	6.0	-	9	-	0.4	-
1998	156	-	6.3	-	6	-	0.3	-
1999	172	-	6.9	-	6	-	0.3	-
2000	218	-	8.7	-	7	-	0.3	-
2001	182	-	7.2	-	5	-	0.2	-
2002	181	-	7.1	-	7	-	0.3	-
2003	181	-	7.1	-	7	-	0.3	-
2004	171	-	6.7	-	5	-	0.2	-
2005	189	-	7.5	-	4	-	0.1	-
2006	146	-	5.7	-	4	-	0.2	-
2007	193	-	7.6	-	6	-	0.2	-
2008	165	-	6.4	-	2	-	0.1	-
2009	199	-	7.7	-	4	-	0.1	-

Source: See footnotes for Table III-26.2.

Table III-26.2: Trends in incidence and mortality by gender using the Joinpoint Regression Program† with up to four joinpoints, Minnesota, 1988-2009, Testis Cancer

	Incidence				Mortality			
	Males		Females		Males		Females	
	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†
Interval 1	1988-2009	1.4*	-	-	1988-1994	-18.1*	-	-
Interval 2			-	-	1994-1997	35.9	-	-
Interval 3			-	-	1997-2009	-7.2*	-	-
AAPC(%)†	2005-2009	1.4*	-	-	2005-2009	-7.2*	-	-
	2000-2009	1.4*	-	-	2000-2009	-7.2*	-	-

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

† Joinpoint Regression version 3.5.2, National Cancer Institute. Annual age-adjusted rates 1988-2009 were analyzed to identify points in time where the trend significantly changed (joinpoints). The trend between joinpoints is the Annual Percent Change (APC) in the rate.

The Average Annual Percent Change (AAPC) is a summary measure of the APCs during the most recent five- and ten-year periods. If no joinpoints were identified, the AAPC is the same as the APC. If joinpoints were identified during the specified period, the AAPC is a weighted average of the APCs. Trends are not calculated if one or more years have no cases/deaths. See Appendix E for more information.

- Not applicable (sex-specific site), or not available (no unique cause of death code prior to 1999).

* The APC/AAPC is significantly different from zero (p < 0.05).

Testis Cancer

Table III-26.3: Number of new cases and deaths and average annual incidence and mortality rates by age and gender, Minnesota, 2005-2009, Testis Cancer

Age (Yr)	Incidence 2005-2009				Mortality 2005-2009			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
0-19	50	-	1.4	-	0	-	0.0	-
20-34	443	-	16.5	-	6	-	0.2	-
35-49	297	-	10.2	-	2	-	0.1	-
50-64	76	-	3.3	-	7	-	0.3	-
65-74	18	-	2.4	-	4	-	0.5	-
75-84	6	-	1.3	-	0	-	0.0	-
85+	2	-	1.3	-	1	-	0.7	-

Source: See footnotes for Table III-26.4.

Table III-26.4: Number of new cases and deaths and average annual incidence and mortality rates by race/ethnicity and gender, Minnesota, 2005-2009, Testis Cancer

Race/Ethnicity**	Incidence 2005-2009				Mortality 2005-2009			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
All Races Combined	892	-	7.0	-	20	-	0.1	-
American Indian								
Statewide	11	-	5.2	-	0	-	~	-
CHSDA**	6	-	~	-	0	-	~	-
Asian/PI	3	-	~	-	0	-	~	-
Black	10	-	1.7	-	0	-	~	-
Non-Hispanic White	828	-	7.7	-	20	-	0.2	-
Hispanic all races	22	-	2.8	-	0	-	~	-

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

** Persons reported with unknown or other race are included in all races combined, but are excluded from race-specific data unless they are Hispanic. Hispanic includes persons of any race, including unknown and other race. CHSDA includes counties in the Contract Health Services Delivery Area, as defined by the Indian Health Services. Refer to Chapter I for a discussion of CHSDA counties and for comments on the accuracy of race-specific rates.

- Not applicable; sex-specific site.

~ Race-specific rates based on fewer than 10 cases or deaths are not presented.

Table III-26.5: Median age at diagnosis/death, lifetime risk of diagnosis/death, and cancer prevalence, Minnesota, 2007-2009, Testis Cancer

	Males	Females
Median Age at Diagnosis (Yr)	32.0	-
Median Age at Death (Yr)	51.5	-
Lifetime Risk of Diagnosis (%)	0.5	-
Lifetime Risk of Death (%)	0.0	-
Complete prevalence†	4,420	-
Five-year prevalence‡	820	-

Source: MCSS December 2011 with Vintage 2009 population estimates. See Appendix E for prevalence calculations.

† Estimated Minnesotans ever diagnosed with this cancer and alive on 1/1/2009, rounded to the nearest 10.

‡ Estimated Minnesotans diagnosed with this cancer in the last five years and alive on 1/1/2009, rounded to the nearest 10.

- Not applicable; sex-specific site.

Table III-26.6: Distribution of cases and five-year relative survival by extent of disease at diagnosis, Testis Cancer

Stage at Diagnosis	Cases(%)†	Five-Year Survival(%)‡
All Stages	100.0	95.2
<i>In situ</i>	0.4	100.0
Localized	66.9	99.0
Regional	20.0	95.8
Distant	11.1	72.5
Unstaged	1.6	83.1

† Among Minnesota cases diagnosed 2007-2009.

‡ Among SEER18 cases diagnosed 2002-2008 followed into 2009 from *SEER Cancer Statistics Review, 1975-2009 (Vintage 2009 Populations)*. Survival for All Stages excludes *in situ* tumors.

- There were not enough intervals to produce the statistic.

Testis Cancer

Table III-26.7: Average annual incidence and mortality rates§ in the U.S. by race/ethnicity and gender, 2005-2009, Testis Cancer**

		Males	Females
Incidence	All Races Combined	5.4	-
	American Indian		
	Total	3.2	-
	CHSDA**	4.5	-
	Asian/PI	2.0	-
	Black	1.3	-
Mortality	Non-Hispanic White	7.0	-
	Hispanic all races	4.5	-
	All Races Combined	0.2	-
	American Indian		
	Total	0.2	-
	CHSDA**	0.3	-
Mortality	Asian/PI	0.1	-
	Black	0.1	-
	Non-Hispanic White	0.3	-
	Hispanic all races	0.3	-

Source: SEER Cancer Statistics Review 1975-2009 (Vintage 2009 Populations). Incidence data are from the SEER 18 areas, which cover 26% of the US population. Mortality data are for the entire US.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

** See footnote for Table III-26.4.

~ See footnote for Table III-26.4.

Descriptive Epidemiology

Incidence and Mortality: Over the five-year period 2005-2009, an average of 178 Minnesota males were diagnosed with testicular cancer each year, and four deaths occurred annually from this disease. Incidence and mortality rates for testicular cancer among non-Hispanic whites are about the same in Minnesota as nationally.

Survival: Among cases of testicular cancer diagnosed in the SEER 18 areas from 2002 to 2008, the five-year relative survival for testicular cancer was quite high, even when it had already spread to other organs when

diagnosed. The majority (67%) of testicular cancers in Minnesota were diagnosed when still confined to the testis, when five-year survival was 99 percent.

Trends: From 1988 to 2009, the incidence rate of testicular cancer in Minnesota increased significantly by an average of 1.4 percent a year, while mortality decreased by seven percent annually. Nationally, incidence is increasing significantly at about the same rate as in Minnesota, while the mortality rate is declining significantly by about one percent a year.

Age: Testicular cancer is a disease of young men. From 2005 to 2009 in Minnesota, about 50 percent of males diagnosed with this cancer were between the ages of 20 and 34 years, and 88 percent were younger than 50 years of age. Mortality from this cancer was relatively rare.

Race: Too few cases of testicular cancer in Minnesota occurred among men of color to assess race/ethnic differences in risk. In the U.S., rates are highest among non-Hispanic whites and lowest among blacks.

Risk Factors

Cryptorchidism, or undescended testicle(s), is the main risk factor for testicular cancer, accounting for about 14 percent of cases. Personal or family history of testicular cancer and exposure to exogenous hormones *in utero* has been linked to increased risk of disease. Excesses of testicular cancer have been reported among men with certain occupations, including miners, leather or utility workers, and oil and gas workers. However, studies have not yet defined specific chemicals related to risk. Several studies have examined injury and vasectomy as risk factors for testicular cancer, but have not found an increased risk associated with these exposures.

Early Detection / Prevention

Testicular cancer can be found in the early stages of development, and most cancers are found through self-examination. The American Cancer Society recommends testicular examination at routine cancer-related checkups.

Thyroid Cancer

Table III-27.1: Number of new cases and deaths and incidence and mortality rates by year and gender, Minnesota, 1988-2009, Thyroid Cancer

Year	Incidence				Mortality			
	New Cases		Rate§		Deaths		Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
1988	55	158	2.9	7.1	5	11	0.3	0.4
1989	60	137	3.2	6.0	4	10	0.3	0.4
1990	66	155	3.3	6.7	9	12	0.6	0.5
1991	62	145	3.0	6.3	9	13	0.5	0.5
1992	70	179	3.6	7.7	8	11	0.5	0.4
1993	69	170	3.2	7.3	8	15	0.4	0.5
1994	65	179	3.1	7.7	9	14	0.5	0.6
1995	58	180	2.7	7.7	7	11	0.4	0.4
1996	66	200	3.0	8.2	6	17	0.3	0.6
1997	87	225	3.9	9.2	13	21	0.6	0.7
1998	84	231	3.6	9.5	4	9	0.2	0.3
1999	89	233	3.9	9.5	7	19	0.4	0.7
2000	93	241	4.0	9.7	12	10	0.6	0.4
2001	87	277	3.7	10.9	12	14	0.6	0.5
2002	109	275	4.5	10.9	2	8	0.1	0.3
2003	102	317	4.2	12.3	7	20	0.3	0.7
2004	115	361	4.6	13.9	5	16	0.2	0.6
2005	126	333	5.1	12.9	10	19	0.4	0.6
2006	138	408	5.5	15.7	11	18	0.4	0.6
2007	138	424	5.4	15.9	14	11	0.5	0.4
2008	189	464	7.3	17.4	12	18	0.5	0.6
2009	156	488	5.9	18.4	17	17	0.6	0.6

Source: See footnotes for Table III-27.2.

Table III-27.2: Trends in incidence and mortality by gender using the Joinpoint Regression Program† with up to four joinpoints, Minnesota, 1988-2009, Thyroid Cancer

	Incidence				Mortality			
	Males		Females		Males		Females	
	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†
Interval 1	1988-2009	4.0*	1988-2000	4.0*	1988-2009	1.0	1988-2009	0.8
Interval 2			2000-2009	7.2*				
AAPC(%)†	2005-2009	4.0*	2005-2009	7.2*	2005-2009	1.0	2005-2009	0.8
	2000-2009	4.0*	2000-2009	7.2*	2000-2009	1.0	2000-2009	0.8

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

† Joinpoint Regression version 3.5.2, National Cancer Institute. Annual age-adjusted rates 1988-2009 were analyzed to identify points in time where the trend significantly changed (joinpoints). The trend between joinpoints is the Annual Percent Change (APC) in the rate.

The Average Annual Percent Change (AAPC) is a summary measure of the APCs during the most recent five- and ten-year periods. If no joinpoints were identified, the AAPC is the same as the APC. If joinpoints were identified during the specified period, the AAPC is a weighted average of the APCs. Trends are not calculated if one or more years have no cases/deaths. See Appendix E for more information.

- Not applicable (sex-specific site), or not available (no unique cause of death code prior to 1999).

* The APC/AAPC is significantly different from zero ($p < 0.05$).

Specific Cancers

Thyroid Cancer

Table III-27.3: Number of new cases and deaths and average annual incidence and mortality rates by age and gender, Minnesota, 2005-2009, Thyroid Cancer

Age (Yr)	Incidence 2005-2009				Mortality 2005-2009			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
0-19	16	38	0.4	1.1	0	0	0.0	0.0
20-34	72	392	2.7	15.3	0	0	0.0	0.0
35-49	220	797	7.6	28.1	13	2	0.5	0.1
50-64	246	610	10.6	26.1	21	13	0.9	0.6
65-74	112	165	14.7	19.3	14	22	1.8	2.6
75-84	69	88	15.0	13.8	12	23	2.6	3.6
85+	12	27	7.9	7.6	4	23	2.6	6.5

Source: See footnotes for Table III-27.4.

Table III-27.4: Number of new cases and deaths and average annual incidence and mortality rates by race/ethnicity and gender, Minnesota, 2005-2009, Thyroid Cancer

Race/Ethnicity**	Incidence 2005-2009				Mortality 2005-2009			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
All Races Combined	747	2,117	5.8	16.1	64	83	0.5	0.5
American Indian								
Statewide	2	19	~	14.7	1	0	~	~
CHSDA**	1	7	~	~	0	0	~	~
Asian/PI	13	57	4.5	14.5	1	2	~	~
Black	15	29	2.9	5.6	0	3	~	~
Non-Hispanic White	691	1,906	5.9	16.2	60	78	0.5	0.5
Hispanic all races	12	52	3.0	14.4	1	0	~	~

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

** Persons reported with unknown or other race are included in all races combined, but are excluded from race-specific data unless they are Hispanic. Hispanic includes persons of any race, including unknown and other race. CHSDA includes counties in the Contract Health Services Delivery Area, as defined by the Indian Health Services. Refer to Chapter I for a discussion of CHSDA counties and for comments on the accuracy of race-specific rates.

- Not applicable; sex-specific site.

~ Race-specific rates based on fewer than 10 cases or deaths are not presented.

Table III-27.5: Median age at diagnosis/death, lifetime risk of diagnosis/death, and cancer prevalence, Minnesota, 2007-2009, Thyroid Cancer

	Males	Females
Median Age at Diagnosis (Yr)	53.0	47.0
Median Age at Death (Yr)	64.0	76.0
Lifetime Risk of Diagnosis (%)	0.5	1.4
Lifetime Risk of Death (%)	0.1	0.1
Complete prevalence†	1,740	5,530
Five-year prevalence‡	540	1,720

Source: MCSS December 2011 with Vintage 2009 population estimates. See Appendix E for prevalence calculations.

† Estimated Minnesotans ever diagnosed with this cancer and alive on 1/1/2009, rounded to the nearest 10.

‡ Estimated Minnesotans diagnosed with this cancer in the last five years and alive on 1/1/2009, rounded to the nearest 10.

- Not applicable; sex-specific site.

Table III-27.6: Distribution of cases and five-year relative survival by extent of disease at diagnosis, Thyroid Cancer

Stage at Diagnosis	Cases(%)†	Five-Year Survival(%)‡
All Stages	100.0	97.5
<i>In situ</i>	0.0	96.2
Localized	65.0	99.9
Regional	27.7	97.1
Distant	2.6	53.9
Unstaged	4.6	87.4

† Among Minnesota cases diagnosed 2007-2009.

‡ Among SEER18 cases diagnosed 2002-2008 followed into 2009 from *SEER Cancer Statistics Review, 1975-2009 (Vintage 2009 Populations)*. Survival for All Stages excludes *in situ* tumors.

- There were not enough intervals to produce the statistic.

Thyroid Cancer

Table III-27.7: Average annual incidence and mortality rates§ in the U.S. by race/ethnicity and gender, 2005-2009, Thyroid Cancer**

		Males	Females	
Incidence	All Races Combined	5.9	17.3	
	American Indian			
	Total	2.3	7.8	
	CHSDA**	3.2	10.9	
	Asian/PI	5.3	17.7	
	Black	3.3	10.1	
	Non-Hispanic White	6.7	18.9	
	Hispanic all races	4.2	16.0	
	Mortality	All Races Combined	0.5	0.5
		American Indian		
Total		0.3	0.3	
CHSDA**		0.5	0.4	
Asian/PI		0.5	0.8	
Black		0.4	0.6	
Non-Hispanic White		0.5	0.5	
Hispanic all races		0.5	0.6	

Source: *SEER Cancer Statistics Review 1975-2009 (Vintage 2009 Populations)*. Incidence data are from the SEER 18 areas, which cover 26% of the US population. Mortality data are for the entire US.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

** See footnote for Table III-27.4.

~ See footnote for Table III-27.4.

Descriptive Epidemiology

Incidence and Mortality: Thyroid cancer is the seventh most commonly diagnosed cancer among females, but does not rank among the top ten for males. Over the five-year period 2005-2009, an average of 573 Minnesotans were diagnosed with thyroid cancer each year, while 29 deaths from this cancer occurred annually. Incidence rates among non-Hispanic whites are about 15 percent lower in Minnesota than in the SEER 18 areas, while mortality is about the same as in the U.S. as a whole. In general, incidence rates reflect young women with papillary or follicular carcinomas, while mortality reflects elderly persons with undifferentiated carcinomas.

Survival: Five-year relative survival from thyroid cancer is quite high, even if diagnosed at advanced stages. About 93 percent of thyroid cancers in Minnesota were diagnosed at the localized or regional stage, when survival reported by the SEER Program was greater than 95 percent.

Trends: Thyroid cancer is one of the most rapidly increasing cancers, both in Minnesota and nationally, and the rate of increase may be increasing. From 2000

to 2009, the thyroid cancer incidence rate among females in Minnesota increased by 7.2 percent per year. Trends in the SEER Program are very similar. While the modest increases in thyroid cancer mortality in Minnesota are not statistically significant, this may be due to the relatively small number of deaths each year in the state. Nationally, the thyroid cancer mortality rate increased significantly by about one percent per year.

Age: Thyroid cancer incidence is highest among women 35-64 years of age. From 2005 to 2009, 87 percent of cases diagnosed in women in Minnesota were diagnosed among women less than 65 years of age, while 82 percent of deaths among women occurred among those 65 years of age or older.

Gender: Thyroid cancer is one of the few cancers that occur more often in women than men. Until age 65, rates among women are two to three times higher than those of men in the same age category.

Race: Although based on a relatively small number of cases among women of color, the incidence rate of female thyroid cancer in Minnesota was very similar among all race/ethnic groups except black women, whose risk was about half that of other women. There were too few deaths among persons of color in Minnesota to assess racial or ethnic disparities in thyroid cancer mortality. National data show a similar race/ethnic pattern as Minnesota.

Risk Factors

The increasing incidence of thyroid cancer is at least partially explained by the increased use of thyroid ultrasound, which can identify small thyroid nodules that might otherwise have gone undetected. Radiation exposure is a proven risk factor for thyroid cancer, particularly exposure during childhood. From 1940 to 1970, nasopharyngeal radium irradiation (NRI) was widely used to treat children with swollen lymphoid tissue. Several studies are examining adverse outcomes in children exposed to NRI, including cancer. To date, no consistent associations have been found, but the cohorts will be followed as they reach the ages when cancer becomes more common. Diets low in iodine, which is essential in thyroid gland regulation, can increase risk of developing thyroid cancer. Heritable conditions and family history of thyroid cancer also increase risk.

Early Detection / Prevention

The American Cancer Society recommends that persons ages 20 and over having periodic health exams should receive a cancer-related checkup, including a thyroid examination.

Urinary Bladder Cancer

Table III-28.1: Number of new cases and deaths and incidence and mortality rates by year and gender, Minnesota, 1988-2009, Urinary Bladder Cancer

Year	Incidence				Mortality			
	New Cases		Rate§		Deaths		Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
1988	605	221	35.5	9.4	130	68	8.4	2.7
1989	639	224	37.5	9.3	123	51	8.0	2.0
1990	617	239	35.8	9.9	97	56	6.0	2.1
1991	731	213	42.1	8.8	110	74	6.8	2.8
1992	682	269	38.3	11.0	132	60	7.9	2.1
1993	678	235	37.3	9.2	116	40	7.1	1.4
1994	673	241	36.6	9.5	132	62	7.8	2.2
1995	686	226	36.8	8.5	113	63	6.7	2.2
1996	662	274	34.9	10.6	159	60	9.0	2.2
1997	736	231	38.3	8.7	136	84	7.7	2.8
1998	753	268	38.5	10.0	133	63	7.3	2.0
1999	759	262	38.3	9.7	129	70	6.9	2.2
2000	753	255	37.3	9.5	146	63	7.8	2.0
2001	814	271	39.4	10.0	146	51	7.4	1.6
2002	841	295	39.9	10.3	164	77	8.5	2.6
2003	830	311	38.8	11.2	149	79	7.3	2.6
2004	926	304	43.1	10.8	155	61	7.7	2.0
2005	880	297	40.3	10.2	137	59	6.7	1.8
2006	910	272	40.5	9.2	148	62	7.0	1.9
2007	911	283	40.2	9.3	159	55	7.4	1.7
2008	945	284	40.1	9.3	172	66	7.8	1.9
2009	943	316	39.0	10.2	173	71	7.4	2.0

Source: See footnotes for Table III-28.2.

Table III-28.2: Trends in incidence and mortality by gender using the Joinpoint Regression Program† with up to four joinpoints, Minnesota, 1988-2009, Urinary Bladder Cancer

	Incidence				Mortality			
	Males		Females		Males		Females	
	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†	Years	APC(%)†
Interval 1	1988-2009	0.5*	1988-2009	0.2	1988-2009	-0.1	1988-2009	-0.9
AAPC(%)†	2005-2009	0.5*	2005-2009	0.2	2005-2009	-0.1	2005-2009	-0.9
	2000-2009	0.5*	2000-2009	0.2	2000-2009	-0.1	2000-2009	-0.9

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

† Joinpoint Regression version 3.5.2, National Cancer Institute. Annual age-adjusted rates 1988-2009 were analyzed to identify points in time where the trend significantly changed (joinpoints). The trend between joinpoints is the Annual Percent Change (APC) in the rate.

The Average Annual Percent Change (AAPC) is a summary measure of the APCs during the most recent five- and ten-year periods. If no joinpoints were identified, the AAPC is the same as the APC. If joinpoints were identified during the specified period, the AAPC is a weighted average of the APCs. Trends are not calculated if one or more years have no cases/deaths. See Appendix E for more information.

- Not applicable (sex-specific site), or not available (no unique cause of death code prior to 1999).

* The APC/AAPC is significantly different from zero ($p < 0.05$).

Urinary Bladder Cancer

Table III-28.3: Number of new cases and deaths and average annual incidence and mortality rates by age and gender, Minnesota, 2005-2009, Urinary Bladder Cancer

Age (Yr)	Incidence 2005-2009				Mortality 2005-2009			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
0-19	1	1	0.0	0.0	0	0	0.0	0.0
20-34	17	8	0.6	0.3	1	1	0.0	0.0
35-49	186	79	6.4	2.8	10	9	0.3	0.3
50-64	1,019	324	43.8	13.9	108	31	4.6	1.3
65-74	1,300	344	170.7	40.3	190	50	25.0	5.9
75-84	1,484	452	322.5	71.0	263	92	57.2	14.5
85+	582	244	384.7	68.7	217	130	143.4	36.6

Source: See footnotes for Table III-28.4.

Table III-28.4: Number of new cases and deaths and average annual incidence and mortality rates by race/ethnicity and gender, Minnesota, 2005-2009, Urinary Bladder Cancer

Race/Ethnicity**	Incidence 2005-2009				Mortality 2005-2009			
	Total Cases		Average Rate§		Total Deaths		Average Rate§	
	Males	Females	Males	Females	Males	Females	Males	Females
All Races Combined	4,589	1,452	40.0	9.6	789	313	7.2	1.9
American Indian								
Statewide	21	8	29.2	~	2	2	~	~
CHSDA**	14	6	34.6	~	1	2	~	~
Asian/PI	27	9	18.7	~	6	2	~	~
Black	58	14	28.4	7.0	9	8	~	~
Non-Hispanic White	4,405	1,399	40.3	9.7	768	299	7.3	1.9
Hispanic all races	29	5	24.3	~	3	1	~	~

Source: MCSS December 2011 (incidence) and Minnesota Center for Health Statistics (mortality), with Vintage 2009 population estimates. All analyses were conducted by MCSS. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

** Persons reported with unknown or other race are included in all races combined, but are excluded from race-specific data unless they are Hispanic. Hispanic includes persons of any race, including unknown and other race. CHSDA includes counties in the Contract Health Services Delivery Area, as defined by the Indian Health Services. Refer to Chapter I for a discussion of CHSDA counties and for comments on the accuracy of race-specific rates.

- Not applicable; sex-specific site.

~ Race-specific rates based on fewer than 10 cases or deaths are not presented.

Table III-28.5: Median age at diagnosis/death, lifetime risk of diagnosis/death, and cancer prevalence, Minnesota, 2007-2009, Urinary Bladder Cancer

	Males	Females
Median Age at Diagnosis (Yr)	73.0	73.0
Median Age at Death (Yr)	78.0	82.0
Lifetime Risk of Diagnosis (%)	4.5	1.3
Lifetime Risk of Death (%)	1.0	0.3
Complete prevalence†	7,420	2,570
Five-year prevalence‡	2,660	830

Source: MCSS December 2011 with Vintage 2009 population estimates. See Appendix E for prevalence calculations.

† Estimated Minnesotans ever diagnosed with this cancer and alive on 1/1/2009, rounded to the nearest 10.

‡ Estimated Minnesotans diagnosed with this cancer in the last five years and alive on 1/1/2009, rounded to the nearest 10.

- Not applicable; sex-specific site.

Table III-28.6: Distribution of cases and five-year relative survival by extent of disease at diagnosis, Urinary Bladder Cancer

Stage at Diagnosis	Cases(%)†	Five-Year Survival(%)‡
All Stages	100.0	77.7
<i>In situ</i>	56.4	96.4
Localized	29.1	70.2
Regional	7.7	32.9
Distant	3.8	5.5
Unstaged	3.0	48.8

† Among Minnesota cases diagnosed 2007-2009.

‡ Among SEER18 cases diagnosed 2002-2008 followed into 2009 from *SEER Cancer Statistics Review, 1975-2009 (Vintage 2009 Populations)*. Survival for All Stages excludes *in situ* tumors.

- There were not enough intervals to produce the statistic.

Urinary Bladder Cancer

Table III-28.7: Average annual incidence and mortality rates§ in the U.S. by race/ethnicity and gender, 2005-2009, Urinary Bladder Cancer**

		Males	Females
Incidence	All Races Combined	37.0	9.0
	American Indian		
	Total	11.7	2.5
	CHSDA**	14.8	3.2
	Asian/PI	16.2	4.0
	Black	21.2	7.1
	Non-Hispanic White	42.7	10.2
	Hispanic all races	19.6	5.3
Mortality	All Races Combined	7.7	2.2
	American Indian		
	Total	3.1	1.1
	CHSDA**	3.6	1.1
	Asian/PI	2.7	0.9
	Black	5.6	2.6
	Non-Hispanic White	8.3	2.3
	Hispanic all races	3.8	1.2

Source: *SEER Cancer Statistics Review 1975-2009 (Vintage 2009 Populations)*. Incidence data are from the SEER 18 areas, which cover 26% of the US population. Mortality data are for the entire US.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

** See footnote for Table III-28.4.

~ See footnote for Table III-28.4.

Descriptive Epidemiology

Incidence and Mortality: Over the five-year period 2005-2009, an average of 1,208 cases of bladder cancer were diagnosed in Minnesotans each year, and 220 deaths occurred annually from this cancer. It was the fourth most commonly diagnosed cancer among males, but was not in the ten leading cancers diagnosed among women. Among non-Hispanic whites, bladder cancer incidence and mortality rates are somewhat lower in Minnesota than nationally.

Survival: A substantial proportion (56%) of bladder cancers in Minnesota were diagnosed before they had become invasive, and were included in the above rates. Based on SEER data, five-year relative survival for *in situ* bladder cancer is 96 percent. Another 29 percent of bladder cancers in Minnesota were diagnosed when still confined to the bladder (localized stage), when survival is 70 percent.

Trends: The incidence rate of bladder cancer among males in Minnesota increased significantly by 0.5

percent a year from 1988 to 2009, while the mortality rate was stable. The increase in incidence was not reported among males in the SEER Program for all races combined or for whites, but mortality among males was stable nationally as well. The bladder cancer incidence and mortality rates among women in Minnesota were stable. In the SEER Program, both incidence and mortality decreased significantly among women.

Age: The urinary bladder cancer incidence rate increases sharply with age. About 75 percent of cancers are diagnosed and 85 percent of deaths occur among persons age 65 years or older.

Gender: Incidence and mortality rates of urinary bladder cancer are three to four times higher in men than women.

Race: Urinary bladder cancer rates are highest among non-Hispanic white males in Minnesota and lower among men in the other race/ethnic groups. There are too few deaths among persons of color in Minnesota to assess disparities in urinary bladder mortality. As in Minnesota, non-Hispanic white males in the SEER 18 areas had the highest incidence rate, and rates were similar among the other race/ethnic groups. Among American Indians, bladder cancer incidence was about two times higher in Minnesota than in the SEER Program.

Risk Factors

Cigarette smoking is a strongly established risk factor for bladder cancer. It accounts for 50 percent of cases among men and about 25 percent among women. Occupational exposures to cyclic chemicals, such as benzene derivatives and arylamines, are known to increase risk. Arsenic in drinking water has been linked to an increased risk for bladder cancer. Diets low in fruits and/or vegetables have also been linked to this disease. Chronic bladder inflammation, personal history of bladder cancer, and certain birth defects involving the bladder increase the risk of developing urinary bladder cancer.

Early Detection / Prevention

Screening for cancer of the urinary bladder in the general population is currently not recommended because research has not shown a clear benefit. The most effective way of preventing development of urinary bladder cancer or decreasing risk of disease is not to smoke.

**Chapter IV:
Cancer in Minnesota Counties and
Regions, 2005-2009**

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Chapter IV: Cancer in Minnesota Counties and Regions, 2005-2009

Introduction

This chapter contains a profile of cancer incidence for 2005-2009 for each county and each region in Minnesota. A precise definition of these cancers is given in Appendix A. The profile is presented for males and females separately. The “observed” number of cancers only includes those that were newly diagnosed in residents of the county during the five-year period, 2005-2009. The “expected” number of cancers was calculated by applying the 2005-2009 age- and sex-specific incidence rates for the entire state to the estimated five-year population of the county. Another way of stating this is that the expected number of cancers for a county is the number that would have been diagnosed if the incidence rates for the county and the state were identical. The county- and region-specific results represent nearly 5,000 different analyses. It is informative to quickly page through these data noting the large number of occasions in which fewer than five cancers were observed, and the extremely variable relationship between the observed and expected numbers. There are many combinations of observed and expected cancers

that are very similar, many combinations where the observed number appears larger than expected, and many others where the expected number appears larger than the observed. This variability is inherent in cancer incidence data for areas with smaller populations.

When at least ten cancers of a given type were diagnosed over the five-year period, the average annual age-adjusted incidence rate is also provided. Because of the year-to-year variability in the occurrence of cancer, which is especially noticeable in smaller populations, average annual rates that appear to be different between counties may actually be statistically indistinguishable.

The purpose of these data is to provide the reader with a description of cancer incidence in each county; to provide a quantitative indication about how many cancers, on average, would be expected to occur; and to reinforce the sense of natural variability of these data.

Table IV-1: Aiken County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	403	388.4	298	283.4	586.7	457.5
Brain††	4	4.1	0	2.9	~	~
Breast	1	0.9	101	85.9	~	139.8
Cervix Uteri	-	-	5	2.8	-	~
Colon and Rectum	42	35.0	29	29.6	63.2	40.2
Corpus and Uterus, NOS	-	-	16	19.8	-	25.4
Esophagus	9	6.4	0	1.7	~	~
Hodgkin Lymphoma	1	1.5	2	1.1	~	~
Kaposi Sarcoma	0	0.2	1	0.0	~	~
Kidney and Renal Pelvis	12	14.3	2	7.7	22.1	~
Larynx	5	4.2	2	0.9	~	~
Leukemia	11	13.4	12	7.4	13.3	28.8
Liver††	2	4.6	0	1.9	~	~
Lung and Bronchus	56	48.6	50	38.4	76.2	66.0
Melanoma of the Skin	15	17.3	10	10.7	22.6	13.6
Mesothelioma	4	1.5	0	0.4	~	~
Myeloma	5	5.4	2	3.3	~	~
Non-Hodgkin Lymphoma	15	17.8	18	13.0	28.3	29.6
Oral Cavity and Pharynx	22	10.8	1	4.9	37.2	~
Ovary	-	-	9	8.2	-	~
Pancreas	11	8.5	4	6.9	16.5	~
Prostate	135	136.0	-	-	177.4	-
Soft Tissues	6	2.1	1	1.6	~	~
Stomach	2	5.1	5	2.5	~	~
Testis	3	2.1	-	-	~	-
Thyroid	2	3.1	5	6.9	~	~
Urinary Bladder	30	28.3	9	7.4	43.3	~

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-2: Anoka County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	3,714	3,601.3	3,325	3,195.5	584.4	437.4
Brain††	62	57.5	40	41.5	8.0	5.0
Breast	7	8.5	967	1,027.0	~	120.2
Cervix Uteri	-	-	51	50.5	-	6.4
Colon and Rectum	345	320.4	316	285.3	58.8	43.9
Corpus and Uterus, NOS	-	-	205	222.5	-	25.5
Esophagus	67	58.9	9	15.2	10.5	~
Hodgkin Lymphoma	31	26.7	27	20.8	4.3	3.6
Kaposi Sarcoma	3	3.3	1	0.5	~	~
Kidney and Renal Pelvis	176	150.7	99	83.5	24.8	12.8
Larynx	53	39.9	13	9.6	7.6	1.8
Leukemia	122	127.7	81	80.7	21.7	11.5
Liver††	63	48.8	23	18.6	8.6	3.4
Lung and Bronchus	474	403.4	444	356.3	78.6	64.0
Melanoma of the Skin	179	185.4	168	169.4	26.4	20.4
Mesothelioma	14	11.0	7	3.4	2.6	~
Myeloma	55	46.9	32	31.3	9.6	4.6
Non-Hodgkin Lymphoma	184	173.0	143	132.2	30.9	19.6
Oral Cavity and Pharynx	105	117.7	65	55.6	15.8	8.8
Ovary	-	-	103	97.1	-	12.4
Pancreas	70	75.6	62	62.8	10.8	8.9
Prostate	1,140	1,185.2	-	-	170.4	-
Soft Tissues	25	25.8	21	22.5	3.5	2.7
Stomach	57	43.9	19	25.1	10.0	2.6
Testis	70	59.0	-	-	8.3	-
Thyroid	43	45.8	161	134.2	5.3	19.1
Urinary Bladder	235	221.5	88	67.7	44.5	12.8

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-3: Becker County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	580	536.3	404	443.7	604.2	386.4
Brain††	9	6.7	5	4.9	~	~
Breast	0	1.3	115	135.5	~	113.7
Cervix Uteri	-	-	7	5.1	-	~
Colon and Rectum	54	48.2	34	45.7	54.7	32.0
Corpus and Uterus, NOS	-	-	29	30.4	-	27.1
Esophagus	12	8.8	3	2.5	12.7	~
Hodgkin Lymphoma	2	2.7	2	2.1	~	~
Kaposi Sarcoma	0	0.3	0	0.1	~	~
Kidney and Renal Pelvis	19	20.7	13	11.8	19.7	11.1
Larynx	8	5.8	2	1.4	~	~
Leukemia	20	18.7	16	11.9	21.9	17.2
Liver††	7	6.8	1	2.8	~	~
Lung and Bronchus	74	64.7	47	56.1	75.4	41.0
Melanoma of the Skin	20	25.1	14	18.7	21.3	15.1
Mesothelioma	2	1.9	0	0.6	~	~
Myeloma	8	7.2	4	5.0	~	~
Non-Hodgkin Lymphoma	31	25.0	21	20.0	34.5	18.5
Oral Cavity and Pharynx	30	15.9	8	7.7	32.3	~
Ovary	-	-	16	13.0	-	14.8
Pancreas	10	11.5	13	10.3	10.2	10.8
Prostate	186	183.5	-	-	181.5	-
Soft Tissues	3	3.2	2	2.8	~	~
Stomach	10	6.8	4	3.9	11.9	~
Testis	4	4.8	-	-	~	-
Thyroid	5	5.1	12	13.0	~	14.2
Urinary Bladder	43	37.1	9	11.2	47.2	~

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-4: Beltrami County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	556	555.6	457	485.9	553.4	397.8
Brain††	9	7.8	4	5.9	~	~
Breast	1	1.3	140	147.9	~	120.6
Cervix Uteri	-	-	12	6.4	-	11.3
Colon and Rectum	49	49.8	51	48.4	50.3	42.4
Corpus and Uterus, NOS	-	-	35	32.7	-	31.6
Esophagus	11	9.0	5	2.6	11.1	~
Hodgkin Lymphoma	4	3.6	1	3.1	~	~
Kaposi Sarcoma	0	0.4	0	0.1	~	~
Kidney and Renal Pelvis	21	21.6	10	12.8	20.7	8.0
Larynx	7	6.0	1	1.5	~	~
Leukemia	14	20.0	8	13.2	14.8	~
Liver††	6	7.1	1	3.0	~	~
Lung and Bronchus	71	65.5	59	58.4	71.5	51.2
Melanoma of the Skin	18	26.7	12	23.1	18.9	12.1
Mesothelioma	1	1.9	0	0.6	~	~
Myeloma	6	7.4	6	5.3	~	~
Non-Hodgkin Lymphoma	17	26.3	14	21.5	17.0	12.2
Oral Cavity and Pharynx	26	16.7	12	8.4	25.1	10.9
Ovary	-	-	18	14.3	-	16.1
Pancreas	10	11.8	12	10.7	10.9	9.8
Prostate	213	185.5	-	-	205.5	-
Soft Tissues	4	3.7	1	3.4	~	~
Stomach	9	7.0	5	4.2	~	~
Testis	5	7.2	-	-	~	-
Thyroid	4	5.8	15	17.0	~	14.3
Urinary Bladder	26	37.6	4	11.7	28.6	~

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-5: Benton County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	465	435.3	409	394.7	588.7	437.2
Brain††	6	6.7	8	5.0	~	~
Breast	0	1.0	115	119.4	~	124.6
Cervix Uteri	-	-	6	6.0	-	~
Colon and Rectum	43	39.7	39	39.6	56.6	39.6
Corpus and Uterus, NOS	-	-	23	25.4	-	26.1
Esophagus	6	7.0	4	2.0	~	~
Hodgkin Lymphoma	3	3.3	4	2.8	~	~
Kaposi Sarcoma	0	0.4	0	0.1	~	~
Kidney and Renal Pelvis	31	17.3	12	10.1	38.8	11.8
Larynx	4	4.6	3	1.1	~	~
Leukemia	24	16.1	8	11.0	30.5	~
Liver††	2	5.7	3	2.4	~	~
Lung and Bronchus	49	49.7	55	44.6	65.7	61.4
Melanoma of the Skin	18	22.2	32	20.5	22.7	34.6
Mesothelioma	0	1.5	0	0.5	~	~
Myeloma	7	5.8	2	4.2	~	~
Non-Hodgkin Lymphoma	26	21.2	18	17.4	34.0	18.9
Oral Cavity and Pharynx	17	13.6	8	6.9	19.4	~
Ovary	-	-	6	11.5	-	~
Pancreas	11	9.2	10	8.5	13.4	10.9
Prostate	149	138.8	-	-	187.5	-
Soft Tissues	1	3.1	2	2.9	~	~
Stomach	2	5.6	8	3.5	~	~
Testis	7	7.6	-	-	~	-
Thyroid	6	5.2	13	15.7	~	14.2
Urinary Bladder	32	29.2	7	9.4	44.2	~

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-6: Big Stone County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	109	112.0	87	96.1	528.9	401.3
Brain††	1	1.2	0	0.9	~	~
Breast	0	0.3	27	28.2	~	114.2
Cervix Uteri	-	-	0	0.9	-	~
Colon and Rectum	16	10.6	10	11.0	75.1	31.4
Corpus and Uterus, NOS	-	-	8	6.2	-	~
Esophagus	3	1.8	0	0.6	~	~
Hodgkin Lymphoma	0	0.5	0	0.4	~	~
Kaposi Sarcoma	0	0.1	0	0.0	~	~
Kidney and Renal Pelvis	3	4.1	3	2.5	~	~
Larynx	0	1.2	0	0.3	~	~
Leukemia	5	4.1	4	2.7	~	~
Liver††	0	1.3	0	0.6	~	~
Lung and Bronchus	14	14.0	10	12.6	69.4	43.2
Melanoma of the Skin	4	5.1	1	3.6	~	~
Mesothelioma	1	0.5	0	0.1	~	~
Myeloma	1	1.6	1	1.2	~	~
Non-Hodgkin Lymphoma	6	5.4	4	4.6	~	~
Oral Cavity and Pharynx	6	3.2	0	1.7	~	~
Ovary	-	-	2	2.7	-	~
Pancreas	1	2.4	4	2.4	~	~
Prostate	38	36.9	-	-	180.9	-
Soft Tissues	1	0.6	1	0.6	~	~
Stomach	0	1.5	0	0.9	~	~
Testis	0	0.7	-	-	~	-
Thyroid	0	0.9	3	2.3	~	~
Urinary Bladder	5	8.7	2	2.7	~	~

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-7: Blue Earth County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	665	695.1	593	628.2	533.9	403.3
Brain††	9	10.2	5	7.5	~	~
Breast	3	1.6	175	186.6	~	120.9
Cervix Uteri	-	-	7	7.9	-	~
Colon and Rectum	55	63.3	74	65.8	44.1	45.9
Corpus and Uterus, NOS	-	-	44	40.6	-	30.5
Esophagus	7	11.2	4	3.4	~	~
Hodgkin Lymphoma	6	5.2	4	4.7	~	~
Kaposi Sarcoma	0	0.5	0	0.1	~	~
Kidney and Renal Pelvis	33	26.7	13	16.3	26.8	8.8
Larynx	5	7.4	4	1.8	~	~
Leukemia	19	25.5	14	17.8	14.5	9.7
Liver††	5	8.9	3	4.0	~	~
Lung and Bronchus	77	81.0	71	74.6	63.2	48.9
Melanoma of the Skin	46	34.3	32	30.0	37.2	21.7
Mesothelioma	2	2.4	0	0.8	~	~
Myeloma	12	9.3	10	7.0	10.0	7.4
Non-Hodgkin Lymphoma	30	33.6	30	28.6	24.0	18.1
Oral Cavity and Pharynx	15	21.2	8	11.1	11.4	~
Ovary	-	-	18	18.4	-	13.2
Pancreas	7	14.7	16	14.2	~	10.0
Prostate	215	224.3	-	-	173.5	-
Soft Tissues	4	4.9	5	4.4	~	~
Stomach	11	8.9	5	5.7	9.0	~
Testis	12	11.4	-	-	8.4	-
Thyroid	7	7.6	21	21.8	~	16.4
Urinary Bladder	48	47.8	6	15.8	39.2	~

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-8: Brown County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	419	445.8	378	372.7	529.2	419.1
Brain††	5	5.4	4	3.9	~	~
Breast	1	1.1	114	111.5	~	129.4
Cervix Uteri	-	-	8	4.1	-	~
Colon and Rectum	50	41.4	48	40.6	61.7	45.5
Corpus and Uterus, NOS	-	-	29	24.3	-	32.9
Esophagus	8	7.3	2	2.1	~	~
Hodgkin Lymphoma	4	2.3	3	1.7	~	~
Kaposi Sarcoma	0	0.3	0	0.1	~	~
Kidney and Renal Pelvis	20	16.7	8	9.8	25.7	~
Larynx	6	4.7	0	1.1	~	~
Leukemia	14	16.1	13	10.3	18.4	12.7
Liver††	3	5.6	1	2.4	~	~
Lung and Bronchus	47	54.4	36	47.1	59.1	38.6
Melanoma of the Skin	20	21.0	17	15.4	26.4	25.9
Mesothelioma	0	1.7	0	0.5	~	~
Myeloma	8	6.1	3	4.4	~	~
Non-Hodgkin Lymphoma	17	21.4	16	17.3	22.6	14.6
Oral Cavity and Pharynx	9	13.1	4	6.5	~	~
Ovary	-	-	10	10.7	-	10.9
Pancreas	16	9.6	5	8.9	19.4	~
Prostate	124	146.8	-	-	150.8	-
Soft Tissues	0	2.7	2	2.3	~	~
Stomach	6	6.0	0	3.5	~	~
Testis	8	3.9	-	-	~	-
Thyroid	4	4.2	13	10.4	~	15.3
Urinary Bladder	27	32.8	18	9.9	32.8	17.8

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-9: Carlton County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	547	508.4	393	440.4	586.6	364.6
Brain††	4	6.8	6	4.9	~	~
Breast	0	1.2	104	134.0	~	96.3
Cervix Uteri	-	-	2	5.3	-	~
Colon and Rectum	34	46.3	37	46.0	36.9	35.2
Corpus and Uterus, NOS	-	-	32	29.2	-	27.5
Esophagus	10	8.3	6	2.4	10.2	~
Hodgkin Lymphoma	2	2.9	0	2.2	~	~
Kaposi Sarcoma	0	0.4	0	0.1	~	~
Kidney and Renal Pelvis	20	19.9	13	11.6	21.7	13.1
Larynx	7	5.5	3	1.3	~	~
Leukemia	19	18.0	11	12.0	20.0	11.3
Liver††	4	6.5	2	2.8	~	~
Lung and Bronchus	82	60.3	57	54.2	87.7	51.2
Melanoma of the Skin	29	24.6	13	19.3	31.8	14.1
Mesothelioma	8	1.8	0	0.6	~	~
Myeloma	5	6.8	4	5.0	~	~
Non-Hodgkin Lymphoma	22	24.2	23	19.9	23.3	20.4
Oral Cavity and Pharynx	17	15.5	5	7.7	16.7	~
Ovary	-	-	12	12.8	-	11.6
Pancreas	11	10.9	14	10.1	11.4	12.6
Prostate	187	169.2	-	-	197.6	-
Soft Tissues	2	3.2	1	2.8	~	~
Stomach	5	6.5	4	4.0	~	~
Testis	5	5.7	-	-	~	-
Thyroid	9	5.3	5	13.7	~	~
Urinary Bladder	42	34.9	7	11.1	47.8	~

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-10: Carver County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	850	883.5	740	807.1	538.0	380.1
Brain††	22	14.9	17	10.7	10.7	7.4
Breast	0	2.1	253	259.3	~	125.6
Cervix Uteri	-	-	11	13.3	-	5.2
Colon and Rectum	66	80.3	61	73.8	44.7	34.0
Corpus and Uterus, NOS	-	-	47	53.8	-	25.4
Esophagus	7	14.5	1	3.8	~	~
Hodgkin Lymphoma	5	6.9	4	5.3	~	~
Kaposi Sarcoma	2	0.9	0	0.1	~	~
Kidney and Renal Pelvis	36	37.4	12	20.7	19.8	5.8
Larynx	11	9.7	1	2.3	7.6	~
Leukemia	29	32.4	28	21.1	19.1	14.8
Liver††	8	12.1	3	4.6	~	~
Lung and Bronchus	90	97.8	75	86.2	66.0	42.1
Melanoma of the Skin	49	46.9	49	44.0	27.3	22.1
Mesothelioma	0	2.7	0	0.9	~	~
Myeloma	9	11.6	6	7.8	~	~
Non-Hodgkin Lymphoma	36	43.6	24	33.6	20.5	11.5
Oral Cavity and Pharynx	30	29.6	15	14.1	17.3	8.1
Ovary	-	-	26	24.2	-	13.0
Pancreas	21	18.5	19	15.6	12.7	11.0
Prostate	316	280.0	-	-	200.5	-
Soft Tissues	5	6.7	2	5.9	~	~
Stomach	13	11.0	6	6.5	8.3	~
Testis	12	15.3	-	-	5.5	-
Thyroid	13	11.9	26	35.3	6.7	12.4
Urinary Bladder	33	55.2	17	17.2	25.5	9.3

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-11: Cass County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	627	568.8	437	421.1	604.2	437.2
Brain††	9	6.7	11	4.6	~	14.0
Breast	0	1.3	113	130.7	~	107.3
Cervix Uteri	-	-	7	4.7	-	~
Colon and Rectum	52	50.4	59	41.4	50.0	61.8
Corpus and Uterus, NOS	-	-	25	30.1	-	22.5
Esophagus	14	9.3	0	2.4	14.4	~
Hodgkin Lymphoma	3	2.6	4	1.9	~	~
Kaposi Sarcoma	0	0.3	0	0.1	~	~
Kidney and Renal Pelvis	29	21.8	19	11.4	28.3	18.6
Larynx	11	6.3	1	1.4	12.3	~
Leukemia	21	19.3	7	10.8	20.2	~
Liver††	9	7.0	3	2.7	~	~
Lung and Bronchus	88	69.3	71	54.7	85.6	65.7
Melanoma of the Skin	24	25.8	19	17.5	24.4	19.8
Mesothelioma	2	2.1	1	0.5	~	~
Myeloma	6	7.7	4	4.7	~	~
Non-Hodgkin Lymphoma	28	25.9	21	18.6	29.7	19.5
Oral Cavity and Pharynx	12	16.4	8	7.3	11.9	~
Ovary	-	-	15	12.5	-	14.4
Pancreas	17	12.3	7	9.7	16.9	~
Prostate	227	201.0	-	-	198.7	-
Soft Tissues	3	3.2	1	2.6	~	~
Stomach	5	7.2	4	3.5	~	~
Testis	3	4.0	-	-	~	-
Thyroid	3	5.1	8	12.2	~	~
Urinary Bladder	41	39.0	7	10.3	44.0	~

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-12: Chippewa County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	229	212.8	197	193.6	601.9	431.5
Brain††	3	2.6	3	2.0	~	~
Breast	1	0.5	56	57.2	~	124.3
Cervix Uteri	-	-	3	2.0	-	~
Colon and Rectum	32	19.9	34	21.9	83.6	64.2
Corpus and Uterus, NOS	-	-	18	12.4	-	36.4
Esophagus	3	3.5	1	1.1	~	~
Hodgkin Lymphoma	1	1.1	1	0.8	~	~
Kaposi Sarcoma	1	0.1	0	0.0	~	~
Kidney and Renal Pelvis	6	8.0	5	5.1	~	~
Larynx	4	2.3	0	0.6	~	~
Leukemia	8	7.7	11	5.5	~	25.2
Liver††	0	2.7	0	1.3	~	~
Lung and Bronchus	23	25.9	15	24.4	58.1	34.5
Melanoma of the Skin	11	10.1	2	7.7	29.9	~
Mesothelioma	0	0.8	0	0.3	~	~
Myeloma	3	2.9	3	2.3	~	~
Non-Hodgkin Lymphoma	11	10.2	8	9.2	27.8	~
Oral Cavity and Pharynx	5	6.3	1	3.4	~	~
Ovary	-	-	4	5.5	-	~
Pancreas	2	4.6	2	4.7	~	~
Prostate	83	69.8	-	-	217.2	-
Soft Tissues	1	1.3	2	1.2	~	~
Stomach	1	2.9	4	1.9	~	~
Testis	0	1.8	-	-	~	-
Thyroid	2	2.0	5	5.1	~	~
Urinary Bladder	21	15.7	5	5.3	52.8	~

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-13: Chisago County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	647	602.5	514	497.9	589.0	429.6
Brain††	5	9.2	7	6.3	~	~
Breast	1	1.4	177	157.6	~	143.8
Cervix Uteri	-	-	7	7.5	-	~
Colon and Rectum	55	54.5	54	46.6	52.0	46.0
Corpus and Uterus, NOS	-	-	24	33.6	-	19.6
Esophagus	12	9.8	2	2.5	9.7	~
Hodgkin Lymphoma	1	4.2	1	3.0	~	~
Kaposi Sarcoma	0	0.5	0	0.1	~	~
Kidney and Renal Pelvis	23	24.5	14	13.0	19.6	12.1
Larynx	7	6.5	2	1.5	~	~
Leukemia	17	21.8	10	13.0	16.4	8.4
Liver††	3	7.9	4	3.0	~	~
Lung and Bronchus	89	69.0	71	57.2	86.9	62.1
Melanoma of the Skin	17	30.5	17	25.3	13.7	13.8
Mesothelioma	2	2.0	1	0.6	~	~
Myeloma	9	8.0	7	5.1	~	~
Non-Hodgkin Lymphoma	33	29.2	26	21.1	29.1	22.2
Oral Cavity and Pharynx	19	19.1	9	8.6	15.9	~
Ovary	-	-	12	14.8	-	10.5
Pancreas	18	12.8	6	10.2	15.3	~
Prostate	247	196.3	-	-	219.6	-
Soft Tissues	4	4.2	3	3.5	~	~
Stomach	10	7.6	4	4.1	9.2	~
Testis	9	8.9	-	-	~	-
Thyroid	7	7.2	15	19.7	~	11.6
Urinary Bladder	35	39.4	11	11.1	35.9	10.0

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-14: Clay County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	604	679.9	575	610.9	490.0	400.7
Brain††	7	9.6	3	7.2	~	~
Breast	3	1.6	158	182.9	~	113.2
Cervix Uteri	-	-	8	7.7	-	~
Colon and Rectum	54	62.6	65	63.9	42.6	41.8
Corpus and Uterus, NOS	-	-	36	39.4	-	25.4
Esophagus	15	11.1	3	3.3	12.2	~
Hodgkin Lymphoma	3	4.5	3	4.2	~	~
Kaposi Sarcoma	0	0.5	0	0.1	~	~
Kidney and Renal Pelvis	22	26.1	21	15.9	18.1	13.7
Larynx	4	7.2	3	1.8	~	~
Leukemia	31	25.0	23	17.2	26.2	16.0
Liver††	11	8.7	2	3.9	8.4	~
Lung and Bronchus	66	80.3	58	73.0	55.0	39.6
Melanoma of the Skin	25	33.3	32	28.6	19.2	24.5
Mesothelioma	3	2.4	3	0.8	~	~
Myeloma	14	9.2	9	6.8	11.7	~
Non-Hodgkin Lymphoma	19	32.9	27	27.8	15.1	18.1
Oral Cavity and Pharynx	24	20.6	7	10.7	19.7	~
Ovary	-	-	18	17.8	-	13.3
Pancreas	19	14.5	9	13.8	15.6	~
Prostate	185	219.9	-	-	148.7	-
Soft Tissues	2	4.6	4	4.2	~	~
Stomach	5	8.9	3	5.5	~	~
Testis	14	9.0	-	-	10.8	-
Thyroid	4	7.2	27	20.9	~	22.3
Urinary Bladder	48	47.9	19	15.3	40.1	11.6

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-15: Clearwater County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	137	147.8	109	116.5	507.9	388.2
Brain††	2	1.8	0	1.3	~	~
Breast	1	0.4	34	35.0	~	113.6
Cervix Uteri	-	-	5	1.3	-	~
Colon and Rectum	10	13.6	19	12.5	35.3	61.9
Corpus and Uterus, NOS	-	-	5	7.7	-	~
Esophagus	3	2.4	0	0.7	~	~
Hodgkin Lymphoma	1	0.7	0	0.5	~	~
Kaposi Sarcoma	0	0.1	0	0.0	~	~
Kidney and Renal Pelvis	5	5.5	2	3.1	~	~
Larynx	2	1.6	0	0.4	~	~
Leukemia	5	5.3	2	3.2	~	~
Liver††	2	1.8	2	0.8	~	~
Lung and Bronchus	25	18.0	11	14.7	93.2	35.9
Melanoma of the Skin	1	6.9	5	4.8	~	~
Mesothelioma	1	0.6	0	0.2	~	~
Myeloma	3	2.0	0	1.3	~	~
Non-Hodgkin Lymphoma	9	7.0	7	5.4	~	~
Oral Cavity and Pharynx	4	4.3	1	2.0	~	~
Ovary	-	-	2	3.4	-	~
Pancreas	1	3.2	4	2.8	~	~
Prostate	46	49.6	-	-	167.2	-
Soft Tissues	1	0.9	0	0.7	~	~
Stomach	1	2.0	1	1.1	~	~
Testis	0	1.2	-	-	~	-
Thyroid	1	1.3	1	3.3	~	~
Urinary Bladder	9	10.8	2	3.0	~	~

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-16: Cook County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	99	110.6	78	85.6	506.8	393.4
Brain††	2	1.3	1	0.9	~	~
Breast	0	0.3	24	26.9	~	111.0
Cervix Uteri	-	-	2	1.0	-	~
Colon and Rectum	13	9.9	5	8.5	65.0	~
Corpus and Uterus, NOS	-	-	5	6.2	-	~
Esophagus	1	1.8	0	0.5	~	~
Hodgkin Lymphoma	0	0.5	2	0.4	~	~
Kaposi Sarcoma	0	0.1	0	0.0	~	~
Kidney and Renal Pelvis	4	4.3	3	2.3	~	~
Larynx	2	1.2	0	0.3	~	~
Leukemia	5	3.8	1	2.1	~	~
Liver††	0	1.4	2	0.5	~	~
Lung and Bronchus	8	13.3	9	10.8	~	~
Melanoma of the Skin	1	5.1	5	3.6	~	~
Mesothelioma	0	0.4	0	0.1	~	~
Myeloma	2	1.5	1	0.9	~	~
Non-Hodgkin Lymphoma	6	5.1	5	3.8	~	~
Oral Cavity and Pharynx	0	3.3	1	1.5	~	~
Ovary	-	-	1	2.6	-	~
Pancreas	6	2.4	4	1.9	~	~
Prostate	37	38.8	-	-	172.0	-
Soft Tissues	0	0.6	0	0.5	~	~
Stomach	0	1.4	0	0.7	~	~
Testis	1	0.8	-	-	~	-
Thyroid	1	1.0	2	2.5	~	~
Urinary Bladder	7	7.5	0	2.1	~	~

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-17: Cottonwood County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	204	206.9	158	179.9	546.5	369.4
Brain††	5	2.4	0	1.8	~	~
Breast	0	0.5	49	52.9	~	113.4
Cervix Uteri	-	-	0	1.8	-	~
Colon and Rectum	30	19.5	19	20.6	77.3	37.0
Corpus and Uterus, NOS	-	-	14	11.5	-	35.7
Esophagus	5	3.4	2	1.1	~	~
Hodgkin Lymphoma	0	1.0	0	0.7	~	~
Kaposi Sarcoma	0	0.1	0	0.0	~	~
Kidney and Renal Pelvis	11	7.6	4	4.7	29.3	~
Larynx	1	2.2	0	0.5	~	~
Leukemia	8	7.6	5	5.2	~	~
Liver††	5	2.6	2	1.2	~	~
Lung and Bronchus	26	25.4	16	22.8	69.3	40.1
Melanoma of the Skin	11	9.7	6	7.0	31.5	~
Mesothelioma	0	0.8	0	0.3	~	~
Myeloma	0	2.9	0	2.2	~	~
Non-Hodgkin Lymphoma	3	10.0	6	8.6	~	~
Oral Cavity and Pharynx	4	6.0	3	3.2	~	~
Ovary	-	-	6	5.1	-	~
Pancreas	5	4.5	4	4.5	~	~
Prostate	55	67.6	-	-	144.5	-
Soft Tissues	0	1.2	2	1.1	~	~
Stomach	4	2.8	3	1.8	~	~
Testis	2	1.6	-	-	~	-
Thyroid	1	1.8	2	4.6	~	~
Urinary Bladder	20	15.7	2	5.0	50.3	~

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-18: Crow Wing County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	1,097	1,061.2	831	866.5	570.4	401.3
Brain††	15	12.9	8	9.6	9.0	~
Breast	5	2.6	242	262.6	~	115.4
Cervix Uteri	-	-	8	10.0	-	~
Colon and Rectum	86	96.2	80	89.4	44.2	36.1
Corpus and Uterus, NOS	-	-	55	58.7	-	25.9
Esophagus	24	17.3	6	4.8	12.6	~
Hodgkin Lymphoma	3	5.4	1	4.3	~	~
Kaposi Sarcoma	0	0.6	0	0.1	~	~
Kidney and Renal Pelvis	40	40.2	27	23.1	21.5	13.2
Larynx	15	11.4	3	2.7	7.7	~
Leukemia	33	37.4	19	23.2	18.1	9.5
Liver††	11	13.1	5	5.5	5.7	~
Lung and Bronchus	140	129.6	124	110.6	71.9	55.3
Melanoma of the Skin	35	49.3	41	37.0	19.5	24.9
Mesothelioma	5	4.0	2	1.1	~	~
Myeloma	8	14.5	6	9.9	~	~
Non-Hodgkin Lymphoma	47	49.8	37	39.2	25.3	17.3
Oral Cavity and Pharynx	35	30.8	12	15.0	18.3	7.2
Ovary	-	-	19	25.2	-	9.3
Pancreas	21	22.9	22	20.2	10.9	9.5
Prostate	392	359.7	-	-	194.7	-
Soft Tissues	5	6.3	6	5.5	~	~
Stomach	17	13.8	3	7.7	9.2	~
Testis	12	9.5	-	-	9.5	-
Thyroid	12	9.9	29	25.7	6.6	17.3
Urinary Bladder	78	75.6	24	21.9	40.7	10.5

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-19: Dakota County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	4,164	4,164.3	4,120	3,827.3	569.8	450.6
Brain††	49	66.8	45	49.9	5.5	4.6
Breast	12	9.9	1,386	1,230.1	1.6	144.2
Cervix Uteri	-	-	55	61.0	-	5.5
Colon and Rectum	364	373.0	397	343.6	50.0	46.6
Corpus and Uterus, NOS	-	-	293	265.1	-	30.6
Esophagus	60	68.3	21	18.1	9.4	2.7
Hodgkin Lymphoma	36	31.0	19	25.3	4.2	2.1
Kaposi Sarcoma	3	3.8	0	0.6	~	~
Kidney and Renal Pelvis	176	174.0	96	99.5	22.4	10.9
Larynx	48	46.0	9	11.3	6.5	~
Leukemia	162	149.2	116	97.5	22.9	12.9
Liver††	57	56.9	27	22.2	7.1	2.8
Lung and Bronchus	465	465.7	455	420.1	69.1	54.7
Melanoma of the Skin	202	215.2	195	204.8	26.3	20.2
Mesothelioma	15	12.8	12	4.1	2.7	1.4
Myeloma	51	54.3	40	37.4	7.8	4.7
Non-Hodgkin Lymphoma	214	201.1	180	158.5	30.1	20.0
Oral Cavity and Pharynx	152	136.7	64	66.8	18.3	6.7
Ovary	-	-	115	116.4	-	12.7
Pancreas	72	87.4	85	74.8	10.4	10.1
Prostate	1,363	1,359.3	-	-	182.3	-
Soft Tissues	31	30.1	32	27.2	3.5	3.3
Stomach	49	51.1	33	30.3	7.4	4.0
Testis	69	68.2	-	-	7.1	-
Thyroid	60	53.0	162	162.4	6.3	16.1
Urinary Bladder	266	258.3	63	81.2	41.1	7.8

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-20: Dodge County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	259	247.5	221	211.3	579.9	437.8
Brain††	3	3.5	0	2.6	~	~
Breast	0	0.6	72	65.2	~	142.2
Cervix Uteri	-	-	4	2.9	-	~
Colon and Rectum	23	22.8	20	21.1	52.3	39.5
Corpus and Uterus, NOS	-	-	12	13.9	-	24.0
Esophagus	3	4.1	0	1.1	~	~
Hodgkin Lymphoma	3	1.6	3	1.2	~	~
Kaposi Sarcoma	0	0.2	0	0.0	~	~
Kidney and Renal Pelvis	12	9.8	5	5.5	25.7	~
Larynx	3	2.6	0	0.6	~	~
Leukemia	8	9.1	7	5.8	~	~
Liver††	4	3.2	3	1.3	~	~
Lung and Bronchus	40	28.9	18	24.7	88.4	36.7
Melanoma of the Skin	18	12.3	18	10.2	39.8	39.4
Mesothelioma	1	0.9	0	0.3	~	~
Myeloma	2	3.3	2	2.3	~	~
Non-Hodgkin Lymphoma	11	12.0	9	9.3	23.9	~
Oral Cavity and Pharynx	12	7.7	4	3.7	25.7	~
Ovary	-	-	6	6.2	-	~
Pancreas	4	5.3	3	4.6	~	~
Prostate	76	80.0	-	-	174.9	-
Soft Tissues	0	1.7	3	1.5	~	~
Stomach	0	3.2	1	1.8	~	~
Testis	5	3.2	-	-	~	-
Thyroid	7	2.8	10	7.6	~	21.4
Urinary Bladder	15	17.1	11	5.0	33.7	20.4

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-21: Douglas County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	639	632.8	483	526.3	566.8	373.8
Brain††	15	7.6	5	5.6	13.8	~
Breast	3	1.5	148	157.3	~	119.3
Cervix Uteri	-	-	7	5.8	-	~
Colon and Rectum	73	57.9	52	56.5	64.9	35.3
Corpus and Uterus, NOS	-	-	37	34.9	-	27.9
Esophagus	7	10.3	2	3.0	~	~
Hodgkin Lymphoma	3	3.2	2	2.5	~	~
Kaposi Sarcoma	0	0.4	0	0.1	~	~
Kidney and Renal Pelvis	25	23.7	7	14.0	22.9	~
Larynx	4	6.7	0	1.6	~	~
Leukemia	19	22.5	16	14.4	19.3	10.9
Liver††	8	7.8	2	3.4	~	~
Lung and Bronchus	69	77.1	57	67.4	60.6	40.2
Melanoma of the Skin	39	29.5	25	21.9	36.4	23.4
Mesothelioma	2	2.4	0	0.7	~	~
Myeloma	11	8.6	10	6.2	9.1	7.5
Non-Hodgkin Lymphoma	38	29.9	22	24.3	35.4	15.5
Oral Cavity and Pharynx	17	18.3	6	9.1	15.0	~
Ovary	-	-	18	15.1	-	15.1
Pancreas	10	13.7	5	12.6	7.9	~
Prostate	198	212.9	-	-	167.4	-
Soft Tissues	2	3.7	1	3.3	~	~
Stomach	6	8.3	5	4.8	~	~
Testis	5	5.8	-	-	~	-
Thyroid	2	5.8	4	14.8	~	~
Urinary Bladder	55	45.7	12	13.8	47.4	8.0

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-22: Faribault County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	288	284.0	267	246.5	566.2	452.2
Brain††	4	3.3	4	2.4	~	~
Breast	0	0.7	78	72.3	~	126.2
Cervix Uteri	-	-	4	2.4	-	~
Colon and Rectum	23	26.6	50	28.2	45.6	69.6
Corpus and Uterus, NOS	-	-	13	15.8	-	23.9
Esophagus	5	4.7	1	1.5	~	~
Hodgkin Lymphoma	2	1.3	1	1.0	~	~
Kaposi Sarcoma	0	0.2	0	0.0	~	~
Kidney and Renal Pelvis	10	10.5	8	6.5	20.4	~
Larynx	3	3.0	1	0.7	~	~
Leukemia	12	10.3	4	7.0	26.1	~
Liver††	3	3.5	2	1.6	~	~
Lung and Bronchus	32	35.1	28	31.8	59.9	39.7
Melanoma of the Skin	19	13.3	11	9.5	44.5	29.2
Mesothelioma	0	1.1	1	0.4	~	~
Myeloma	3	3.9	1	3.0	~	~
Non-Hodgkin Lymphoma	16	13.6	5	11.8	32.1	~
Oral Cavity and Pharynx	9	8.2	3	4.3	~	~
Ovary	-	-	9	6.9	-	~
Pancreas	7	6.2	7	6.2	~	~
Prostate	105	93.5	-	-	199.4	-
Soft Tissues	3	1.7	5	1.5	~	~
Stomach	1	3.8	2	2.4	~	~
Testis	1	2.1	-	-	~	-
Thyroid	3	2.5	5	6.1	~	~
Urinary Bladder	11	21.4	9	6.9	22.3	~

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-23: Fillmore County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	380	364.5	291	306.7	581.7	397.5
Brain††	4	4.4	4	3.2	~	~
Breast	0	0.9	93	91.4	~	128.5
Cervix Uteri	-	-	5	3.3	-	~
Colon and Rectum	46	33.8	36	33.8	67.9	42.7
Corpus and Uterus, NOS	-	-	18	20.0	-	25.1
Esophagus	4	6.0	1	1.7	~	~
Hodgkin Lymphoma	3	1.8	2	1.4	~	~
Kaposi Sarcoma	0	0.2	0	0.1	~	~
Kidney and Renal Pelvis	13	13.7	12	8.1	22.8	15.2
Larynx	2	3.9	0	0.9	~	~
Leukemia	12	13.2	10	8.6	17.8	13.0
Liver††	5	4.5	2	2.0	~	~
Lung and Bronchus	40	44.5	24	38.5	59.5	32.1
Melanoma of the Skin	19	17.2	11	12.5	29.8	20.3
Mesothelioma	0	1.4	1	0.4	~	~
Myeloma	7	5.0	6	3.6	~	~
Non-Hodgkin Lymphoma	24	17.4	13	14.3	37.5	17.6
Oral Cavity and Pharynx	11	10.7	4	5.4	16.6	~
Ovary	-	-	3	8.8	-	~
Pancreas	7	7.9	6	7.4	~	~
Prostate	126	120.6	-	-	186.4	-
Soft Tissues	1	2.2	4	1.9	~	~
Stomach	5	4.9	4	2.9	~	~
Testis	3	3.1	-	-	~	-
Thyroid	6	3.4	10	8.5	~	18.2
Urinary Bladder	25	26.8	8	8.2	38.2	~

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-24: Freeborn County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	545	559.2	425	478.1	539.9	369.4
Brain††	4	6.7	4	5.0	~	~
Breast	1	1.4	126	142.1	~	112.8
Cervix Uteri	-	-	3	5.2	-	~
Colon and Rectum	54	51.6	57	52.4	53.7	41.5
Corpus and Uterus, NOS	-	-	23	31.2	-	19.6
Esophagus	10	9.2	6	2.8	9.4	~
Hodgkin Lymphoma	1	2.7	2	2.2	~	~
Kaposi Sarcoma	0	0.3	0	0.1	~	~
Kidney and Renal Pelvis	8	21.0	15	12.7	~	12.6
Larynx	9	6.0	2	1.5	~	~
Leukemia	25	20.0	5	13.3	25.6	~
Liver††	4	6.9	5	3.1	~	~
Lung and Bronchus	81	68.4	44	61.4	80.8	37.4
Melanoma of the Skin	33	26.2	21	19.5	33.3	22.4
Mesothelioma	1	2.1	0	0.7	~	~
Myeloma	4	7.7	5	5.7	~	~
Non-Hodgkin Lymphoma	25	26.6	14	22.3	24.9	12.0
Oral Cavity and Pharynx	20	16.3	5	8.3	19.9	~
Ovary	-	-	7	13.6	-	~
Pancreas	11	12.1	15	11.6	10.3	11.3
Prostate	163	186.3	-	-	157.3	-
Soft Tissues	2	3.3	3	3.0	~	~
Stomach	6	7.4	5	4.5	~	~
Testis	4	4.7	-	-	~	-
Thyroid	5	5.2	12	13.0	~	18.4
Urinary Bladder	42	40.9	9	12.8	39.8	~

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-25: Goodhue County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	686	703.4	593	605.7	542.1	417.6
Brain††	10	9.1	6	6.7	7.3	~
Breast	0	1.7	194	184.4	~	138.4
Cervix Uteri	-	-	5	7.3	-	~
Colon and Rectum	71	64.5	71	63.7	56.7	45.6
Corpus and Uterus, NOS	-	-	38	40.2	-	26.3
Esophagus	6	11.6	1	3.3	~	~
Hodgkin Lymphoma	5	3.9	3	3.0	~	~
Kaposi Sarcoma	0	0.5	0	0.1	~	~
Kidney and Renal Pelvis	19	27.3	13	15.9	16.0	9.3
Larynx	6	7.6	2	1.8	~	~
Leukemia	23	25.1	9	16.5	18.7	~
Liver††	6	9.0	5	3.8	~	~
Lung and Bronchus	86	84.1	54	73.9	67.2	37.5
Melanoma of the Skin	40	33.8	33	26.6	31.7	27.8
Mesothelioma	2	2.5	0	0.8	~	~
Myeloma	11	9.5	6	6.8	8.6	~
Non-Hodgkin Lymphoma	30	33.6	38	27.4	25.2	25.7
Oral Cavity and Pharynx	20	21.3	6	10.6	14.7	~
Ovary	-	-	18	17.6	-	13.4
Pancreas	12	15.1	8	13.9	9.6	~
Prostate	222	233.5	-	-	168.3	-
Soft Tissues	8	4.4	3	3.9	~	~
Stomach	8	9.1	5	5.5	~	~
Testis	11	7.1	-	-	10.3	-
Thyroid	7	7.1	16	18.8	~	13.9
Urinary Bladder	56	49.3	15	15.4	46.5	9.0

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-26: Grant County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	128	121.8	96	99.1	579.1	403.0
Brain††	1	1.4	1	1.0	~	~
Breast	0	0.3	28	29.1	~	116.2
Cervix Uteri	-	-	1	1.0	-	~
Colon and Rectum	16	11.4	6	11.3	76.2	~
Corpus and Uterus, NOS	-	-	8	6.4	-	~
Esophagus	4	2.0	0	0.6	~	~
Hodgkin Lymphoma	0	0.5	1	0.4	~	~
Kaposi Sarcoma	0	0.1	0	0.0	~	~
Kidney and Renal Pelvis	2	4.4	2	2.6	~	~
Larynx	2	1.3	0	0.3	~	~
Leukemia	5	4.4	3	2.8	~	~
Liver††	1	1.5	0	0.7	~	~
Lung and Bronchus	17	15.2	15	12.9	71.2	55.4
Melanoma of the Skin	4	5.6	4	3.8	~	~
Mesothelioma	0	0.5	0	0.1	~	~
Myeloma	1	1.7	3	1.2	~	~
Non-Hodgkin Lymphoma	6	5.8	4	4.7	~	~
Oral Cavity and Pharynx	2	3.4	1	1.7	~	~
Ovary	-	-	4	2.8	-	~
Pancreas	6	2.7	1	2.5	~	~
Prostate	44	40.2	-	-	189.1	-
Soft Tissues	0	0.7	3	0.6	~	~
Stomach	1	1.7	1	1.0	~	~
Testis	1	0.8	-	-	~	-
Thyroid	0	1.0	2	2.5	~	~
Urinary Bladder	8	9.4	1	2.8	~	~

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-27: Hennepin County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	13,129	13,464.2	13,009	12,652.8	538.8	428.9
Brain††	196	201.4	148	154.1	7.2	5.0
Breast	33	32.1	4,173	3,902.1	1.4	137.7
Cervix Uteri	-	-	174	182.2	-	5.9
Colon and Rectum	1,145	1,226.6	1,185	1,249.5	47.3	37.6
Corpus and Uterus, NOS	-	-	862	847.3	-	28.0
Esophagus	189	220.1	66	64.9	7.5	2.2
Hodgkin Lymphoma	89	95.0	83	79.4	3.3	2.8
Kaposi Sarcoma	28	11.7	3	2.3	1.0	~
Kidney and Renal Pelvis	517	539.6	285	328.8	20.1	9.6
Larynx	142	144.8	37	37.0	5.8	1.2
Leukemia	509	488.1	385	339.2	21.0	12.6
Liver††	223	178.5	97	76.6	8.7	3.3
Lung and Bronchus	1,494	1,544.7	1,532	1,455.4	64.4	52.5
Melanoma of the Skin	700	683.6	587	629.8	27.8	19.7
Mesothelioma	37	45.1	10	15.4	1.7	0.3
Myeloma	175	179.0	147	134.1	7.2	4.8
Non-Hodgkin Lymphoma	666	652.4	529	553.0	27.7	17.1
Oral Cavity and Pharynx	422	426.3	242	221.3	16.3	7.7
Ovary	-	-	408	374.4	-	13.4
Pancreas	299	284.8	276	271.0	12.4	9.0
Prostate	4,110	4,345.1	-	-	169.0	-
Soft Tissues	107	93.5	91	87.5	4.2	3.0
Stomach	160	171.3	117	109.4	6.7	3.7
Testis	196	211.8	-	-	6.6	-
Thyroid	174	159.1	434	475.7	6.3	14.6
Urinary Bladder	848	896.1	319	298.6	37.8	10.4

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-28: Houston County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	326	325.2	260	274.1	552.8	405.1
Brain††	3	4.0	7	2.9	~	~
Breast	1	0.8	89	83.0	~	139.2
Cervix Uteri	-	-	2	3.2	-	~
Colon and Rectum	33	30.1	19	29.4	54.2	24.4
Corpus and Uterus, NOS	-	-	16	18.0	-	23.2
Esophagus	6	5.4	3	1.5	~	~
Hodgkin Lymphoma	2	1.7	2	1.3	~	~
Kaposi Sarcoma	0	0.2	0	0.0	~	~
Kidney and Renal Pelvis	10	12.4	8	7.2	15.8	~
Larynx	5	3.5	0	0.8	~	~
Leukemia	12	11.6	2	7.5	20.5	~
Liver††	2	4.2	3	1.8	~	~
Lung and Bronchus	37	39.3	30	33.8	63.3	44.9
Melanoma of the Skin	22	15.5	12	11.7	39.2	24.0
Mesothelioma	1	1.2	0	0.4	~	~
Myeloma	4	4.4	3	3.2	~	~
Non-Hodgkin Lymphoma	12	15.6	10	12.6	21.0	15.3
Oral Cavity and Pharynx	4	9.7	4	4.8	~	~
Ovary	-	-	7	7.9	-	~
Pancreas	5	7.0	6	6.4	~	~
Prostate	128	107.7	-	-	211.9	-
Soft Tissues	0	2.0	1	1.7	~	~
Stomach	3	4.3	6	2.5	~	~
Testis	3	2.9	-	-	~	-
Thyroid	1	3.1	9	8.1	~	~
Urinary Bladder	23	23.4	8	7.1	40.4	~

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-29: Hubbard County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	359	379.0	304	285.9	513.6	453.3
Brain††	6	4.4	6	3.1	~	~
Breast	0	0.9	91	87.4	~	134.7
Cervix Uteri	-	-	1	3.1	-	~
Colon and Rectum	23	34.2	31	29.2	31.9	41.3
Corpus and Uterus, NOS	-	-	24	19.9	-	37.6
Esophagus	6	6.2	3	1.6	~	~
Hodgkin Lymphoma	1	1.7	2	1.3	~	~
Kaposi Sarcoma	0	0.2	0	0.0	~	~
Kidney and Renal Pelvis	10	14.3	14	7.7	14.6	20.1
Larynx	2	4.1	1	0.9	~	~
Leukemia	12	13.1	5	7.5	18.9	~
Liver††	4	4.6	2	1.8	~	~
Lung and Bronchus	44	46.7	41	37.2	60.2	55.5
Melanoma of the Skin	19	17.2	10	11.7	29.6	19.8
Mesothelioma	2	1.4	1	0.4	~	~
Myeloma	8	5.2	4	3.3	~	~
Non-Hodgkin Lymphoma	18	17.6	10	12.9	28.9	14.2
Oral Cavity and Pharynx	18	10.8	5	4.9	24.1	~
Ovary	-	-	12	8.4	-	19.1
Pancreas	7	8.2	8	6.7	~	~
Prostate	128	131.1	-	-	172.7	-
Soft Tissues	4	2.1	0	1.7	~	~
Stomach	7	4.9	1	2.5	~	~
Testis	1	2.6	-	-	~	-
Thyroid	4	3.3	10	8.0	~	19.5
Urinary Bladder	17	27.1	3	7.2	25.2	~

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-30: Isanti County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	439	464.3	374	404.3	526.1	384.0
Brain††	6	7.0	5	5.0	~	~
Breast	3	1.1	121	126.7	~	123.2
Cervix Uteri	-	-	9	5.9	-	~
Colon and Rectum	27	41.9	26	38.6	30.7	26.2
Corpus and Uterus, NOS	-	-	28	27.4	-	27.1
Esophagus	5	7.6	3	2.0	~	~
Hodgkin Lymphoma	1	3.2	5	2.5	~	~
Kaposi Sarcoma	0	0.4	0	0.1	~	~
Kidney and Renal Pelvis	17	18.8	7	10.5	17.8	~
Larynx	11	5.1	1	1.2	14.1	~
Leukemia	18	16.6	7	10.6	23.0	~
Liver††	9	6.1	5	2.4	~	~
Lung and Bronchus	58	53.0	52	46.4	77.5	55.6
Melanoma of the Skin	16	23.4	12	20.4	21.7	12.0
Mesothelioma	0	1.5	0	0.5	~	~
Myeloma	6	6.1	2	4.2	~	~
Non-Hodgkin Lymphoma	21	22.3	11	17.4	23.6	12.6
Oral Cavity and Pharynx	12	14.7	8	7.1	12.3	~
Ovary	-	-	14	12.0	-	13.3
Pancreas	15	9.8	7	8.5	18.6	~
Prostate	145	152.7	-	-	168.3	-
Soft Tissues	2	3.2	3	2.8	~	~
Stomach	7	5.8	3	3.4	~	~
Testis	8	6.8	-	-	~	-
Thyroid	6	5.5	21	15.6	~	21.5
Urinary Bladder	27	30.2	8	9.2	36.6	~

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-31: Itasca County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	778	810.3	614	639.8	526.7	393.6
Brain††	7	9.8	5	6.9	~	~
Breast	3	1.9	191	196.7	~	120.2
Cervix Uteri	-	-	6	7.3	-	~
Colon and Rectum	82	73.1	75	65.2	54.8	47.4
Corpus and Uterus, NOS	-	-	43	44.3	-	26.4
Esophagus	15	13.3	7	3.5	9.7	~
Hodgkin Lymphoma	3	3.9	2	3.0	~	~
Kaposi Sarcoma	0	0.5	0	0.1	~	~
Kidney and Renal Pelvis	28	31.0	16	17.1	18.0	10.3
Larynx	10	8.8	3	2.0	7.0	~
Leukemia	30	28.2	12	16.8	20.8	7.3
Liver††	7	10.2	3	4.1	~	~
Lung and Bronchus	89	98.3	62	81.1	58.9	38.2
Melanoma of the Skin	33	37.6	23	27.0	22.7	17.1
Mesothelioma	4	3.0	0	0.8	~	~
Myeloma	12	11.0	4	7.2	8.1	~
Non-Hodgkin Lymphoma	39	37.7	39	28.6	27.1	25.4
Oral Cavity and Pharynx	24	23.9	8	11.1	16.6	~
Ovary	-	-	21	18.9	-	13.9
Pancreas	24	17.5	11	14.7	17.7	6.6
Prostate	237	278.0	-	-	153.6	-
Soft Tissues	4	4.7	3	3.9	~	~
Stomach	10	10.4	4	5.6	7.1	~
Testis	6	6.6	-	-	~	-
Thyroid	6	7.5	15	18.8	~	10.9
Urinary Bladder	67	56.6	18	16.0	47.6	11.0

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-32: Jackson County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	179	205.6	142	168.5	492.3	355.0
Brain††	5	2.4	3	1.7	~	~
Breast	0	0.5	37	49.6	~	103.5
Cervix Uteri	-	-	2	1.8	-	~
Colon and Rectum	22	19.5	21	19.0	54.3	39.4
Corpus and Uterus, NOS	-	-	13	10.8	-	32.9
Esophagus	0	3.4	1	1.0	~	~
Hodgkin Lymphoma	2	1.0	1	0.7	~	~
Kaposi Sarcoma	0	0.1	0	0.0	~	~
Kidney and Renal Pelvis	6	7.5	2	4.4	~	~
Larynx	0	2.1	0	0.5	~	~
Leukemia	7	7.6	2	4.8	~	~
Liver††	2	2.5	0	1.1	~	~
Lung and Bronchus	19	25.2	16	21.6	52.9	40.6
Melanoma of the Skin	8	9.7	9	6.7	~	~
Mesothelioma	1	0.8	0	0.2	~	~
Myeloma	3	2.9	2	2.0	~	~
Non-Hodgkin Lymphoma	8	10.0	6	8.0	~	~
Oral Cavity and Pharynx	4	6.0	1	2.9	~	~
Ovary	-	-	7	4.8	-	~
Pancreas	5	4.5	3	4.1	~	~
Prostate	51	66.5	-	-	139.6	-
Soft Tissues	5	1.2	0	1.0	~	~
Stomach	3	2.8	1	1.6	~	~
Testis	2	1.7	-	-	~	-
Thyroid	3	1.9	2	4.4	~	~
Urinary Bladder	15	15.8	2	4.6	36.4	~

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-33: Kanabec County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	276	261.7	175	204.7	585.6	349.3
Brain††	2	3.4	3	2.3	~	~
Breast	1	0.6	52	63.7	~	101.0
Cervix Uteri	-	-	5	2.6	-	~
Colon and Rectum	32	23.5	13	20.1	72.6	24.8
Corpus and Uterus, NOS	-	-	12	14.2	-	22.2
Esophagus	8	4.3	0	1.1	~	~
Hodgkin Lymphoma	1	1.4	0	1.0	~	~
Kaposi Sarcoma	0	0.2	0	0.0	~	~
Kidney and Renal Pelvis	12	10.3	8	5.5	24.0	~
Larynx	4	2.9	2	0.6	~	~
Leukemia	8	9.1	3	5.3	~	~
Liver††	6	3.3	0	1.3	~	~
Lung and Bronchus	26	31.3	27	25.4	54.9	51.8
Melanoma of the Skin	6	12.4	11	9.2	~	23.3
Mesothelioma	2	0.9	0	0.3	~	~
Myeloma	5	3.5	2	2.2	~	~
Non-Hodgkin Lymphoma	9	12.2	3	9.0	~	~
Oral Cavity and Pharynx	10	7.9	2	3.5	20.6	~
Ovary	-	-	4	6.1	-	~
Pancreas	7	5.6	1	4.5	~	~
Prostate	91	89.5	-	-	181.6	-
Soft Tissues	0	1.6	2	1.3	~	~
Stomach	3	3.3	0	1.7	~	~
Testis	2	2.5	-	-	~	-
Thyroid	7	2.6	6	6.7	~	~
Urinary Bladder	23	17.7	1	4.9	49.2	~

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-34: Kandiyohi County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	587	635.5	534	540.8	515.8	414.9
Brain††	11	8.1	5	6.0	10.5	~
Breast	1	1.5	146	163.9	~	114.0
Cervix Uteri	-	-	8	6.4	-	~
Colon and Rectum	54	58.5	60	56.7	47.9	41.4
Corpus and Uterus, NOS	-	-	55	36.0	-	42.4
Esophagus	6	10.4	0	3.0	~	~
Hodgkin Lymphoma	4	3.5	3	2.8	~	~
Kaposi Sarcoma	0	0.4	0	0.1	~	~
Kidney and Renal Pelvis	29	24.2	9	14.3	24.7	~
Larynx	9	6.8	2	1.6	~	~
Leukemia	21	22.9	10	14.8	17.8	6.7
Liver††	4	8.1	2	3.4	~	~
Lung and Bronchus	62	76.3	51	66.7	54.7	37.6
Melanoma of the Skin	33	30.3	30	23.6	31.3	26.0
Mesothelioma	4	2.3	0	0.7	~	~
Myeloma	6	8.6	7	6.1	~	~
Non-Hodgkin Lymphoma	21	30.3	33	24.5	18.8	24.6
Oral Cavity and Pharynx	12	19.0	15	9.4	10.0	11.5
Ovary	-	-	11	15.8	-	8.3
Pancreas	8	13.7	11	12.5	~	8.6
Prostate	193	210.4	-	-	164.1	-
Soft Tissues	3	4.0	4	3.5	~	~
Stomach	7	8.3	3	4.9	~	~
Testis	10	6.4	-	-	10.4	-
Thyroid	8	6.2	26	16.6	~	24.2
Urinary Bladder	57	45.3	7	13.8	50.8	~

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-35: Kittson County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	80	91.9	76	77.7	492.1	487.3
Brain††	2	1.0	0	0.8	~	~
Breast	0	0.2	30	22.6	~	185.5
Cervix Uteri	-	-	1	0.8	-	~
Colon and Rectum	16	8.7	7	9.1	86.9	~
Corpus and Uterus, NOS	-	-	7	4.9	-	~
Esophagus	0	1.5	0	0.5	~	~
Hodgkin Lymphoma	0	0.4	0	0.3	~	~
Kaposi Sarcoma	0	0.0	0	0.0	~	~
Kidney and Renal Pelvis	2	3.4	2	2.0	~	~
Larynx	1	1.0	0	0.2	~	~
Leukemia	1	3.3	1	2.3	~	~
Liver††	1	1.1	0	0.5	~	~
Lung and Bronchus	14	11.3	8	10.1	85.3	~
Melanoma of the Skin	1	4.3	5	2.9	~	~
Mesothelioma	0	0.4	0	0.1	~	~
Myeloma	1	1.3	0	1.0	~	~
Non-Hodgkin Lymphoma	5	4.4	3	3.7	~	~
Oral Cavity and Pharynx	3	2.6	0	1.4	~	~
Ovary	-	-	0	2.2	-	~
Pancreas	2	2.0	0	2.0	~	~
Prostate	25	30.5	-	-	149.7	-
Soft Tissues	0	0.5	1	0.5	~	~
Stomach	0	1.3	1	0.8	~	~
Testis	0	0.6	-	-	~	-
Thyroid	0	0.8	1	1.8	~	~
Urinary Bladder	4	7.0	2	2.2	~	~

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-36: Koochiching County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	244	251.8	204	211.7	546.7	404.2
Brain††	0	3.0	2	2.2	~	~
Breast	0	0.6	55	63.9	~	111.7
Cervix Uteri	-	-	8	2.3	-	~
Colon and Rectum	29	23.1	33	22.8	64.2	57.5
Corpus and Uterus, NOS	-	-	15	14.1	-	32.0
Esophagus	4	4.1	1	1.2	~	~
Hodgkin Lymphoma	1	1.2	1	0.9	~	~
Kaposi Sarcoma	0	0.1	0	0.0	~	~
Kidney and Renal Pelvis	9	9.5	7	5.6	~	~
Larynx	2	2.7	0	0.7	~	~
Leukemia	14	8.8	7	5.7	36.8	~
Liver††	1	3.2	1	1.4	~	~
Lung and Bronchus	35	30.7	30	27.1	75.2	58.6
Melanoma of the Skin	6	11.7	5	8.6	~	~
Mesothelioma	2	0.9	1	0.3	~	~
Myeloma	3	3.4	3	2.5	~	~
Non-Hodgkin Lymphoma	13	11.9	8	9.7	27.2	~
Oral Cavity and Pharynx	4	7.4	2	3.7	~	~
Ovary	-	-	2	6.1	-	~
Pancreas	6	5.5	3	5.1	~	~
Prostate	77	85.2	-	-	163.6	-
Soft Tissues	0	1.5	0	1.3	~	~
Stomach	6	3.3	1	1.9	~	~
Testis	0	1.9	-	-	~	-
Thyroid	2	2.3	4	5.8	~	~
Urinary Bladder	17	18.1	7	5.6	41.4	~

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-37: Lac Qui Parle County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	145	149.6	127	124.3	527.2	405.2
Brain††	1	1.7	0	1.2	~	~
Breast	0	0.4	39	36.6	~	122.2
Cervix Uteri	-	-	0	1.2	-	~
Colon and Rectum	21	14.2	12	14.3	69.1	26.1
Corpus and Uterus, NOS	-	-	12	8.0	-	43.5
Esophagus	2	2.5	0	0.7	~	~
Hodgkin Lymphoma	0	0.6	1	0.5	~	~
Kaposi Sarcoma	0	0.1	0	0.0	~	~
Kidney and Renal Pelvis	5	5.5	4	3.3	~	~
Larynx	0	1.6	0	0.4	~	~
Leukemia	2	5.5	7	3.6	~	~
Liver††	0	1.9	1	0.8	~	~
Lung and Bronchus	19	18.5	10	15.8	69.0	35.8
Melanoma of the Skin	4	7.0	5	4.7	~	~
Mesothelioma	0	0.6	0	0.2	~	~
Myeloma	1	2.1	0	1.5	~	~
Non-Hodgkin Lymphoma	8	7.2	6	6.0	~	~
Oral Cavity and Pharynx	3	4.3	1	2.2	~	~
Ovary	-	-	4	3.5	-	~
Pancreas	1	3.3	3	3.1	~	~
Prostate	67	48.9	-	-	251.8	-
Soft Tissues	0	0.9	0	0.8	~	~
Stomach	0	2.1	2	1.2	~	~
Testis	1	1.0	-	-	~	-
Thyroid	0	1.3	6	3.0	~	~
Urinary Bladder	5	11.5	3	3.5	~	~

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-38: Lake County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	212	222.5	176	169.6	523.4	427.0
Brain††	1	2.5	5	1.8	~	~
Breast	0	0.5	47	51.3	~	106.7
Cervix Uteri	-	-	3	1.9	-	~
Colon and Rectum	12	20.4	21	18.0	30.7	46.6
Corpus and Uterus, NOS	-	-	15	11.4	-	36.2
Esophagus	5	3.7	0	1.0	~	~
Hodgkin Lymphoma	0	1.0	3	0.7	~	~
Kaposi Sarcoma	0	0.1	0	0.0	~	~
Kidney and Renal Pelvis	10	8.3	3	4.5	24.3	~
Larynx	2	2.4	0	0.5	~	~
Leukemia	3	7.8	2	4.5	~	~
Liver††	4	2.8	1	1.1	~	~
Lung and Bronchus	30	27.6	20	22.0	71.7	45.4
Melanoma of the Skin	6	10.2	7	6.9	~	~
Mesothelioma	0	0.9	0	0.2	~	~
Myeloma	2	3.1	1	2.0	~	~
Non-Hodgkin Lymphoma	10	10.5	8	7.7	25.5	~
Oral Cavity and Pharynx	4	6.4	4	2.9	~	~
Ovary	-	-	5	4.9	-	~
Pancreas	3	4.8	6	4.0	~	~
Prostate	95	75.1	-	-	223.9	-
Soft Tissues	0	1.3	1	1.0	~	~
Stomach	3	2.9	2	1.5	~	~
Testis	2	1.6	-	-	~	-
Thyroid	1	2.0	3	4.7	~	~
Urinary Bladder	13	16.3	7	4.4	29.2	~

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-39: Lake of the Woods County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	98	83.7	56	64.6	663.4	341.1
Brain††	0	1.0	0	0.7	~	~
Breast	0	0.2	18	19.6	~	109.8
Cervix Uteri	-	-	1	0.7	-	~
Colon and Rectum	10	7.7	8	6.8	69.9	~
Corpus and Uterus, NOS	-	-	1	4.4	-	~
Esophagus	3	1.4	0	0.4	~	~
Hodgkin Lymphoma	0	0.4	1	0.3	~	~
Kaposi Sarcoma	0	0.0	0	0.0	~	~
Kidney and Renal Pelvis	4	3.2	2	1.7	~	~
Larynx	1	0.9	0	0.2	~	~
Leukemia	1	2.9	0	1.7	~	~
Liver††	1	1.1	0	0.4	~	~
Lung and Bronchus	7	10.2	8	8.4	~	~
Melanoma of the Skin	3	3.9	5	2.6	~	~
Mesothelioma	0	0.3	0	0.1	~	~
Myeloma	1	1.1	1	0.8	~	~
Non-Hodgkin Lymphoma	7	3.9	2	2.9	~	~
Oral Cavity and Pharynx	3	2.5	0	1.1	~	~
Ovary	-	-	1	1.9	-	~
Pancreas	3	1.8	2	1.5	~	~
Prostate	35	28.6	-	-	228.3	-
Soft Tissues	0	0.5	1	0.4	~	~
Stomach	1	1.1	0	0.6	~	~
Testis	1	0.5	-	-	~	-
Thyroid	2	0.8	0	1.8	~	~
Urinary Bladder	10	6.0	3	1.7	61.8	~

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-40: Le Sueur County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	421	411.4	306	343.3	569.6	375.3
Brain††	4	5.5	2	3.9	~	~
Breast	0	1.0	104	105.3	~	128.2
Cervix Uteri	-	-	3	4.3	-	~
Colon and Rectum	42	37.5	37	35.1	57.6	44.3
Corpus and Uterus, NOS	-	-	15	23.0	-	18.0
Esophagus	9	6.8	3	1.9	~	~
Hodgkin Lymphoma	1	2.3	1	1.8	~	~
Kaposi Sarcoma	0	0.3	0	0.1	~	~
Kidney and Renal Pelvis	21	16.1	6	9.0	27.3	~
Larynx	1	4.5	0	1.0	~	~
Leukemia	19	14.7	9	9.3	26.8	~
Liver††	1	5.3	2	2.1	~	~
Lung and Bronchus	44	48.7	34	41.7	62.3	39.9
Melanoma of the Skin	21	20.0	14	15.5	30.1	19.0
Mesothelioma	1	1.5	0	0.4	~	~
Myeloma	7	5.5	4	3.8	~	~
Non-Hodgkin Lymphoma	25	19.6	7	15.3	33.8	~
Oral Cavity and Pharynx	7	12.6	9	6.0	~	~
Ovary	-	-	7	10.0	-	~
Pancreas	16	8.8	9	7.7	22.2	~
Prostate	145	136.8	-	-	189.3	-
Soft Tissues	1	2.6	2	2.3	~	~
Stomach	5	5.3	1	3.0	~	~
Testis	4	4.4	-	-	~	-
Thyroid	4	4.3	11	11.2	~	17.1
Urinary Bladder	25	28.3	5	8.5	34.4	~

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-41: Lincoln County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	104	120.2	91	101.2	489.2	383.2
Brain††	1	1.3	1	1.0	~	~
Breast	0	0.3	24	29.1	~	111.2
Cervix Uteri	-	-	0	1.0	-	~
Colon and Rectum	10	11.3	17	12.0	40.7	56.8
Corpus and Uterus, NOS	-	-	4	6.3	-	~
Esophagus	0	2.0	0	0.6	~	~
Hodgkin Lymphoma	1	0.5	0	0.4	~	~
Kaposi Sarcoma	0	0.1	0	0.0	~	~
Kidney and Renal Pelvis	4	4.3	0	2.7	~	~
Larynx	1	1.2	0	0.3	~	~
Leukemia	3	4.4	2	3.0	~	~
Liver††	0	1.4	2	0.7	~	~
Lung and Bronchus	13	15.1	8	13.2	56.4	~
Melanoma of the Skin	7	5.5	1	3.8	~	~
Mesothelioma	0	0.5	0	0.2	~	~
Myeloma	0	1.7	3	1.3	~	~
Non-Hodgkin Lymphoma	2	5.8	11	4.9	~	45.1
Oral Cavity and Pharynx	0	3.4	1	1.8	~	~
Ovary	-	-	3	2.8	-	~
Pancreas	1	2.6	3	2.6	~	~
Prostate	49	39.4	-	-	217.0	-
Soft Tissues	0	0.7	1	0.6	~	~
Stomach	1	1.7	1	1.0	~	~
Testis	2	0.8	-	-	~	-
Thyroid	0	1.0	5	2.3	~	~
Urinary Bladder	7	9.4	2	2.9	~	~

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-42: Lyon County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	347	343.2	311	306.1	560.3	423.0
Brain††	3	4.6	5	3.5	~	~
Breast	0	0.8	82	91.1	~	118.0
Cervix Uteri	-	-	6	3.7	-	~
Colon and Rectum	33	31.9	37	33.2	53.1	42.8
Corpus and Uterus, NOS	-	-	22	19.6	-	31.9
Esophagus	6	5.6	2	1.7	~	~
Hodgkin Lymphoma	1	2.1	2	1.8	~	~
Kaposi Sarcoma	0	0.2	0	0.1	~	~
Kidney and Renal Pelvis	9	13.0	10	7.9	~	14.7
Larynx	5	3.6	1	0.9	~	~
Leukemia	10	12.7	10	8.7	15.5	11.6
Liver††	1	4.3	3	1.9	~	~
Lung and Bronchus	41	40.9	36	36.8	64.8	50.2
Melanoma of the Skin	14	16.7	15	13.8	23.0	22.7
Mesothelioma	2	1.3	1	0.4	~	~
Myeloma	3	4.7	0	3.5	~	~
Non-Hodgkin Lymphoma	22	16.6	10	14.1	34.9	10.7
Oral Cavity and Pharynx	8	10.3	8	5.4	~	~
Ovary	-	-	6	8.8	-	~
Pancreas	7	7.4	8	7.1	~	~
Prostate	127	110.7	-	-	207.0	-
Soft Tissues	2	2.3	1	2.1	~	~
Stomach	5	4.6	3	2.9	~	~
Testis	7	4.2	-	-	~	-
Thyroid	2	3.5	18	9.7	~	28.0
Urinary Bladder	28	24.8	6	8.0	46.7	~

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-43: McLeod County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	518	511.0	449	456.2	558.9	413.2
Brain††	2	7.0	6	5.2	~	~
Breast	1	1.2	122	138.1	~	113.4
Cervix Uteri	-	-	2	5.7	-	~
Colon and Rectum	48	46.6	43	47.5	53.9	34.6
Corpus and Uterus, NOS	-	-	30	29.9	-	27.5
Esophagus	6	8.3	3	2.5	~	~
Hodgkin Lymphoma	3	3.1	3	2.4	~	~
Kaposi Sarcoma	0	0.4	0	0.1	~	~
Kidney and Renal Pelvis	12	19.9	15	12.0	12.7	13.8
Larynx	3	5.5	1	1.4	~	~
Leukemia	14	18.5	14	12.6	15.3	12.4
Liver††	6	6.5	0	2.9	~	~
Lung and Bronchus	61	60.5	52	55.5	67.8	47.7
Melanoma of the Skin	33	24.9	29	20.6	35.3	30.4
Mesothelioma	2	1.8	0	0.6	~	~
Myeloma	9	6.9	6	5.1	~	~
Non-Hodgkin Lymphoma	25	24.5	20	20.7	27.8	16.2
Oral Cavity and Pharynx	10	15.5	9	8.0	10.7	~
Ovary	-	-	14	13.2	-	13.6
Pancreas	11	10.9	5	10.4	11.8	~
Prostate	198	168.2	-	-	207.2	-
Soft Tissues	3	3.3	2	3.0	~	~
Stomach	7	6.6	3	4.1	~	~
Testis	3	6.1	-	-	~	-
Thyroid	7	5.4	27	14.8	~	30.1
Urinary Bladder	33	35.5	16	11.5	37.2	13.6

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-44: Mahnomens County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	96	83.1	56	67.9	633.1	343.1
Brain††	1	1.0	1	0.7	~	~
Breast	0	0.2	17	20.2	~	100.8
Cervix Uteri	-	-	2	0.7	-	~
Colon and Rectum	10	7.6	5	7.3	62.9	~
Corpus and Uterus, NOS	-	-	1	4.5	-	~
Esophagus	0	1.4	0	0.4	~	~
Hodgkin Lymphoma	0	0.4	2	0.3	~	~
Kaposi Sarcoma	0	0.0	0	0.0	~	~
Kidney and Renal Pelvis	4	3.1	1	1.8	~	~
Larynx	4	0.9	1	0.2	~	~
Leukemia	5	3.0	1	1.9	~	~
Liver††	0	1.0	1	0.4	~	~
Lung and Bronchus	14	10.1	8	8.7	90.7	~
Melanoma of the Skin	3	3.9	3	2.8	~	~
Mesothelioma	0	0.3	0	0.1	~	~
Myeloma	0	1.1	0	0.8	~	~
Non-Hodgkin Lymphoma	5	3.9	3	3.1	~	~
Oral Cavity and Pharynx	4	2.4	1	1.2	~	~
Ovary	-	-	1	1.9	-	~
Pancreas	3	1.8	1	1.6	~	~
Prostate	31	28.0	-	-	195.6	-
Soft Tissues	1	0.5	1	0.4	~	~
Stomach	2	1.1	0	0.6	~	~
Testis	1	0.7	-	-	~	-
Thyroid	1	0.8	3	1.9	~	~
Urinary Bladder	5	6.0	0	1.8	~	~

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-45: Marshall County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	163	173.8	120	140.3	530.3	358.3
Brain††	0	2.1	5	1.5	~	~
Breast	1	0.4	35	42.0	~	107.5
Cervix Uteri	-	-	0	1.5	-	~
Colon and Rectum	14	16.3	19	15.3	43.3	53.5
Corpus and Uterus, NOS	-	-	8	9.2	-	~
Esophagus	4	2.9	2	0.8	~	~
Hodgkin Lymphoma	0	0.8	0	0.6	~	~
Kaposi Sarcoma	0	0.1	0	0.0	~	~
Kidney and Renal Pelvis	5	6.5	5	3.7	~	~
Larynx	1	1.8	0	0.4	~	~
Leukemia	8	6.3	3	3.9	~	~
Liver††	2	2.2	0	0.9	~	~
Lung and Bronchus	21	21.2	13	17.8	66.2	38.0
Melanoma of the Skin	4	8.2	5	5.7	~	~
Mesothelioma	0	0.7	0	0.2	~	~
Myeloma	2	2.4	0	1.6	~	~
Non-Hodgkin Lymphoma	7	8.4	5	6.5	~	~
Oral Cavity and Pharynx	9	5.1	2	2.4	~	~
Ovary	-	-	0	4.0	-	~
Pancreas	3	3.8	4	3.4	~	~
Prostate	59	57.0	-	-	180.3	-
Soft Tissues	3	1.0	1	0.9	~	~
Stomach	0	2.3	1	1.3	~	~
Testis	0	1.4	-	-	~	-
Thyroid	1	1.6	1	3.8	~	~
Urinary Bladder	6	12.9	4	3.7	~	~

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-46: Martin County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	350	379.1	362	334.0	512.4	464.7
Brain††	2	4.4	3	3.4	~	~
Breast	0	0.9	102	98.5	~	141.2
Cervix Uteri	-	-	9	3.4	-	~
Colon and Rectum	35	35.3	46	38.0	52.4	54.0
Corpus and Uterus, NOS	-	-	27	21.5	-	38.4
Esophagus	9	6.3	6	2.0	~	~
Hodgkin Lymphoma	1	1.8	2	1.4	~	~
Kaposi Sarcoma	0	0.2	0	0.1	~	~
Kidney and Renal Pelvis	17	14.1	14	8.8	24.4	19.5
Larynx	3	4.0	1	1.0	~	~
Leukemia	16	13.6	11	9.5	23.7	12.7
Liver††	4	4.7	2	2.2	~	~
Lung and Bronchus	45	46.5	38	42.6	64.6	44.8
Melanoma of the Skin	20	17.7	12	13.1	31.2	19.8
Mesothelioma	0	1.5	0	0.5	~	~
Myeloma	4	5.2	7	4.0	~	~
Non-Hodgkin Lymphoma	11	18.1	14	15.9	15.9	14.4
Oral Cavity and Pharynx	13	11.1	0	5.8	20.8	~
Ovary	-	-	14	9.5	-	18.7
Pancreas	8	8.2	10	8.3	~	8.5
Prostate	115	125.9	-	-	163.3	-
Soft Tissues	1	2.2	3	2.1	~	~
Stomach	7	5.1	6	3.2	~	~
Testis	1	2.9	-	-	~	-
Thyroid	2	3.4	8	8.5	~	~
Urinary Bladder	18	28.1	7	9.2	25.3	~

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-47: Meeker County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	354	375.7	242	312.5	520.3	322.6
Brain††	3	4.8	2	3.4	~	~
Breast	0	0.9	62	94.4	~	79.1
Cervix Uteri	-	-	1	3.6	-	~
Colon and Rectum	42	34.6	28	33.5	60.9	33.1
Corpus and Uterus, NOS	-	-	15	20.6	-	19.9
Esophagus	7	6.2	2	1.7	~	~
Hodgkin Lymphoma	3	2.0	1	1.5	~	~
Kaposi Sarcoma	0	0.2	0	0.1	~	~
Kidney and Renal Pelvis	13	14.4	11	8.2	19.0	13.5
Larynx	3	4.0	0	0.9	~	~
Leukemia	10	13.5	7	8.7	15.2	~
Liver††	2	4.8	1	2.0	~	~
Lung and Bronchus	36	45.2	31	38.7	51.8	43.2
Melanoma of the Skin	13	17.9	7	13.3	19.0	~
Mesothelioma	1	1.4	0	0.4	~	~
Myeloma	5	5.1	4	3.6	~	~
Non-Hodgkin Lymphoma	19	18.0	14	14.3	29.1	18.0
Oral Cavity and Pharynx	6	11.2	4	5.5	~	~
Ovary	-	-	4	9.0	-	~
Pancreas	7	8.1	3	7.3	~	~
Prostate	131	124.4	-	-	189.0	-
Soft Tissues	0	2.3	1	2.0	~	~
Stomach	8	4.9	1	2.9	~	~
Testis	2	3.6	-	-	~	-
Thyroid	2	3.7	13	9.2	~	25.2
Urinary Bladder	20	26.8	9	8.1	29.6	~

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-48: Mille Lacs County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	422	393.7	350	342.4	595.2	430.0
Brain††	5	5.1	9	3.9	~	~
Breast	0	0.9	97	103.3	~	117.7
Cervix Uteri	-	-	5	4.1	-	~
Colon and Rectum	29	35.8	35	35.8	42.0	39.0
Corpus and Uterus, NOS	-	-	20	22.6	-	27.4
Esophagus	6	6.4	0	1.9	~	~
Hodgkin Lymphoma	0	2.2	4	1.8	~	~
Kaposi Sarcoma	0	0.3	0	0.1	~	~
Kidney and Renal Pelvis	27	15.1	14	9.0	38.2	16.9
Larynx	2	4.2	3	1.0	~	~
Leukemia	20	14.1	9	9.4	29.5	~
Liver††	2	4.9	2	2.2	~	~
Lung and Bronchus	80	47.3	50	42.8	113.3	59.0
Melanoma of the Skin	17	18.8	10	15.0	24.5	12.5
Mesothelioma	5	1.4	1	0.5	~	~
Myeloma	4	5.3	3	3.9	~	~
Non-Hodgkin Lymphoma	13	18.7	15	15.6	18.7	18.5
Oral Cavity and Pharynx	16	11.7	4	5.9	22.3	~
Ovary	-	-	11	9.9	-	14.9
Pancreas	6	8.5	7	8.0	~	~
Prostate	123	131.1	-	-	168.1	-
Soft Tissues	1	2.5	2	2.2	~	~
Stomach	7	5.1	3	3.1	~	~
Testis	3	4.2	-	-	~	-
Thyroid	4	4.0	12	10.5	~	17.6
Urinary Bladder	32	27.7	8	8.7	45.1	~

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-49: Morrison County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	516	502.1	405	428.6	571.6	403.0
Brain††	6	6.5	5	4.8	~	~
Breast	1	1.2	119	129.7	~	117.4
Cervix Uteri	-	-	6	5.1	-	~
Colon and Rectum	43	45.7	34	45.0	48.0	28.0
Corpus and Uterus, NOS	-	-	26	28.4	-	25.2
Esophagus	8	8.2	2	2.4	~	~
Hodgkin Lymphoma	5	2.8	3	2.1	~	~
Kaposi Sarcoma	0	0.3	0	0.1	~	~
Kidney and Renal Pelvis	24	19.4	10	11.3	24.6	9.2
Larynx	5	5.4	4	1.3	~	~
Leukemia	17	17.9	12	11.7	20.6	10.5
Liver††	4	6.4	1	2.7	~	~
Lung and Bronchus	52	60.1	48	53.5	58.4	46.2
Melanoma of the Skin	13	24.0	21	18.6	13.8	24.7
Mesothelioma	2	1.8	0	0.6	~	~
Myeloma	10	6.8	4	4.9	11.7	~
Non-Hodgkin Lymphoma	31	23.9	10	19.5	35.0	10.4
Oral Cavity and Pharynx	14	15.0	16	7.4	15.9	15.2
Ovary	-	-	13	12.4	-	13.1
Pancreas	11	10.8	10	9.9	12.3	9.9
Prostate	176	167.5	-	-	188.0	-
Soft Tissues	3	3.1	2	2.8	~	~
Stomach	8	6.5	7	3.9	~	~
Testis	3	5.2	-	-	~	-
Thyroid	7	5.0	19	13.0	~	27.0
Urinary Bladder	49	35.1	13	10.9	55.3	11.8

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-50: Mower County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	628	623.8	507	552.7	558.2	386.5
Brain††	3	7.7	10	5.8	~	10.9
Breast	2	1.5	154	161.5	~	123.0
Cervix Uteri	-	-	7	6.0	-	~
Colon and Rectum	56	58.5	51	62.7	49.1	33.3
Corpus and Uterus, NOS	-	-	32	34.7	-	24.2
Esophagus	10	10.3	3	3.2	9.0	~
Hodgkin Lymphoma	2	3.3	4	2.6	~	~
Kaposi Sarcoma	0	0.4	0	0.1	~	~
Kidney and Renal Pelvis	22	23.2	10	14.5	18.9	8.0
Larynx	3	6.5	1	1.6	~	~
Leukemia	23	23.1	19	16.0	20.1	11.4
Liver††	7	7.7	4	3.6	~	~
Lung and Bronchus	80	76.4	59	70.0	72.1	40.2
Melanoma of the Skin	45	29.7	24	22.6	43.4	22.5
Mesothelioma	3	2.5	2	0.8	~	~
Myeloma	10	8.6	2	6.7	8.8	~
Non-Hodgkin Lymphoma	29	30.3	19	26.2	26.1	13.7
Oral Cavity and Pharynx	15	18.2	6	9.6	13.5	~
Ovary	-	-	14	15.5	-	11.2
Pancreas	10	13.5	12	13.6	8.7	8.0
Prostate	197	201.3	-	-	175.2	-
Soft Tissues	5	3.8	5	3.6	~	~
Stomach	12	8.5	5	5.4	10.1	~
Testis	4	5.9	-	-	~	-
Thyroid	6	5.9	15	15.0	~	15.4
Urinary Bladder	47	47.0	14	15.2	39.5	7.8

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-51: Murray County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	164	172.0	150	140.2	527.8	431.4
Brain††	1	2.0	1	1.4	~	~
Breast	1	0.4	38	41.5	~	113.6
Cervix Uteri	-	-	3	1.4	-	~
Colon and Rectum	22	16.0	25	15.7	73.3	69.1
Corpus and Uterus, NOS	-	-	15	9.1	-	44.6
Esophagus	0	2.8	0	0.8	~	~
Hodgkin Lymphoma	2	0.8	0	0.6	~	~
Kaposi Sarcoma	0	0.1	0	0.0	~	~
Kidney and Renal Pelvis	10	6.4	4	3.7	30.6	~
Larynx	2	1.8	0	0.4	~	~
Leukemia	4	6.1	5	3.9	~	~
Liver††	0	2.1	1	0.9	~	~
Lung and Bronchus	19	21.3	16	18.3	58.1	43.9
Melanoma of the Skin	6	7.9	3	5.4	~	~
Mesothelioma	0	0.7	0	0.2	~	~
Myeloma	4	2.4	1	1.7	~	~
Non-Hodgkin Lymphoma	5	8.2	5	6.6	~	~
Oral Cavity and Pharynx	1	4.9	4	2.4	~	~
Ovary	-	-	3	4.0	-	~
Pancreas	3	3.7	5	3.5	~	~
Prostate	54	57.5	-	-	166.6	-
Soft Tissues	1	1.0	0	0.9	~	~
Stomach	2	2.3	2	1.3	~	~
Testis	0	1.2	-	-	~	-
Thyroid	0	1.5	6	3.5	~	~
Urinary Bladder	20	12.9	4	3.8	62.8	~

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-52: Nicollet County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	372	409.8	325	347.2	498.3	393.4
Brain††	5	5.8	6	4.1	~	~
Breast	0	1.0	89	105.8	~	106.5
Cervix Uteri	-	-	3	4.5	-	~
Colon and Rectum	47	37.0	31	34.9	64.0	35.8
Corpus and Uterus, NOS	-	-	30	23.2	-	35.1
Esophagus	8	6.7	2	1.8	~	~
Hodgkin Lymphoma	3	2.7	2	2.3	~	~
Kaposi Sarcoma	0	0.3	0	0.1	~	~
Kidney and Renal Pelvis	17	16.0	5	9.1	22.2	~
Larynx	3	4.4	0	1.0	~	~
Leukemia	8	14.7	10	9.4	~	12.0
Liver††	4	5.3	0	2.2	~	~
Lung and Bronchus	48	47.8	30	41.6	67.2	34.6
Melanoma of the Skin	22	20.0	11	16.4	28.1	17.1
Mesothelioma	1	1.4	0	0.4	~	~
Myeloma	5	5.5	5	3.8	~	~
Non-Hodgkin Lymphoma	15	19.5	21	15.4	21.7	24.9
Oral Cavity and Pharynx	17	12.6	7	6.1	20.3	~
Ovary	-	-	18	10.3	-	21.0
Pancreas	4	8.7	11	7.7	~	11.8
Prostate	105	135.8	-	-	135.5	-
Soft Tissues	6	2.8	3	2.4	~	~
Stomach	5	5.2	3	3.0	~	~
Testis	7	5.5	-	-	~	-
Thyroid	1	4.4	12	12.1	~	17.8
Urinary Bladder	33	27.7	4	8.4	46.2	~

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-53: Nobles County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	315	316.3	263	272.0	555.3	419.3
Brain††	4	4.1	4	2.9	~	~
Breast	0	0.8	79	80.8	~	130.7
Cervix Uteri	-	-	7	3.0	-	~
Colon and Rectum	42	29.3	39	30.1	74.0	52.5
Corpus and Uterus, NOS	-	-	22	17.6	-	38.2
Esophagus	3	5.2	4	1.5	~	~
Hodgkin Lymphoma	3	1.7	0	1.3	~	~
Kaposi Sarcoma	1	0.2	0	0.0	~	~
Kidney and Renal Pelvis	13	12.0	6	7.1	23.6	~
Larynx	2	3.3	2	0.8	~	~
Leukemia	11	11.6	6	7.8	19.7	~
Liver††	5	4.0	0	1.8	~	~
Lung and Bronchus	33	38.0	26	33.9	56.8	40.7
Melanoma of the Skin	13	15.2	12	11.3	21.6	21.9
Mesothelioma	0	1.2	0	0.4	~	~
Myeloma	7	4.3	2	3.2	~	~
Non-Hodgkin Lymphoma	12	15.2	14	12.7	20.7	20.0
Oral Cavity and Pharynx	9	9.4	2	4.8	~	~
Ovary	-	-	2	7.8	-	~
Pancreas	4	6.8	8	6.5	~	~
Prostate	100	103.7	-	-	171.4	-
Soft Tissues	2	2.0	1	1.8	~	~
Stomach	6	4.2	1	2.6	~	~
Testis	5	3.1	-	-	~	-
Thyroid	4	3.1	13	7.7	~	26.1
Urinary Bladder	19	22.9	4	7.3	33.5	~

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-54: Norman County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	139	124.4	95	106.3	618.2	363.1
Brain††	0	1.5	1	1.1	~	~
Breast	1	0.3	30	31.4	~	123.5
Cervix Uteri	-	-	1	1.1	-	~
Colon and Rectum	17	11.6	14	12.0	71.3	45.6
Corpus and Uterus, NOS	-	-	5	6.8	-	~
Esophagus	5	2.1	1	0.6	~	~
Hodgkin Lymphoma	1	0.6	0	0.4	~	~
Kaposi Sarcoma	0	0.1	0	0.0	~	~
Kidney and Renal Pelvis	3	4.6	4	2.8	~	~
Larynx	3	1.3	0	0.3	~	~
Leukemia	4	4.5	2	3.0	~	~
Liver††	0	1.5	1	0.7	~	~
Lung and Bronchus	20	15.4	11	13.8	85.2	42.4
Melanoma of the Skin	3	5.8	5	4.1	~	~
Mesothelioma	0	0.5	0	0.2	~	~
Myeloma	3	1.7	3	1.3	~	~
Non-Hodgkin Lymphoma	6	6.0	2	5.0	~	~
Oral Cavity and Pharynx	5	3.6	3	1.9	~	~
Ovary	-	-	2	3.0	-	~
Pancreas	3	2.7	1	2.6	~	~
Prostate	49	41.2	-	-	214.2	-
Soft Tissues	2	0.7	0	0.7	~	~
Stomach	1	1.7	0	1.0	~	~
Testis	0	0.9	-	-	~	-
Thyroid	2	1.1	4	2.7	~	~
Urinary Bladder	6	9.3	2	2.9	~	~

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-55: Olmsted County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	1,925	1,730.4	1,650	1,580.8	607.2	439.2
Brain††	28	25.1	24	19.1	8.6	6.7
Breast	6	4.1	499	487.0	~	133.2
Cervix Uteri	-	-	24	22.0	-	6.6
Colon and Rectum	150	157.6	122	157.2	48.5	31.7
Corpus and Uterus, NOS	-	-	104	105.5	-	26.1
Esophagus	31	28.3	11	8.2	9.5	2.9
Hodgkin Lymphoma	20	11.4	12	9.5	6.2	3.5
Kaposi Sarcoma	1	1.4	0	0.3	~	~
Kidney and Renal Pelvis	85	68.5	56	41.2	26.3	15.5
Larynx	12	18.6	0	4.7	3.8	~
Leukemia	69	62.9	41	42.7	22.1	10.9
Liver††	29	22.4	16	9.7	8.8	4.2
Lung and Bronchus	183	201.7	159	185.0	60.3	42.9
Melanoma of the Skin	181	86.0	167	76.8	54.8	46.2
Mesothelioma	4	6.0	2	1.9	~	~
Myeloma	30	23.1	15	16.9	9.6	4.2
Non-Hodgkin Lymphoma	87	83.4	66	69.4	27.2	17.1
Oral Cavity and Pharynx	65	53.5	21	27.6	19.4	5.3
Ovary	-	-	38	46.5	-	10.4
Pancreas	49	36.7	34	34.3	15.8	8.7
Prostate	565	563.8	-	-	176.4	-
Soft Tissues	14	11.8	10	10.9	4.1	2.5
Stomach	21	22.2	17	13.7	6.9	4.2
Testis	31	24.2	-	-	8.6	-
Thyroid	37	19.4	73	57.3	10.9	20.8
Urinary Bladder	137	117.4	35	37.7	46.4	9.0

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-56: Otter Tail County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	1,053	1,086.3	819	884.3	536.1	388.1
Brain††	14	12.7	7	9.2	7.6	~
Breast	2	2.6	242	265.7	~	116.9
Cervix Uteri	-	-	11	9.4	-	7.9
Colon and Rectum	113	99.7	108	95.4	58.5	45.1
Corpus and Uterus, NOS	-	-	53	59.2	-	24.4
Esophagus	20	17.9	5	5.1	9.8	~
Hodgkin Lymphoma	4	5.1	1	3.8	~	~
Kaposi Sarcoma	0	0.6	0	0.1	~	~
Kidney and Renal Pelvis	33	40.7	23	23.5	17.3	10.0
Larynx	15	11.6	3	2.7	7.2	~
Leukemia	36	38.4	19	24.1	18.7	7.8
Liver††	5	13.4	1	5.8	~	~
Lung and Bronchus	123	133.2	99	113.8	60.9	46.3
Melanoma of the Skin	37	50.3	45	35.6	20.7	27.7
Mesothelioma	3	4.1	1	1.2	~	~
Myeloma	15	14.9	16	10.4	8.3	6.6
Non-Hodgkin Lymphoma	38	51.2	40	40.8	20.8	18.4
Oral Cavity and Pharynx	26	31.5	7	15.4	13.7	~
Ovary	-	-	25	25.5	-	12.7
Pancreas	24	23.5	17	21.3	11.7	6.9
Prostate	407	367.2	-	-	200.3	-
Soft Tissues	6	6.3	8	5.4	~	~
Stomach	13	14.3	9	8.1	6.6	~
Testis	6	8.3	-	-	~	-
Thyroid	1	9.8	16	23.7	~	10.3
Urinary Bladder	76	78.9	25	23.3	38.0	10.1

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-57: Pennington County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	203	199.2	171	184.6	560.8	387.4
Brain††	3	2.6	5	2.0	~	~
Breast	0	0.5	45	55.1	~	109.9
Cervix Uteri	-	-	2	2.2	-	~
Colon and Rectum	24	18.3	17	19.9	68.6	30.7
Corpus and Uterus, NOS	-	-	13	12.0	-	28.3
Esophagus	7	3.3	1	1.0	~	~
Hodgkin Lymphoma	2	1.2	2	1.0	~	~
Kaposi Sarcoma	0	0.1	0	0.0	~	~
Kidney and Renal Pelvis	9	7.6	7	4.8	~	~
Larynx	2	2.1	0	0.5	~	~
Leukemia	2	7.2	4	5.2	~	~
Liver††	1	2.5	1	1.2	~	~
Lung and Bronchus	26	23.7	24	22.6	73.7	52.9
Melanoma of the Skin	7	9.6	3	8.1	~	~
Mesothelioma	1	0.7	1	0.3	~	~
Myeloma	2	2.7	0	2.1	~	~
Non-Hodgkin Lymphoma	3	9.5	14	8.5	~	28.6
Oral Cavity and Pharynx	13	6.0	5	3.2	34.0	~
Ovary	-	-	6	5.3	-	~
Pancreas	2	4.3	5	4.3	~	~
Prostate	74	65.5	-	-	198.5	-
Soft Tissues	3	1.3	0	1.2	~	~
Stomach	0	2.6	2	1.7	~	~
Testis	2	2.3	-	-	~	-
Thyroid	1	2.0	3	5.6	~	~
Urinary Bladder	14	14.1	4	4.8	43.5	~

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-58: Pine County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	476	465.9	369	366.7	569.0	421.5
Brain††	6	6.0	3	4.1	~	~
Breast	1	1.1	105	112.5	~	122.8
Cervix Uteri	-	-	6	4.4	-	~
Colon and Rectum	43	42.0	37	37.1	53.4	40.1
Corpus and Uterus, NOS	-	-	27	25.1	-	29.6
Esophagus	8	7.6	2	2.0	~	~
Hodgkin Lymphoma	4	2.6	2	1.8	~	~
Kaposi Sarcoma	0	0.3	0	0.1	~	~
Kidney and Renal Pelvis	22	18.1	10	9.8	25.9	10.7
Larynx	11	5.1	1	1.2	12.7	~
Leukemia	12	16.3	7	9.7	15.5	~
Liver††	9	5.9	1	2.3	~	~
Lung and Bronchus	66	55.9	50	46.3	76.1	56.4
Melanoma of the Skin	11	22.2	12	15.9	13.6	16.3
Mesothelioma	1	1.7	1	0.5	~	~
Myeloma	4	6.3	1	4.1	~	~
Non-Hodgkin Lymphoma	14	22.0	17	16.4	17.2	18.9
Oral Cavity and Pharynx	11	13.9	10	6.3	14.8	10.8
Ovary	-	-	10	10.8	-	11.3
Pancreas	7	10.0	11	8.4	~	11.9
Prostate	160	157.2	-	-	183.7	-
Soft Tissues	0	2.9	2	2.3	~	~
Stomach	10	6.0	5	3.2	13.8	~
Testis	9	5.0	-	-	~	-
Thyroid	4	4.7	10	11.3	~	14.2
Urinary Bladder	41	32.1	11	9.1	51.5	11.7

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-59: Pipestone County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	179	162.4	164	152.6	633.1	439.0
Brain††	3	1.9	4	1.5	~	~
Breast	0	0.4	69	44.3	~	206.6
Cervix Uteri	-	-	2	1.5	-	~
Colon and Rectum	22	15.3	22	17.8	75.3	43.8
Corpus and Uterus, NOS	-	-	11	9.5	-	21.8
Esophagus	1	2.7	1	0.9	~	~
Hodgkin Lymphoma	1	0.8	2	0.6	~	~
Kaposi Sarcoma	0	0.1	0	0.0	~	~
Kidney and Renal Pelvis	8	6.0	4	4.0	~	~
Larynx	5	1.7	0	0.4	~	~
Leukemia	10	6.0	6	4.5	37.1	~
Liver††	4	2.0	1	1.0	~	~
Lung and Bronchus	22	20.0	7	19.7	73.0	~
Melanoma of the Skin	7	7.6	4	5.9	~	~
Mesothelioma	0	0.6	0	0.2	~	~
Myeloma	0	2.3	2	1.9	~	~
Non-Hodgkin Lymphoma	7	7.9	6	7.4	~	~
Oral Cavity and Pharynx	3	4.7	1	2.7	~	~
Ovary	-	-	6	4.3	-	~
Pancreas	5	3.5	3	3.8	~	~
Prostate	52	52.9	-	-	175.7	-
Soft Tissues	3	1.0	0	1.0	~	~
Stomach	4	2.2	3	1.5	~	~
Testis	2	1.3	-	-	~	-
Thyroid	4	1.5	1	3.8	~	~
Urinary Bladder	11	12.4	1	4.3	36.0	~

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-60: Polk County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	470	479.1	441	429.1	545.1	437.2
Brain††	5	6.1	3	4.6	~	~
Breast	2	1.2	135	127.8	~	138.4
Cervix Uteri	-	-	7	4.8	-	~
Colon and Rectum	51	44.3	69	47.2	58.6	64.0
Corpus and Uterus, NOS	-	-	25	27.8	-	25.7
Esophagus	10	7.9	1	2.4	11.7	~
Hodgkin Lymphoma	0	2.6	3	2.1	~	~
Kaposi Sarcoma	0	0.3	1	0.1	~	~
Kidney and Renal Pelvis	16	18.2	12	11.2	19.1	12.9
Larynx	7	5.1	2	1.3	~	~
Leukemia	18	17.3	14	12.1	21.8	12.3
Liver††	4	6.1	1	2.8	~	~
Lung and Bronchus	69	57.6	36	53.1	77.9	35.3
Melanoma of the Skin	12	22.9	17	18.1	15.2	20.0
Mesothelioma	5	1.8	0	0.6	~	~
Myeloma	5	6.5	5	5.0	~	~
Non-Hodgkin Lymphoma	24	22.9	23	20.0	28.1	17.8
Oral Cavity and Pharynx	14	14.3	8	7.5	16.7	~
Ovary	-	-	7	12.3	-	~
Pancreas	15	10.3	7	10.3	17.4	~
Prostate	135	158.1	-	-	155.0	-
Soft Tissues	4	3.0	7	2.8	~	~
Stomach	5	6.3	4	4.1	~	~
Testis	3	4.8	-	-	~	-
Thyroid	1	4.7	9	12.3	~	~
Urinary Bladder	32	34.4	18	11.4	37.0	19.0

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-61: Pope County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	199	208.6	140	177.6	542.6	304.1
Brain††	1	2.4	2	1.8	~	~
Breast	0	0.5	39	52.7	~	91.5
Cervix Uteri	-	-	2	1.8	-	~
Colon and Rectum	16	19.4	20	19.9	44.2	33.4
Corpus and Uterus, NOS	-	-	11	11.6	-	25.1
Esophagus	5	3.4	0	1.0	~	~
Hodgkin Lymphoma	2	1.0	1	0.8	~	~
Kaposi Sarcoma	0	0.1	0	0.0	~	~
Kidney and Renal Pelvis	10	7.7	3	4.7	27.2	~
Larynx	3	2.2	0	0.5	~	~
Leukemia	7	7.5	3	5.0	~	~
Liver††	2	2.6	1	1.2	~	~
Lung and Bronchus	24	25.6	21	22.7	62.6	39.3
Melanoma of the Skin	9	9.7	4	7.0	~	~
Mesothelioma	1	0.8	0	0.3	~	~
Myeloma	3	2.9	2	2.1	~	~
Non-Hodgkin Lymphoma	6	9.9	2	8.3	~	~
Oral Cavity and Pharynx	7	6.1	2	3.1	~	~
Ovary	-	-	5	5.1	-	~
Pancreas	6	4.5	5	4.4	~	~
Prostate	56	69.3	-	-	144.3	-
Soft Tissues	0	1.2	0	1.1	~	~
Stomach	3	2.8	4	1.7	~	~
Testis	5	1.6	-	-	~	-
Thyroid	2	1.9	3	4.6	~	~
Urinary Bladder	16	15.5	5	4.8	41.1	~

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-62: Ramsey County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	6,274	6,193.3	5,789	6,046.5	556.3	400.5
Brain††	99	87.9	57	71.1	8.4	4.1
Breast	13	14.8	1,766	1,823.6	1.1	124.8
Cervix Uteri	-	-	76	79.9	-	5.8
Colon and Rectum	507	565.5	532	625.6	45.5	34.6
Corpus and Uterus, NOS	-	-	363	396.9	-	25.6
Esophagus	108	101.0	28	32.3	9.6	2.0
Hodgkin Lymphoma	43	40.9	25	36.7	3.5	1.8
Kaposi Sarcoma	8	4.8	3	1.1	~	~
Kidney and Renal Pelvis	227	241.8	151	157.6	19.7	10.5
Larynx	70	66.0	20	17.7	5.9	1.4
Leukemia	230	225.8	148	166.8	20.7	9.8
Liver††	113	80.2	39	37.7	9.4	2.8
Lung and Bronchus	699	726.0	734	720.5	63.9	51.0
Melanoma of the Skin	288	305.5	202	285.2	25.4	14.8
Mesothelioma	19	21.8	10	7.8	1.8	0.7
Myeloma	82	83.2	84	67.0	7.5	5.3
Non-Hodgkin Lymphoma	301	298.4	268	272.0	27.1	17.8
Oral Cavity and Pharynx	191	189.8	124	105.6	16.4	8.4
Ovary	-	-	189	176.3	-	13.2
Pancreas	146	131.7	132	135.9	13.2	8.6
Prostate	2,149	2,014.3	-	-	187.9	-
Soft Tissues	38	41.8	49	41.2	3.3	3.4
Stomach	72	79.8	48	54.4	6.6	3.2
Testis	75	86.1	-	-	6.0	-
Thyroid	56	67.6	201	207.7	5.0	15.8
Urinary Bladder	410	426.7	148	150.6	38.1	9.3

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-63: Red Lake County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	82	72.6	46	59.8	610.4	320.4
Brain††	0	0.9	0	0.6	~	~
Breast	0	0.2	16	17.9	~	121.5
Cervix Uteri	-	-	0	0.7	-	~
Colon and Rectum	11	6.7	4	6.5	78.2	~
Corpus and Uterus, NOS	-	-	1	3.9	-	~
Esophagus	0	1.2	0	0.3	~	~
Hodgkin Lymphoma	0	0.4	1	0.3	~	~
Kaposi Sarcoma	0	0.0	0	0.0	~	~
Kidney and Renal Pelvis	0	2.7	0	1.6	~	~
Larynx	1	0.8	0	0.2	~	~
Leukemia	3	2.6	0	1.7	~	~
Liver††	1	0.9	0	0.4	~	~
Lung and Bronchus	11	8.8	5	7.5	78.5	~
Melanoma of the Skin	0	3.4	2	2.5	~	~
Mesothelioma	0	0.3	0	0.1	~	~
Myeloma	2	1.0	1	0.7	~	~
Non-Hodgkin Lymphoma	2	3.4	5	2.8	~	~
Oral Cavity and Pharynx	4	2.1	2	1.0	~	~
Ovary	-	-	0	1.7	-	~
Pancreas	0	1.6	2	1.4	~	~
Prostate	28	24.2	-	-	204.6	-
Soft Tissues	2	0.4	0	0.4	~	~
Stomach	2	1.0	0	0.6	~	~
Testis	0	0.7	-	-	~	-
Thyroid	1	0.7	1	1.7	~	~
Urinary Bladder	9	5.2	3	1.6	~	~

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-64: Redwood County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	254	281.6	217	235.6	507.9	402.0
Brain††	3	3.4	6	2.4	~	~
Breast	0	0.7	68	69.6	~	125.0
Cervix Uteri	-	-	2	2.5	-	~
Colon and Rectum	32	26.3	21	26.6	68.0	32.8
Corpus and Uterus, NOS	-	-	23	15.2	-	44.6
Esophagus	5	4.6	1	1.4	~	~
Hodgkin Lymphoma	3	1.4	0	1.0	~	~
Kaposi Sarcoma	0	0.2	0	0.0	~	~
Kidney and Renal Pelvis	10	10.4	9	6.2	19.0	~
Larynx	3	3.0	0	0.7	~	~
Leukemia	9	10.3	3	6.7	~	~
Liver††	1	3.5	0	1.5	~	~
Lung and Bronchus	25	34.5	20	29.8	50.5	31.8
Melanoma of the Skin	10	13.2	12	9.3	20.5	30.7
Mesothelioma	0	1.1	0	0.3	~	~
Myeloma	7	3.9	3	2.8	~	~
Non-Hodgkin Lymphoma	9	13.5	9	11.2	~	~
Oral Cavity and Pharynx	8	8.1	2	4.1	~	~
Ovary	-	-	8	6.7	-	~
Pancreas	8	6.1	5	5.8	~	~
Prostate	80	92.7	-	-	154.8	-
Soft Tissues	0	1.7	1	1.5	~	~
Stomach	6	3.8	0	2.3	~	~
Testis	3	2.3	-	-	~	-
Thyroid	3	2.5	5	6.1	~	~
Urinary Bladder	20	21.1	5	6.5	39.0	~

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-65: Renville County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	322	280.6	241	233.6	647.1	436.5
Brain††	2	3.4	5	2.4	~	~
Breast	3	0.7	61	69.6	~	111.3
Cervix Uteri	-	-	1	2.5	-	~
Colon and Rectum	28	26.2	30	26.0	55.7	55.3
Corpus and Uterus, NOS	-	-	18	15.1	-	27.5
Esophagus	4	4.6	3	1.3	~	~
Hodgkin Lymphoma	1	1.4	0	1.0	~	~
Kaposi Sarcoma	0	0.2	0	0.0	~	~
Kidney and Renal Pelvis	12	10.6	9	6.1	25.2	~
Larynx	7	3.0	0	0.7	~	~
Leukemia	13	10.2	8	6.6	25.8	~
Liver††	1	3.5	0	1.5	~	~
Lung and Bronchus	36	34.1	16	29.4	71.9	30.0
Melanoma of the Skin	10	13.3	15	9.5	18.8	38.4
Mesothelioma	3	1.1	1	0.3	~	~
Myeloma	3	3.9	1	2.8	~	~
Non-Hodgkin Lymphoma	12	13.5	12	11.0	23.2	20.8
Oral Cavity and Pharynx	3	8.3	5	4.1	~	~
Ovary	-	-	8	6.7	-	~
Pancreas	7	6.1	7	5.7	~	~
Prostate	125	92.2	-	-	241.9	-
Soft Tissues	1	1.7	3	1.5	~	~
Stomach	4	3.8	4	2.2	~	~
Testis	4	2.4	-	-	~	-
Thyroid	3	2.6	8	6.4	~	~
Urinary Bladder	25	20.7	7	6.3	48.4	~

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-66: Rice County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	710	771.4	652	672.9	509.3	405.0
Brain††	9	11.2	14	8.1	~	9.2
Breast	2	1.8	200	205.5	~	126.1
Cervix Uteri	-	-	6	8.8	-	~
Colon and Rectum	62	69.8	71	68.0	45.0	41.7
Corpus and Uterus, NOS	-	-	51	44.7	-	31.1
Esophagus	18	12.5	2	3.5	13.0	~
Hodgkin Lymphoma	2	5.3	4	4.2	~	~
Kaposi Sarcoma	0	0.6	0	0.1	~	~
Kidney and Renal Pelvis	30	30.4	12	17.6	20.7	7.3
Larynx	3	8.3	0	2.0	~	~
Leukemia	42	27.8	21	18.4	29.7	12.8
Liver††	10	9.9	1	4.2	5.5	~
Lung and Bronchus	96	89.9	78	80.0	68.9	49.8
Melanoma of the Skin	30	38.2	20	31.8	22.0	13.2
Mesothelioma	1	2.7	1	0.8	~	~
Myeloma	6	10.3	11	7.3	~	6.8
Non-Hodgkin Lymphoma	38	37.1	26	29.9	27.6	14.8
Oral Cavity and Pharynx	27	23.7	12	11.8	17.9	7.7
Ovary	-	-	17	19.8	-	11.2
Pancreas	18	16.3	11	14.9	13.6	6.6
Prostate	207	252.7	-	-	147.0	-
Soft Tissues	1	5.3	1	4.6	~	~
Stomach	7	9.8	5	5.9	~	~
Testis	4	11.0	-	-	~	-
Thyroid	12	8.7	25	23.5	8.3	17.3
Urinary Bladder	56	51.9	20	16.3	44.1	10.6

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-67: Rock County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	154	160.0	113	142.5	557.1	315.1
Brain††	3	1.9	0	1.5	~	~
Breast	0	0.4	35	41.9	~	106.2
Cervix Uteri	-	-	1	1.5	-	~
Colon and Rectum	12	14.8	14	16.1	42.1	38.3
Corpus and Uterus, NOS	-	-	14	9.1	-	37.2
Esophagus	2	2.6	1	0.8	~	~
Hodgkin Lymphoma	5	0.8	0	0.6	~	~
Kaposi Sarcoma	0	0.1	0	0.0	~	~
Kidney and Renal Pelvis	5	6.0	0	3.7	~	~
Larynx	3	1.7	0	0.4	~	~
Leukemia	5	5.8	1	4.1	~	~
Liver††	1	2.0	0	0.9	~	~
Lung and Bronchus	14	19.6	12	18.0	44.5	33.9
Melanoma of the Skin	10	7.5	3	5.7	33.7	~
Mesothelioma	0	0.6	0	0.2	~	~
Myeloma	3	2.2	2	1.7	~	~
Non-Hodgkin Lymphoma	6	7.7	7	6.8	~	~
Oral Cavity and Pharynx	6	4.7	1	2.5	~	~
Ovary	-	-	4	4.0	-	~
Pancreas	2	3.5	2	3.5	~	~
Prostate	47	52.8	-	-	160.6	-
Soft Tissues	2	1.0	0	0.9	~	~
Stomach	3	2.1	1	1.4	~	~
Testis	4	1.4	-	-	~	-
Thyroid	1	1.5	4	3.8	~	~
Urinary Bladder	11	11.8	5	3.9	40.0	~

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-68: Roseau County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	227	226.1	181	184.0	554.6	412.7
Brain††	1	3.1	1	2.1	~	~
Breast	0	0.5	52	57.0	~	122.6
Cervix Uteri	-	-	2	2.4	-	~
Colon and Rectum	22	20.7	16	18.7	56.9	35.0
Corpus and Uterus, NOS	-	-	16	12.3	-	34.3
Esophagus	2	3.7	2	1.0	~	~
Hodgkin Lymphoma	0	1.3	0	1.0	~	~
Kaposi Sarcoma	1	0.2	0	0.0	~	~
Kidney and Renal Pelvis	9	8.9	7	4.8	~	~
Larynx	1	2.4	1	0.5	~	~
Leukemia	7	8.2	4	5.0	~	~
Liver††	2	2.9	0	1.1	~	~
Lung and Bronchus	17	26.5	19	21.6	41.6	43.2
Melanoma of the Skin	10	11.2	8	8.5	26.9	~
Mesothelioma	0	0.8	0	0.2	~	~
Myeloma	3	3.0	4	2.0	~	~
Non-Hodgkin Lymphoma	10	10.9	12	8.2	25.0	22.9
Oral Cavity and Pharynx	8	7.0	0	3.2	~	~
Ovary	-	-	1	5.4	-	~
Pancreas	8	4.8	5	4.1	~	~
Prostate	84	74.3	-	-	200.2	-
Soft Tissues	1	1.5	1	1.2	~	~
Stomach	1	2.9	4	1.6	~	~
Testis	6	2.6	-	-	~	-
Thyroid	2	2.5	8	6.3	~	~
Urinary Bladder	18	15.5	8	4.5	43.7	~

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-69: St Louis County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	3,123	3,055.7	2,721	2,692.5	568.0	427.8
Brain††	49	39.2	22	29.1	9.8	4.4
Breast	13	7.3	787	813.6	2.3	128.3
Cervix Uteri	-	-	35	30.8	-	7.3
Colon and Rectum	287	279.9	274	286.2	52.4	39.0
Corpus and Uterus, NOS	-	-	182	179.4	-	28.1
Esophagus	66	50.3	10	14.9	11.4	1.4
Hodgkin Lymphoma	21	17.0	10	14.1	4.1	1.9
Kaposi Sarcoma	0	2.0	0	0.4	~	~
Kidney and Renal Pelvis	115	117.2	68	70.7	20.8	10.2
Larynx	36	33.0	14	8.1	6.3	2.3
Leukemia	95	108.6	59	73.7	17.6	8.7
Liver††	34	39.4	19	17.2	5.9	2.9
Lung and Bronchus	392	365.0	359	332.2	70.4	54.0
Melanoma of the Skin	151	146.0	103	115.8	27.1	19.3
Mesothelioma	24	11.0	6	3.6	4.7	~
Myeloma	35	41.3	23	30.8	6.6	3.3
Non-Hodgkin Lymphoma	147	145.2	131	123.1	28.0	19.4
Oral Cavity and Pharynx	113	92.1	59	47.1	20.4	8.9
Ovary	-	-	87	78.6	-	13.6
Pancreas	62	65.7	76	62.7	11.4	11.0
Prostate	962	1,019.2	-	-	170.0	-
Soft Tissues	17	19.0	17	17.1	3.7	3.2
Stomach	55	39.7	30	24.5	10.0	4.2
Testis	31	31.2	-	-	7.8	-
Thyroid	28	30.2	64	80.7	4.9	13.0
Urinary Bladder	235	214.5	82	69.3	43.4	12.3

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-70: Scott County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	1,127	1,161.1	1,063	1,037.1	543.2	431.0
Brain††	22	20.6	11	14.8	8.1	4.0
Breast	6	2.8	342	335.3	~	130.3
Cervix Uteri	-	-	15	19.0	-	5.3
Colon and Rectum	113	103.6	97	88.7	57.6	43.3
Corpus and Uterus, NOS	-	-	59	70.0	-	22.2
Esophagus	21	18.8	5	4.6	11.3	~
Hodgkin Lymphoma	12	9.8	10	7.7	3.8	4.1
Kaposi Sarcoma	0	1.3	0	0.2	~	~
Kidney and Renal Pelvis	38	50.0	23	26.7	16.0	9.1
Larynx	10	12.7	3	3.0	5.5	~
Leukemia	38	42.5	29	26.8	21.3	12.6
Liver††	12	15.9	6	5.8	5.6	~
Lung and Bronchus	123	126.2	122	107.7	69.5	55.5
Melanoma of the Skin	67	62.5	73	60.6	29.0	27.3
Mesothelioma	3	3.4	2	1.0	~	~
Myeloma	8	15.0	7	9.5	~	~
Non-Hodgkin Lymphoma	61	57.0	30	41.9	26.6	14.7
Oral Cavity and Pharynx	34	39.1	21	18.1	14.0	7.4
Ovary	-	-	31	31.4	-	11.9
Pancreas	32	24.1	19	19.1	17.0	10.0
Prostate	316	369.4	-	-	154.7	-
Soft Tissues	14	9.1	10	8.0	6.6	3.7
Stomach	23	14.1	13	8.0	11.3	6.7
Testis	38	23.2	-	-	11.4	-
Thyroid	23	16.5	59	50.3	8.4	18.9
Urinary Bladder	53	69.3	24	20.7	29.6	10.7

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-71: Sherburne County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	770	796.9	747	704.0	568.7	451.2
Brain††	20	14.0	14	9.9	12.6	7.8
Breast	2	1.9	243	225.4	~	136.3
Cervix Uteri	-	-	6	12.4	-	~
Colon and Rectum	53	70.6	65	61.9	44.6	46.6
Corpus and Uterus, NOS	-	-	50	47.5	-	29.1
Esophagus	13	12.9	2	3.2	9.0	~
Hodgkin Lymphoma	5	6.9	5	5.3	~	~
Kaposi Sarcoma	2	0.8	0	0.1	~	~
Kidney and Renal Pelvis	28	33.8	25	18.1	17.4	17.0
Larynx	3	8.7	0	2.0	~	~
Leukemia	32	29.1	21	18.5	22.3	12.7
Liver††	11	10.8	3	4.0	6.5	~
Lung and Bronchus	85	87.1	86	73.8	69.6	61.7
Melanoma of the Skin	44	42.3	45	40.4	30.6	23.6
Mesothelioma	2	2.4	1	0.7	~	~
Myeloma	15	10.3	4	6.6	12.4	~
Non-Hodgkin Lymphoma	37	38.8	36	28.9	25.4	22.1
Oral Cavity and Pharynx	18	26.4	12	12.3	13.4	7.2
Ovary	-	-	20	21.3	-	12.3
Pancreas	14	16.5	15	13.3	10.7	10.1
Prostate	265	255.7	-	-	193.5	-
Soft Tissues	5	6.2	3	5.4	~	~
Stomach	11	9.6	6	5.5	8.4	~
Testis	19	16.3	-	-	8.3	-
Thyroid	8	11.0	38	32.9	~	18.6
Urinary Bladder	51	47.8	11	14.5	47.4	6.6

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-72: Sibley County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	213	230.6	176	194.8	513.4	385.0
Brain††	1	3.0	2	2.2	~	~
Breast	0	0.6	42	58.5	~	94.8
Cervix Uteri	-	-	2	2.3	-	~
Colon and Rectum	18	21.2	16	20.9	42.1	30.4
Corpus and Uterus, NOS	-	-	10	12.6	-	21.7
Esophagus	2	3.8	0	1.1	~	~
Hodgkin Lymphoma	1	1.3	2	1.0	~	~
Kaposi Sarcoma	0	0.2	0	0.0	~	~
Kidney and Renal Pelvis	6	8.9	7	5.1	~	~
Larynx	2	2.5	1	0.6	~	~
Leukemia	4	8.3	3	5.4	~	~
Liver††	1	2.9	3	1.2	~	~
Lung and Bronchus	27	27.7	30	24.2	64.7	64.7
Melanoma of the Skin	9	11.1	5	8.4	~	~
Mesothelioma	1	0.9	0	0.3	~	~
Myeloma	3	3.1	5	2.2	~	~
Non-Hodgkin Lymphoma	14	11.1	12	8.9	34.4	27.9
Oral Cavity and Pharynx	4	6.9	1	3.4	~	~
Ovary	-	-	4	5.6	-	~
Pancreas	7	4.9	4	4.6	~	~
Prostate	81	76.0	-	-	192.0	-
Soft Tissues	4	1.5	1	1.3	~	~
Stomach	4	3.0	3	1.8	~	~
Testis	1	2.4	-	-	~	-
Thyroid	0	2.3	2	5.9	~	~
Urinary Bladder	12	16.4	5	5.0	29.1	~

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-73: Stearns County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	1,875	1,865.8	1,550	1,565.0	563.9	415.2
Brain††	27	26.5	20	18.9	7.8	5.3
Breast	9	4.5	466	476.5	~	127.5
Cervix Uteri	-	-	15	20.3	-	4.8
Colon and Rectum	169	169.3	154	156.6	51.2	38.7
Corpus and Uterus, NOS	-	-	96	103.7	-	25.5
Esophagus	28	30.3	13	8.3	8.3	3.2
Hodgkin Lymphoma	16	12.4	10	10.4	4.9	2.7
Kaposi Sarcoma	0	1.4	0	0.2	~	~
Kidney and Renal Pelvis	79	72.6	54	41.1	23.8	14.3
Larynx	13	20.0	4	4.7	3.8	~
Leukemia	55	67.4	48	42.6	16.9	12.6
Liver††	17	23.8	5	9.8	5.0	~
Lung and Bronchus	212	220.2	181	188.7	65.0	48.1
Melanoma of the Skin	88	91.1	82	74.5	26.8	23.9
Mesothelioma	5	6.6	1	2.0	~	~
Myeloma	28	25.0	12	17.1	8.3	3.2
Non-Hodgkin Lymphoma	85	89.6	71	69.5	25.5	18.9
Oral Cavity and Pharynx	50	56.6	20	27.2	14.6	5.4
Ovary	-	-	45	46.1	-	12.0
Pancreas	35	39.7	28	34.5	10.6	7.3
Prostate	664	611.1	-	-	195.7	-
Soft Tissues	7	12.6	8	10.7	~	~
Stomach	18	23.9	13	13.6	5.5	3.5
Testis	23	25.5	-	-	6.5	-
Thyroid	18	20.1	64	55.1	5.5	18.3
Urinary Bladder	147	128.1	44	37.8	46.8	10.9

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-74: Steele County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	492	484.6	401	432.8	564.5	387.0
Brain††	6	6.7	12	5.1	~	12.2
Breast	0	1.2	123	132.0	~	117.3
Cervix Uteri	-	-	6	5.6	-	~
Colon and Rectum	44	44.4	63	44.3	50.5	59.3
Corpus and Uterus, NOS	-	-	22	28.6	-	20.8
Esophagus	11	7.9	4	2.3	13.7	~
Hodgkin Lymphoma	2	3.0	2	2.4	~	~
Kaposi Sarcoma	0	0.4	0	0.1	~	~
Kidney and Renal Pelvis	22	19.0	13	11.4	25.4	12.2
Larynx	3	5.2	1	1.3	~	~
Leukemia	20	17.6	16	11.8	23.9	15.1
Liver††	6	6.3	3	2.7	~	~
Lung and Bronchus	53	57.1	34	52.2	62.1	33.1
Melanoma of the Skin	22	23.8	19	19.9	26.0	19.2
Mesothelioma	0	1.7	0	0.6	~	~
Myeloma	4	6.5	2	4.8	~	~
Non-Hodgkin Lymphoma	23	23.3	19	19.4	26.0	16.1
Oral Cavity and Pharynx	11	14.8	5	7.5	11.6	~
Ovary	-	-	10	12.6	-	9.4
Pancreas	9	10.3	9	9.7	~	~
Prostate	170	158.5	-	-	192.8	-
Soft Tissues	2	3.2	3	2.9	~	~
Stomach	6	6.3	1	3.8	~	~
Testis	6	5.9	-	-	~	-
Thyroid	3	5.2	11	14.5	~	12.7
Urinary Bladder	38	33.5	5	10.7	44.8	~

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-75: Stevens County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	140	146.6	110	125.3	558.6	387.6
Brain††	2	1.8	1	1.3	~	~
Breast	0	0.4	43	36.1	~	160.5
Cervix Uteri	-	-	0	1.3	-	~
Colon and Rectum	8	13.9	14	14.3	~	35.2
Corpus and Uterus, NOS	-	-	6	7.8	-	~
Esophagus	3	2.4	0	0.7	~	~
Hodgkin Lymphoma	1	0.8	2	0.8	~	~
Kaposi Sarcoma	0	0.1	0	0.0	~	~
Kidney and Renal Pelvis	3	5.3	4	3.3	~	~
Larynx	2	1.5	0	0.4	~	~
Leukemia	5	5.5	3	3.7	~	~
Liver††	2	1.8	0	0.8	~	~
Lung and Bronchus	14	17.9	11	15.7	55.6	32.8
Melanoma of the Skin	12	7.0	4	5.2	49.2	~
Mesothelioma	0	0.6	0	0.2	~	~
Myeloma	3	2.0	0	1.5	~	~
Non-Hodgkin Lymphoma	3	7.2	4	6.0	~	~
Oral Cavity and Pharynx	1	4.3	3	2.2	~	~
Ovary	-	-	1	3.6	-	~
Pancreas	4	3.2	1	3.1	~	~
Prostate	52	46.9	-	-	205.6	-
Soft Tissues	1	0.9	0	0.8	~	~
Stomach	1	2.0	1	1.2	~	~
Testis	2	1.5	-	-	~	-
Thyroid	2	1.3	2	3.5	~	~
Urinary Bladder	11	11.2	4	3.5	42.9	~

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-76: Swift County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	187	186.2	186	154.8	566.4	501.8
Brain††	3	2.4	3	1.5	~	~
Breast	0	0.5	57	45.0	~	160.2
Cervix Uteri	-	-	3	1.5	-	~
Colon and Rectum	17	17.6	30	18.0	48.8	63.8
Corpus and Uterus, NOS	-	-	8	9.8	-	~
Esophagus	4	3.1	2	0.9	~	~
Hodgkin Lymphoma	0	1.1	0	0.6	~	~
Kaposi Sarcoma	0	0.1	0	0.0	~	~
Kidney and Renal Pelvis	11	7.0	1	4.1	33.9	~
Larynx	1	1.9	0	0.5	~	~
Leukemia	1	6.8	6	4.5	~	~
Liver††	4	2.3	1	1.0	~	~
Lung and Bronchus	17	22.3	19	19.9	52.6	45.1
Melanoma of the Skin	7	9.2	11	5.9	~	36.4
Mesothelioma	0	0.7	0	0.2	~	~
Myeloma	4	2.5	1	1.9	~	~
Non-Hodgkin Lymphoma	11	9.1	8	7.5	32.6	~
Oral Cavity and Pharynx	2	5.6	6	2.7	~	~
Ovary	-	-	2	4.3	-	~
Pancreas	3	4.0	2	3.9	~	~
Prostate	66	59.1	-	-	203.3	-
Soft Tissues	1	1.2	3	1.0	~	~
Stomach	3	2.5	1	1.5	~	~
Testis	3	2.3	-	-	~	-
Thyroid	3	1.9	5	3.8	~	~
Urinary Bladder	17	13.7	5	4.4	49.9	~

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-77: Todd County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	390	404.4	293	322.1	542.3	375.2
Brain††	4	5.1	1	3.5	~	~
Breast	2	1.0	75	98.3	~	95.7
Cervix Uteri	-	-	3	3.7	-	~
Colon and Rectum	47	36.7	41	33.4	65.7	48.3
Corpus and Uterus, NOS	-	-	22	21.8	-	28.9
Esophagus	9	6.6	1	1.8	~	~
Hodgkin Lymphoma	3	2.1	1	1.5	~	~
Kaposi Sarcoma	0	0.2	0	0.0	~	~
Kidney and Renal Pelvis	18	15.5	11	8.6	25.2	12.9
Larynx	4	4.4	0	1.0	~	~
Leukemia	5	14.3	9	8.7	~	~
Liver††	2	5.1	2	2.1	~	~
Lung and Bronchus	47	48.7	33	40.5	65.2	39.4
Melanoma of the Skin	10	19.1	11	13.6	12.5	15.0
Mesothelioma	1	1.5	0	0.4	~	~
Myeloma	3	5.5	7	3.7	~	~
Non-Hodgkin Lymphoma	18	19.0	24	14.6	25.4	30.4
Oral Cavity and Pharynx	13	12.0	4	5.6	17.4	~
Ovary	-	-	8	9.4	-	~
Pancreas	4	8.7	5	7.5	~	~
Prostate	149	136.7	-	-	201.0	-
Soft Tissues	7	2.4	5	2.0	~	~
Stomach	7	5.2	1	2.9	~	~
Testis	5	3.7	-	-	~	-
Thyroid	2	3.9	7	9.5	~	~
Urinary Bladder	17	28.3	4	8.2	24.0	~

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-78: Traverse County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	84	84.5	55	67.2	508.5	416.5
Brain††	0	0.9	0	0.6	~	~
Breast	1	0.2	13	19.2	~	75.6
Cervix Uteri	-	-	0	0.6	-	~
Colon and Rectum	10	8.2	9	8.1	55.4	~
Corpus and Uterus, NOS	-	-	5	4.1	-	~
Esophagus	2	1.4	0	0.4	~	~
Hodgkin Lymphoma	1	0.3	1	0.3	~	~
Kaposi Sarcoma	0	0.0	0	0.0	~	~
Kidney and Renal Pelvis	6	2.9	0	1.8	~	~
Larynx	0	0.9	1	0.2	~	~
Leukemia	3	3.2	1	2.0	~	~
Liver††	0	1.0	2	0.5	~	~
Lung and Bronchus	9	10.8	5	8.9	~	~
Melanoma of the Skin	3	3.9	3	2.4	~	~
Mesothelioma	0	0.4	0	0.1	~	~
Myeloma	1	1.2	1	0.9	~	~
Non-Hodgkin Lymphoma	5	4.1	3	3.3	~	~
Oral Cavity and Pharynx	4	2.3	0	1.2	~	~
Ovary	-	-	2	1.8	-	~
Pancreas	5	1.9	2	1.8	~	~
Prostate	25	27.0	-	-	152.4	-
Soft Tissues	0	0.5	0	0.4	~	~
Stomach	1	1.2	1	0.7	~	~
Testis	0	0.5	-	-	~	-
Thyroid	0	0.7	3	1.5	~	~
Urinary Bladder	5	7.0	3	2.0	~	~

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-79: Wabasha County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	349	362.5	296	292.2	535.5	437.5
Brain††	6	4.6	3	3.2	~	~
Breast	0	0.9	85	89.6	~	120.7
Cervix Uteri	-	-	1	3.5	-	~
Colon and Rectum	43	33.3	33	30.2	66.4	43.4
Corpus and Uterus, NOS	-	-	22	19.7	-	30.3
Esophagus	4	6.0	4	1.6	~	~
Hodgkin Lymphoma	2	1.9	4	1.4	~	~
Kaposi Sarcoma	0	0.2	0	0.0	~	~
Kidney and Renal Pelvis	16	13.9	12	7.7	25.8	18.0
Larynx	3	3.9	1	0.9	~	~
Leukemia	14	12.9	7	7.9	21.2	~
Liver††	5	4.6	2	1.8	~	~
Lung and Bronchus	58	43.5	33	36.0	89.3	46.5
Melanoma of the Skin	23	17.3	15	12.7	34.9	29.4
Mesothelioma	0	1.3	0	0.4	~	~
Myeloma	5	4.9	0	3.3	~	~
Non-Hodgkin Lymphoma	16	17.2	10	13.2	23.0	13.1
Oral Cavity and Pharynx	7	10.8	5	5.1	~	~
Ovary	-	-	8	8.6	-	~
Pancreas	8	7.8	3	6.7	~	~
Prostate	88	121.0	-	-	131.3	-
Soft Tissues	1	2.2	5	1.9	~	~
Stomach	2	4.7	2	2.6	~	~
Testis	7	3.4	-	-	~	-
Thyroid	5	3.5	11	9.0	~	20.4
Urinary Bladder	24	25.7	7	7.3	36.8	~

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-80: Wadena County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	258	244.8	217	209.9	597.8	438.1
Brain††	3	2.9	1	2.2	~	~
Breast	0	0.6	58	61.3	~	118.8
Cervix Uteri	-	-	4	2.1	-	~
Colon and Rectum	25	22.7	23	23.7	55.1	37.6
Corpus and Uterus, NOS	-	-	19	13.4	-	39.3
Esophagus	4	4.0	0	1.2	~	~
Hodgkin Lymphoma	0	1.2	0	0.9	~	~
Kaposi Sarcoma	0	0.1	0	0.0	~	~
Kidney and Renal Pelvis	16	9.0	8	5.6	37.9	~
Larynx	3	2.6	1	0.6	~	~
Leukemia	12	8.9	8	6.0	29.8	~
Liver††	0	3.0	1	1.4	~	~
Lung and Bronchus	26	30.4	26	27.5	56.5	46.7
Melanoma of the Skin	11	11.3	9	8.2	26.9	~
Mesothelioma	0	1.0	0	0.3	~	~
Myeloma	2	3.4	1	2.6	~	~
Non-Hodgkin Lymphoma	18	11.7	11	10.0	44.7	20.6
Oral Cavity and Pharynx	5	6.9	0	3.6	~	~
Ovary	-	-	7	5.9	-	~
Pancreas	3	5.3	6	5.2	~	~
Prostate	77	81.2	-	-	173.8	-
Soft Tissues	2	1.4	1	1.3	~	~
Stomach	4	3.3	1	2.0	~	~
Testis	3	2.0	-	-	~	-
Thyroid	2	2.2	5	5.3	~	~
Urinary Bladder	31	18.4	12	5.8	66.7	23.4

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-81: Waseca County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	270	270.8	230	232.9	553.4	426.2
Brain††	6	3.8	2	2.6	~	~
Breast	1	0.6	69	70.4	~	132.0
Cervix Uteri	-	-	3	2.8	-	~
Colon and Rectum	22	25.0	23	24.6	47.3	38.7
Corpus and Uterus, NOS	-	-	14	15.3	-	25.0
Esophagus	5	4.4	2	1.3	~	~
Hodgkin Lymphoma	1	1.7	1	1.2	~	~
Kaposi Sarcoma	0	0.2	0	0.0	~	~
Kidney and Renal Pelvis	9	10.6	8	6.1	~	~
Larynx	3	2.9	1	0.7	~	~
Leukemia	4	9.9	7	6.5	~	~
Liver††	5	3.5	1	1.5	~	~
Lung and Bronchus	32	31.7	27	28.4	65.8	49.0
Melanoma of the Skin	16	13.5	4	10.3	34.4	~
Mesothelioma	2	1.0	0	0.3	~	~
Myeloma	4	3.7	1	2.6	~	~
Non-Hodgkin Lymphoma	16	13.1	19	10.6	30.2	38.1
Oral Cavity and Pharynx	7	8.4	4	4.1	~	~
Ovary	-	-	6	6.8	-	~
Pancreas	7	5.8	9	5.4	~	~
Prostate	83	87.3	-	-	169.1	-
Soft Tissues	3	1.8	2	1.5	~	~
Stomach	6	3.5	1	2.1	~	~
Testis	2	3.6	-	-	~	-
Thyroid	1	3.0	5	7.3	~	~
Urinary Bladder	20	18.9	6	5.9	43.3	~

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-82: Washington County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	2,687	2,580.3	2,519	2,288.6	596.9	465.2
Brain††	46	40.2	23	29.2	8.5	4.1
Breast	7	6.1	862	740.7	~	149.2
Cervix Uteri	-	-	41	35.1	-	7.4
Colon and Rectum	239	230.1	219	205.5	54.0	43.3
Corpus and Uterus, NOS	-	-	181	160.8	-	30.8
Esophagus	42	42.5	10	10.9	7.7	1.8
Hodgkin Lymphoma	12	18.0	17	14.0	2.3	3.3
Kaposi Sarcoma	1	2.3	0	0.3	~	~
Kidney and Renal Pelvis	108	107.8	55	59.8	21.2	10.5
Larynx	24	28.8	5	6.9	5.0	~
Leukemia	114	91.2	65	57.7	26.4	13.0
Liver††	37	35.3	16	13.3	7.4	3.2
Lung and Bronchus	260	289.9	282	254.1	64.5	57.8
Melanoma of the Skin	146	131.6	146	118.8	31.8	26.4
Mesothelioma	14	7.9	1	2.5	3.5	~
Myeloma	42	33.7	20	22.5	10.3	3.9
Non-Hodgkin Lymphoma	144	123.4	106	94.8	32.5	20.8
Oral Cavity and Pharynx	63	84.4	35	40.0	12.3	6.3
Ovary	-	-	84	69.8	-	15.2
Pancreas	33	54.5	56	45.1	7.4	11.2
Prostate	939	856.8	-	-	200.5	-
Soft Tissues	24	18.1	13	15.9	5.3	2.2
Stomach	25	31.5	13	18.0	5.0	2.7
Testis	32	37.8	-	-	6.1	-
Thyroid	32	31.8	113	93.6	6.2	19.7
Urinary Bladder	172	159.3	50	48.7	46.5	10.5

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-83: Watonwan County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	193	190.0	149	160.3	561.7	390.5
Brain††	3	2.3	1	1.7	~	~
Breast	0	0.5	40	47.0	~	112.1
Cervix Uteri	-	-	2	1.7	-	~
Colon and Rectum	24	17.7	12	18.1	65.8	26.3
Corpus and Uterus, NOS	-	-	11	10.2	-	25.4
Esophagus	2	3.1	1	0.9	~	~
Hodgkin Lymphoma	3	0.9	0	0.7	~	~
Kaposi Sarcoma	0	0.1	0	0.0	~	~
Kidney and Renal Pelvis	6	7.1	3	4.2	~	~
Larynx	0	2.0	0	0.5	~	~
Leukemia	5	6.9	1	4.6	~	~
Liver††	1	2.3	0	1.1	~	~
Lung and Bronchus	24	23.3	23	20.3	67.1	55.6
Melanoma of the Skin	8	8.9	11	6.5	~	29.3
Mesothelioma	0	0.7	0	0.2	~	~
Myeloma	1	2.6	1	1.9	~	~
Non-Hodgkin Lymphoma	11	9.1	10	7.6	33.5	26.2
Oral Cavity and Pharynx	8	5.5	5	2.8	~	~
Ovary	-	-	2	4.5	-	~
Pancreas	4	4.1	7	3.9	~	~
Prostate	62	62.8	-	-	176.3	-
Soft Tissues	0	1.1	1	1.0	~	~
Stomach	3	2.5	3	1.6	~	~
Testis	4	1.5	-	-	~	-
Thyroid	0	1.7	3	4.3	~	~
Urinary Bladder	13	14.1	1	4.4	37.1	~

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-84: Wilkin County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	94	106.7	85	89.6	497.8	364.9
Brain††	1	1.3	0	1.0	~	~
Breast	1	0.3	27	27.2	~	127.0
Cervix Uteri	-	-	1	1.0	-	~
Colon and Rectum	12	9.9	14	9.5	65.2	53.3
Corpus and Uterus, NOS	-	-	3	5.9	-	~
Esophagus	2	1.8	0	0.5	~	~
Hodgkin Lymphoma	0	0.6	0	0.4	~	~
Kaposi Sarcoma	0	0.1	0	0.0	~	~
Kidney and Renal Pelvis	3	4.1	2	2.4	~	~
Larynx	1	1.1	0	0.3	~	~
Leukemia	2	3.8	3	2.5	~	~
Liver††	1	1.3	0	0.6	~	~
Lung and Bronchus	8	13.0	13	11.1	~	61.3
Melanoma of the Skin	5	5.1	1	3.8	~	~
Mesothelioma	2	0.4	0	0.1	~	~
Myeloma	2	1.5	3	1.0	~	~
Non-Hodgkin Lymphoma	6	5.1	5	4.1	~	~
Oral Cavity and Pharynx	4	3.2	1	1.6	~	~
Ovary	-	-	1	2.6	-	~
Pancreas	1	2.3	2	2.1	~	~
Prostate	29	35.1	-	-	149.9	-
Soft Tissues	0	0.7	0	0.6	~	~
Stomach	2	1.4	1	0.8	~	~
Testis	0	1.0	-	-	~	-
Thyroid	1	1.0	1	2.6	~	~
Urinary Bladder	9	7.7	2	2.3	~	~

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-85: Winona County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	610	665.7	557	579.7	507.6	399.2
Brain††	8	9.0	5	6.6	~	~
Breast	0	1.6	183	173.4	~	135.3
Cervix Uteri	-	-	5	6.9	-	~
Colon and Rectum	65	60.8	58	61.2	54.5	39.7
Corpus and Uterus, NOS	-	-	39	37.9	-	28.3
Esophagus	9	10.9	3	3.2	~	~
Hodgkin Lymphoma	3	4.2	4	3.8	~	~
Kaposi Sarcoma	0	0.4	1	0.1	~	~
Kidney and Renal Pelvis	15	25.4	17	15.1	12.8	12.5
Larynx	8	7.1	4	1.7	~	~
Leukemia	26	24.0	12	16.2	21.6	6.2
Liver††	8	8.5	3	3.7	~	~
Lung and Bronchus	83	79.0	70	70.0	70.9	50.1
Melanoma of the Skin	29	32.0	21	26.4	24.4	16.9
Mesothelioma	1	2.4	0	0.8	~	~
Myeloma	10	8.9	5	6.5	8.0	~
Non-Hodgkin Lymphoma	29	31.8	19	26.5	24.3	13.2
Oral Cavity and Pharynx	19	20.0	10	10.2	15.0	7.8
Ovary	-	-	15	17.0	-	11.3
Pancreas	13	14.2	17	13.3	10.6	12.0
Prostate	182	219.7	-	-	149.2	-
Soft Tissues	7	4.4	1	3.9	~	~
Stomach	6	8.6	4	5.3	~	~
Testis	5	8.2	-	-	~	-
Thyroid	6	6.8	18	18.8	~	14.5
Urinary Bladder	51	46.5	14	14.8	43.9	8.8

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-86: Wright County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	1,184	1,237.2	1,040	1,068.1	535.6	407.3
Brain††	21	20.0	17	14.3	7.7	6.1
Breast	1	2.9	292	336.8	~	109.5
Cervix Uteri	-	-	18	17.2	-	6.2
Colon and Rectum	102	110.5	86	97.9	49.6	35.7
Corpus and Uterus, NOS	-	-	64	71.8	-	24.8
Esophagus	12	20.0	6	5.1	6.8	~
Hodgkin Lymphoma	8	9.3	8	7.3	~	~
Kaposi Sarcoma	0	1.1	0	0.2	~	~
Kidney and Renal Pelvis	53	51.2	37	27.8	22.1	14.3
Larynx	11	13.5	3	3.1	4.9	~
Leukemia	40	45.1	19	28.4	19.6	6.8
Liver††	16	16.3	2	6.3	7.1	~
Lung and Bronchus	135	139.6	148	118.8	68.3	62.7
Melanoma of the Skin	47	63.5	58	57.1	20.2	21.2
Mesothelioma	2	3.9	2	1.2	~	~
Myeloma	19	16.2	16	10.6	9.2	6.1
Non-Hodgkin Lymphoma	57	59.8	44	44.9	24.8	18.0
Oral Cavity and Pharynx	46	39.6	26	18.6	18.6	10.1
Ovary	-	-	26	31.9	-	10.1
Pancreas	30	26.0	30	21.4	12.4	12.5
Prostate	417	402.5	-	-	186.8	-
Soft Tissues	9	9.1	5	7.9	~	~
Stomach	16	15.3	9	8.7	7.3	~
Testis	17	20.7	-	-	5.9	-
Thyroid	13	15.6	44	45.3	5.1	16.0
Urinary Bladder	59	78.2	23	23.3	27.4	9.5

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-87: Yellow Medicine County Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	178	182.8	161	157.2	524.9	415.8
Brain††	2	2.2	2	1.6	~	~
Breast	1	0.4	38	46.0	~	90.1
Cervix Uteri	-	-	0	1.6	-	~
Colon and Rectum	12	17.2	23	18.2	34.6	51.9
Corpus and Uterus, NOS	-	-	11	9.9	-	33.1
Esophagus	2	3.0	1	0.9	~	~
Hodgkin Lymphoma	1	0.9	1	0.7	~	~
Kaposi Sarcoma	0	0.1	0	0.0	~	~
Kidney and Renal Pelvis	10	6.8	4	4.1	29.4	~
Larynx	0	1.9	1	0.5	~	~
Leukemia	4	6.7	8	4.6	~	~
Liver††	2	2.3	2	1.0	~	~
Lung and Bronchus	22	22.5	24	19.9	66.8	62.6
Melanoma of the Skin	6	8.6	3	6.2	~	~
Mesothelioma	2	0.7	1	0.2	~	~
Myeloma	1	2.5	2	1.9	~	~
Non-Hodgkin Lymphoma	11	8.8	16	7.5	32.0	43.1
Oral Cavity and Pharynx	2	5.3	2	2.8	~	~
Ovary	-	-	3	4.4	-	~
Pancreas	2	4.0	3	3.9	~	~
Prostate	77	59.7	-	-	228.9	-
Soft Tissues	1	1.1	2	1.0	~	~
Stomach	2	2.5	1	1.6	~	~
Testis	0	1.5	-	-	~	-
Thyroid	0	1.7	6	4.0	~	~
Urinary Bladder	11	13.8	2	4.4	32.2	~

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

Table IV-88: Northeastern Region‡ Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	5,406	5,347.7	4,484	4,523.2	560.0	415.3
Brain††	67	66.8	41	48.7	7.7	4.7
Breast	17	12.8	1,309	1,372.2	1.8	123.1
Cervix Uteri	-	-	61	51.3	-	7.7
Colon and Rectum	499	487.7	474	476.3	51.9	40.8
Corpus and Uterus, NOS	-	-	308	304.5	-	27.8
Esophagus	110	88.0	24	25.2	10.9	1.9
Hodgkin Lymphoma	28	28.0	20	22.3	3.3	2.7
Kaposi Sarcoma	0	3.3	1	0.7	~	~
Kidney and Renal Pelvis	198	204.6	112	119.7	20.8	10.1
Larynx	64	57.8	22	13.8	6.4	2.1
Leukemia	177	188.6	104	122.2	18.6	9.5
Liver††	52	68.1	28	28.9	5.2	2.5
Lung and Bronchus	692	643.9	587	565.7	70.6	51.7
Melanoma of the Skin	241	252.6	166	192.0	25.4	18.2
Mesothelioma	42	19.5	7	6.0	4.5	~
Myeloma	64	72.6	38	51.8	6.7	3.3
Non-Hodgkin Lymphoma	252	252.4	232	205.9	27.2	20.6
Oral Cavity and Pharynx	184	159.3	80	78.8	19.1	7.1
Ovary	-	-	137	132.1	-	12.7
Pancreas	123	115.2	118	105.4	12.8	10.1
Prostate	1,730	1,801.3	-	-	172.6	-
Soft Tissues	29	32.3	23	28.3	3.6	2.5
Stomach	81	69.3	46	40.8	8.5	3.9
Testis	48	49.8	-	-	7.3	-
Thyroid	49	51.6	98	133.1	5.2	12.3
Urinary Bladder	411	376.2	130	115.9	43.6	11.3

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

‡See Appendix C for regional definitions.

Table IV-89: Northwestern Region‡ Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	3,190	3,152.5	2,516	2,646.2	559.0	399.5
Brain††	38	39.9	31	29.3	6.8	5.6
Breast	6	7.6	758	799.5	~	122.4
Cervix Uteri	-	-	41	30.8	-	8.3
Colon and Rectum	311	287.6	294	278.8	54.7	43.0
Corpus and Uterus, NOS	-	-	170	176.6	-	27.4
Esophagus	63	51.7	18	14.7	11.2	2.6
Hodgkin Lymphoma	11	16.9	14	13.3	2.2	2.8
Kaposi Sarcoma	1	1.9	1	0.4	~	~
Kidney and Renal Pelvis	107	120.4	79	69.9	19.0	12.7
Larynx	40	33.9	8	8.1	6.9	~
Leukemia	100	112.5	60	72.5	18.5	9.1
Liver††	31	39.7	10	16.9	5.6	1.5
Lung and Bronchus	413	379.7	290	330.0	71.3	44.7
Melanoma of the Skin	101	149.1	94	113.7	18.7	17.4
Mesothelioma	12	11.6	2	3.5	2.2	~
Myeloma	44	42.8	28	30.2	7.4	4.2
Non-Hodgkin Lymphoma	144	149.2	121	120.5	26.1	17.7
Oral Cavity and Pharynx	141	93.3	47	46.1	24.9	7.4
Ovary	-	-	66	76.8	-	10.8
Pancreas	67	67.8	64	61.7	11.7	8.9
Prostate	1,093	1,057.2	-	-	184.5	-
Soft Tissues	28	19.3	15	17.0	5.5	2.5
Stomach	39	41.0	23	24.0	7.0	3.7
Testis	23	30.4	-	-	5.3	-
Thyroid	25	30.5	68	79.2	4.7	13.0
Urinary Bladder	199	222.9	62	67.8	35.6	9.1

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

‡See Appendix C for regional definitions.

Table IV-90: Central Region‡ Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	10,314	10,191.3	8,402	8,564.6	562.9	409.1
Brain††	140	143.8	120	103.1	7.4	6.0
Breast	27	24.4	2,459	2,637.0	1.6	119.4
Cervix Uteri	-	-	108	115.3	-	5.8
Colon and Rectum	896	920.9	817	848.0	50.2	38.2
Corpus and Uterus, NOS	-	-	536	574.1	-	25.6
Esophagus	170	166.0	46	44.9	9.1	2.2
Hodgkin Lymphoma	59	64.6	52	50.5	3.1	2.8
Kaposi Sarcoma	2	7.6	0	1.4	~	~
Kidney and Renal Pelvis	444	401.8	282	225.2	23.7	13.8
Larynx	110	110.0	29	25.9	5.9	1.4
Leukemia	338	365.3	208	230.0	19.2	9.9
Liver††	109	130.6	38	52.9	5.8	1.8
Lung and Bronchus	1,250	1,196.9	1,105	1,024.7	70.0	54.0
Melanoma of the Skin	403	498.6	416	407.0	22.0	21.4
Mesothelioma	32	35.4	10	10.6	1.8	0.5
Myeloma	140	136.5	81	92.4	7.8	3.9
Non-Hodgkin Lymphoma	481	486.6	378	376.9	26.5	18.3
Oral Cavity and Pharynx	294	311.3	152	148.8	15.5	7.4
Ovary	-	-	228	252.1	-	11.1
Pancreas	217	217.0	173	187.5	11.8	8.3
Prostate	3,611	3,373.7	-	-	191.8	-
Soft Tissues	52	67.6	48	58.2	2.7	2.4
Stomach	140	129.7	71	73.8	7.9	3.4
Testis	128	131.4	-	-	6.8	-
Thyroid	108	111.1	331	302.4	5.8	17.5
Urinary Bladder	716	689.0	209	204.7	41.4	9.9

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

‡See Appendix C for regional definitions.

Table IV-91: West Central Region‡ Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	2,941	3,067.3	2,363	2,580.3	534.4	381.9
Brain††	41	37.7	19	27.8	7.9	3.8
Breast	10	7.4	698	770.1	2.1	116.6
Cervix Uteri	-	-	30	28.7	-	6.9
Colon and Rectum	302	283.0	288	278.8	55.6	40.3
Corpus and Uterus, NOS	-	-	159	169.3	-	25.2
Esophagus	58	50.3	10	14.6	10.3	1.2
Hodgkin Lymphoma	14	16.0	11	13.1	3.0	2.8
Kaposi Sarcoma	0	1.8	0	0.4	~	~
Kidney and Renal Pelvis	104	115.1	62	68.0	19.1	9.8
Larynx	31	32.6	7	7.8	5.5	~
Leukemia	108	110.3	71	71.7	20.3	11.1
Liver††	30	38.1	8	16.7	5.5	~
Lung and Bronchus	330	373.0	279	325.6	58.7	42.9
Melanoma of the Skin	134	144.4	118	108.5	25.9	23.5
Mesothelioma	11	11.7	4	3.6	2.0	~
Myeloma	50	42.0	44	30.1	9.4	6.3
Non-Hodgkin Lymphoma	121	146.2	107	119.3	22.5	16.3
Oral Cavity and Pharynx	85	89.7	27	45.0	15.4	4.5
Ovary	-	-	74	74.3	-	13.0
Pancreas	75	66.2	42	61.5	13.3	6.1
Prostate	996	1,018.4	-	-	175.5	-
Soft Tissues	11	18.6	16	16.4	2.2	2.2
Stomach	32	40.6	25	23.9	5.7	3.7
Testis	33	28.4	-	-	8.0	-
Thyroid	12	28.8	58	74.2	2.4	12.9
Urinary Bladder	228	223.3	71	67.8	40.7	9.9

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

‡See Appendix C for regional definitions.

Table IV-92: Southwestern Region‡ Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	3,657	3,727.7	3,142	3,198.9	547.5	411.0
Brain††	51	45.6	42	33.6	8.3	6.6
Breast	7	9.0	905	947.1	~	121.4
Cervix Uteri	-	-	38	34.5	-	7.3
Colon and Rectum	405	348.2	414	357.2	59.9	46.3
Corpus and Uterus, NOS	-	-	268	206.1	-	35.5
Esophagus	46	61.3	19	18.4	6.7	2.1
Hodgkin Lymphoma	25	19.0	11	14.5	4.9	1.9
Kaposi Sarcoma	2	2.3	0	0.6	~	~
Kidney and Renal Pelvis	152	139.4	74	83.9	23.1	9.7
Larynx	43	39.3	6	9.5	6.4	~
Leukemia	121	135.9	94	90.9	18.4	11.7
Liver††	30	46.5	15	20.9	4.5	1.6
Lung and Bronchus	405	453.6	302	402.7	59.6	38.9
Melanoma of the Skin	161	176.8	132	130.4	24.4	20.4
Mesothelioma	13	14.3	3	4.6	1.8	~
Myeloma	46	51.3	30	38.0	7.0	3.4
Non-Hodgkin Lymphoma	154	179.4	161	150.4	22.9	19.9
Oral Cavity and Pharynx	76	109.5	53	56.0	11.5	6.9
Ovary	-	-	79	91.1	-	10.2
Pancreas	64	80.6	73	77.7	9.4	8.4
Prostate	1,264	1,220.8	-	-	185.8	-
Soft Tissues	23	22.7	21	20.3	3.8	3.2
Stomach	51	50.1	30	30.6	7.2	3.7
Testis	45	33.5	-	-	9.9	-
Thyroid	34	35.0	115	87.1	5.6	20.3
Urinary Bladder	292	276.3	62	86.7	42.9	6.8

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

‡See Appendix C for regional definitions.

Table IV-93: South Central Region‡ Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	3,191	3,316.5	2,786	2,859.9	533.8	411.6
Brain††	39	43.8	29	31.8	6.6	5.1
Breast	5	8.0	813	856.0	~	122.5
Cervix Uteri	-	-	41	33.5	-	7.9
Colon and Rectum	316	305.0	337	306.1	52.5	44.4
Corpus and Uterus, NOS	-	-	193	186.5	-	28.8
Esophagus	55	54.3	21	15.9	9.1	2.9
Hodgkin Lymphoma	22	19.5	16	15.8	3.8	3.0
Kaposi Sarcoma	0	2.2	0	0.5	~	~
Kidney and Renal Pelvis	139	126.8	72	74.9	23.2	11.1
Larynx	26	35.3	8	8.5	4.3	~
Leukemia	101	120.0	72	79.9	17.2	10.2
Liver††	27	42.2	14	18.3	4.3	2.1
Lung and Bronchus	376	396.3	317	352.3	63.6	45.6
Melanoma of the Skin	181	159.8	117	125.1	30.8	20.2
Mesothelioma	7	12.2	1	3.9	~	~
Myeloma	47	45.0	37	32.8	8.0	5.1
Non-Hodgkin Lymphoma	155	159.1	134	131.5	26.2	19.0
Oral Cavity and Pharynx	89	99.5	41	50.0	14.5	5.7
Ovary	-	-	88	82.7	-	13.3
Pancreas	76	71.1	78	66.8	12.4	10.4
Prostate	1,035	1,089.2	-	-	170.4	-
Soft Tissues	22	21.2	24	18.7	3.8	3.8
Stomach	48	43.4	24	26.4	8.1	3.2
Testis	40	37.6	-	-	8.0	-
Thyroid	22	33.5	80	87.6	3.6	14.9
Urinary Bladder	207	235.5	61	74.1	35.2	8.0

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

‡ See Appendix C for regional definitions.

Table IV-94: Southeastern Region‡ Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	6,910	6,838.0	5,853	5,987.0	560.1	411.8
Brain††	84	92.2	89	68.4	6.9	6.9
Breast	12	16.4	1,818	1,815.1	1.0	129.5
Cervix Uteri	-	-	68	74.9	-	5.7
Colon and Rectum	647	627.1	601	623.9	53.0	39.2
Corpus and Uterus, NOS	-	-	377	394.4	-	25.9
Esophagus	112	112.0	38	32.5	8.9	2.5
Hodgkin Lymphoma	45	40.7	42	32.9	3.9	3.4
Kaposi Sarcoma	1	4.8	1	1.0	~	~
Kidney and Renal Pelvis	252	264.5	173	156.8	20.4	12.3
Larynx	57	73.1	11	17.8	4.5	0.8
Leukemia	274	247.3	149	164.7	22.4	10.0
Liver††	86	87.3	47	37.7	6.7	3.2
Lung and Bronchus	837	812.8	603	725.5	68.2	41.6
Melanoma of the Skin	462	331.9	361	270.7	37.7	28.8
Mesothelioma	14	24.7	6	7.8	1.2	~
Myeloma	93	92.4	57	67.0	7.5	3.9
Non-Hodgkin Lymphoma	324	328.3	243	270.6	26.6	16.1
Oral Cavity and Pharynx	211	206.8	82	104.5	16.5	5.7
Ovary	-	-	143	174.2	-	10.2
Pancreas	146	146.4	124	136.2	11.9	8.2
Prostate	2,124	2,245.2	-	-	168.9	-
Soft Tissues	41	44.2	39	39.8	3.1	2.9
Stomach	76	89.0	55	53.9	6.4	3.5
Testis	83	79.6	-	-	7.2	-
Thyroid	95	71.0	210	194.2	7.7	17.5
Urinary Bladder	514	479.3	146	150.5	43.0	9.2

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

‡See Appendix C for regional definitions.

Table IV-95: Metro Region‡ Minnesota observed and expected number of cancers diagnosed and average annual incidence rates by gender, all races combined, 2005-2009

Cancer Site	Males		Females		Average Annual Rate§	
	Observed	Expected†	Observed	Expected†	Males	Females
All Sites	31,945	32,048.0	30,565	29,854.7	553.2	427.2
Brain††	496	489.3	341	371.4	7.6	4.8
Breast	78	76.3	9,749	9,318.0	1.4	134.5
Cervix Uteri	-	-	423	441.1	-	5.9
Colon and Rectum	2,779	2,899.5	2,807	2,871.9	48.9	39.0
Corpus and Uterus, NOS	-	-	2,010	2,016.4	-	27.3
Esophagus	494	524.2	140	149.8	8.5	2.0
Hodgkin Lymphoma	228	228.3	185	189.3	3.4	2.6
Kaposi Sarcoma	45	28.0	7	5.0	0.6	~
Kidney and Renal Pelvis	1,278	1,301.3	721	776.7	20.6	10.2
Larynx	358	347.9	88	87.7	6.1	1.3
Leukemia	1,204	1,156.9	852	789.9	21.3	11.9
Liver††	513	427.7	211	178.8	8.2	3.0
Lung and Bronchus	3,605	3,653.7	3,644	3,400.3	66.3	53.6
Melanoma of the Skin	1,631	1,630.7	1,420	1,512.6	27.4	19.7
Mesothelioma	102	104.7	42	35.1	2.0	0.6
Myeloma	422	423.7	336	309.7	7.5	4.8
Non-Hodgkin Lymphoma	1,606	1,548.9	1,280	1,286.0	28.2	17.8
Oral Cavity and Pharynx	997	1,023.6	566	521.6	16.1	7.8
Ovary	-	-	956	889.6	-	13.2
Pancreas	673	676.6	649	624.4	11.9	9.2
Prostate	10,333	10,410.2	-	-	176.9	-
Soft Tissues	244	225.1	218	208.2	4.0	3.0
Stomach	399	402.8	249	251.7	7.1	3.5
Testis	492	501.4	-	-	6.9	-
Thyroid	401	385.7	1,156	1,159.1	6.0	16.1
Urinary Bladder	2,017	2,086.4	709	684.7	38.9	10.0

Source: MCSS December 2011 with Vintage 2009 population estimates. Cases were microscopically confirmed (1988+) or Death Certificate Only (1995+). *In situ* cancers except those of the urinary bladder were excluded. Ovary excludes borderline cases and histologies 8442, 8451, 8462, 8472 and 8473.

† Expected number of cases based on Minnesota statewide incidence rates 2005-2009.

†† Brain=brain and other nervous system; Liver=liver and intrahepatic bile duct.

§ Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population (19 age groups).

- Not applicable; sex-specific site.

~ Rates based on fewer than 10 cases are not presented.

‡See Appendix C for regional definitions.

Appendices

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Appendix A: Definitions for Cancer Incidence Data

MCSS collects information on all microscopically confirmed malignant and *in situ* tumors diagnosed in Minnesota residents, with the exception of basal and squamous cell carcinomas of non-genital skin sites and *in situ* cancers of the cervix. *In situ* cancers except those of the bladder are only included in stage-specific tables in Chapter III, and are excluded from all other tables. *In situ* bladder cancers are included with invasive bladder cancers and counts of all cancers sites combined because the distinction between *in situ* and invasive bladder cancers is often unclear, and some *in situ* bladder cancers can be life-threatening.

The anatomic site and histologic type reported for the cancer in the medical record or pathology report is coded according to the International Classification of Diseases for Oncology (ICD-O), developed by the World Health Organization. Cases diagnosed in 1988-1991 were coded to the first edition of ICD-O, cases diagnosed in 1992-2000 according to the second edition (ICD-O-2), and those cases diagnosed in 2001-2004 according to the third edition (ICD-O-3). These codes were then grouped according to conventions developed by the Surveillance, Epidemiology, and End Results (SEER) program of the National Cancer Registry.

Cancer	Anatomic site (ICD-O-3)	Histologic Type (ICD-O-3)
Oral Cavity and Pharynx		Excluding 9590-9989, 9050-9055, 9140
Lip	C000-C009	
Tongue	C019-C029	
Salivary Gland	C079-C089	
Floor of Mouth	C040-C049	
Gum and Other Mouth	C030-C039, C050-C059, C060-C069	
Nasopharynx	C110-C119	
Tonsil	C090-C099	
Oropharynx	C100-C109	
Hypopharynx	C129, C130-C139	
Other Oral Cavity and Pharynx	C140, C142-C148	
Digestive System		Excluding 9590-9989, 9050-9055, 9140
Esophagus	C150-C159	
Stomach	C160-C169	
Small Intestine	C170-C179	

Colon excluding Rectum	C180-C189, C260	
Rectum and Rectosigmoid Junction	C199, C209	
Anus, Anal Canal, and Anorectum	C210-C212, C218	
Liver and Intrahepatic Bile Duct	C220, C221	
Gallbladder	C239	
Other Biliary	C240-C249	
Cancer	Anatomic site (ICD-O-3)	Histologic Type (ICD-O-3)
Pancreas	C250-C259	
Retroperitoneum	C480	
Peritoneum, Omentum, and Mesentery	C481-C482	
Other Digestive Organs	C268-C269, C488	
Respiratory System		Excluding 9590-9989, 9050-9055, 9140
Nose, Nasal Cavity and Middle Ear	C300-C301, C310-C319	
Larynx	C320-C329	
Lung and Bronchus	C340-C349	
Pleura	C384	
Trachea, Mediastinum and Other Respiratory Organs	C339, C381-C383, C388, C390, C398, C399	
Mesothelioma	All sites	9050-9055
Bones and Joints	C400-C419	Excluding 9590-9989, 9050-9055, 9140
Soft Tissue including Heart	C380, C470-C479, C490-C499	Excluding 9590-9989, 9050-9055, 9140
Skin excluding Basal and Squamous		
Melanoma of the Skin	C440-C449	8720 – 8790
Other Non-Epithelial Skin	C440-C449	Excluding 8000-8005, 8010-8045, 8050-8084, 8090-8110, 8720-8790, 9590-9989, 9050-9055, 9140

Kaposi Sarcoma	All sites	9140
Breast	C500-C509	Excluding 9590-9989, 9050-9055, 9140
Female Genital System		Excluding 9590-9989, 9050-9055, 9140
Cervix Uteri	C530-C539	
Corpus and Uterus, NOS	C540-C549, C559	
Ovary	C569	
Vagina	C529	
Vulva	C510-C519	
Other Female Genital Organs	C570-C589	
Male Genital System		Excluding 9590-9989, 9050-9055, 9140
Prostate	C619	
Testis	C620-C629	
Penis	C600-C609	
Cancer	Anatomic site (ICD-O-3)	Histologic Type (ICD-O-3)
Other Male Genital Organs	C630-C639	
Urinary System		Excluding 9590-9989, 9050-9055, 9140
Urinary Bladder	C670-C679	
Kidney and Renal Pelvis	C649, C659	
Ureter	C669	
Other Urinary Organs	C680-C689	
Eye and Orbit	C690-C699	Excluding 9590-9989, 9050-9055, 9140
Brain and Other Nervous System		
Brain	C710-C719	Excluding 9530-9539, 9590-9989,

		9050-9055, 9140
Other Nervous System	C710-C719	9530-9539
	C700-C709, C720-C729	Excluding 9590-9989, 9050-9055, 9140
Endocrine System		Excluding 9590-9989, 9050-9055, 9140
Thyroid	C739	
Other Endocrine including Thymus	C379, C740-C749, C750-C759	
Lymphoma		
Hodgkin Lymphoma	All sites	9650-9667
Non-Hodgkin Lymphoma	C024, C098-C099, C111, C142, C379, C422, C770-C779	9590-9596, 9670-9671, 9673, 9675, 9678-9680, 9684, 9687, 9689-9691, 9695, 9698-9702, 9705, 9708-9709, 9714-9719, 9727-9729, 9823, 9827
	All sites except C024, C098-C099, C111, C142, C379, C422, C770-C779	9590-9596, 9670-9671, 9673, 9675, 9678-9680, 9684, 9687, 9689-9691, 9695, 9698-9702, 9705, 9708-9709, 9714-9719, 9727-9729
	All sites, except C024, C098-C099, C111, C142, C379, C420-C422, C424, C770-C779	9823, 9827
Multiple Myeloma	All sites	9731-9732, 9734
Leukemia		
Lymphocytic Leukemia		
Acute Lymphocytic Leukemia	All sites	9826, 9835-9837
Chronic Lymphocytic Leukemia	C420-C421, C424	9823
Other Lymphocytic Leukemia	All sites	9820, 9832-9834, 9940
Cancer	Anatomic site (ICD-O-3)	Histologic Type (ICD-O-3)

Myeloid and Monocytic Leukemia		
Acute Myeloid Leukemia	All sites	9840, 9861, 9866, 9867, 9871-9874, 9895-9897, 9910, 9920
Acute Monocytic Leukemia	All sites	9891
Chronic Myeloid Leukemia	All sites	9863, 9875, 9876, 9945, 9946
Other Myeloid/Monocytic Leukemia	All sites	9860, 9930
Other Leukemia		
Other Acute Leukemia	All sites	9801, 9805, 9931
Aleukemic, Subleukemic and NOS	All sites	9733, 9742, 9800, 9831, 9870, 9948, 9963, 9964
	C420-C421, C424	9827
Miscellaneous	All sites	9740-9741, 9750-9758, 9760-9769, 9950, 9960-9962, 9970, 9975, 9980, 9982-9987, 9989
	C420-C424, C760-C768, C770-C779, C809	Excluding 9590-9989, 9050-9055, 9140

Appendix B: Definitions for Cancer Mortality Data

Cancer mortality data on Minnesota residents were obtained from death certificates reported to the Minnesota Center for Health Statistics. The underlying cause of death was coded according to the Manual of the International Classification of Diseases (ICD), developed by the World Health Organization. From 1988 to 1998, the ninth revision of ICD was used, and starting with deaths occurring in 1999, the tenth revision was used. These codes are then grouped according to conventions developed by the Surveillance, Epidemiology, and End Results (SEER) program of the National Cancer Registry, given below.

Cancer	Anatomic site (ICD-9)	Anatomic site (ICD-10)
Oral Cavity and Pharynx		
Lip	140	C00
Tongue	141	C01-C02
Salivary Gland	142	C07-C08
Floor of Mouth	144	C04
Gum and Other Mouth	143, 145	C03, C05-C06
Nasopharynx	147	C11
Tonsil	146.0-146.2	C09
Oropharynx	146.3-146.9	C10
Hypopharynx	148	C12-C13
Other Oral Cavity and Pharynx	149	C14
Digestive System		
Esophagus	150	C15
Stomach	151	C16
Small Intestine	152	C17
Colon excluding Rectum	153,159.0	C18, C26.0
Rectum and Rectosigmoid Junction	154.0-154.1	C19-C20
Anus, Anal Canal, and Anorectum	154.2-154.3, 154.8	C21
Liver	155.0, 155.2	C22.0, C22.2-C22.4, C22.7, C22.9
Intrahepatic Bile Duct	155.1	C22.1
Gallbladder	156.0	C23

Other Biliary	156.1-156.2, 156.8-156.9	C24
Pancreas	157	C25
Retroperitoneum	158.0	C48.0
Peritoneum, Omentum, and Mesentery	158.8-158.9	C48.1-C48.2
Other Digestive Organs	159.8-159.9	C26.8-C26.9, C48.8
Cancer	Anatomic site (ICD-9)	Anatomic site (ICD-10)
Respiratory System		
Nose, Nasal Cavity, and Middle Ear	160	C30-C31
Larynx	161	C32
Lung and Bronchus	162.2-162.5, 162.8-162.9	C34
Pleura	163	C38.4
Trachea, Mediastinum, and Other Respiratory Organs	162.0, 164.2-164.3, 164.8-164.9, 165	C33, C38.1-C38.3, C38.8, C39
Mesothelioma	N/A	C45
Bones and Joints	170	C40-C41
Soft Tissue including Heart	164.1, 171	C47, C49, C38.0
Skin excluding Basal and Squamous		
Melanoma of the Skin	172	C43
Other Non-Epithelial Skin	173	C44
Kaposi Sarcoma	N/A	C46
Breast	174-175	C50
Female Genital System		
Cervix Uteri	180	C53
Corpus and Uterus, NOS	179, 182	C54-C55
Ovary	183.0	C56

Vagina	184.0	C52
Vulva	184.1-184.4	C51
Other Female Genital Organs	181, 183.2-183.5, 183.8-183.9, 184.8-184.9	C57-C58
Male Genital System		
Prostate	185	C61
Testis	186	C62
Penis	187.1-187.4	C60
Other Male Genital Organs	187.5-187.9	C63
Urinary System		
Bladder	188	C67
Kidney and Renal Pelvis	189.0-189.1	C64-C65
Ureter	189.2	C66
Other Urinary Organs	189.3-189.4, 189.8-189.9	C68
Cancer	Anatomic site (ICD-9)	Anatomic site (ICD-10)
Eye and Orbit	190	C69
Brain and Other Nervous System	191, 192	C70, C71, C72
Endocrine System		
Thyroid	193	C73
Other Endocrine, including Thymus	164.0, 194	C37, C74-C75
Lymphoma		
Hodgkin Lymphoma	201	C81
Non-Hodgkin Lymphoma	200, 202.0-202.2, 202.8-202.9	C82-C85, C96.3
Multiple Myeloma	203.0, 238.6	C90.0, C90.2
Leukemia		
Lymphocytic Leukemia		
Acute Lymphocytic Leukemia	204.0	C91.0
Chronic Lymphocytic	204.1	C91.1

Leukemia		
Other Lymphocytic Leukemia	202.4, 204.2, 204.8-204.9	C91.2-C91.4, C91.7, C91.9
Myeloid and Monocytic Leukemia		
Acute Myeloid Leukemia	205.0, 207.0, 207.2	C92.0, C92.4-C92.5, C94.0, C94.2
Acute Monocytic Leukemia	206.0	C93.0
Chronic Myeloid Leukemia	205.1	C92.1
Other Myeloid/Monocytic Leukemia	205.2-205.3, 205.8-205.9, 206.1-206.2, 206.8-206.9	C92.2-C92.3, C92.7, C92.9, C93.1-C93.2, C93.7, C93.9
Other Leukemia		
Other Acute Leukemia	208.0	C94.4, C94.5, C95.0
Aleukemic, Subleukemic and NOS	203.1, 207.1, 207.8, 208.1-208.2, 208.8-208.9	C90.1, C91.5, C94.1, C94.3, C94.7, C95.1, C95.2, C95.7, C95.9
Miscellaneous	159.1, 195-199, 202.3, 202.5-202.6, 203.8	C26.1, C76-C80, C88, C96.0-C96.2, C96.7, C96.9, C97

Appendix C: Minnesota Geographic Divisions

Table 1: Minnesota Regions

Region	Counties			
Metropolitan Minnesota (Metro)	Anoka Carver	Dakota Hennepin	Ramsey Scott	Washington
Southeastern Minnesota (SE)	Dodge Fillmore Freeborn	Goodhue Houston Mower	Olmsted Rice Steele	Wabasha Winona
South Central Minnesota (SC)	Blue Earth Brown Faribault	Le Sueur Martin	Nicollet Sibley	Waseca Watonwan
Southwestern Minnesota (SW)	Big Stone Chippewa Cottonwood Jackson Kandiyohi	Lac Qui Parle Lincoln Lyon Murray	Nobles Pipestone Redwood Renville	Rock Swift Yellow Medicine
Central Minnesota (Central)	Benton Cass Chisago Crow Wing	Isanti Kanabec McLeod Meeker	Mille Lacs Morrison Pine Sherburne	Stearns Todd Wadena Wright
West Central Minnesota (WC)	Clay Douglas	Grant Otter Tail	Pope Stevens	Traverse Wilkin
Northwestern Minnesota (NW)	Becker Beltrami Clearwater Hubbard	Kittson Lake of the Woods Mahnommen	Marshall Norman Pennington	Polk Red Lake Roseau
Northeastern Minnesota (NE)	Aitkin	Carlton Cook	Itasca Koochiching	Lake St. Louis

Table 2: Minnesota CHSDA Counties

Aitkin	Hubbard	Pine
Becker	Itasca	Polk
Beltrami	Kanabec	Redwood
Carlton	Koochiching	Renville
Cass	Lake of the Woods	Roseau
Chippewa	Mahnomen	St. Louis
Clearwater	Marshall	Scott
Cook	Mille Lacs	Traverse
Goodhue	Norman	Yellow Medicine
Houston	Pennington	

Table 3: Metropolitan and Micropolitan Statistical Areas, Minnesota, 2007

Statistical Area	Designation	County or Counties
Micropolitan	Albert Lea	Freeborn
	Alexandria	Douglas
	Austin	Mower
	Bemidji	Beltrami
	Brainerd	Cass, Crow Wing
	Faribault-Northfield	Rice
	Fairmont	Martin
	Fergus Falls	Otter Tail
	Hutchinson	McLeod
	Marshall	Lyon
	New Ulm	Brown
	Owatonna	Steele
	Red Wing	Goodhue
	Willmar	Kandiyohi
	Winona	Winona
Worthington	Nobles	
Metropolitan	Duluth	Carlton, St. Louis
	Mankato-North Mankato	Blue Earth, Nicollet
	Minneapolis-St Paul-Bloomington	Anoka, Carver, Chisago, Dakota, Hennepin, Isanti, Ramsey, Scott, Sherburne, Washington, Wright
	Rochester	Dodge, Olmsted, Wabasha
	St Cloud	Benton, Stearns

Appendix D: Glossary

Age-Adjusted Rate: A rate that has been adjusted to control for differences in age distribution between populations. It is a weighted average of age-specific rates, with the proportion of individuals in the corresponding age groups of the standard population functioning as the weights. All age-adjusted rates in this report are age-adjusted to the 2000 U.S. population and are expressed per 100,000 persons.

Age-Specific Rate: The rate of occurrence of a cancer for a specific age group (the number of cancers occurring during a specified period of time in a particular age group divided by the total number of individuals in the age group and time period).

Annual Percent Change (APC): The average percent change in the age-adjusted rate each year over a specified period of time. See also Appendix E.

Artifact: Any artificial product. In epidemiology, any observation that has been introduced by the methods used for data collection or data analysis.

Benign: A tumor or abnormal cell growth that is not malignant and unlikely to metastasize.

Cancer: A group of diseases characterized by rapid, uncontrolled cell growth, with a tendency to spread throughout the body.

Cancer Incidence: The number of new cases of cancer diagnosed during a specified period of time.

Cancer Incidence Rate: The rate at which newly diagnosed cancers occur in a population (the number of cancers occurring in a defined period of time divided by the total number of people in the population during that period of time).

Cancer Mortality: The number of deaths due to cancer during a specified period of time, regardless of when the disease was diagnosed.

Cancer Mortality Rate: The rate at which cancer-related deaths occur in a population (the number of deaths occurring in a defined period of time divided by the total number of people in the population during that period of time).

Cancer Registry: An ongoing system for the registration and follow-up of patients who develop cancer.

- **Hospital-Based Cancer Registry:** A cancer registry that uses hospital records as the primary data source for identification of cases.
- **Pathology-Based Cancer Registry:** A cancer registry that uses pathology laboratory records as the primary data source for identification of cases.
- **Population-Based Cancer Registry:** A cancer registry that attempts to collect information on at least 95 percent of the incident cancers occurring in the individuals residing within a defined geopolitical region. The MCSS is a population-based cancer registry.

Carcinoma: A malignant tumor of epithelial origin.

Case-Control Study: A study in which individuals with a particular condition such as cancer (referred to as cases) are selected for comparison with individuals in whom the condition is absent (controls). Cases and controls are compared with respect to past exposures, risk factors, or attributes thought to be relevant to the development of the condition under study.

CDC: Centers for Disease Control and Prevention.

Clinical Diagnosis: Cancers that are not histologically confirmed, but are instead diagnosed through other means—for example, through imaging procedures such as CT scans. The MCSS does not collect information on cancers that are only clinically diagnosed and have no microscopic confirmation.

Cumulative Lifetime Risk of Cancer: As calculated in this report, this is the estimated percentage of newborns in Minnesota in 2000-2002 who would be diagnosed with cancer over their entire lifetime, if cancer incidence and mortality and all-cause mortality rates do not change from those in 2000-2002. See also Appendix E.

Death Clearance: A quality control activity that links the MCSS database of incident cancers with Minnesota cancer-related death certificates. Any death certificates that do not have a corresponding match in the MCSS database indicate a cancer that may have been missed. MCSS staff members follow up on each of these cases to see if the cancer should have been included in the database.

Epidemiology: The study of health conditions (e.g., cancers, injuries, etc.) by looking for patterns of occurrence by time, place, or person in the hopes of finding causes or identifying control measures for the condition.

Etiology: The study or theory of the causation of any disease; the sum of knowledge regarding causes.

Expected Number of Cases: The number of cases (of a cancer) expected in a given population in a given time period if the incident rates for that cancer were the same as the rates in a comparison population, adjusting for age differences of the two populations.

Five-year Relative Survival: The estimated proportion of persons who will be alive five years following diagnosis, after adjusting for expected mortality from other causes.

Histology: The type of tissue in which a tumor originated, e.g., glandular tissue, connective tissue, etc.

ICD-9 and ICD-10: The ninth and tenth revisions of the International Classification of Diseases used to code and classify underlying cause of death.

ICD-O-FT, ICD-O-2 and ICD-O-3: The 1987 Field Trial, second and third revisions of the International Classifications of Diseases for Oncology used to code and classify anatomic site and histologic type of cancer cases.

In Site: See **Stage at diagnosis**.

Invasive: The tendency of a tumor to spread to adjacent healthy tissues. Technically, “invasive” means the carcinoma has penetrated the basement membranes and is close to blood vessels.

Malignant: Tending to become progressively worse, to spread, and invade other tissues.

MCHS: Minnesota Center for Health Statistics.

MCSS: Minnesota Cancer Surveillance System.

MDH: Minnesota Department of Health.

Median Age: As calculated in this report, the midpoint of the age distribution of group of persons diagnosed with or dying of cancer during the 3-year period 2000-2002; that is, the age at which 50 percent of cases or deaths are younger and 50 percent are older.

Metropolitan and Micropolitan Statistical Areas: Geographic entities defined by the [Office of Management and Budget](#) for use by Federal statistical agencies, including the Census Bureau, in collecting, tabulating, and publishing Federal statistics. The term "Core Based Statistical Area" is a collective term for both metro and micro areas. A metropolitan area contains a core urban area of 50,000 or more population, and a micropolitan area contains an urban core of at least 10,000 (but less than 50,000) population. Each metropolitan or micropolitan area consists of one or more counties and includes the counties containing the core urban area, as well as any adjacent counties that have a high degree of social and economic integration (as measured by commuting to work) with the urban core. Minnesota metropolitan and micropolitan areas in 2007 and the counties included in each are listed in Appendix C, Table 3. For more information, see www.census.gov/population/metro/.

Microscopic Confirmation: A tumor of which at least a piece has been examined microscopically and diagnosed by a pathologist or other specialist.

NAACCR: North American Association of Central Cancer Registries.

NPCR: National Program of Cancer Registries.

Observed Number of Cases: The actual (also called crude) number of cases of a cancer recorded for a given population for a given period of time.

Pathology: The branch of medicine that studies the essential nature of disease, especially the structural changes in tissues or organs associated with disease.

Prevalence: The number of people alive on a certain date who have been diagnosed with cancer at any time in their lives. Prevalence considers both newly diagnosed and previously diagnosed cancers.

Primary Site (cancer site): The place in the body where the cancer first arose.

Quality Control: The steps taken to avoid making errors and to find and correct errors before the data are added to the master database.

Record Linkage: The process of comparing two records from different sources, deciding if the records correspond to the same individual or entity, and then taking some action based on that decision.

Risk Factor: An attribute or exposure that is associated with an increased probability of developing a condition or disease, but does not necessarily imply cause and effect.

SEER (Surveillance, Epidemiology, and End Results): An ongoing, population-based cancer surveillance system sponsored by the National Cancer Institute that monitors cancer incidence, treatment, and follow-up in nine or thirteen U.S. regions comprising approximately 10 or 14 percent of the U.S. population depending on which years of data are examined. Since a cancer registry covering the entire U.S. does not exist, cancer incidence data from SEER are widely cited as national data.

Stage at diagnosis: The extent to which the cancer has spread at the time of diagnosis. Two well-known staging systems include the General Summary Stage system, developed for the SEER Program, and the TNM staging system, developed by the American Joint Committee on Cancer. For this report, the following terms describing cancer stage are used:

- ***In situ*:** earliest stage of cancer development in which the tumor has not infiltrated the tissue of the organ in which they are growing;
- **Localized:** tumor has invaded the tissue of the organ, but has not spread beyond the organ in which the tumor originated;
- **Regional:** tumor has spread beyond the organ in which the tumor originated to adjacent lymph nodes or tissues;
- **Distant:** most advanced stage of cancer development in which the tumor has spread, or metastasized, beyond the organ in which the tumor originated to organs in other parts of the body;
- **Unknown:** unstaged tumors due to insufficient information recorded in the medical record to determine the extent of the tumor at the time of diagnosis.

Surveillance: The systematic collection, analysis, and interpretation of data pertaining to the occurrence of specific diseases (in this report, cancer).

- **Active Surveillance:** The reporters of disease are contacted at regular intervals and specifically asked about the occurrence of the disease under surveillance. This is considered the most ideal and complete form of surveillance.
- **Passive Surveillance:** Reporting of the disease in question is initiated by the reporting source.

Tumor: A mass resulting from the abnormal growth of cells. Tumors may either be benign (with little tendency to spread throughout the body) or malignant (with a tendency to spread throughout the body). Malignant tumors are synonymous with cancer.

Underlying Cause of Death: The disease or injury that initiated events resulting in death.

Appendix E: Statistical Methods

Age-Adjusted Rates

Age-adjusted rates were calculated using the National Cancer Institute, Surveillance Research Program, SEER*Stat software (<http://seer.cancer.gov/seerstat/index.html>) version 7.0.5. The Tiwari et al 2006 modification for calculating confidence intervals was used. Age-adjustment was to the 2000 U.S. standard population (19 age groups – Census P25-113).

Cases diagnosed with histology codes 9950, 9960-9962, 9980-9984, and 9989 were defined as a “borderline malignancy” under ICD-O-2 coding rules and “invasive” under ICD-O-3. In addition, cases diagnosed with cell types 8442, 8451, 8462, 8472, and 8473 were defined as “invasive” under ICD-O-2 but as having “uncertain behavior” under ICD-O-FT and ICD-O-3. For consistency over time and with SEER published data, tumors with these histologies are not included in this report, but are available on request. Please see Chapter I, Coding and Inclusion of Cancer Cases, for more information.

$$aarate_{x-y} = \sum_{i=x}^y \left[\left(\frac{count_i}{pop_i} \right) \times 100,000 \times \left(\frac{std_{mali}}{\sum_{j=x}^y std_{mali}} \right) \right]$$

Standard Population

2000 U.S. Standard Million Population

Age group (years)	Population
0	13,818
1-4	55,317
5-9	72,533
10-14	73,032
15-19	72,169
20-24	66,478
25-29	64,529
30-34	71,044
35-39	80,762
40-44	81,851
45-49	72,118
50-54	62,716
55-59	48,454
60-64	38,793
65-69	34,264
70-74	31,773
75-79	26,999
80-84	17,842
85+	15,508

Trends/Annual Percent Change

Cancer trends were calculated using the Joinpoint Regression Program, National Cancer Institute, Surveillance Research Program (<http://srab.cancer.gov/joinpoint>) version 3.5.2. Program parameters were selected to match those used by SEER, with a maximum of four joinpoints. Joinpoint applies a statistical algorithm to annual age-adjusted cancer rates and their standard errors to find the optimal number and locations (i.e., points in time) where the trend significantly changed, called a joinpoint. The regression model describes a continuous, piecewise, exponential function where intervals are connected at a joinpoint. The trend during the interval between joinpoints is given as the Annual Percent Change (APC) in the rate. To simplify comparisons between groups during recent periods, joinpoint regression also provides a summary measure of the trend during the most recent five- and ten-year periods, referred to as the average annual percent changes (AAPC). Please note that the AAPCs have fixed intervals, while the APCs vary based on identified changes in trends. If no joinpoints are identified, the AAPC is the same as the APC. If joinpoints are identified during the specified five- or ten-year period, the AAPC is a weighted average of the APCs, with the weights equal to the lengths of each interval. Trends are not calculated if one or more years have no cases (for incidence trends) or deaths (for mortality trends). For more detailed information, see <http://surveillance.cancer.gov/joinpoint>.

Cumulative Lifetime Risk

The cumulative lifetime risk of developing or dying from cancer was calculated using the National Cancer Institute, Surveillance Research Program, DevCan software program (<http://srab.cancer.gov/devcan>) version 6.4.1, using site-, sex-, and age-specific cancer incidence, cancer mortality and all cause mortality in Minnesota for 2006-2008. It represents the estimated percentage of Minnesotans born in 2006-2008 who would develop cancer during their lifetimes, if cancer incidence and mortality rates and all cause mortality rates in the state do not change from those in 2004-2008.

Statistical Significance

Statistical significance was determined at the $p = 0.05$ level using methods incorporated into SEER*Stat software programs.

Prevalence

MCSS cannot directly calculate prevalence for Minnesota because MCSS has only registered cancers in Minnesota since 1988 and does not have complete follow-up information on the vital status of the individual.

To estimate Minnesota cancer prevalence, the age-, sex- and site-specific cancer prevalence percents (5-year and 33-year) for the white population in the nine regions participating in the SEER Program since 1975 were calculated in limited duration prevalence sessions in SEER*Stat version 7.0.4 for all sites combined and the most common cancers. Prevalence percents were multiplied by the corresponding age- and sex-specific population estimates for Minnesota on January 1, 2008, obtained by averaging estimates for the mid-year of 2007 and 2008 obtained from SEER.

To adjust for generally lower cancer rates in Minnesota, the resulting numbers were multiplied by age-, sex- and site-specific rate ratios for cancer incidence in Minnesota and in the SEER 9 Region white population during 2004-2008. Age-specific estimates were summed for site and sex totals and rounded to the nearest ten persons. The prevalence estimates for males and females were summed to estimate prevalence for both sexes combined. Completeness indexes for SEER 9 whites were estimated in ComPrev (<http://srab.cancer.gov/comprev>) and applied to the 33-year estimates for complete prevalence.

Statistical Methods

The prevalence data presented here are estimates, not actual counts of Minnesotans living with cancer. Adjusting the prevalence percents for the white population in the nine SEER regions by known differences in cancer incidence between Minnesota and SEER decreased cancer prevalence estimates for Minnesota. This is appropriate given that overall cancer incidence has historically been lower in Minnesota than in the geographic areas participating in the SEER program.

However, other factors affecting cancer prevalence could not be adjusted for. If Minnesotans have higher cancer survival rates than the SEER 9 Region white population, our prevalence estimates will be too low. MCSS is not yet able to calculate cancer survival rates for Minnesotans because of incomplete follow-up information. However, given the recognized high quality of health care in Minnesota, higher survival rates in Minnesota may occur. Similarly, Minnesotans have a higher life expectancy than many other states, due in part to having the lowest heart disease mortality rate in the nation. Since Minnesotans live longer and therefore have more “opportunity” to develop cancer, these prevalence estimates may be too low. It is therefore likely that the prevalence estimates presented here represent the lower limits of actual prevalence.